



ARCHITECTS

Capital Bank Plaza

333 Fayetteville Street, Suite 225

Raleigh NC 27601

# PROJECT MANUAL

VOLUME 2 of 3

Divisions 02 thru 19

## Harnett County Schools

1008 South 11th Street

Lillington, North Carolina 27546

## Multiple Schools - Additions / Renovations

Architect's Project Number: 02110.000

### Locations:

#### Highland Elementary School

1915 Buffalo Lake Road

Sanford, NC 27332

#### Overhills Elementary School

2626 Ray Road

Spring Lake, NC 28390

#### Harnett Primary School

800 W Harnett Street

Dunn, NC 28334

August 15, 2022

Bid Set

Set Number: \_\_\_\_\_



**SECTION 00 01 01****PROJECT TITLE PAGE**

**Date** August 15, 2022  
Bid Set

**Project Identification** Multiple Schools - Additions / Renovations  
Architect's Project Number: 02110.000

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Sanford, NC 27332

Overhills Elementary School  
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Spring Lake, NC 28390

Harnett Primary School  
800 W Harnett Street  
Dunn, NC 28334

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**Civil Engineer**

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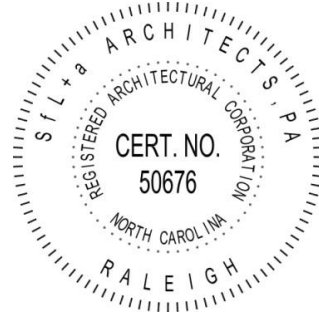
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SEALS PAGE

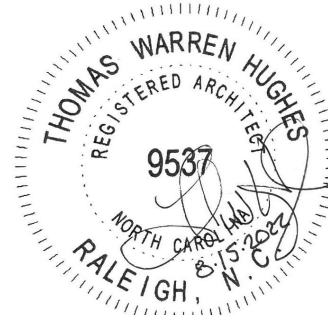
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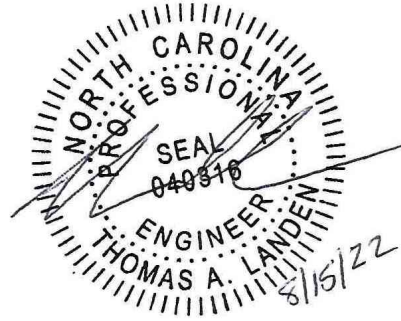


Fire Protection Engineering  
Plumbing Engineering

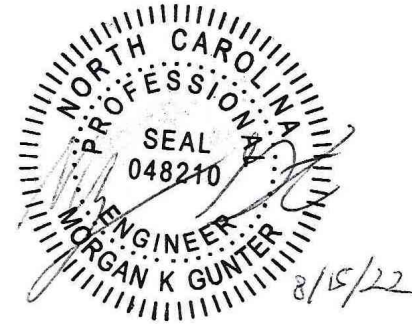
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**END OF SECTION**

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Section Titles followed by an underscore and uppercase letters apply only to the following Work Sites:

_HES =	Highland Elementary School
_OES =	Overhills Elementary School
_HPS =	Harnett Primary School
_HES-HPS =	Highland Elementary School & Harnett Primary School
_HES-OES =	Highland Elementary School & Overhills Elementary School

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00 21 13 - Information for Bidders
00 31 00 - Available Project Information <ul style="list-style-type: none"> <li>• Geotechnical Exploration Information_HES</li> <li>• Geotechnical Exploration Information_OES</li> <li>• Geotechnical Exploration Information_HPS</li> </ul>
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00 43 39.20 - AFFIDAVIT B - Intent to Perform Contract with Own Workforce (Attach to Bid)
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00 43 39.40 - AFFIDAVIT D - Good Faith Efforts
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00 62 76.13 - Sales Tax Form
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**PROCUREMENT AND CONTRACTING REQUIREMENTS GROUP****DIVISION 00 - PROCUREMENT AND CONTRACTING REQUIREMENTS**

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03 20 00 - Concrete Reinforcing

03 30 00 - Cast-In-Place Concrete

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04 20 00 - Unit Masonry

04 72 00 - Cast Stone Masonry

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07 42 93.13 - Metal Soffit Panels
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07 84 00 - Firestopping
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07 95 13 - Expansion Joint Cover Assemblies

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09 51 13 - Acoustical Panel Ceilings
09 65 00 - Resilient Flooring
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09 68 13 - Tile Carpeting
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10 44 00 - Fire Protection Specialties
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<b><u>Legend</u></b>	
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**PROCUREMENT AND CONTRACTING REQUIREMENTS GROUP**

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21 01 05 - Fire Protection Submittal Requirements_HES-OES
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21 05 48 - Vibration Controls For Fire-Suppression Piping And Equipment_HES-OES
21 13 00 - Automatic Sprinkler Systems_HES-OES
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22 05 53 - Identification For Plumbing Systems
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23 05 19 - Meters And Gages For HVAC Piping
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23 05 48 - Vibration And Seismic Controls For HVAC Piping And Equipment_HPS
23 05 53 - Identification For HVAC Piping And Equipment
23 05 93 - Testing, Adjusting, And Balancing For HVAC
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23 09 00 - Direct Digital Control System_HPS
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23 37 13 - Diffusers, Registers, And Grilles
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26 05 19 - Low-Voltage Electrical Power Conductors And Cables
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26 05 26 - Grounding And Bonding For Electrical Systems
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26 05 53 - Identification For Electrical Systems
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26 09 43 - Network Lighting Controls
26 22 00 - Low-Voltage Transformers
26 24 13 - Switchboards_HPS
26 24 16 - Panelboards
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26 28 13 - Fuses
26 28 16 - Enclosed Switches And Circuit Breakers
26 32 13 - Engine Generators_HES
26 43 13 - Transient-Voltage Suppression For Low-Voltage Electrical Circuits (SPD)
26 51 16 - Lighting

**DIVISION 27 - COMMUNICATIONS**

27 53 19 - Emergency Responder Radio Antenna-Repeater System_HES-HPS
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28 31 11 - Digital, Addressable Fire-Alarm System
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31 23 33 - Excavation, Trenching, and Backfilling for Utilities Systems
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33 30 00 - Sanitary Sewerage - Harnett Regional Standards_HES-OES
33 42 11 - Stormwater Gravity Piping

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Not Used

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**SECTION 03 10 00**  
**CONCRETE FORMING AND ACCESSORIES**

**PART 1 GENERAL****1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

**1.2 SUMMARY**

- A. Section Includes:
1. Formwork for cast-in place concrete.
  2. Shoring, bracing, and anchorage.
  3. Form accessories.
  4. Form stripping.
- B. Related Sections:
1. Section 03 30 00 - Cast-In-Place Concrete.
  2. Section 04 20 00 - Unit Masonry: Product requirements for masonry accessories for placement by this Section.
  3. Section 05 50 00 - Metal Fabrications: Product requirements for metal fabrications for placement by this Section.

**1.3 REFERENCES**

- A. American Concrete Institute:
1. ACI 117 - Standard Specifications for Tolerances for Concrete Construction and Materials.
  2. ACI 301 - Specifications for Structural Concrete.
  3. ACI 318 - Building Code Requirements for Structural Concrete.
  4. ACI 347 - Guide to Formwork for Concrete.
- B. American Forest and Paper Association:
1. AF&PA - National Design Specifications for Wood Construction.
- C. The Engineered Wood Association:
1. APA/EWA PS 1 - Voluntary Product Standard for Construction and Industrial Plywood.
- D. ASTM International:
1. ASTM D1751 - Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).
  2. ASTM E96 - Standard Test Methods for Water Vapor Transmission of Materials.

**1.4 SUBMITTALS**

- A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.
- B. Shop Drawings:
1. Submit formwork, shoring, and reshoring shop drawings.
  2. Indicate the following:
    - a. Pertinent dimensions, openings, methods of construction, types of connections, materials, joint arrangement and details, ties and shores, location of framing, studding and bracing, and temporary supports.

- b. Sequence and timing of erection and stripping assumed compressive strength at time of stripping, height of lift and height of drop during placement.
  - c. Procedure and schedule for removal of shores and installation and removal of reshores.
- C. Product Data: Submit data on void form materials and installation requirements.

### 1.5 QUALITY ASSURANCE

- A. Perform Work in accordance with ACI 347, ACI 301 and ACI 318.
- B. For wood products furnished for work of this Section, comply with AF&PA.

### 1.6 QUALIFICATIONS

- A. Design formwork under direct supervision of Professional Engineer experienced in design of this Work and licensed in State of North Carolina.

### 1.7 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 - Product Requirements: Products storage and handling requirements.
- B. Store off ground in ventilated and protected manner to prevent deterioration from moisture.

### 1.8 COORDINATION

- A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.
- B. Coordinate this Section with other sections of work, requiring attachment of components to formwork.

## PART 2 PRODUCTS

### 2.1 WOOD FORM MATERIALS

- A. Form Materials: At discretion of Contractor.
- B. Lumber Forms:
  - 1. Application: Use for edge forms and unexposed finish concrete.
  - 2. Boards: 6 inches or 8 inches in width, ship lapped or tongue and groove, "Standard" Grade Douglas Fir, conforming to WCLIB Standard Grading Rules for West Coast Lumber. Surface boards on four sides.
- C. Plywood Forms:
  - 1. Application: Use for exposed finish concrete.
  - 2. Forms: Conform to PS 1; full size 4 x 8 feet panels; each panel labeled with grade trademark of APA/EWA.
  - 3. Plywood for Surfaces to Receive Membrane Waterproofing: Minimum of 5/8 inch thick; APA/EWA "B-B Plyform Structural I Exterior" grade.
  - 4. Plywood where "Smooth Finish" is required, as indicated on Drawings: APA/EWA "HD Overlay Plyform Structural I Exterior" grade, minimum of 3/4 inch thick.

### 2.2 PREFABRICATED FORMS

- A. Preformed Steel Forms: Minimum 16 gage matched, tight fitting, stiffened to support weight of concrete without deflection detrimental to tolerances and appearance of finished surfaces.

**2.3 FORMWORK ACCESSORIES**

- A. Form Release Agent: Colorless mineral oil that will not stain concrete, or absorb moisture, or impair natural bonding or color characteristics of coating intended for use on concrete.
- B. Bituminous Joint Filler: ASTM D1751.
- C. Nails, Spikes, Lag Bolts, Through Bolts, Anchorages: Size, strength and character to maintain formwork in place while placing concrete.

**PART 3 EXECUTION****3.1 EXAMINATION**

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify lines, levels, and centers before proceeding with formwork. Verify dimensions agree with Drawings.
- C. When formwork is placed after reinforcement resulting in insufficient concrete cover over reinforcement before proceeding, request instructions from Architect/Engineer.

**3.2 PREPARATION**

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this section.
- B. Prepare materials to be installed and equipment to be used during installation.

**3.3 INSTALLATION**

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Earth Forms:
  - 1. Trench earth forms neatly, accurately, and at least 2 inches wider than footing widths indicated on Drawings.
  - 2. Trim sides and bottom of earth forms.
  - 3. Construct wood edge strips at top of each side of trench to secure reinforcing and prevent trench from sloughing.
  - 4. Form sides of footings where earth sloughs.
  - 5. Tamp earth forms firm and clean forms of debris and loose material before depositing concrete.
- C. Formwork - General:
  - 1. Provide top form for sloped surfaces steeper than 1.5 horizontal to 1 vertical to hold shape of concrete during placement, unless it can be demonstrated that top forms can be omitted.
  - 2. Construct forms to correct shape and dimensions, mortar-tight, braced, and of sufficient strength to maintain shape and position under imposed loads from construction operations.
  - 3. Camber forms where necessary to produce level finished soffits unless otherwise shown on Drawings.
  - 4. Carefully verify horizontal and vertical positions of forms. Correct misaligned or misplaced forms before placing concrete.
  - 5. Complete wedging and bracing before placing concrete.
- D. Forms for Smooth Finish Concrete:
  - 1. Use steel, plywood or lined board forms.

2. Use clean and smooth plywood and form liners, uniform in size, and free from surface and edge damage capable of affecting resulting concrete finish.
  3. Install form lining with close-fitting square joints between separate sheets without springing into place.
  4. Use full size sheets of form lines and plywood wherever possible.
  5. Tape joints to prevent protrusions in concrete.
  6. Use care in forming and stripping wood forms to protect corners and edges.
  7. Level and continue horizontal joints.
  8. Keep wood forms wet until stripped.
- E. Erect formwork, shoring, and bracing to achieve design requirements, in accordance with requirements of ACI 301 and ACI 318.
- F. Arrange and assemble formwork to permit dismantling and stripping. Do not damage concrete during stripping. Permit removal of remaining principal shores.

### 3.4 APPLICATION - FORM RELEASE AGENT

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Apply form release agent on formwork in accordance with manufacturer's recommendations.
- C. Apply prior to placement of reinforcing steel, anchoring devices, and embedded items.
- D. Do not apply form release agent where concrete surfaces are indicated to receive finishes or applied coverings that are affected by agent. Soak inside surfaces of untreated forms with clean water. Keep surfaces coated prior to placement of concrete.
- E. Reuse and Coating of Forms: Thoroughly clean forms and reapply form coating before each reuse. For exposed work, do not reuse forms with damaged faces or edges. Apply form coating to forms in accordance with manufacturer's specifications. Do not coat forms for concrete indicated to receive "scored finish". Apply form coatings before placing reinforcing steel.

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

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Install formed openings for items to be embedded in or passing through concrete work.
- C. Locate and set in place items required to be cast directly into concrete.
- D. Coordinate with Work of other sections in forming and placing openings, slots, reglets, recesses, sleeves, bolts, anchors, other inserts, and components of other Work.
- E. Install accessories straight, level, and plumb. Ensure items are not disturbed during concrete placement.
- F. Arrangement: Arrange formwork to allow proper erection sequence and to permit form removal without damage to concrete.
- G. Construction Joints:
  1. Install surfaced pouring strip where construction joints intersect exposed surfaces to provide straight line at joints.
  2. Just prior to subsequent concrete placement, remove strip and tighten forms to conceal shrinkage.
  3. Show no overlapping of construction joints. Construct joints to present same appearance as butted plywood joints.
  4. Arrange joints in continuous line straight, true and sharp.
- H. Embedded Items:

1. Make provisions for pipes, sleeves, anchors, inserts, reglets, anchor slots, nailers, water stops, and other features.
  2. Do not embed wood or uncoated aluminum in concrete.
  3. Obtain installation and setting information for embedded items furnished under other Specification sections.
  4. Securely anchor embedded items in correct location and alignment prior to placing concrete.
  5. Verify conduits and pipes, including those made of coated aluminum, meet requirements of ACI 318 for size and location limitations.
- I. Openings for Items Passing Through Concrete:
1. Frame openings in concrete where indicated on Drawings. Establish exact locations, sizes, and other conditions required for openings and attachment of work specified under other sections.
  2. Coordinate work to avoid cutting and patching of concrete after placement.
  3. Perform cutting and repairing of concrete required as result of failure to provide required openings.
- J. Screeds:
1. Set screeds and establish levels for tops of concrete slabs and levels for finish on slabs.
  2. Slope slabs to drain where required or as shown on Drawings.
  3. Before depositing concrete, remove debris from space to be occupied by concrete and thoroughly wet forms. Remove freestanding water.
- K. Screed Supports:
1. For concrete over waterproof membranes and vapor retarder membranes, use cradle, pad or base type screed supports which will not puncture membrane.
  2. Staking through membrane is not be permitted.

### 3.6 FORM CLEANING

- A. Clean forms as erection proceeds, to remove foreign matter within forms.
- B. Clean formed cavities of debris prior to placing concrete.
- C. Flush with water or use compressed air to remove remaining foreign matter. Ensure that water and debris drain to exterior through clean-out ports.
- D. During cold weather, remove ice and snow from within forms. Do not use de-icing salts. Do not use water to clean out forms, unless formwork and concrete construction proceed within heated enclosure. Use compressed air or other means to remove foreign matter.

### 3.7 FORM REMOVAL

- A. Do not remove forms or bracing until concrete has gained sufficient strength to carry its own weight and imposed loads and removal has been approved by Architect/Engineer.
- B. Loosen forms carefully. Do not wedge pry bars, hammers, or tools against finish concrete surfaces scheduled for exposure to view.
- C. Store removed forms in manner that surfaces to be in contact with fresh concrete will not be damaged. Discard damaged forms.
- D. Leave forms in place for minimum number of days as specified in ACI 347.

### 3.8 ERECTION TOLERANCES

- A. Section 01 40 00 - Quality Requirements: Tolerances.

- B. Construct formwork to maintain tolerances required by ACI 301 and ACI 318.

### **3.9 FIELD QUALITY CONTROL**

- A. Section 01 40 00 - Quality Requirements: Field inspecting and testing.
- B. Inspect erected formwork, shoring, and bracing to ensure that work is in accordance with formwork design, and that supports, fastenings, wedges, ties, and items are secure.
- C. Notify Architect/Engineer after placement of reinforcing steel in forms, but prior to placing concrete.
- D. Schedule concrete placement to permit formwork inspection before placing concrete.

**END OF SECTION**

**SECTION 03 20 00**  
**CONCRETE REINFORCING**

**PART 1 GENERAL****1.1 SUMMARY**

- A. Section Includes:
  - 1. Reinforcing bars.
  - 2. Welded wire fabric.
  - 3. Reinforcement accessories.
- B. Related Sections:
  - 1. Section 03 10 00 - Concrete Forming and Accessories.
  - 2. Section 03 30 00 - Cast-In-Place Concrete.
  - 3. Division 26 - Electrical as related to bonding and grounding requirements.

**1.2 REFERENCES**

- A. American Concrete Institute (ACI):
  - 1. ACI 301 - Specifications for Structural Concrete, 2016.
  - 2. ACI 318 - Building Code Requirements for Structural Concrete, 2014.
  - 3. ACI SP-66 - ACI Detailing Manual, 2004.
- B. ASTM International (ASTM):
  - 1. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement, 2016.
  - 2. ASTM A1064/A1064M - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete, 2017.
- C. American Welding Society (AWS):
  - 1. AWS D1.4/D1.4M - Structural Welding Code - Reinforcing Steel.
  - 2. AWS D1.1/D1.1M - Structural Welding Code - Steel
- D. Concrete Reinforcing Steel Institute (CRSI):
  - 1. CRSI (DA4) - Manual of Standard Practice.
- E. The Masonry Society (TMS):
  - 1. TMS 402/602 - Building Code Requirements and Specification For Masonry Structures; 2016.

**1.3 COORDINATION**

- A. Division 01 Administrative Requirements: Coordination and project conditions.
- B. Coordinate with placement of formwork, formed openings and other Work.

**1.4 SUBMITTALS**

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Shop Drawings: Comply with requirements of ACI SP-66. Indicate bar sizes, spacings, locations, and quantities of reinforcing steel, bending and cutting schedules, and supporting and spacing devices.
- C. Certificates:
  - 1. Manufacturer's Certificate: Certify that reinforcing steel and accessories supplied for this project meet or exceed specified requirements.

2. AWS qualification certificate for welders employed on the Work.

### **1.5 QUALITY ASSURANCE**

- A. Perform Work in accordance with CRSI (DA4), ACI 301 and ACI 318.
  1. Maintain one copy of each document on project site.

### **1.6 QUALIFICATIONS**

- A. Welders: Certified as AWS qualified within previous 12 months.

## **PART 2 PRODUCTS**

### **2.1 REINFORCEMENT**

- A. Deformed Reinforcement: ASTM A615/A615M; 60 ksi yield strength, steel bars, unfinished.
- B. Welded Plain Wire Fabric: ASTM A1064/A1064M; in flat sheets or coils; unfinished.

### **2.2 ACCESSORY MATERIALS**

- A. Tie Wire: Annealed, minimum 16 gage, 0.0508 inch.
- B. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for strength and support of reinforcement during concrete placement conditions including load bearing pad on bottom to prevent vapor retarder puncture.
- C. Special Chairs, Bolsters, Bar Supports, Spacers Adjacent to Weather Exposed Concrete Surfaces: Plastic tipped steel type; size and shape to meet Project conditions.

### **2.3 FABRICATION**

- A. Fabricate concrete reinforcement in accordance with CRSI (DA4).
- B. Form standard hooks for 90 degree bend as indicated on Drawings.
- C. Form reinforcement bends with minimum diameters in accordance with ACI 318.
- D. Fabricate column reinforcement with offset bends at reinforcement splices.
- E. Welding of reinforcement is not permitted, unless indicated on Drawings or approved by Architect.
  1. If welding of reinforcement is indicated on Drawings or otherwise approved by Architect, perform welding in accordance with AWS D1.4/D1.4M.
  2. Galvanized or Epoxy Coated Reinforcement: Clean surfaces, weld and re-protect welded joint in accordance with CRSI (DA4).
- F. Locate reinforcement splices not indicated on Drawings, at point of minimum stress. Review location of splices with Architect.

## **PART 3 EXECUTION**

### **3.1 EXAMINATION**

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.



**3.2 PREPARATION**

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this section.
- B. Prepare materials to be installed and equipment to be used during installation.

**3.3 PLACEMENT**

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Place, support and secure reinforcement against displacement. Do not deviate from required position beyond specified tolerance.
  - 1. Do not weld crossing reinforcement bars for assembly.
- C. Do not displace or damage vapor barrier.
- D. Accommodate placement of formed openings.
- E. Space reinforcement bars with minimum clear spacing in accordance with ACI 318, but not less than 1 inch.
  - 1. Where bars are indicated in multiple layers, place upper bars directly above lower bars.
- F. Maintain concrete cover around reinforcement in accordance with ACI 318.
- G. Splice reinforcing where indicated on Drawings in accordance with splicing device manufacturer's instructions.
- H. Bond and ground all reinforcement to requirements of Division 26 - Electrical as related to bonding and grounding requirements.

**3.4 ERECTION TOLERANCES**

- A. Section 01 40 00 - Quality Requirements.
- B. Install reinforcement within the tolerances specified in TMS 402/602 for foundation walls.

**3.5 FIELD QUALITY CONTROL**

- A. Section 01 40 00 - Quality Requirements: Field inspecting and testing.
- B. Field inspection and testing will be performed by Owner's testing laboratory in accordance with ACI 318.
- C. Provide free access to Work and cooperate with appointed firm.
- D. Reinforcement Inspection:
  - 1. Placement Acceptance: Specified and ACI 318 material requirements and specified placement tolerances.
  - 2. Welding: Inspect welds in accordance with AWS D1.1/D1.1M.
  - 3. Periodic Placement Inspection: Inspect for correct materials, fabrication, sizes, locations, spacing, concrete cover, and splicing.

**END OF SECTION**



**SECTION 03 30 00**  
**CAST-IN-PLACE CONCRETE**

**PART 1 GENERAL****1.1 SUMMARY**

- A. Section includes cast-in-place concrete for the following:
1. Slabs on grade.
  2. Footings.
  3. Concrete stairs
  4. Mechanical equipment pads and housekeeping pads.
  5. Control, expansion and contraction joint devices.

**1.2 REFERENCES**

- A. American Concrete Institute:
1. ACI 301 - Specifications for Structural Concrete.
  2. ACI 305 - Hot Weather Concreting.
  3. ACI 306.1 - Standard Specification for Cold Weather Concreting.
  4. ACI 308.1 - Standard Specification for Curing Concrete.
  5. ACI 318 - Building Code Requirements for Structural Concrete.
- B. ASTM International:
1. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
  2. ASTM C31/C31M - Standard Practice for Making and Curing Concrete Test Specimens in the Field.
  3. ASTM C33 - Standard Specification for Concrete Aggregates.
  4. ASTM C39 - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.
  5. ASTM C42/C42M - Standard Test Method for Obtaining and Testing Drilled Cores and Sawed Beams of Concrete.
  6. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete.
  7. ASTM C143/C143M - Standard Test Method for Slump of Hydraulic Cement Concrete.
  8. ASTM C150 - Standard Specification for Portland Cement.
  9. ASTM C172 - Standard Practice for Sampling Freshly Mixed Concrete.
  10. ASTM C173/C173M - Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method.
  11. ASTM C231 - Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method.
  12. ASTM C260 - Standard Specification for Air-Entraining Admixtures for Concrete.
  13. ASTM C330 - Standard Specification for Lightweight Aggregates for Structural Concrete.
  14. ASTM C494/C494M - Standard Specification for Chemical Admixtures for Concrete.
  15. ASTM C595 - Standard Specification for Blended Hydraulic Cements.
  16. ASTM C618 - Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Concrete.
  17. ASTM C685/C685M - Standard Specification for Concrete Made By Volumetric Batching and Continuous Mixing.
  18. ASTM C845 - Standard Specification for Expansive Hydraulic Cement.

19. ASTM C989 - Standard Specification for Ground Granulated Blast-Furnace Slag for Use in Concrete and Mortars.
20. ASTM C1017/C1017M - Standard Specification for Chemical Admixtures for Use in Producing Flowing Concrete.
21. ASTM C1064/C1064M - Standard Test Method for Temperature of Freshly Mixed Hydraulic-Cement Concrete.
22. ASTM C1107 - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonsrink).
23. ASTM C1116 - Standard Specification for Fiber-Reinforced Concrete and Shotcrete.
24. ASTM C1157 - Standard Performance Specification for Hydraulic Cement.
25. ASTM C1218 - Standard Test Method for Water-Soluble Chloride in Mortar and Concrete.
26. ASTM C1240 - Standard Specification for Silica Fume Used in Cementitious Mixtures.
27. ASTM D994 - Standard Specification for Preformed Expansion Joint Filler for Concrete (Bituminous Type).
28. ASTM D1751 - Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).
29. ASTM D1752 - Standard Specification for Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction.
30. ASTM D6690 - Standard Specification for Joint and Crack Sealants, Hot Applied, for Concrete and Asphalt Pavements.
31. ASTM E96 - Standard Test Methods for Water Vapor Transmission of Materials.
32. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials.
33. ASTM E1643 - Standard Practice for Installation of Water Vapor Retarders Used in Contact with Earth or Granular Fill under Concrete Slabs.
34. ASTM E1745 - Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs.

### 1.3 PERFORMANCE REQUIREMENTS

- A. Vapor Barrier Permeance: testing results from ASTM F 1249 or ASTM E 96 must state a water vapor transmission rate (WVTR) of less than 0.01 perms (grains/[hour \* ft<sup>2</sup> \* in. Hg])

### 1.4 SUBMITTALS

- A. Section 013300 - Submittal Procedures: Submittal procedures.
- B. Product Data: Submit data on joint devices, attachment accessories and admixtures.
- C. Design Data:
  1. Submit concrete mix design for each concrete strength. Submit separate mix designs when admixtures are required for the following:
    - a. Hot and cold weather concrete work.
    - b. Air entrained concrete work.
  2. Identify mix ingredients and proportions, including admixtures.
  3. Identify chloride content of admixtures and whether or not chloride was added during manufacture.
- D. Manufacturer's Installation Instructions: Submit installation procedures and interface required with adjacent Work.

**1.5 CLOSEOUT SUBMITTALS**

- A. Section 017700 - Execution and Closeout Requirements: Closeout procedures.
- B. Project Record Documents: Accurately record actual locations of embedded utilities and components concealed from view in finished construction.

**1.6 QUALITY ASSURANCE**

- A. Perform Work in accordance with ACI 301 and ACI 318.
- B. Conform to ACI 305 when concreting during hot weather.
- C. Conform to ACI 306.1 when concreting during cold weather.
- D. Acquire cement and aggregate from one source for Work.

**1.7 COORDINATION**

- A. Coordinate placement of joint devices with erection of concrete formwork and placement of form accessories.

**PART 2 PRODUCTS****2.1 CONCRETE MATERIALS**

- A. Portland Cement: ASTM C 150, and as follows:
  - 1. Type I, except where other type is specifically permitted or required.
    - a. Type I may be replaced by Type III (high early strength) for concrete placed during cold weather.
- B. Fly Ash: ASTM C 618, Type C or F.
  - 1. Maximum allowable loss on ignition: 4.0 percent.
- C. Water: Potable.
- D. Aggregates:
  - 1. Normal weight concrete: ASTM C 33, uniformly graded as follows:
    - a. Class: Moderate weathering region, but not less than 3M
    - b. Nominal Maximum Aggregate Size:
      - 1) Slabs on Grade: 1-inch.
      - 2) Footings and Walls: 3/4-inch.
  - 2. Lightweight Aggregate: ASTM C330, 3/4-inch nominal maximum aggregate size.
- E. Admixtures - General: Admixtures which result in more than 0.1 percent of soluble chloride ions by weight of cement are prohibited.
- F. Air-Entraining Admixture: ASTM C 260 and certified by manufacturer for compatibility with other mix components.
- G. Water-Reducing Admixture: ASTM C 494, Type A.
- H. Water-Reducing, Retarding Admixture: ASTM C 494, Type D.
- I. Water-Reducing and Accelerating Admixtures: ASTM C 494, Type E.

**2.2 REINFORCEMENT**

- A. Deformed Reinforcement: ASTM A615/A615M; 60 ksi yield strength, steel bars, unfinished.

**2.3 REINFORCEMENT ACCESSORY MATERIALS**

- A. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for strength and support of reinforcement during concrete placement conditions including load bearing pad on bottom to prevent vapor retarder puncture.
- B. Special Chairs, Bolsters, Bar Supports, Spacers Adjacent to Weather Exposed Concrete Surfaces: Plastic tipped steel type; size and shape to meet Project conditions.

**2.4 MISCELLANEOUS MATERIALS AND ACCESSORIES**

- A. Vapor Barrier
  - 1. Vapor barrier must have all of the following qualities:
    - a. Permeance of less than 0.01 Perms [grains/(ft<sup>2</sup> · hr · inHg)] as tested in accordance with ASTM E 1745 Section 7.1.
    - b. Other performance criteria:
      - 1) Strength: ASTM E 1745 Class A.
      - 2) Thickness: 15 mils
    - c. Manufactured from prime virgin resins.
  - 2. Seam Tape: Manufacturer's recommended low permeance tape composed of a high-density polyethylene film and a rubber based, pressure-sensitive adhesive.
- B. Nonshrink Grout: ASTM C 1107.
  - 1. Type: Provide nonmetallic type only.
  - 2. Products: The following products, provided they comply with requirements of the contract documents, will be among those considered acceptable:
    - a. Nonmetallic type:
      - 1) "Masterflow 928"; Master Builders, Inc.
      - 2) "SonogROUT 14k"; Sonneborn Building Products Division/ChemRex, Inc.
      - 3) "Euco N-S Grout"; The Euclid Chemical Company.
      - 4) "Supreme"; Cormix Construction Chemicals.
      - 5) "Crystex"; L & M Construction Chemicals, Inc.
      - 6) "Sure-Grip High Performance Grout"; Dayton Superior Corporation.
      - 7) "Horn Non-Corrosive Non-Shrink Grout"; A. C. Horn, Inc.
      - 8) "Five Star Grout"; Five Star Products, Inc.
- C. Burlap: AASHTO M 182, Class 2 jute or kenaf cloth.
- D. Moisture-Retaining Cover: ASTM C 171, and as follows:
  - 1. Curing paper.
  - 2. Polyethylene film.
  - 3. White burlap-polyethylene sheeting.
- E. Liquid Curing Compounds:
  - 1. Manufacturers: Provide products complying with requirements of the contract documents and made by one of the following:
    - a. Master Builders, Inc.
    - b. Anti Hydro International, Inc.
    - c. The Euclid Chemical Company.
    - d. A. C. Horn, Inc.
    - e. Dayton Superior Corporation.
    - f. W. R. Meadows, Inc.
    - g. The Burke Company.
    - h. Sonneborn Building Products Division/ChemRex, Inc.

- i. L & M Construction Chemicals, Inc.
    - j. Setcon Industries, Inc.
    - k. Cormix, Inc.
  - 2. Material - curing compounds: Comply with ASTM C 309, Type 1.
    - a. Non-yellowing formulation where subject to ultraviolet light.
    - b. Where compounds are proposed for use on surfaces to which finishes, coatings, or coverings subsequently will be applied, compound shall possess demonstrated compatibility with finish, coating, or covering, and use shall be subject to approval of the architect.
    - c. Curing and sealing compound: Where indicated, provide curing and sealing formulation with long-lasting finish that is resistant to chemicals, oil, grease, deicing salts, and abrasion.
  - 3. Solvents: Water-based products where used on interior surfaces.
- F. Self-Expanding Strip Waterstops: Manufactured rectangular or trapezoidal strip, sodium bentonite or other hydrophylic material for adhesive bonding to concrete.
- 1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Volclay Waterstop-RX;
    - b. Colloid Environmental Technologies Co.
    - c. Conseal CS-231; Concrete Sealants Inc.
    - d. Swellseal Joint; De Neef Construction Chemicals (U.S.) Inc.
    - e. Hydrotite; Greenstreak.
    - f. Mirastop; Mirafi Moisture Protection, Div. of Royal Ten Cate (USA), Inc.
    - g. Adeka Ultra Seal; Mitsubishi International Corporation.
    - h. Superstop; Progress Unlimited Inc.
- G. Underlayment Compound: Self-leveling cementitious compound designed for pumping.
- 1. Products: Provide one of the following:
    - a. "Flo-Top"; The Euclid Chemical Company.
    - b. "Thoro Underlayment Self-Leveling"; Thoro System Products Division/ICI Americas.
- H. Expansion Joint Filler:
- 1. Interior - Nonextruding bituminous type: ASTM D 1751.
  - 2. Exterior - Sponge rubber type: ASTM D 1752, Type I.

## 2.5 CONCRETE MIXTURES, GENERAL

- A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301.
  - 1. Use a qualified independent testing agency for preparing and reporting proposed mixture designs based on laboratory trial mixtures.
- B. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than portland cement in concrete as follows:
  - 1. Fly Ash: 25 percent, for concrete exposed to weather.
- C. Limit water-soluble, chloride-ion content in hardened concrete, measured by percent by weight of cement, as follows:
  - 1. Concrete slabs exposed to weather. 0.30.
  - 2. Concrete protected from weather: 1.00.
- D. Admixtures: Use admixtures according to manufacturer's written instructions.

1. Use water-reducing, high-range water-reducing, or plasticizing admixture in concrete, as required, for placement and workability.
2. Use water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.
3. Use water-reducing admixture in pumped concrete and concrete with a water-cementitious materials ratio below 0.50.

## 2.6 CONCRETE MIXTURES FOR BUILDING ELEMENTS

- A. Footings: Proportion normal-weight concrete mixture as follows:
  1. Minimum Compressive Strength: 3000 psi at 28 days.
  2. Slump Limit: 4 inches, plus or minus 1 inch.
- B. Slabs-on-Grade, protected from weather: Proportion normal-weight concrete mixture as follows:
  1. Minimum Compressive Strength: 3000 psi at 28 days.
  2. Minimum Cementitious Materials Content: 520 lb/cu. yd. for 1 inch maximum aggregate size or 540 lb/cu. yd. for  $\frac{3}{4}$  inch maximum aggregate size.
  3. Slump Limit: 4 inches, plus or minus 1 inch.
  4. Air Content: Do not allow air content of troweled finished floors to exceed 3 percent.
- C. Slabs-on-Grade, exposed to weather: Proportion normal-weight concrete mixture as follows:
  1. Minimum Compressive Strength: 4500 psi at 28 days.
  2. Minimum Cementitious Materials Content: 520 lb/cu. yd. for 1 inch maximum aggregate size; 540 lb/cu. yd. for  $\frac{3}{4}$  inch maximum aggregate size.
  3. Slump Limit: 4 inches, plus or minus 1 inch.
- D. Suspended Slabs on Composite Steel Deck: Proportion structural lightweight concrete mixture as follows:
  1. Minimum Compressive Strength: 3500 psi at 28 days.
  2. Maximum aggregate size:  $\frac{3}{4}$  inch
  3. Calculated Equilibrium Unit Weight: 115 lb/cu. ft., plus or minus 3 lb/cu. ft. as determined by ASTM C567.
  4. Slump Limit: 4 inches, plus or minus 1 inch.
  5. Air Content: Provide minimum 4% air content as required by UL.
- E. Slump: A tolerance of up to 1 inch above approved design mix slump will be permitted for 1 batch in 5 consecutive batches tested. Concrete of lower slump than that specified may be used, provided proper placing and consolidation is obtained.
- F. Total Air Content: A tolerance of plus or minus 1-1/2 percent of approved design mix air content will be allowed for field measurements.
- G. Do not use batches that exceed tolerances.

## 2.7 CONCRETE MIXING

- A. Transit Mixers: Mix concrete materials in transit mixers, complying with requirements of ASTM C 94.
  1. At ambient temperatures of 85 to 90 degrees F, reduce mixing and delivery time to 75 minutes.
  2. At ambient temperatures above 90 degrees F, reduce mixing and delivery time to 60 minutes.



## **PART 3 EXECUTION**

### **3.1 EXAMINATION**

- A. Section 013100 - Administrative Requirements: Coordination and project conditions.
- B. Verify requirements for concrete cover over reinforcement.
- C. Verify anchors, seats, plates, reinforcement and other items to be cast into concrete are accurately placed, positioned securely, and will not interfere with placing concrete.

### **3.2 PREPARATION**

- A. Prepare previously placed concrete by cleaning with steel brush and applying bonding agent. Remove laitance, coatings, and unsound materials.
- B. In locations where new concrete is doweled to existing work, drill holes in existing concrete, insert steel dowels and pack solid with non-shrink grout.
- C. Remove debris and ice from formwork, reinforcement, and concrete substrates.
- D. Remove water from areas receiving concrete before concrete is placed.

### **3.3 PLACING CONCRETE**

- A. Place concrete in accordance with ACI 301 and ACI 318.
- B. Notify testing laboratory and Architect/Engineer minimum 24 hours prior to commencement of operations.
- C. Ensure reinforcement, inserts, embedded parts, formed expansion and contraction joints are not disturbed during concrete placement.
- D. Install vapor barrier under interior slabs on grade in accordance with ASTM E1643. Lap joints minimum 6 inches and seal watertight by taping edges and ends.
- E. Repair vapor barrier damaged during placement of concrete reinforcing. Repair with vapor barrier material; lap over damaged areas minimum 6 inches and seal watertight.
- F. Install construction joint devices in coordination with floor slab pattern placement sequence. Set top to required elevations. Secure to resist movement by wet concrete.
- G. Install joint device anchors. Maintain correct position to allow joint cover to be flush with floor and wall finish.
- H. Install joint covers in longest practical length, when adjacent construction activity is complete.
- I. Apply sealants in joint devices in accordance with Section 07920.
- J. Deposit concrete at final position. Prevent segregation of mix.
- K. Place concrete in continuous operation for each panel or section determined by predetermined joints.
- L. No free falls in excess of 3 feet shall be permitted. For falls in excess of 3 feet, chutes or elephant trunks shall be employed.
- M. Concrete shall be thoroughly compacted during placing and thoroughly worked around reinforcing and embedded fixtures and into the corners of the form. Vibration shall be employed to aid the compaction of the concrete under experienced supervision. Forms shall

- be designed to withstand their action. Supplement vibration by spading. No forking and/or raking shall be permitted. At least one spare vibrator shall be on hand for emergency use.
- N. Maintain records of concrete placement. Record date, location, quantity, air temperature, and test samples taken.
  - O. Place concrete continuously between predetermined expansion, control, and construction joints.
  - P. Do not interrupt successive placement; do not permit cold joints to occur.
  - Q. No concrete that has partially hardened, become contaminated by foreign materials, or has been re-tempered shall be deposited.
  - R. Place floor slabs in saw cut pattern indicated.
  - S. Saw cut joints within 12 hours after placing. Use 3/16 inch thick blade, cut into 1/4 depth of slab thickness.
  - T. Screed floors and slabs on grade level, maintaining surface flatness of maximum ¼ inch in 10 ft.
  - U. Provide control joints in concrete terrazzo flooring per NTMA recommendations and as follows: Provide control joints at no more than 6'-0" on center. Provide control joints at all corner locations. Coordinate joint locations with Architectural documents.
  - V. For pumped concrete, grout used to prime the pump shall be not be used on the project.

### 3.4 FINISHING SLABS

- A. Finishing Operations - General:
  1. Do not directly apply water to slab surface or dust with cement.
  2. Use hand or powered equipment only as recommended in ACI 302.1R.
  3. Screeding: Strikeoff to required grade and within surface tolerances indicated. Verify conformance to surface tolerances. Correct deficiencies while concrete is still plastic.
  4. Bull Floating: Immediately following screeding, bull float or darby before bleed water appears to eliminate ridges, fill in voids, and embed coarse aggregate. Recheck and correct surface tolerances.
  5. Do not perform subsequent finishing until excess moisture or bleed water has disappeared and concrete will support either foot pressure with less than 1/4-inch indentation or weight of power floats without damaging flatness.
  6. Final floating: Float to embed coarse aggregate, to eliminate ridges, to compact concrete, to consolidate mortar at surface, and to achieve uniform, sandy texture. Recheck and correct surface tolerances.
  7. Troweling: Trowel immediately following final floating. Apply first troweling with power trowel except in confined areas, and apply subsequent trowelings with hand trowels. Wait between trowelings to allow concrete to harden. Do not over trowel. Begin final troweling when surface produces a ringing sound as trowel is moved over it. Consolidate concrete surface by final troweling operation. Completed surface shall be free of trowel marks, uniform in texture and appearance, and within surface tolerance specified.
  8. Grind smooth surface defects which would telegraph through final floor covering system.
- B. Coordinate appearance and texture of required final finishes with the architect before application.
- C. Float Finish: As specified above.

- D. Broomed Float Finish: After floating and when water sheen has practically disappeared, apply uniform transverse corrugations approximately 1/16 inch deep, without tearing surface.
- E. Trowel Finish: As specified above.
- F. Trowel and Fine Broom Finish: Follow trowel finishing operation immediately with fine brooming to achieve slightly scarified surface.
- G. Slab Surface Tolerances:
  - 1. Achieve flat, level planes except where grades are indicated. Slope uniformly to drains.
  - 2. Floated finishes: Depressions between high spots shall not exceed 1/4 inch under a 10-foot straightedge.
  - 3. Troweled finishes: Achieve level surface plane so that depressions between high spots do not exceed the following dimension, using a 10-foot straightedge:
    - a. 1/8 inch non-cumulative in any direction and equivalent to FF25 (floor flatness), FL20 (floor levelness) at areas to receive wood flooring and special sports flooring as noted in Division 9.
    - b. 3/16 inch all others receiving troweled finishes.
- H. Slab Finish Schedule: Apply finishes in the following typical locations and as otherwise shown on the drawings:
  - 1. Float finish:
    - a. Surfaces to receive thickset stone flooring
  - 2. Broomed float:
    - a. Sidewalks.
    - b. Exterior slabs not otherwise scheduled.
  - 3. Trowel finish:
    - a. Exposed interior floors not otherwise scheduled.
    - b. Surfaces to receive resilient tile.
    - c. Surfaces to receive carpet.
  - 4. Trowel and fine broom:
    - a. Surfaces to receive thinset tile.
  - 5. Finish of all slabs to receive terrazzo shall be coordinated with terrazzo installer.
- I. Repair of Slab Surfaces: Test slab surfaces for smoothness and to verify surface plane to tolerance specified. Repair defects as follows:
  - 1. High areas: Correct by grinding after concrete has cured for not less than 14 days.
  - 2. Low areas: Immediately after completion of surface finishing operations, cut out low areas and replace with fresh concrete. Finish repaired areas to blend with adjacent concrete. Proprietary patching compounds may be used when approved by the architect.
  - 3. Crazed or cracked areas: Cut out defective areas, except random cracks and single holes not exceeding 1 inch in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts. Dampen exposed concrete and apply bonding compound. Mix, place, compact, and finish patching concrete to match adjacent concrete.
  - 4. Isolated cracks and holes: Groove top of cracks and cut out holes not over 1 inch in diameter. Dampen cleaned concrete surfaces and apply bonding compound; place dry pack or proprietary repair compound acceptable to architect while bonding compound is still active:
    - a. Dry-pack mix: One part portland cement to 2-1/2 parts fine aggregate and enough water as required for handling and placing.

- b. Install patching mixture and consolidate thoroughly, striking off level with and matching surrounding surface. Do not allow patched areas to dry out prematurely.
- 5. Underlayment: Leveling of slabs for subsequent application of floor finishes may be achieved by use of specified underlayment material, at contractor's option.
- J. Surface Sealer: Apply to all interior concrete slabs to remain exposed.
  - 1. Allow concrete to cure for 30 days prior to application of sealer.
  - 2. Use clear solvent base, 100% solid epoxy sealer similar to Tamms Duraltex 1705. Apply two coats. Follow manufacturers recommendation for surface preparation.

### 3.5 CONCRETE CURING AND PROTECTION

- A. General:
  - 1. Prevent premature drying of freshly placed concrete, and protect from excessively cold or hot temperatures until concrete has cured.
  - 2. Provide curing of concrete by one of the methods listed and as appropriate to service conditions and type of applied finish in each case.
- B. Normal Curing Period:
  - 1. Not less than 7 days for standard cements and mixes.
  - 2. Not less than 4 days for high early strength concrete using Type III cement.
- C. Formed Surfaces: Cure formed concrete surfaces by moist curing with forms in place for full curing period or until forms are removed.
  - 1. Keep wooden or metal forms moist when exposed to heat of the sun.
  - 2. If forms are removed prior to completion of curing process, continue curing by one of the applicable methods specified.
- D. Surfaces Not in Contact with Forms:
  - 1. Start initial curing as soon as free water has disappeared, but before surface is dry.
  - 2. Keep continuously moist for not less than 7 days by uninterrupted use of any of the following:
    - a. Water ponding.
    - b. Water-saturated sand.
    - c. Water-fog spray.
    - d. Saturated burlap: Provide 4-inch minimum overlap at joints.
  - 3. Begin final curing procedures immediately following initial curing and before concrete has dried.
    - a. Moisture-retaining cover: Lap not less than 3 inches at edges and ends, and seal with waterproof tape or adhesive. Repair holes or tears during curing period with same tape or adhesive. Maintain covering in intimate contact with concrete surface. Secure to avoid displacement.
      - 1) Extend covering past slab edges at least twice the thickness of slab.
      - 2) Do not use plastic sheeting on surfaces which will be exposed to view when in service.
    - b. Curing compound: Apply at rate stated by manufacturer to conform with moisture-retention requirements specified, using second, immediate application at right angles to first, if necessary, and reapply if damaged by rain.
    - c. Curing and sealing compound: Apply at rate stated by manufacturer to conform with moisture-retention requirements specified, using second, immediate application at right angles to first, if necessary, and reapply if

- damaged by rain. Apply additional coat near substantial completion to act as sealer.
- d. Use curing compounds only in locations permitted or required, and where use will not interfere with other finishes, coatings, or coverings to be applied.
- 4. Continue final curing to end of curing period.
- E. Avoid rapid drying at end of curing period.
- F. During and following curing period, protect concrete from temperature changes of adjacent air in excess of 5 degrees F per hour and 50 degrees F per 24 hours. Progressively adjust protective measures to provide uniform temperature changes over entire concrete surface.

### 3.6 MISCELLANEOUS CONCRETE ITEMS

- A. Fill-in: Fill in holes and openings left in concrete structures for passage of work by other trades after such work is in place. Place such fill-in concrete to blend with existing construction, using same mix and curing methods.
- B. Equipment Bases and Foundations: Provide machine and equipment bases and foundations, as indicated on drawings. Set anchor bolts at correct elevations, complying with diagrams or templates of equipment manufacturer.
  - 1. Grout base plates and foundations as indicated with nonshrink grout.
  - 2. Use nonmetallic grout for exposed conditions, unless otherwise indicated.
- C. Steel Pan Stairs: Provide concrete fill for steel pan stair treads, landings, and associated items. Screed, tamp, and finish concrete surfaces as scheduled.
- D. Reinforced Masonry: Provide concrete grout for reinforced masonry where indicated on drawings and as scheduled.

### 3.7 CONCRETE REPAIRS

- A. Perform cosmetic repairs of concrete surfaces as specified under concrete application.
- B. Perform structural repairs with prior approval of the architect for method and procedure, using epoxy bonding systems. The architect's approval is required for repair methods using materials other than those specified.

### 3.8 QUALITY CONTROL TESTING DURING CONSTRUCTION

- A. Composite Sampling, and Making and Curing of Specimens: ASTM C 172 and ASTM C 31.
  - 1. Take samples at point of discharge.
  - 2. For pumped concrete, perform sampling and testing at the frequencies specified herein at point of delivery to pump, and perform additional sampling and testing at the same frequency at discharge from line. Results obtained at discharge from line shall be used for acceptance of concrete.
- B. Slump: ASTM C 143. One test per strength test and additional tests if concrete consistency changes.
  - 1. Modify sampling to comply with ASTM C 94.
- C. Air Content of Normal Weight Concrete: ASTM C 173 or ASTM C 231. One test per strength test performed on air-entrained concrete.
- D. Air Content of Lightweight Concrete: ASTM C 173. One test per strength test performed on air-entrained concrete.

- E. Approximate Air-Dry Weight of Lightweight Concrete: ASTM C 567. Determine fresh unit weight once per strength test and report approximate air-dry weight of concrete represented.
- F. Concrete Temperature:
1. Test hourly when air temperature is 40 degrees F or below.
  2. Test hourly when air temperature is 90 degrees F or above.
  3. Test each time a set of strength test specimens is made.
- G. Compressive Strength Tests: ASTM C 39.
1. Compression test specimens: Mold and cure one set of 4 standard cylinders for each compressive strength test required.
  2. Testing for acceptance of potential strength of as-delivered concrete:
    - a. Obtain samples on a statistically sound, random basis.
    - b. Minimum frequency:
      - 1) One set per 100 cubic yards or fraction thereof for each day's pour of each concrete class.
      - 2) One set per 3500 square feet of slab or wall area or fraction thereof for each day's pour of each concrete class.
      - 3) When less than 5 cubic yards is placed in one day, the architect may, at architect's option, waive laboratory testing of specimens if adequate evidence of satisfactory strength is provided. (Molding and curing of these specimens is not waived.)
      - 4) When the above testing frequency would provide fewer than 5 strength tests for a given class of concrete during the project, conduct testing from not less than 5 randomly selected batches, or from each batch if fewer than 5.
    - c. Test one specimen per set at 7 days for information unless an earlier age is required.
    - d. Test 2 specimens per set for acceptance of strength potential; test at 28 days unless other age is specified. The test result shall be the average of the two specimens. If one specimen shows evidence of improper sampling, molding, or testing, the test result shall be the result of the remaining specimen; if both show such evidence, discard the test result and inform the architect.
    - e. Retain one specimen from each set for later testing, if required.
    - f. Strength potential of as-delivered concrete will be considered acceptable if all of the following criteria are met:
      - 1) No individual test result falls below specified compressive strength by more than 500 psi.
      - 2) Not more than 10 percent of individual test results fall below specified compressive strength  $f'(c)$ .
      - 3) Average of any 3 consecutive strength test results equals or exceeds specified compressive strength  $f'(c)$ .
  3. Removal of forms or supports: Mold additional specimens and field-cure with concrete represented; test to determine strength of concrete at proposed time of form or support removal.
- H. Test Results: Testing agency shall report test results in writing to architect and contractor within 24 hours of test.
1. Test reports shall contain the following data:
    - a. Project name, number, and other identification.
    - b. Name of concrete testing agency.
    - c. Date and time of sampling.
    - d. Concrete type and class.

- e. Location of concrete batch in the completed work.
- f. All information required by respective ASTM test methods.
- 2. Nondestructive testing devices such as impact hammer or sonoscope may be used at architect's option for assistance in determining probable concrete strength at various locations or for selecting areas to be cored, but such tests shall not be the sole basis for acceptance or rejection.
- 3. The testing agency shall make additional tests of in-place concrete as directed by the architect when test results indicate that specified strength and other concrete characteristics have not been attained.
  - a. Testing agency may conduct tests of cored cylinders complying with ASTM C 42, or tests as directed.
  - b. Cost of additional testing shall be borne by the contractor when unacceptable concrete has been verified.

**END OF SECTION**





**SECTION 04 05 03**  
**MASONRY MORTARING AND GROUTING**

**PART 1 GENERAL****1.1 SUMMARY**

- A. Section Includes:
  - 1. Mortar for masonry.
  - 2. Grout for masonry.
- B. Related Sections:
  - 1. Section 04 20 00 - Unit Masonry: Installation of mortar and grout.
  - 2. Section 04 72 00 - Cast Stone Masonry: Installation of mortar.
  - 3. Section 08 11 13 - Hollow Metal Doors and Frames: Products and execution for grouting steel door frames installed in masonry.

**1.2 REFERENCES**

- A. ASTM International (ASTM):
  - 1. ASTM C91/C91M - Standard Specification for Masonry Cement; 2018.
  - 2. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete; 2021.
  - 3. ASTM C144 - Standard Specification for Aggregate for Masonry Mortar; 2018.
  - 4. ASTM C150/C150M - Standard Specification for Portland Cement; 2021.
  - 5. ASTM C207 - Standard Specification for Hydrated Lime for Masonry Purposes; 2018.
  - 6. ASTM C270 - Standard Specification for Mortar for Unit Masonry; 2019.
  - 7. ASTM C387/C387M - Standard Specification for Packaged, Dry, Combined Materials for Concrete and High Strength Mortar; 2017.
  - 8. ASTM C404 - Standard Specification for Aggregates for Masonry Grout; 2018.
  - 9. ASTM C476 - Standard Specification for Grout for Masonry; 2020.
  - 10. ASTM C780 - Standard Test Method for Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry; 2020.
  - 11. ASTM C979/C979M - Standard Specification for Pigments for Integrally Colored Concrete; 2016.
  - 12. ASTM C1019 - Standard Test Method for Sampling and Testing Grout; 2013.
  - 13. ASTM C1072 - Standard Test Method for Measurement of Masonry Flexural Bond Strength; 2019.
  - 14. ASTM C1314 - Standard Test Method for Compressive Strength of Masonry Prisms; 2021.
  - 15. ASTM D1148 - Standard Test Method for Rubber Deterioration-Discoloration from Ultraviolet (UV) or UV/Visible Radiation and Heat Exposure of Light-Colored Surfaces; 2013.
  - 16. ASTM E514/E514M - Standard Test Method for Water Penetration and Leakage Through Masonry; 2020.
  - 17. ASTM E518/E518M - Standard Test Methods for Flexural Bond Strength of Masonry; 2021.
- B. The Masonry Society (TMS):
  - 1. TMS 402/602 - Building Code Requirements and Specification For Masonry Structures; 2016.

**1.3 SUBMITTALS**

- A. Section 01 33 00 - Submittal Procedures: Submittal requirements.
- B. Product Data: Include design mix and indicate whether the Proportion or Property specification of ASTM C270 is to be used. Also, include required environmental conditions and admixture limitations.
- C. Samples:
  - 1. Standard Masonry Mortar: Submit three samples of manufacture's full range of colors.
  - 2. Colored Masonry Mortar: Submit two sample sets of manufacture's full range.
- D. Test Reports:
  - 1. Submit reports on mortar indicating conformance of mortar to property requirements of ASTM C270 and test and evaluation reports per ASTM C780.
  - 2. Submit reports on grout indicating conformance of component grout materials to requirements of ASTM C476 and test and evaluation reports to requirements of ASTM C1019.
- E. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- F. Manufacturer's Installation Instructions: Submit packaged dry mortar manufacturer's installation instructions.

**1.4 QUALITY ASSURANCE**

- A. Comply with provisions of TMS 402/602, except where exceeded by requirements of the contract documents.

**1.5 DELIVERY, STORAGE, AND HANDLING**

- A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Maintain packaged materials clean, dry, and protected against dampness, freezing, and foreign matter.

**1.6 ENVIRONMENTAL REQUIREMENTS**

- A. Section 01 60 00 - Product Requirements: Requirements before, during and after installation of Work.
- B. Cold and Hot Weather Requirements: Comply with requirements of TMS 402/602 or applicable building code, whichever is more stringent.
- C. Maintain materials and surrounding air temperature to minimum 40 degrees F and maximum 90 degrees F prior to, during, and 48 hours after completion of masonry work.

**PART 2 PRODUCTS****2.1 MORTAR AND GROUT APPLICATIONS**

- A. Mortar: At Contractor's option, mortar may be field-mixed from packaged dry materials, made from factory premixed dry materials with addition of water only, or ready-mixed.
- B. Masonry Cement ASTM C91 IS NOT PERMITTED.
- C. Mortar Mix Designs: ASTM C270, Property Specification.
  - 1. Structural Masonry: Type S.

2. Non-Structural Masonry: Type S.
  3. Repointing Masonry:
    - a. Match existing type, strength, composition and color at cured stage.
- D. Mortar Colors:
1. Standard Masonry Mortar: Standard Gray.
    - a. Sand Base: Buff.
    - b. Location: All masonry not indicated to be other color.
  2. Colored Masonry Mortar(s):
    - a. Colors:
      - 1) Three colors as selected by Architect from manufacture's full range.
    - b. Locations:
      - 1) As indicated on Drawings.
- E. Grout Mix Designs:
1. Structural Masonry: 3,000 psi strength at 28 days; 8-11 inches slump; provide ready-mixed type in accordance with ASTM C94/C 94M.
    - a. Fine grout.
  2. Non-Structural Masonry: 2,000 psi strength at 28 days; 8-11 inches slump; provide ready-mixed type in accordance with ASTM C94/C 94M.
    - a. Fine grout.

## 2.2 MATERIALS

- A. Packaged Dry Material for Mortar for Unit Masonry: Premixed Portland cement, hydrated lime, and sand; complying with ASTM C387/C387M and capable of producing mortar of the specified strength in accordance with ASTM C270 with the addition of water only.
1. Type: As indicated for Mortar Mix Design in MORTAR AND GROUT APPLICATIONS article in this Section.
  2. Color: As required to produce approved mortar color sample(s).
- B. Packaged Dry Material for Grout for Masonry: Premixed cementitious materials and dried aggregates; capable of producing grout of the specified strength in accordance with ASTM C476 with the addition of water only.
1. Type: Fine.
- C. Portland Cement: ASTM C150/C150M.
1. Type: Type I - Normal; ASTM C150/C150M.
  2. Color: As required to produce approved mortar color sample(s).
- D. Hydrated Lime: ASTM C207, Type S.
- E. Mortar Aggregate: ASTM C144, standard masonry type.
1. Color: As required to produce approved mortar color sample(s).
- F. Grout Aggregate: ASTM C404.
- G. Pigments for Colored Mortar: Pure, concentrated mineral pigments specifically intended for mixing into mortar and complying with ASTM C979/C979M.
1. Color: As required to produce approved mortar color samples(s).
- H. Water: Clean and potable.
- I. Bonding Agent: Latex type.

## 2.3 MORTAR MIXING

- A. Thoroughly mix mortar ingredients using mechanical batch mixer, in accordance with ASTM C270 and in quantities needed for immediate use.

- B. Maintain sand uniformly damp immediately before the mixing process.
- C. Colored Mortar: Proportion selected pigments and other ingredients to match approved mortar color sample(s), without exceeding manufacturer's recommended pigment-to-cement ratio; mix in accordance with manufacturer's instructions, uniform in coloration.
- D. Add admixtures in accordance with manufacturer's instructions; mix uniformly.
- E. Do not use anti-freeze compounds to lower the freezing point of mortar.
- F. If water is lost by evaporation, re-temper only within two hours of mixing.

## **2.4 GROUT MIXING**

- A. Ready-mixed type grout in accordance with ASTM C94/C94M.
- B. Thoroughly mix grout ingredients in quantities needed for immediate use in accordance with ASTM C476 for fine and coarse grout.
- C. Add admixtures in accordance with manufacturer's instructions; mix uniformly.
- D. Do not use anti-freeze compounds to lower the freezing point of grout.

## **PART 3 EXECUTION**

### **3.1 EXAMINATION**

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Request inspection of spaces to be grouted.

### **3.2 PREPARATION**

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this section. Prepare materials to be installed and equipment used during installation.
- B. Brace masonry to resist wet grout pressure.
- C. Remove excess mortar from grout spaces.
- D. Ensure that reinforcement is secured in required positions.
- E. Apply bonding agent to existing concrete surfaces where masonry units are set on concrete surfaces.

### **3.3 INSTALLATION**

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Install mortar and grout to requirements of Section 04 20 00 - Unit Masonry and other section(s) in which masonry is specified.
- C. Work grout into masonry cores and cavities to eliminate voids.
- D. Do not install grout in lifts greater than 16 inches without consolidating grout by rodding.
- E. Do not displace reinforcement while placing grout.

### **3.4 FIELD QUALITY CONTROL**

- A. Section 01 40 00 - Quality Requirements: Testing and inspection services.
- B. An independent testing agency will perform field tests.

- C. Test and evaluate mortar in accordance with ASTM C780 procedures for aggregate ratio and water content, air content, consistency, and compressive strength.
  - 1. Test frequency: Every 5,000 sf of completed wall area.
  
- D. Test and evaluate grout in accordance with ASTM C1019 procedures for compressive strength, and in accordance with ASTM C143/C143M for slump.
  - 1. Test frequency: Every 5,000 sf of completed wall area.

**END OF SECTION**



**SECTION 04 20 00****UNIT MASONRY****PART 1 GENERAL****1.1 SUMMARY**

- A. Section Includes:
1. Concrete Masonry Units.
  2. Brick Masonry Units.
  3. Reinforcement and Anchorage.
  4. Accessories.
- B. Related Requirements:
1. Section 01 21 00 - Allowances: Allowance(s) for brick.
  2. Section 04 05 03 - Masonry Mortaring and Grouting: Mortar and grout.
  3. Section 04 72 00 - Cast Stone Masonry.
  4. Section 05 12 00 - Structural Steel: Product requirements for steel anchors for placement by this Section.
  5. Section 05 21 00 - Steel Joists: Product requirements for steel bearing pads for joists for placement by this Section.
  6. Section 05 50 00 - Metal Fabrications: Product requirements for loose steel lintels and fabricated steel items for placement by this Section.
  7. Section 05 40 00 - Cold Formed Metal Framing: Product requirements for steel bearing pads for trusses placed by this Section.
  8. Section 07 11 00 - Dampproofing: Dampproofing masonry surfaces.
  9. Section 07 21 19 - Foamed-In-Place Insulation: For veneer wall cavity spaces.
  10. Section 07 62 00 - Sheet Metal Flashing and Trim: Product requirements for reglets for flashings for placement by this Section.
  11. Section 07 84 00 - Firestopping: Firestopping at penetrations of masonry work.
  12. Section 07 90 00 - Joint Protection: Rod and sealant at control and expansion joints.
  13. Section 07 95 13 - Expansion Joint Cover Assemblies.
  14. Division 08 - Openings: Multiple types of opening frames to be installed in or anchored to masonry work.

**1.2 REFERENCES**

- A. American Concrete Institute (ACI):
1. ACI 216.1 - Code Requirements for Determining Fire Resistance of Concrete and Masonry Construction Assemblies; 2014, with changes through 2017.
- B. ASTM International (ASTM):
1. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2016a.
  2. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement; 2020.
  3. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2015.
  4. ASTM A951/A951M - Standard Specification for Steel Wire for Masonry Joint Reinforcement; 2016, with changes through 2018.
  5. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Required Hardness, Solution Hardened, and Bake Hardenable; 2021a.

6. ASTM A1064/A1064M - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete; 2018a.
  7. ASTM C40/C40M - Standard Test Method for Organic Impurities in Fine Aggregates for Concrete; 2020.
  8. ASTM C55 - Standard Specification for Concrete Building Brick; 2017.
  9. ASTM C62 - Standard Specification for Building Brick (Solid Masonry Units Made From Clay or Shale); 2017.
  10. ASTM C67/C67M - Standard Test Methods for Sampling and Testing Brick and Structural Clay Tile; 2021.
  11. ASTM C90 - Standard Specification for Loadbearing Concrete Masonry Units; 2014.
  12. ASTM C129 - Standard Specification for Nonloadbearing Concrete Masonry Units; 2017.
  13. ASTM C142/C142M - Standard Test Method for Clay Lumps and Friable Particles in Aggregates; 2017.
  14. ASTM C216 - Standard Specification for Facing Brick (Solid Masonry Units Made From Clay or Shale); 2021.
  15. ASTM C641 - Standard Test Method for Iron Staining Materials in Lightweight Concrete Aggregates; 2017.
  16. ASTM C1072 - Standard Test Methods for Measurement of Masonry Flexural Bond Strength; 2019.
  17. ASTM C1148 - Standard Test Method for Measuring the Drying Shrinkage of Masonry Mortar; 1992a, changes through 2014.
  18. ASTM C1314 - Standard Test Method for Compressive Strength of Masonry Prisms; 2021.
  19. ASTM D226/D226M - Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing; 2017.
  20. ASTM D746 - Standard Test Method for Brittleness Temperature of Plastics and Elastomers by Impact; 2020.
  21. ASTM D2287 - Standard Classification System and Basis for Specification for Nonrigid Vinyl Chloride Polymer and Copolymer Molding and Extrusion Compounds; 2019.
  22. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2021a.
  23. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials; 2020.
  24. ASTM E514/E514M - Standard Test Method for Water Penetration and Leakage Through Masonry; 2020.
- C. Canadian Standards Association (CSA Group) (CSA):
1. CSA A82 - Fired Masonry Brick Made from Clay or Shale; 2018.
- D. The Masonry Society (TMS):
1. TMS 402/602 - Building Code Requirements and Specification For Masonry Structures; 2016.
- E. Underwriters Laboratories Inc. (UL):
1. UL (FRD) - Fire Resistance Directory; Current Edition.
  2. UL 263 - UL Standard for Safety Fire Tests of Building Construction and Materials; Current Edition.
  3. UL 618 - UL Standard for Safety Concrete Masonry Units; Current Edition.
  4. UL 723 - UL Standard for Safety Test for Surface Burning Characteristics of Building Materials; Current Edition.



**1.3 PRE-INSTALLATION MEETINGS**

- A. Section 01 30 00 - Administrative Requirements: Pre-installation meeting.
- B. Convene minimum one week prior to commencing work of this Section.

**1.4 COORDINATION**

- A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.
- B. Coordinate masonry work with related work to include, but not limited to:
  - 1. Installation of anchors for windows, doors fixtures and other work requiring anchors to masonry work. door anchors.
  - 2. Electrical items and other built-in work.
  - 3. Mechanical ducts and dampers.
  - 4. Plumbing work items. Copper piping to be isolated from contact with cementitious materials as per code requirements.
  - 5. Foamed-in-place insulation and all waterproofing and air barrier design elements.

**1.5 SUBMITTALS**

- A. Section 01 33 00 - Submittal Procedures: Submittal requirements.
- B. Product Data:
  - 1. Submit data for masonry units and fabricated wire reinforcement, wall ties, anchors, and other accessories.
  - 2. Indicate initial rate of absorption for clay and shale brick.
- C. Samples for Initial Selections: Two manufacturer's complete sets of color samples illustrating the full range of finishes, textures, and colors available; 4 x 4 x 1 inches in size. Include samples of full range of mortar and sealant colors for all unit masonry work. Submit for Architect's initial selections.
  - 1. Masonry Unit Types requiring sample submittals are as follows:
    - a. Face Brick.
    - b. Decorative Concrete Masonry Units.
    - c. Polished Face Decorative Concrete Masonry Units.
- D. Samples for Verification: From the Architect's initial selections, prepare and submit three samples for each selected finish, texture, and color; samples to be same product material type indicated for final Work; each masonry unit sample 12 x 12 x 1 inches; each mortar and sealant sample 3/8 x 4 inches. Where finishes involve normal color and texture variations, include sample sets showing the full range of variations expected.
- E. Manufacturer's Certificate:
  - 1. Certify products meet or exceed specified requirements.
  - 2. Certify Aggregate used in Fire-Rated Concrete Masonry Units (CMU) is compliant with UL Fire Resistance Design Ratings requirements or alternate methods of determining fire resistance as allowed by Section 703.3 of the International Building Code.

**1.6 QUALIFICATIONS**

- A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this Section with minimum five (5) years of documented experience.
- B. Installer Qualifications: Company specializing in performing Work of this Section with minimum three (3) years documented experience.

**1.7 MOCKUP**

- A. Section 01 40 00 - Quality Requirements: Mockup requirements.
- B. Exterior Wall Mockup Construction: Construction is to include all wall assembly components from exterior to interior of building. Contractor is to coordinate the various trade contractors to provide their work types in a sequenced and timely manner.
  - 1. Refer to Mockup details in Drawings.
  - 2. Locate mockup construction where directed by Architect.
  - 3. Mockup Construction Removal: Request and acquire approval from Architect.

**1.8 DELIVERY, STORAGE, AND HANDLING**

- A. Section 01 60 00 - Product Requirements: Product storage and handling requirements.
- B. Inspect products for damage during deliveries on site.
- C. Store products in accordance with manufacturer's recommendation and to avoid damage.

**1.9 ENVIRONMENTAL REQUIREMENTS**

- A. Section 01 60 00 - Product Requirements.
- B. Cold Weather Requirements: In accordance with TMS 402/602 when ambient temperature or temperature of masonry units is less than 40 degrees F.
- C. Hot Weather Requirements: In accordance with TMS 402/602 when ambient temperature is greater than 100 degrees F or ambient temperature is greater than 90 degrees F with wind velocity greater than 8 mph.

**PART 2 PRODUCTS****2.1 PERFORMANCE REQUIREMENTS**

- A. Comply with provisions of TMS 402/602, except where exceeded by requirements on Drawings or other Contract Documents.
  - 1. Maintain one copy of each document on project site.
- B. Fire-Resistance Ratings: Comply with requirements for fire-resistance-rated assembly designs indicated on Drawings.
  - 1. Where fire-resistance-rated construction is indicated, units shall be listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction.
  - 2. Provide units that comply with requirements for fire-resistance ratings indicated as determined by testing according to ASTM E119 or UL 263, and as acceptable to authorities having jurisdiction.
    - a. Alternate methods for determining fire resistance are to be as allowed by Section 703.3 of the International Building Code.

**2.2 MANUFACTURERS**

- A. Source Limitations for Masonry Units: Obtain exposed masonry units of a uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, from single source from single manufacturer for each product required.
- B. Source Limitations for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color for exposed masonry, from single manufacturer for each cementitious component and from single source or producer for each aggregate.

- C. Source Limitations for Masonry Accessories: Obtain each type of masonry accessory from single manufacturer for each product required.

### 2.3 MASONRY UNITS - GENERAL

- A. Special Shapes: Applies to all required masonry unit types.
1. Provide special shape units for 90 degree and 135 degree corners and lintels.
  2. Provide solid units where Drawings indicate unit setting position or special shape would otherwise result in exposure of unit cores, frogs, voids, or unfinished surfaces.
  3. Provide special shape units where Drawings indicate sculpted unit design (i.e. bullnose, angled, chamfered, ogee, coped water tables, sills, offsets, accents, etc.).
- B. Defective Units: Referenced masonry unit standards may allow a certain percentage of units to contain chips, cracks, or other defects exceeding limits stated. Do not use units where such defects are exposed in the completed Work.
- C. CMU Chips and Surface Deficiencies: In addition to the referenced standards regarding subject, also comply with the following more stringent requirements:
1. Do not install CMU with exposed chipped edges or corners greater than 1/2 inch and any exposed face damage or deviations greater than 1/4 inch diameter. All chips or deviations must be repaired to a surface consistent with the unblemished CMU surface and to the satisfaction of the Architect.

### 2.1 CONCRETE MASONRY UNITS

- A. General: Provide shapes indicated and with exposed surfaces matching finish and color of exposed faces of adjacent units of same type.
1. Unit Size and Shape: Unless indicated otherwise on Drawings, modular face size to be 7-5/8 x 15-5/8 inches and depths as indicated on Drawings.
    - a. Bond: 1/2 Bond (Running Bond), unless indicate otherwise on Drawings.
    - b. Coursing: One unit and one mortar joint to equal 8 inches.
    - c. Mortar Joints Tooling: Refer to INSTALLATION in this Section.
  2. Provide special shape units configured for corners, lintels, headers, control joint edges and for special conditions indicated on Drawings.
  3. Provide bullnose units as follows:
    - a. Wall outside corners.
      - 1) Exception: Provide angle-corner units for first exposed course at outside corners scheduled to receive wall base finish. Grind exposed upper portion of angle-corner unit to create a smooth transition to match the bullnose units above.
    - b. Wall caps, unless other cap material finish is indicated.
    - c. Windowsills, unless other sill material finish is indicated.
- B. Fire-Rated Hollow Load Bearing and Non-Load Bearing Concrete Masonry Units (CMU):
1. ASTM C90; light weight; UL 618; ACI 216.1-14.
  2. Compressive Strength: As indicated on Drawings, but not less than 2,000 PSI.
  3. Single scored vertically where indicated on Drawings.
- C. Hollow Load Bearing Concrete Masonry Units (CMU):
1. ASTM C90; lightweight in accordance with ASTM C331 with the following modifications:
 

a. Organic Impurities (Color):	ASTM C40/C40M	<1
b. Clay Lumps (%):	ASTM C142/C142M	<2
c. Stain Test (Index):	ASTM C641	No Stain
  2. Compressive Strength: As indicated on Drawings, but not less than 2,000 PSI.
  3. Single scored vertically where indicated on Drawings.

- D. Solid Load-Bearing Concrete Masonry Units (CMU):
1. ASTM C90; lightweight in accordance with ASTM C331 with the following modifications:
    - a. Organic Impurities (Color): ASTM C40/C40M <1
    - b. Clay Lumps (%): ASTM C142/C142M <2
    - c. Stain Test (Index): ASTM C641 No Stain
  2. Compressive Strength: As indicated on Drawings, but not less than 2,000 PSI.
  3. Single scored vertically where indicated on Drawings.
- E. Hollow Non-Load Bearing Concrete Masonry Units (CMU):
1. ASTM C129; lightweight.
  2. Compressive Strength: As indicated on Drawings, but not less than 2,000 PSI.
  3. Single scored vertically where indicated on Drawings.
- F. Concrete Brick Units: ASTM C55; for use in concealed from view utility applications.
1. Compressive Strength: As indicated on Drawings, but not less than 2,000 PSI.
    - a. If concrete brick units are used in an assembly with other concrete masonry units, match compressive strength of other concrete masonry units.
- G. Cast Stone Masonry: Refer to Section 04 72 00 - Cast Stone Masonry.

## 2.2 BRICK MASONRY UNITS

- A. General: Provide shapes indicated and as follows, with exposed surfaces matching finish and color of exposed faces of adjacent units of same type:
1. For ends of sills and caps and for similar applications that would otherwise expose unfinished brick surfaces, provide units without cores or frogs and with exposed surfaces finished.
  2. Provide special shapes for applications where stretcher units cannot accommodate special conditions, including those at corners, movement joints, bond beams, sashes, and lintels.
  3. Provide special shapes for applications requiring brick of size, form, color, and texture on exposed surfaces that cannot be produced by sawing.
  4. Provide special shapes for applications where shapes produced by sawing would result in sawed surfaces being exposed to view.
  5. For Soldier Course applications, provide shapes that produce coursing pattern and unit size as indicated on Drawings.
- B. Face Brick Modular Size: ASTM C216, Type FBS, Grade SW.
1. Size: 2-1/4 x 3-5/8 x 7-5/8 inches.
  2. Unit Compressive Strength: 3,000 psi minimum, unless indicated otherwise on Drawings.
    - a. Measured in accordance with ASTM C67/C67M.
    - b. As determined by average of five (5) brick method; and no individual brick less than 2,500 psi.
  3. Initial Rate of Absorption: Less than 30 g/30 sq. in. per minute when tested according to ASTM C67/C67M.
  4. Efflorescence Rating: Rating to be "not effloresced" in accordance with ASTM C67/C67M or rating to be "slightly effloresced" in accordance with CSA A82.
  5. Bond: 1/2 Bond (Running Bond); unless indicated otherwise on Drawings.
  6. Coursing: Three units and three mortar joints to equal 8 inches.
  7. Mortar Joint Tooling: Refer to INSTALLATION in this Section.
  8. Basis of Design Products: Subject to compliance with requirements, provide face brick with physical and visual characteristics comparable to the following Basis of Design units, as approved by Architect:
    - a. Face Brick Color - BRK1:

- 1) Lee Brick: 206F.
  - b. Face Brick Color - BRK2:
    - 1) Lee Brick: 216.
  - c. Face Brick Color - BRK3:
    - 1) Lee Brick: 608.
  - d. Face Brick Color - BRK4:
    - 1) Manufacturer / Finish To Be Determined: Cream Color Accent Brick.
- C. Building (Common) Brick: ASTM C62, Grade SW; solid units; for use in concealed from view utility applications.
- 1. Compressive Strength: 3,000 psi minimum, unless indicated otherwise on Drawings.
    - a. Measured in accordance with ASTM C67/C67M.
    - b. As determined by average of five (5) brick method; and no individual brick less than 2,500 psi.
  - 2. Initial Rate of Absorption: Less than 30 g/30 sq. in. per minute when tested according to ASTM C 67.
  - 3. Efflorescence Rating: Rating to be “not effloresced” in accordance with ASTM C67/C67M or rating to be “slightly effloresced” in accordance with CSA A82.

### 2.3 ACCESSORIES

- A. Manufacturers: Reinforcement and anchorage materials.
  - 1. Hohmann & Barnard, Inc.
  - 2. Wire-Bond.
  - 3. Blok-Lok Limited.
- B. Mortar and Grout: As specified in Section 04 05 03 - Masonry Mortaring and Grouting.
- C. Reinforcing Steel: ASTM A615/A615M, Grade 60 (60,000 psi) yield strength, deformed billet bars, uncoated finish.
- D. Reinforcing Steel Rebar Positioners (Z-shaped wire bridges cell of block while bent ends rest on block shell):
  - 1. Basis of Design: Hohmann & Barnard, Inc - HB RB Rebar Positioner.
  - 2. Wire (Carbon Steel): Cold-drawn steel wire conforming to ASTM A1064/A1064M.
  - 3. Wire Diameter: 9 gauge (.148 inch).
  - 4. Tensile Strength: 80,000 psi.
  - 5. Yield Point - 70,000 psi minimum.
  - 6. Hot-Dip Galvanized after fabrication: ASTM A153/A153M (1.5 oz/ft).
- E. Single Wythe Joint Reinforcement: Ladder type; ASTM A951/A951M steel wire, hot dip galvanized after fabrication to ASTM A153/A153M, Class B; 0.1875 inch side rods with 0.1483 inch cross rods; width as required to provide not more than 1 inch and not less than 1/2 inch of mortar coverage on each exposure.
  - 1. Basis of Design: Hohmann & Barnard, Inc - HB 220 Ladder-Mesh.
- F. Multiple Wythe Joint Reinforcement: Ladder type; ASTM A951/A951M steel wire, hot dip galvanized after fabrication to ASTM A153/A153M, Class B; 0.1875 inch side rods with 0.1483 inch cross rods; width as required to provide not more than 1 inch and not less than 1/2 inch of mortar coverage on each exposure.
  - 1. Basis of Design: Hohmann & Barnard, Inc - HB 220 Ladder-Mesh.
- G. Strap Anchors: Zee bent steel shape. 1-1/2 x 16 inches size x 1/4 inch thick. Hot dip galvanized after fabrication to ASTM A153/A153, Class B.
  - 1. Basis of Design: Hohmann & Barnard, Inc - HB 344 Rigid Partition Anchor.
- H. Cavity Wall Joint Reinforcing / Wall Ties: Ladder type, 0.1875 inch side rods with 0.148 inch cross rods; eye and pintle type anchors, 0.188 inch wire with compressed pintle legs;

- seismic clip to continuous rod in veneer, 0.1875 inch rod. All, ASTM A951/A951M steel wire, hot dip galvanized after fabrication to ASTM A153/A153M, Class B.
1. Basis of Design: Hohmann & Barnard, Inc. - HB 265 S.I.S Ladder -2X Hook Anchor and Seismic Interlock System.
  2. Where coursing of masonry veneer and structural masonry is not dimensionally aligned, provide joint reinforcing and wall tie system that allows for variations in alignment, up to 2-1/4 inch.
  3. Soldier Course Masonry Veneer: Due to the vertical joint condition, anchor system must turn vertical to accommodate joint.
    - a. Base Plate: ASTM A1008/A1008M carbon steel plate, 16 gauge thick x 2 inches wide with 1 inch bend. Hot dip galvanized to ASTM A153/A153M, Class B.
    - b. Wire Tie: ASTM A1064/A1064M carbon steel, 0.1875 inch wire. Hot dip galvanized to ASTM A153/A153M, Class B.
    - c. Basis of Design: Hohmann & Barnard, Inc. - HB BL-5407.
- I. Wall Ties: ASTM A1064/A1064M; steel wire 0.1875 inch diameter, eye and pintle type. ASTM A153/A153M, Class B hot dip galvanized after fabrication.
- J. Wall Ties (For Attachment to Metal Studs): Two-piece type; ASTM A1008/A1008M, 14 gage steel anchors; 0.1875 inch diameter wire ties. ASTM A153/A153M, Class B hot dip galvanized after fabrication.
- K. Wall Ties (For Attachment to Structural Steel): Two-piece type; 0.25 inch continuous steel weld-on anchors, 8 feet total length, with 3/8 inch offsets spaced 8 inches OC.; 0.1875 inch diameter wire ties. ASTM A153/A153M, Class B hot dip galvanized after fabrication.
- L. Wall Ties (For Attachment to Concrete Walls): Two piece type; ASTM A1008/A1008M, 18 gauge steel imbedded dovetail anchors, 10 feet total length, with foam insert; 0.1875 inch diameter wire ties. ASTM A153/A153M, Class B hot dip galvanized after fabrication.
- M. Through-Wall Flashing and Counter Flashing: Self adhering stainless steel fabric flashing; width of roll to suit application; with preformed end dams, and inside and outside corners.
  1. Thickness:
    - a. Membrane - 0.040 inch (40 mil).
    - b. Stainless steel - 0.030 inch (30 mil); Type 304.
  2. Tensile Strength - ASTM D412C: 100.000 psi, minimum.
  3. Puncture Resistance - ASTM E154: 2,500 psi, minimum.
  4. Peel Strength of Adhesive Bonds - ASTM D903: Not less than 103 lbs/ft.
  5. Fire Resistance - ASTM E84: Pass.
  6. Mold Resistance - ASTM D3273: Pass.
  7. Basis of Design: Hohmann & Barnard, Inc. - Mighty-Flash, SA Flashing.
- N. Termination Bar at Top of Through-Wall Flashing: Type 304, stainless steel type, 1 inch x 8 feet x 1/8 inch thick.
  1. At all locations where top edge of through-wall flashing is not indicated to be imbedded into back-up masonry wall, install continuous Termination Bar along top edge using stainless steel fasteners at 8 inches OC., preventing pull-out. Apply sealant continuously along top edge of termination bar and flashing assembly to seal against water penetration behind top of through-wall flashing assembly.
  2. Basis of Design: Hohmann & Barnard, Inc.
- O. Metal Flashing Drip Edge Plate: Stainless Steel Flashing: ASTM A666, Type 304, soft temper; 26 gauge (0.0179 inch) thick, factory formed hemmed drip edge configuration; finish 2D (dull).
  1. Basis of Design: Hohmann & Barnard, Inc. - HB Drip Edge Plate.
  2. Length: Not less than 8 feet long.

3. Width: As indicated on Drawings, but not less than 3 inches wide.
  4. Provide factory preformed Inside Corners, Outside Corners and End Dams.
- P. Preformed Control and Expansion Joints: Extruded polyvinyl chloride material conforming with ASTM D2287. Furnish with corner and tee accessories. Fuse joints.
1. Tensile Strength - ASTM D412: 2200 psi.
  2. Ultimate Elongation - ASTM D412: 350 percent.
  3. Shore A Hardness - ASTM D2240: 85 (+ or - 5).
  4. Low Temp Brittleness - ASTM D746: -35 degrees C.
- Q. Joint Filler: Closed cell rubber (polychloroprene) oversized 50 percent to joint width; self-expanding; width indicated by maximum lengths.
- R. Cavity Drainage Material:
1. Open polyethylene or polypropylene mesh; thickness as required to fill cavity space; 10 inches high with 7 inches deep dovetail notches at top; designed to allow cavity drainage and prevent collection and damming effect of mortar droppings in cavity.
- S. Weeps: Preformed corrugated polypropylene cell vents; conforming to ASTM D2240, ASTM D790B, ASTM D638, and ASTM D1238B standards.
1. Basis of Design: Hohmann & Barnard, Inc. - HB Quadro Vent.
  2. Size: 2-1/2 x 3-1/2 inches size, 3/8 inch thick.
  3. Color: Clear.
- T. Cavity Vents: Same material as weeps.
- U. Masonry Cleaning Solution: Non-acidic and not harmful to masonry or adjacent materials.
1. Manufacturers:
    - a. EaCo Chem., Inc. - NMD 80 New Masonry Detergent.
    - b. PROSOCO - Sure Klean Vana Trol.
  2. Basis of Design: PROSOCO - Sure Klean Vana Trol.
- V. Steel Lintels, Windowsill Supports, and Other Steel Supports: Refer to Section 05 50 00 - Metal Fabrications. Size and configuration as indicated on Drawings. All exterior steel components to be hot dip galvanized per Section 05 50 00.

## **PART 3 EXECUTION**

### **3.1 EXAMINATION**

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify field conditions are acceptable and are ready to receive work.
- C. Verify items provided by other Sections of work are properly sized and located.
- D. Verify built-in items are in proper location, and ready for roughing into masonry work.

### **3.2 PREPARATION**

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this Section.
- B. Prepare materials to be installed and equipment used during installation.
- C. Direct and coordinate placement of metal anchors supplied to other Sections.
- D. Provide protection coverings to protect adjacent and surrounding work from damage and mortar and grouting splatters/droppings.

- E. Furnish temporary bracing during installation of masonry work. Maintain in place until building structure provides permanent support.
- F. Wet clay and shale brick before laying when initial rate of absorption is greater than 30 grams when tested in accordance with ASTM C67/C67M.

### 3.3 INSTALLATION

- A. Protection Against Water Infiltration: Protect tops of masonry work with waterproof coverings secured in place without damaging masonry. Provide coverings where masonry is exposed to weather when work is not in progress.
- B. Establish lines, levels, and coursing indicated. Protect from displacement.
- C. Maintain masonry courses to uniform dimension. Form bed and head joints of uniform thickness.
- D. Placing and Bonding:
  - 1. Lay solid masonry units in full bed of mortar, with full head joints.
  - 2. Lay hollow masonry units with face shell bedding on head and bed joints.
  - 3. Buttering corners of joints or excessive furrowing of mortar joints are not permitted.
  - 4. Remove excess mortar as work progresses.
  - 5. Interlock intersections and external corners.
  - 6. Do not shift or tap masonry units after mortar has achieved initial set. Where adjustment is required, remove mortar and replace.
  - 7. Perform job site cutting of masonry units with proper tools to assure straight, clean, unchipped edges. Prevent broken masonry unit corners or edges.
  - 8. Isolate masonry from vertical structural framing members with movement joint.
  - 9. Isolate top of masonry from horizontal structural framing members and slabs or decks with compressible joint filler.
- E. Mortar Joints Finishing:
  - 1. General:
    - a. Mortar joints to be of consistent execution with consistent depth and width. Strike vertical joints first, then strike horizontal joints. This provides a continuous horizontal joint (uninterrupted by vertical joints) and is the required appearance.
    - b. Mortar joints at bullnose corners are to be continuously tooled around corner and to be consistent in appearance with the straight-run joints.
    - c. Clean inside corner joints free of excess mortar and finish.
  - 2. Concave Tooling: Use convex steel tool of diameter 1/4 inch greater than joint width.
    - a. Application: All locations unless indicated otherwise in this Section or on Drawings.
  - 3. Flush-Cut Joints: Cut mortar joints flush with face of masonry units; no tooling.
    - a. Applications:
      - 1) Masonry walls indicated to receive direct applied plaster finish, dampproofing, or waterproofing materials.
      - 2) Behind resilient base locations, cut mortar joints flush with face of masonry units and only where concealed behind the resilient base application. Coordinate with approved resilient base height.
  - 4. Where masonry wall is constructed of single vertically scored CMU, joint tooling to be recessed to same depth as CMU manufactured score.
- F. Weeps: Furnish weeps in outer wythe at 24 inches OC. horizontally above through-wall flashing, above shelf angles and lintels and at bottom of walls.



- G. Cavity Wall: Do not permit mortar to drop or accumulate into cavity air space or to plug weeps.
1. Install cavity drain material continuously at bottom of each cavity above through-wall flashing.
  2. At foundation and below grade locations, don't allow debris or soil to collect and remain in the cavity prior to installing the cavity materials as indicated on Drawings. Ensure that the cavity is free of any debris or soil prior to installing cavity materials as indicated on Drawings.
- H. Joint Reinforcement and Anchorage - Single Wythe Masonry:
1. Install horizontal joint reinforcement 16 inches OC.
  2. Place masonry joint reinforcement in first horizontal joints above and below openings. Extend minimum 16 inches each side of opening.
  3. Place joint reinforcement continuous in first joint below top of walls.
  4. Lap joint reinforcement ends minimum 6 inches.
  5. Reinforce joint corners and intersections with strap anchors 16 inches OC.
- I. Joint Reinforcement and Anchorage - Multiple Wythe Unit Masonry:
1. Install horizontal joint reinforcement 16 inches OC.
  2. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 16 inches each side of opening.
  3. Place joint reinforcement continuous in first and second joint below top of walls.
  4. Lap joint reinforcement ends minimum 6 inches.
  5. Support and secure reinforcing bars from displacement. Maintain position within 1/2 inch of dimensioned position.
- J. Joint Reinforcement and Anchorage - Masonry Veneer (where no cavity indicated on Drawings) (Interior walls only; exterior walls must have cavity for drainage.):
1. Install horizontal joint reinforcement 16 inches OC.
  2. Place masonry joint reinforcement in first horizontal joints above and below openings. Extend minimum 16 inches each side of opening.
  3. Place joint reinforcement continuous in first joint below top of walls.
  4. Lap joint reinforcement ends minimum 6 inches.
  5. Embed wall ties in masonry backing to bond veneer at maximum 16 inches OC vertically and 16 inches OC horizontally. Place wall ties at maximum 8 inches OC vertically within 8 inches of jamb of wall openings.
  6. Reinforce joint corners and intersections with strap anchors 16 inches OC.
- K. Joint Reinforcement and Anchorages - Cavity Wall Masonry:
1. Install horizontal joint reinforcement 16 inches OC.
  2. Place masonry joint reinforcement in first horizontal joints above and below openings. Extend minimum 16 inches each side of opening.
  3. Place joint reinforcement continuous in first joint below top of walls.
  4. Lap joint reinforcement ends minimum 6 inches.
  5. Attach to structural steel members. Embed anchorages in every second block joint.
  6. Reinforce joint corners and intersections with strap anchors 16 inches OC.
- L. Masonry Through-Wall Flashings:
1. Solid substrate to be continuous below and behind flashing material.
  2. Install metal flashing drip edge plate with sealed lap joints and preformed corners and end dams in accordance with manufactures recommendations. Adhere through-wall flashing continuously along top of drip edge plate as indicated on Drawings and with adhesive compatible with both surface types.
  3. Whether or not specifically indicated, install masonry through-wall flashing to divert water to exterior at all locations where downward flow of water would otherwise be interrupted.

4. Extend through-wall flashings horizontally through outer wythe at foundation walls, above ledge or shelf angles and lintels, under parapet caps and at bottom of walls, and terminate bottom and top edges as indicated on Drawings.
    - a. Unless indicated otherwise on Drawings, extend vertical flashing portion a minimum of 8 inches above lower flashing portion that diverts water to exterior.
      - 1) Self-Adhering Flashing (when indicated):
        - a) Terminate top edge with continuous termination bar and sealant.
        - b) Terminate bottom edge at no more than 1/4 inch from exterior face of masonry. For steel support lintels and ledges, terminate bottom edge of flashing at steel support edge.
      - 2) Non-Self-Adhering Flashing (when indicated):
        - a) Terminate top edge by embedding top edge into masonry joint with a minimum of 1-1/2 inches embedment and seal.
          - (1) Exception: Only if indicated on Drawings in specific construction locations, top edge to be terminated with termination bar and sealant.
        - b) Terminate bottom edge at no more than 1/4 inch from exterior face of masonry. For steel support lintels and ledges, terminate bottom edge at steel support edge.
  5. Lap end joints minimum 6 inches and seal watertight with sealant recommended by flashing manufacturer.
  6. Form and configure flashing as to drain moisture along its drainage path to the exterior of the wall, preventing moisture migration into the wall and cavity.
  7. Turn flashing, fold, and seal at corners, bends, and interruptions. Use preformed end dams, and inside and outside corners when indicated.
- M. Lintels:
1. Install loose steel and reinforced unit masonry lintels over openings as indicated.
  2. Install reinforced unit masonry lintels over openings where steel or precast concrete lintels are not scheduled or indicated.
  3. Do not splice reinforcing bars.
  4. Support and secure reinforcing bars from displacement.
  5. Place and consolidate grout fill without displacing reinforcing.
  6. Allow masonry lintels to attain specified strength before removing temporary supports.
  7. Maintain minimum 8 inches bearing on each side of opening.
- N. Grouted Components:
1. Reinforce bond beam as indicted on Drawings.
  2. Lap splices for reinforcing bars to be as required by code and Drawings and as related to the bar diameters.
  3. Support and secure reinforcing bars from displacement.
  4. Place and consolidate grout fill without displacing reinforcing.
  5. At bearing locations, fill masonry cores with grout for minimum 12 inches both sides of opening.
- O. Reinforced Masonry:
1. Lay masonry units with core vertically aligned and clear of mortar and unobstructed.
  2. Place reinforcement bars as indicated on Drawings.
  3. Splice reinforcement in accordance with Section 03 20 00.
  4. Support and secure reinforcement from displacement.
  5. Place and consolidate grout fill without displacing reinforcing.
  6. Place grout in accordance with TMS 402/602 Specification for Masonry Structures.

- P. Control and Expansion Joints:
1. Install control and expansion joints at locations indicated on Drawings and not to exceed the following maximum spacing:
    - a. Exterior Walls: 24 feet on center and within 24 inches on one side of each interior and exterior corner.
    - b. Interior Walls: 24 feet on center.
    - c. At changes in wall height.
  2. Do not continue horizontal joint reinforcement through expansion joints.
  3. Install preformed control and expansion joint device in continuous lengths. Seal butt and corner joints in accordance with manufacturer's instructions.
  4. Size control joint in accordance with Section 07 90 00 for sealant performance.
  5. Form expansion joint by omitting mortar and cutting unit to form open space.
- Q. Built-In Work:
1. As work progresses, install built-in metal door and glazed frames, window frames, anchor bolts, plates, and other items to be built-in the work and furnished by other Sections.
  2. Install built-in items plumb and level.
  3. Bed anchors of metal door and glazed frames in adjacent mortar joints. Fill frame voids solid with grout or mortar. Fill adjacent masonry cores with grout minimum 12 inches from framed openings.
  4. Do not build into masonry construction organic materials or other materials that are subject to deterioration.

### 3.4 CUTTING AND FITTING

- A. Cut and fit for chases, pipes, conduit, sleeves, and other construction requirements indicated. Coordinate with other Sections of work to provide correct size, shape, and location.
- B. Obtain approval prior to cutting or fitting masonry work not indicated or where appearance or strength of masonry work may be impaired.
- C. Core drill masonry walls for pipe and sleeve penetrations, regardless of size. Do not break out masonry for penetration access.
- D. All ductwork and large sleeve penetrations wider than 16 inches must have at least 4 inches solid masonry on both sides, supporting steel lintel or bond beam over opening.

### 3.5 ERECTION TOLERANCES

- A. Section 01 40 00 - Quality Requirements: Tolerances.
- B. Maximum Variation from Alignment of Columns and Pilasters: 1/4 inch.
- C. Maximum Variation from Unit to Adjacent Unit: 1/16 inch.
- D. Maximum Variation from Plane of Wall: 1/4 inch in 10 ft and 1/2 inch in 20 ft or more.
- E. Maximum Variation from Plumb: 1/4 inch per story non-cumulative; 1/2 inch in two stories or more.
- F. Maximum Variation from Level Coursing: 1/8 inch in 3 ft and 1/4 inch in 10 ft; 1/2 inch in 30 ft.
- G. Maximum Variation of Joint Thickness: 1/8 inch in 3 ft.
- H. Maximum Variation from Cross Sectional Thickness of Walls: 1/4 inch.
- I. Maximum Variation for Steel Reinforcement:

1. Install reinforcement within the tolerances specified in TMS 402/602 for foundation walls.
2. Plus or minus 1/2 inch when distance from centerline of steel to opposite face of masonry is 8 inches or less.
3. Plus or minus 1 inch when distance is between 8 and 24 inches.
4. Plus or minus 1-1/4 inch when distance is greater than 24 inches.
5. Plus or minus 2 inches from location along face of wall.

### **3.6 CLEANING**

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures: Related to cleaning.
- B. Remove excess mortar and mortar smears as work progresses.
- C. Replace defective mortar. Match adjacent work.
- D. Clean soiled surfaces with cleaning solution.
- E. Use non-metallic tools in cleaning operations.
- F. Progress Payments for completed work will not be made until brick is cleaned of all excessive mortar and mortar stains.

### **3.7 PROTECTION OF INSTALLED CONSTRUCTION**

- A. Section 01 73 00 - Execution: Protecting installed construction.
- B. Without damaging completed work, provide protective boards at exposed external corners that are subject to damage by construction activities.
- C. Protect masonry and other items built into masonry walls from spatter, droppings, and staining that can be caused by other work activities such as mortaring and grouting.
  1. Aggressive protection efforts to be provided for interior and exterior base of walls and windowsills.
- D. Protection Against Water Infiltration: Protect tops of masonry work with waterproof coverings secured in place without damaging masonry. Provide coverings where masonry is exposed to weather when work is not in progress.

**END OF SECTION**

**SECTION 04 72 00**  
**CAST STONE MASONRY**

**PART 1 GENERAL****1.1 SUMMARY**

- A. Section Includes:
  - 1. Sills for windows.
  - 2. Caps for masonry walls.
  - 3. Other cast stone items indicated on Drawings.
- B. Related Requirements:
  - 1. Section 04 05 03 - Masonry Mortaring and Grouting: Mortar for setting cast stone.
  - 2. Section 04 20 00 - Unit Masonry: Installation of cast stone in conjunction with masonry.
  - 3.
  - 4. Section 05 50 00 - Metal Fabrications: Loose lintels and supports for cast stone units.
  - 5. Section 07 90 00 - Joint Protection: Sealing joints indicated to be left open for sealant.

**1.2 REFERENCES**

- A. American Concrete Institute (ACI):
  - 1. ACI 318 - Building Code Requirements for Structural Concrete (ACI 318-19) Commentary on Building Code Requirements for Structural Concrete (ACI 318R-19); 2019, Errata 2021.
- B. ASTM International (ASTM):
  - 1. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.
  - 2. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon Steel Bars for Concrete Reinforcement; 2020.
  - 3. ASTM A767/A767M - Standard Specification for Zinc-Coated (Galvanized) Steel Bars for Concrete Reinforcement; 2019.
  - 4. ASTM A775/A775M - Standard Specification for Epoxy-Coated Steel Reinforcing Bars; 2019.
  - 5. ASTM A884/A884M - Standard Specification for Epoxy-Coated Steel Wire and Welded Wire Reinforcement; 2019, with editorial change 2020.
  - 6. ASTM A1064/A1064M - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete; 2018.
  - 7. ASTM C33/C33M - Standard Specification for Concrete Aggregates; 2018.
  - 8. ASTM C39/C39M - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens; 2021.
  - 9. ASTM C150/C150M - Standard Specification for Portland Cement; 2021.
  - 10. ASTM C270 - Standard Specification for Mortar for Unit Masonry; 2019.
  - 11. ASTM C494/C494M - Standard Specification for Chemical Admixtures for Concrete; 2019.
  - 12. ASTM C642 - Standard Test Method for Density, Absorption, and Voids in Hardened Concrete; 2013.
  - 13. ASTM C979/C979M - Standard Specification for Pigments for Integrally Colored Concrete; 2016.
  - 14. ASTM C1195 - Standard Test Method for Absorption of Architectural Cast Stone; 2021.

15. ASTM C1364 - Standard Specification for Architectural Cast Stone; 2019.

C. Minerals, Metals, & Materials Society (TMS):

1. TMS 402/602 - Building Code Requirements and Specification for Masonry Structures; 2016.

### 1.3 COORDINATION

- A. Section 01 30 00 - Administrative Requirements: Requirements for coordination.
- B. Coordinate cast stone work with masonry backup and veneer, framed backup, and installation of anchors for frames in openings.

### 1.4 SUBMITTALS

- A. See Section 01 33 00 - Submittal Procedures: Requirements, for submittal procedures.
- B. Product Data: Test results of cast stone components made previously by the manufacturer.
- C. Shop Drawings: Include elevations, dimensions, layouts, profiles, cross sections, reinforcement, exposed faces, arrangement of joints, anchoring methods, anchors, and piece numbers.
- D. Samples for Initial Selections: Two manufacturer's complete sets of color samples illustrating the full range of finishes, textures, and colors available; 4 x 4 x 1 inches in size. Include samples of full range of mortar and sealant colors. Submit for Architect's initial selections.
- E. Samples for Verification: From the Architect's initial selections, prepare and submit two samples for each selected finish, texture, and color; samples to be same product material type indicated for final Work; each cast stone sample 12 x 12 x 1 inches; each mortar and sealant sample 3/8 x 4 inches. Where finishes involve normal color and texture variations, include sample sets showing the full range of variations expected.
- F. Test Reports: Indicate concrete mix design compressive strength and water absorption.
- G. Manufacturer's Installation Instructions: Submit instructions for anchor attachment, cast stone cleaning, and special Project installation conditions.
- H. Manufacturer's Certificate: Certify Products meet or exceed specified requirements.

### 1.5 QUALITY ASSURANCE

- A. Perform Work in accordance with TMS 402/602 Building Code Requirements and Specifications for Masonry Structures.
- B. Perform Work in accordance with Cast Stone Institute Technical Manual.

### 1.6 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing Products specified in this section with minimum five (5) years documented experience.
  - 1. Current producer member of the Cast Stone Institute or the Architectural Precast Association.
  - 2. Manufacturer's production facility currently holds a Plant Certification from the Cast Stone Institute or the Architectural Precast Association.
  - 3. Adequate plant capacity to furnish quality, sizes, and quantity of cast stone required without delaying progress of the work.
- B. Installer: Company specializing in performing work of this section with minimum three (3) years documented experience.

**1.7 MOCKUP**

- A. Section 01 40 00 - Quality Requirements: Mockup requirements.
- B. Provide full size cast stone components for installation in mock-up of exterior wall.
  - 1. Approved mockup will become standard for appearance and workmanship.
  - 2. Remove mock-up not incorporated into the work and dispose of debris.

**1.8 DELIVERY, STORAGE, AND HANDLING**

- A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Deliver cast stone components secured to shipping pallets and protected from damage and discoloration. Protect corners from damage.
- C. Number each piece individually to match shop drawings and schedule.
- D. Store cast stone components and installation materials in accordance with manufacturer's instructions.
- E. Store cast stone components on pallets with non-staining, waterproof covers. Ventilate under covers to prevent condensation. Prevent contact with dirt.
- F. Protect cast stone components during handling and installation to prevent chipping, cracking, or other damage.
- G. Store mortar materials where contamination will not occur.
- H. Schedule and coordinate production and delivery of cast stone components with unit masonry work to optimize on-site inventory and to avoid delaying the work.
- I. Cast stone units are not to be packaged and shipped prior to completion of curing, and prior to drying from cleaning of cement film process.

**1.9 ENVIRONMENTAL REQUIREMENTS**

- A. Section 01 60 00 - Product Requirements: Environmental conditions affecting products on site.
- B. Cold Weather Requirements: In accordance with TMS 402/602 when ambient temperature or temperature of masonry units is less than 40 degrees F.
- C. Hot Weather Requirements: In accordance with TMS 402/602 when ambient temperature is greater than 100 degrees F or ambient temperature is greater than 90 degrees F with wind velocity greater than 8 mph.

**PART 2 PRODUCTS****2.1 MANUFACTURERS**

- A. Architectural Cast Stone:
  - 1. Any current producer member of the Architectural Precast Association or the Cast Stone Institute.

**2.2 ARCHITECTURAL CAST STONE**

- A. Cast Stone: Architectural concrete product manufactured to simulate appearance of natural granite, complying with ASTM C1364.
  - 1. Compressive Strength: ASTM C39/C39M; minimum 5,000 psi at 28 days.

2. Absorption: ASTM C1195; maximum 6 percent for cold water and 10 percent for boiling water at 28 days.
  3. Freeze-Thaw Resistance: Demonstrated by field experience.
  4. Surface Texture: Fine grained texture, with no bug holes, air voids, or other surface blemishes visible from distance of 10 feet.
  5. Remove cement film from exposed surfaces before packaging for shipment.
  6. Color:
    - a. To be selected by Architect from manufacturer's full range.
- B. Shapes: Provide shapes indicated on drawings.
1. Variation from Any Dimension, Including Bow, Camber, and Twist: Maximum of plus/minus 1/8 inch or length divided by 360, whichever is greater, but not more than 1/4 inch.
  2. Unless otherwise indicated on drawings, provide:
    - a. Wash or slope of 1:12 on exterior horizontal surfaces.
    - b. Drips on projecting components, wherever possible and as indicated on Drawings.
- C. Reinforcement: Provide reinforcement as required to withstand handling and structural stresses; comply with ACI 318.
1. Pieces more than 24 inches in any dimension: Provide full length two-way reinforcement of cross-sectional area not less than 0.25 percent of unit cross-sectional area.
- D. Materials:
1. Portland Cement: ASTM C150/C150M.
    - a. For Precast Units:
      - 1) Type I - Normal, white or gray as required to match Architect's selected sample.
      - 2) Type III - High Early Strength, for use in cold weather, white or gray as required to match Architect's selected sample.
    - b. For Units: Type I or II, white.
  2. Coarse Aggregate: ASTM C33/C33M, except for gradation; granite, quartz, or limestone.
  3. Fine Aggregate: ASTM C33/C33M, except for gradation; natural or manufactured sands.
  4. Pigments: ASTM C979, inorganic iron oxides; do not use carbon black.
  5. Admixtures: ASTM C494/C494M.
  6. Water: Potable.
  7. Reinforcing Bars: ASTM A615/A615M deformed bars, galvanized.
    - a. Galvanized in accordance with ASTM A767/A767M, Class I.
    - b. Epoxy coated in accordance with ASTM A775/A775M.
  8. Steel Welded Wire Reinforcement: ASTM A1064/A1064M, galvanized or ASTM A884/A884M, epoxy coated.
  9. Embedded Anchors, Dowels, and Inserts: Type 304 stainless steel, of type and size as required for conditions.
  10. Flashings: As specified in Section 04 20 00 and as indicated on Drawings.
  11. Shelf Angles and Similar Structural Items: Hot-dip galvanized steel per ASTM A123/A123M, of shapes and sizes as required for conditions.
  12. Mortar: Portland cement-lime, as specified in Section 04 05 11; do not use masonry cement.
  13. Mortar: As specified in Section 04 20 00.
  14. Cleaner: General-purpose cleaner designed for removing mortar and grout stains, efflorescence, and other construction stains from new masonry surfaces without discoloring or damaging masonry surfaces; approved for intended use by cast stone



manufacturer and by cleaner manufacturer for use on cast stone and adjacent masonry materials.

### 2.3 FABRICATION

- A. Size: As indicated on Drawings, square edges unless indicated otherwise on Drawings.
- B. Use rigid molds, constructed to maintain cast stone units uniform in shape, size, and finish.
- C. Form units to length required for joint layout indicated on Drawings. Field cutting to length is not permitted.
- D. Reinforce units in accordance with ASTM C1364 for safe handling and as indicated on shop drawings to resist structural loads.
- E. Form corners to profiles indicated on Drawings.
- F. Form drip slot in bottom surface of exterior units projecting 3/4 inch or more beyond face of wall. Locate slot 3/8 inch back from nose of projection. Size slot not less than 3/8 inch wide and 3/8 inch deep and continuous for full width of projection.
- G. Curing: Cure units to develop concrete quality, and to minimize appearance blemishes including non-uniformity, staining, or surface cracking.
- H. Clean exposed-to-view surfaces to remove cement film and achieve uniform appearance.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Examine construction to receive cast stone components.
- C. Do not begin installation until unacceptable conditions have been corrected.

### 3.2 PREPARATION

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this section.
- B. Prepare materials to be installed and equipment to be used during installation.

### 3.3 INSTALLATION

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Provide for erection procedures and induced loads during erection. Furnish temporary bracing during installation. Maintain temporary bracing in place until final support is provided.
- C. Install cast stone components in conjunction with masonry, complying with requirements of Section 04 20 00.
- D. Mechanically anchor cast stone units indicated; set remainder in mortar.
- E. Erect units without damage to shape or finish. Replace or repair damaged panels.
- F. Erect units level and plumb within allowable tolerances.
- G. Align and maintain uniform horizontal and vertical joints as erection progresses.

- H. When units require adjustment beyond design or tolerance criteria, discontinue affected work; advise Architect.
- I. Setting:
1. Drench cast stone components with clear, running water immediately before installation.
  2. Set units in a full bed of mortar unless otherwise indicated. Allow for final joint finish material application.
  3. Fill vertical joints with mortar but allowing for final joint finish material application.
  4. Fill dowel holes and anchor slots completely with mortar or non-shrink grout.
  5. Do not shift or tap cast stone units after mortar has achieved initial set. Where adjustment is required, remove mortar, and replace.
- J. Joints: Where Drawings indicate specific locations for joints, comply with locations indicated.
1. Exposed joint widths to be 3/8 inch unless otherwise indicated on Drawings.
  2. Rake and clear mortar joints to 3/4 inch depth from unit face for application of joint finish material.
  3. Remove excess mortar from face of stone before application of joint finish material.
  4. Seal perimeter and intermediate joints in accordance with Section 07 90 00 with non-staining, silicone type sealant.
  5. Tool joint finish material to finish profile as indicated on Drawings.
- K. Repairs and Replacement of Damaged Units:
1. Repair chips and other surface damage noticeable when viewed in direct daylight at 10 feet.
  2. Repair with matching repair materials provided by the manufacturer and in accordance with manufacturer's instructions.
  3. Architect's judgement regarding acceptability of repair results is final.
  4. Remove and replace units that are not repaired to the approval of Architect.

### 3.4 ERECTION TOLERANCES

- A. Section 01 40 00 - Quality Requirements: Tolerances.
- B. Variation from Plumb: Not more than 1/8 inch in 10 feet or 1/4 inch in 20 feet or more.
- C. Variation from Level: Not more than 1/8 inch in 10 feet or 1/4 inch in 20 feet, or 3/8 inch maximum.
- D. Variation in Joint Width: Not more than 1/8 inch in 36 inches or 1/4 of nominal joint width, whichever is less.
- E. Variation in Plane Between Adjacent Surfaces (Lipping): Not more than 1/16 inch difference between planes of adjacent units or adjacent surfaces indicated to be flush with units.

### 3.5 CLEANING

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures: Related to cleaning.
- B. Clean Work in accordance with manufacturer's instructions.
- C. Keep cast stone components clean as work progresses.
- D. Clean completed exposed cast stone after mortar is thoroughly set and cured.
- E. Wet surfaces with water before applying cleaner.

- F. Apply cleaner to cast stone in accordance with manufacturer's instructions.
- G. Remove cleaner promptly by rinsing thoroughly with clear water.
- H. Do not use acidic cleaners.

### **3.6 PROTECTION OF INSTALLED CONSTRUCTION**

- A. Section 01 73 00 - Execution: Protecting installed construction.
- B. Protect completed work from damage.
- C. Clean, repair, or restore damaged or mortar-splashed work to condition of new work.

**END OF SECTION**



**SECTION 05 12 00**  
**STRUCTURAL STEEL**

**PART 1 GENERAL**

**1.1 SUMMARY**

- A. Section Includes:
1. Structural shapes.
  2. Channels and angles.
  3. Hollow structural sections.
  4. Structural pipe.
  5. Structural plates and bars.
  6. Fasteners, connectors, and anchors.
  7. Base plate grout.
- B. Related Sections:
1. Section 052100 - Steel Joists.
  2. Section 053100 - Steel Decking.

**1.2 REFERENCES**

- A. American Institute of Steel Construction:
1. AISC Code of Standard Practice for Steel Buildings and Bridges.
  2. AISC Load and Resistance Factor Design (LRFD) Specification for Structural Steel Buildings.
  3. AISC Load and Resistance Factor Design Specification for Single-Angle Members.
  4. AISC Seismic Provisions for Structural Steel Buildings.
  5. AISC Specification for Allowable Stress Design of Single-Angle Members.
  6. AISC Specification for the Design of Steel Hollow Structural Sections.
  7. AISC Specification for Structural Steel Buildings Allowable Stress Design, and Plastic Design.
- B. American Society of Civil Engineers:
1. ASCE 19 - Standard Applications of Steel Cables for Buildings.
- C. ASTM International:
1. ASTM A36/A36M - Standard Specification for Carbon Structural Steel.
  2. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
  3. ASTM A108 - Standard Specification for Steel Bar, Carbon and Alloy, Cold-Finished.
  4. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
  5. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
  6. ASTM A193/A193M - Standard Specification for Alloy-Steel and Stainless Steel Bolting Materials for High-Temperature Service.
  7. ASTM A307 - Standard Specification for Carbon Steel Bolts and Studs, 60 000 PSI Tensile Strength.
  8. ASTM A325 - Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.
  9. ASTM A354 - Standard Specification for Quenched and Tempered Alloy Steel Bolts, Studs, and Other Externally Threaded Fasteners.

10. ASTM A449 - Standard Specification for Quenched and Tempered Steel Bolts and Studs.
  11. ASTM A490 - Standard Specification for Structural Bolts, Alloy Steel, Heat Treated, 150 ksi Minimum Tensile Strength.
  12. ASTM A500 - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
  13. ASTM A501 - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing.
  14. ASTM A514/A514M - Standard Specification for High-Yield-Strength, Quenched and Tempered Alloy Steel Plate, Suitable for Welding.
  15. ASTM A529/A529M - Standard Specification for High-Strength Carbon-Manganese Steel of Structural Quality.
  16. ASTM A563 - Standard Specification for Carbon and Alloy Steel Nuts.
  17. ASTM A572/A572M - Standard Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel.
  18. ASTM A588/A588M - Standard Specification for High-Strength Low-Alloy Structural Steel with 50 ksi (345 MPa) Minimum Yield Point to 4-in. (100-mm) Thick.
  19. ASTM A618 - Standard Specification for Hot-Formed Welded and Seamless High-Strength Low-Alloy Structural Tubing.
  20. ASTM A786/A786M - Standard Specification for Hot-Rolled Carbon, Low-Alloy, High-Strength Low-Alloy, and Alloy Steel Floor Plates.
  21. ASTM A847 - Standard Specification for Cold-Formed Welded and Seamless High Strength, Low Alloy Structural Tubing with Improved Atmospheric Corrosion Resistance.
  22. ASTM A852/A852M - Standard Specification for Quenched and Tempered Low-Alloy Structural Steel Plate with 70 ksi (485 MPa) Minimum Yield Strength to 4 in. (100 mm) Thick.
  23. ASTM A913/A913M - Standard Specification for High-Strength Low-Alloy Steel Shapes of Structural Quality, Produced by Quenching and Self-Tempering Process (QST).
  24. ASTM A992/A992M - Standard Specification for Structural Steel Shapes.
  25. ASTM B695 - Standard Specification for Coatings of Zinc Mechanically Deposited on Iron and Steel.
  26. ASTM E94 - Standard Guide for Radiographic Examination.
  27. ASTM E164 - Standard Practice for Ultrasonic Contact Examination of Weldments.
  28. ASTM E165 - Standard Test Method for Liquid Penetrant Examination.
  29. ASTM E709 - Standard Guide for Magnetic Particle Examination.
  30. ASTM F436 - Standard Specification for Hardened Steel Washers.
  31. ASTM F959 - Standard Specification for Compressible-Washer-Type Direct Tension Indicators for Use with Structural Fasteners.
  32. ASTM F1554 - Standard Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength.
  33. ASTM F1852 - Standard Specification for Twist Off Type Tension Control Structural Bolt/Nut/Washer Assemblies, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.
- D. American Welding Society:
1. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination.
  2. AWS D1.1 - Structural Welding Code - Steel.
- E. National Association of Architectural Metal Manufacturers:

1. NAAMM MBG 531, "Metal Bar Grating Manual"
- F. Research Council on Structural Connections:
  1. RCSC - Specification for Structural Joints Using ASTM A325 or A490 Bolts.
- G. SSPC: The Society for Protective Coatings:
  1. SSPC - Steel Structures Painting Manual.
  2. SSPC Paint 15 - Steel Joist Shop Paint.
  3. SSPC Paint 20 - Zinc-Rich Primers (Type I - Inorganic and Type II - Organic).
  4. SSPC SP 3 - Power Tool Cleaning.
  5. SSPC SP 6 - Commercial Blast Cleaning.

### 1.3 SUBMITTALS

- A. Section 01330 - Submittal Procedures: Requirements for submittals.
- B. Shop Drawings:
  1. Indicate profiles, sizes, spacing, location of structural members, openings, attachments and fasteners.
  2. Connections. Engage a fabricator who utilizes a South Carolina registered Professional Engineer to prepare calculations, shop drawings and other structural data for structural steel connections.
  3. Cambers.
  4. Indicate welded connections with AWS A2.4 welding symbols. Indicate net weld lengths.
- C. Mill Test Reports: Submit indicating structural strength, destructive and non-destructive test analysis.
- D. Manufacturer's Mill Certificate: Certify products meet or exceed specified requirements.
- E. Welders Certificates: Certify welders employed on the Work, verifying AWS qualification within previous 12 months.

### 1.4 QUALITY ASSURANCE

- A. Perform Work in accordance with the following:
  1. AISC Code of Standard Practice for Steel Buildings and Bridges.
  2. AISC Code of Standard Practice for Steel Buildings and Bridges. Section 10.
  3. AISC Seismic Provisions for Structural Steel Buildings.
  4. AISC Specification for Structural Steel Buildings Allowable Stress Design, and Plastic Design.

### 1.5 QUALIFICATIONS

- A. Fabricator: Company specializing in performing Work of this section with minimum 5 years' experience with the following current AISC Certification:
  1. Certified Building Fabricator (BU).
- B. Erector: Company specializing in performing Work of this section with minimum 5 years' experience.
- C. Welders and Welding Procedures: AWS D1.1 qualified within previous 12 months.

### 1.6 COORDINATION

- A. Section 014000 - Quality Requirements.
- B. Coordinate work with the following:

1. Section 052100, 053100.
2. Section 055000 for miscellaneous steel supports other than structural steel.
3. Section 078110 for finishes on structural steel receiving fireproofing.

## **PART 2 PRODUCTS**

### **2.1 STRUCTURAL STEEL**

- A. Structural W-Shapes: ASTM A992.
- B. Structural M-Shapes: ASTM A36.
- C. Structural T-Shapes: Cut from structural W-shapes.
- D. Channels and Angles: ASTM A36.
- E. Square and Rectangular Hollow Structural Sections: ASTM A500, Grade B.
- F. Structural Pipe: ASTM A53, Grade B.
- G. Structural Plates and Bars: ASTM A36.
- H. Wire Rod for Grating Crossbars: ASTM A 510

### **2.2 FASTENERS, CONNECTORS, AND ANCHORS**

- A. High-Strength Bolts, Nuts, and Washers: ASTM A 325, Type 1, heavy hex steel structural bolts, heavy hex carbon-steel nuts, and hardened carbon-steel washers.
  1. Finish, Interior Framing: Plain, uncoated.
  2. Finish, Exterior Framing: Mechanically deposited zinc coating, ASTM B 695, Class 50.
- B. Nuts: ASTM A563 heavy hex type.
  1. Finish: Unfinished.
- C. Washers: ASTM F436; Type 1, circular
  1. Finish: Unfinished.
- D. Shear Connectors: ASTM A108; Grade 1015 or 1020, headed, unfinished and in accordance with AWS D1.1; Type B.
- E. Threaded Anchor Rods: ASTM F 1554, Grade 36 or Grade 55, as indicated on Drawings.
  1. Configuration: Straight.
  2. Nuts: ASTM A 563 (ASTM A 563M) heavy hex carbon steel.
  3. Plate Washers: ASTM A 36/A 36M carbon steel.
  4. Washers: ASTM F 436 (ASTM F 436M) hardened carbon steel.
  5. Finish, Interior Framing: Plain.
  6. Finish, Exterior Framing: Hot-dip zinc coating, ASTM A 153/A 153M, Class C or mechanically deposited zinc coating, ASTM B 695, Class 50.

### **2.3 WELDING MATERIALS**

- A. Welding Materials: AWS D1.1; type required for materials being welded.

### **2.4 ACCESSORIES**

- A. Grout: Non-shrink type, pre-mixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing additives, capable of developing minimum compressive strength of 7,000 psi at 28 days.



- B. Shop and Touch-Up Primer:
  - 1. Concealed Structural Steel: Fabricators dark color rust-inhibiting primer.
  - 2. Exposed Structural Steel: Refer to Division 9.

## 2.5 FABRICATION

- A. Continuously seal joined members by continuous welds. Grind exposed welds smooth.
- B. Fabricate connections for bolt, nut, and washer connectors.
- C. Develop required camber for members.

## 2.6 FINISH

- A. Prepare structural component surfaces in accordance with SSPC SP 3 "Power Tool Cleaning" for all concealed work and SSPC SP 6 "Commercial Blast Cleaning" for all work exposed to view.
- B. Shop prime structural steel members. Do not prime surfaces that will be fireproofed, field welded or in contact with concrete.
- C. Galvanizing for Structural Steel Members: ASTM A123; minimum 1.2 oz/sq ft coating thickness; galvanize after fabrication.
- D. Galvanizing for Fasteners, Connectors, and Anchors:
  - 1. Hot-Dipped Galvanizing: ASTM A153.

## 2.7 SOURCE QUALITY CONTROL AND TESTS

- A. Section 014000 - Quality Requirements: Testing, inspection and analysis requirements.
- B. Shop test bolted and welded connections as specified for field quality control tests.
- C. When fabricator is approved by authority having jurisdiction, submit certificate of compliance indicating Work performed at fabricator's facility conforms to Contract Documents.
  - 1. Specified shop tests are not required for Work performed by approved fabricator.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Verify bearing surfaces are at correct elevation.
- B. Verify anchors rods are set in correct locations and arrangements with correct exposure for steel attachment.

### 3.2 PREPARATION

- A. Furnish templates for installation of anchor rods and embedments in concrete and masonry work.

### 3.3 ERECTION

- A. Allow for erection loads, and for sufficient temporary bracing to maintain structure safe, plumb, and in alignment until completion of erection and installation of permanent bracing.
- B. Field weld components and shear connectors indicated on Drawings.

- C. Field connect members with threaded fasteners; tighten to snug tight for bearing type connections.
- D. Do not field cut or alter structural members without approval of Architect/Engineer.
- E. After erection, touch up welds and abrasions to match shop finishes.

### 3.4 GROUT INSTALLATION

- A. Shim bearing plates and equipment supports to proper elevation, snug tighten anchor bolts.
- B. Fill void under bearing surface with grout. Install and pack grout to remove air pockets.
- C. Moist cure grout.
- D. Remove forms after grout is set. Trim grout edges to form smooth surface, splayed 45 degrees.

### 3.5 INSTALLING METAL BAR GRATINGS

- A. General: Install gratings to comply with recommendations of referenced metal bar grating standards that apply to grating types and bar sizes indicated, including installation clearances and standard anchoring details.
- B. Attach removable units to supporting members with type and size of clips and fasteners indicated or, if not indicated, as recommended by grating manufacturer for type of installation conditions shown.
- C. Attach nonremovable units to supporting members by welding where both materials are same; otherwise, fasten by bolting as indicated above.

### 3.6 FIELD QUALITY CONTROL

- A. Owner will engage an independent testing and inspecting agency to perform field inspections and tests and to prepare test reports.
  - 1. Testing agency will conduct and interpret tests and state in each report whether tested work complied with or deviates from requirements.
- B. Correct deficiencies in or remove and replace structural steel that inspections and test reports indicate do not comply with specified requirements at no additional cost to the Owner.
- C. Additional testing, at Contractor's expense, will be performed to determine compliance of corrected work with specified requirements.
- D. Field-bolted connections will be tested and inspected according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."
  - 1. Direct-tension indicator gaps will be verified to comply with ASTM F 592, Table 2.
- E. In addition to visual inspection, field welded connections will be inspected and tested according to AWS D1.1 and the inspection procedures listed below, at testing agency's option.
  - 1. Liquid Penetrant Inspection: ASTM E165.
  - 2. Magnetic Particle Inspection: ASTM E 709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration will not be accepted.
  - 3. Radiographic Inspection: ASTM E 94 and ASTM E 142; minimum quality level "2-2T."
  - 4. Ultrasonic inspection: ASTM E 164.
- F. In addition to visual inspection, field welded shear connectors will be inspected and tested according to requirements of AWS D1.1 for stud welding and as follows:

1. Bend test will be performed when visual inspections reveal either less than a continuous 360 degree flash or welding repairs to any shear connector.
  2. Tests will be conducted on additional shear connectors when weld fracture occurs on shear connectors already tested, according to requirements of AWS D1.1
- G. Contractor shall furnish all necessary staging, platforms, ladders, or other items necessary to facilitate the testing laboratory in testing and inspecting the work.
- H. The testing laboratory shall inspect 15% of the field full penetration welds, except at truss splices where 100% shall be inspected. All tested welds shall pass.
- I. The testing laboratory shall inspect 50% of the fillet welds and spot check gauge and length of all welds.

### **3.7 CLEANING**

- A. Touch-up Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint. Apply paint to exposed areas using same material as used for shop painting.
1. Apply by brush or spray to provide a minimum dry film thickness of 1.5 mils.
- B. Touch up all hot dipped galvanized steel with high zinc dust content paint.
1. For re-galvanizing welds and steel, comply with SSPC-Paint 20.

**END OF SECTION**



**SECTION 05 21 00****STEEL JOISTS****PART 1 GENERAL****1.1 SUMMARY**

- A. Section Includes:
  - 1. K-series and LH-series open web steel joists.
  - 2. Bracing.
- B. Related Sections:
  - 1. Section 051200 - Structural Steel.
  - 2. Section 053100 - Steel Decking.

**1.2 REFERENCES**

- A. FS TT-P-664D -- Primer Coating, Alkyd, Corrosion-Inhibiting, Lead and Chromate Free, VOC-Compliant; 1988.
- B. SJI Technical Digest No. 9 -- Handling and Erection of Steel Joists and Joist Girders; Steel Joist Institute; July 1987. Standard Specifications Load Tables and Weight Tables for Steel Joists and Joist Girders; Steel Joist Institute (SJI); 1990.
- C. Steel Structures Painting Manual, Volume 2, Systems and Specifications; Steel Structures Painting Council (SSPC); 1991.

**1.3 SYSTEM DESCRIPTION**

- A. Provide joist system which is designed and fabricated to comply with requirements of the contract documents and which strictly conforms to material, manufacturing, and erection requirements of the Steel Joist Institute's (SJI) "Standard Specifications Load Tables and Weight Tables for Steel Joists and Joist Girders" (referred to hereinafter as SJI "Specifications").
  - 1. Wind uplift: Design joists and connections to comply with wind uplift requirements indicated.

**1.4 SUBMITTALS**

- A. Product Data: Submit for each distinct type of joist required and for accessories.
- B. Shop Drawings: Drawings for fabrication and erection of joists; include plans, elevations, and large scale details of typical sections, special connections, joining, and accessories.
  - 1. Show location and spacing of joists; indicate mark number and type.
  - 2. Show bridging.
- C. Quality Control Submittals: Submit the following:
  - 1. SJI certification of joist characteristics.

**1.5 DELIVERY, STORAGE, AND HANDLING**

- A. Strictly conform to requirements of SJI Technical Digest No. 9.

## **PART 2 PRODUCTS**

### **2.1 MATERIALS**

- A. Steel: Conform to requirements of SJI "Specifications."
- B. Steel Primer Joists: Rust-inhibitive, lead and chromate free, low VOC primer, complying with FS TT-P-664, or equivalent.
- C. Accessories: Provide accessories required for erection of steel joists, complying with SJI "Specifications" and with contract documents.

### **2.2 JOIST FABRICATION**

- A. General: All materials shall be clean and straight.
- B. Bridging is schematically shown on drawings. Detail and fabricate bridging in complete accordance with SJI requirements.
- C. Joists:
  - 1. Top chord extensions: Provide extensions where indicated. Extension members shall be designed as cantilever beams, with their reactions carried back at least to the first panel point of the joists.
  - 2. Bottom chords: Form bottom chord members of joists using angles.
  - 3. Bottom chord extensions: Where indicated, provide extended bottom chords or separate extension units properly designed to support ceilings attached directly to joist bottom chords. Maximum clearance between wall finish and end of extension: 1/2 inch, unless indicated otherwise.
  - 4. Special end connections: Provide special end connections where joists bear less than 2-1/2 inches over steel supports. Connections shall provide positive attachment to the support.
  - 5. Surface preparation for shop priming: SSPC-SP 2: Hand tool cleaning.
  - 6. Shop priming: Apply primer in accordance with paint manufacturer's recommendations.

## **PART 3 EXECUTION**

### **3.1 ERECTION**

- A. Do not begin joist erection until structural support components have been installed and are in suitable condition to receive joists.
- B. Do not overload or exceed carrying capacity of any joist during construction period.
- C. Accurately position and space joists before permanent attachment to structural supports.
- D. Provide safe, stable structure throughout construction period. Do not remove bridging after construction is completed, unless specifically authorized to do so by the architect.
  - 1. Install bridging in accordance with SJI requirements.
  - 2. Bridging installation shall proceed concurrently with joist erection and shall be completed before joists are subjected to construction loads.
- E. Joist Anchorage:
  - 1. Anchor joists to structural support members as indicated on drawings.

**END OF SECTION**

**SECTION 05 31 00****STEEL DECK****PART 1 GENERAL****1.1 SCOPE**

- A. This work shall consist of furnishing all plant, labor, materials, equipment, and apparatus for the installation of all steel roof decking and composite floor decking with accessories indicated, specified, and/or reasonably implied for a complete, first-quality job.

**1.2 RELATED WORK SPECIFIED ELSEWHERE**

- A. Section 033000 – Cast-in-Place Concrete
- B. Section 051200 - Structural Steel
- C. Section 052100 - Steel Joists

**1.3 REFERENCE SPECIFICATIONS**

- A. "Specification for the Design of Light Gage Cold-Formed Steel Structure Members" of the American Institute of Steel Construction.
- B. "Code of Recommended Standard Practice" of the Steel Deck Institute.
- C. Specifications and commentary for composite steel floor deck of the Steel Deck Institute.
- D. Specifications and commentary for steel roof deck of the Steel Deck Institute.
- E. Structural Welding Code - Sheet steel of the American Welding Society.

**1.4 QUALITY ASSURANCE**

- A. Installer Qualifications: Engage an experienced installer who has completed steel deck similar in material, design, and extent to that indicated for this Project and with a record of successful in-service performance.
- B. Qualifications of Welding: Use qualified processes and welding operators in conformance with AWS "Welder Qualification" procedures.
- C. Testing Agency Qualifications: An independent agency qualified according to ASTM E 329 for testing indicated
- D. Fire-Test-Response Characteristics: Where indicated, provide steel deck units identical to those tested for fire resistance per ASTM E 119 by a testing and inspecting agency acceptable to authorities having jurisdiction.
  - 1. Fire-Resistance Ratings: Indicated by design designations of applicable testing and inspecting agency.
  - 2. Steel deck units shall be identified with appropriate markings of applicable testing and inspecting agency
- E. AISI Specifications: Comply with calculated structural characteristics of steel deck according to AISI's "North American Specification for the Design of Cold-Formed Steel Structural Members."
- F. FMG Listing: Provide steel roof deck evaluated by FMG and listed in its "Approval Guide, Building Materials" for Class 1 fire rating and Class 1-90 windstorm ratings.

- G. Welding Inspection: All decking welds shall be inspected by the Architect prior to covering. Notify the Architect in writing forty-eight (48) hours prior to completing welds for each major area.

## 1.5 SUBMITTALS

- A. Shop and Erection Drawings shall be submitted for all metal decking to the Architect for approval. Drawings shall indicate layout, types of specified materials and accessories, gauges to be supplied, anchorage details, all conditions requiring closure panels, supplementary framing, sump pans, cant strips, cut openings, special jointing or other accessories. Drawings shall include layout for all shear studs to be applied through deck units. Manufacture or fabricating of any materials or the performing of any work prior to the approval of shop drawings will be entirely at the risk of the Contractor.
- B. Product Data: For each type of deck, accessory, and product indicated
- C. The Contractor shall submit the manufacturer's specifications, load tables, and installation instructions for each type specified.
- D. Welding certificates and welding procedures (WPS)
- E. Field quality-control test and inspection reports.

## 1.6 DELIVERY, STORAGE AND HANDLING

- A. Steel deck units shall be protected against damage in transit to the jobsite.
- B. If site storage is necessary, steel deck units shall be stacked on wood blocking clear of the ground and tilted slightly to insure against the entrapment of water.
- C. The steel deck units shall be hoisted to each individual floor as required and rough spread.

## PART 2 PRODUCTS

### 2.1 COMPOSITE FLOOR DECK

- A. Composite Steel Floor Deck: Fabricate panels, with integrally embossed or raised pattern ribs and interlocking side laps, to comply with "SDI Specifications and Commentary for Composite Steel Floor Deck," in SDI Publication No. 30, with the minimum section properties indicated, and with the following:
  - 1. Galvanized Steel Sheet: ASTM A653, Structural Steel (SS), Grade 50, G60 zinc coating.
  - 2. Profile Depth: 3"
  - 3. Design Uncoated-Steel Thickness: 16 gauge.
  - 4. Span Condition: Triple span or more.

### 2.2 ROOF DECK

- A. Roof Deck: Fabricate panels, without top-flange stiffening grooves, to comply with "SDI Specifications and Commentary for Steel Roof Deck," in SDI Publication No. 30, and with the following:
  - 1. Galvanized Steel Sheet: ASTM A653, Structural Steel (SS), Grade 33.
  - 2. Galvanizing: ASTM A 525, G60.
  - 3. Deck Profile: Type B.
  - 4. Profile Depth: 1½"
  - 5. Design Uncoated-Steel Thickness: 20 gauge.



6. Span Condition: Triple span or more unless noted in drawings.
7. Side Laps: Overlapped.

### 2.3 ACCESSORIES

- A. General: Provide manufacturer's standard accessory materials for deck that comply with requirements indicated.
- B. Weld Washers: Mild steel, uncoated, sized as recommended by manufacturer of steel deck units.
- C. Mechanical Fasteners: Stainless steel, low-velocity, power-actuated or pneumatically driven carbon-steel fasteners; or self-drilling, self-threading screws.
- D. Side-Lap Fasteners: Stainless steel, hexagonal washer head; self-drilling, carbon-steel screws, No. 10 minimum diameter.
- E. Miscellaneous Sheet Metal Deck Accessories: Steel sheet, minimum yield strength of 33,000 psi, not less than 0.0359-inch design uncoated thickness, of same material and finish as deck; of profile indicated or required for application.
- F. Pour Stops and Girder Fillers: Steel sheet, minimum yield strength of 33,000 psi, of same material and finish as deck, and of thickness and profile indicated.
- G. Column Closures, End Closures, Z-Closures, and Cover Plates: Steel sheet, of same material, finish, and thickness as deck, unless otherwise indicated.
- H. Repair Paint: Manufacturer's standard rust-inhibitive primer of same color as primer.
- I. Galvanizing Repair Paint: High zinc-dust content paint formulated specifically for repair of damaged galvanized surfaces. Prepare surfaces and repair in accordance with procedures specified in ASTM A 780.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Examine supporting frame and field conditions for compliance with requirements for installation tolerances and other conditions affecting performance.

### 3.2 INSTALLATION, GENERAL

- A. Install deck panels and accessories according to applicable specifications and commentary in SDI Publication No. 30, manufacturer's written instructions, and requirements in this Section.
- B. Install temporary shoring before placing deck panels, if required to meet deflection limitations.
- C. Locate deck bundles to prevent overloading of supporting members.
- D. Place deck panels on supporting frame and adjust to final position with ends accurately aligned and bearing on supporting frame before being permanently fastened. Do not stretch or contract side-lap interlocks.
- E. Place deck panels flat and square and fasten to supporting frame without warp or deflection.
- F. Cut and neatly fit deck panels and accessories around openings and other work projecting through or adjacent to deck.

- G. Provide additional reinforcement and closure pieces at openings as required for strength, continuity of deck, and support of other work.
- H. Comply with AWS requirements and procedures for manual shielded metal arc welding, appearance and quality of welds, and methods used for correcting welding work.
- I. Mechanical fasteners may be used in lieu of welding to fasten deck. Locate mechanical fasteners and install according to deck manufacturer's written instructions.
- J. Holes for openings: Deck shall be cut by the Contractor to fit large framed openings which are located by dimension on the structural design drawings. Holes required by other trades shall be supplied at the expense of those trades. The trade involved shall notify the Architect/Engineer regarding the size, location and number of holes so that the structural adequacy of the steel deck units and/or composite slab can be checked. Holes shall be cut in floor deck units only after concrete has been placed and 75% of design strength attained.

### 3.3 FLOOR DECK INSTALLATION

- A. Erect metal deck in accordance with SDI 29 Manual.
- B. Bear deck on steel supports with 1-1/2 inch minimum bearing. Align and level.
- C. Fasten deck to steel support members at ends and intermediate supports with 5/8" diameter fusion welds as indicated on the drawings.
- D. Weld in accordance with AWS D1.1.
- E. Mechanically clinch male/female side laps as indicated on the drawings.
- F. Reinforce steel deck openings from 6 to 18 inches in size with 2 x 2 x 1/4 inch steel angles. Place angles perpendicular to flutes; extend minimum two flutes beyond each side of opening and mechanically attach to deck at each flute.
- G. Install 6 inch minimum wide sheet steel cover plates, of same thickness as deck, where deck changes direction. Mechanically attach 12 inches o.c. maximum.
- H. Install wet concrete stops at floor edge upturned to top surface of slab, to contain wet concrete. Install stops of sufficient strength to remain stationary without distortion.
- I. Install sheet steel closures and angle flashings to close openings between deck and walls, columns, and openings.
- J. Position floor drain pans with flange bearing on top surface of deck. Fusion weld at each deck flute.
- K. Welding washers shall be used on all deck units with metal thickness less than 0.028 inches (22 gage). Welding washers shall be a minimum thickness of 0.0598 inches and have a nominal 3/8 inch diameter hole.
- L. Immediately after welding deck and other metal components in position, coat welds, burned areas, and damaged surface coating, with touch-up prime paint.

### 3.4 ROOF-DECK INSTALLATION

- A. Fasten roof-deck panels to steel supporting members as indicated on the drawings
- B. Side-Lap and Perimeter Edge Fastening: Fasten side laps and perimeter edges of panels between supports as indicated on the drawings.
- C. End Bearing: Install deck ends over supporting frame with a minimum end bearing of 1-1/2 inches, with end joints as follows:

1. End Joints: Lapped 2 inches minimum.
- D. Miscellaneous Roof-Deck Accessories: Install ridge and valley plates, finish strips, end closures, and reinforcing channels according to deck manufacturer's written instructions. Weld or mechanically fasten to substrate to provide a complete deck installation.
  1. Weld cover plates at changes in direction of roof-deck panels, unless otherwise indicated.
- E. Flashing: The steel deck manufacturer shall furnish sheet metal flashings to close openings between deck units and columns, deck units and girders, and openings which occur where deck abut. These flashings shall be welded in position by the steel deck installer.
- F. Roof Sump Pans: Place over openings provided in roof decking and weld to top decking surface. Space welds not more than 12" with at least one weld at each corner.
- G. Closure Strips: Provide flexible closure strips at open uncovered ends and edges of roof decking also in voids between decking and other construction. Install with adhesive in accordance with manufacturer's instructions.

### **3.5 FIELD QUALITY CONTROL**

- A. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports.
- B. Field welds will be subject to inspection.
- C. Additional testing will be performed to determine compliance of corrected work with specified requirements.
- D. Testing agency will report inspection results promptly and in writing to Contractor and Architect.
- E. Remove and replace work that does not comply with specified requirements.
- F. Additional inspecting, at Contractor's expense, will be performed to determine compliance of corrected work with specified requirements.

### **3.6 REPAIRS AND PROTECTION**

- A. Repair Painting: Wire brushing, cleaning, and repair painting of rust spots, welds, and abraded areas of both deck surfaces are included in Division 9 Section "Interior Painting."
- B. Provide final protection and maintain conditions to ensure that steel deck is without damage or deterioration at time of Substantial Completion.

**END OF SECTION**



**SECTION 05 40 00**  
**COLD FORMED STEEL FRAMING**

**PART 1 GENERAL****1.1 RELATED DOCUMENTS**

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

**1.2 SUMMARY**

- A. This Section includes the following:
  - 1. Interior load-bearing wall framing.
  - 2. Roof trusses.
- B. Related Sections include the following:
  - 1. Division 5 Section "Metal Fabrications" for masonry shelf angles and connections.
  - 2. Division 9 Section "Gypsum Board Assemblies" for interior non-load-bearing, metal-stud framing and ceiling-suspension assemblies.

**1.3 PERFORMANCE REQUIREMENTS**

- A. Structural Performance: Provide cold-formed metal framing capable of withstanding design loads within limits and under conditions indicated.
  - 1. Design Loads: As indicated.
  - 2. Deflection Limits: Design framing systems to withstand design loads without deflections greater than the following:
    - a. Interior Load-Bearing Wall Framing: Horizontal deflection of 1/360 of the wall height under a horizontal load of 5 lb/sq. ft.
    - b. Roof Trusses: Vertical deflection of 1/360 of the span.
  - 3. Design framing systems to provide for movement of framing members without damage or overstressing, sheathing failure, connection failure, undue strain on fasteners and anchors, or other detrimental effects when subject to a maximum ambient temperature change of 120 deg F.
  - 4. Design framing system to maintain clearances at openings, to allow for construction tolerances, and to accommodate live load deflection of primary building structure as follows:
    - a. Upward and downward movement of 1/2 inch.
- B. Cold-Formed Steel Framing, General: Design according to AISI's "Standard for Cold-Formed Steel Framing - General Provisions."
  - 1. Roof Trusses: Design according to AISI's "Standard for Cold-Formed Steel Framing - Truss Design."

**1.4 SUBMITTALS**

- A. Product Data: For each type of cold-formed metal framing product and accessory indicated.
- B. Shop Drawings: Show layout, spacings, sizes, thicknesses, and types of cold-formed metal framing; fabrication; and fastening and anchorage details, including mechanical fasteners. Show reinforcing channels, opening framing, supplemental framing, strapping, bracing, bridging, splices, accessories, connection details, and attachment to adjoining work.

1. For cold-formed metal framing indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
- C. Welding certificates.
- D. Qualification Data: For professional engineer.
- E. Product Test Reports: From a qualified testing agency, unless otherwise stated, indicating that each of the following complies with requirements, based on evaluation of comprehensive tests for current products:
  1. Steel sheet.
  2. Expansion anchors.
  3. Power-actuated anchors.
  4. Mechanical fasteners.
  5. Vertical deflection clips.
  6. Horizontal drift deflection clips
  7. Miscellaneous structural clips and accessories.
- F. Research/Evaluation Reports: For cold-formed metal framing.

### 1.5 QUALITY ASSURANCE

- A. Engineering Responsibility: Preparation of Shop Drawings, design calculations, and other structural data by a qualified professional engineer.
- B. Professional Engineer Qualifications: A professional engineer registered in the State of North Carolina and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of cold-formed metal framing that are similar to those indicated for this Project in material, design, and extent.
- C. Product Tests: Mill certificates or data from a qualified independent testing agency, or in-house testing with calibrated test equipment indicating steel sheet complies with requirements, including base-metal thickness, yield strength, tensile strength, total elongation, chemical requirements, and metallic-coating thickness.
- D. Welding: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code--Steel," and AWS D1.3, "Structural Welding Code--Sheet Steel."
- E. AISI Specifications and Standards: Comply with AISI's "North American Specification for the Design of Cold-Formed Steel Structural Members" and its "Standard for Cold-Formed Steel Framing - General Provisions."
  1. Comply with AISI's "Standard for Cold-Formed Steel Framing - Truss Design."
  2. Comply with AISI's "Standard for Cold-Formed Steel Framing - Header Design."
- F. Comply with AISI's "Standard for Cold-Formed Steel Framing - Prescriptive Method for One and Two Family Dwellings."
- G. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Management and Coordination."

### 1.6 DELIVERY, STORAGE AND HANDLING

- A. Protect cold-formed metal framing from corrosion, deformation, and other damage during delivery, storage, and handling.
- B. Store cold-formed metal framing, protect with a waterproof covering, and ventilate to avoid condensation.

## **PART 2 PRODUCTS**

### **2.1 MANUFACTURERS**

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering cold-formed metal framing that may be incorporated into the Work include, but are not limited to, the following:
1. Allied Studco.
  2. AllSteel Products, Inc.
  3. California Expanded Metal Products Company.
  4. Clark Steel Framing.
  5. Consolidated Fabricators Corp.; Building Products Division.
  6. Craco Metals Manufacturing, LLC.
  7. Custom Stud, Inc.
  8. Dale/Incor.
  9. Design Shapes in Steel.
  10. Dietrich Metal Framing; a Worthington Industries Company.
  11. Formetal Co. Inc. (The).
  12. Innovative Steel Systems.
  13. MarinoWare; a division of Ware Industries.
  14. Quail Run Building Materials, Inc.
  15. SCAFCO Corporation.
  16. Southeastern Stud & Components, Inc.
  17. Steel Construction Systems.
  18. Steeler, Inc.
  19. Super Stud Building Products, Inc.
  20. United Metal Products, Inc.

### **2.2 MATERIALS**

- A. Steel Sheet: ASTM A1003, Structural Grade, Type H, metallic coated, of grade and coating weight as follows:
1. Grade: ST33H or as required by structural performance.
  2. Coating: G60 or equivalent.
- B. Steel Sheet for Vertical Deflection and Drift Clips: ASTM A653, structural steel, zinc coated, of grade and coating as follows:
1. Grade: 50, Class 1 or 2.
  2. Coating: G90.

### **2.3 LOAD-BEARING WALL FRAMING**

- A. Steel Studs: Manufacturer's standard C-shaped steel studs, of web depths indicated, punched, with stiffened flanges, and as follows:
1. Minimum base-metal thickness: 0.0329 inch.
  2. Minimum flange width: 1-5/8 inches.
- B. Steel Track: Manufacturer's standard U-shaped steel track, of web depths indicated, unpunched, with straight flanges, and as follows:
1. Minimum base-metal thickness: 0.0329 inch, but no less than thickness of steel studs.
  2. Flange width: 1-1/4 inches.
- C. Steel Box or Back-to-Back Headers: Manufacturer's standard C-shapes used to form header beams, of web depths indicated, punched, with stiffened flanges, and as follows:
1. Minimum base-metal thickness: 0.0329 inch.

2. Minimum flange width: 1-5/8 inches.
- D. Steel Double-L Headers: Manufacturer's standard L-shapes used to form header beams, of web depths indicated, and as follows:
  1. Minimum base-metal thickness: 0.0329 inch.
  2. Top flange width: 1-5/8 inches.

## 2.4 ROOF TRUSSES

- A. Roof Truss Members: Manufacturer's standard-shape steel sections.

## 2.5 FRAMING ACCESSORIES

- A. Fabricate steel-framing accessories from steel sheet, ASTM A1003, Structural Grade, Type H, metallic coated, of same grade and coating weight used for framing members.
- B. Provide accessories of manufacturer's standard thickness and configuration, unless otherwise indicated, as follows:
  1. Supplementary framing.
  2. Bracing, bridging, and solid blocking.
  3. Web stiffeners.
  4. Anchor clips.
  5. End clips.
  6. Foundation clips.
  7. Gusset plates.
  8. Stud kickers, knee braces, and girts.
  9. Joist hangers and end closures.
  10. Hole reinforcing plates.
  11. Backer plates.

## 2.6 ANCHORS, CLIPS, AND FASTENERS

- A. Steel Shapes and Clips: ASTM A36, zinc coated by hot-dip process according to ASTM A123.
- B. Anchor Bolts: ASTM F1554, Grade 36, threaded carbon-steel; carbon-steel nuts; and flat, hardened-steel washers; zinc coated by hot-dip process according to ASTM A153, Class C.
- C. Expansion Anchors: Fabricated from corrosion-resistant materials, with capability to sustain, without failure, a load equal to 5 times design load, as determined by testing per ASTM E488 conducted by a qualified independent testing agency.
- D. Power-Actuated Anchors: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with capability to sustain, without failure, a load equal to 10 times design load, as determined by testing per ASTM E1190 conducted by a qualified independent testing agency.
- E. Mechanical Fasteners: ASTM C1513, corrosion-resistant-coated, self-drilling, self-tapping steel drill screws.
  1. Head Type: Low-profile head beneath sheathing, manufacturer's standard elsewhere.
- F. Welding Electrodes: Comply with AWS standards.

## 2.7 MISCELLANEOUS MATERIALS

- A. Nonmetallic, Nonshrink Grout: Premixed, nonmetallic, noncorrosive, nonstaining grout containing selected silica sands, portland cement, shrinkage-compensating agents, and



plasticizing and water-reducing agents, complying with ASTM C1107, with fluid consistency and 30-minute working time.

- B. Shims: Load bearing, high-density multimonomer plastic, nonleaching.
- C. Sealer Gaskets: Closed-cell neoprene foam, 1/4 inch thick, selected from manufacturer's standard widths to match width of bottom track or rim track members.

## 2.8 FABRICATION

- A. Fabricate cold-formed metal framing and accessories plumb, square, and true to line, and with connections securely fastened, according to referenced AISI's specifications and standards, manufacturer's written instructions, and requirements in this Section.
  - 1. Fabricate framing assemblies using jigs or templates.
  - 2. Cut framing members by sawing or shearing; do not torch cut.
  - 3. Fasten cold-formed metal framing members by welding, screw fastening, clinch fastening, or riveting as standard with fabricator. Wire tying of framing members is not permitted.
    - a. Comply with AWS D1.3 requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
    - b. Locate mechanical fasteners and install according to Shop Drawings, with screw penetrating joined members by not less than three exposed screw threads.
  - 4. Fasten other materials to cold-formed metal framing by welding, bolting, or screw fastening, according to Shop Drawings.
- B. Reinforce, stiffen, and brace framing assemblies to withstand handling, delivery, and erection stresses. Lift fabricated assemblies to prevent damage or permanent distortion.
- C. Fabrication Tolerances: Fabricate assemblies level, plumb, and true to line to a maximum allowable tolerance variation of 1/8 inch in 10 feet and as follows:
  - 1. Spacing: Space individual framing members no more than plus or minus 1/8 inch from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.
  - 2. Squareness: Fabricate each cold-formed metal framing assembly to a maximum out-of-square tolerance of 1/8 inch.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Examine supporting substrates and abutting structural framing for compliance with requirements for installation tolerances and other conditions affecting performance.
  - 1. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Before sprayed fire-resistive materials are applied, attach continuous angles, supplementary framing, or tracks to structural members indicated to receive sprayed fire-resistive materials.
- B. After applying sprayed fire-resistive materials, remove only as much of these materials as needed to complete installation of cold-formed framing without reducing thickness of fire-resistive materials below that are required to obtain fire-resistance rating indicated. Protect remaining fire-resistive materials from damage.

- C. Install load bearing shims or grout between the underside of wall bottom track or rim track and the top of foundation wall or slab at stud or joist locations to ensure a uniform bearing surface on supporting concrete or masonry construction.
- D. Install sealer gaskets to isolate the underside of wall bottom track or rim track and the top of foundation wall or slab at stud or joist locations.

### 3.3 INSTALLATION, GENERAL

- A. Cold-formed metal framing may be shop or field fabricated for installation, or it may be field assembled.
- B. Install cold-formed metal framing according to AISI's "Standard for Cold-Formed Steel Framing - General Provisions" and to manufacturer's written instructions unless more stringent requirements are indicated.
- C. Install shop- or field-fabricated, cold-formed framing and securely anchor to supporting structure.
  - 1. Screw, bolt, or weld wall panels at horizontal and vertical junctures to produce flush, even, true-to-line joints with maximum variation in plane and true position between fabricated panels not exceeding 1/16 inch.
- D. Install cold-formed metal framing and accessories plumb, square, and true to line, and with connections securely fastened.
  - 1. Cut framing members by sawing or shearing; do not torch cut.
  - 2. Fasten cold-formed metal framing members by welding, screw fastening, clinch fastening, or riveting. Wire tying of framing members is not permitted.
    - a. Comply with AWS D1.3 requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
    - b. Locate mechanical fasteners and install according to Shop Drawings, and complying with requirements for spacing, edge distances, and screw penetration.
- E. Install framing members in one-piece lengths unless splice connections are indicated for track or tension members.
- F. Install temporary bracing and supports to secure framing and support loads comparable in intensity to those for which structure was designed. Maintain braces and supports in place, undisturbed, until entire integrated supporting structure has been completed and permanent connections to framing are secured.
- G. Do not bridge building expansion and control joints with cold-formed metal framing. Independently frame both sides of joints.
- H. Install insulation, specified in Division 7 Section "Building Insulation," in built-up exterior framing members, such as headers, sills, boxed joists, and multiple studs at openings, that are inaccessible on completion of framing work.
- I. Fasten hole reinforcing plate over web penetrations that exceed size of manufacturer's standard punched openings.
- J. Erection Tolerances: Install cold-formed metal framing level, plumb, and true to line to a maximum allowable tolerance variation of 1/8 inch in 10 feet and as follows:
  - 1. Space individual framing members no more than plus or minus 1/8 inch from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.

### 3.4 LOAD-BEARING WALL INSTALLATION

- A. Install continuous top and bottom tracks sized to match studs. Align tracks accurately and securely anchor at corners and ends, and at spacings as follows:
  - 1. Anchor Spacing: As shown on Shop Drawings.
- B. Squarely seat studs against top and bottom tracks with gap not exceeding of 1/8 inch between the end of wall framing member and the web of track. Fasten both flanges of studs to top and bottom tracks. Space studs as follows:
  - 1. Stud Spacing: As indicated.
- C. Set studs plumb, except as needed for diagonal bracing or required for nonplumb walls or warped surfaces and similar configurations.
- D. Align studs vertically where floor framing interrupts wall-framing continuity. Where studs cannot be aligned, continuously reinforce track to transfer loads.
- E. Align floor and roof framing over studs. Where framing cannot be aligned, continuously reinforce track to transfer loads.
- F. Anchor studs abutting structural columns or walls, including masonry walls, to supporting structure as indicated.
- G. Install headers over wall openings wider than stud spacing. Locate headers above openings as indicated. Fabricate headers of compound shapes indicated or required to transfer load to supporting studs, complete with clip-angle connectors, web stiffeners, or gusset plates.
  - 1. Frame wall openings with not less than a double stud at each jamb of frame as indicated on Shop Drawings. Fasten jamb members together to uniformly distribute loads.
  - 2. Install runner tracks and jack studs above and below wall openings. Anchor tracks to jamb studs with clip angles or by welding, and space jack studs same as full-height wall studs.
- H. Install supplementary framing, blocking, and bracing in stud framing indicated to support fixtures, equipment, services, casework, heavy trim, furnishings, and similar work requiring attachment to framing.
  - 1. If type of supplementary support is not indicated, comply with stud manufacturer's written recommendations and industry standards in each case, considering weight or load resulting from item supported.
- I. Install horizontal bridging of the types listed below in stud system, spaced as indicated on Shop Drawings. Fasten at each stud intersection.
  - 1. Bridging: Cold-rolled steel channel, welded or mechanically fastened to webs of punched studs with a minimum of 2 screws into each flange of the clip angle for framing members up to 6 inches deep.
  - 2. Bridging: Combination of flat, taut, steel sheet straps of width and thickness indicated and stud-track solid blocking of width and thickness to match studs. Fasten flat straps to stud flanges and secure solid blocking to stud webs or flanges.
  - 3. Bridging: Proprietary bridging bars installed according to manufacturer's written instructions.
- J. Install steel sheet diagonal bracing straps to both stud flanges, terminate at and fasten to reinforced top and bottom tracks. Fasten clip-angle connectors to multiple studs at ends of bracing and anchor to structure.

- K. Install miscellaneous framing and connections, including supplementary framing, web stiffeners, clip angles, continuous angles, anchors, and fasteners, to provide a complete and stable wall-framing system.

### **3.5 TRUSS INSTALLATION**

- A. Install, bridge, and brace trusses according to Shop Drawings and requirements in this Section.
- B. Truss Spacing: As indicated.
- C. Do not alter, cut, or remove framing members or connections of trusses.
- D. Erect trusses with plane of truss webs plumb and parallel to each other, align, and accurately position at spacings indicated.
- E. Erect trusses without damaging framing members or connections.
- F. Align webs of bottom chords and load-bearing studs or continuously reinforce track to transfer loads to structure. Anchor trusses securely at all bearing points.
- G. Install continuous bridging and permanently brace trusses as indicated on Shop Drawings and designed according to LGSEA's Technical Note 551e, "Design Guide for Permanent Bracing of Cold-Formed Steel Trusses".

### **3.6 FIELD QUALITY CONTROL**

- A. Testing: Owner will engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports.
- B. Field and shop welds will be subject to testing and inspecting.
- C. Testing agency will report test results promptly and in writing to Contractor and Architect.
- D. Remove and replace work where test results indicate that it does not comply with specified requirements.
- E. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

### **3.7 REPAIRS AND PROTECTION**

- A. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and installer, that ensure that cold-formed metal framing is without damage or deterioration at time of Substantial Completion.

**END OF SECTION**

**SECTION 05 50 00**  
**METAL FABRICATIONS**

**PART 1 GENERAL****1.1 SUMMARY**

- A. Section includes shop fabricated metal items:
  - 1. Lintels.
  - 2. Ledge and shelf angles.
  - 3. Bollards.
  - 4. Ladders.
  - 5. Structural supports for miscellaneous attachments.
  - 6. Anchor bolts for sill plates.
  
- B. Related Requirements:
  - 1. Section 03 30 00 - Cast-In-Place Concrete: Execution requirements for embedded anchors and attachments for metal fabrications specified by this section in concrete.
  - 2. Section 04 20 00 - Unit Masonry: Execution requirements for embedded anchors and attachments for metal fabrications specified by this section in masonry.
  - 3. Section 05 12 00 - Structural Steel: Structural steel column anchor bolts.
  - 4. Section 05 21 00 - Steel Joist: Structural joist bearing plates, including anchorage.
  - 5. Section 05 31 00 - Steel Deck: Bearing plates for metal deck bearing, including anchorage.
  - 6. Section 05 52 00 - Metal Railings.
  - 7. Section 09 90 00 - Painting and Coating: Field applied paint finish.

**1.2 REFERENCES**

- A. American Architectural Manufacturers Association (AAMA):
  - 1. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum.
  - 2. AAMA 611 AA-M12C22A41: Clear anodic coating.
  
- B. American National Standards Institute (ANSI):
  - 1. ANSI A14.3 - Ladders - Fixed - Safety Requirements
  
- C. ASTM International (ASTM):
  - 1. ASTM A36/A36M - Standard Specification for Carbon Structural Steel.
  - 2. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
  - 3. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
  - 4. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
  - 5. ASTM A307 - Standard Specification for Carbon Steel Bolts and Studs, 60 000 PSI Tensile Strength.
  - 6. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
  - 7. ASTM A563 - Standard Specification for Carbon and Alloy Steel Nuts.
  - 8. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
  - 9. ASTM A992/A992M - Standard Specification for Structural Steel Shapes.
  - 10. ASTM B26/B26M - Standard Specification for Aluminum-Alloy Sand Castings.
  - 11. ASTM B85 - Standard Specification for Aluminum-Alloy Die Castings.

12. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
  13. ASTM B210 - Standard Specification for Aluminum and Aluminum-Alloy Drawn Seamless Tubes.
  14. ASTM B211 - Standard Specification for Aluminum and Aluminum-Alloy Bar, Rod, and Wire.
  15. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes, 2014.
  16. ASTM B695 - Standard Specification for Coatings of Zinc Mechanically Deposited on Iron and Steel.
  17. ASTM F436 - Standard Specification for Hardened Steel Washers.
  18. ASTM F1554 - Standard Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength.
- D. American Welding Society (AWS):
1. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination.
  2. AWS D1.1 - Structural Welding Code - Steel.
  3. AWS D1.2 - Structural Welding Code - Aluminum.
- E. California Department of Health Services:
1. Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers, including 2004 Addenda.
- F. National Ornamental & Miscellaneous Metals Association (NOMMA):
1. NOMMA Guideline 1 - Joint Finishes.
- G. The Society for Protective Coatings (SSPC):
1. SSPC - Steel Structures Painting Manual.
  2. SSPC Paint 15 - Steel Joist Shop Paint.
  3. SSPC Paint 20 - Zinc-Rich Primers (Type I - Inorganic and Type II - Organic).

### 1.3 COORDINATION

- A. Section 01 30 00 - Administrative Requirements: Requirements for coordination.
- B. Where anchors or support brackets to structure penetrate finish and moisture protection materials, coordinate fabrication of those finish and moisture protection materials to provide for weather sealed finish condition (e.g., exterior mounted ladders, etc.).

### 1.4 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Submittal requirements.
- B. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable. Indicate welded connections using standard AWS A2.4 welding symbols. Indicate net weld lengths.
- C. Designer's Qualification Statement: Licensed Engineer.
- D. Fabricator's Qualification Statement: Provide documentation showing steel fabricator is accredited under IAS AC172.
- E. Welders' Qualification Statement: Welders' certificates in accordance with AWS B2.1/B2.1M.

**1.5 QUALITY ASSURANCE**

- A. Finish joints in accordance with NOMMA Guideline 1.
- B. Perform Work in accordance with applicable codes and standards in the State in which the project is located.
- C. Maintain one copy of each document on site.

**1.6 QUALIFICATIONS**

- A. Design under direct supervision of Professional Engineer experienced in design of this Work and licensed in State in which the project is located.
- B. Welder Qualifications: Welding processes and welding operators qualified in accordance with AWS D1.1/D1.1M and AWS D1.2/D1.2M and dated no more than twelve (12) months before start of scheduled welding work.
- C. Fabricator Qualifications: A qualified steel fabricator that is accredited by IAS AC172.

**1.7 DELIVERY, STORAGE, AND HANDLING**

- A. Section 01 60 00 - Product Requirements: Product storage and handling requirements.
- B. Accept metal fabrications on site in labeled shipments. Inspect for damage.
- C. Protect metal fabrications from damage by exposure to weather.

**PART 2 PRODUCTS****2.1 MATERIALS - STEEL**

- A. Structural W-Shapes: ASTM A992/A992M.
- B. Structural Shapes: ASTM A36/A36M.
- C. Channels and Angles: ASTM A36/A36M.
- D. Steel Plate: ASTM A36/A36M.
- E. Hollow Structural Sections: ASTM A500/A500M, Grade B.
- F. Steel Pipe: ASTM A53/A53M, Grade B, Schedule 40.
- G. Sheet Steel: ASTM A653/A653M, Grade 33 Structural Quality, galvanized with coating class.
- H. High-Strength Structural Bolts, Nuts, and Washers: ASTM F3125/F3125M, Type 1, with matching compatible ASTM A563 or ASTM A563M nuts and ASTM F436 washers.
- I. Structural Bolts, Nuts and Washers: Carbon steel, ASTM A307, Grade A and galvanized in compliance with ASTM A153/A153M, Class B.
- J. Welding Materials: AWS D1.1; type required for materials being welded.
- K. Shop Primer: SSPC Paint 15, Type 1, red oxide.
- L. Touch-Up Primer: Match shop primer.
  - 1. Interior Anti-Corrosive Paints: Maximum volatile organic compound content in accordance with California Department of Health Services Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers, including 2004 Addenda.
- M. Touch-Up Primer for Galvanized Surfaces: SSPC Paint 20 Type I Inorganic.

1. Interior Anti-Corrosive Paints: Maximum volatile organic compound content in accordance with California Department of Health Services Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers, including 2004 Addenda.

## 2.2 MATERIALS – ALUMINUM

- A. Extruded Aluminum: ASTM B221 (ASTM B221M), 6063 alloy, T6 temper.
- B. Sheet Aluminum: ASTM B209 (ASTM B209M), 5052 alloy, H32 or H22 temper.
- C. Aluminum-Alloy Drawn Seamless Tubes: ASTM B210 (ASTM B210M), 6063 alloy, T6 temper.
- D. Aluminum-Alloy Bars: ASTM B211 (ASTM B211M), 6061 alloy, T6 temper.
- E. Aluminum-Alloy Sand Castings: ASTM B26/B26M.
- F. Aluminum -Alloy Die Castings: ASTM B85/B85M.
- G. Bolts, Nuts, and Washers:
  1. Stainless steel.
- H. Welding Materials: AWS D1.2/D1.2M; type required for materials being welded.

## 2.3 LINTELS

- A. Lintels: Steel sections, size and configuration as indicated on Drawings, length to allow 8 inches minimum bearing on both sides of opening.
  1. Exterior Locations: Finish to ASTM A123/A123M, hot dip galvanized after fabrication.
  2. Interior Locations: Finish to be primer paint, two coats.

## 2.4 LEDGE AND SHELF ANGLES

- A. Ledge and Shelf Angles Not Attached to Structural Framing: For support of masonry; galvanized.
  1. Exterior Locations: Finish to ASTM A123/A123M, hot dip galvanized after fabrication.
  2. Interior Locations: Finish to be primer paint, two coats.

## 2.5 BOLLARDS

- A. Bollards: 6 inch diameter steel pipe, galvanized after fabrication; 3,000 psi concrete filled; smooth dome shaped concrete cap; length and base securement as indicated on Drawings.
  1. Paint: DOT yellow color; one coat primer; two coats top coat, gloss (including cap).
  2. Acceptable Alternative Concrete Dome Shaped Cap:
    - a. Precast 5,000 psi concrete reinforced with micro fibers.
    - b. Class A form smooth dome shape finish.
    - c. Diameter: Equal to outside diameter of steel pipe bollard.
    - d. Galvanized anchor bolt cast into center of base of cap (for setting into bollard uncured concrete fill).

## 2.6 LADDERS

- A. Ladder type as indicated on Drawings.
  1. Aluminum Ladder: Welded metal unit complying with ANSI A14.3; factory fabricated to greatest degree practical and in the largest components possible.



- a. Components: Manufacturer's standard side rails, rungs, treads, handrails. returns, platforms and safety devices complying with the requirements of the MATERIALS article of this section.
- b. Materials: Aluminum; ASTM B221 (ASTM B221M), 6063 alloy, T52 temper.
- c. Mounting: Space rungs 7 inches from wall surface; with metal mounting brackets and attachments. Mounting brackets attached as indicated on Drawings, but not greater than 36 inches apart.
- d. Finish:
  - 1) Clear anodized coating in compliance with AAMA 611, Class 1.

## 2.7 STRUCTURAL SUPPORTS

- A. Other Structural Supports: Steel sections, shape and size as indicated on Drawings required to support applied loads with maximum deflection of 1/240 of the span; prime paint, one coat.

## 2.8 ANCHOR BOLTS

- A. Anchor Rods: ASTM A307; Grade A.
  - 1. Shape: Hooked and straight.
  - 2. Furnish with nut and washer; unfinished.

## 2.9 FABRICATION

- A. Fit and shop assemble items in largest practical sections, for delivery to site.
- B. Fabricate items with joints tightly fitted and secured.
- C. Continuously seal joined members by continuous welds.
- D. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.
- E. Exposed Mechanical Fastenings: Flush countersunk screws or bolts; unobtrusively located; consistent with design of component, except where specifically noted otherwise.
- F. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.
- G. Railing Assemblies, wall rails, and attachments to resist force of 75 lbs at any point without damage or permanent set.

## 2.10 FACTORY APPLIED FINISHES

- A. Finishes as follows unless indicated otherwise on Drawings or in component description in this Section.
- B. Steel - Interior Use:
  - 1. Shop Prime Paint items with two coats except where galvanizing is specified.
    - a. Prepare surfaces to be primed in accordance with SSPC SP 2.
    - b. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.
    - c. Shop prime structural steel members. Do not prime surfaces that will be fireproofed, field welded, in contact with concrete, or high strength bolted.
- C. Steel - Exterior Use:
  - 1. Galvanizing: ASTM A123/A123M; minimum 1.7 oz/sq ft coating thickness; hot dip galvanized after fabrication.
  - 2. Galvanizing for Fasteners, Connectors, and Anchors: Hot dip galvanized to ASTM A153/A153M, Class B, unless specifically indicated as Mechanical Galvanized.

- a. Mechanical Galvanizing: ASTM B695; Class 50 minimum.
- D. Aluminum:
  - 1. Exterior Aluminum Surfaces: Class I natural anodized.
  - 2. Interior Aluminum Surfaces: Class I natural anodized.
  - 3. Class I Natural Anodized Finish: AAMA 611 AA-M12C22A41 Clear anodic coating not less than 0.7 mils thick.

## 2.11 FABRICATION TOLERANCES

- A. Squareness: 1/8 inch maximum difference in diagonal measurements.
- B. Maximum Offset Between Faces: 1/16 inch.
- C. Maximum Misalignment of Adjacent Members: 1/16 inch.
- D. Maximum Bow: 1/8 inch in 48 inches.
- E. Maximum Deviation from Plane: 1/16 inch in 48 inches.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify field conditions are acceptable and are ready to receive Work.
- C. Verify field measurements are as indicated on shop drawings.

### 3.2 PREPARATION

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this section.
- B. Prepare materials to be installed and equipment to be used during installation.
- C. Clean and strip primed steel items to bare metal where site welding is required.
- D. Supply steel items required to be cast into concrete or embedded in masonry with setting templates to appropriate sections.

### 3.3 INSTALLATION

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Install items plumb and level, accurately fitted, free from distortion or defects.
- C. Make provisions for erection stresses. Install temporary bracing to maintain alignment, until permanent bracing and attachments are installed.
- D. Field weld components indicated on shop drawings.
- E. Perform steel field welding in accordance with AWS D1.1 – Structural Welding Code.
- F. Perform aluminum field welding in accordance with AWS D1.2 – Structural Welding Code.
- G. Obtain approval of Architect prior to site cutting or making adjustments not scheduled.
- H. After erection, touch up welds, abrasions, and damaged finishes:
  - 1. Steel - Apply prime paint or galvanizing repair paint to match shop finishes.
  - 2. Aluminum – Repair finish to match shop finishes.

**3.4 ERECTION TOLERANCES**

- A. Section 01 40 00 - Quality Requirements: Tolerances.
- B. Maximum Variation from Plumb: 1/4 inch per story or for every 12 feet in height whichever is greater, non-cumulative.
- C. Maximum Offset from Alignment: 1/4 inch.
- D. Maximum Out-of-Position: 1/4 inch.

**3.5 FIELD QUALITY CONTROL**

- A. Section 01 40 00 - Quality Requirements: Monitor quality of installation and testing.
- B. Welding: Inspect steel welds in accordance with AWS D1.1.
- C. Welding: Inspect aluminum welds in accordance with AWS D1.2.

**END OF SECTION**



**SECTION 05 52 00**  
**METAL RAILINGS**

**PART 1 GENERAL**

**1.1 SUMMARY**

- A. Section Includes:
1. This Section applies to metal railing requirements that are not indicated in other Sections of the Work.
  2. Metal railings at stairs, ramps, vertical edges, and as indicated on Drawings. Includes interior and exterior locations, balustrades, and guardrails,
- B. Related Sections:
1. Section 03 30 00 - Cast-In-Place Concrete. Floor mounting handrailings and guardrails.
  2. Section 04 20 00 - Unit Masonry. Wall mounting handrailings and guardrails.
  3. Section 05 50 10 - Metal Fabrications.
  4. Section 09 90 00 - Painting and Coating: Paint finish.

**1.2 REFERENCES**

- A. Americans with Disabilities Act (ADA):
1. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design; current edition.
- B. American Institute of Steel Construction (AISC):
1. AISC 207 - Certification Standard For Steel Fabrication and Erection, and Manufacturing of Metal Components; 2016.
- C. ASTM International (ASTM):
1. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2019.
  2. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2020.
  3. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.
  4. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2016a.
  5. ASTM A276/A276M - Standard Specification for Stainless Steel Bars and Shapes; 2017.
  6. ASTM A307 - Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength; 2021.
  7. ASTM A501/A501M - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing; 2021.
  8. ASTM E935 - Standard Test Methods for Performance of Permanent Metal Railing Systems and Rails for Buildings; 2021.
  9. ASTM F3125/F3125M - Standard Specification for High Strength Structural Bolts and Assemblies, Steel and Alloy Steel, Heat Treated, Inch Dimensions 120 ksi and 150 ksi Minimum Tensile Strength, and Metric Dimensions 830 MPa and 1040 MPa Minimum Tensile Strength; 2020.
- D. American Welding Society (AWS):
1. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination; 2020.
  2. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2020.

3. AWS D1.6/D1.6M - Structural Welding Code - Stainless Steel; 2017.
- E. California Department of Health Services (CA/DHS):
  1. CA/DHS/EHLB/R-174 - Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers, including 2004 Addenda.
- F. International Accreditation Service, Inc. (IAS):
  1. IAS AC172 - Accreditation Criteria For Fabricator Inspection Programs For Structural Steel; 2019.
- G. National Ornamental & Miscellaneous Metals Association (NOMMA):
  1. NOMMA Guideline 1 - Joint Finishes.
- H. The Society for Protective Coatings (SSPC):
  1. SSPC Paint 15 - Steel Joist Shop Primer/Metal Building Primer; 2004.
  2. SSPC Paint 20 - Zinc-Rich Primers (Type I - Inorganic, and Type II - Organic); 2019.

### 1.3 PRE-INSTALLATION MEETINGS

- A. Section 01 30 00 - Administrative Requirements: Pre-installation meeting.
- B. Convene minimum one week prior to commencing work of this Section. Review the work requirements, application procedures, quality control, testing and inspection and production schedule.

### 1.4 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Submittal requirements.
- B. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories.
  1. Indicate welded connections using standard AWS A2.4 welding symbols. Indicate net weld lengths.
- C. Welder's Qualification Statement.
- D. Fabricator's Qualification Statement.

### 1.5 QUALITY ASSURANCE

- A. Welder Qualifications: Show certification of welders employed on the Work, verifying AWS qualification within the previous twelve (12) months.
- B. Fabricator Qualifications:
  1. Qualified steel fabricator that is certified under AISC 207 or IAS AC172.
  2. Company specializing in manufacturing products specified in this section, with not less than five (5) years of documented experience.

## PART 2 PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

- A. Comply with applicable accessibility requirements of ADA Standards.
- B. Provide railings that comply with most stringent requirements of local, state, and federal regulations; where requirements of Contract Documents exceed those of regulations, comply with Contract Documents.

- C. Design and install railing assemblies, wall mounted rails, and attachments to resist force loads without damage or permanent set when tested in accordance with ASTM E935.
  - 1. Distributed Force Loads: 75 pounds per linear foot (1095 N/m) applied to the top of the assembly and in any direction.
  - 2. Concentrated Force Loads: 200 pounds (890 N) applied at any point on the top of the assembly and in any direction.
- D. Railing shapes, heights, profiles, configurations, and component members are to comply with applicable codes and as indicated on Drawings.
  - 1. Unless indicated otherwise on Drawings, round tube railings to be 1-1/2 inch diameter.

## 2.2 COMPONENTS

- A. Sizes, shapes, and configurations to be as indicated on Drawings.

## 2.3 MATERIALS

- A. Steel Components:
  - 1. Steel Bars, Plates, Channels, and Angles: ASTM A36/A36M.
  - 2. Steel Round and Rectangular Tubing:
    - a. ASTM A501/A501M, hot-formed.
  - 3. Steel Structural Pipe:
    - a. ASTM A53/A53M, Grade B, Schedule 40.
  - 4. Fasteners, Bolts, Nuts and Washers:
    - a. ASTM F3125/F3125M; Grade A325, Type 1, 120 ksi minimum tensile strength.
- B. Stainless Steel Components:
  - 1. Stainless Steel Sheet, Strip, Plate, and Flat Bar: ASTM A666, Type 304.
  - 2. Stainless Steel Bars, Shapes and Moldings: ASTM A276/A276M, Type 304.
  - 3. Fastener, Bolts, Nuts and Washers: Stainless steel compatible with components to be fastened.
- C. Welding Materials: AWS D1.1/D1.1M and other AWS standards applicable to materials to be welded.

## 2.4 FABRICATION

- A. Verify field measurements prior to fabrication.
- B. Fit and shop assemble components in largest practical sections, for delivery to site.
- C. Fabricate components with joints tightly fitted and secured.
- D. Continuously seal joined pieces by intermittent welds and plastic filler.
- E. Exposed Welded Joints: NOMMA Guideline 1 Joint Finish 1.
  - 1. No evidence of weld.
- F. Exposed Mechanical Fastenings: Flush countersunk screws or bolts; unobtrusively located; consistent with design of component, except where specifically noted otherwise.
- G. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.
- H. Accurately form components required for anchorage of stairs and landings and railings to each other and to building structure.

**2.5 SHOP FINISHING**

- A. Ungalvanized Railings and Components:
  - 1. Locations:
    - a. All interior items unless otherwise indicated.
  - 2. Provide Shop Primer Coating: SSPC Paint 15, Type 1, red oxide; two coats.
    - a. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.
      - 1) Remove surface contamination and oils and wash with solvent in accordance with SSPC-SP 1.
      - 2) Prepare surface in accordance with SSPC-SP 2, hand tool cleaning.
  - 3. Interior Anti-Corrosive Paints: Maximum volatile organic compound content in accordance with California Department of Health Services Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers, including 2004 Addenda.
  - 4. Touch-Up Primer: Match shop primer.
- B. Stainless Steel Components:
  - 1. Provide No. 4 satin brushed finish.

**2.6 FIELD FINISHING**

- A. Field applied paint finish coats as indicated in Section 09 90 00 - Painting and Coating; color as selected by Architect.
- B. Interior Railings and Components:
  - 1. Apply primer coat and finish coats unless otherwise indicated. Coatings are to be compatible with substrate.

**PART 3 EXECUTION****3.1 EXAMINATION**

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify field conditions are acceptable and are ready to receive work.
- C. Verify concealed blocking and reinforcement is installed and correctly located to receive wall mounted handrails.

**3.2 PREPARATION**

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this section.
- B. Prepare materials to be installed and equipment to be used during installation.
- C. Clean and strip primed steel items to bare metal where site welding is required.
- D. Supply items required to be cast into concrete and or embedded in masonry with setting templates.

**3.3 INSTALLATION**

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Install railings in compliance with ADA Standards for accessible design at applicable locations.
- C. Install components with true alignment, plumb and level, accurately fitted, free from distortion or defects.



- D. Install anchors, angles, struts and blocking as required for connecting stairs to structure.
- E. Core-drill concrete floor to receive vertical support of railings. Insert vertical supports to depths and grout securely as indicated on Drawings.
- F. Secure wall-mounted railings as indicated on Drawings.
- G. Allow for erection loads. Install sufficient temporary bracing to maintain framing safe, plumb, and in alignment.
- H. Field weld components indicated on shop drawings. Perform field welding in accordance with AWS D1.1\D1.1M and other AWS standards applicable to the materials to be welded.
- I. Field bolt and weld to match shop bolting and welding. Conceal bolts and screws whenever possible. Where not concealed, use flush countersunk fastenings.
- J. Mechanically fasten joints butted tight, flush, and hairline.
- K. Grind welds smooth and flush.
- L. Prime welds, abrasions, and otherwise damaged shop primed or galvanized coatings with indicated touch-up coating.
- M. Obtain approval of Architect prior to site cutting or creating adjustments not scheduled.

### **3.4 ERECTION TOLERANCES**

- A. Section 01 40 00 - Quality Requirements: Tolerances.
- B. Maximum Variation From Plumb: 1/4 inch per story, non-cumulative.
- C. Maximum Offset From True Alignment: 1/4 inch.

### **3.5 CLEANING**

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures: Clean installed work and comply with manufacturer's recommendations.

### **3.6 PROTECTION OF INSTALLED CONSTRUCTION**

- A. Section 01 73 00 - Execution: Protecting installed construction.

**END OF SECTION**



**SECTION 06 10 53****MISCELLANEOUS ROUGH CARPENTRY****PART 1 GENERAL****1.1 SUMMARY**

- A. Section Includes:
  - 1. Roof curbs and perimeter nailers.
  - 2. Blocking in wall and roof openings.
  - 3. Communications and electrical panel back boards.
  - 4. Fire-retardant treatment of wood.
  - 5. Preservative treatment of wood.
- B. Related Requirements:
  - 1. Specification sections related to roofing curbs, roofing, and roof decking construction.

**1.2 REFERENCES**

- A. American Lumber Standards Committee (ALSC):
  - 1. ALSC PS 20 - American Softwood Lumber Standard; 2020.
- B. American Wood-Protection Association (AWPA):
  - 1. AWPA U1 - Use Category System: User Specification for Treated Wood; 2021.
- C. APA - The Engineered Wood Association (APA):
  - 1. APA PS 1 - Structural Plywood; 2009.
  - 2. APA PS 2 - Performance Standard for Wood-Based Structural-Use Panels; 2010.
- D. ASTM International (ASTM):
  - 1. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2016.
  - 2. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2020.
  - 3. ASTM C557 - Standard Specification for Adhesives for Fastening Gypsum Wallboard to Wood; 2003.
  - 4. ASTM D3498 - Standard Specification for Adhesives for Field-Gluing Wood Structural Panels (Plywood or Oriented Strand Board) to Wood Based Floor System Framing; 2019.
  - 5. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2021.
  - 6. ASTM F1667 - Standard Specification for Driven Fasteners: Nails, Spikes, and Staples; 2021.
- E. Southern Pine Inspection Bureau (SPIB):
  - 1. SPIB - Standard Grading Rules for Southern Pine Lumber; 2021.

**1.3 SUBMITTALS**

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Product Data: Submit technical data on wood products, preservative and fire retardant treatment materials, and application instructions.

**1.4 QUALITY ASSURANCE**

- A. Grading Agency: Any grading agency acceptable to the Authority Having Jurisdiction and whose rules are approved by the Board of Review, American Lumber Standard Committee ([www.alsc.org](http://www.alsc.org)) and who provides grading service for the species and grade specified; provide lumber stamped with grade mark unless otherwise indicated.
- B. Perform Work in accordance with the following:
  - 1. Dimension Lumber: Comply with ALSC PS 20 and requirements of specified grading agencies.
  - 2. Wood Construction Panels:
    - a. Plywood: Comply with APA PS 1 and requirements of specified grading agencies.
    - b. Oriented Strand Board (OSB): Comply with APA PS 2 and requirements of specified grading agencies.
- C. Surface Burning Characteristics:
  - 1. Fire Retardant Treated Materials: Maximum 25/450 flame spread/smoke developed index when tested in accordance with ASTM E84.
- D. Apply label from agency approved by Authority Having Jurisdiction to identify each preservative treated and fire retardant treated material.

**PART 2 PRODUCTS****2.1 DIMENSION LUMBER FOR CONCEALED APPLICATIONS**

- A. Grading Agency: Southern Pine Inspection Bureau, Inc; SPIB.
- B. Sizes: Nominal sizes as indicated on Drawings, S4S (surfaced on 4 sides).
- C. Moisture Content: S-dry or MC19 (19 percent maximum moisture content).
- D. Stud Framing for sizes 2 by 2 through 2 by 6 (50 by 50 mm through 50 by 150 mm):
  - 1. Species: Southern Pine.
  - 2. Grade: No.2.
- E. Miscellaneous Framing, Blocking, Nailers, Grounds, and Furring:
  - 1. Lumber: S4S (surfaced on 4 sides), No.2 or Standard Grade.
  - 2. Boards: Standard or No.3.

**2.2 CONSTRUCTION PANELS**

- A. Communications and Electrical Room Mounting Boards: PS 1, A-D plywood, or medium density fiberboard; 3/4 inch (19 mm) thick; Fire Retardant Treated as indicated in this Section; flame spread index of 25 or less, smoke developed index of 450 or less, when tested in accordance with ASTM E84.
- B. Other Applications:
  - 1. Plywood Concealed From View But Located Within Exterior Enclosure: PS 1, C-C Plugged or better, Exterior grade.
  - 2. Plywood Exposed to View But Not Exposed to Weather: PS 1, A-D or better.
  - 3. Other Locations: PS 1, C-D Plugged or better.

**2.3 ACCESSORIES**

- A. Fasteners and Anchors:
  - 1. Metal and Finish: Hot-dipped galvanized steel complying with ASTM A153/A153M for high humidity and preservative-treated wood locations, unfinished steel elsewhere.

2. Anchors:
  - a. Toggle bolt type for anchorage to hollow masonry.
  - b. Expansion shield and lag bolt type for anchorage to solid masonry or concrete.
  - c. Bolt or ballistic fastener for anchorages to steel.
- B. Die-Stamped Connectors: Hot dipped galvanized steel, sized to suit framing conditions.
  1. For contact with preservative treated wood in exposed locations, provide minimum G185 (Z550) galvanizing complying with ASTM A653/A653M.
- C. Construction Adhesives: Adhesives complying with ASTM C557 or ASTM D3498.

## 2.4 FACTORY WOOD TREATMENT

- A. Treated Lumber and Plywood: Comply with requirements of AWWA U1 - Use Category System for wood treatments determined by use categories, expected service conditions, and specific applications.
  1. Fire-Retardant Treated Wood: Mark each piece of wood with producer's stamp indicating compliance with specified requirements.
  2. Preservative-Treated Wood: Provide lumber and plywood marked or stamped by an ALSC-accredited testing agency, certifying level and type of treatment in accordance with AWWA standards.
- B. Fire Retardant Treatment:
  1. Exterior Type: AWWA U1, Use Category UCFB, Commodity Specification H, chemically treated and pressure impregnated; capable of providing a maximum flame spread index of 25 when tested in accordance with ASTM E84, with no evidence of significant combustion when test is extended for an additional 20 minutes both before and after accelerated weathering test performed in accordance with ASTM D2898.
    - a. Kiln dry wood after treatment to a maximum moisture content of 19 percent for lumber and 15 percent for plywood.
    - b. Fire retardant treatment required as follows:
      - 1) All exterior rough carpentry items.
  2. Interior Type: AWWA U1, Use Category UCFA, Commodity Specification H, low temperature, low hygroscopic type, chemically treated and pressure impregnated; capable of providing a maximum flame spread index of 25 when tested in accordance with ASTM E84, with no evidence of significant combustion when test is extended for an additional 20 minutes.
    - a. Kiln dry wood after treatment to a maximum moisture content of 19 percent for lumber and 15 percent for plywood.
    - b. Fire retardant treatment required as follows:
      - 1) All interior rough carpentry items.
- C. Preservative Treatment:
  1. Preservative Pressure Treatment of Lumber Above Grade: AWWA U1, Use Category UC3B, Commodity Specification A using waterborne preservative to 0.10 lb/cu ft retention.
    - a. Kiln dry lumber after treatment to maximum moisture content of 19 percent.
    - b. Treat lumber as indicated on Drawings.
    - c. Treat lumber exposed to weather.
    - d. Treat lumber in contact with roofing, flashing or waterproofing.
    - e. Treat lumber in contact with masonry or concrete.
    - f. Treat lumber less than 18 inches above grade.
  2. Preservative Pressure Treatment of Plywood Above Grade: AWWA U1, Use Category UC2 and UC3B, Commodity Specification F using waterborne preservative to 0.25 lb/cu ft retention.
    - a. Kiln dry plywood after treatment to maximum moisture content of 15 percent.

- b. Treat plywood as indicated on Drawings.
  - c. Treat plywood in contact with roofing, flashing or waterproofing.
  - d. Treat plywood in contact with masonry or concrete.
  - e. Treat plywood less than 18 inches above grade.
3. Preservative Pressure Treatment of Lumber in Contact with Soil: AWPA U1, Use Category UC4A, Commodity Specification A using waterborne preservative to 0.31 lb/cu ft retention.
- a. Kiln dry lumber after treatment to maximum moisture content of 19 percent.
  - b. Treat lumber as indicated on Drawings.
  - c. Preservative for Field Application to Cut Surfaces: As recommended by manufacturer of factory treatment chemicals for brush-application in the field.
  - d. Restrictions: Do not use lumber or plywood treated with chromated copper arsenate (CCA) in exposed exterior applications subject to leaching.

## **PART 3 EXECUTION**

### **3.1 EXAMINATION**

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify substrate conditions are ready to receive blocking, curbing, and framing.

### **3.2 PREPARATION**

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this section.
- B. Prepare materials to be installed and equipment to be used during installation.
- C. Coordinate placement of blocking, curbing and framing items.

### **3.3 INSTALLATION**

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Set members level and plumb, in correct position.
- C. Place horizontal members, crown side up.
- D. Except where prefabricated roof curbs are indicated and unless specified otherwise in specification sections for roofing construction, construct curb members of solid wood sections and form corners by alternating lapping side members.
- E. Coordinate curb installation with installation of decking and support of deck openings, and parapet construction.
- F. Communications and Electrical Room Mounting Boards: Coordinate and size mounting boards 12 inches beyond size of panels, devices and wiring to be mounted.

**END OF SECTION**

**SECTION 06 20 00**  
**FINISH CARPENTRY**

**PART 1 GENERAL**

**1.1 SUMMARY**

- A. Section includes finish carpentry materials and work not otherwise indicated in other Sections.
  - 1. Finish carpentry items.
  - 2. Wood trim.
  - 3. Hardware and attachment accessories for finish carpentry items not specified in other Sections.
  
- B. Related Requirements:
  - 1. Section 06 10 53 - Miscellaneous Rough Carpentry: Grounds and support framing.
  - 2. Section 09 90 00 - Painting and Coating: Painting and finishing of finish carpentry items.
  - 3. Section 12 32 16 - Manufactured Plastic-Laminate-Faced Casework: Shop fabricated cabinet work.

**1.2 REFERENCES**

- A. American National Standards Institute (ANSI):
  - 1. ANSI A135.4 - Basic Hardboard; 2020.
  - 2. ANSI/BHMA A156.9 - Cabinet Hardware; 2020.
  - 3. ANSI A208.1 - Particleboard; 2016.
  
- B. American National Standards Institute (ANSI) and Decorative Hardwood Association (formerly Hardwood Plywood and Veneer Association (HPVA)):
  - 1. ANSI/HPVA HP-1 - American National Standard for Hardwood and Decorative Plywood; 2020.
  
- C. American Wood-Protection Association (AWPA):
  - 1. AWPA U1 - Use Category System: User Specification for Treated Wood; 2021.
  
- D. APA - The Engineered Wood Association (APA):
  - 1. APA PS 1 - Structural Plywood; 2009.
  
- E. Architectural Woodwork Institute (AWI):
  - 1. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards; 2014, Errata 2016.
  - 2. AWI (QCP) - Quality Certification Program; current edition, [www.awigcp.org](http://www.awigcp.org).
  
- F. ASTM International (ASTM):
  - 1. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass; 2018.
  - 2. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2021a.
  - 3. ASTM F1667 - Standard Specification for Driven Fasteners: Nails, Spikes, and Staples; 2021.
  
- G. National Electrical Manufacturers Association (NEMA):
  - 1. NEMA LD 3 - High Pressure Decorative Laminates; 2005.

**1.3 ADMINISTRATIVE REQUIREMENTS**

- A. Section 01 30 00 - Administrative Requirements: Coordination and sequencing work.

- B. Coordinate the work with plumbing rough-in, electrical rough-in, installation of associated and adjacent components.
- C. Sequence work to ensure utility connections are achieved in orderly and expeditious manner.

#### 1.4 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Product Data: Submit the following data:
  - 1. Wood materials to be used in viewable construction.
  - 2. Veneer materials.
  - 3. Fire retardant and preservative treatment materials and application instructions.
  - 4. Finish materials.
  - 5. Attachment hardware, and finish hardware.
- C. Shop Drawings: Indicate materials, component profiles, fastening methods, jointing details, accessories, and to minimum scale of 1-1/2 inch equals 1 foot.
  - 1. Provide the information required by AWI/AWMAC/WI (AWS).
- D. Samples for Initial Selection: Two manufacturer's color samples illustrating the full range of finishes, patterns, and colors available for each finish surface type, trim and hardware indicated; submit for Architect's initial selections.
  - 1. For clear coats on stained wood, samples to illustrate range of stain colors and sheens available as applied to wood species required in construction.
  - 2. For clear coats on non-stained wood, samples to illustrate sheens available as applied to wood species required in construction.
- E. Samples for Verification: From the Architect's initial selections, prepare and submit two samples for each selected finish, pattern, and color; minimum 4 x 4 inch samples and actual trim and hardware. Where finishes involve normal color and texture variations, include sample sets showing the full range of variations expected.
- F. Certificates:
  - 1. Submit copy of fabricator's AWI (QCP) - Quality Certification Program license and Project specific letters to the Architect.
  - 2. Submit labels and certificates required by quality assurance and quality control programs.

#### 1.5 QUALITY ASSURANCE

- A. Fabricator Qualifications: Company specializing in fabricating products indicated in this Section with minimum five (5) years documented experience.
  - 1. Accredited participant in the specified Quality Certification service/program prior to the commencement of fabrication and throughout the duration of the project.
- B. Quality Certification: Comply with AWI (QCP) woodwork association quality certification service/program in accordance with requirements for work specified in this Section.
  - 1. Provide labels or certificates indicating that the products and work comply with AWI/AWMAC/WI (AWS) requirements for grade or grades specified.
  - 2. Provide designated labels on shop drawings as required by certification program.
  - 3. Provide designated labels on installed products as required by certification program.
  - 4. Submit certifications upon completion of installation that verifies the work complies with specified requirements.
- C. Maintain copy of AWI/AWMAC/WI (AWS) on site available for review.



**1.6 DELIVERY, STORAGE, AND HANDLING**

- A. Section 01 60 00 - Product Requirements.
- B. Deliver factory-fabricated units to project site in original packages, containers or bundles bearing brand name and identification.
- C. Store finish carpentry items under cover, elevated above grade, and in a dry, well-ventilated area not exposed to heat or sunlight.
- D. Protect from moisture damage.
- E. Handle materials and products to prevent damage to edges, ends, or surfaces.

**PART 2 PRODUCTS****2.1 PERFORMANCE REQUIREMENTS**

- A. Quality Standard: Products and work of this Section is to comply with the following grade in accordance with AWI/AWMAC/WI (AWS), unless otherwise indicated.
  - 1. Grade:
    - a. Custom Grade.
  - 2. Moisture Content for Wood Based Products:
    - a. Interior Use: 6 - 8 percent.
    - b. Exterior Use: 8 - 10 percent.
  - 3. Quality to be suitable for transparent finish unless indicated otherwise.
- B. Surface Burning Characteristics: Provide materials having fire and smoke properties as required by authority having jurisdiction and applicable code.

**2.2 COMPONENTS**

- A. Softwood Lumber:
  - 1. Species of Wood:
    - a. Southern Pine.
  - 2. Cut or Slicing of Wood:
    - a. Rift or Quarter Sawn.
- B. Hardwood Lumber:
  - 1. Species of Wood:
    - a. Red Oak.
  - 2. Cut or Slicing of Wood:
    - a. Rift Sawn.
- C. Softwood Plywood: Refer to ACCESSORIES article in this Section for adhesive type.
  - 1. Core Type:
    - a. Veneer core.
      - 1) Exterior grade for exterior use.
  - 2. Species of Face Veneer: APA PS 1 Grade B-B.
    - a. Fir.
  - 3. Slicing of Face Veneer:
    - a. Rotary Sliced.
  - 4. Interior Composite Wood Products: Meets California Department of Health Services Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers, including 2004 Addenda.
- D. High Pressure Decorative Laminate (HPDL): NEMA LD 3.
  - 1. High Wear Surfaces: HWS (0.060 inch thick).

2. Horizontal Surfaces: HGS (0.048 inch thick).
3. Vertical Surfaces: VGS (0.028 inch thick).
4. Cabinet Liner Surfaces: CLS (0.02 inch thick).
5. Concealed Backer Surfaces: BKL (0.02 inch thick) undecorated laminate backer for application to concealed backside of panels faced with HPDL.
6. Laminate Adhesive: Type recommended by laminate manufacturer to suit application; not containing formaldehyde or other volatile organic compounds.
7. Colors and Finish:
  - a. Vertical Surfaces:
    - 1) As selected by Architect from manufacturer's full range.
  - b. Horizontal Surfaces:
    - 1) As selected by Architect from manufacturer's full range.
- E. Particleboard: Medium density; moisture resistant; not less than Type M-2 exterior glue complying ANSI A208.1; sanded faces.
- F. Hardboard: ANSI A135.4; Pressed wood fiber with resin binder, Class 1 (tempered grade), 1/4 inch thick, smooth one sides (S1S).
- G. Glass Shelves: ASTM C1048, Kind FT Fully tempered, Condition A, uncoated, Type 1 transparent flat, Class 1 clear, Quality q3 glazing select; with horizontal tempering, arrised edges.
- H. Wood Capped Handrails: Concealed fasteners; shape and configuration as indicated on Drawings.
  1. Lumber Species: Hardwood lumber to match adjacent wood trim.
  2. Finish and Color:
    - a. Transparent and stain as selected by Architect from manufacturer's full range.

### 2.3 ACCESSORIES

- A. Adhesive: Wood-to-wood adhesive used to glue for thickness, width, or lay-up of veneered construction. To be for the intended purpose and to be applied in accordance with the manufacturer's instructions.
  1. Type I: Exterior or non-climate controlled interior applications.
  2. Type II: Interior climate controlled applications.
- B. Shelf Standards and Fitted Supports: Stainless steel; satin finish.
  1. Standards to be formed channels, slotted for fitted supports spaced at 1 inch centers.
- C. Shelf Brackets: Stainless steel; satin finish.
  1. Fabricated with angled extension support, pre-drilled and countersunk fastener holes.
- D. Mirror Attachment Accessories: Stainless steel J-profile channels; satin finish.
- E. Fasteners and Adhesives:
  1. Fasteners: Steel of size and type to suit application; hot dipped galvanized steel for high humidity and treated wood locations, unfinished steel elsewhere.
    - a. Concealed Joint Fasteners: Threaded steel.
    - b. Exterior Fasteners: Length required to penetrate wood substrate 1-1/2 inch.
      - 1) Stainless steel, Grade 304 or 316 and complying with ASTM F1667.
  2. Adhesive for Purposes Other Than Laminate Installation: Suitable for the purpose; not containing formaldehyde or other volatile organic compounds.
- F. Lumber for Shimming and Blocking: Softwood lumber.
- G. Veneer Edge Band: Standard wood veneer edge band matching face veneer.

- H. Wood Filler: Base type as recommended by manufacturer of finish materials and tintable to match surrounding surface finish.
- I. Primer: Low VOC alkyd primer sealer type.
  - 1. Interior Primers: Maximum volatile organic compound content in accordance with California Department of Health Services Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers, including 2004 Addenda.

## 2.4 HARDWARE

- A. Hardware: Comply with ANSI/BHMA A156.9.
  - 1. Hinges: European style, stainless steel, satin finish.
  - 2. Pulls: Wire style.
    - a. Stainless steel, satin finish.
  - 3. Drawer Slides: Full suspension style, powder coat finish.
  - 4. Cabinet Locks: Keyed cylinder, two keys for each lock, master keyed, steel with satin finish.

## 2.5 WOOD TREATMENT

- A. Factory-Treated Lumber: Comply with requirements of AWWA U1 - Use Category System for pressure impregnated wood treatments determined by use categories, expected service conditions, and specific applications.
- B. Fire Retardant Treatment (FR-S Type): Chemically treated and pressure impregnated; capable of providing flame spread index of 25, maximum, and smoke developed index of 450, maximum, when tested in accordance with ASTM E84.
  - 1. 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.
- C. Wood Preservative by Pressure Treatment (PT Type): AWWA U1 Treatment using water borne preservative with 0.25 percent retainage.
- D. Shop pressure treat wood materials requiring fire rating to concealed wood blocking.
- E. Provide identification on fire retardant treated material.
- F. Deliver fire retardant treated materials cut to required sizes. Minimize field cutting.
- G. Redry wood after pressure treatment to the indicated percent moisture content.

## 2.6 FABRICATION

- A. Verify field measurements prior to fabrication.
- B. Fabricate in accordance with PERFORMANCE REQUIREMENTS article of this Section.
- C. Shop assemble work for delivery to site, permitting passage through building openings.
- D. Fit exposed sheet material edges with matching veneer edging. Use one piece for full length only.
- E. Cap exposed high pressure decorative laminate finish edges with material of same finish and pattern.
- F. Shop prepare and identify components for book match grain matching during site erection.
- G. When necessary to cut and fit on site, fabricate materials with ample allowance for cutting. Furnish trim for scribing and site cutting.

- H. Apply high pressure decorative laminate finish in full uninterrupted sheets consistent with manufactured sizes. Fit corners and joints hairline; secure with concealed fasteners. Slightly bevel arises.
- I. Apply laminate backing sheet to reverse face of high pressure decorative laminate finished surfaces.

## 2.7 FINISHING

- A. Shop finish items indicated to be shop fabricated and finished for installation at site.
- B. Sand work smooth and set exposed nails and screws.
- C. Apply wood filler to fill recessed nail and screw indentations.
  - 1. On items to receive transparent finishes, tint wood filler to matching surrounding surfaces and of types recommended by manufacturer of applied finishes.
- D. Apply seal coat to concealed wood surfaces in contact with cementitious materials.
- E. Back prime woodwork items to be field finished, prior to installation.
- F. Finish work in accordance with AWI/AWMAC/WI (AWS), Section 5 - Finishing for grade indicated in PERFORMANCE REQUIREMENTS article of this Section and as follows:
  - 1. Refer to Section 09 90 00 - Painting and Coating for finishes for interior wood.
  - 2. Transparent System:
    - a. System - 5, Varnish, Conversion.
    - b. Stain:
      - 1) Match wood door stain.
    - c. Sheen:
      - 1) Semigloss.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify adequacy of backing and support framing.
- C. Verify mechanical, electrical, and building items affecting work of this section are placed and ready to receive this work.

### 3.2 PREPARATION

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this section.
- B. Prepare materials to be installed and equipment to be used during installation.

### 3.3 INSTALLATION

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Install work in accordance with PERFORMANCE REQUIREMENTS of this Section.
- C. Set and secure materials and components in place, plumb and level.
- D. Carefully scribe work abutting other components, with maximum gaps of 1/32 inch. Do not use additional overlay trim to conceal larger gaps.
- E. Install trim with finish nails at 12 inches on center.

1. Set, fill and finish over fastener locations to match surrounding finish.
- F. Install hardware.
- G. Site Applied Wood Treatment:
  1. Apply preservative treatment.
  2. Brush apply one coat of preservative treatment on wood in contact with cementitious materials. Treat site-sawn cuts.
  3. Allow preservative to dry prior to erecting members.

### **3.4 ERECTION TOLERANCES**

- A. Section 01 40 00 - Quality Requirements: Tolerances.
- B. Maximum Variation from Indicated Position: 1/16 inch.
- C. Maximum Offset from Alignment with Abutting Materials: 1/32 inch.

### **3.5 CLEANING**

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures: Clean installed work and comply with manufacturer's recommendations.

### **3.6 PROTECTION OF INSTALLED CONSTRUCTION**

- A. Section 01 73 00 - Execution: Protecting installed construction.

**END OF SECTION**



**SECTION 06 61 16**  
**SOLID SURFACING FABRICATIONS**

**PART 1 GENERAL****1.1 SUMMARY**

- A. Section Includes:
  - 1. Window sills.
  - 2. Vertical surface applications.
  - 3. Solid surfacing fabrications and components indicated on Drawings.
- B. Related Requirements:
  - 1. Sections describing substrates and construction receiving solid surface fabrications.

**1.2 REFERENCE STANDARDS**

- A. ASTM International (ASTM):
  - 1. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2021a.

**1.3 SUBMITTALS**

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Product Data: Provide data on specified component products, electrical characteristics and connection requirements.
- C. Shop Drawings: Indicate dimensions, thicknesses, required clearances, tolerances, materials, colors, finishes, fabrication details, field jointing, adjacent construction, design load parameters, methods of support, integration of plumbing components, and anchorages. Indicate preparation of opening required, rough-in sizes; provide templates for cast-in or placed frames or anchors; tolerances for item placement, and temporary bracing of components.
- D. Samples for Initial Selection: Two manufacturer's complete set of color charts illustrating the full range of patterns, finishes and colors available for solid surface fabrications and sealants; 3 x 4 inch samples; submit for Architect's initial selections.
- E. Samples for Verification: From the Architect's initial selections, prepare and submit two samples for each selection; each sample to be 12 x12 inches illustrating actual fabrication construction; include fastener hardware. Where finishes involve normal color and texture variations, include sample sets showing the full range of variations expected.

**1.4 CLOSEOUT SUBMITTALS**

- A. Section 01 77 00 - Closeout Procedures.
- B. Maintenance Data: Indicate list of approved cleaning materials and procedures required; list of substances that are harmful to the component materials.
- C. Include instructions for stain removal, and surface and gloss restoration.
- D. Warranty Documentation: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

**1.5 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum five (5) years of documented experience.

**1.6 WARRANTY**

- A. Section 01 77 00 - Closeout Procedures: Product warranties.
- B. Manufacturer Warranty: Provide manufacturer's standard warranty for material only for period of ten (10) years against defects and/or deficiencies in the Work. Promptly correct any defects or deficiencies which become apparent within warranty period, to satisfaction of Owner and at no cost to Owner.

**1.7 SPARE PARTS AND MAINTENANCE PRODUCTS**

- A. Section 01 60 00 - Product Requirements: Extra materials, spare parts, and maintenance products.
  - 1. Extra Polishing Cream: 16 oz.

**PART 2 PRODUCTS****2.1 MANUFACTURERS**

- A. Solid Surface Fabrications:
  - 1. Corian (by DuPont).
  - 2. Staron (by Lotte Advanced Materials).
  - 3. Wilsonart Contract.
  - 4. Substitutions: See Section 01 60 00 - Product Requirements.

**2.2 MATERIALS**

- A. Provide finished products having flame spread index of 35 and smoke developed index of 15, when tested in accordance with ASTM E84 in thickness of 3/4 inch.
- B. Resin: Polyester type, with integral coloring, stain resistant to domestic chemicals and cleaners.
- C. Polishing Cream: Compatible polishing cream to achieve specified finish sheen.
- D. Adhesive: Type recommended by solid surface manufacturer and coordinated for bonding to substrate type.

**2.3 FABRICATION**

- A. Design fabrications with sufficient strength for applicable stresses during handling, installation and use after installation.
- B. Fabricate components by mold to achieve shape and configuration.
- C. Thickness, profile and configuration to be as indicated on Drawings.
- D. Gel coat the finish exposed surfaces smooth and polish to a gloss sheen.
- E. Corners and edges:
  - 1. Radius.
- F. Fabricate components in shop to greatest extent practical to sizes and shapes indicated, in accordance with Drawings and approved Shop Drawings and solid polymer manufacturer



requirements. Form joints between components using manufacturer's standard joint adhesive without conspicuous joints.

- G. Fabricate components to provide for mounting and anchorage materials and devices to be concealed from view, unless indicated otherwise on Drawings.
- H. Where applicable, provide factory cutouts for penetrations of elements of other construction to include, but not limited to, plumbing fittings and bath accessories as indicated on Drawings.
- I. Ensure no blistering, whitening and cracking of components during forming.
- J. Cure components prior to shipment, except sheet materials requiring site handling.

## 2.4 FINISH

- A. Color:
  - 1. As selected by Architect from manufacturer's full range.
- B. Exposed to View Surface Visual Texture:
  - 1. As selected by Architect from manufacturer's full range.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify that surfaces and conditions are ready to accept the work of this Section. Proceed with installation only after unsatisfactory conditions have been corrected.
- C. Examine products to be installed for damage and other conditions detrimental to completion of the Work. Proceed with installation only after unsatisfactory conditions have been corrected.
- D. Verify that field measurements are as indicated.
- E. Verify that joint preparation and affected dimensions are acceptable.
- F. Verify mechanical, electrical, and building items affecting work of this section are placed and ready to receive this work.

### 3.2 PREPARATION

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this Section.
- B. Prepare materials to be installed and equipment to be used during installation.
- C. Provide anchoring devices for installation and embedding.
- D. Provide templates and rough-in measurements.

### 3.3 INSTALLATION

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Install components in accordance with Drawings and approved shop drawings and manufacturer's instructions.
- C. Align work plumb and level.

- D. Mounting and anchorage materials and devices to be concealed from view, unless indicated otherwise on Drawings.
- E. Rigidly anchor and secure to substrate to prevent misalignment and delamination from substrate.
- F. Seal joints at junctions to other construction elements with joint sealant compatible with material type being sealed. Sealant to be paintable and colored as selected by Architect.

### **3.4 ERECTION TOLERANCES**

- A. Section 01 40 00 - Quality Requirements: Tolerances.
- B. Maximum Variation From True Dimension: 1/8 inch.
- C. Maximum Offset From True Position: 1/8 inch.

### **3.5 CLEANING**

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures: Related to cleaning.
- B. Clean and polish surfaces in accordance with manufacturer's instructions.

### **3.6 PROTECTION OF INSTALLED CONSTRUCTION**

- A. Section 01 73 00 - Execution: Protecting installed construction.
- B. Do not permit construction near unprotected surfaces.

**END OF SECTION**

**SECTION 07 11 00****DAMPPROOFING****PART 1 GENERAL****1.1 SUMMARY**

- A. Section Includes:
  - 1. Bituminous dampproofing.
- B. Related Requirements:
  - 1. Section 04 20 00 - Unit Masonry.

**1.2 REFERENCE STANDARDS**

- A. ASTM International (ASTM):
  - 1. ASTM D1187/D1187M - Standard Specification for Asphalt-Base Emulsions for Use as Protective Coatings for Metal; 2011, Reapproval 2018.
  - 2. ASTM D1227 - Standard Specification for Emulsified Asphalt Used as a Protective Coating for Roofing; 2019.
- B. National Roofing Contractors Association (NRCA):
  - 1. NRCA (WM) - The NRCA Waterproofing Manual; 2005.

**1.3 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide properties of primer, bitumen, and mastics.
- C. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.

**1.4 QUALIFICATIONS**

- A. Installer Qualifications: Company specializing in performing the work of this section with minimum three (3) years experience.

**1.5 FIELD CONDITIONS**

- A. Section 01 60 00 - Product Requirements: Requirements before, during and after installation of Work.
- B. Maintain ambient temperatures above 40 degrees F for 24 hours before and during application until dampproofing has cured.

**PART 2 PRODUCTS****2.1 MANUFACTURERS**

- A. Manufacturers:
  - 1. Henry Company: [www.henry.com](http://www.henry.com).
  - 2. Karnak Corporation: [www.karnakcorp.com](http://www.karnakcorp.com).
  - 3. Mar-Flex Systems, Inc: [www.mar-flex.com/sle](http://www.mar-flex.com/sle).
  - 4. W.R. Meadows, Inc: [www.wrmeadows.com/sle](http://www.wrmeadows.com/sle).
  - 5. Substitutions: See Section 01 60 00 - Product Requirements.

**2.2 DAMPPROOFING PRODUCTS**

- A. Bituminous Dampproofing: Cold-applied water-based emulsion; asphalt with mineral colloid or chemical emulsifying agent; with or without fiber reinforcement; asbestos-free; suitable for application on vertical and horizontal surfaces.
  - 1. Composition - Vertical Application: ASTM D1227 Type III or ASTM D1187/D1187M Type I.
  - 2. Composition - Horizontal and Low-Slope Application: ASTM D1227 Type II or III.
  - 3. VOC Content: Not more than permitted by local, State, and federal regulations.
  - 4. Applied Thickness: 1/16 inch (1.5 mm), minimum, wet film. Provide thicker wet film if recommended by dampproofing manufacturer.
- B. Primers, Mastics, and Related Materials: Type as recommended by dampproofing manufacturer.

**PART 3 EXECUTION****3.1 EXAMINATION**

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify existing conditions before starting work.
- C. Verify substrate surfaces are durable, free of matter detrimental to adhesion or application of dampproofing system.
- D. Verify that items that penetrate surfaces to receive dampproofing are securely installed.

**3.2 PREPARATION**

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this section.
- B. Prepare materials to be installed and equipment to be used during installation.
- C. Protect adjacent surfaces not designated to receive dampproofing.
- D. Clean and prepare surfaces to receive dampproofing in accordance with manufacturer's instructions.
- E. Do not apply dampproofing to surfaces unacceptable to manufacturer.
- F. Apply mastic to seal penetrations, small cracks, or minor honeycomb in substrate.

**3.3 INSTALLATION**

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Perform work in accordance with manufacturer's instructions and NRCA (WM) applicable requirements.
- C. Install dampproofing system to surfaces and locations as indicated on Drawings
- D. Prime surfaces in accordance with manufacturer's instructions.
- E. Apply dampproofing with tools or equipment as recommended by manufacturer.
- F. Apply dampproofing at a temperature limited by equiviscous temperature (EVT) plus or minus 25 degrees F; do not exceed finish blowing temperature for four hours.
- G. Apply each coat of dampproofing in continuous and uniform coat at a rate of 1 gal per 25 sq ft.

- H. Seal penetrations and items projecting through dampproofing surface. Seal watertight with mastic compatible and recommended by dampproofing manufacturer.

### **3.4 PROTECTION OF INSTALLED CONSTRUCTION**

- A. Section 01 73 00 - Execution: Protecting installed construction.
- B. Protect work from damage.

**END OF SECTION**



**SECTION 07 14 16****COLD FLUID-APPLIED WATERPROOFING****PART 1 GENERAL****1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

**1.2 SUMMARY**

- A. Section Includes:
  - 1. Surface preparation.
  - 2. Application of single-component, cold-applied, liquid waterproofing membrane.
- B. Related Requirements:
  - 1. Section 03 30 00 - Cast-in-Place Concrete.
  - 2. Section 04 20 00 - Unit Masonry.
  - 3. Section 07 21 00 - Thermal Insulation.
  - 4. Section 07 62 00 - Sheet Metal Flashing And Trim.
  - 5. Section 07 90 00 - Joint Protection.

**1.3 REFERENCES**

- A. ASTM International (ASTM):
  - 1. ASTM C661 - Standard Test Method for Indentation Hardness of Elastomeric-Type Sealants by Means of a Durometer; 2015.
  - 2. ASTM D816 - Standard Test Methods for Rubber Cements; 2006, Reapproval 2016.
  - 3. ASTM D1644 - Standard Test Methods for Nonvolatile Content of Varnishes; 2001, Reapproval 2017.
  - 4. ASTM D2370 - Standard Test Method for Tensile Properties of Organic Coatings; 2016.
  - 5. ASTM D2697 - Standard Test Method for Volume Nonvolatile Matter in Clear or Pigmented Coatings; 2003, Reapproval 2021.
  - 6. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials; 2016.

**1.4 PRE-INSTALLATION MEETINGS**

- A. Section 01 30 00 - Administrative Requirements: Pre-installation meeting.
- B. Convene minimum one week prior to commencing work of this section.

**1.5 SUBMITTALS**

- A. Section 01 33 00 - Submittal Procedures.
- B. Product Data: For each type of product. Include manufacturer's written instructions for evaluating, preparing, and treating substrate, technical data, and tested physical and performance properties of waterproofing.
- C. Shop Drawings: Show locations and extent of waterproofing. Include details for substrate joints and cracks, sheet flashings, penetrations, inside and outside corners, tie-ins to adjoining waterproofing, and other termination conditions.

**1.6 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Obtain waterproofing materials from a single manufacturer regularly engaged in manufacturing the product.
- B. Installer Qualifications: Installer to be experienced and have adequate number of skilled personnel who are thoroughly trained and experienced in the application of fluid applied waterproofing membranes.
- C. Regulatory Requirements: Provide products which comply with all state and local regulations controlling use of volatile organic compounds (VOCs).

**1.7 MOCK-UP**

- A. Section 01 40 00 - Quality Requirements: Mock-up requirements.
- B. Prior to installation of waterproofing membrane, apply waterproofing membrane to 100 sf of deck or wall to demonstrate surface preparation, crack and joint treatment, corner treatment, thickness, and to demonstrate tie-ins with adjoining construction, and other termination conditions, as well as qualities of materials and execution.

**1.8 DELIVERY, STORAGE, AND HANDLING**

- A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.
- C. Store materials in a clean, dry area in accordance with manufacturer's instructions.
- D. Store at temperatures between 40 to 70 deg F (4 to 21 deg C).
- E. Protect materials during handling and application to prevent damage or contamination.

**1.9 ENVIRONMENTAL REQUIREMENTS**

- A. Section 01 60 00 - Product Requirements: Requirements before, during and after installation of Work.
- B. Product not intended for uses subject to abuse or permanent exposure to the elements.
- C. Do not apply membrane when air, material, or surface temperatures are expected to fall below 30 deg F (-1 deg C) within four hours of completed application.
- D. Do not apply membrane if rainfall is forecast or imminent within 12 hours.
- E. Do not apply waterproofing membrane to any surfaces containing frost.
- F. Consult manufacturer for applications to green concrete.

**PART 2 PRODUCTS****2.1 MANUFACTURERS**

- A. Waterproofing Membrane:
  - 1. Carlisle Coatings & Waterproofing, Inc.
  - 2. Henry Company.
  - 3. Tremco Commercial Sealants & Waterproofing.
  - 4. W. R. Meadows, Inc.
  - 5. Substitutions: Section 01 60 00 - Product Requirements.



- B. Basis of Design: W. R. Meadows, Inc. - Hydralastic 836 Waterproofing Membrane.

## 2.2 MATERIALS

- A. Waterproofing Membrane: Single-component, cold-applied, solvent-free, non-shrink, liquid waterproofing membrane.
  1. Solids Content by Weight, ASTM C1250: 98 percent.
  2. Tensile Strength, ASTM D412: 100 psi.
  3. Elongation at Break, ASTM D412: 425 percent.
  4. Water Vapor Transmission, ASTM E96 (Method BW): 0.10 perms.
  5. Shore 00 Hardness, ASTM D2240: 57.
  6. VOC, ASTM D2369: 36 g/L.

## 2.3 ACCESSORIES

- A. Joint Tape: 6 inches (150 mm) minimum width, reinforcing fabric for corners, crack, and joint treatment.
  1. Reinforcing Fabric HCR by W. R. Meadows, Inc. (Basis of Design)
- B. Reinforced Joint Tape for outside corners subject to backfill.
  1. Precon Tape by W.R. Meadows, Inc. (Basis of Design)
- C. Detailing Membrane: BEM by W. R. Meadows, Inc. (Basis of Design)
- D. Concrete Repair Materials: Meadow-Patch 5 and Meadow-Patch 20 Concrete Repair Mortars by W. R. Meadows, Inc. (Basis of Design)
- E. Waterproofing Protection Course: Perminator or Protection Course by W. R. Meadows, Inc. (Basis of Design)
- F. Rolled Matrix Drainage System: Mel-Drain by W. R. Meadows, Inc. (Basis of Design)

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Examine surfaces to receive membrane. Notify architect if surfaces are not acceptable. Do not begin surface preparation or application until unacceptable conditions have been corrected.

### 3.2 PREPARATION

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this Section.
- B. Prepare materials to be installed and equipment to be used during installation.
- C. Protect adjacent surfaces not designated to receive waterproofing.
- D. Clean and prepare surfaces to receive waterproofing in accordance with manufacturer's instructions.
- E. Do not apply waterproofing to surfaces unacceptable to manufacturer.
- F. Clean concrete surfaces so they are free of all coatings, dirt, oil, paints and any other contaminants.
- G. Patch all holes and voids and smooth out any surface misalignments.

- H. Remove and patch all concrete form ties.
- I. Treatment of Existing Cracks and All Non-Structural Joints:
  1. Identify and install detailing membrane in all cracks and all non-structural joints.
  2. Apply a 30 wet mil coat of the fluid applied membrane ensuring that there is a minimum of 3 inches (75 mm) of membrane extending onto the wall in all directions.
  3. Embed the non-woven reinforcing fabric over the entire area of this membrane and work in using trowel.
  4. Completely cover the glass mesh with a second coat of the fluid applied membrane at 30 wet mils while the first coat is still wet, again extending 3 inches onto the wall in all directions.
- J. Treatment of Inside & Outside Corners:
  1. Install detailing membrane to create a minimum 3/4 inch fillet in all inside corners.
  2. Apply a 30 wet mil coat of the fluid applied membrane ensuring that there is a minimum of 3 inches (75 mm) of membrane extending onto the wall in all directions.
  3. Embed the non-woven reinforcing fabric over the entire area of this membrane and work in using trowel.
  4. Completely cover the glass mesh with a second coat of fluid applied membrane at 30 wet mils while the first coat is still wet, again extending 3 inches onto the wall in all directions.
  5. On outside corners subject to backfilling, install reinforced joint tape in lieu of fabric joint tape following the same procedure.

### 3.3 INSTALLATION

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Apply waterproofing membrane system in accordance with manufacturer's instructions.
- C. Gently mix membrane prior to application.
- D. Apply membrane by trowel, flat-blade squeegee, or roller, at a minimum coverage rate of 25 sf per 1 U.S. gal (2.3 m<sup>2</sup>/3.78 L), providing a thickness of 60 mils wet.
- E. If a two-coat application is required, apply second coat as soon as possible with no more than eight hours between coats providing a minimum total thickness of 60 mils wet.
- F. Frequently inspect surface area to ensure proper adhesion and consistent thickness is achieved.
- G. Work material into any fluted rib forming indentations.
- H. Provide minimum cured membrane thickness of 60 mils dry.

### 3.4 PROTECTION OF INSTALLED CONSTRUCTION

- A. Section 01 73 00 - Execution: Protecting installed construction.
- B. Protect membrane with application of waterproofing protection course, drainage board, or other approved material.
- C. Backfill immediately using care to avoid damaging waterproofing membrane system.

**END OF SECTION**

**SECTION 07 21 00**  
**THERMAL INSULATION**

**PART 1 GENERAL****1.1 SUMMARY**

- A. Section Includes:
1. Board insulation at perimeter foundation walls.
    - a. Exception: Where Drawings indicate foamed-in-place insulation, comply with Section 07 21 19 - Foamed-In-Place Insulation.
  2. Batt insulation and vapor retarder in exterior framed walls, ceilings, and soffits.
  3. Batt insulation for filling perimeter window and door shim spaces and crevices in exterior walls.
- B. Related Requirements:
1. Division 07 - Thermal and Moisture Protection: Roofing insulation requirements.
  2. Section 07 21 19 - Foamed-In-Place Insulation: Plastic foam insulation other than boards.
  3. Section 09 21 16 - Gypsum Board Assemblies: Acoustic attenuation insulation for interior construction that does not require a thermal barrier between two conditioned spaces.

**1.2 REFERENCE STANDARDS**

- A. ASTM International (ASTM):
1. ASTM C272/C272M - Standard Test Method for Water Absorption of Core Materials for Sandwich Constructions; 2018.
  2. ASTM C303 - Standard Test Method for Dimensions and Density of Preformed Block and Board-Type Thermal Insulation; 2021.
  3. ASTM C518 - Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus; 2021.
  4. ASTM C578 - Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation; 2019.
  5. ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing; 2017.
  6. ASTM C1338 - Standard Test Method for Determining Fungi Resistance of Insulation Materials and Facings; 2019.
  7. ASTM D774/D774M - Standard Test Method for Bursting Strength of Paper; 1997, Reapproval 2007.
  8. ASTM D1621 - Standard Test Method for Compressive Properties of Rigid Cellular Plastics; 2016.
  9. ASTM D4397 - Standard Specification for Polyethylene Sheeting for Construction, Industrial, and Agricultural Applications; 2016.
  10. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2021a.
  11. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials; 2016.
  12. ASTM E970 - Standard Test Method for Critical Radiant Flux of Exposed Attic Floor Insulation Using a Radiant Heat Energy Source; 2017.
- B. National Fire Protection Association (NFPA):

1. NFPA 285 - Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Non-Load-Bearing Wall Assemblies Containing Combustible Components; 2019.
- C. Green Seal (GS):
  1. GS-36 - Adhesives for Commercial Use.
- D. South Coast Air Quality Management District (SCAQMD):
  1. SCAQMD Rule 1168 - Adhesive and Sealant Applications.

### 1.3 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Product Data: Provide data on product characteristics, performance criteria, and product limitations.
- C. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

## PART 2 PRODUCTS

### 2.1 BOARD INSULATION MATERIALS

- A. Extruded Polystyrene (XPS) Board Insulation: Extruded polystyrene board; ASTM C578; and the following characteristics:
  1. Application Locations: Locations as indicated on Drawings and as follows.
    - a. Foundation perimeter, except where Drawings indicate foamed-in-place insulation, comply with Section 07 21 19 - Foamed-In-Place Insulation.
  2. Type (ASTM C578), Minimum Compressive Strength (ASTM D1621), Minimum R-value (ASTM C518, at 75 degrees F mean temperature), Maximum Water Absorption (ASTM C272/C271M, by volume, total immersion) are as follows:
    - a. Type IV, 25 psi, R-value 5.0 per inch, Water Absorption 0.3 percent.
  3. Board Thickness: 3 inches unless indicated otherwise on Drawings.
  4. Flame Spread Index (FSI): Class A, 25 or less, when tested as per ASTM E84.
  5. Smoke Developed Index (SDI): 450 or less, when tested as per ASTM E84.
  6. Comply with fire resistance requirements shown on the drawings as part of an exterior non-load-bearing exterior wall assembly when tested in accordance with NFPA 285.
  7. Board Edges: Square.
  8. Board Size: 48 x 96 inch, scored at 16 inch increments.
  9. Manufacturers:
    - a. DiversiFoam Products - CertiFoam.
    - b. Dow Chemical - Styrofoam.
    - c. Owens Corning - Foamular XPS.
    - d. Kingspan Insulation, LLC - Green Guard XPS.

### 2.2 BATT INSULATION MATERIALS

- A. Mineral Fiber Batt Insulation: Flexible or semi-rigid preformed batt or blanket, complying with ASTM C665; friction fit.
  1. Unfaced Type: ASTM C665 Type-I (unfaced); rated flame spread / smoke development of 25 / 50, or less, when tested in accordance with ASTM E84).
    - a. Application Locations: Where indicated on Drawings.
  2. Faced Type: ASTM C665 Type-III (faced); Class-A (FSK (foil-scrim-kraft facing)); Category-I (vapor retarder facing); rated flame spread / smoke development of 25 / 50, or less, when tested in accordance with ASTM E84.
    - a. Application Locations: Where indicated on Drawings.

3. Thermal Resistance: Minimum R-value of 4.0 per inch thickness, when tested in accordance with ASTM C518 at 75 degrees F.
  4. Combustion Characteristics: Passes when tested in accordance with ASTM E136.
  5. Fungi Resistance: Passes when tested in accordance with ASTM C1338.
  6. Nominal Density: Minimum 2.5 pcf when tested in accordance with ASTM C303.
  7. Corrosivity to Steel: Passes when tested in accordance with ASTM C665.
  8. Blanket Width: Sized to fully friction fit space between framing members.
  9. Blanket Thickness: Sized to fully friction fit cavity, but not less than 3-1/2 inches.
  10. Manufacturers:
    - a. Johns Manville.
    - b. Knauf Insulation.
    - c. Owens Corning.
    - d. Rockwool.
- B. Vapor Retarder Sheet: Polyethylene film complying with ASTM D4397.
1. Application Locations: Where indicated on Drawings.
  2. Color:
    - a. Clear.
  3. Thickness:
    - a. 6 mils (0.006 inch) (0.1524 mm).
  4. Water Vapor Permeance:
    - a. For 6 mil Sheet Thickness: 0.13 perms complying with ASTM D4397.
  5. Seam and Perimeter Tape: Polyethylene self-adhering type, mesh reinforced, 2 inches (50 mm) wide, compatible with sheet material.

### 2.3 ACCESSORIES

- A. Aluminum Foil Tape: Bright aluminum self-adhering type, mesh reinforced, minimum 2 inches wide, and as recommended by insulation manufacturer.
- B. Tape For Rigid Insulation Boards: Joint tape material to be in accordance with insulation material manufacturers' instructions.
- C. Adhesive: Type recommended by insulation manufacturer for application.
  1. Interior Adhesives: Maximum volatile organic compound content in accordance with SCAQMD Rule 1168.
  2. Interior Aerosol Adhesives: Maximum volatile organic compound content in accordance with GS-36.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify that substrate, adjacent materials, and insulation materials are dry and that substrates are ready to receive insulation.
- C. Verify substrate surfaces are flat, free of honeycomb, fins, irregularities, or materials or substances that may impede adhesive bond.

### 3.2 PREPARATION

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this section.
- B. Prepare materials to be installed and equipment to be used during installation.

### 3.3 INSTALLATION

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Board Insulation at Foundation Perimeter: (Exception: Where Drawings indicate foamed-in-place insulation, comply with Section 07 21 19 - Foamed-In-Place Insulation.)
  - 1. Adhere strip of polyethylene sheet over control joint with double beads of adhesive each side of joint between sheets. Extend sheet full height of joint.
  - 2. Apply adhesive in three continuous beads per board length. Daub adhesive tight to protrusions to ensure continuity of vapor retarder and air seal.
  - 3. Install boards horizontally on foundation perimeter.
    - a. Place boards to maximize adhesive contact.
    - b. Install in running bond pattern.
    - c. Butt edges and ends tightly to adjacent boards and to protrusions.
  - 4. Extend boards over expansion joints, unbonded to foundation on one side of joint.
  - 5. Cut and fit insulation tightly to protrusions or interruptions to the insulation plane.
  - 6. Where cavity exists between installed foundation insulation boards and back of masonry veneer and cavity is indicated to be grouted solid, protect cavity from intrusion of soil and/or other debris. Install grout in cleaned cavity within 48 hours of masonry veneer installation.
- C. Batt Insulation:
  - 1. Install insulation in accordance with manufacturer's instructions.
  - 2. Install in exterior wall, soffit spaces, ceiling spaces and other locations indicated on Drawings without gaps or voids. Do not compress insulation.
  - 3. Trim insulation neatly to fit spaces. Insulate miscellaneous gaps and voids.
  - 4. Fit insulation tightly in cavities and tightly to exterior side of mechanical and electrical services within the plane of the insulation.
  - 5. Faced Batt Insulation: Install with factory applied face facing warm side of building spaces. Lap ends and side flanges of membrane over framing members.
  - 6. Tape insulation batts in place.
  - 7. Tape and seal butt ends, lapped flanges, and minor tears or cuts in membrane.
- D. Vapor Retarder Sheet:
  - 1. Install vapor retarder sheet in accordance with manufacturer's instructions.
  - 2. Metal Framing: Where indicated on Drawings only and in conjunction with batt insulation installation, place vapor retarder sheet on warm side of building spaces; lap and seal vapor retarder sheet joints over face of framing members (framing members will provide solid backing to facilitate applying appropriate pressure for tape adhesion).
  - 3. Extend vapor retarder sheet tightly to full perimeter of adjacent window and door frames and other items interrupting the plane of the membrane. Tape and seal in place.
  - 4. Tape and seal minor tears or cuts in vapor retarder sheet.

### 3.4 PROTECTION OF INSTALLED CONSTRUCTION

- A. Section 01 73 00 - Execution: Protecting installed construction.
- B. Do not permit installed insulation to be damaged prior to its concealment.

**END OF SECTION**

**SECTION 07 21 19****FOAMED-IN-PLACE INSULATION****PART 1 GENERAL****1.1 SUMMARY**

- A. Section includes foamed-in-place insulation system.
- B. Related Requirements:
  - 1. Section 04 20 00 - Unit Masonry: Insulated masonry cavity walls.
  - 2. Section 07 21 00 - Thermal Insulation.
  - 3. Section 07 27 00 - Air Barriers.

**1.2 REFERENCES**

- A. Air Barrier Association of America (ABAA):
  - 1. ABAA - Quality Assurance Program (ABAA - QAP).
- B. American Association of Textile Chemists and Colorists (AATCC):
  - 1. AATCC 127 - Water Resistance: Hydrostatic Pressure Test, 2018.
- C. ASTM International:
  - 1. ASTM C518 - Standard Test Method for Steady-State Thermal Transmission properties by Means of the Heat Flow Meter Apparatus; 2021.
  - 2. ASTM C1029 - Standard Specification for Spray-Applied Rigid Cellular Polyurethane Thermal Insulation; 2020.
  - 3. ASTM C1338 - Standard Test Method for Determining Fungi Resistance of Insulation Materials and Facings; 2019.
  - 4. ASTM D1621 - Standard Test Method for Compressive Properties of Rigid Cellular Plastics; 2016.
  - 5. ASTM D1622 - Standard Test Method for Apparent Density of Rigid Cellular Plastics; 2020.
  - 6. ASTM D1623 - Standard Test Method for Tensile and Tensile Adhesion Properties of Rigid Cellular Plastics; 2017.
  - 7. ASTM D6226 - Standard Test Method for Open Cell Content of Rigid Cellular Plastics; 2021.
  - 8. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2021a.
  - 9. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials; 2016.
  - 10. ASTM E2178 - Standard Test Method for Determining Air Leakage Rate and Calculation of Air Permeance of Building Materials; 2021.
- D. FM Global:
  - 1. FM 4880 - Evaluating the Fire Performance of Insulated Building Panel Assemblies and Interior Finish Materials; 2017.
- E. National Fire Protection Association:
  - 1. NFPA 286 - Standard Methods of Fire Tests for Evaluating Contribution of Wall and Ceiling Interior Finish to Room Fire Growth; 2019.
- F. Underwriters Laboratories Inc.:
  - 1. UL 1040 - Standard for Safety Fire Test of Insulated Wall Construction; Current Edition, Including All Revisions.

2. UL 1715 - Standard for Safety Fire Test of Interior Finish Material; Current Edition, Including All Revisions.

### 1.3 COORDINATION

- A. Section 01 30 00 - Administrative Requirements: Coordination, scheduling, and sequencing.
- B. Coordinate the work of this Section with other adjacent and interfacing work.
- C. Sequence the work to permit installation of materials in conjunction with related materials and seals.

### 1.4 PRE-INSTALLATION MEETINGS

- A. Section 01 30 00 - Administrative Requirements: Pre-installation meeting.
- B. Convene minimum one week prior to commencing work of this section.

### 1.5 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Product Data: Submit product description, insulation properties, and preparation requirements.
- C. Manufacturer's Installation Instructions: Submit special procedures, perimeter conditions requiring special attention including around windows, and other special conditions.
- D. Manufacturer's Certificates:
  1. Certify products meet or exceed specified requirements.
  2. Provide test results from large-scale tests such as NFPA 286 (with acceptance criteria of Section 803.2), FM 4880, UL 1040 or UL 1715.
    - a. Such testing shall be related to the actual end-use configuration and be performed in the finished manufactured foam plastic assembly in the maximum thickness intended for use.

### 1.6 MOCKUP

- A. Section 01 40 00 - Quality Requirements: Requirements for mockup.
- B. Provide mockup as part of the mockup requirements for Section 04 20 00 - Unit Masonry.

### 1.7 QUALITY ASSURANCE

- A. Apply label from agency approved by authority having jurisdiction to identify each foam plastic component.

### 1.8 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three (3) years documented experience.
- B. Installer: Company specializing in performing Work of this section, on projects of similar size, with minimum three (3) years documented experience and certified by manufacturer.

### 1.9 ENVIRONMENTAL REQUIREMENTS

- A. Section 01 60 00 - Product Requirements: Requirements before, during and after installation of Work.
- B. Temperature: Install work within range of ambient and substrate temperature, and moisture content recommended by the primary material manufacturer. Do not apply materials to a



damp or wet substrate. Do not install materials when ambient temperature is lower than 50 degrees F unless manufacturer provides written approval.

- C. Field Conditions: Do not install work in snow, rain, fog, or mist. Do not install air barrier when the temperature of substrate surfaces and surrounding air temperatures are below those recommended by the material manufacturer.
- D. Sequencing: Do not install work before the roof assembly and other construction has been sufficiently installed to prevent water infiltration into the substrate construction and building.
- E. Compatibility: Do not allow materials to come in contact with chemically incompatible materials.
- F. Ultra-Violet Exposure: Do not expose air barrier materials to sunlight longer than as recommended by the material manufacturer.

### 1.10 WARRANTY

- A. Section 01 77 00 - Closeout Procedures: Requirements for warranties.
- B. Manufacturer's Warranty: Provide manufacturer's warranty covering against faulty materials in foamed-in-place insulation system, components, and accessories provided by manufacturer. Warranty duration to be five (5) years from date of Substantial Completion.
- C. Installer's Warranty: Provide installer's warranty covering against water intrusion and leaks in foamed-in-place insulation system, components, and accessories. Warranty duration to be two (2) years from date of Substantial Completion.

## PART 2 PRODUCTS

### 2.1 GENERAL

- A. Regulatory Requirements: Comply with applicable codes for flame and smoke limitations.
- B. Application: Locations indicated on Drawings including, but not limited to, masonry cavity walls, and at junctions of dissimilar wall and roof materials to achieve thermal, dampproofing, and air barrier.
- C. All materials are to be compatible with the foamed-in-place insulation manufacturer's product.

### 2.2 FOAMED-IN-PLACE INSULATION

- A. Manufacturers:
  1. BASF - Walltite US.
  2. Henry Company - Permax 2.0X.
  3. Huntsman - Heatlok HFO Pro.
  4. Johns Manville - Corbond III.
  5. NCFI Polyurethanes - InsulBloc.
  6. Substitutions: Section 01 60 00 - Product Requirements.
- B. Basis of Design: NCFI Polyurethanes - InsulBloc.
- C. Foamed-In-Place Insulation: Conforming to ASTM C1029, medium-density, rigid or semi-rigid, closed cell polyurethane foam; foamed on-site, using blowing agent of water or non-ozone-depleting gas.
  1. Closed Cell Content: 90 percent, minimum, in accordance with ASTM D6226.
  2. Thermal Resistance: R-value of 6.7, minimum, per 1 inch thickness at 75 degrees F mean temperature when tested in accordance with ASTM C518.

3. Density: 2.0 pcf, minimum, in accordance with ASTM D1622.
4. Compressive Strength: 25 psi, minimum, in accordance with ASTM D1621.
5. Water Vapor Permeance: Vapor retarder; 1.3 perm, maximum, at 1.0 inch thick when tested in accordance with ASTM E96/E96M, desiccant method.
6. Air Permeance: 0.004 cfm per sq ft, maximum, at 1.57 psf pressure differential, in accordance with ASTM E2178.
7. Surface Burning Characteristics:  $\leq 25$  Flame Spread and  $\leq 450$  Smoke Developed, in accordance with ASTM E84.
8. Fungal Growth: None in accordance with ASTM C1338.

### 2.3 ACCESSORIES

- A. All accessories are to be compatible with the foamed-in-place insulation manufacturer's product.
- B. Primer: As recommended by insulation manufacturer.
- C. Joint Filler Foam: As recommended by insulation manufacturer.
- D. Joint Sealer: Single component polyurethane type and as recommended by foamed-in-place insulation manufacturer.
- E. Moisture Detection Paper Strips: MDP Strips.
- F. Mineral Wool: Mineral Wool Board, 4 pcf density.
- G. Transition Strips: Provide transition strips where difference in spray-applied thickness is greater than 2 inches. Strips are to be fastened directly to CMU, or other substrate, and provide transition backer no less than thickness of the larger depth requirement.
- H. Air Barrier Flashing Sheet Seal: Refer to Section 07 27 00 - Air Barriers.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify Work within construction spaces or crevices are complete prior to insulation application.
- C. Verify surfaces are clean, dry, and free of matter capable of inhibiting adhesion work in this section.

### 3.2 PREPARATION

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this section.
- B. Prepare materials to be installed and equipment to be used during installation.
- C. Prime substrate if required by manufacturer.
- D. Mask and protect adjacent surfaces from over spray or dusting.
- E. Mask areas where brick abuts concrete masonry at window and door jambs and other areas where brick abuts concrete masonry.
- F. Fill voids between masonry and structural steel and metal deck with mineral wool.
- G. Install Air Barrier Flashing at all openings and other locations as indicated on the Drawings. Lap seams one inch. Prime substrate as recommended by manufacturer.

**3.3 INSTALLATION**

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Apply work in this Section in accordance with manufacturer's instructions.
- C. Apply insulation by spray method to uniform monolithic density without voids and seal around objects embedded or penetrating substrate.
- D. Apply to a cured thickness of not less than that indicated on Drawings and not greater than that indicated thickness plus 1/2 inch. Cured application is to comply with the specified R-value.
- E. Provide minimum of 2 inches overlap onto air barrier materials as indicated on Drawings.
- F. Install trim pieces for transition from full spray insulation to lesser spray thicknesses at more than 2 inches as per thickness indicated on the Drawings.
- G. Where applied to voids and gaps assure space for expansion to avoid pressure on adjacent materials that may bind operable parts.
- H. Trim excess away for applied trim or remove as required for continuous sealant bead.
- I. Trim excess as required to not interfere with application of cladding or other cover systems by other trades.
- J. Patch damaged areas with same foam insulation product.

**3.4 FIELD QUALITY CONTROL**

- A. Section 01 40 00 - Quality Requirements: Monitor quality of installation and testing.
- B. Inspection will include verification of insulation thickness and density.
- C. Where damage occurs, which violates the insulation's thermal requirements, air seal and moisture seal, repair as needed using the specified spray polyurethane material or foam repair kit material approved by the manufacturer.

**3.5 PROTECTION OF INSTALLED CONSTRUCTION**

- A. Section 01 73 00 - Execution: Protecting installed construction.
- B. Do not permit subsequent construction work to damage the installed work of this section.
- C. Protect the work of this section from damage.

**END OF SECTION**



**SECTION 07 27 00****AIR BARRIERS****PART 1 GENERAL****1.1 SUMMARY**

- A. Section Includes:
  - 1. Air Barriers.
- B. Related Requirements:
  - 1. Division 07 - Thermal and Moisture Protection: Exterior cladding systems.
  - 2. Section 07 21 19 - Foamed-In-Place Insulation.
  - 3. Section 07 62 00 - Sheet Metal Flashing and Trim: Metal flashings installed in conjunction with air barriers.
  - 4. Section 09 21 16 - Gypsum Board Assemblies: Exterior gypsum board sheathing.

**1.2 REFERENCES**

- A. ASTM International (ASTM):
  - 1. ASTM D1970/D1970M - Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection; 2020.
  - 2. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2021a.
  - 3. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials; 2016.
  - 4. ASTM E2178 - Standard Test Method for Determining Air Leakage Rate and Calculation of Air Permeance of Building Materials; 2021a.
- B. National Fire Protection Association (NFPA):
  - 1. NFPA 285 - Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Wall Assemblies Containing Combustible Components; 2019.

**1.3 COORDINATION**

- A. Section 01 30 00 - Administrative Requirements: Coordination, scheduling, and sequencing.
- B. Coordinate the work of this Section with other adjacent and interfacing work.
- C. Sequence the work to permit installation of materials in conjunction with related materials and seals.

**1.4 SUBMITTALS**

- A. Section 01 33 00 - Submittal Procedures.
- B. Product Data: Submit data on material characteristics, performance criteria, and limitations.
- C. Manufacturer's Installation Instructions: Submit preparation, installation requirements and techniques, product storage and handling criteria.
- D. Manufacturer's qualification statement.
- E. Installer's qualification statement.

**1.5 QUALITY ASSURANCE**

- A. Air Barrier Association of America (ABAA) Evaluated Air Barrier Assemblies: Use evaluated materials from a single manufacturer regularly engaged in air barrier material manufacturing, and use secondary materials approved in writing by primary material manufacturer.
- B. Manufacturer Qualifications: Use evaluated materials from a single manufacturer regularly engaged in air barrier material manufacturing, and use secondary materials approved in writing by primary material manufacturer.
- C. Installer Qualifications: Company specializing in performing Work of this section with minimum three (3) years documented experience.

**1.6 MOCK-UPS**

- A. Section 01 40 00 - Quality Requirements: Mock-up requirements.
  - 1. Install and incorporate requirements of this Section into mock-ups required for construction for the project.

**1.7 ENVIRONMENTAL REQUIREMENTS**

- A. Section 01 60 00 - Product Requirements: Requirements before, during and after installation of Work.
- B. Maintain temperature and humidity recommended by materials manufacturers before, during and after installation.

**PART 2 PRODUCTS****2.1 PERFORMANCE REQUIREMENTS**

- A. Air Barrier System: Continuous network of materials and joints providing air tightness, with adequate strength and stiffness to not deflect excessively under air pressure differences, to which it will be subjected in service. It can be comprised of single material or combination of materials to achieve performance requirements.
- B. Provide continuity of air barrier materials and assemblies in conjunction with other barrier materials described in Division 07 - Thermal and Moisture Protection.
- C. Static Test: Resist air leakage caused by static air pressure across exterior wall assemblies and other interruptions to integrity of building enclosure systems; to maximum air leakage rate of 0.004 cfm/sq ft when subjected to pressure differential of 1.57 lbs/sq ft when tested in accordance with ASTM E2178.

**2.2 AIR BARRIER MATERIALS**

- A. Air Impermeable and Water Vapor Impermeable:
  - 1. Self-adhered sheet of rubberized asphalt bonded to thermoplastic sheet complying with ASTM D1970/D1970M.
  - 2. Thickness: 40 mils (0.040 inch), minimum.
  - 3. Sheet Width: 6 inches, 12 inches, 18 inches, 24 inches, and 36 inches; coordinate width with application area.
  - 4. Air Permeance: 0.004 cfm/sq ft (0.02 L/s/sq m), maximum; ASTM E2178 with pressure differential of 1.57 lb./sq ft.
  - 5. Water Vapor Permeance: 0.10 perm, maximum; ASTM E96/E96M using Procedure A (desiccant method) at 73.4 degrees F.

6. Water Penetration Resistance Around Nails: Pass; ASTM D1970/D1970M (modified).
7. Ultraviolet and Weathering Resistance: Approved in writing by manufacturer for minimum of 50 days weather exposure.
8. Comply with NFPA 285 requirements for wall assembly.
9. Seam and Perimeter Tape: As recommended by sheet manufacturer.
10. Manufacturers:
  - a. Carlisle Coatings and Waterproofing, Inc.
  - b. Henry Company.
  - c. W.R. Meadows, Inc.
  - d. Substitutions: See Section 01 60 00 - Product Requirements.
11. Basis of Design:
  - a. Henry Company - Blueskin SA.

### 2.3 ACCESSORIES

- A. Substrate Cleaner: Non-corrosive; type recommended by barrier product manufacturer; compatible with adjacent materials.
- B. Primer: As recommended by barrier product manufacturer for substrate material.
- C. Sealant: Moisture cure type as recommended by barrier product manufacture for construction joints subject to dynamic joint movement.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify that surfaces and conditions are ready to accept the work of this section. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this section. Prepare materials to be installed and equipment used during installation.
- B. Remove loose or foreign matter that may otherwise impair adhesion of materials.
- C. Clean and prime substrate surfaces to receive barrier materials if recommended by barrier material manufacturer.

### 3.3 INSTALLATION

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Install the Work in accordance with manufacturer's recommendations and as indicated on Drawings.
- C. Air Barriers: Install continuous airtight barrier over solid surfaces indicated, with sealed seams and with sealed joints to adjacent surfaces.
- D. Apply sealants and adhesives at locations recommended by barrier manufacturer. Apply within temperature range as recommended by manufacturer.
- E. Self-Adhered Sheets:

1. Prepare substrate in manner recommended by sheet manufacturer. Fill and tape joints in substrate and between dissimilar materials.
  2. Lap sheets shingle-fashion to shed water and seal laps airtight.
  3. Once sheets are in place, press firmly into substrate with resilient hand roller; ensure that all material and laps are firmly adhered to substrate with no gaps or fish mouths.
  4. Use same material, or other material approved by sheet manufacturer for the purpose, to seal to adjacent construction and as flashing.
  5. At wide joints, provide extra flexible membrane allowing joint movement.
- F. Openings, Junctions, and Penetrations in Air Barriers:
1. Sheet Seal at Wall/Roof Junction: Lap sheet seal onto roof air barrier material and seal. Caulk to ensure complete air seal. Position lap seal over firm bearing.
  2. Install sheet seal between window and door frames and adjacent wall seal materials with air barrier material. Apply sealant to ensure complete seal. Position lap seal over firm bearing.
  3. Install sheet seal to maintain continuity across different substrates and interface with other construction and building assemblies.
  4. Provide 2 inches minimum overlap of spray foam insulation over sheet seal membrane edges.
  5. Provide 2 inches minimum overlap at sheet seal joint and apply in manner as to shed water.
  6. Construct all end dams at sill installations to provide continuous air barrier with window openings.

### **3.4 PROTECTION OF INSTALLED CONSTRUCTION**

- A. Section 01 73 00 - Execution: Protecting installed construction.
- B. Do not leave materials exposed to weather longer than recommended by manufacturer.
- C. Do not permit adjacent work to damage work of this section.

**END OF SECTION**



**SECTION 07 41 13**  
**METAL ROOF PANELS**

**PART 1 GENERAL****1.1 SUMMARY**

- A. Section Includes:
  - 1. Metal roofing system.
  - 2. Roof Insulation.
  - 3. Underlayment Sheet.
  - 4. Roofing system accessories.
  - 5. Metal flashings and trim.
- B. Related Sections:
  - 1. Section 06 10 53 - Miscellaneous Rough Carpentry.
  - 2. Section 07 42 13 - Metal Wall Panels.
  - 3. Section 07 62 00 - Sheet Metal Flashing and Trim.
  - 4. Section 07 71 23 - Manufactured Gutters and Downspouts.
  - 5. Section 07 90 00 - Joint Protection.

**1.2 REFERENCES**

- A. American Architectural Manufacturers Association (AAMA):
  - 1. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2020.
- B. American Society of Civil Engineers (ASCE):
  - 1. ASCE 7 - Minimum Design Loads for Buildings and Other Structures.
- C. ASTM International (ASTM):
  - 1. ASTM A792/A792M - Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process; 2021.
  - 2. ASTM C209 - Standard Test Methods for Cellulosic Fiber Insulating Board; 2020.
  - 3. ASTM C1177/C1177M - Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing; 2017.
  - 4. ASTM C1289 - Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board; 2021.
  - 5. ASTM C1306/C1306M - Standard Test Method for Hydrostatic Pressure Resistance of a Liquid-Applied Waterproofing Membrane; 2016.
  - 6. ASTM D1970/D1970M - Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection; 2021.
  - 7. ASTM D2244 - Standard Practice for Calculation of Color Tolerances and Color Differences from Instrumentally Measured Color Coordinates; 2021.
  - 8. ASTM D4214 - Standard Test Methods for Evaluating the Degree of Chalking of Exterior Paint Films; 2007, reapproved 2017.
  - 9. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2021.
  - 10. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials; 2016.
  - 11. ASTM E108 - Standard Test Methods for Fire Tests of Roof Coverings; 2020.

12. ASTM E1592 - Standard Test Method for Structural Performance of Sheet Metal Roof and Siding Systems by Uniform Static Air Pressure Difference; 2005, reapproved 2017.
  13. ASTM E1646 - Standard Test Method for Water Penetration of Exterior Metal Roof Panel Systems by Uniform Static Air Pressure Difference; 1995, reapproved 2018.
  14. ASTM E1680 - Standard Test Method for Rate of Air Leakage Through Exterior Metal Roof Panel Systems; 2016.
- D. National Roofing Contractors Association (NRCA):
1. NRCA - The NRCA Roofing and Waterproofing Manual.
- E. National Standard of Canada (CAN) / ULC Standards (ULC):
1. CAN/ULC-S770 - Standard Test Method For Determination Of Long-Term Thermal Resistance Of Closed-Cell Thermal Insulating Foams; 2020.
- F. Sheet Metal and Air Conditioning Contractors (SMACNA):
1. SMACNA - Architectural Sheet Metal Manual.
- G. Underwriters Laboratories Inc. (UL):
1. UL 580 - Standard for Safety Tests for Uplift Resistance of Roof Assemblies; 2013.
  2. UL 790 - Standard Test Methods for Fire Tests of Roof Coverings; 2014.

### 1.3 PRE-INSTALLATION MEETINGS

- A. Section 01 30 00 - Administrative Requirements: Pre-installation meeting.
- B. Convene minimum one week prior to commencing work of this section.

### 1.4 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Product Data:
  1. Submit data on roofing system, components, and accessories. Include data regarding metal types, finishes, and characteristics.
- C. Shop Drawings:
  1. Indicate metal roofing panel and trim profiles, jointing patterns, jointing details, fastening methods, flashings, terminations, snow guards and installation details.
  2. Engineered Design Data: Submit structural design calculations for metal roofing signed and sealed by professional engineer.
- D. Samples for Initial Selection: Two manufacturer's color charts illustrating the full range of finishes and colors available for products with factory-applied finishes; submit for Architect's initial selections.
- E. Samples for Verification: From the Architect's initial selections, prepare and submit two samples for each selected finish and color; samples on same product material type indicated for final Work; each sample 4 x 4 inches. Where finishes involve normal color and texture variations, include sample sets showing the full range of variations expected.
- F. Manufacturer's Installation Instructions: Submit instructions including special procedures for roofing penetrations, flashings, and perimeter conditions requiring special attention.
- G. Manufacturer's Certificate: Certify Products meet or exceed specified requirements.

### 1.5 QUALITY ASSURANCE

- A. Perform Work in accordance with SMACNA Architectural Sheet Metal Manual and The NRCA Roofing and Waterproofing Manual.

- B. Field Quality Control:
  - 1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect metal roof panel installation, including accessories. Report results in writing. Representative is to not be in the employment of the roofing Installer.
  - 2. Remove and replace applications of metal roof panels where inspections indicate that they do not comply with specified requirements.
  - 3. Additional inspections, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

## 1.6 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing Products specified in this section with minimum three years documented experience.
- B. Installer: Company specializing in performing work of this section with minimum five years documented experience and approved by manufacturer.
- C. Engineered Design: Design sheet metal roofing system under direct supervision of Professional Engineer experienced in design of this Work and licensed in the State in which the Work is constructed.

## 1.7 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Provide strippable plastic protection on prefinished roofing panels for removal after installation.
- C. Store roofing panels on project site as recommended by manufacturer. Provide proper ventilation and prevent twisting, bending, abrasion, and other damage to panels.
- D. Prevent contact with materials causing discoloration or staining.

## 1.8 WARRANTY

- A. Section 01 77 00 - Closeout Procedures: Requirements for warranties.
- B. Provide two (2) year General Contractor's material and labor warranty to cover failure to prevent penetration of water.
- C. Special Warranties:
  - 1. Special Watertightness Warranty: Manufacturer's warranty in which manufacturer agrees to repair or replace standing-seam metal roof panel assemblies that fail to remain watertight, including leaks, within specified warranty period.
    - a. Warranty Form:
      - 1) No Dollar Limit Form.
    - b. Warranty Period: Duration from date of Substantial Completion.
      - 1) Twenty (20) Years.
    - c. The addition of solar panels mounted with mounting clamps to roof panel standing seams shall not void the warranty.
    - d. Shop drawings must be provided (or reviewed) by the panel manufacturer and approved by the panel manufacturer prior to the installation of the panel system.
    - e. A minimum of two inspections by the technical representative of the panel system manufacturer are required. The first inspection is to be performed when the underlayment and flashing are in place and the second inspection is to be performed when the roof is complete.

2. Special Installer Warranty: Furnish a written warranty signed by the roofing panel installer, guaranteeing materials and workmanship for watertightness of the roofing system, flashings, penetrations, and against all leaks within specified warranty period.
  - a. Warranty Period: Two (2) years from date of Substantial Completion.
3. Special Warranty on Panel Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace metal panels that show evidence of deterioration of factory-applied finishes within specified warranty period.
  - a. Warranty Period: twenty (20) years from date of Substantial Completion.
  - b. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:
    - 1) Color fading more than 5 Hunter units when tested according to ASTM D2244.
    - 2) Chalking more than a No. 8 rating when tested according to ASTM D4214.
    - 3) Cracking, chipping, peeling, or failure of paint to adhere to bare metal.

## PART 2 PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

- A. Provide complete roofing system, including roof panels, clips, fasteners, connectors, insulation, flashings, and accessories, tested for compliance with the following minimum standards.
- B. Overall: Complete weathertight system tested and approved in accordance with ASTM E1592.
- C. Wind Loads: Design and size components to withstand positive and negative wind loads, including increased loads at building corners.
  1. Design Wind Load: As calculated in accordance with ASCE 7 with 100 mph basic wind speed, exposure C.
- D. Wind Uplift Resistance: Class 90 wind uplift resistance of UL 580.
- E. Air Infiltration: Limit air leakage through roof assembly to 0.025 cfm/sq ft of roof area, measured at reference differential pressure across assembly of 6.24 psf as measured in accordance with ASTM E1680.
- F. Water Leakage: None, when measured in accordance with ASTM E1646 with test pressure of 6.24 psf. Perform test immediately following air infiltration test.
- G. Roof Covering Fire Test Classification: UL 790 (ASTM E108), Class A, minimum.
- H. Exterior Components: Accommodate the following without damage to system, components, or deterioration of seals.
  1. Movement within system.
  2. Movement between system and perimeter framing components.
  3. Dynamic loading and release of loads.
  4. Deflection of structural support framing.
  5. Expansion and contraction from temperature range of 170 degrees F over 12 hour period.

### 2.2 MANUFACTURED SHEET METAL ROOFING

- A. Manufacturers:
  1. ATAS International, Inc.
  2. Berridge Manufacturing Company.

3. Centria Architectural Systems.
  4. Construction Metal Products (CMP).
  5. Dimensional Metals, Inc. (DMI).
  6. Fabral Metal Wall and Roof Systems.
  7. Innovative Metals Company, Inc. (IMETCO).
  8. MCBI Metal Wall and Roof Systems.
  9. McElroy Metal, Inc.
  10. Metal Roofing Systems, Inc.
  11. Metal Sales Manufacturing, LLC.
  12. Petersen Aluminum Corporation (PAC-CLAD).
  13. Substitutions: Section 01 60 00 - Product Requirements.
- B. Structural Metal Roof Panels: Provide complete engineered system designed and constructed to complying with specified requirements, remain weathertight, withstand anticipated movement of substrate and thermally induced movement of roofing system.
- C. Metal Panels and Components: Factory-formed metal panels and components with factory-applied finish.
1. Base Sheet Metal:
    - a. Steel Panels:
      - 1) SS (structural steel), Grade 50 sheet.
      - 2) Galvalume Coating: Aluminum-zinc alloy-coated complying with ASTM A792/A792M; minimum AZ50 (AZM150) coating.
      - 3) Steel Thickness: Minimum 24 gauge, 0.024 inch (0.61 mm), unless indicated otherwise on Drawings.
    2. /Roof Panel Type: Single skin, uninsulated.
    3. Roof Panel Profile: Standing seam, with 2.0 inch (51 mm) seam height; concealed fastener system for field seaming.
      - a. Seam Type: 180 degrees double locked, field machine formed seams.
    4. Roof Panel Texture:
      - a. Smooth, and striated for added stiffness.
    5. Roof Panel Length:
      - a. As indicated on Drawings.
    6. Roof Panel Width: Nominal 16 inches, unless indicated otherwise on Drawings.
- D. Metal Finish: Factory applied.
1. Exposed Finish:
    - a. Polyvinylidene fluoride (PVDF) multi-coat organic coatings system including at least 70 percent PVDF resin and having a minimum total dry film thickness (TDFT) of 1.2 mil (0.0012 inch) (0.030 mm) when measured in accordance with ASTM D1790.
    - b. AAMA Coating System Compliance Required:
      - 1) AAMA 2605 - Superior performing organic coating system.
      - 2) Coating Manufacturers:
        - a) Arkema, Inc.: Kynar 500.
        - b) PPG Metal Coatings: Duranar.
        - c) Sherwin-Williams Company: Fluropon.
  2. Unexposed Finish: Manufacturer's standard coating, minimum 0.5 mil total dry film thickness.
  3. Color and Gloss:
    - a. As selected by Architect from panel manufacturer's full range.

### 2.3 INSULATION MATERIALS

- A. Polyisocyanurate (ISO) Insulation Board: Rigid closed-cell foam panels, complying with ASTM C1289.
1. Basis of Design: Johns Manville - Energy 3.
  2. Type II:
    - a. Class 1 - Faced with glass fiber reinforced cellulosic felt facers on both major surfaces of core foam.
      - 1) Compressive Strength:
        - a) Grade 2: 20 psi (138 kPa), minimum.
        - 2) : : Long Term Thermal Resistance at 1.5 Inch Thick: 8.4 (1.48) LTTR, minimum when tested at 75 degrees F (24 degrees C) in accordance with ASTM C1306/C1306M or CAN/ULC-S770.
  3. Flame Spread Index (FSI): Class B - 26 to 75; per ASTM E84.
  4. Smoke Developed Index (SDI): 450 or less; per ASTM E84.
  5. Tensile Strength: 500 psf, minimum per ASTM C209.
  6. Water Absorption: 1 percent, maximum by volume per ASTM C209.
  7. Water Vapor Permeance: 1 perm, maximum per ASTM E96.
  8. Board Size: Largest size applicable, but not less than 48 x 96 inches.
  9. Board Thickness: As indicated on Drawings.
  10. Number of Layers: As indicated on Drawings.
  11. Board Edges: Square.
- B. Underlayment Sheet: Self-adhering with reinforcing scrim, high temperature sheet, consisting of slip-resisting top surface laminated to SBS-modified asphalt adhesive, with release-paper backing; cold applied.
1. Thickness: 50 mils (0.05 inch), minimum.
  2. Roll Width: 36 inches.
  3. Thermal Stability: Stable after testing at 250 deg F; ASTM D1970/D1970M.
  4. Low-Temperature Flexibility: Passes after testing at minus 20 deg F; ASTM D1970/D1970M.
  5. Seams shall be lapped in accordance with manufacturer's recommendations.
  6. Underlayment shall be approved for 90 days (minimum) of exposure to UV and weather penetrations.
- C. Slip Sheet: Rosin building paper.

### 2.4 ACCESSORIES

- A. Miscellaneous Sheet Metal Items: Provide flashings, gutters, downspouts, trim, moldings, closure strips, preformed crickets, caps, equipment curbs, and similar sheet metal items of the same material, thickness, and finish as used for the roofing panels. Items completely concealed after installation may optionally be made of stainless steel.
1. Coordinate work requirements with the following Sections:
    - a. Section 07 62 00 - Sheet Metal Flashing and Trim.
    - b. Section 07 71 23 - Manufactured Gutters and Downspouts.
- B. Rib and Ridge Closures: Provide prefabricated, close-fitting, and weathertight components of same metal, thickness, and finish as roof panels.
- C. Fasteners: Stainless steel.
- D. Insulation Board Joint Tape: Minimum 6 inches wide, high temperature and self-adhering type, glass fiber reinforced type, compatible with roofing materials, and as recommended by insulation manufacturer.

- E. Sound Absorbing Insulation Strips: Application is to provide sound absorbing material within acoustic flutes of all acoustic metal roof decking. Sound absorbing insulation strips are to be pre-formed, continuous length and full depth of each flute, and to be as recommended by the metal decking manufacturer.
- F. Sealant:
  - 1. Seam Sealant: Factory applied continuous non-curing butyl sealant.
  - 2. Exposed Sealant: Silicone type approved by component manufacturer.
- G. Dissimilar Materials Separation: Separate dissimilar materials to prevent galvanic or other corrosive action by applying a permanent separator material. Separator material to be type that will remain in the concealed area of application without running, staining, or migrating onto visible finish surfaces. Separator material must be acceptable to building component manufacturer and may include material such as a zinc molybdate alkyd coating, or a bituminous coating, or self-adhering rubberized asphalt sheet, or other permanent applied material as recommended by component manufacturer.
- H. Snow Guards: Prefabricated, noncorrosive units designed to be installed without penetrating metal roof panels, and complete with predrilled holes, clamps, or hooks for anchoring. Snow guards shall be illustrated within the panel manufacturer's shop drawings and shall be designed to resist the sliding force of snow in accordance with the requirements of ASCE-7. Confirming calculations to be provided by the roofing panel manufacturer as part of the shop drawings submittal.
  - 1. Seam-Mounted, Bar-Type Snow Guards: Extruded Aluminum rods or bars held in place by aluminum clamps attached to vertical ribs of standing-seam metal roof panels.
  - 2. Color:
    - a. Match roof panels in finish type and color.

## 2.5 FABRICATION

- A. Verify field measurements prior to fabrication.
- B. Form sections accurate in size, square, and free from distortion or defects.
  - 1. Form roofing panels to width indicated.
  - 2. Finished standing seam height to be 2 inches after on-site machine forming of 180 degrees Double-Lock seam.
    - a. Seam Sealant: Factory applied continuous non-curing butyl sealant.
  - 3. Length of roofing panels to be continuous from eaves to ridges.
- C. Fabricate fascia, trim, flashing, and other metal components from same material as metal roof panels.
  - 1. Provide exposed metal surfaces with same finish as exposed face of metal roof panels.
- D. Fabricate cleats of same material as sheet, to interlock with sheet.
- E. Fabricate starter strips of same material as sheet, continuous, to interlock with sheet.
- F. Form pieces in longest practical lengths, but not less than specified lengths where indicated.
- G. Hem exposed edges on underside 1/2 inch; miter and seam corners.
- H. At moving joints, use sealed lapped, bayonet-type or interlocking hooked seams.
- I. Fabricate corners from one piece with minimum 18 inch long legs; seam for rigidity, seal with sealant.
- J. Fabricate vertical faces with bottom edge formed outward 1/4 inch and hemmed to form drip.

**PART 3 EXECUTION****3.1 EXAMINATION**

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Metal Deck:
  - 1. Inspect roof deck to verify deck is clean and smooth, free of depressions, waves, or projections, and properly sloped to eaves.
  - 2. Verify deck is dry and free of snow and ice. Verify substrate joints are solidly supported and fastened.
  - 3. Verify wood nailers are installed and correctly located.
- C. Verify roof openings, curbs, pipes, sleeves, ducts, or vents through roof are solidly set, reglets are in place, and nailing strips located.
- D. Verify roofing termination and base flashings are in place, sealed, and secure.

**3.2 PREPARATION**

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this section.
- B. Prepare materials to be installed and equipment to be used during installation.
- C. Verify that manufacturer applied factory applied continuous sealant in roofing panel seams and as may be required for other roofing system components.
- D. Metal Decks with Acoustic Flutes:
  - 1. Install preformed sound absorbing insulation strips at full depth and continuous in flutes, and in accordance with manufacturer's instructions.
- E. Dissimilar Materials Separation: Separate dissimilar materials to prevent galvanic or other corrosive action with permanent applied material as indicated in ACCESSORIES article in this Section. Where using applied coating, coat to minimum dry film thickness of 15 mil.

**3.3 INSTALLATION**

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Overall:
  - 1. Install roofing system in accordance with the Contract Documents, Engineer's design, and panel manufacturer's instructions and recommendations. Anchor all components of roofing system securely in place while allowing for thermal and structural movement.
  - 2. Install roofing system with concealed clips and fasteners, except as otherwise recommended by manufacturer for specific circumstances.
  - 3. Minimize field cutting of panels. Where field cutting is absolutely required, use methods that will not distort panel profiles. Use of torches for field cutting is absolutely prohibited.
  - 4. Accessories: Install all components required for a complete roofing assembly, including, but not limited to, flashings, gutters, downspouts, trim, moldings, closure strips, preformed crickets, caps, equipment curbs, rib closures, ridge closures, and similar roof accessory items.
    - a. Coordinate work requirements with other related Section of work such as sheet metal flashing and trim, roofing specialties, roof hatches, gutters, downspouts, roof deck substrates, etc.
- C. Insulation:



1. Apply no more insulation than can be covered with roofing and made weathertight in same day.
  2. Place boards perpendicular to deck flutes with edges over flute surface for bearing support.
  3. Lay boards with edges in contact, but without forcing. Cut insulation to fit neatly to perimeter blocking and around penetrations through roof.
  4. Mechanically fasten insulation to deck.
  5. Stagger joints for each additional layer of board materials by 12 inches each way to ensure that joints do not coincide with joints of preceding layers.
  6. Fully tape all joints of each insulation layer with minimum 6 inches wide, high temperature and self-adhering type, glass fiber reinforced type, compatible with roofing materials, and as recommended by insulation manufacturer
  7. Total insulation thickness shall be as indicated on Drawings.
  8. Place fasteners in accordance with wind uplift requirements, but not less than one fastener for every two square feet of insulation board area.
- D. Underlayment Sheet:
1. Self-Adhering Sheet Underlayment: Apply primer if required by manufacturer and as indicated herein. Comply with temperature restrictions of underlayment manufacturer for installation and with end laps of not less than 6 inches staggered 24 inches between courses. Overlap side edges not less than 3-1/2 inches. Roll laps with roller. Cover underlayment within 90 days.
  2. Apply underlayment over entire roof surface, wrinkle free, in shingle fashion to shed water.
  3. Lower edge terminations and roof edge terminations to be as indicated on Drawings.
  4. Install underlayment laid perpendicular to slope.
  5. Weather lap side edges not less than 3-1/2 inches.
  6. Weather lap end laps not less than 6 inches and staggered 24 inches between courses.
  7. Turn up 4 inches onto roof penetrations and other vertical obstructions.
- E. Metal Roofing Panels:
1. Install slip sheet over underlayment prior to installing roofing panels.
  2. Install roofing panels with long dimension perpendicular to eaves.
  3. Install roofing panels beginning at eaves. Panel to extend from eaves to ridges without traverse joints.
  4. Install clips to secure roof panels without deforming roof panels.
    - a. Where indicated on Drawings, install clips spaced 24 inches o.c. maximum to receive future solar panels. The addition of solar panels using solar panel hardware clamps shall not void the roofing warranty.
  5. Machine form standing seam, forming a 180 degrees Double Lock seam, between adjacent roofing panels. Hand form joints where machine forming is not possible.
  6. Terminate roofing panels with sheet metal trim and flashing for watertight installation. Close and conceal openings between roofing panels, panel seams, and roof substrate.
  7. Seal metal joints watertight.
  8. Install snow guards in locations indicated on Drawings and in accordance with roofing panel manufacturer's written recommendations.
- F. Flashing and Trim:
1. Place eave edge and rake edge metal flashings tight to fascia. Weather lap joints 2 inches and seal with plastic cement. Secure flange to substrate.
  2. Form valleys with sheet metal not exceeding 10 feet in length. Lap joints 6 inches in direction of drainage. Extend valley sheet minimum 6 inches under roofing sheets.
  3. Secure flashings in place using concealed fasteners. Use exposed fasteners only where permitted.
  4. Secure flashing exposed edges with continuous cleats.

5. Fit flashings tight in place. Make corners square, surfaces true and straight in planes, and lines accurate to profiles.
6. Seal metal joints watertight.

### **3.4 CLEANING**

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures: Clean installed work and comply with manufacturer's recommendations.

### **3.5 PROTECTION OF INSTALLED CONSTRUCTION**

- A. Section 01 73 00 - Execution: Protecting installed construction.
- B. Do not permit traffic over unprotected roof surface.

**END OF SECTION**

**SECTION 07 42 13**  
**METAL WALL PANELS**

**PART 1 GENERAL****1.1 SUMMARY**

- A. Section Includes:
  - 1. Manufactured preformed metal wall panels and framing support system.
- B. Related Sections:
  - 1. Section 07 43 13 - Metal Soffit Panels.
  - 2. Section 07 62 00 - Sheet Metal Flashing and Trim.
  - 3. Section 07 90 00 - Joint Protection.

**1.2 REFERENCES**

- A. American Architectural Manufacturers Association (AAMA):
  - 1. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2017a.
- B. American Society of Civil Engineers (ASCE):
  - 1. ASCE 7-10 - Minimum Design Loads For Buildings And Other Structures.
- C. ASTM International (ASTM):
  - 1. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2020.
  - 2. ASTM A792/A792M - Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process; 2021.
  - 3. ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2021.
  - 4. ASTM C645 - Standard Specification for Nonstructural Steel Framing Members; 2018.
  - 5. ASTM E283/E283M - Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen; 2019.
  - 6. ASTM E331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference; 2000, with changes through reapproval 2016.

**1.3 SUBMITTALS**

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Product Data: Submit data on panels and hanging system; include metal types, finishes, and characteristics.
- C. Design Data: Submit design calculations.
- D. Shop Drawings: Indicate dimensions, layout, joints, expansion joints, construction details, panel profiles, methods of anchorage, and interface with adjacent materials.
- E. Samples for Initial Selection: Two manufacturer's color charts illustrating the full range of finishes and colors available for products with factory-applied color finishes; submit for Architect's initial selections.

- F. Samples for Verification: From the Architect's initial selections, prepare and submit two samples for each selected finish and color; samples on same product material type indicated for final Work; each sample 4 x 4 inches. Where finishes involve normal color and texture variations, include sample sets showing the full range of variations expected.
- G. Manufacturer's Installation Instructions: Submit special procedures.

#### 1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum five (5) years of documented experience.
- B. Installer Qualifications: Company specializing in installing the products specified in this section with minimum five (5) years of documented experience.

#### 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Protect panels from accelerated weathering by removing or venting sheet plastic shipping wrap.
- C. Store prefinished material off ground and protected from weather. Prevent twisting, bending, or abrasion, and provide ventilation to stored materials. Slope metal sheets to ensure drainage.
- D. Prevent contact with materials that may cause discoloration or staining of products.

#### 1.6 WARRANTY

- A. Section 01 77 00 - Closeout Procedures.
- B. Furnish twenty (20) year manufacturer warranty to cover degradation of panel finish, including color fading caused by exposure to weather.
- C. Furnish five (5) year installer warranty to cover defects in water tightness and integrity of seals.

### PART 2 PRODUCTS

#### 2.1 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Design and size system components and support system to support wall panel system dead loads, and to withstand live loads caused by positive and negative wind pressure acting normal to wall plane.
  - 1. Wind Design Pressure:
    - a. As indicated on Drawings, in accordance with ASCE 7-10, and in accordance with the State Building Code for the State in which the project is located.
  - 2. Maximum Allowable Deflection of Panel: 1/180 of span.
- B. Air Leakage: 0.01 cfm/sf, maximum with static pressure differentials of 6.24 psf, in accordance with ASTM E283/E283M.
- C. Water Penetration: None with static pressure differentials of 12.00 psf, with water spray of 5 gal/hr/sf, for 15 minutes, in accordance with ASTM E331.
- D. Thermal Movement: Allow for thermal movement from variations in both ambient and internal temperatures. Accommodate movement of support structure caused by thermal expansion and contraction.

## 2.2 METAL WALL PANELS

- A. Manufacturers:
  1. AEP-Span.
  2. ATAS International, Inc.
  3. Berridge Manufacturing Company.
  4. Centria.
  5. Dimensional Metal, Inc. (DMI).
  6. Fabral.
  7. McElroy Metal, Inc.
  8. Metal Roofing Systems, Inc.
  9. Petersen Aluminum Corporation (PAC).
- B. Basis of Design:
  1. Centria - IW Series, IW-14A.

## 2.3 COMPONENTS

- A. Precoated Metal Sheet:
  1. Precoated Aluminum Sheet:
    - a. Comply with the following:
      - 1) ASTM B209/B209M, aluminum alloy and temper to be as required for structural performance requirements.
    - b. Thickness:
      - 1) 18 gauge (0.040 inch) (1.02 mm) thick minimum.
    - c. Continuous coil-coated on exposed surfaces with specified finish coating and on concealed surfaces with specified concealed surfaces coating.
  2. Strippable Film: Apply to the exposed surface of finished coil to protect the finish during fabrication, shipping, and field handling. Strippable film to be removed as recommended by manufacturer.
- B. Exterior Metal Panels: Factory formed.
  1. Installation Direction:
    - a. As indicated on Drawings.
  2. Panel Width:
    - a. 12 inches, unless indicated otherwise on Drawings.
  3. Profiles:
    - a. Flush with single V groove for stiffening.
  4. Panel Depth:
    - a. 1-1/2 inch depth.
  5. Panel Edges: Concealed fastened and continuous interlocking edge.
    - a. Sealed with continuous sealant bead.
  6. Color: As selected by Architect from manufacturer's full range of colors.
- C. Movement and Expansion Joints: Same material, thickness and finish as metal panel and concealed fasteners. Accommodate movement within system without damage to components or deterioration of seals, movement within system; movement between system and perimeter components when subject to seasonal temperature cycling; dynamic loading and release of loads; and deflection of structural support framing.
- D. Provide continuity of air barrier and vapor retarder seal at building enclosure elements.
- E. Drainage: Provide positive drainage to exterior for moisture entering or condensation occurring within panel system.

- F. Internal and External Corners: Same material, thickness, and finish as metal panels; profile to suit system; shop cut and factory mitered to required angles; profile as indicated on Drawings, but not less than 3 inch returns.
- G. Trim, Closures, Caps, Flashings, Facias and Infills: Same material, thickness, and finish as metal panels; brake formed to required profiles.
- H. Fasteners to be concealed; self-tapping screws and other acceptable fasteners recommended by panel manufacturer; non-corrosion type compatible with materials being fastened and substrate. Where exposed fasteners are required for special trim conditions, fastener heads to be factory finished to match the finish of the adjacent material finish.
- I. Metal Framing Support System: Cold-formed metallic-coated steel sheet, ASTM A 653/A 653M, G90 (Z180).
  - 1. Metal thickness as indicated on Drawings, but not less than 0.06 inch/16 ga.
  - 2. Anchorage to be concealed, non-corrosive type and as required to comply with structural performance requirements, including specified deflection limitations; hat channel profile; appropriate to anchor panel system to building structure.

## 2.4 FABRICATION

- A. Form sections to shape indicated on Drawings, accurate in size, square, and free from distortion or defects.
- B. Form pieces in longest practicable lengths.

## 2.5 FACTORY APPLIED FINISH

- A. Exposed Surface Finish: Fluoropolymer coil coating system. Polyvinylidene fluoride (PVDF) multi-coat superior performing organic coatings system complying with AAMA 2605, including at least 70 percent PVDF resin, and at least 80 percent of coil coated metal surfaces having minimum total dry film thickness (DFT) of 0.9 mil (0.0009 inch) (0.023 mm), Color and gloss as selected by Architect from manufacturer's full range.
- B. Concealed Surface Finish: Manufacturer's standard coating, minimum 0.5 mil dry film thickness; compatible with finish system, as recommended by finish system manufacturer.

## 2.6 ACCESSORIES

- A. Underlayment Sheet: As indicated on Drawings; compatible with panel system manufacturer's panels and requirements; designed for exterior application.
- B. Gaskets: Manufacturer's standard type suitable for use with system, permanently resilient; ultraviolet and ozone resistant.
- C. Sealants to be as required by manufacturers of materials being sealed and may include:
  - 1. Exposed Sealant: Elastomeric; silicone, polyurethane, or silyl-terminated polyether/polyurethane; as required by manufacturers of materials being sealed.
  - 2. Concealed Sealant: Non-curing butyl sealant or tape sealant.
  - 3. Seam Sealant: Factory-applied, non-skinning, non-drying type.
- D. Field Touch-up Paint: As recommended by panel manufacturer.
- E. Dissimilar Materials Separation: Separate dissimilar materials to prevent galvanic or other corrosive action by applying a permanent separator material. Separator material to be type that will remain in the concealed area of application without running, staining, or migrating onto visible finish surfaces. Separator material must be acceptable to building component manufacturer and may include material such as a zinc molybdate alkyd coating, or a

bituminous coating, or self-adhering rubberized asphalt sheet, or other permanent applied material as recommended by component manufacturer.

### **PART 3 EXECUTION**

#### **3.1 EXAMINATION**

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify that building framing members or structural concrete or masonry walls are ready to receive panels.
- C. Verify that weather and air barriers and thermal insulation has been installed completely and correctly.

#### **3.2 PREPARATION**

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this section.
- B. Prepare materials to be installed and equipment used during installation.
- C. Install Underlayment:
  - 1. Install underlayment as indicated on Drawings.
  - 2. Weather lap edges 2 inches minimum and ends 6 inches minimum.
  - 3. Stagger vertical joints of each layer.
  - 4. Fasten securely to substrate with stainless steel fasteners.
- D. Install subgirts and support framing system as indicated on Drawings and as required by panel manufacturer for conditions and direction of panels. Securely fasten with stainless steel fasteners to substrate and framing members and shimmed and leveled to uniform plane. Space at intervals indicated.
- E. Dissimilar Materials Separation: Separate dissimilar materials to prevent galvanic or other corrosive action with permanent applied material as indicated in ACCESSORIES article in this Section. Where using applied coating, coat to minimum dry film thickness of 15 mil.

#### **3.3 INSTALLATION**

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Install metal panels and support system in accordance with Performance / Design Criteria and manufacturer's instructions.
- C. Protect surfaces in contact with cementitious materials and dissimilar metals with concealed bituminous paint. Allow to cure prior to installation.
- D. Fasten metal panels to structural supports; aligned, level, and plumb. Space fasteners maximum 24 inches on center either horizontally or vertically to suit application.
- E. Provide expansion joints where indicated.
- F. Use concealed fasteners unless otherwise approved by Architect.
- G. Seal and place gaskets to prevent weather penetration. Maintain neat appearance.

#### **3.4 ERECTION TOLERANCES**

- A. Section 01 40 00 - Quality Requirements: Tolerances.

- B. Maximum Offset from True Alignment Between Adjacent Members Butting or In Line:  
1/16 inch.
- C. Maximum Variation from Plane or Location Indicated on Drawings: 1/8 inch.

### **3.5 CLEANING**

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures: Related to cleaning.
- B. Remove site cuttings from finish surfaces.
- C. Clean and wash prefinished surfaces with mild soap and water; rinse with clean water.
- D. Upon completion of installation, thoroughly clean prefinished surfaces in accordance with manufacturer's recommendations.

### **3.6 PROTECTION OF INSTALLED CONSTRUCTION**

- A. Section 01 73 00 - Execution: Protecting installed construction.
- B. Protect installed work from damage.

**END OF SECTION**



**SECTION 07 42 93.13**  
**METAL SOFFIT PANELS**

**PART 1 GENERAL**

**1.1 SUMMARY**

- A. Section Includes:
  - 1. Manufactured preformed metal soffit panels and suspension system.
- B. Related Requirements:
  - 1. Section 07 42 13 - Metal Wall Panels.
  - 2. Section 07 62 00 - Sheet Metal Flashing and Trim.
  - 3. Section 07 90 00 - Joint Protection.

**1.2 REFERENCES**

- A. American Architectural Manufacturers Association (AAMA):
  - 1. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2017a.
- B. American Society of Civil Engineers (ASCE):
  - 1. ASCE 7-10 - Minimum Design Loads For Buildings And Other Structures.
- C. ASTM International (ASTM):
  - 1. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2020.
  - 2. ASTM A792/A792M - Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process; 2021.
  - 3. ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2021.
  - 4. ASTM C645 - Standard Specification for Nonstructural Steel Framing Members; 2018.

**1.3 SUBMITTALS**

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Product Data: Submit data on panels and hanging system; include metal types, finishes, and characteristics.
- C. Design Data: Submit design calculations.
- D. Shop Drawings: Indicate dimensions, layout, joints, expansion joints, construction details, panel profiles, methods of anchorage, and interface with adjacent materials.
- E. Samples for Initial Selection: Two manufacturer's color charts illustrating the full range of finishes and colors available for products with factory-applied color finishes; submit for Architect's initial selections.
- F. Samples for Verification: From the Architect's initial selections, prepare and submit two samples for each selected finish and color; samples on same product material type indicated for final Work; each sample 4 x 4 inches. Where finishes involve normal color and texture variations, include sample sets showing the full range of variations expected.
- G. Manufacturer's Installation Instructions: Submit special procedures.

**1.4 QUALITY ASSURANCE**

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum five (5) years documented experience.
- B. Installer: Company specializing in performing Work of this section with minimum five (5) years documented experience and approved by manufacturer.

**1.5 DELIVERY, STORAGE, AND HANDLING**

- A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Protect panels from accelerated weathering by removing or venting sheet plastic shipping wrap.
- C. Store prefinished material off ground and protected from weather. Prevent twisting, bending, or abrasion, and provide ventilation to stored materials. Slope metal sheets to ensure drainage.
- D. Prevent contact with materials that may cause discoloration or staining of products.

**1.6 WARRANTY**

- A. Section 01 77 00 - Closeout Procedures: Product warranties.
- B. Furnish twenty (20) year manufacturer warranty to cover degradation of panel finish, including color fading caused by exposure to weather.
- C. Furnish five (5) year installer warranty to cover defects in water tightness and integrity of seals.

**PART 2 PRODUCTS****2.1 PERFORMANCE REQUIREMENTS**

- A. Structural Performance: Design and size system components and support system to support wall panel system dead loads, and to withstand live loads caused by positive and negative wind pressure acting normal to soffit plane.
  - 1. Wind Design Pressure:
    - a. As indicated on Drawings, in accordance with ASCE 7-10, and in accordance with the State Building Code for the State in which the project is located.
  - 2. Maximum Allowable Deflection of Panel: 1/180 of span.
- B. Thermal Movement: Allow for thermal movement from variations in both ambient and internal temperatures. Accommodate movement of support structure caused by thermal expansion and contraction.

**2.2 METAL SOFFIT PANELS**

- A. Manufacturers:
  - 1. AEP-Span.
  - 2. ATAS International, Inc.
  - 3. Berridge Manufacturing Company.
  - 4. Dimensional Metal, Inc. (DMI).
  - 5. Fabral.
  - 6. McElroy Metal, Inc.
  - 7. Metal Roofing Systems, Inc.
  - 8. Petersen Aluminum Corporation (PAC).

- B. Basis of Design:
  - 1. Petersen Aluminum Corporation (PAC).

## 2.3 COMPONENTS

- A. Precoated Metal Sheet:
  - 1. Precoated Aluminum Sheet:
    - a. Comply with the following:
      - 1) ASTM B209/B209M, aluminum alloy and temper to be as required for structural performance requirements.
    - b. Thickness:
      - 1) 18 gauge (0.040 inch) (1.02 mm) thick minimum.
    - c. Continuous coil-coated on exposed surfaces with specified finish coating and on concealed surfaces with specified concealed surfaces coating.
  - 2. Strippable Film: Apply to the exposed surface of finished coil to protect the finish during fabrication, shipping, and field handling. Strippable film to be removed as recommended by manufacturer.
- B. Exterior Metal Panels: Factory formed.
  - 1. Installation Direction:
    - a. As indicated on Drawings.
  - 2. Panel Width:
    - a. 12 inches, unless indicated otherwise on Drawings.
  - 3. Profiles:
    - a. Flush.
      - 1) Panel widths greater than 8 inches to have single V groove for stiffening.
  - 4. Panel Depth:
    - a. 1 inch depth.
  - 5. Panel Edges: Concealed fastened and continuous interlocking edge.
  - 6. Venting:
    - a. Full-vented.
  - 7. Color: As selected by Architect from manufacturer's full range of colors.
- C. Trim, Closures, Caps, Flashings, Facias and Infills: Same material, thickness, and finish as metal panels; brake formed to required profiles.
- D. Fasteners to be concealed; self-tapping screws and other acceptable fasteners recommended by panel manufacturer; non-corrosion type compatible with materials being fastened and substrate. Where exposed fasteners are required for special trim conditions, fastener heads to be factory finished to match the finish of the adjacent material finish.
- E. Suspension System:
  - 1. Steel main runners, hanger wires and hat channels; galvanized finish. Thickness and profile as required to support specified loads within specified Performance Requirements.
    - a. Minimum Requirements:
      - 1) Main Runners: Cold rolled channels, galvanized finish; 16 gage, 1-1/2 inches deep.
      - 2) Hanger Wire: 12 gage, galvanized, soft annealed steel wire.
      - 3) Hat Channels: ASTM C645; 25 gage, galvanized.

## 2.4 FABRICATION

- A. Form sections to shapes indicated on Drawings, accurate in size, square, and free from distortion or defects.
- B. Form pieces in longest practicable lengths.

**2.5 FACTORY APPLIED FINISH**

- A. Exposed Surface Finish: Fluoropolymer coil coating system. Polyvinylidene fluoride (PVDF) multi-coat superior performing organic coatings system complying with AAMA 2605, including at least 70 percent PVDF resin, and at least 80 percent of coil coated metal surfaces having minimum total dry film thickness (DFT) of 0.9 mil (0.0009 inch) (0.023 mm), Color and gloss as selected by Architect from manufacturer's full range.
- B. Concealed Surface Finish: Manufacturer's standard coating, minimum 0.5 mil dry film thickness; compatible with finish system, as recommended by finish system manufacturer.

**2.6 ACCESSORIES**

- A. Sealants: Silicone type as specified in Section 07 90 00 - Joint Protection.
- B. Field Touch-up Paint: As recommended by material manufacturer.
- C. Dissimilar Materials Separation: Separate dissimilar materials to prevent galvanic or other corrosive action by applying a permanent separator material. Separator material to be type that will remain in the concealed area of application without running, staining, or migrating onto visible finish surfaces. Separator material must be acceptable to building component manufacturer and may include material such as a zinc molybdate alkyd coating, or a bituminous coating, or self-adhering rubberized asphalt sheet, or other permanent applied material as recommended by component manufacturer.

**PART 3 EXECUTION****3.1 EXAMINATION**

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify building framing members are ready to receive soffit panel system.

**3.2 PREPARATION**

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this section.
- B. Prepare materials to be installed and equipment to be used during installation.
- C. Dissimilar Materials Separation: Separate dissimilar materials to prevent galvanic or other corrosive action with permanent applied material as indicated in ACCESSORIES article in this Section. Where using applied coating, coat to minimum dry film thickness of 15 mil.

**3.3 INSTALLATION**

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Install metal panels and support system in accordance with Performance / Design Criteria and manufacturer's instructions.
- C. Protect surfaces in contact with cementitious materials and dissimilar metals with concealed bituminous paint. Allow to cure prior to installation.
- D. Main Runners: Suspend from building structure; parallel to soffit panels installation; spaced not greater than 48 inches o.c.
- E. Hat Channels: Secure perpendicular to main runners as required for attachment of metal panels and spaced not greater than 24 inches o.c.
- F. Add struts as required to resist upward pressure.

- G. Fasten metal panels to suspension system; aligned and level.
- H. Use concealed fasteners unless otherwise approved by Architect.
- I. Seal to prevent weather penetration. Maintain neat appearance.

### **3.4 ERECTION TOLERANCES**

- A. Section 01 40 00 - Quality Requirements: Tolerances.
- B. Maximum Offset from Indicated Alignment Between Adjacent Members Butting or In Line: 1/16 inch.
- C. Maximum Variation from Plane or Location Indicated on Drawings: 1/8 inch.

### **3.5 CLEANING**

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures: Related to cleaning.
- B. Remove site cuttings from finish surfaces.
- C. Clean and wash prefinished surfaces with mild soap and water; rinse with clean water.
- D. Upon completion of installation, thoroughly clean prefinished surfaces in accordance with manufacturer's recommendations.

### **3.6 PROTECTION OF INSTALLED CONSTRUCTION**

- A. Section 01 73 00 - Execution: Protecting installed construction.
  - 1. Protect installed Work from damage.

**END OF SECTION**



**SECTION 07 62 00****SHEET METAL FLASHING AND TRIM****PART 1 GENERAL****1.1 SUMMARY**

- A. Section includes flashings and counterflashings, and fabricated sheet metal items, as indicated in Schedule.
- B. Related Sections:
  - 1. Section 07 41 13 - Metal Roof Panels.
  - 2. Section 07 71 23 - Manufactured Gutters and Downspouts.
  - 3. Section 07 90 00 - Joint Protection.

**1.2 REFERENCES**

- A. American Architectural Manufacturers Association:
  - 1. AAMA 2604 - Voluntary specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels, 2013.
  - 2. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum, 2012.
- B. ASTM International:
  - 1. ASTM A240/A240M - Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications.
  - 2. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
- C. Sheet Metal and Air Conditioning Contractors:
  - 1. SMACNA - Architectural Sheet Metal Manual.

**1.3 SUBMITTALS**

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Product Data: Submit data on manufactured components metal types, finishes, and characteristics.
- C. Shop Drawings: Indicate material profile, jointing pattern, jointing details, fastening methods, flashings, terminations, and installation details.
- D. Samples for Initial Selection: Two manufacturer's color charts illustrating the full range of finishes and colors available for products with factory-applied finishes; submit for Architect's initial selections.
- E. Samples for Verification: From the Architect's initial selections, prepare and submit two samples for each selected finish and color; samples on same product material type indicated for final Work; each sample 4 x 4 inches. Where finishes involve normal color and texture variations, include sample sets showing the full range of variations expected.

**1.4 QUALITY ASSURANCE**

- A. Perform Work in accordance with these specifications and SMACNA (ASMM) - Architectural Sheet Metal Manual.

- B. Installation shall comply with the current NRCA Roofing and Water Proofing Manual, 5th Edition, 2001, where applicable.
- C. Installation shall comply with the sheet metal system and component manufacturers' published installation manuals and guidelines and all referenced standards therein.
- D. Installation of sheet metal flashings incorporated into roofing system shall meet all minimum requirements published by the membrane manufacturer in addition to all requirements specified and detailed herein.
- E. Work to be free of leaks in all weather conditions.

### **1.5 QUALIFICATIONS**

- A. Manufacturer: Company specializing in manufacturing Products specified in this section with minimum five (5) years documented experience.
- B. Installer: Company specializing in sheet metal work with minimum five (5) years documented experience.

### **1.6 PRE-INSTALLATION MEETINGS**

- A. Section 01 30 00 - Administrative Requirements: Pre-installation meeting.
- B. Convene minimum one week prior to commencing work of this section in conjunction with roofing pre-installation meeting.

### **1.7 COORDINATION**

- A. Section 01 30 00 - Administrative Requirements: Requirements for coordination.
- B. Coordinate Work with construction related to or interfacing with this Work.

### **1.8 DELIVERY, STORAGE, AND HANDLING**

- A. Section 01 60 00 - Product Requirements: Product storage and handling requirements.
- B. Delivery: Deliver materials in the manufacturer's original sealed and labeled containers and in quantities required to allow continuity of application.
- C. Storage: Store materials within areas designated or approved by the Owner. Ensure materials remain dry, covered and not in contact with the ground.
- D. Handling: Handle material in such manner as to preclude damage and contamination with moisture or foreign matter.

### **1.9 WARRANTY**

- A. Section 01 77 00 - Closeout Procedures: Product warranties.
- B. Provide the pre-finished sheet metal manufacturer's thirty (30) year finish warranty from the date of substantial completion.

## **PART 2 PRODUCTS**

### **2.1 PRE-FINISHED ALUMINUM**

- A. ASTM B209 Aluminum Alloy Sheet and Plate, alloy and temper 3003-H14.
  - 1. Thickness: 0.040 inch (40-mil), unless indicated otherwise on Drawings or in this Section.



2. Finish: Primed and finished on one side with fluoropolymer coating; multiple coats to minimum 1.0 mil total dry film thickness as specified for sheet metal system, thermally cured, conforming to AAMA 2604. On reverse side, finish with wash coat compatible with finish system as recommended by finish system manufacturer; wash coat to minimum 0.3 to 0.4 mil dry film thickness. A strippable plastic film should protect the finish during fabrication and installation.
  - a. Color: As selected by Architect from submitted samples.
3. Expansion Joint Cover.
4. Expansion Joint Cleat.
5. Closure Metal.
6. Receiver.
7. Counterflashing.
8. Slip Flashing.
9. Miscellaneous Exposed Trim.

## 2.2 MILL FINISHED ALUMINUM

- A. ASTM B209 Aluminum Alloy Sheet and Plate, alloy and temper 3003-H14.
  1. Thickness: 0.050 inch (50-mil).
  2. Finish: Mill.
  3. Continuous Cleat.

## 2.3 STAINLESS STEEL

- A. Type 304 as tested in accordance with ASTM A240/A240M, fully annealed.
  1. Thickness: 0.040 inch, unless indicate otherwise on Drawings or in this Section.
  2. Finish:
    - a. Smooth; No. 2D.
  3. Miscellaneous stainless steel flashing.

## 2.4 ACCESSORIES

- A. Fasteners: Same material and finish as flashing metal, with soft neoprene washers.
- B. Sealant: Silicone sealant specified in Section 07 90 00.

## 2.5 FABRICATION

- A. Form sections shape indicated on Drawings, accurate in size, square, and free from distortion or defects.
- B. Fabricate cleats of same material as sheet metal, interlocking with sheet.
- C. Form pieces in longest possible lengths.
- D. Hem exposed edges on underside 1/2 inch; miter and seam corners.
- E. Form material with batten seams, except where otherwise indicated. At moving joints, use sealed lapped, bayonet-type or interlocking hooked seams.
- F. Fabricate corners from one piece with minimum 18 inch long legs; seam for rigidity, seal with sealant.
- G. Fabricate vertical faces with bottom edge formed outward 1/4 inch and hemmed to form drip.
- H. Fabricate flashings to allow toe to extend 2 inches over roofing. Return and brake edges.
- I. Seal metal joints.

**PART 3 EXECUTION****3.1 EXAMINATION**

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify that surfaces and conditions are ready to accept the work of this section. Proceed with installation only after unsatisfactory conditions have been corrected.
- C. Examine products to be installed for damage and other conditions detrimental to completion of the Work. Proceed with installation only after unsatisfactory conditions have been corrected.

**3.2 PREPARATION**

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this section.
- B. Prepare materials to be installed and equipment used during installation.
- C. Install starter and edge strips, and cleats before starting installation.

**3.3 INSTALLATION**

- A. Secure flashings in place using concealed fasteners. Use exposed fasteners only where permitted.
- B. Fit flashings tight in place. Make corners square, surfaces true and straight in planes, and lines accurate to profiles.
- C. Seal metal joints watertight.

**3.4 FIELD QUALITY CONTROL**

- A. Section 01 40 00 - Quality Requirements: Field inspecting and testing.
- B. Monitor and inspect Work during installation to ensure compliance with specified requirements.

**END OF SECTION**

**SECTION 07 71 23**  
**MANUFACTURED GUTTERS AND DOWNSPOUTS**

**PART 1 GENERAL****1.1 SUMMARY**

- A. Section Includes:
  - 1. Gutters.
  - 2. Downspouts.
  - 3. Downspout Boots.
  - 4. Conductor Heads (Collection Boxes).
  - 5. Splash Pads.
  - 6. Supports and Accessories.
- B. Related Requirements:
  - 1. Division 33 - Utilities: Sections related to stormwater utility construction.
  - 2. Section 07 41 13 - Metal Roof Panels.
  - 3. Section 07 62 00 - Sheet Metal Flashing and Trim.
  - 4. Section 07 90 00 - Joint Protection.

**1.2 REFERENCES**

- A. American Architectural Manufacturers Association (AAMA):
  - 1. AAMA 2604 - Voluntary specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels.
- B. ASTM International (ASTM):
  - 1. ASTM A48/A48M - Standard Specification for Gray Iron Castings; 2003, reapproved 2016.
  - 2. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar, 2015.
  - 3. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate, 2014.
- C. Sheet Metal and Air Conditioning Contractors (SMACNA):
  - 1. SMACNA (ASMM) - Architectural Sheet Metal Manual, 7th Edition, 2012.

**1.3 COORDINATION**

- A. Section 01 30 00 - Administrative Requirements: Requirements for coordination.
  - 1. Coordinate Work with construction related to or interfacing with this Work.
  - 2. Coordinate Work with downspout discharge pipe inlets or connections, if any.

**1.4 PRE-INSTALLATION MEETINGS**

- A. Section 01 30 00 - Administrative Requirements: Pre-installation meeting.
- B. Convene minimum one week prior to commencing work of this section and in conjunction with roofing pre-installation meeting.

**1.5 SUBMITTALS**

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Shop Drawings: Indicate locations, configurations, jointing methods, fastening methods, sizing, spacing, slope, calculations, and installation details.

- C. Product Data: Submit data on manufactured components, materials, and finishes.
- D. Samples for Initial Selection: Two manufacturer's color charts illustrating the full range of finishes and colors available for products with factory-applied finishes; submit for Architect's initial selections.
- E. Samples for Verification: From the Architect's initial selections, prepare and submit two samples for each selected finish and color; samples on same product material type indicated for final Work; each sample 4 x 4 inches. Where finishes involve normal color and texture variations, include sample sets showing the full range of variations expected.
  - 1. Submit a gutter section and downspout section of minimum size 12 inches long illustrating actual metal, thickness, configuration, profile, color, and texture.

## 1.6 QUALITY ASSURANCE

- A. Perform Work in accordance with these specifications and SMACNA (ASMM) - Architectural Sheet Metal Manual.
- B. Installation shall comply with the current NRCA Roofing and Water Proofing Manual, 5th Edition, 2001, where applicable.
- C. Installation shall comply with the sheet metal system and component manufacturers' published installation manuals and guidelines and all referenced standards therein.
- D. Work to be free of leaks in all weather conditions.

## 1.7 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing Products specified in this section with minimum five (5) years documented experience.
- B. Installer: Company specializing in sheet metal work with minimum five (5) years documented experience.

## 1.8 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 - Product Requirements: Product storage and handling requirements.
- B. Deliver materials in the manufacturer's original sealed and labeled containers and in quantities required to allow continuity of application.
- C. Store materials within areas designated or approved by the Owner. Ensure materials remain dry, covered and not in contact with the ground.
- D. Handle material in such manner as to preclude damage and contamination with moisture or foreign matter.

## 1.9 WARRANTY

- A. Section 01 77 00 - Closeout Procedures: Product warranties.
- B. Provide the pre-finished sheet metal manufacturer's thirty (30) year finish warranty from the date of substantial completion.

## PART 2 PRODUCTS

### 2.1 PRE-FINISHED ALUMINUM

- A. Aluminum: ASTM B209, alloy 3003, H14 temper.
  - 1. Thickness: 0.040 inch (40-mil), unless indicated otherwise on Drawings or in this Section.
  - 2. Finish: Primed and finished on one side with fluoropolymer coating; multiple coats to minimum 1.0 mil total dry film thickness as specified for sheet metal system,

thermally cured, conforming to AAMA 2604. On reverse side, finish with wash coat compatible with finish system as recommended by finish system manufacturer; wash coat to minimum 0.3 to 0.4 mil dry film thickness. A strippable plastic film should protect the finish during fabrication and installation.

- a. Color: As selected by Architect from full range of colors and sheens.

## 2.2 COMPONENTS

- A. Gutters:
  1. Pre-Finished Aluminum; 0.050 inch thick; profile as indicated on Drawings.
- B. Downspouts:
  1. Pre-Finished Aluminum; 0.040 inch thick; profile as indicated on Drawings.
- C. Downspout Boots: Cast iron; smooth interior without boxed corners or choke points; include integral lug slots, integral cleanout, cleanout cover, and tamper proof fasteners.
  1. Basis of Design: J.R. Hoe and Sons.
  2. Material: Cast iron; ASTM A48/A48M; casting thickness 3/8 inch (9.5 mm), minimum.
  3. Configuration and Profile:
    - a. As indicated on Drawings.
  4. Finish: Manufacturer's standard factory applied powder coat finish.
    - a. Color:
      - 1) To be selected by Architect from full range of colors and sheen.
  5. Accessories: Compatible with and appropriate for installation of downspout boots.
    - a. Stainless steel fasteners and building wall anchors.
    - b. Neoprene gaskets and rubber coupling.
- D. Conductor Heads (Collection Boxes):
  1. Pre-Finished Aluminum; 0.050 inch thick; profile as indicated on Drawings.
  2. Pre-manufactured conductor heads to fit scupper drainage outlets and downspouts.
  3. Factory weld joints.
  4. Factory apply finish after fabrication.
- E. Splash Pads: Precast concrete type; minimum 3000 psi (21 MPa) at 28 days, with minimum 5 percent air entrainment.
  1. Size: 3H x 11W x 30L inches unless indicated otherwise on Drawings.

## 2.3 ACCESSORIES

- A. Anchors and Supports: Profiled to suit gutters and downspouts.
  1. Anchoring Devices: In accordance with SMACNA requirements.
  2. Gutter Supports:
    - a. Brackets - Configuration, size and metal thickness as indicated on Drawings. Finish to match gutter.
  3. Downspout Supports:
    - a. Straps, minimum 0.050 inch thick. Finish to match downspout.
- B. Fasteners: Same material and finish as gutters and downspouts.

## 2.4 FABRICATION

- A. Form components accurately to sizes and profiles indicated on Drawings.
- B. Fabricate with required connection components.
- C. Form component in maximum possible lengths, free of distortion or defects detrimental to appearance or performance. Allow for expansion at joints.
- D. Hem exposed edges of metal.

- E. Seal joints watertight.

### **PART 3 EXECUTION**

#### **3.1 EXAMINATION**

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Contractor is to coordinate all work for correct sequencing of items which make up the completed building envelope systems.
- C. Verify that surfaces are ready to receive work.

#### **3.2 PREPARATION**

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this section.
- B. Prepare materials to be installed and equipment to be used during installation.
- C. Paint concealed metal surfaces and surfaces in contact with dissimilar metals with protective backing paint to minimum dry film thickness of 15 mil.
- D. Protect components to prevent scratches, dents, and other damages during the work and associated with the work of other trades.
- E. Verify that all exposed fasteners are pre-finished to match surface finish of the component being fastened.

#### **3.3 INSTALLATION**

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Install products in accordance with manufacturer's instructions.
- C. Sheet Metal: Join lengths with seams sealed watertight. Flash and seal gutters to downspouts and accessories.
- D. Slope gutters 1/8 inch per foot minimum to drains.
- E. Connect downspouts to downspout boots at elevations indicated on Drawings; but, in no case is connection to be less than 4 inches above grade. Do not seal connection watertight.

#### **3.4 CLEANING**

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures: Related to cleaning.
- B. Clean installed work and comply with manufacturer's recommendations.
- C. Clean adjacent soiled surfaces and comply with surface manufacturer's recommendations.

#### **3.5 PROTECTION OF INSTALLED CONSTRUCTION**

- A. Section 01 73 00 - Execution: Protecting installed construction.
- B. Protect installed construction from damage.

**END OF SECTION**

**SECTION 07 84 00****FIRESTOPPING****PART 1 GENERAL****1.1 SUMMARY**

- A. Section Includes:
  - 1. Firestopping through-penetrations of fire rated assemblies.
  - 2. Firestopping joints in fire rated assemblies.
  - 3. Firestopping tops of fire rated walls.
  - 4. Smoke sealing at joints between floor slabs and exterior walls.
  - 5. Smoke sealing penetrations and joints of smoke partitions.
- B. Related Requirements:
  - 1. Section 04 05 03 - Masonry Mortaring and Grouting: Mortar used for firestopping.
  - 2. Section 09 21 16 - Gypsum Board Assemblies: Gypsum board fireproofing.
  - 3. Division 22: Plumbing work requiring firestopping.
  - 4. Division 23: HVAC work requiring firestopping.
  - 5. Division 26: Electrical work requiring firestopping.

**1.2 REFERENCES**

- A. ASTM International (ASTM):
  - 1. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2021a.
  - 2. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials; 2020.
  - 3. ASTM E814 - Standard Test Method for Fire Tests of Through-Penetration Fire Stops; 2013a, Reapproval 2017.
  - 4. ASTM E1966 - Standard Test Method for Fire-Resistive Joint Systems; 2015, Reapproval 2019.
- B. Intertek Testing Services (Warnock Hersey Listed):
  - 1. WH - Certification Listings.
- C. Underwriters Laboratories Inc. (UL):
  - 1. UL - Fire Resistance Directory.
  - 2. UL 263 - Standard for Safety Fire Tests of Building Construction and Materials; 2011, Revisions 2021.
  - 3. UL 1479 - Standard for Safety Fire Tests of Through-Penetration Firestops; 2015, Revisions 2021.
  - 4. UL 2079 - Standard for Safety Tests for Fire Resistance of Building Joint Systems; 2015, Revisions 2020.
- D. California Department of Health Services (CA/DHS):
  - 1. CA/DHS/EHLB/R-174 - Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers, including 2004 Addenda.

**1.3 DEFINITIONS**

- A. Firestopping (Through-Penetration Protection System): Sealing or stuffing material or assembly placed in spaces between and penetrations through building materials to arrest movement of fire, smoke, heat, and hot gases through fire rated construction.

**1.4 SUBMITTALS**

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Product Data: Submit data on product characteristics, performance, and limitation criteria.
- C. Schedule: Submit schedule of opening locations and sizes, penetrating items, and required listed design numbers to seal openings to maintain fire resistance rating of adjacent assembly.
- D. Manufacturer's Installation Instructions: Submit preparation and installation instructions.
- E. Manufacturer's Certificate: Certify products meet or exceed specified requirements.
- F. Engineering Judgements: For conditions not covered by UL or WH listed designs, submit judgements by licensed professional engineer suitable for presentation to authority having jurisdiction for acceptance as meeting code fire protection requirements.

**1.5 QUALITY ASSURANCE**

- A. All firestopping on the project to be performed by the same Company.
- B. Through Penetration Firestopping of Fire Rated Assemblies: UL 1479 or ASTM E814 with 0.10 inch water gage minimum positive pressure differential to achieve fire F-Ratings and temperature T-Ratings as indicated on Drawings, but not less than 1-hour.
  - 1. Wall Penetrations: Fire F-Ratings as indicated on Drawings, but not less than 1-hour.
  - 2. Floor Penetrations: Fire F-Ratings and temperature T-Ratings as indicated on Drawings, but not less than 1-hour.
    - a. Floor Penetrations Within Wall Cavities: T-Rating is not required.
- C. Through Penetration Firestopping of Non-Fire Rated Floor Assemblies: Materials to resist free passage of flame and products of combustion.
  - 1. Noncombustible Penetrating Items: Noncombustible materials for penetrating items connecting maximum of three stories.
  - 2. Penetrating Items: Materials approved by authorities having jurisdiction for penetrating items connecting maximum of two stories.
- D. Fire Resistant Joints in Fire Rated Floor, Roof, and Wall Assemblies: ASTM E1966 or UL 2079 to achieve fire resistant rating as indicated on Drawings for assembly in which joint is installed.
  - 1. Smoke Barrier Joints Air Leakage: Maximum 5 cfm per foot 0.30 inches water gage pressure differential
- E. Fire Resistant Joints Between Floor Slabs and Exterior Walls: ASTM E119 with 0.10 inch water gage minimum positive pressure differential to achieve fire resistant rating as indicated on Drawings for floor assembly.
- F. Surface Burning Characteristics: Maximum 25/450 flame spread/smoke developed index when tested in accordance with ASTM E84.

**1.6 QUALIFICATIONS**

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three (3) years documented experience.
- B. Applicator: Company specializing in performing Work of this section with minimum three (3) years documented experience and approved by manufacturer.

**1.7 ENVIRONMENTAL REQUIREMENTS**



- A. Section 01 60 00 - Product Requirements: Requirements before, during and after installation of Work.
- B. Do not apply materials when temperature of substrate material and ambient air is below 60 degrees F.
- C. Maintain this minimum temperature before, during, and for minimum 3 days after installation of materials.
- D. Provide ventilation in areas to receive solvent cured materials.

## **PART 2 PRODUCTS**

### **2.1 PERFORMANCE REQUIREMENTS**

- A. Conform to UL or WH for fire resistance ratings and surface burning characteristics.
- B. Provide certificate of compliance from authority having jurisdiction indicating approval of materials used.

### **2.2 FIRESTOPPING**

- A. Manufacturers:
  1. 3M Fire Protection Products
  2. A/D Fire Protection Systems, Inc.
  3. Hilti Corp.
  4. Nelson Firestop Products
  5. Specified Technologies
  6. Substitutions: Section 01 60 00 - Product Requirements.
- B. Product Description: Different types of products by multiple manufacturers are acceptable as required to meet specified system description and performance requirements; provide only one type for each similar application.
  1. Formulated Firestopping Compound of Incombustible Fibers: Formulated compound mixed with incombustible non-asbestos fibers.
    - a. Maximum volatile organic compound content in accordance with CA/DHS.
  2. Fiber Stuffing and Sealant Firestopping: Composite of mineral fiber stuffing insulation with silicone elastomer for smoke stopping.
    - a. Maximum volatile organic compound content in accordance with CA/DHS.
  3. Mechanical Firestopping Device with Fillers: Mechanical device with incombustible fillers and silicone elastomer, covered with sheet stainless steel jacket, joined with collars, penetration sealed with flanged stops.
  4. Intumescent Firestopping: Intumescent putty compound which expands on exposure to surface heat gain.
    - a. Maximum volatile organic compound content in accordance with CA/DHS.
  5. Firestop Pillows: Formed mineral fiber pillows.

### **2.3 ACCESSORIES**

- A. Primer: Type recommended by firestopping manufacturer for specific substrate surfaces and suitable for required fire ratings.
  1. Maximum volatile organic compound content in accordance with CA/DHS.
- B. Dam Material: Permanent; mineral fiber matting.
- C. Installation Accessories: Provide clips, collars, fasteners, temporary stops or dams, and other devices required to position and retain materials in place.

**PART 3 EXECUTION****3.1 EXAMINATION**

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify openings are ready to receive firestopping.

**3.2 PREPARATION**

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this Section.
- B. Prepare materials to be installed and equipment to be used during installation.
- C. Clean substrate surfaces of dirt, dust, grease, oil, loose material, or other matter affecting bond of firestopping material.
- D. Remove incompatible materials affecting bond.
- E. Install damming materials to arrest liquid material leakage.

**3.3 APPLICATION**

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Install material at fire rated construction perimeters and openings containing penetrating sleeves, piping, ductwork, conduit, and other items, requiring firestopping.
- C. Apply primer as recommended by manufacturer for type of firestopping material and substrate involved, and as required for compliance with required fire ratings.
- D. Apply firestopping material in sufficient thickness to achieve required fire and smoke rating, to uniform density and texture.
- E. Compress fibered material to maximum 40 percent of its uncompressed size.
- F. Install fire-rated cable management/firestopping products at locations as indicated on the Drawings or any location where low-voltage cable penetrates a fire rated partition.
- G. Dam material to remain.

**3.4 FIELD QUALITY CONTROL**

- A. Section 01 40 00 - Quality Requirements: Monitor quality of installation, inspection, and testing.
- B. Inspect installed firestopping for compliance with specifications and submitted schedule.
- C. Install descriptive label at all penetrations including UL assembly and verify noted UL assembly is consistent with installation.

**3.5 CLEANING**

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures: Related to cleaning.
- B. Clean adjacent surfaces of firestopping materials.

**3.6 PROTECTION OF INSTALLED CONSTRUCTION**

- A. Section 01 73 00 - Execution: Protecting installed construction.
- B. Protect adjacent surfaces from damage by material installation.

**END OF SECTION**



**SECTION 07 90 00**  
**JOINT PROTECTION**

**PART 1 GENERAL**

**1.1 SUMMARY**

- A. Section includes sealants and joint backing, and accessories.
- B. Related Sections:
  - 1. Section 07 84 00 - Firestopping: Firestopping sealants.
  - 2. Section 08 80 00 - Glazing: Glazing sealants and accessories.
  - 3. Section 09 21 16 - Gypsum Board Assemblies: Acoustic sealant.
  - 4. Section 09 30 00 - Tiling: Sealant used as tile grout.

**1.2 REFERENCES**

- A. ASTM International (ASTM):
  - 1. ASTM C661 - Standard Test Method for Indentation Hardness of Elastomeric-Type Sealants by Means of a Durometer; 2015.
  - 2. ASTM C719 - Standard Test Method for Adhesion and Cohesion of Elastomeric Joint Sealants Under Cyclic Movement (Hockman Cycle); 2014, with amendments 2019.
  - 3. ASTM C834 - Standard Specification for Latex Sealants; 2017.
  - 4. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2018.
  - 5. ASTM C1193 - Standard Guide for Use of Joint Sealants; 2016.
  - 6. ASTM D412 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers-Tension; 2016; Reapproval 2021.
  - 7. ASTM D1056 - Standard Specification for Flexible Cellular Materials - Sponge or Expanded Rubber; 2020.
- B. California Department of Health Services (CA/DHS):
  - 1. Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers, including 2004 Addenda.

**1.3 COORDINATION**

- A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.
- B. Coordinate Work with sections referencing this section.

**1.4 SUBMITTALS**

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Products Data: Submit data indicating sealant chemical characteristics, performance criteria, substrate preparation, limitations, and color availability.
- C. Samples for Initial Selection: Submit two (2) sets of samples of manufacturer's full range of colors and finishes for each joint protection product indicated for Architect's initial selection.
  - 1. Exterior Wall Applications: Provide for custom color selection by Architect.
- D. Samples for Verification: Acquire Architect's direction to provide one of the following from Architect's initial selection:
  - 1. Submit two samples, 6 inches long, illustrating profile, dimension, color, and finish.

2. Install Mockup samples of three (3) different shades of each sealant at each variation of construction type to be sealed for Architect to make selection verifications. Mockup locations to be as directed by Architect.
  - a. This Mockup requirement is for sealants that will remain visible and without paint or coating.
- E. Manufacturer's Installation Instructions: Submit special procedures, surface preparation, and perimeter conditions requiring special attention.
- F. Indoor Air Quality Certificates:
  1. Certify volatile organic compound content for each interior sealant and related primer.
- G. Warranty Sample: As specified in this section.

### 1.5 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.
- B. Applicator: Company specializing in performing Work of this section with minimum three years documented experience.

### 1.6 ENVIRONMENTAL REQUIREMENTS

- A. Section 01 60 00 - Product Requirements.
- B. Maintain temperature and humidity recommended by sealant manufacturer during and after installation.

### 1.7 WARRANTY

- A. Section 01 77 00 - Closeout Procedures: Product warranties and product bonds.
- B. Provide 20 year manufacturer's weatherseal and non-staining warranty.
- C. Warranty: Include coverage for replacement of installed sealant and accessories for adhesion and cohesion failure, degradation of sealant, failure of sealant to cure, failure to maintain watertight seal, and staining of substrate.

## PART 2 PRODUCTS

### 2.1 JOINT SEALERS

- A. Silicone Sealant: ASTM C920, Grade NS, Class 25; single component, neutral curing, non-sagging, non-staining, fungus resistant, non-bleeding.
  1. Manufacturers:
    - a. Dow Chemical Company.
    - b. General Electric Company, Silicone Products Division
    - c. Pecora Corporation.
  2. Basis of Design: Dow Chemical Company.
  3. Color: Colors as selected by Architect from full range.
  4. Movement Capability: Plus and minus 25 percent.
  5. Service Temperature Range: -65 to 180 degrees F.
  6. Shore A Hardness Range: 15 to 35.
- B. Acrylic Sealant: ASTM C920, Grade NS, Class 12-1/2; single component, solvent curing, non-staining, non-bleeding, non-sagging.
  1. Manufacturers:
    - a. Master Builders Solutions, formerly BASF.

- b. Pecora Corporation.
    - c. Sika Corporation.
    - d. Tremco.
  2. Basis of Design: Master Builders Solutions.
  3. Color: White.
  4. Movement Capability: Plus and minus 12-1/2 percent.
  5. Service Temperature Range: -13 to 180 degrees F.
  6. Shore A Hardness Range: 25 to 50.
  7. Interior Sealants and Sealant Primers: Maximum volatile organic compound content in accordance with California Department of Health Services Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers, including 2004 Addenda.
- C. Self-Leveling Silicone Sealant: ASTM C920, Grade P, Class 25; single component, chemical curing, non-staining, non-bleeding, self-leveling type.
1. Color: Gray.
  2. Movement Capability: Plus and minus 25 percent.
  3. Service Temperature Range: -40 to 180 degrees F.
  4. Shore A Hardness Range: 20 to 35.
- D. Polyurethane Sealant: ASTM C920; polyurethane based, non-sag elastomeric sealant; Grade NS, Uses M and A; single or multi-component; paintable.
1. Manufacturers:
    - a. Master Builders Solutions, formerly BASF.
    - b. Sika Corporation.
    - c. Pecora Corporation.
    - d. Substitutions: Section 01 60 00 - Product Requirements.
  2. Basis of Design: Sika Corporation.
  3. Color: To be selected by Architect from full range.
  4. Movement Capability: Plus and minus 35 percent, minimum; ASTM C719.
  5. Service Temperature Range: Minus 40 to 170 degrees F.
  6. Shore A Hardness Range: 20 to 45; ASTM C661.
  7. Tensile Stress: 125 - 175 psi at 21 days; ASTM D412.
  8. Elongation to Break: 550 percent, minimum; ASTM D412

## 2.2 ACCESSORIES

- A. Primer: Non-staining type, recommended by sealant manufacturer to suit application.
- B. Joint Cleaner: Non-corrosive and non-staining type, recommended by sealant manufacturer; compatible with joint forming materials.
- C. Joint Backing: Round foam rod compatible with sealant; ASTM D1056, sponge or expanded rubber; oversized 30 to 50 percent larger than joint width.
- D. Bond Breaker: Pressure sensitive tape recommended by sealant manufacturer to suit application.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify substrate surfaces and joint openings are ready to receive work.
- C. Verify joint backing and release tapes are compatible with sealant.

**3.2 PREPARATION**

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this section. Prepare materials to be installed and equipment used during installation.
- B. Remove loose materials and foreign matter impairing adhesion of sealant.
- C. Clean and prime joints.
- D. Perform preparation in accordance with ASTM C1193.
- E. Protect elements surrounding Work of this section from damage or disfiguration.

**3.3 INSTALLATION**

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Perform installation in accordance with ASTM C1193.
- C. Measure joint dimensions and size joint backers to achieve width-to-depth ratio, neck dimension, and surface bond area as recommended by manufacturer, except where specific dimensions are indicated.
- D. Install bond breaker where joint backing is not used.
- E. Install sealant free of air pockets, foreign embedded matter, ridges, and sags.
- F. Apply sealant within recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.
- G. Tool joints concave.

**3.4 CLEANING**

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures: Related to cleaning.
- B. Clean adjacent soiled surfaces.

**3.5 PROTECTION OF INSTALLED CONSTRUCTION**

- A. Section 01 73 00 - Execution: Protecting installed construction.
- B. Protect sealants until cured.

**3.6 SCHEDULE**

- A. Exterior Joints for Which No Other Sealant Type is Indicated: Silicone - DOWSIL 795.
- B. Control and Expansion Joints in Paving: Silicone - Self Leveling.
- C. Control, Expansion, and Soft Joints in Masonry, and Between Masonry and Adjacent Work: Silicone - DOWSIL 790.
- D. Lap Joints in Exterior Sheet Metal Work: Silicone - DOWSIL 795.
- E. Joints Between Exterior Metal Frames and Adjacent Work (except masonry): Silicone - DOWSIL 795.
- F. Interior Joints at Vertical and Underside of Concrete Panels and Planks: Polyurethane type.
- G. Under Exterior Door Thresholds: Clear silicone - DOWSIL 999-A.
- H. Interior Joints for Which No Other Sealant is Indicated: Acrylic - Master Builders Solutions MasterSeal NP 520.



- I. Control and Expansion Joints in Interior Concrete Slabs and Floors: Silicone - Self Leveling.
- J. Joints Between Plumbing Fixtures and Walls and Floors, and Between Counter tops and Walls: White silicone - sanitary type.

**END OF SECTION**



**SECTION 07 95 13****EXPANSION JOINT COVER ASSEMBLIES****PART 1 GENERAL****1.1 SUMMARY**

- A. Section includes expansion joint cover assemblies for floor, wall and ceiling surfaces.
- B. Related Requirements:
  - 1. Section 04 20 00 - Unit Masonry: Execution requirements for placement of joint assembly frames specified in this section in masonry.
  - 2. Section 07 90 00 - Joint Protection: Expansion and control joint finishing utilizing sealant and bond breaker.

**1.2 REFERENCES**

- A. ASTM International (ASTM):
  - 1. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2021.
  - 2. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric); 2021.
  - 3. ASTM B308/B308M - Standard Specification for Aluminum-Alloy 6061-T6 Standard Structural Profiles; 2020.
- B. Intertek Testing Services (ITS):
  - 1. ITS (DIR) - Directory of Listed Products; current edition.
- C. Underwriters Laboratories Inc. (UL):
  - 1. UL (Dir) - Online Certifications Directory; current edition.
  - 2. UL (FDR) - Fire Resistance Directory; current edition.

**1.3 SUBMITTALS**

- A. Section 01 33 00 - Submittal Procedures: Submittal requirements.
- B. Product Data: Submit joint assembly profiles, profile dimensions, anchorage devices, and manufacturer's full range and custom range of colors and finishes.
- C. Shop Drawings: Indicate joint and splice locations, miters, layout of work, affected adjacent construction, and anchorage locations.
- D. Samples for Initial Selection: Submit two samples of manufacturer's full range of colors and finishes for Architect's initial selection.
  - 1. For Exterior Wall Applications: Allow for custom color selection by Architect.
- E. Samples for Verification: Submit two samples 6 inches long, illustrating profile, dimension, color, and finish selected from Architect's initial selection.
  - 1. For Exterior Wall Applications: Allow for custom color selection by Architect.
- F. Manufacturer's Installation Instructions: Submit rough-in sizes; provide templates for cast-in or placed frames or anchors; required tolerances for item placement.

## PART 2 PRODUCTS

### 2.1 MANUFACTURERS

- A. Expansion Joint Cover Assemblies:
  - 1. Architectural Art Mfg., Inc.
  - 2. Balco, Inc.
  - 3. Watson Bowman Acme Corporation.
  - 4. Construction Specialties, Inc.
  - 5. MM Systems Corporation.
  - 6. Nystrom, Inc.
- B. Basis of Design: MM System Corporation.

### 2.2 APPLICATIONS

- A. Colors to be as selected by Architect from manufacturer's full range, unless indicated otherwise.
- B. Interior Joints:
  - 1. Floor to Floor Joints: [Flushline System FSS Series](#).
  - 2. Wall to Wall Masonry Joints: [ESS Series](#).
  - 3. Wall to Wall Masonry Corner Joints: [ESS Series](#).
  - 4. Wall to GWB Ceiling Joints: [VSGL Series](#).
  - 5. Wall to Acoustic Ceiling Joints: [VSGL Series](#).
  - 6. Inline Acoustic Ceiling Joints: [VSG Series](#).
- C. Exterior Joints:
  - 1. Wall to Wall Masonry Joints: [ESS Series](#).
  - 2. Wall to Wall Masonry Corner Joints: [ESS Series](#).
- D. Fire Rated Expansion and Seismic Joints: [Pyro-Flex Fire Barrier](#).
  - 1. Provide cover assembly labled to have fire rating equivalent to that required for constructed joint.
    - a. Acceptable Evaluation Agencies: UL, ULC, and Intertek.

### 2.3 EXPANSION JOINT COVER ASSEMBLIES

- A. Expansion Joint Cover Assemblies - General: Factory-fabricated and assembled; designed to completely fill joint openings, sealed to prevent passage of air, dust, water, smoke; suitable for traffic expected.
  - 1. Joint Dimensions and Configurations: As indicated on Drawings.
  - 2. Joint Cover Sizes: Selected to suit joint width and configuration, based on manufacturer's published recommendations and limitations.
  - 3. Joint Cover Styles: As indicated in the Applications Article of this section and as indicated on Drawings.
  - 4. Joint Movement Capability: If not indicated, provide minimum plus/minus 50 percent joint movement capability.
  - 5. Lengths: Provide covers in full lengths required; avoid splicing wherever possible.
  - 6. Anchors, Fasteners, and Fittings: Provided by cover manufacturer.
- B. Floor Joint Covers: Coordinate with indicated floor coverings.
  - 1. If floor covering is not indicated, obtain instructions from Architect before proceeding.
  - 2. If style is not indicated, provide extruded aluminum frame both sides, resilient seals, and minimize exposed metal.

- C. Sliding Cover Plate Type Covers: Provide plate with beveled edges and neat fit that does not collect dirt.
- D. Covers In Fire Rated Assemblies: Provide cover assembly labeled to have fire rating equivalent to that required for constructed joint.
  - 1. Acceptable Evaluation Agencies: UL, ULC, and Intertek.

## 2.4 MATERIALS

- A. Extruded Aluminum: ASTM B221 (ASTM B221M), 6063 alloy, T6 temper; or ASTM B308/B308M, 6061 alloy, T6 temper.
  - 1. Colors: As selected by Architect from manufacturer's full range of finishes.
- B. Anchors and Fasteners:
  - 1. Exterior Applications: Stainless steel as recommended by cover manufacturer.
  - 2. Interior Applications at Cementitious Substrates: Stainless steel as recommended by cover manufacturer.
  - 3. Interior Applications at Non-Cementitious Substrates: As recommended by cover manufacturer.
- C. Backing Paint: Asphaltic type.
- D. Sealant: Silicone, color to match preformed expansion joint color.

## 2.5 FABRICATION

- A. Joint Covers: Aluminum cover plate, designed to permit plus or minus 50 percent joint movement with full recovery, surface mounted.
- B. Back paint components in contact with cementitious materials or dissimilar metals.
- C. Shop assemble components and package with anchors and fittings.
- D. Furnish joint components in single continuous length wherever practical. Minimize site splicing.

## 2.6 FACTORY FINISHING

- A. As selected by Architect from manufacturer's full range of finishes.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Examine substrates for conditions detrimental to installation of the Work. Proceed with installation only after unsatisfactory conditions have been corrected.
- C. Verify that joint preparation and dimensions are acceptable and in accordance with manufacturer's requirements.
- D. Verify that joint sealant system has been installed before application of rigid joint cover assembly.
- E. Verify that frames and anchors installed by others are in correct locations and suitable for installation of remainder of assembly.

**3.2 PREPARATION**

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this section.
- B. Prepare materials to be installed and equipment to be used during installation.
- C. Provide anchoring devices for installation and embedding.
- D. Provide templates and rough-in measurements.

**3.3 INSTALLATION**

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Install components and accessories in accordance with manufacturer's instructions.
- C. Align materials and cover assemblies as indicated on the Drawings.
- D. Align work plumb and level, flush with adjacent surfaces.
- E. Rigidly anchor to substrate to prevent misalignment.
- F. Where indicated, apply field sealant to exterior joint material, both sides of joint.

**3.4 CLEANING**

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures: Clean installed work and comply with manufacturer's recommendations.
- B. Clean installed work in accordance with manufacturer's recommended materials and procedures.

**3.5 PROTECTION**

- A. Section 01 73 00 - Execution: Protecting installed construction.
- B. Do not permit traffic over unprotected floor joint surfaces.

**END OF SECTION**

**SECTION 08 11 13**  
**HOLLOW METAL DOORS AND FRAMES**

**PART 1 GENERAL****1.1 SUMMARY**

- A. Section Includes:
1. Non-fire-rated hollow metal doors and frames.
  2. Fire-rated hollow metal doors and frames.
  3. Hollow metal frames for wood doors and door types other than steel doors.
  4. Hollow metal borrowed lites glazing frames.
- B. Related Requirements:
1. Section 04 20 00 - Unit Masonry: Wall construction type. Masonry grout fill of metal frames and placement of anchors into masonry wall construction.
  2. Section 08 14 16 - Flush Wood Doors: Wood doors for metal frames.
  3. Section 08 71 00 - Door Hardware: Hardware, silencers, and weatherstripping.
  4. Section 08 80 00 - Glazing: Glass for doors and lite frames.
  5. Section 09 21 16 - Gypsum Board Assemblies: Wall construction type.
  6. Section 09 90 00 - Painting and Coating: Field painting.

**1.2 REFERENCES**

- A. American National Standards Institute (ANSI) and Steel Door Institute (SDI):
1. ANSI/SDI A250.4 - Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames and Frame Anchors; 2018.
  2. ANSI/SDI A250.6 - Recommended Practice for Hardware Reinforcing on Standard Steel Doors and Frames; 2015.
  3. ANSI/SDI A250.8 - Specifications for Standard Steel Doors and Frames; 2017.
  4. ANSI/SDI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames; 2020.
- B. Americans With Disabilities Act (ADA):
1. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design; Current Edition.
- C. ASTM International (ASTM):
1. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2020.
  2. ASTM C1363 - Standard Test Method for Thermal Performance of Building Materials and Envelope Assemblies by Means of a Hot Box Apparatus; 2019.
  3. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2021a.
- D. International Code Council (ICC):
1. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2017.
- E. Intertek Testing Services (ITS):
1. ITS (DIR) - Directory of Listed Products; Current Edition.
- F. National Fire Protection Association (NFPA):
1. NFPA 80 - Standard for Fire Doors and Other Opening Protectives: 2022.
  2. NFPA 101 - Life Safety Code; 2021.

3. NFPA 105 - Standard for Smoke Door Assemblies and other Opening Protectives; 2022.
  4. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies; 2022.
  5. NFPA 257 - Standard On Fire Test For Window And Glass Block Assemblies; 2022.
- G. Steel Door Institute (SDI):
1. SDI 117 - Manufacturing Tolerances for Standard Steel Doors and Frames; 2013.
- H. Underwriters Laboratories Inc. (UL):
1. UL (DIR) - Online Certifications Directory; Current Edition.
  2. UL 9 - Standard for Safety Fire Tests of Window Assemblies; 2009, Revisions 2020.
  3. UL 10B - Standard for Safety Fire Tests of Door Assemblies; 2009, Revisions 2020.
  4. UL 10C - Standard for Safety Positive Pressure Fire Tests of Door Assemblies; 2016, Revisions 2021.
  5. UL 1784 - Standard for Safety Air Leakage Tests of Door Assemblies and Other Opening Protectives; 2015; Revisions 2020.

### 1.3 COORDINATION

- A. Section 01 30 00 - Administrative Requirements: Requirements for coordination.
- B. Coordinate fire rating of metal frames to fire rating requirements of doors and wall construction compliance with overall fire rated separation requirements.
- C. Coordinate Work with frame and door opening construction and door hardware and glazing installation.
- D. Coordinate frames to accommodate various glazing types, door types and hardware requirements as indicated in the Drawings and other specification sections.
- E. Coordinate door frames and anchors with adjacent wall construction which may include, but not be limited to, masonry and framed wall construction with various finish types.
- F. Coordinate fabrication of doors and frames to include factory installed steel plate reinforcing for required hardware devices as indicated in this Section and in Section 08 71 00 for each door and frame. Reinforcing to comply with ANSI/SDI A250.8 and ANSI/SDI A250.6.
- G. Coordinate fabrications and sequence installation to accommodate required door hardware electric wire connections.

### 1.4 PRE-INSTALLATION MEETINGS

- A. Section 01 30 00 - Administrative Requirements: Pre-installation meeting.
- B. Convene at project site minimum one week prior to commencing work of this section.
- C. Require attendance of Architect, Owner, Owner's Locksmith and installers of doors, frames, hardware, access control systems, electrical and walls.
- D. Review specification section and cited standards for this Work and Work of related installers; verify submittal approvals and outstanding issues; verify qualifications including qualifications of Contractor's inspectors.

### 1.5 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Product Data: Submit manufacturer's product data describing products and components. Include sample of each warranty specified.
- C. Shop Drawings: Indicate materials and details of design and construction; hardware locations; reinforcement type and locations; anchor types, spacing, locations and fastening



methods; door and frame elevations and assemblies; glazing; fire rating; smoke and draft control; and finishes.

- D. Installation Instructions: Manufacturer's published instructions, including any special installation instructions relating to this project.
- E. Manufacturer's Certificate: Certification that products meet or exceed specified requirements.
- F. Manufacturer's Qualification Statement.
- G. Installer's Qualification Statement.

## 1.6 QUALITY ASSURANCE

- A. Perform Work in accordance with ANSI/SDI A250.8 - Recommended Specifications for Standard Steel Doors and Frames.
- B. Manufacturer Qualifications: Company specializing in manufacturing Products specified in this section with at least five (5) years documented experience.
- C. Installer Qualifications: Company specializing in performing work of the type specified and with at least three (3) years documented experience.
- D. Maintain at project site copies of reference standards relating to installation of products specified.

## 1.7 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Accept frames and doors on site in manufacturer's packaging. Inspect for damage.
- C. Comply with manufacturer's recommendation and ANSI/SDI A250.8 in accordance with specified requirements.
- D. Protect with resilient packaging; prevent against humidity build-up under coverings; prevent corrosion and adverse effects on factory applied painted finish.

## 1.8 WARRANTY

- A. Section 01 77 00 - Closeout Procedures: Product warranties.
- B. Furnish manufacturer's five (5) year warranty for fire rated and for smoke and draft control assemblies.

## PART 2 PRODUCTS

### 2.1 MANUFACTURERS

- A. Hollow Metal Doors and Frames:
  - 1. Ceco Door - Assa Abloy.
  - 2. Curries - Assa Abloy.
  - 3. Fleming Door Products - Allegion.
  - 4. Pioneer Industries.
  - 5. Republic Doors - Allegion.
  - 6. Steelcraft - Allegion.
  - 7. Substitutions: Section 01 60 00 - Product Requirements.

## 2.2 REGULATORY REQUIREMENTS

- A. Regulatory requirements in this Article are minimum requirements, unless requirements by authorities having jurisdiction are more stringent. Comply with the most stringent requirements.
- B. Fire Rated Assemblies:
  - 1. Complying with NFPA 80 and listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction for fire-protection ratings indicated.
  - 2. Fire Rating: As indicated on Drawings, tested in accordance with UL 10C and NFPA 252 (positive pressure fire tests).
  - 3. Provide units listed and labeled by UL (DIR) or ITS (DIR).
    - a. Attach fire rating label to each fire rated unit.
  - 4. Temperature-Rise Rating (TRR) Across Door Thickness: In accordance with local building code and authorities having jurisdiction.
- C. Smoke and Draft Control Assemblies:
  - 1. Provide an assembly with gaskets listed and labeled for smoke and draft control by a qualified testing agency acceptable to authorities having jurisdiction.
  - 2. Locations as indicated on Drawings.
  - 3. Self-closing or automatic closing doors in accordance with NFPA 80 and NFPA 105, with fire-resistance-rated wall construction rated the same or greater than the fire rated doors, and as follows:
    - a. Maximum Air Leakage: 3.0 cfm/sq ft (0.02 cu m/sec/sq m) of door opening at 0.10 inch w.g. (24.9 Pa) pressure, when tested in accordance with UL 1784 at both ambient and elevated temperatures.
    - b. Gasketing: Provide gasketing and edge sealing as necessary to achieve leakage limit.
    - c. Label: Include the "S" label on fire-rating label of door.
- D. Fire Rated, Borrowed-Lite Assemblies:
  - 1. Complying with NFPA 80 and listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction for fire protection ratings.
  - 2. Fire Rating: As indicated on Drawings, tested in accordance with UL 9 and NFPA 257.
- E. Accessibility: Comply with ICC A117.1 and ADA Standards.

## 2.3 HOLLOW METAL DOORS AND FRAMES

- A. Standard and custom shop fabricated hollow metal doors and frames; fire rated and smoke and draft control assemblies; refer to Drawings and this Section for sizes and configurations.
- B. Finish for doors and frames:
  - 1. Factory primed and field finished. Refer to 09 90 00 - Coating and Painting for field finish.
- C. Interior Doors: ANSI/SDI A250.8, 1-3/4 inch thick.
  - 1. Level 3 - Extra Heavy Duty; door face 0.053 inch (16 gauge) thick steel, minimum.
  - 2. Model 2 (seamless), unless indicated otherwise on Drawings.
  - 3. Physical Performance: Level A (1,000,000 cycles), in accordance with ANSI/SDI A250.4.
  - 4. Door Face Sheet: Flush.
  - 5. Door Core:
    - a. Manufacturer's standard core material/construction and in compliance with requirements.
  - 6. End Closures: Steel channel type; 0.042 inch thick; flush with door faces and edges.

7. Fire-Rating and Smoke and Draft Control: As indicated on Drawings and in compliance with REGULATORY REQUIREMENTS in this Section.
- D. Interior Frames: ANSI/SDI A250.8.
1. Level 3 - Extra Heavy Duty; 0.053 inch (16 gauge) thick steel, minimum.
  2. Joinery of Frame Members:
    - a. Full profile continuously welded type.
  3. Fire-Rating and Smoke and Draft Control: As indicated on Drawings and in compliance with REGULATORY REQUIREMENTS in this Section.
- E. Exterior Doors: ANSI/SDI A250.8, 1-3/4 inch thick.
1. Level 4 - Maximum Duty; door face 0.067 inch (14 gauge) thick steel, minimum.
    - a. Zinc Coating: A60/ZF180 (galvannealed), ASTM A653/A653M.
  2. Model 2 (seamless), unless indicated otherwise on Drawings.
  3. Physical Performance: Level A (1,000,000 cycles), in accordance with ANSI/SDI A250.4.
  4. Door Face Sheet: Flush.
  5. Door Core:
    - a. Manufacturer's standard core material/construction and in compliance with requirements.
  6. Thermal Resistance Rating: For doors and frames separating conditioned air space and unconditioned air space, provide door and frame assembly with R-value of not less than 2.4 deg F x h x sq. ft./BTU when tested in accordance with ASTM C1363.
  7. End Closures: Steel channel type; 0.042 inch thick; flush with door faces and edges.
    - a. Provide weep hole openings in bottoms to permit moisture to escape to exterior. Seal joints in top edges of doors against water penetration.
  8. Weatherstripping: Refer to Section 08 71 00.
  9. Fire-Rating and Smoke and Draft Control: As indicated on Drawings and in compliance with REGULATORY REQUIREMENTS in this Section.
- F. Exterior Frames: ANSI/SDI A250.8.
1. Level 4 - Maximum Duty; 0.067 inch (14 gauge) thick steel, minimum.
    - a. Zinc Coating: A60/ZF180 (galvannealed), ASTM A653/A653M.
  2. Joinery of Frame Members:
    - a. Full profile continuously welded type.
  3. Weatherstripping: Refer to Section 08 71 00.
  4. Fire-Rating and Smoke and Draft Control: As indicated on Drawings and in compliance with REGULATORY REQUIREMENTS in this Section.
- G. Borrowed Lites Glazing Frames: Construction and face dimensions to match door frames, and as indicated on Drawings. Non-removable stops on non-secured side of frame.

## 2.4 ACCESSORIES

- A. Louvers: Roll formed steel with overlapping frame; steel coating and finish same as door components; factory-installed.
1. In Fire-Rated Doors: UL (DIR) or ITS (DIR) listed fusible link louver, same rating as door.
  2. Style: Standard straight slat blade, unless indicated otherwise on Drawings.
  3. Louver Free Area: Comply with air flow requirements.
  4. Fasteners: Concealed fasteners.
- B. Glazing: As specified in Section 08 80 00 - Glazing; factory installed.
- C. Removable Glazing Stops: Rolled steel channel shape, mitered, or butted corners; prepared for countersink type screw holes and screws.

- D. Frame Anchors:
  1. Masonry Walls: Masonry strap type; three holes in strap; galvanized.
  2. Metal Stud Walls: Steel stud channel type.
  3. Base Anchor: Fixed base type.
- E. Astragals for Double Doors: Comply with requirements of door operation and fire rating and smoke and draft control.
- F. Hollow Metal Fixed Panels: If indicated on Drawings, provide panels of same construction, performance, and finish as doors.
- G. Silencers: Specified in Section 08 71 00.
- H. Weatherstripping: Specified in Section 08 71 00.

## 2.5 FABRICATION

- A. Fabricate doors and frames to comply with fire rating and smoke and draft control indicated on Drawings.
- B. Fabricate doors and frames with hardware reinforcement welded in place. Comply with ANSI/SDI A250.8 and ANSI/SDI A250.6. Protect frame hardware preparations with mortar guard boxes.
- C. Fabricate frames to accommodate various glazing types, door types and hardware requirements as indicated in the Drawings and other specification sections.
- D. Fabricate frames and anchors to suit indicated adjacent wall and floor construction which may include, but not be limited to, concrete, masonry, and framed wall construction with indicated finish types.
- E. Fabricate frames to suit masonry wall coursing with head member height as required to fill opening without cutting masonry units.
- F. Reinforce frames wider than 48 inches with roll formed steel channels fitted tightly into frame head, flush with top.
- G. Prepare interior frames for silencers or other seal devices for achieving fire rating and smoke and draft control requirements.
- H. Kerfed Frames: Provide kerfed-style frames where required by door seal hardware such as smoke gasketing, sound gasketing or weatherstripping.
- I. Frame Silencers and Weatherstripping:
  1. Interior Frames: Prepare frames for silencers. Provide three single silencers for single doors on strike side. Provide two single silencers on frame head at double doors without mullions.
  2. Exterior Frames: Configure exterior frames with profile to receive recessed weatherstripping.
- J. Frame Mullions for Double Doors: Removable type, with profile matching jambs.
- K. Frame Transom Bars for Glazed Lights: Fixed type, integral with adjacent frame construction and with profile matching jamb and head.
- L. Attach fire rating label to each fire rated door and frame.
- M. Attach label to each hollow metal door and frame indicating A-60 Galvannealed.

## 2.6 SHOP FINISHING

- A. Steel Sheet: Galvanized to ASTM A653/A653M, A60.

- B. Primer: Baked. ANSI A250.10 rust inhibitive type.
- C. Bituminous Coating: Fibered asphalt emulsion. Coating inside of frames to be set in masonry walls or otherwise grouted solid with cementitious grout. Apply coating after fabrication and after primer has cured.

## **PART 3 EXECUTION**

### **3.1 EXAMINATION**

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify existing conditions before starting work.
- C. Verify opening sizes and tolerances are acceptable.
- D. Verify that finished walls are in plane to ensure proper door alignment.

### **3.2 PREPARATION**

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this section.
- B. Prepare materials to be installed and equipment to be used during installation.
- C. Coat inside of frames to be installed in masonry or to be grouted, with bituminous coating, prior to installation.

### **3.3 INSTALLATION**

- A. Install doors and frames in accordance with ANSI/SDI A250.8.
- B. Install fire rated units in accordance with NFPA 80.
- C. Coordinate installation of doors and frames with indicated types of doors, electrical connections, hardware and glazing panels that are specific to each opening as indicated on the Drawings and in the Specifications.
- D. Install door hardware as specified in Section 08 71 00.
  - 1. Comply with recommended practice for hardware placement of doors and frames in accordance with ANSI/SDI A250.8 and ANSI/SDI A250.6.
- E. Coordinate installation of door frames and anchors with indicated adjacent wall and floor construction which may include, but not be limited to, concrete, masonry, and framed wall construction with indicated finish types.
- F. Grout solid, frames in masonry construction. Prior to grouting, provide bracing sufficient so that pressure of grout will not deform frames.
- G. Install roll formed steel reinforcement channels between two abutting frames. Anchor to structure and floor.
- H. Comply with glass and glazing installation requirements in Section 08 80 00.
- I. Adjust door for smooth and balanced door movement and latching.

### **3.4 ERECTION TOLERANCES**

- A. Section 01 40 00 - Quality Requirements: Tolerances.
- B. Comply with tolerances and clearances indicated in SDI 117.

- C. Maximum Diagonal Distortion: 1/16 inch measured with straight edges, crossed corner to corner.

**3.5 SCHEDULE**

- A. Refer to Door and Frame Schedule on Drawings.

**END OF SECTION**

**SECTION 08 14 16**  
**FLUSH WOOD DOORS**

**PART 1 GENERAL****1.1 SUMMARY**

- A. Section Includes:
  1. Flush wood doors.
- B. Related Requirements:
  1. Section 08 11 13 - Hollow Metal Doors and Frames: Metal frames for wood doors indicated to be installed in metal frame.
  2. Section 08 41 13 - Aluminum-Framed Entrances and Storefronts: Aluminum frames for wood doors indicated to be installed in aluminum frame.
  3. Section 08 71 00 - Door Hardware.
  4. Section 08 80 00 - Glazing.

**1.2 REFERENCES**

- A. ASTM International (ASTM):
  1. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements; 2009, Reapproval 2016.
  2. ASTM E413 - Classification for Rating Sound Insulation; 2016.
- B. Architectural Woodwork Institute, Architectural Woodwork Manufacturers Association of Canada, and Woodwork Institute (AWI/AWMAC/WI (AWS)):
  1. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards, 2014, with Errata 2016.
- C. Architectural Woodwork Institute (AWI):
  1. AWI (QCP) - Quality Certification Program; Current Edition.
- D. California Air Resource Board (CARB):
  1. CARB - Standard for Ultra-Low Emitting Formaldehyde (ULEF).
- E. Forest Stewardship Council (FSC):
  1. FSC - Forest Stewardship Council Standard for Chain of Custody Certification, FSC-STD-40-004, V2-1.
- F. National Fire Protection Association (NFPA):
  1. NFPA 80 - Standard for Fire Doors and Other Opening Protectives; 2022.
  2. NFPA 105 - Standard for Smoke Door Assemblies and Other Opening Protectives; 2022.
- G. Underwriters Laboratories Inc. (UL):
  1. UL (Dir) - Online Certifications Directory; Current Edition.
  2. UL 10C - Standard for Safety Positive Pressure Fire Tests of Door Assemblies; 2016, Revisions 2021.
  3. UL 1784 - Standard for Safety Air Leakage Tests of Door Assemblies and Other Opening Protectives; 2015, Revisions 2020.

**1.3 COORDINATION**

- A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.
- B. Provide the necessary framing, blocking, and backing in walls and ceilings adequate for anchorage the Work.

- C. Coordinate Work with door opening construction, door frame and door hardware.
- D. Coordinate fire rating of metal frames to fire rating requirements of doors and wall construction for compliance with overall fire rated separation requirements.
- E. Coordinate frames with smoke and draft control doors to comply with overall assembly requirements.
- F. Coordinate frames with sound rated doors to comply with overall assembly requirements.

#### **1.4 PRE-INSTALLATION MEETINGS**

- A. Section 01 30 00 - Administrative Requirements: Pre-installation meeting.
- B. Convene minimum one week prior to commencing work of this Section. Review the work requirements, project conditions, sequencing, application procedures, quality control, testing and inspection and production schedule.

#### **1.5 SUBMITTALS**

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Product Data: Indicate door core materials and construction; veneer species, type, and characteristics.
- C. Shop Drawings: Illustrate door opening criteria, elevations, sizes, types, swings, undercuts required, special beveling, special blocking for hardware, factory machining criteria, factory finishing criteria, identify cutouts for glazing.
  - 1. Provide information as required by AWI/AWMAC/WI (AWS).
  - 2. Include AWI (QCP) certification program label and project registration identification.
- D. Samples for Initial Selection: Two sets of manufacturer's samples; each 2 x 4 inches; illustrating the full range of wood grains, stain colors and sheens available for products with factory-applied finishes; submit for Architect's initial selections.
- E. Samples for Verification: From the Architect's initial selections, prepare two samples for each selected finish, color, and sheen; on same product material type indicated for final Work; each 8 x 10 inches. Where finishes involve normal finish, color, sheen, and texture variations, include sample sets showing the full range of variations expected.
- F. Manufacturer's Installation Instructions: Submit special installation instructions.
- G. Manufacturer's Qualification Statement.
- H. Installer's Qualification Statement.
- I. Specimen warranty.

#### **1.6 CLOSEOUT SUBMITTALS**

- A. Warranties executed in Owner's name.
- B. AWI (QCP) - Quality Certification Program certificates.

#### **1.7 QUALITY ASSURANCE**

- A. Maintain one copy of the specified door quality standards on site for review during installation and finishing.
- B. Comply with AWI/AWMAC/WI (AWS) standards and Grade indicated, unless otherwise specified or indicated.



1. Grade indicated is minimum requirement. Where the Contract Documents indicate elements of the Work requirements that exceed the minimum Grade indicated, comply with the Contract Documents regarding that element of the Work.
- C. Comply with AWI (QCP) - Quality Certification Program requirements.
  1. AWI (QCP) quality certification:
    - a. Register project and comply with AWI (QCP) woodwork association quality certification service/program in accordance with requirements for work specified in this Section.
    - b. Provide labels or certificates indicating that installed work will comply with AWI/AWMAC/WI (AWS) requirements for Grade(s) specified.
    - c. Provide designated labels on shop drawings and installed products as required by certification program.
    - d. Submit certifications upon completion of installation that verifies this work complies with specified requirements.
- D. Attach labels from certifying agencies approved by authority having jurisdiction.
- E. Certified Wood Materials: Furnish wood materials certified in accordance with FSC-STD-40-004, V2-1 including:
  1. Face veneer.
  2. Core material.

## 1.8 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum five (5) years documented experience.
  1. Licensed participant in AWI (QCP) - Quality Certification Program prior to commencement of fabrication and throughout the duration of the project.
- B. Installer Qualifications: Company specializing in performing work of the type specified in this Section, with not less than five (5) years of documented experience.

## 1.9 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 - Product Requirements: Product storage and handling requirements.
- B. Package, deliver, and store doors in accordance with AWI/AWMAC/WI (AWS) standards, and door manufacturer requirements.

## 1.10 ENVIRONMENTAL REQUIREMENTS

- A. Environmental Limitations: Comply with AWI/AWMAC/WI (AWS) standards and as follows.
  1. Do not deliver or install doors until building space is enclosed and weathertight, wet work 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. Allow minimum of 72 hours for delivered materials to acclimate to the climate controlled building space before beginning installation.

## 1.11 WARRANTY

- A. Section 01 77 00 - Closeout Procedures: Product warranties and product bonds.
- B. Furnish manufacturer's "Life of Installation" warranty for interior doors, including hanging and finishing if door(s) do not comply with warranty tolerance standards.

1. Include coverage for defective materials, delamination, warping, cupping, bowing, and telegraphing of core construction beyond specified installation tolerances.

## **PART 2 PRODUCTS**

### **2.1 MANUFACTURERS**

- A. Wood Veneer Faced Doors:
  1. Masonite International Architectural.
  2. Oshkosh Architectural Door Company.
  3. Oregon Door.
  4. VT Industries.
  5. Substitutions: Section 01 60 00 - Product Requirements.

### **2.2 FLUSH WOOD DOORS - INTERIOR**

- A. Grade:
  1. Custom.
- B. Performance:
  1. Extra Heavy Duty.
- C. Door Size and Configuration:
  1. Thickness: 1-3/4 inches thick unless otherwise indicated on Drawings.
  2. Size: As indicated on Drawings.
  3. Glass Panel: As indicated on Drawings.
- D. Non-Rated and 20-min Rated Doors:
  1. Solid Core: Type PC-5, particleboard core, 5-ply.
- E. Fire Rated Doors: Tested to fire ratings indicated on Drawings in accordance with UL 10C-Positive Pressure; UL labeled without any visible seals when door is closed.
  1. Solid Core: Type FD-5 rating as scheduled; Category A for positive pressure fire test, 5-ply.
- F. Smoke and Draft Control Doors: Required as indicated on Drawings. In addition to required fire rating, provide door assemblies acceptable tested in accordance with UL 1784 and installed in accordance with NFPA 105 with maximum air leakage of 3.0 cfm per sq ft (0.01524 cu m/s/sq m) of door opening at 0.10 inch wg (24.9 Pa) pressure at both ambient and elevated temperatures; if necessary, provide additional gasketing or edge sealing. UL labeled without any visible seals when door is closed.
- G. Sound-Rated Doors: Tested to STC ratings indicated on Drawings in accordance with ASTM E413, tested in accordance with ASTM E90; STC rating labeled without any visible seals when door is closed.
  1. Required as indicated on Drawings; certified and labeled for compliance with STC rating indicated on Drawings.
- H. Wood Veneer Facings:
  1. Species:
    - a. Red Oak.
  2. Veneer Cut:
    - a. Rift cut.
  3. Veneer Adjacent Leaf Matching: Book match.
  4. Veneer Panel Leaf Matching: Balance match.
  5. Doors Matching:
    - a. Pair match.

- b. Set match doors within 1 foot of each other (doors closed).
- 6. Doors With Transom Matching:
  - a. End match.
- 7. Finish:
  - a. Shop applied transparent over stain.

### 2.3 FABRICATION

- A. Bonding Adhesive: Type I - Waterproof.
  - 1. Compliant with CARB as ULEF for ultra-low emitting formaldehyde.
- B. Provide solid core blocking reinforcement for hardware applications and as follows:
  - 1. Lock blocks.
  - 2. Top rail block for closer.
  - 3. Center rail for exit bar.
  - 4. Bottom rail block for kickplates.
  - 5. Hardware through bolt blocks.
- C. Edges For Veneered Doors:
  - 1. Vertical Edges: Minimum 7/16 inch hardwood laminated to 1 inch (25mm) structural composite lumber and bonded to door core. Exposed hardwood edge species and finish to match door face veneer.
  - 2. Horizontal Edges: Minimum 1-7/16 inch structural composite lumber and bonded to door core.
- D. Factory machine doors for finish hardware in accordance with hardware requirements and dimensions. Do not machine for surface hardware. Furnish solid blocking for surface mounted and through bolted hardware.
  - 1. Comply with hardware requirements indicated on Drawings and as specified in Division 08 for the specifications.
  - 2. Include machine work required for securing door perimeter seals.
- E. Door and Frame Fit: Fabricate doors so that door edge clearances of installed doors comply with AWI/AWMAC/WI (AWS) standards.

### 2.4 FINISHES

- A. Shop Applied Finish:
  - 1. Transparent System - 5, Conversion Varnish.
    - a. Sheen to be as selected by Architect from full range of options.
  - 2. Stain Color:
    - a. As selected by Architect from full range of colors.
- B. Seal door top edge with color sealer to match door facing.

### 2.5 ACCESSORIES

- A. Hardware: As specified in Section 08 71 00 - Door Hardware.
- B. Door Frames: As indicated on Drawings.
- C. Door Louvers: Size to be as indicated on Drawings.
  - 1. Metal Louvers:
    - a. Material and Finish: Roll formed steel; pre-painted finish; color as selected by Architect from full range of options.
    - b. Louver Blades:
      - 1) Inverted V shape.

- 2) Fire rated to match door with fusible link design to UL (DIR) requirements.
- D. Door View Panels: Size to be as indicated on Drawings.
1. Glazing: As indicated on Drawings, but not less than 1/4 inch (6.4 mm) thick, tempered glass, in compliance with requirements of authorities having jurisdiction.
  2. Wood Frame:
    - a. Glazing Stops: Solid wood material, of same species and finish as door facing, lip profile; mitered corners; fasteners to be countersunk, fill and finish to match glazing stop finish.

## **PART 3 EXECUTION**

### **3.1 EXAMINATION**

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify opening sizes and tolerances are acceptable.
- C. Do not install doors in frame openings that are not plumb or are out-of-tolerance for size or alignment.

### **3.2 PREPARATION**

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this section.
- B. Prepare materials to be installed and equipment to be used during installation.

### **3.3 INSTALLATION**

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Comply with AWI/AWMAC/WI (AWS) standards and Grade indicated, and manufacturer's requirements, unless otherwise specified or indicated.
  1. Fire Rated Doors: Comply with NFPA 80, and fire ratings as indicated on Drawings.
  2. Smoke and Draft Control Doors: Comply with NFPA 105, and smoke and draft control requirements as indicated on Drawings.
  3. Sound Rated Door: Comply with sound rating requirements indicated on Drawings.
- C. Coordinate installation of doors with installation of frames and hardware.
- D. Install door louvers and vision panels plumb and level.
  1. Wood Glazing Stops: Countersink fasteners, fill and finish to match glazing stop finish.

### **3.4 INSTALLATION TOLERANCES**

- A. Section 01 40 00 - Quality Requirements: Tolerances.
- B. Comply with AWI/AWMAC/WI (AWS) standards and Grade indicated, unless otherwise specified or indicated.
- C. Maximum Vertical or Horizontal Distortion (Bow or Cup): Maximum 1/8 inch measured at center distance from any edge or corner of door.
- D. Comply with AWI/AWMAC/WI (AWS) tolerance requirements and as follows:
  1. Telegraph: Maximum 0.010 inch in any 3 inch span.
  2. Warp: Maximum 0.125 inch per 7 feet of door section.
  3. Squareness: Maximum diagonal variance of 1/8 inch.

4. Door to Frame Fit and Clearance: 0.125 inch gap.

### **3.5 ADJUSTING**

- A. Section 01 73 00 - Execution: Adjusting.
- B. Adjust door for smooth and balanced door movement and latching.

### **3.6 CLEANING**

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures: Clean installed work and comply with manufacturer's recommendations.
- B. Clean installed work in accordance with manufacturer's recommended materials and procedures.

### **3.7 SCHEDULE**

- A. Door types and locations to be as indicated on Drawings.

**END OF SECTION**



**SECTION 08 17 43****INTEGRATED COMPOSITE DOOR OPENING ASSEMBLIES****PART 1 GENERAL****1.1 SUMMARY**

- A. Section includes fiber reinforced polyester (FRP) faced aluminum doors and frames.
- B. Related Requirements:
  - 1. Section 08 41 13 - Aluminum-Framed Entrances and Storefronts: Frames requiring FRP doors.
  - 2. Section 08 71 00 - Door Hardware: Hardware items other than specified in this section.
  - 3. Section 08 80 00 - Glazing.

**1.2 REFERENCES**

- A. American Architectural Manufacturers Association (AAMA):
  - 1. AAMA 2604 - Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix), 2021.
- B. ASTM International (ASTM):
  - 1. ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2021.
  - 2. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2021.
  - 3. ASTM E330/E330M - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference; 2014, Reapproval 2021.
  - 4. ASTM E331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference; 2000, Reapproval 2016.

**1.3 SYSTEM DESCRIPTION**

- A. Aluminum framed entrance system with aluminum doors faced with fiber reinforced polyester faces.

**1.4 SUBMITTALS**

- A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.
- B. Shop Drawings: Indicate system dimensions, framed opening requirements and tolerances, affected related Work and expansion and contraction joint location and details.
- C. Product Data: Submit component dimensions; describe components within assembly, anchorage and fasteners, glass and infill, door hardware, and internal drainage details.
- D. Samples for Initial Selection: Two manufacturer's complete set of color samples illustrating the full range of finishes and colors available. Include samples for FRP surfaces, aluminum frame finishes, glass units, infill panels, glazing materials. Submit for Architect's initial selections.
- E. Samples for Verification: From the Architect's initial selections, prepare and submit two samples for each selected finish and color; samples to be same product material type

indicated for final Work; each sample 8 x 8 inches. Where finishes involve normal color and texture variations, include sample sets showing the full range of variations expected.

- F. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

## 1.5 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum five (5) years documented experience.
- B. Installer: Company specializing in performing work of this section with minimum five (5) years documented experience.

## 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Protect finished aluminum surfaces with strippable coating. Do not use adhesive papers or sprayed coatings which bond when exposed to sunlight or weather.

## 1.7 WARRANTY

- A. Section 01 77 00 - Closeout Procedures: Product warranties.
- B. Furnish ten (10) year manufacturer's warranty for doors and frames systems.

## PART 2 PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

- A. System Design: Design and size components to withstand dead and live loads caused by positive and negative wind pressure acting normal to plane of wall, including building corners.
1. To design pressure of 6.24 lb/sq ft, as tested in accordance with ASTM E330/E330M.
- B. System Assembly: Accommodate without damage to components or deterioration of seals, movement within system, movement between system and peripheral construction, dynamic loading and release of loads, deflection of structural support framing.
- C. Water Leakage: None, when measured in accordance with ASTM E331 with test pressure difference of 20 percent of design pressure, with minimum differential of 2.86 lbf/sq ft and maximum of 12.00 lbf/sq ft.

### 2.2 INTEGRATED COMPOSITE DOOR OPENING ASSEMBLIES

- A. Manufacturers:
1. Eliason Corporation.
  2. Kawneer Co., Inc.
  3. Oldcastle Building Envelope.
  4. Special-Lite, Inc.
  5. Substitutions: Section 01 60 00 - Product Requirements.
- B. Product Description:
1. Aluminum Frame: Non-thermally broken; applied door stops.
  2. Door: Fiber reinforced polyester faced aluminum framed doors.
  3. Door Thickness: As indicated on Drawings, but not less than 1-3/4 inches thick.
  4. Door Size: As indicated on Drawings.



**2.3 COMPONENTS**

- A. Extruded Aluminum: ASTM B221; 6063 alloy, T5 temper typical, 6061 alloy, T6 temper for extruded structural members.
- B. Sheet Aluminum: ASTM B209/B209M, 5005 alloy, H15 or H34 temper.
- C. Door Face: Fiber reinforced polyester, 0.120 inch thick; pebble finish.
- D. Reinforcement for Hardware: Provide minimum internal 3/16" steel reinforcing.
- E. Insulation:
  - 1. 25 psi density polystyrene core.
- F. Hardware:
  - 1. Coordinate with Section 08 71 00 - Door Hardware and provide door hardware for types of doors, applications and hardware indicated:
    - a. Weatherstripping: Wool pile, continuous and replaceable.
    - b. Hinges: Specified in Section 08 71 00. Continuous type, non-removable pin.
    - c. Threshold: Specified in Section 08 71 00. Extruded aluminum, one piece for each door opening, ribbed surface.
    - d. Panic Device: Specified in Section 08 71 00.
    - e. Closer: Specified in Section 08 71 00.
    - f. Lock Cylinders: Specified in Section 08 71 00.
    - g. Finish: Exposed hardware to match hardware finishes specified in Section 08 71 00.
- G. Fasteners: Stainless steel.
- H. Vision Lights:
  - 1. Manufacturer's integral aluminum frame, factory glazed with 1 inch insulated tempered glass as specified in Section 08 80 00 – Glazing for glazing type. Allow for thermal movement.

**2.4 FABRICATION**

- A. Fabricate components with minimum clearances and shim spacing around perimeter of assembly, yet enabling installation and dynamic movement of perimeter seal.
- B. Door configuration indicating Stiles and Rails:
  - 1. Side Stiles: As indicated on Drawings, but not less than 5-1/2 inches wide, reinforced minimum 3/16 inch thick.
  - 2. Top and Bottom Rails: As indicated on Drawings, but not less than 6 inches wide, reinforced minimum 3/16 inch thick.
- C. Accurately fit and secure joints and corners. Make joints flush, hairline, and weatherproof.
- D. Prepare components to receive anchor devices. Fabricate anchors.
- E. Arrange fasteners and attachments to conceal from view.
- F. Prepare components with heavy duty internal reinforcement for door hardware.
- G. Reinforce framing members for imposed loads.

**2.5 SHOP FINISHING**

- A. Painted Aluminum Surfaces: AA-M12C12R1x non-specular as fabricated mechanical finish, chemically cleaned, and prepared for applied coating; with organic coating.
  - 1. High Performance Organic Coating: Fluoropolymer coating system complying with AAMA 2604 minimum two-coat, with minimum 70 percent polyvinylidene fluoride resin.

2. Color: To match door frame in which door is set.
- B. FRP: As selected by Architect from manufacturer's full range of colors and finishes.

### **PART 3 EXECUTION**

#### **3.1 EXAMINATION**

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Examine substrates for conditions detrimental to installation of the Work. Proceed with installation only after unsatisfactory conditions have been corrected.
- C. Examine products to be installed for damage and other conditions detrimental to completion of the Work. Proceed with installation only after unsatisfactory conditions have been corrected.
- D. Verify dimensions, tolerances, and method of attachment with other Work.
- E. Verify wall openings are ready to receive Work of this Section.

#### **3.2 PREPARATION**

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this section.
- B. Prepare materials to be installed and equipment to be used during installation.

#### **3.3 INSTALLATION**

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.
- C. Provide alignment attachments and shims to permanently fasten system to building structure.
- D. Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances.
- E. Provide thermal isolation where components penetrate or disrupt building insulation.
- F. Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.
- G. Set thresholds in bed of mastic and secure.
- H. Install hardware using templates provided. Refer to Section 08 71 00 for installation requirements.
- I. Install infill panels using method required to achieve performance criteria.
- J. Coordinate installation of perimeter sealants with Section 07 90 00.

#### **3.4 ERECTION TOLERANCES**

- A. Section 01 40 00 - Quality Requirements: Tolerances.
- B. Maximum Diagonal Distortion: 1/16 inch measured with straight edge, corner to corner.

#### **3.5 ADJUSTING**

- A. Section 01 73 00 - Execution: Adjusting requirements.

- B. Adjust door for smooth and balanced door movement and latching.

### **3.6 CLEANING**

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures.
- B. Clean installed work and comply with manufacturer's recommendations.

### **3.7 PROTECTION OF INSTALLED CONSTRUCTION**

- A. Section 01 73 00 - Execution: Protecting installed construction.
- B. Protect installed construction from damage.

**END OF SECTION**



**SECTION 08 31 13**  
**ACCESS DOORS AND FRAMES**

**PART 1 GENERAL****1.1 SUMMARY**

- A. Section includes fire resistive rated and non-rated access doors and panels with frames.
- B. Related Requirements:
  - 1. Section 04 20 00 - Unit Masonry: Placement of access frame unit anchors in masonry partitions.
  - 2. Section 09 21 16 - Gypsum Board Assemblies: Placement of access frame unit anchors in gypsum board partitions.
  - 3. Section 09 90 00 - Painting and Coating: Field paint finish.
  - 4. Divisions of Work such as plumbing, HVAC and electrical construction requiring access doors.

**1.2 REFERENCES**

- A. Intertek Testing Services (ITS):
  - 1. ITS (DIR) - Directory of Listed Products; Current Edition.
- B. National Fire Protection Association (NFPA):
  - 1. NFPA 80 - Standard for Fire Doors and Other Opening Protectives; 2022.
- C. Underwriters Laboratories Inc. (UL):
  - 1. UL (FDR) - Fire Resistance Directory; Current Edition.

**1.3 COORDINATION**

- A. Section 01 30 00 - Administrative Requirements: Requirements for coordination.
- B. Coordinate the work of this Section with the work and devices requiring access to controls, valves, traps, dampers, cleanouts, and similar items located behind finished surfaces, but requiring operation and maintenance. Provide access doors and frames for such access.
- C. Coordinate exact locations with various trades and local code requirements to assure proper placement of access doors and panels.

**1.4 SUBMITTALS**

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Product Data: Submit literature indicating sizes, types, finishes, hardware, scheduled locations, fire resistance listings, and details of adjoining Work.
- C. Shop Drawings: Indicate exact position of each access door units. Indicate sizes that are at variance with sizes indicated and request Architect's approval.
- D. Manufacturer's Installation Instructions: Submit installation requirements and rough-in dimensions.

**1.5 CLOSEOUT SUBMITTALS**

- A. Section 01 77 00 - Closeout Procedures.
- B. Project Record Documents: Provide drawings and schedule indicating locations of installed access units.

**1.6 QUALITY ASSURANCE**

- A. Units in Fire Rated Assemblies: Fire rating as required by applicable code for the fire rated assembly in which access doors and frames are being installed.
  - 1. Provide products listed by ITS (DIR) or UL (FRD) as suitable for the purpose indicated. Attach labels identifying certification.

**PART 2 PRODUCTS****2.1 ACCESS DOORS AND PANELS**

- A. Manufacturers:
  - 1. Acudor Products, Inc.
  - 2. Cendrex, Inc.
  - 3. JL Industries.
  - 4. Karp Associates, Inc.
  - 5. Nystrom Products Co.
  - 6. Milcor LTD, Partnership.
  - 7. Substitutions: Section 01 60 00 - Product Requirements.
- B. Flush Framed Access Doors (Type 1): Frames and nominal 1 inch wide exposed flanges of 16 gage steel and door panels of 14 gage steel.
- C. Gypsum Board Access Doors (Type 2): Frames and nominal 1 inch wide flanges of 16 gage steel and door panels of 14 gage steel. Design flanges to be concealed by gypsum board joint finishing compound specified in Section 09 21 16.
- D. Fire Rated Access Doors (Type 3): Frames and nominal 1 inch wide exposed flanges of minimum 16 gage steel and door panels of 20 gage steel. Provide self-closing and latching doors with keyed lock to match cylinders specified in Section 08 71 00.
- E. Gypsum Board Fire Rated Access Doors (Type 4): 16 gage steel frames with minimum 22 gage galvanized steel drywall bead flanges and door panels of 20 gage steel. Design flanges to be concealed by gypsum board joint finishing compound specified in Section 09 21 16. Provide self-closing and latching doors with keyed lock to match cylinders specified in Section 08 71 00.

**2.2 FABRICATION**

- A. Factory fabricate units of continuous welded construction; weld, fill, and grind joints to assure flush and square unit.
- B. Wall and Ceiling Access Door and Panel Hardware:
  - 1. Hinges: Standard continuous or concealed spring pin type, 175 degree steel hinges.
  - 2. Latches and Locks:
    - a. Screwdriver Operated Latches:
      - 1) Locations: Non-public secured rooms such as mechanical, electrical, HVAC, and plumbing equipment rooms.
    - b. Keyed Locks: Provide keyed locks. Keyed locks to match cylinders specified in Section 08 71 00.
      - 1) Locations: All locations accessible to public and not indicated to be otherwise.

**2.3 FINISHES**

- A. Base Metal Protection: Factory apply baked-on primer coat that is compatible with indicated finish system.

- B. Finish System: Field paint after installation to match adjacent material finish. Refer to Section 09 90 00 - Painting and Coating.

### **PART 3 EXECUTION**

#### **3.1 EXAMINATION**

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Examine substrates for conditions detrimental to installation of the Work. Proceed with installation only after unsatisfactory conditions have been corrected.
- C. Verify rough openings for access doors and panels are correctly sized and located.

#### **3.2 PREPARATION**

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this section.
- B. Prepare materials to be installed and equipment to be used during installation.

#### **3.3 INSTALLATION**

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Install units in accordance with manufacturer's instructions.
- C. Install frames plumb and level in openings, and secure units rigidly in place.
- D. Position units to provide convenient access to concealed equipment when necessary.
- E. Set concealed frame type units flush with adjacent finished surfaces.
- F. Install fire rated units in accordance with NFPA 80 and requirements for fire listing.

#### **3.4 ADJUSTING**

- A. Section 01 73 00 - Execution: Starting, testing, adjusting, and balancing.
- B. Adjust opening/closing and latch operation to smooth operation.

#### **3.5 CLEANING**

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures: Clean installed work and comply with manufacturer's recommendations.
- B. Clean installed work in accordance with manufacturer's recommended materials and procedures.

#### **3.6 PROTECTION OF INSTALLED CONSTRUCTION**

- A. Section 01 73 00 - Execution: Protect installed construction.

**END OF SECTION**





**SECTION 08 41 13****ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS****PART 1 GENERAL****1.1 SUMMARY**

- A. Section Includes:
1. Aluminum-framed storefront systems.
  2. Glass and glazing panels.
  3. Aluminum frame doors and hardware.
  4. Structural design requirement.
- B. Related Requirements:
1. Section 05 50 00 - Metal Fabrications: Metal fabricated attachment devices.
  2. Section 07 90 00 - Joint Protection: Perimeter joint sealers other than those integral to the aluminum-framed entrances and storefronts frames and glazing.
  3. Section 08 17 43 - Integrated Composite Door Opening Assemblies.
  4. Section 08 14 16 - Flush Wood Doors.
  5. Section 08 71 00 - Door Hardware: Hardware requirements for reinforcing plates and electrical items to be integrated into the storefront frame of this Section.
  6. Section 08 80 00 - Glazing: Glazing for aluminum-framed entrances and storefronts.
  7. .
  8. Division 26 - Electrical: Electrical requirements to be integrated into the storefront framing of this Section.

**1.2 REFERENCES**

- A. American Architectural Manufacturers Association (AAMA):
1. AAMA 501.2 - Quality Assurance and Diagnostic Water Leakage Field Check of Installed Storefronts, Curtain Walls, and Sloped Glazing Systems; 2015.
  2. AAMA 503 - Voluntary Specification for Field Testing of Newly Installed Storefronts, Curtain Walls, and Sloped Glazing Systems; 2014.
  3. AAMA 609 & 610 - Cleaning and Maintenance Guide for Architecturally Finished Aluminum; 2015.
  4. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum; 2020.
  5. AAMA 1503 - Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections; 2009.
  6. AAMA 2604 - Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2021.
  7. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2020.
  8. AAMA CW - Care and Handling of Architectural Aluminum from Shop to Site; 2015.
  9. AAMA SFM-1 - Aluminum Store Front and Entrance Manual; 2014.
- B. American Society of Civil Engineers (ASCE):
1. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures; Most Recent Edition Cited by Referring Code or Reference Standard.
- C. ASTM International (ASTM):
1. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2019.

2. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.
  3. ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2021.
  4. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2021.
  5. ASTM C794 - Standard Test Method for Adhesion-in-Peel of Elastomeric Joint Sealants, 2018.
  6. ASTM E283/E283M - Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Skylights, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen; 2019.
  7. ASTM E330/E330M - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights, and Curtain Walls by Uniform Static Air Pressure Difference; 2014, Reapproval 2021.
  8. ASTM E331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference; 2000, Reapproval 2016.
  9. ASTM E783 - Standard Test Method for Field Measurement of Air Leakage Through Installed Exterior Windows and Doors; 2002, Reapproval 2018.
  10. ASTM E1105 - Standard Test Method for Field Determination of Water Penetration of Installed Exterior Windows, Skylights, Doors, and Curtain Walls, by Uniform or Cyclic Static Air Pressure Difference; 2015.
- D. The Society for Protective Coatings (SSPC):
1. SSPC Paint 20 - Zinc-Rich Primers (Type I - Inorganic and Type II - Organic); 2019.

### 1.3 COORDINATION

- A. Section 01 30 00 - Administrative Requirements: Requirements for coordination.
- B. Coordinate work of this Section with related Door Hardware requirements.
  1. Provide reinforcement in storefront framing members to accommodate hardware items other than items specified in this Section.
  2. Preparation of storefront framing members to accommodate electrical hardware devices such as security access readers and automatic operators.
- C. Coordinate work of this Section with related Electrical requirements.
  1. Provide for electrical service wiring for electrical hardware devices such as security access readers, automatic operators, and similar related electrical requirements.

### 1.4 PRE-INSTALLATION MEETINGS

- A. Section 01 30 00 - Administrative Requirements: Pre-installation meeting.
- B. Convene minimum one week prior to commencing work of this Section.

### 1.5 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Product Data: Submit component dimensions; describe components within assembly, anchorage and fasteners, glass and infill panels, door hardware, and internal drainage details.
- C. Shop Drawings: Indicate system dimensions, doors and frames, framed opening requirements and tolerances, anticipated deflection under load, affected related work, weep drainage network, expansion and contraction joint location and details, and field welding required.

1. Details to indicate system interface and maintenance of continuity of building envelope air and weather barrier components by others.
  2. Provide design and calculations sealed by Professional Structural Engineer demonstrating compliance with wind loading per ASCE 7.
  3. Include details of core stile and rail construction, trim for lites and all other components.
  4. Include details of finish hardware mounting.
  5. Include shop applied and field applied sealants by manufacturer; include product name and application locations on drawings. Show sealant joint sizes, including tolerances and maximum/minimum joint sizes required.
- D. Samples for Initial Selection: Two manufacturer's color charts illustrating the full range of finishes and colors available for products with factory-applied finishes; submit for Architect's initial selections.
- E. Samples for Verification: From the Architect's initial selections, prepare and submit two samples for each selected finish and color; samples on same product material type indicated for final Work; each sample 8 x 8 inches. Include samples of glazing, infill panels and glazing materials. Where finishes involve normal color and texture variations, include sample sets showing the full range of variations expected.
- F. Design Data: Indicate engineered framing members structural and physical characteristics, calculations, dimensional limitations.
- G. Manufacturer's Certificate: Certify products meet or exceed specified requirements.
- H. Installation Data: Special installation requirements.
- I. Field Quality Control Submittals: Submit field inspection and test reports required in FIELD QUALITY CONTROL article in this Section.

## 1.6 QUALITY ASSURANCE

- A. Perform Work in accordance with AAMA SFM-1 - Aluminum Storefront and Entrance Manual.
- B. Designer Qualifications: Design structural support framing components under direct supervision of a Professional Structural Engineer experienced in design of this Work and licensed at the State in which the Project is located.
- C. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum five (5) years documented experience.
- D. Installer: Company specializing in performing Work of this Section with minimum five (5) years documented experience.

## 1.7 DELIVERY, STORAGE, AND PROTECTION

- A. Section 01 60 00 - Product Requirements: Product storage and handling requirements.
- B. Handle products of this Section in accordance with AAMA CW - Care and Handling of Architectural Aluminum from Shop to Site.
- C. Protect prefinished aluminum surfaces with wrapping. Do not use adhesive papers or sprayed coatings which bond when exposed to sunlight or weather. Provide for adequate ventilation through wrappings.

## 1.8 ENVIRONMENTAL REQUIREMENTS

- A. Section 01 60 00 - Product Requirements: Requirements before, during and after installation of Work.

- B. Do not install sealants when ambient temperature is less than 40 degrees F during and 48 hours after installation.

## 1.9 WARRANTY

- A. Section 01 77 00 - Closeout Procedures: Product warranties.
- B. Provide five (5) year warranty to correct defective Work.
- C. Provide five (5) year manufacturer warranty against failure of glass seal on insulating glass units, including interpane dusting, condensation or misting. Include provision for replacement of failed units.
- D. Provide manufacturer warranty against excessive degradation of metal finishes. Include provision for replacement of units with excessive fading, chalking, peeling, blistering, or flaking. Warranty period to be as follow:
  1. Ten (10) year manufacturer warranty.

## PART 2 PRODUCTS

### 2.1 SYSTEM DESCRIPTION

- A. Aluminum-Framed Storefront System: Includes extruded aluminum framing and doors with supplementary internal support components where required, aluminum and glass entrances, shop fabricated components, factory finished glass, glazing and infill panels, related joint sealers, flashings, anchorage, and attachment devices.
- B. Provide products and system designed to comply with the State Building Code for the State in which the project is located.

### 2.2 PERFORMANCE REQUIREMENTS

- A. Wind Loads: Design and size components and system to withstand dead loads and live loads caused by positive and negative wind loads acting normal to plane of wall, including increased wind loads at building corners.
  1. As calculated in accordance with ASCE 7 - Calculation of Wind Loads, as measured in accordance with ASTM E330/E330M.
  2. Comply with Design Loads indicated on Drawings and applicable code requirements based on geographical location.
- B. Seismic Loads: Design and size components and system to withstand seismic loads and sway displacement as calculated in accordance with ASCE 7 and applicable code requirements.
- C. Deflection: Limit mullion deflection to flexure limit of glass of span; with full recovery of glazing materials.
- D. System Assembly: Accommodate the following without damage to system, components, or deterioration of seals.
  1. Movement within system.
  2. Movement between system, system components and perimeter construction.
  3. Dynamic loading and release of loads.
  4. Deflection of structural support framing.
  5. Tolerance of supporting components.
- E. Air Leakage: Limit air leakage through assembly to 0.06 cfm/sq ft of wall area, measured at reference differential pressure across assembly of 1.57 psf as measured in accordance with ASTM E283/E283M.

- F. Air and Vapor Seal: Maintain continuous air barrier and vapor retarder throughout assembly, primarily in line with inside pane of glass and heel bead of glazing compound.
- G. Vapor Seal: Limit vapor seal with interior atmospheric pressure of 1 inch static pressure, 72 degrees F, 40 percent relative humidity without seal failure.
- H. Water Penetration: None, when measured in accordance with ASTM E331 with test pressure difference of 20 percent of design pressure, with minimum differential of 2.86 lbf/sq ft and maximum of 12.00 lbf/sq ft.
- I. Thermal Transmittance of Assembly (Excluding Entrances): Maximum U-value of 0.45 Btu/(hr sq ft deg F) when measured in accordance with AAMA 1503.
- J. Expansion / Contraction: System to provide for expansion and contraction within system components caused by cycling temperature range of 170 degrees F over 12 hour period without causing detrimental effect to system components and anchorage.
- K. System Internal Drainage: Drain water entering joints, condensation occurring in glazing channels, or migrating moisture occurring within system, to exterior by weep drainage network.
- L. Not Permitted: Vibration harmonics, wind whistles, noises caused by thermal movement, thermal movement transmitted to other building elements, loosening, weakening, or fracturing of attachments or components of system.

### 2.3 ALUMINUM-FRAMED STOREFRONTS

- A. Exterior Storefronts: Application to be where one side of storefront is exposed to unconditioned air; includes building exterior exposure.
  - 1. Extruded aluminum frame members with internal reinforcement of aluminum or shaped steel structural sections as required to withstand imposed loads, including loads imposed by operating doors and hardware of types and sizes indicated.
  - 2. Frame components to be thermally broken from exterior exposed surfaces.
  - 3. Frame size, configuration, dimensions, and profile: As indicated on Drawings.
    - a. For frames with laminated glass panels, coordinate with glass panel thickness.
    - b. Continuous perimeter filler.
  - 4. Provide glazing panels and infill panels as indicated on Drawings, sealed weathertight within frames.
    - a. Panel Position Within Frame:
      - 1) As indicated on Drawings.
  - 5. Exterior Subsills: High performance type, profile of extruded aluminum, thermally broken, with back flange turned up full height of frame face and sealed end dams each end.
  - 6. Internal weep drainage system to drain to exterior.
  - 7. Manufacturers:
    - a. Kawneer Co., Inc.
    - b. Oldcastle BuildingEnvelope.
    - c. Tubelite, Inc.
    - d. U.S. Aluminum, a C.R. Lurance Company.
    - e. YKK AP America.
    - f. Substitutions: Section 01 60 00 - Product Requirements.
  - 8. Basis of Design:
    - a. Kawneer Co., Inc.:
      - 1) Trifab VG 451T, 2 inch sightline.
- B. Interior Storefronts: Application to be as partitions between building interior spaces with conditioned air on both sides.

1. Extruded aluminum frame members with internal reinforcement of aluminum or shaped steel structural sections as required to withstand imposed loads, including loads imposed by operating doors and hardware of types and sizes indicated.
2. Frame components not required to be thermally broken.
3. Frame size, configuration, dimensions, and profile: As indicated on Drawings.
  - a. For frames with laminated glass panels, coordinate with glass panel thickness.
4. Provide glazing panels and infill panels as indicated on Drawings, sealed weathertight within frames.
  - a. Panel Position Within Frame:
    - 1) As indicated on Drawings.
5. Manufacturers:
  - a. Kawneer Co., Inc.
  - b. Oldcastle BuildingEnvelope.
  - c. Tubelite, Inc.
  - d. U.S. Aluminum, a C.R. Lurance Company.
  - e. YKK AP America.
  - f. Substitutions: Section 01 60 00 - Product Requirements.
6. Basis of Design:
  - a. Kawneer Co., Inc.:
    - 1) Trifab VG 451, 2 inch sightline.

## 2.4 COMPONENTS

- A. Extruded Aluminum: ASTM B221; 6063 alloy, T5 temper typical, 6061 alloy, T6 temper for extruded structural members.
- B. Sheet Aluminum: ASTM B209/B209M, 5005 alloy, H15 or H34 temper, wall thickness as required for system application and use but not less than 0.125 inch.
- C. Sheet Steel: ASTM A653/A653M; galvanized to minimum G90.
- D. Steel Sections: ASTM A36/A36M; shaped to suit aluminum framing and mullion members.
  1. For use as concealed structural support reinforcement.
    - a. For exterior framing, steel to be galvanized per ASTM A123/A123M.
    - b. For interior framing, steel to be shop primed.
- E. Structural Supporting Anchors Attached to Structural Steel:
  1. Design to suite attachment requirements.
- F. Structural Supporting Anchors Attached to Reinforced Concrete Members:
  1. Design to suite attachment requirements.
- G. Fasteners: Provide aluminum, non-magnetic stainless steel, or other non-corrosive metal fasteners, recommended to be compatible by the manufacturer of materials being fastened, including doors, frames, stops, panels, hardware, anchors, and other items receiving fasteners. For exposed fasteners (if any) provide Oval Phillips Head screws with finish matching the item to be fastened. The use of sex bolts will not be accepted.
- H. Framing Members Profiles: Extruded aluminum and as indicated on Drawings.
- I. Trim Components Profiles: Extruded aluminum and as indicated on Drawings.
- J. Glass and Glazing Panels:
  1. As indicated on Drawings.
  2. As specified in Section 08 80 00 - Glazing.
- K. Doors:
  1. Material: As indicated on Drawings.
  2. Thickness: As indicated on Drawings.

3. Storefront Framing Members:
    - a. Coordinate frame's door stop and door silencer feature (along the frame stop) with door thickness and door type indicated on Drawings.
    - b. Coordinate reinforcement and shop preparation with door hardware, including closers, hinges, latching and locking components, automatic door operators, and other hardware indicated in other Sections.
    - c. Coordinate storefront frames with the specified doors, types, weight, and hardware and as indicated. Provide aluminum storefront frames with internal and concealed reinforcement and anchorage required to support attachment of the hinges and closers and to withstand the operating and closing loads imposed on the storefront frames by the specified doors and hardware. (e.g. The heavy weight of a solid wood door imposes greater operating loads on door frame members than aluminum and FRP doors.).
    - d. Coordinate with security, safety and other electrical wiring and hardware requirements such as automatic door operators and actuators.
  4. Glass and Glazing Panels:
    - a. As indicated on Drawings.
  5. Glazing Stops Profile: As indicated on Drawings.
  6. Stiles and Rails: Extruded aluminum; profiles as indicated on Drawings.
    - a. Exterior door components to be thermally broken; interior door components not required to be thermally broken.
    - b. Coordinate reinforcement and shop preparation with door hardware attachment and operating requirements.
    - c. Unless Indicated Otherwise on Drawings:
      - 1) Stiles to be 6 inches.
      - 2) Top and middle rails to be 6 inches.
        - a) Doors scheduled to receive exit hardware device to be fabricated with middle rail.
      - 3) Bottom rails to be 10 inches.
  7. Finish: For aluminum framed doors, finish to match storefront frame in which the door is set. Finish for other door types shall be as indicated on Drawings or in other Sections.
- L. Door Hardware:
1. Weatherstripping and Sill Sweep Strips: For aluminum frame doors, manufacturer's standard type to suit application; removable for maintenance replacement.
  2. Threshold: Specified in Section 08 71 00. Extruded aluminum, one piece for each door opening, ribbed non-slip surface.
  3. Hinges: Specified in Section 08 71 00.
  4. Exit Panic Devices: Specified in Section 08 71 00.
  5. Closers: Specified in Section 08 71 00.
  6. Automatic Door Operators and Actuators: Specified in Section 08 71 00.
  7. Lock Cylinders: Specified in Section 08 71 00.
  8. Other hardware as may be indicated on Drawings or in Section 08 71 00.
  9. Finish: Exposed hardware to match hardware finishes specified in Section 08 71 00.
- M. Flashings:
1. Exposed Flashings: Sheet aluminum, finish to match framing members.
    - a. Thickness: 18 gage, 0.040 inch, minimum.
  2. Concealed Flashings: Sheet aluminum.
    - a. Thickness: 22 gage, 0.025 inch, minimum.
- N. Firestopping: As specified in Section 07 84 00.

- O. Storefront System Sealants: As recommended by storefront system manufacturer; silicone type, with adhesion in compliance with ASTM C794; compatible with glazing panels, infill panels, framing members, flashings, other components, and accessories.
- P. Glazing Gaskets and Accessories: As recommended by storefront and glazing system manufacturers; type to suit application to achieve weather, moisture, and air infiltration requirements.
- Q. Perimeter Sealants and Backing Materials: Provide sealants and backing materials complying with requirements specified in Section 07 90 00.
- R. Sealant for Setting Thresholds: Non-curing butyl type.

## 2.5 FABRICATION

- A. Fabricate components with minimum clearances and shim spacing around perimeter of assembly yet enabling installation and dynamic movement of perimeter seal.
- B. Accurately fit and secure joints and corners. Make joints flush, hairline, and weatherproof.
- C. Provide System Internal Drainage: Drain to the exterior by means of a weep drainage networks any water entering joints, condensation occurring in glazing channel, and migrating moisture occurring within system.
- D. Prepare system members to receive anchor devices. Fabricate anchors.
- E. Arrange fasteners and attachments to conceal from view.
- F. Prepare system members with internal reinforcement for door hardware.
- G. Prepare system members for installation of door hardware and electrical hardware devices such as security access readers and automatic operators.
- H. Prepare components with internal reinforcement for window treatments.
- I. Reinforce framing members to withstand external imposed loads.
- J. Eliminate noises caused by wind and thermal movement, prevent vibration harmonics, and prevent "stack effect" in internal spaces.

## 2.6 SHOP FINISHING

- A. Anodized Aluminum Finish:
  - 1. Clear Anodized Finish: AAMA 611, AA-M12C22A41 Clear anodic coating; Class I, not less than 0.7 mils thick.
- B. Touch-Up Materials: As recommended by finish manufacturer for field application.
- C. Extent of Finish:
  - 1. Apply factory coating to surfaces exposed at completed assemblies.
  - 2. Apply finish to surfaces cut during fabrication so no natural aluminum is visible in completed assemblies, including joint edges.
  - 3. Apply touch-up materials recommended by coating manufacturer for field application to cut ends and minor damage to factory applied finish.
- D. Concealed Steel Items: Galvanized to ASTM A123/A123M; minimum 2.0 oz/sq ft coating thickness; galvanize after fabrication.
- E. Apply bituminous paint to concealed aluminum and steel surfaces in contact with cementitious or dissimilar metals.
- F. Touch-Up Primer for Galvanized Steel Surfaces: SSPC Paint 20 zinc rich.



**PART 3 EXECUTION****3.1 EXAMINATION**

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify dimensions, tolerances, and method of attachment with other Work.
- C. Verify wall openings are ready to receive Work of this Section.
- D. Verify that construction to which the Work is to be anchored is complete, structurally sound, and adequate to provide the required securement.

**3.2 PREPARATION**

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this Section.
- B. Prepare materials to be installed and equipment to be used during installation.

**3.3 INSTALLATION**

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Install wall system in accordance with engineered design, manufacturer's instructions, and AAMA SFM-1 - Aluminum Storefront and Entrance Manual.
- C. Installation to interface with and maintain continuity of building envelope air and weather barrier components by others.
- D. Coordinate with installers of other products to be installed as integral or surface mounted components to the Work required in this Section.
  - 1. Provide open pathways for electrical wiring and device attachment requirements, to include, but not limited to, the following:
    - a. Electrical hardware devices such as security access readers and automatic operators.
    - b. Electrical life safety and security devices.
- E. Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.
- F. Provide alignment attachments and shims to permanently fasten system to building structure.
- G. Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances, aligning with adjacent Work.
- H. Provide thermal isolation where components penetrate or disrupt building insulation.
- I. Install sill flashings. Turn up ends and edges; seal to adjacent Work to form watertight dam.
- J. Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.
- K. Install integral flashings and integral joint sealers.
- L. Set thresholds in bed setting sealant and secure.
- M. Install hardware using hardware manufacturer's templates. Refer to Section 08 71 00 for door hardware requirements other than specified in this Section.
- N. Glazing:
  - 1. Coordinate installation of glass with Section 08 80 00 - Glazing; separate glass from metal surfaces.

- O. Install system weather seal sealants, seals, gaskets and glazing and infill panels to achieve performance criteria.
- P. Install perimeter sealant and backer to achieve performance criteria conforming with installation criteria specified in Section 07 90 00.

### **3.4 FIELD QUALITY CONTROL**

- A. Section 01 40 00 - Quality Requirements: Monitor quality of installation, inspection, and testing.
- B. Manufacturer's Field Services: Provide services of storefront manufacturer's field representative to inspect for proper installation of system and submit report. Representative is to submit inspection report, including list of deficiencies within 5 days of each inspection.
  - 1. Inspections Required:
    - a. 10 percent of completion of the work of this Section.
    - b. 100 percent of completion of the work of this Section.
- C. Water-Spray Test: Provide water spray quality test of installed storefront components in accordance with AAMA 501.2 during construction process and before installation of interior finishes.
  - 1. Perform a minimum of two tests in each area as directed by Architect or Owner.
  - 2. Conduct tests in each area prior to 10 percent and 50 percent completion of this work.
  - 3. Tests are to be observed and reported by storefront manufacturer's field representative. Submit test results and observations report within 5 days of each test.
- D. Repair or replace storefront components that have failed designated field testing, and retest to verify performance complies with specified requirements. Submit reports of retest results within 5 days of each retest.

### **3.5 ERECTION TOLERANCES**

- A. Section 01 40 00 - Quality Requirements: Tolerances.
- B. Maximum Variation from Plumb: 1/16 inch every 3 feet non-cumulative or 1/16 inches per 10 feet, whichever is less.
- C. Maximum Misalignment of Two Adjoining Members Abutting in Plane: 1/32 inch.

### **3.6 ADJUSTING**

- A. Section 01 73 00 - Execution: Testing and adjusting.
- B. Adjust operating hardware for smooth operation and latching.

### **3.7 CLEANING**

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures: Related to cleaning.
- B. Remove protective material from pre-finished aluminum surfaces.
- C. Wash down surfaces with solution of mild detergent in warm water, applied with soft, clean wiping cloths. Take care to remove dirt from corners. Wipe surfaces clean.
- D. Upon completion of installation, thoroughly clean aluminum surfaces in accordance with AAMA 609 & 610.
- E. Remove excess sealant by method acceptable to sealant manufacturer.

**3.8 PROTECTION OF INSTALLED CONSTRUCTION**

- A. Section 01 73 00 - Execution: Protecting installed construction.
- B. Protect finished Work from damage.

**3.9 DEMONSTRATION AND TRAINING**

- A. Section 01 79 00 - Demonstration and Training: Provide demonstration and training to the Owner regarding operation and maintenance of components of the installed Work.

**END OF SECTION**



**SECTION 08 71 00.10**  
**FINISH HARDWARE**

**PART 1 - GENERAL**

1.1 QUALITY ASSURANCE

- A. Acceptable Designs: Specified products and their manufacturers establish acceptable design, material, type, grade, size, function, and finish of hardware items required. Do not substitute other products, except with Architect's and Owner's acceptance.
- B. Manufacturer: Obtain each kind of hardware [latch and locksets, hinges, closers] from only one manufacturer, although several may be indicated as offering products complying with the manufacturer's requirements.
- C. Supplier: The hardware supplier shall be a full member of the Society of Architectural Hardware Consultants and shall be available during normal working hours during the course of the project for hardware consultation to the Owner, Architect, and Contractor.

1.2 SUBMITTALS

- A. Product Data: Submit in accordance with the requirements of Section 01300. Include installation and maintenance instructions for operating parts and finish. Transmit copy of applicable data to Installer.
- B. Certificates: Any hardware that is furnished other than that scheduled on the drawings shall have manufacturer's certificates certifying that the hardware meets this specification submitting the hardware shop drawings.
- C. Hardware Schedule: Submit final hardware schedule in the manner and format indicated below. Hardware schedules are intended for coordination of work.
  - 1. Organize hardware schedule into "hardware sets" indicating complete designations of every item required for each door or opening, including:
    - a. Type, style, function, size and finish of each hardware item.
    - b. Name and manufacturer of each item.
    - c. Fastenings and other pertinent information.
    - d. Location of hard set cross-referenced to indications on Drawings both of floor plans and in door and frame schedule.
    - e. Explanation of all abbreviations, symbols, code, etc. contained in schedule.
    - f. Mounting locations for hardware.
    - g. Door and frame sizes and materials.
  - 2. 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.
  - 3. Include product data, samples, shop drawings of other work affected by builder's hardware, and other information essential to the coordinated review of hardware schedule.

4. Templates: Furnish for the installation of all hardware and to the manufacturer of related equipment for his preparation of that equipment for all hardware that must be attached thereto. Templates shall also be furnished to the manufacturer of wood doors for use on all wood doors that are factory fitting and factory machined for hardware.
- D. Keying Schedule: Submit separate detail schedule indicating clearly how the Owner's final instruction on keying of locks has been fulfilled. Prior to submittal, submit a blank key schedule to be completed by maintenance personnel.
- E. Samples: Prior to submittal of the final hardware schedule and prior to final ordering of builders hardware, submit one sample of each type of exposed hardware unit, finished as required, and tagged with full description for coordination with schedule.

### 1.3 JOB CONDITIONS:

- A. Coordinate hardware with other work. Tag each item or package separately with identification related to the final hardware schedule. Furnish hardware items of proper design for use on doors and frames of the thickness, profile, swing, security, and similar requirements indicated as necessary for proper installation and function. Deliver individually packaged hardware items at the proper times to the proper location [shop or project site] for installation.
- B. Packing and Marking: Package each item of hardware separately in individual containers, complete with necessary screws, keys, instructions and installation templates for spotting mortising tools. Mark each container with item's number corresponding to number shown on hardware supplier's schedule and properly tag each cylinder's key.
- C. Provide secure lock-up for hardware delivered to the project but not the installed. Control the handling and installation of hardware items, which are not immediately replaceable, so that the completion of the work will not be delayed by hardware losses, both before and after installation.
- D. 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 the shop drawings of such other work to confirm that adequate provisions are made for the proper installation of hardware.
- E. The hardware supplier shall visit the project when the hardware is delivered and check it before it is installed. After the hardware is installed, the hardware supplier shall meet with the Owner or his representative and explain the functions, uses, and maintenance of all types of hardware installed. The Contractor shall turn over to the owner, after completion of the work, all tools, wrenches and templates that come packaged with the hardware for the Owner's use in servicing the hardware.

## PART 2 - PRODUCTS

### 2.1 PRODUCTS:

- A. Acceptable Manufacturers:
  1. Hinges: Best, Hager, Mckinney
  2. Continuous Gear Hinges: Select, ABH, Best, NGP  
(see owners preferred alternate for Select "no substitution")

3. Cylinders: Best  
(see owners preferred alternate for Best “no substitution”)
4. Door Closers: Best HD8000, LCN 4040, Norton 7500  
(see owners preferred alternate for Best “no substitution”)
5. Locks, Latches: Best, Schlage, Sargent  
(see owners preferred alternate for Best “no substitution”)
6. Silencers, Stops & Flush Bolts: Baldwin, Burns, Trimco
7. Kick Plates, & Misc.: Baldwin, Burns, Trimco
8. Weatherstrip: National Guard, Reese, Zero
9. Push/Pulls: Baldwin, Burns, Trimco
10. Exit Devices: Precision, Sargent, Von Duprin  
(see owners preferred alternate for Precision “no substitution”)
11. Thresholds: National Guard, Reese, Zero
12. Overhead Stops/ HOLDERS: ABH, Rixson, Sargent
13. Electronics: Schlage (no substitution)
14. Auto Operators: Dormakaba

## 2.2 MATERIALS, FABRICATION AND FINISHES:

### A. General:

1. Manufacturer's Name Plate: Do not use products which have manufacturer's name or trade name displayed in a visible location except in conjunction with required UL labels.
2. Unless otherwise noted, exposed hardware items shall receive satin stainless steel finish.
3. Furnish screws of type as required for substrates indicated with each hardware item. Finish exposed screws to match the hardware finish or, if exposed in surfaces of other work, to match the finish of such other work as closely as possible.
4. Unless otherwise noted, provide concealed fasteners for hardware units that are exposed when door is closed. Where fasteners must remain exposed when door is closed. Where fasteners must remain exposed, provide vandal resistant fasteners.
5. Finish shall be as scheduled. Dull Chrome [US26D], Dull Stainless Steel [US32D] Aluminum Lacquer [AL], Extruded Aluminum [Alum] and Prime Coat [USP] as listed.
6. Tools for maintenance: Furnish a complete set of specialized tools as needed for Owner's continued adjustment, maintenance and removal and replacement of builder's hardware.
7. Hardware Operation: Force required to activate door hardware shall be not greater than 5 lbf.
8. Door Opening Force: Maximum force for pushing or pulling open a door shall comply with this paragraph. For hinged doors the force shall be applied perpendicular to the door at the door opener or 30 inches from the hinged side whichever is farther from the hinge.
  - a. Exterior hinged doors shall not exceed 8.5 lbf. Slight increases in opening force shall be allowed where 8.5 lbf. is insufficient to compensate for air pressure differentials.
  - b. Interior hinged doors shall not exceed 5.0 lbf.

- c. Fire doors shall be adjusted to meet the minimum opening force permitted by governing fire safety standards.

B. Hinges:

1. Provide template-produced hinges complying with ANSI A156.1.
2. Provide stainless steel pins, non-removable type for exterior doors and non-rising types for interior doors. Pins shall have flat button ends finished to match hinge leaves.
3. Hinges shall be full-mortised, 4½” x 4½” unless otherwise noted; five knuckle ball bearing type, heavy duty rated.

C. Keys and Keying:

1. All cylinders/Cores shall be Best Patented Cormax 7-pin interchangeable cores and keyed into the existing factory registered Grand Master Key System.
2. All keying must be approved by the Harnett County Schools Lock Shop, during a keying conference, before cylinders/locks are ordered. A “key schedule” will be determined at this time. Three keys shall be supplied with each core combination.
3. On all projects the exterior locksets, locksets on mechanical and electrical rooms and exit devices shall be provided with construction key cores. Construction keyed cores are to be replaced with “permanent” cores in the presence of owner and turn over all building keys.
4. Hardware Installer shall install permanent cores at substantial completion.
5. All keys shall be stamped with appropriate key symbols and “DO NOT DUPLICATE.” No biting numbers are to be stamped on the key.
6. All Cores and keys shall be transmitted to Harnett County Schools Lock Shop by UPS with a delivery confirmation request.
7. Furnish keys in the following quantities:
  - 2 each Grand Masterkey
  - 2 each Masterkeys per set
  - 3 each Change Key per each keyed core
  - 6 each Construction masterkeys
  - 2 each Control Keys
8. Hardware Supplier shall supply both a Best IMPKSW-2 code import with each new project.
9. KEY CABINET: Acceptable Manufacturers are Lund, MMF Industries, Tel-Kee and P.O. Moore Company. Size of cabinet shall provide for 50% expansion capacity. Hardware Supplier shall supply, set up, compile Hook to Key Schedule, hang keys, and install key cabinet.



10. KEY BOX: Each facility shall have a recessed Knox Series 4400RDL Dual Key Lock Box installed on the exterior of the building at the main entrance. This box shall be keyed to the local Fire Department. In addition, a "Lock Box" shall be provided where required by the Local Fire Official.

D. Locksets and Latchsets:

1. Base Specification: Best Access Systems components as listed.
2. Locksets and latchsets of other acceptable manufacturers must conform to the requirements of Subparagraphs 3 and 4.
3. Cylindrical Type:
  - a. Locksets must be extra heavy-duty cylindrical type with 2 ¾ inch backset, or greater as specified, with a 9/16 inch throw latchbolt.
  - b. Provide locksets with 14D lever and Cormax Patented interchangeable core.
  - c. Locksets and latchsets must conform to ANSI A156.2, Series 4000, Grade 1 or 2 as scheduled and be UL listed.
  - d. Locksets must be available with tactile lever for identification of hazardous areas.
  - e. Locks to have solid shank with no opening for access to keyed lever keeper.
  - f. Keyed lever to be removable only after core is removed, by authorized control key, to allow access to lever "keeper".
  - g. Permanent cores face must be the same finish as the lockset finish.
  - h. Levers must be zinc material with a minimum wall thickness of .060.

E. Exit Devices: Exit devices shall be as scheduled with no substitutes accepted. Exit devices shall comply with ANSI Standard 156.3 Grade 1 modified as follows:

1. The devices shall be "touchpad" type and include sound reduction dampening for both depression and extension of the touchpad. The touchpad shall extend a minimum of 1/2 of the door width.
2. Devices should have a ¼" gap between the face of the door and the touchbar unit eliminating the need for shims or cutting away the glass moulding.
3. Lock stile chassis shall be investment cast steel. Stamped steel units will not be accepted. All device latchbolts shall be stainless steel and shall be deadlocking type.
4. Device strikes shall be investment cast stainless steel.
5. Device end cap shall be all metal and secured with bracket that completely inserts into device housing. Mounting bracket shall interlock both at the touchbar channel and hinge side filler to prevent end cap "peel-back".

6. All outside device trim shall be cast or forged brass full escutcheon. Lever trim shall be “vandal resistant” with substantial resistance to rotation when locked. Lever shall return to home position when released.
  7. Device housing and all exposed surfaces of the device shall be manufactured from Brass, Bronze or Stainless Steel.
  8. Devices must be non-handed and convertible from one function to another in the field. .
  9. Device shall be secured to the door with sex bolts and through bolting at both ends.
  10. All devices shall be UL approved for all types and functions indicated in the Hardware Schedule.
  11. Devices shall have published five-year warranty.
  12. All exit devices shall be by the same manufacturer.
  13. Mullions shall be “keyed removable” type with only a key required for take down. No key or tools shall be required to reinstall. Mullions shall be by the same manufacturer as the exit devices.
- F. Closers: Shall be as scheduled with no substitutes accepted. Closers shall comply with ANSI Standard A156.4 Grade 1 modified as follows:
1. Closer shall be non-handed and have adjustable spring power range from size 1 to 6 plus 50% (ANSI PT-4C).
  2. Closer shall have R14 high silicone aluminum alloy cylinder body with 1 ½” diameter steel piston.
  3. Closer shall have 3 hydraulic adjustments to control backcheck, closing and latching speeds. Adjustment shall be by means of non-critical “v-slot” regulating valves. Closer shall not incorporate pressure relief valves on the opening or closing cycle.
  4. Closer shall have hydraulic fluid with a consistent viscosity range of no less than 0 to 100 degrees Fahrenheit to eliminate seasonal adjustment.
  5. Closer shall be U.L. Listed and meet positive pressure testing requirements of UL10C and UBC 7-2.
  6. Closers shall have forged main arms. Parallel mounted closers shall have Extra Duty (EDA) arm incorporating forged main and forearms, and a cast mounting shoe.
  7. Closer shall have thirty-year warranty.
- G. Overhead Stops/ HOLDERS: Shall be as scheduled.
1. Units shall have metal/plated end plugs.
  2. Units mounting screws shall be designed so that they go through housing and end plug.
  3. Units shall have metal slide.
  4. All stops shall be by same manufacturer.
- H. Silencers, Stops & Flush Bolts: Shall be as scheduled.
1. Silencers: Provide plug-type [not adhered type] silencers in all metal door frames unless continuous bumper-type weather-stripping is shown or specified. Provide 3 silencer units in door frames.

2. All Stops [wall and floor] shall be by the same manufacturer.
3. Flush bolts shall have 3/4" throw with 2" vertical adjustment. Shall have override feature and stainless steel cams and rubplates. All flush bolts shall be by the same manufacturer.
- I. Door Stripping and Seals: Unless otherwise indicated, provide full-length weather-stripping at each edge of every exterior swing door leaf. All weather-stripping to be by same manufacturer.
- J. Thresholds: Extruded aluminum, smooth commercial mill finish, grooved tread, 4" minimum tread by full door width. Thickness of threshold shall be 0.5" at primary tread surfaces, 0.1875" for secondary tread surfaces, and 0.125" for concealed flanges and legs.
- K. Kick Plates, Mop Plates and Armor Plates: .050 material sized as follows:
  - Kick Plates: 8 x 2 LDW
  - Mop Plates: 4 x 2 LDW
  - Armor Plates: 16 x 2 LDW

### 2.3 SCHEDULE OF HARDWARE

- A. See Hardware Schedule at end of this Section.

## PART 3 – EXECUTION

### 3.1 INSTALLATION

- A. General: Apply hardware in accordance with templates and manufacturer's instructions; mortise and fit accurately; apply securely and adjust carefully.
  1. **All hardware (except aluminum door hardware) and cylinders/cores shall be installed by the hardware supplier. Final adjustments of all hardware shall be performed prior to building turn over. Installation shall be preformed by the hardware supplier using personnel that are experienced in the installation of hardware for schools. Personnel shall have a minimum of 5 years of documented experience doing this type of work.**
  2. Mount hardware units at heights recommended in "Recommended Locations for Builders Hardware" by DHI, except where shown otherwise on drawings.
  3. Install each hardware item in compliance with the manufacturer's instructions and recommendations. Do not install surface mounted items until finishes have been completed on the substrate.
  4. Set units level, plumb, and true to line and location. Adjust and reinforce the attachment substrate as necessary for proper installation and operation.
  5. Exercise care not to injure work when applying hardware. Review shop drawings and Contract Drawings for proper location. Cover door hardware with a heavy cloth until painting is completed. At completion of the work, examine doors and hardware, adjust as required and leave hardware in proper working order, free from defects.

6. At all times be responsible for the distribution of keys for hardware installed during construction, and cause all keys to be returned prior to final completion of the building
- B. Preparation:
1. Do not install finish hardware until the wet trades have been fully completed.
  2. Supplier shall mark each item of hardware for location. Protect markings until each item is installed. If any item of hardware is delivered to the Project not properly marked, return it to the supplier for marking before attempting to install it.
  3. Install and make necessary adjustments for proper working order. Hardware damaged by improper adjustments or abuse will be rejected.
  4. Provide clean, properly sized, and accurately placed mortises and drilled holes for all mortise and surface mounted finish hardware. Use appropriate jigs, templates, and power mortising equipment for the installation of all mortised hardware items.
  5. Metal frames to receive hardware items shall be drilled and tapped accurately.
  6. Removal for Painting:
    - a. Before painters' finish is applied, remove all finish hardware except prime-coated items.
    - b. After final paint and finish coats are dry, permanently replace and adjust finish hardware for proper operation.
- C. Thresholds:
1. Cut and fit threshold to profile door frames, with mitered corners and hairline joints. Screw thresholds to substrate with No. 10 or larger bronze or stainless steel screws.
  2. Set thresholds in a bed of either butyl/rubber sealant or polyisobutylene mastic sealant to completely fill concealed voids and exclude moisture from every source. Do not plug drainage holes or block weeps. Remove excess sealant.
- D. Weatherstrip: Accurately install weatherstrip to the door or frames where scheduled using proper type flush fasteners spaced not over 18" o.c. Installed work shall make continuous contact with the abutting surfaces and shall function for use intended. Adjust seals as required.
- E. Mounting Heights: Shall be as follows, measured from finished floor except for top hinge which is measured from door top:
1. Bottom hinge: 10-3/8" [hinge center].
  2. Top hinge: 9-3/4" [hinge center].
  3. Intermediate hinges: Equally spaced between top and bottom hinges.
  4. Locks and latches: 38" [operating spindle].
  5. Pulls, pull and push plates: 42" [center].

### 3.2 ADJUST AND CLEAN:

- A. Adjust and check each operating item of hardware and each door to ensure proper operation or function of every unit. Lubricate moving parts with type lubricant recommended by manufacturer [graphite-type if no other recommended]. Replace units that cannot be adjusted and lubricated to operate freely and smoothly as intended for the application made.
- B. Upon completion of the work and before final acceptance demonstrate that all hardware is in satisfactory working order, that all keys fit in their respective locks, and upon acceptance of the work, tag and deliver all keys to the Owner.
- C. Final Adjustment: Wherever hardware installation is made more than one month prior to acceptance or occupancy of a space or area, return to the work during the week prior to acceptance or occupancy and make a final check and adjustment of all hardware items in such space or area. Clean and re-lubricate operating items as necessary to restore proper function and finish of hardware and doors. Adjust door control devices to compensate for final operation of heating and ventilating equipment.
- D. Instruct Owner's personnel in proper adjustment and maintenance of hardware and hardware finish during the final adjustment of hardware.

**Harnett County Schools  
Highland Elementary School  
Addition/Renovation  
Sandford, NC**

### 3.3 SCHEDULE OF HARDWARE

#### Hardware Set #1 – Doors# D-04B, D-19B, D-38, D-39

Each to have:

2 ea. Continuous Hinges	A110HD x Clear	ABH
1 ea. Exit Device	2103 x LD x US32D	PHI
1 ea. Access Control Trim	AD-400-993R-70-MT-SPA-4B-LRX x 626	SCH
1 ea. Exit Device	2102 x 1702A x LD x US32D	PHI
1 ea. Mullion	KR822 x MCS822 x Alum	PHI
2 ea. Cylinders	Rim	BES
2 ea. Closers	HD8016-SDST-BSHD-NFHD-689	BES
2 ea. Stops	1209	TRM
1 ea. Threshold	896SA	NGP
1 set Weatherstrip	A625A	NGP
1 ea. Door Bottoms	600A	NGP
<b>*Access Control Trim by others</b>		

**Hardware Set #2 – Doors# D-04A, D-19A, D-20A, D-20B**

Each to have:

2 ea. Continuous Hinges	A110HD x Clear	ABH
2 ea. Push Bars	673 x 1702 x US32D	PHI
2 ea. Closers	HD8016-SDST-BSHD-NFHD-689	BES
1 ea. Threshold	896SA	NGP
1 set Weatherstrip	A625A	NGP
2 ea. Door Bottoms	600A	NGP

**Hardware Set #3 – Door# D-30**

Each to have:

1 ½ pr. Hinges	FBB179 x US26D 4 ½ x 4 ½	BES
1 ea. Electronic Lockset	NDE-80-BD-SPA x 626	SCH
1 ea. Core	1CM7 x 626	BES
1 ea. Kick Plate	8 x 2 LDW x .050 x B4E x CSK x US32D	TRM
1 ea. Stop	1270CV x US26D	TRM
3 ea. Silencers	1229A	TRM

**\*Electronic Lockset by others****Hardware Set #4 – Doors# D-21, D-22, D-33, D-34, D-35**

Each to have:

1 ½ pr. Hinges	FBB179 x US26D 4 ½ x 4 ½	BES
1 ea. Electronic Lockset	NDE-80-BD-SPA x 626	SCH
1 ea. Core	1CM7 x 626	BES
1 ea. Closer	HD8016-AF80P-689	BES
1 ea. Kick Plate	8 x 2 LDW x .050 x B4E x CSK x US32D	TRM
1 ea. Overhead Stop	4400 x US32D	ABH
3 ea. Silencers	1229A	TRM

**\*Electronic Lockset by others****Hardware Set #5 – Doors# D-23, D-24, D-25, D-26, D-28, D-29, D-36, D-37**

Each to have:

1 ½ pr. Hinges	FBB179 x US26D 4 ½ x 4 ½	BES
1 ea. Electronic Lockset	NDE-80-BD-SPA x 626	SCH
1 ea. Core	1CM7 x 626	BES
1 ea. Closer	HD8016-AF80P-689	BES
1 ea. Overhead Stop	4400 x US32D	ABH

**\*Electronic Lockset by others**

**Hardware Set #6 – Door# D-40**

Each to have:

1 ½ pr. Hinges	FBB179 x US26D 4 ½ x 4 ½	BES
1 ea. Electronic Lockset	NDE-80-BD-SPA x 626	SCH
1 ea. Core	1CM7 x 626	BES
1 ea. Closer	HD8016-SDS-689	BES
1 ea. Kick Plate	8 x 2 LDW x .050 x B4E x CSK x US32D	TRM
1 set Intumescent Seal9450	NGP	
<b>*Electronic Lockset by others</b>		

**Hardware Set #7 – Door# D-33A**

Each to have:

1 ½ pr. Hinges	FBB179 x US26D 4 ½ x 4 ½	BES
1 ea. Electronic Privacy Set	NDEB-BD-SPA x 626	SCH
1 ea. Kick Plate	8 x 2 LDW x .050 x B4E x CSK x US32D	TRM
1 ea. Overhead Stop	4400 x US32D	ABH
3 ea. Silencers	1229A	TRM
<b>*Electronic Lockset by others</b>		

**Hardware Set #8 – Doors# D-20C, D-20D**

Each to have:

2 ea. Continuous Hinges	FRA110HD x Clear	ABH
2 ea. Exit Devices	FL2108 x V4908D x US32D	PHI
1 ea. Mullion	FLKR822 x MCS822 x Alum	PHI
3 ea. Cylinders	Rim	BES
2 ea. Closers	HD8016-SPA-689	BES
2 ea. Kick Plates	8 x 2 LDW x .050 x B4E x CSK x US32D	TRM
2 ea. Magnetic Holders	2120 x Extensions x US32D	ABH
1 set Intumescent Seal9450	NGP	
1 ea. Edge Seal	9500	NGP

**Hardware Set #9 – Access System Components**

To have:

1 ea. Software Licenses	By Others Open Options
4 ea. Interface Boards	By Others Open Options LP4502
1 ea.100 Proximity Cards	By Others
1 ea. System Installation	By Others
1 ea. Owner Training	By Others
1 ea. Computer	By Owner
1 ea. LAN Line (POE)	By Owner

**MANUFACTURER'S ABBREVIATIONS:**

ABH .....ABH MANUFACTURING  
BES.....BEST ACCESS SYSTEMS  
NGP .....NATIONAL GUARD PRODUCTS  
PHI .....PRECISION HARDWARE  
SCH .....SCHLAGE  
SDC .....SECURITY DOOR CONTROLS  
TRM .....TRIMCO MANUFACTURING

Harnett County Schools  
Highland Elementary School  
Additions/Renovations  
Sandford, NC  
1/20/22wdb, rev4/7/22wdb, rev.5/3/22wdb



**SECTION 08 71 00.20**  
**FINISH HARDWARE**

**PART 1 - GENERAL**

1.1 QUALITY ASSURANCE

- A. Acceptable Designs: Specified products and their manufacturers establish acceptable design, material, type, grade, size, function, and finish of hardware items required. Do not substitute other products, except with Architect's and Owner's acceptance.
- B. Manufacturer: Obtain each kind of hardware [latch and locksets, hinges, closers] from only one manufacturer, although several may be indicated as offering products complying with the manufacturer's requirements.
- C. Supplier: The hardware supplier shall be a full member of the Society of Architectural Hardware Consultants and shall be available during normal working hours during the course of the project for hardware consultation to the Owner, Architect, and Contractor.

1.2 SUBMITTALS

- A. Product Data: Submit in accordance with the requirements of Section 01300. Include installation and maintenance instructions for operating parts and finish. Transmit copy of applicable data to Installer.
- B. Certificates: Any hardware that is furnished other than that scheduled on the drawings shall have manufacturer's certificates certifying that the hardware meets this specification submitting the hardware shop drawings.
- C. Hardware Schedule: Submit final hardware schedule in the manner and format indicated below. Hardware schedules are intended for coordination of work.
  - 1. Organize hardware schedule into "hardware sets" indicating complete designations of every item required for each door or opening, including:
    - a. Type, style, function, size and finish of each hardware item.
    - b. Name and manufacturer of each item.
    - c. Fastenings and other pertinent information.
    - d. Location of hard set cross-referenced to indications on Drawings both of floor plans and in door and frame schedule.
    - e. Explanation of all abbreviations, symbols, code, etc. contained in schedule.
    - f. Mounting locations for hardware.
    - g. Door and frame sizes and materials.
  - 2. 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.
  - 3. Include product data, samples, shop drawings of other work affected by builder's hardware, and other information essential to the coordinated review of hardware schedule.

4. Templates: Furnish for the installation of all hardware and to the manufacturer of related equipment for his preparation of that equipment for all hardware that must be attached thereto. Templates shall also be furnished to the manufacturer of wood doors for use on all wood doors that are factory fitting and factory machined for hardware.
- D. Keying Schedule: Submit separate detail schedule indicating clearly how the Owner's final instruction on keying of locks has been fulfilled. Prior to submittal, submit a blank key schedule to be completed by maintenance personnel.
- E. Samples: Prior to submittal of the final hardware schedule and prior to final ordering of builders hardware, submit one sample of each type of exposed hardware unit, finished as required, and tagged with full description for coordination with schedule.

### 1.3 JOB CONDITIONS:

- A. Coordinate hardware with other work. Tag each item or package separately with identification related to the final hardware schedule. Furnish hardware items of proper design for use on doors and frames of the thickness, profile, swing, security, and similar requirements indicated as necessary for proper installation and function. Deliver individually packaged hardware items at the proper times to the proper location [shop or project site] for installation.
- B. Packing and Marking: Package each item of hardware separately in individual containers, complete with necessary screws, keys, instructions and installation templates for spotting mortising tools. Mark each container with item's number corresponding to number shown on hardware supplier's schedule and properly tag each cylinder's key.
- C. Provide secure lock-up for hardware delivered to the project but not the installed. Control the handling and installation of hardware items, which are not immediately replaceable, so that the completion of the work will not be delayed by hardware losses, both before and after installation.
- D. 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 the shop drawings of such other work to confirm that adequate provisions are made for the proper installation of hardware.
- E. The hardware supplier shall visit the project when the hardware is delivered and check it before it is installed. After the hardware is installed, the hardware supplier shall meet with the Owner or his representative and explain the functions, uses, and maintenance of all types of hardware installed. The Contractor shall turn over to the owner, after completion of the work, all tools, wrenches and templates that come packaged with the hardware for the Owner's use in servicing the hardware.

## PART 2 - PRODUCTS

### 2.1 PRODUCTS:

- A. Acceptable Manufacturers:
  1. Hinges: Best, Hager, Mckinney
  2. Continuous Gear Hinges: Select, ABH, Best, NGP  
(see owners preferred alternate for Select "no substitution")

3. Cylinders: Best  
(see owners preferred alternate for Best “no substitution”)
4. Door Closers: Best HD8000, LCN 4040, Norton 7500  
(see owners preferred alternate for Best “no substitution”)
5. Locks, Latches: Best, Schlage, Sargent  
(see owners preferred alternate for Best “no substitution”)
6. Silencers, Stops & Flush Bolts: Baldwin, Burns, Trimco
7. Kick Plates, & Misc.: Baldwin, Burns, Trimco
8. Weatherstrip: National Guard, Reese, Zero
9. Push/Pulls: Baldwin, Burns, Trimco
10. Exit Devices: Precision, Sargent, Von Duprin  
(see owners preferred alternate for Precision “no substitution”)
11. Thresholds: National Guard, Reese, Zero
12. Overhead Stops/holders: ABH, Rixson, Sargent
13. Electronics: Schlage (no substitution)
14. Auto Operators: Dormakaba

## 2.2 MATERIALS, FABRICATION AND FINISHES:

### A. General:

1. Manufacturer's Name Plate: Do not use products which have manufacturer's name or trade name displayed in a visible location except in conjunction with required UL labels.
2. Unless otherwise noted, exposed hardware items shall receive satin stainless steel finish.
3. Furnish screws of type as required for substrates indicated with each hardware item. Finish exposed screws to match the hardware finish or, if exposed in surfaces of other work, to match the finish of such other work as closely as possible.
4. Unless otherwise noted, provide concealed fasteners for hardware units that are exposed when door is closed. Where fasteners must remain exposed when door is closed. Where fasteners must remain exposed, provide vandal resistant fasteners.
5. Finish shall be as scheduled. Dull Chrome [US26D], Dull Stainless Steel [US32D] Aluminum Lacquer [AL], Extruded Aluminum [Alum] and Prime Coat [USP] as listed.
6. Tools for maintenance: Furnish a complete set of specialized tools as needed for Owner's continued adjustment, maintenance and removal and replacement of builder's hardware.
7. Hardware Operation: Force required to activate door hardware shall be not greater than 5 lbf.
8. Door Opening Force: Maximum force for pushing or pulling open a door shall comply with this paragraph. For hinged doors the force shall be applied perpendicular to the door at the door opener or 30 inches from the hinged side whichever is farther from the hinge.
  - a. Exterior hinged doors shall not exceed 8.5 lbf. Slight increases in opening force shall be allowed where 8.5 lbf. is insufficient to compensate for air pressure differentials.

- b. Interior hinged doors shall not exceed 5.0 lbf.
- c. Fire doors shall be adjusted to meet the minimum opening force permitted by governing fire safety standards.

B. Hinges:

1. Provide template-produced hinges complying with ANSI A156.1.
2. Provide stainless steel pins, non-removable type for exterior doors and non-rising types for interior doors. Pins shall have flat button ends finished to match hinge leaves.
3. Hinges shall be full-mortised, 4½” x 4½” unless otherwise noted; five knuckle ball bearing type, heavy duty rated.

C. Keys and Keying:

1. All cylinders/Cores shall be Best Patented Cormax 7-pin interchangeable cores and keyed into the existing factory registered Grand Master Key System.
2. All keying must be approved by the Harnett County Schools Lock Shop, during a keying conference, before cylinders/locks are ordered. A “key schedule” will be determined at this time. Three keys shall be supplied with each core combination.
3. On all projects the exterior locksets, locksets on mechanical and electrical rooms and exit devices shall be provided with construction key cores. Construction keyed cores are to be replaced with “permanent” cores in the presence of owner and turn over all building keys.
4. Hardware Installer shall install permanent cores at substantial completion.
5. All keys shall be stamped with appropriate key symbols and “DO NOT DUPLICATE.” No biting numbers are to be stamped on the key.
6. All Cores and keys shall be transmitted to Harnett County Schools Lock Shop by UPS with a delivery confirmation request.
7. Furnish keys in the following quantities:
  - 2 each Grand Masterkey
  - 2 each Masterkeys per set
  - 3 each Change Key per each keyed core
  - 6 each Construction masterkeys
  - 2 each Control Keys
8. Hardware Supplier shall supply both a Best IMPKSW-2 code import with each new project.
9. KEY CABINET: Acceptable Manufacturers are Lund, MMF Industries, Tel-Kee and P.O. Moore Company. Size of cabinet shall provide for 50% expansion capacity. Hardware Supplier shall supply, set up, compile Hook to Key Schedule, hang keys, and install key cabinet.

10. KEY BOX: Each facility shall have a recessed Knox Series 4400RDL Dual Key Lock Box installed on the exterior of the building at the main entrance. This box shall be keyed to the local Fire Department. In addition, a "Lock Box" shall be provided where required by the Local Fire Official.

D. Locksets and Latchsets:

1. Base Specification: Best Access Systems components as listed.
2. Locksets and latchsets of other acceptable manufacturers must conform to the requirements of Subparagraphs 3 and 4.
3. Cylindrical Type:
  - a. Locksets must be extra heavy-duty cylindrical type with 2 ¾ inch backset, or greater as specified, with a 9/16 inch throw latchbolt.
  - b. Provide locksets with 14D lever and Cormax Patented interchangeable core.
  - c. Locksets and latchsets must conform to ANSI A156.2, Series 4000, Grade 1 or 2 as scheduled and be UL listed.
  - d. Locksets must be available with tactile lever for identification of hazardous areas.
  - e. Locks to have solid shank with no opening for access to keyed lever keeper.
  - f. Keyed lever to be removable only after core is removed, by authorized control key, to allow access to lever "keeper".
  - g. Permanent cores face must be the same finish as the lockset finish.
  - h. Levers must be zinc material with a minimum wall thickness of .060.

E. Exit Devices: Exit devices shall be as scheduled with no substitutes accepted. Exit devices shall comply with ANSI Standard 156.3 Grade 1 modified as follows:

1. The devices shall be "touchpad" type and include sound reduction dampening for both depression and extension of the touchpad. The touchpad shall extend a minimum of 1/2 of the door width.
2. Devices should have a ¼" gap between the face of the door and the touchbar unit eliminating the need for shims or cutting away the glass moulding.
3. Lock stile chassis shall be investment cast steel. Stamped steel units will not be accepted. All device latchbolts shall be stainless steel and shall be deadlocking type.
4. Device strikes shall be investment cast stainless steel.
5. Device end cap shall be all metal and secured with bracket that completely inserts into device housing. Mounting bracket shall interlock both at the touchbar channel and hinge side filler to prevent end cap "peel-back".

6. All outside device trim shall be cast or forged brass full escutcheon. Lever trim shall be “vandal resistant” with substantial resistance to rotation when locked. Lever shall return to home position when released.
  7. Device housing and all exposed surfaces of the device shall be manufactured from Brass, Bronze or Stainless Steel.
  8. Devices must be non-handed and convertible from one function to another in the field. .
  9. Device shall be secured to the door with sex bolts and through bolting at both ends.
  10. All devices shall be UL approved for all types and functions indicated in the Hardware Schedule.
  11. Devices shall have published five-year warranty.
  12. All exit devices shall be by the same manufacturer.
  13. Mullions shall be “keyed removable” type with only a key required for take down. No key or tools shall be required to reinstall. Mullions shall be by the same manufacturer as the exit devices.
- F. Closers: Shall be as scheduled with no substitutes accepted. Closers shall comply with ANSI Standard A156.4 Grade 1 modified as follows:
1. Closer shall be non-handed and have adjustable spring power range from size 1 to 6 plus 50% (ANSI PT-4C).
  2. Closer shall have R14 high silicone aluminum alloy cylinder body with 1 ½” diameter steel piston.
  3. Closer shall have 3 hydraulic adjustments to control backcheck, closing and latching speeds. Adjustment shall be by means of non-critical “v-slot” regulating valves. Closer shall not incorporate pressure relief valves on the opening or closing cycle.
  4. Closer shall have hydraulic fluid with a consistent viscosity range of no less than 0 to 100 degrees Fahrenheit to eliminate seasonal adjustment.
  5. Closer shall be U.L. Listed and meet positive pressure testing requirements of UL10C and UBC 7-2.
  6. Closers shall have forged main arms. Parallel mounted closers shall have Extra Duty (EDA) arm incorporating forged main and forearms, and a cast mounting shoe.
  7. Closer shall have thirty-year warranty.
- G. Overhead Stops/ HOLDERS: Shall be as scheduled.
1. Units shall have metal/plated end plugs.
  2. Units mounting screws shall be designed so that they go through housing and end plug.
  3. Units shall have metal slide.
  4. All stops shall be by same manufacturer.
- H. Silencers, Stops & Flush Bolts: Shall be as scheduled.
1. Silencers: Provide plug-type [not adhered type] silencers in all metal door frames unless continuous bumper-type weather-stripping is shown or specified. Provide 3 silencer units in door frames.

2. All Stops [wall and floor] shall be by the same manufacturer.
3. Flush bolts shall have 3/4" throw with 2" vertical adjustment. Shall have override feature and stainless steel cams and rubplates. All flush bolts shall be by the same manufacturer.
- I. Door Stripping and Seals: Unless otherwise indicated, provide full-length weather-stripping at each edge of every exterior swing door leaf. All weather-stripping to be by same manufacturer.
- J. Thresholds: Extruded aluminum, smooth commercial mill finish, grooved tread, 4" minimum tread by full door width. Thickness of threshold shall be 0.5" at primary tread surfaces, 0.1875" for secondary tread surfaces, and 0.125" for concealed flanges and legs.
- K. Kick Plates, Mop Plates and Armor Plates: .050 material sized as follows:
  - Kick Plates: 8 x 2 LDW
  - Mop Plates: 4 x 2 LDW
  - Armor Plates: 16 x 2 LDW

## 2.3 SCHEDULE OF HARDWARE

- A. See Hardware Schedule at end of this Section.

## PART 3 – EXECUTION

### 3.1 INSTALLATION

- A. General: Apply hardware in accordance with templates and manufacturer's instructions; mortise and fit accurately; apply securely and adjust carefully.
  1. **All hardware (except aluminum door hardware) and cylinders/cores shall be installed by the hardware supplier. Final adjustments of all hardware shall be performed prior to building turn over. Installation shall be preformed by the hardware supplier using personnel that are experienced in the installation of hardware for schools. Personnel shall have a minimum of 5 years of documented experience doing this type of work.**
  2. Mount hardware units at heights recommended in "Recommended Locations for Builders Hardware" by DHI, except where shown otherwise on drawings.
  3. Install each hardware item in compliance with the manufacturer's instructions and recommendations. Do not install surface mounted items until finishes have been completed on the substrate.
  4. Set units level, plumb, and true to line and location. Adjust and reinforce the attachment substrate as necessary for proper installation and operation.
  5. Exercise care not to injure work when applying hardware. Review shop drawings and Contract Drawings for proper location. Cover door hardware with a heavy cloth until painting is completed. At completion of the work, examine doors and hardware, adjust as required and leave hardware in proper working order, free from defects.

6. At all times be responsible for the distribution of keys for hardware installed during construction, and cause all keys to be returned prior to final completion of the building
- B. Preparation:
1. Do not install finish hardware until the wet trades have been fully completed.
  2. Supplier shall mark each item of hardware for location. Protect markings until each item is installed. If any item of hardware is delivered to the Project not properly marked, return it to the supplier for marking before attempting to install it.
  3. Install and make necessary adjustments for proper working order. Hardware damaged by improper adjustments or abuse will be rejected.
  4. Provide clean, properly sized, and accurately placed mortises and drilled holes for all mortise and surface mounted finish hardware. Use appropriate jigs, templates, and power mortising equipment for the installation of all mortised hardware items.
  5. Metal frames to receive hardware items shall be drilled and tapped accurately.
  6. Removal for Painting:
    - a. Before painters' finish is applied, remove all finish hardware except prime-coated items.
    - b. After final paint and finish coats are dry, permanently replace and adjust finish hardware for proper operation.
- C. Thresholds:
1. Cut and fit threshold to profile door frames, with mitered corners and hairline joints. Screw thresholds to substrate with No. 10 or larger bronze or stainless steel screws.
  2. Set thresholds in a bed of either butyl/rubber sealant or polyisobutylene mastic sealant to completely fill concealed voids and exclude moisture from every source. Do not plug drainage holes or block weeps. Remove excess sealant.
- D. Weatherstrip: Accurately install weatherstrip to the door or frames where scheduled using proper type flush fasteners spaced not over 18" o.c. Installed work shall make continuous contact with the abutting surfaces and shall function for use intended. Adjust seals as required.
- E. Mounting Heights: Shall be as follows, measured from finished floor except for top hinge which is measured from door top:
1. Bottom hinge: 10-3/8" [hinge center].
  2. Top hinge: 9-3/4" [hinge center].
  3. Intermediate hinges: Equally spaced between top and bottom hinges.
  4. Locks and latches: 38" [operating spindle].
  5. Pulls, pull and push plates: 42" [center].



### 3.2 ADJUST AND CLEAN:

- A. Adjust and check each operating item of hardware and each door to ensure proper operation or function of every unit. Lubricate moving parts with type lubricant recommended by manufacturer [graphite-type if no other recommended]. Replace units that cannot be adjusted and lubricated to operate freely and smoothly as intended for the application made.
- B. Upon completion of the work and before final acceptance demonstrate that all hardware is in satisfactory working order, that all keys fit in their respective locks, and upon acceptance of the work, tag and deliver all keys to the Owner.
- C. Final Adjustment: Wherever hardware installation is made more than one month prior to acceptance or occupancy of a space or area, return to the work during the week prior to acceptance or occupancy and make a final check and adjustment of all hardware items in such space or area. Clean and re-lubricate operating items as necessary to restore proper function and finish of hardware and doors. Adjust door control devices to compensate for final operation of heating and ventilating equipment.
- D. Instruct Owner's personnel in proper adjustment and maintenance of hardware and hardware finish during the final adjustment of hardware.

**Harnett County Schools  
Overhills Elementary School  
Addition/Renovation  
Spring Lake, NC**

### 3.3 SCHEDULE OF HARDWARE

#### Hardware Set #1 – Doors# 400A, 400B, 427, 433

Each to have:

2 ea. Continuous Hinges	A110HD x Clear	ABH
1 ea. Exit Device	2103 x LD x US32D	PHI
1 ea. Access Control Trim	AD-400-993R-70-MT-SPA-4B-LRX x 626	SCH
1 ea. Exit Device	2102 x 1702A x LD x US32D	PHI
1 ea. Mullion	KR822 x MCS822 x Alum	PHI
2 ea. Cylinders	Rim	BES
2 ea. Closers	HD8016-SDS-BSHD-NFHD-689	BES
2 ea. Stops	1209	TRM
1 ea. Threshold	896SA	NGP
1 set Weatherstrip	A625A	NGP
1 ea. Door Bottoms	600A	NGP

**\*Access Control Trim by others**

**Hardware Set #2 – Doors# 400C, 400D, 426A, 426B**

Each to have:

2 ea. Continuous Hinges	A110HD x Clear	ABH
2 ea. Push Bars	673 x 1702 x US32D	PHI
2 ea. Closers	HD8016-SDS-BSHD-NFHD-689	BES
1 ea. Threshold	896SA	NGP
1 set Weatherstrip	A625A	NGP
2 ea. Door Bottoms	600A	NGP

**Hardware Set #3 – Door# 438**

Each to have:

1 ½ pr. Hinges	FBB179 x US26D 4 ½ x 4 ½	BES
1 ea. Electronic Lockset	NDE-80-BD-SPA x 626	SCH
1 ea. Core	1CM7 x 626	BES
1 ea. Kick Plate	8 x 2 LDW x .050 x B4E x CSK x US32D	TRM
1 ea. Overhead Stop	4400 x US32D	ABH
3 ea. Silencers	1229A	TRM
<b>*Electronic Lockset by others</b>		

**Hardware Set #4 – Door# 420**

Each to have:

1 ½ pr. Hinges	FBB179 x US26D 4 ½ x 4 ½	BES
1 ea. Electronic Lockset	NDE-80-BD-SPA x 626	SCH
1 ea. Core	1CM7 x 626	BES
1 ea. Closer	HD8016-AF80P-689	BES
1 ea. Kick Plate	8 x 2 LDW x .050 x B4E x CSK x US32D	TRM
1 ea. Stop	1270CV x US26D	TRM
3 ea. Silencers	1229A	TRM
<b>*Electronic Lockset by others</b>		

**Hardware Set #5 – Doors# 419, 423, 436, 437**

Each to have:

1 ½ pr. Hinges	FBB179 x US26D 4 ½ x 4 ½	BES
1 ea. Electronic Lockset	NDE-80-BD-SPA x 626	SCH
1 ea. Core	1CM7 x 626	BES
1 ea. Closer	HD8016-AF80P-689	BES
1 ea. Kick Plate	8 x 2 LDW x .050 x B4E x CSK x US32D	TRM
1 ea. Overhead Stop	4400 x US32D	ABH
3 ea. Silencers	1229A	TRM
<b>*Electronic Lockset by others</b>		

**Hardware Set #6 – Doors# 424, 425, 428, 429, 431, 432, 434, 435**

Each to have:

1 ½ pr. Hinges	FBB179 x US26D 4 ½ x 4 ½	BES
1 ea. Electronic Lockset	NDE-80-BD-SPA x 626	SCH
1 ea. Core	1CM7 x 626	BES
1 ea. Closer	HD8016-AF80P-689	BES
1 ea. Overhead Stop	4400 x US32D	ABH
<b>*Electronic Lockset by others</b>		

**Hardware Set #7 – Door# 422**

Each to have:

1 ½ pr. Hinges	FBB179 x US26D 4 ½ x 4 ½	BES
1 ea. Electronic Lockset	NDE-80-BD-SPA x 626	SCH
1 ea. Core	1CM7 x 626	BES
1 ea. Closer	HD8016-SDS-689	BES
1 ea. Kick Plate	8 x 2 LDW x .050 x B4E x CSK x US32D	TRM
1 set Intumescent Seal9450	NGP	
<b>*Electronic Lockset by others</b>		

**Hardware Set #8 – Door# 421**

Each to have:

1 ½ pr. Hinges	FBB179 x US26D 4 ½ x 4 ½	BES
1 ea. Electronic Privacy Set	NDEB-BD-SPA x 626	SCH
1 ea. Kick Plate	8 x 2 LDW x .050 x B4E x CSK x US32D	TRM
1 ea. Overhead Stop	4400 x US32D	ABH
3 ea. Silencers	1229A	TRM
<b>*Electronic Lockset by others</b>		

**Hardware Set #9 – Doors# 426C, 426D**

Each to have:

2 ea. Continuous Hinges	FRA110HD x Clear	ABH
2 ea. Exit Devices	FL2108 x V4908D x US32D	PHI
1 ea. Mullion	FLKR822 x MCS822 x Alum	PHI
3 ea. Cylinders	Rim	BES
2 ea. Closers	HD8016-SPA-689	BES
2 ea. Kick Plates	8 x 2 LDW x .050 x B4E x CSK x US32D	TRM
2 ea. Magnetic Holders	2120 x Extensions x US32D	ABH
1 set Intumescent Seal9450	NGP	
1 ea. Edge Seal	9500	NGP

**Hardware Set #10 – Access System Components**

To have:

1 ea. Software Licenses	By Others Open Options
4 ea. Interface Boards	By Others Open Options LP4502
1 ea.100 Proximity Cards	By Others
1 ea. System Installation	By Others
1 ea. Owner Training	By Others
1 ea. Computer	By Owner
1 ea. LAN Line (POE)	By Owner

**MANUFACTURER’S ABBREVIATIONS:**

ABH .....	ABH MANUFACTURING
BES.....	BEST ACCESS SYSTEMS
NGP .....	NATIONAL GUARD PRODUCTS
PHI .....	PRECISION HARDWARE
SCH .....	SCHLAGE
SDC .....	SECURITY DOOR CONTROLS
TRM .....	TRIMCO MANUFACTURING

Harnett County Schools  
 Overhills Elementary School  
 Additions/Renovations – Phase 2  
 Spring Lake, NC  
 1/20/22wdb, rev.4/7/22wdb, rev.5/3/22wdb

**SECTION 08 71 00.30**  
**FINISH HARDWARE**

**PART 1 - GENERAL**

1.1 QUALITY ASSURANCE

- A. Acceptable Designs: Specified products and their manufacturers establish acceptable design, material, type, grade, size, function, and finish of hardware items required. Do not substitute other products, except with Architect's and Owner's acceptance.
- B. Manufacturer: Obtain each kind of hardware [latch and locksets, hinges, closers] from only one manufacturer, although several may be indicated as offering products complying with the manufacturer's requirements.
- C. Supplier: The hardware supplier shall be a full member of the Society of Architectural Hardware Consultants and shall be available during normal working hours during the course of the project for hardware consultation to the Owner, Architect, and Contractor.

1.2 SUBMITTALS

- A. Product Data: Submit in accordance with the requirements of Section 01300. Include installation and maintenance instructions for operating parts and finish. Transmit copy of applicable data to Installer.
- B. Certificates: Any hardware that is furnished other than that scheduled on the drawings shall have manufacturer's certificates certifying that the hardware meets this specification submitting the hardware shop drawings.
- C. Hardware Schedule: Submit final hardware schedule in the manner and format indicated below. Hardware schedules are intended for coordination of work.
  - 1. Organize hardware schedule into "hardware sets" indicating complete designations of every item required for each door or opening, including:
    - a. Type, style, function, size and finish of each hardware item.
    - b. Name and manufacturer of each item.
    - c. Fastenings and other pertinent information.
    - d. Location of hard set cross-referenced to indications on Drawings both of floor plans and in door and frame schedule.
    - e. Explanation of all abbreviations, symbols, code, etc. contained in schedule.
    - f. Mounting locations for hardware.
    - g. Door and frame sizes and materials.
  - 2. 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.
  - 3. Include product data, samples, shop drawings of other work affected by builder's hardware, and other information essential to the coordinated review of hardware schedule.

4. Templates: Furnish for the installation of all hardware and to the manufacturer of related equipment for his preparation of that equipment for all hardware that must be attached thereto. Templates shall also be furnished to the manufacturer of wood doors for use on all wood doors that are factory fitting and factory machined for hardware.
- D. Keying Schedule: Submit separate detail schedule indicating clearly how the Owner's final instruction on keying of locks has been fulfilled. Prior to submittal, submit a blank key schedule to be completed by maintenance personnel.
- E. Samples: Prior to submittal of the final hardware schedule and prior to final ordering of builders hardware, submit one sample of each type of exposed hardware unit, finished as required, and tagged with full description for coordination with schedule.

### 1.3 JOB CONDITIONS:

- A. Coordinate hardware with other work. Tag each item or package separately with identification related to the final hardware schedule. Furnish hardware items of proper design for use on doors and frames of the thickness, profile, swing, security, and similar requirements indicated as necessary for proper installation and function. Deliver individually packaged hardware items at the proper times to the proper location [shop or project site] for installation.
- B. Packing and Marking: Package each item of hardware separately in individual containers, complete with necessary screws, keys, instructions and installation templates for spotting mortising tools. Mark each container with item's number corresponding to number shown on hardware supplier's schedule and properly tag each cylinder's key.
- C. Provide secure lock-up for hardware delivered to the project but not the installed. Control the handling and installation of hardware items, which are not immediately replaceable, so that the completion of the work will not be delayed by hardware losses, both before and after installation.
- D. 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 the shop drawings of such other work to confirm that adequate provisions are made for the proper installation of hardware.
- E. The hardware supplier shall visit the project when the hardware is delivered and check it before it is installed. After the hardware is installed, the hardware supplier shall meet with the Owner or his representative and explain the functions, uses, and maintenance of all types of hardware installed. The Contractor shall turn over to the owner, after completion of the work, all tools, wrenches and templates that come packaged with the hardware for the Owner's use in servicing the hardware.

## PART 2 - PRODUCTS

### 2.1 PRODUCTS:

- A. Acceptable Manufacturers:
  1. Hinges: Best, Hager, Mckinney
  2. Continuous Gear Hinges: Select, ABH, Best, NGP  
(see owners preferred alternate for Select "no substitution")

3. Cylinders: Best  
(see owners preferred alternate for Best “no substitution”)
4. Door Closers: Best HD8000, LCN 4040, Norton 7500  
(see owners preferred alternate for Best “no substitution”)
5. Locks, Latches: Best, Schlage, Sargent  
(see owners preferred alternate for Best “no substitution”)
6. Silencers, Stops & Flush Bolts: Baldwin, Burns, Trimco
7. Kick Plates, & Misc.: Baldwin, Burns, Trimco
8. Weatherstrip: National Guard, Reese, Zero
9. Push/Pulls: Baldwin, Burns, Trimco
10. Exit Devices: Precision, Sargent, Von Duprin  
(see owners preferred alternate for Precision “no substitution”)
11. Thresholds: National Guard, Reese, Zero
12. Overhead Stops/holders: ABH, Rixson, Sargent
13. Electronics: Schlage (no substitution)
14. Auto Operators: Dormakaba

## 2.2 MATERIALS, FABRICATION AND FINISHES:

### A. General:

1. Manufacturer's Name Plate: Do not use products which have manufacturer's name or trade name displayed in a visible location except in conjunction with required UL labels.
2. Unless otherwise noted, exposed hardware items shall receive satin stainless steel finish.
3. Furnish screws of type as required for substrates indicated with each hardware item. Finish exposed screws to match the hardware finish or, if exposed in surfaces of other work, to match the finish of such other work as closely as possible.
4. Unless otherwise noted, provide concealed fasteners for hardware units that are exposed when door is closed. Where fasteners must remain exposed when door is closed. Where fasteners must remain exposed, provide vandal resistant fasteners.
5. Finish shall be as scheduled. Dull Chrome [US26D], Dull Stainless Steel [US32D] Aluminum Lacquer [AL], Extruded Aluminum [Alum] and Prime Coat [USP] as listed.
6. Tools for maintenance: Furnish a complete set of specialized tools as needed for Owner's continued adjustment, maintenance and removal and replacement of builder's hardware.
7. Hardware Operation: Force required to activate door hardware shall be not greater than 5 lbf.
8. Door Opening Force: Maximum force for pushing or pulling open a door shall comply with this paragraph. For hinged doors the force shall be applied perpendicular to the door at the door opener or 30 inches from the hinged side whichever is farther from the hinge.
  - a. Exterior hinged doors shall not exceed 8.5 lbf. Slight increases in opening force shall be allowed where 8.5 lbf. is insufficient to compensate for air pressure differentials.
  - b. Interior hinged doors shall not exceed 5.0 lbf.

- c. Fire doors shall be adjusted to meet the minimum opening force permitted by governing fire safety standards.

B. Hinges:

1. Provide template-produced hinges complying with ANSI A156.1.
2. Provide stainless steel pins, non-removable type for exterior doors and non-rising types for interior doors. Pins shall have flat button ends finished to match hinge leaves.
3. Hinges shall be full-mortised, 4½” x 4½” unless otherwise noted; five knuckle ball bearing type, heavy duty rated.

C. Keys and Keying:

1. All cylinders/Cores shall be Best Patented Cormax 7-pin interchangeable cores and keyed into the existing factory registered Grand Master Key System.
2. All keying must be approved by the Harnett County Schools Lock Shop, during a keying conference, before cylinders/locks are ordered. A “key schedule” will be determined at this time. Three keys shall be supplied with each core combination.
3. On all projects the exterior locksets, locksets on mechanical and electrical rooms and exit devices shall be provided with construction key cores. Construction keyed cores are to be replaced with “permanent” cores in the presence of owner and turn over all building keys.
4. Hardware Installer shall install permanent cores at substantial completion.
5. All keys shall be stamped with appropriate key symbols and “DO NOT DUPLICATE.” No biting numbers are to be stamped on the key.
6. All Cores and keys shall be transmitted to Harnett County Schools Lock Shop by UPS with a delivery confirmation request.
7. Furnish keys in the following quantities:
  - 2 each Grand Masterkey
  - 2 each Masterkeys per set
  - 3 each Change Key per each keyed core
  - 6 each Construction masterkeys
  - 2 each Control Keys
8. Hardware Supplier shall supply both a Best IMPKSW-2 code import with each new project.
9. KEY CABINET: Acceptable Manufacturers are Lund, MMF Industries, Tel-Kee and P.O. Moore Company. Size of cabinet shall provide for 50% expansion capacity. Hardware Supplier shall supply, set up, compile Hook to Key Schedule, hang keys, and install key cabinet.
10. KEY BOX: Each facility shall have a recessed Knox Series 4400RDL Dual Key Lock Box installed on the exterior of the building at the main entrance. This box shall be keyed to



the local Fire Department. In addition, a “Lock Box” shall be provided where required by the Local Fire Official.

D. Locksets and Latchsets:

1. Base Specification: Best Access Systems components as listed.
2. Locksets and latchsets of other acceptable manufacturers must conform to the requirements of Subparagraphs 3 and 4.
3. Cylindrical Type:
  - a. Locksets must be extra heavy-duty cylindrical type with 2 ¾ inch backset, or greater as specified, with a 9/16 inch throw latchbolt.
  - b. Provide locksets with 14D lever and Cormax Patented interchangeable core.
  - c. Locksets and latchsets must conform to ANSI A156.2, Series 4000, Grade 1 or 2 as scheduled and be UL listed.
  - d. Locksets must be available with tactile lever for identification of hazardous areas.
  - e. Locks to have solid shank with no opening for access to keyed lever keeper.
  - f. Keyed lever to be removable only after core is removed, by authorized control key, to allow access to lever “keeper”.
  - g. Permanent cores face must be the same finish as the lockset finish.
  - h. Levers must be zinc material with a minimum wall thickness of .060.

E. Exit Devices: Exit devices shall be as scheduled with no substitutes accepted. Exit devices shall comply with ANSI Standard 156.3 Grade 1 modified as follows:

1. The devices shall be “touchpad” type and include sound reduction dampening for both depression and extension of the touchpad. The touchpad shall extend a minimum of 1/2 of the door width.
2. Devices should have a ¼” gap between the face of the door and the touchbar unit eliminating the need for shims or cutting away the glass moulding.
3. Lock stile chassis shall be investment cast steel. Stamped steel units will not be accepted. All device latchbolts shall be stainless steel and shall be deadlocking type.
4. Device strikes shall be investment cast stainless steel.
5. Device end cap shall be all metal and secured with bracket that completely inserts into device housing. Mounting bracket shall interlock both at the touchbar channel and hinge side filler to prevent end cap “peel-back”.
6. All outside device trim shall be cast or forged brass full escutcheon. Lever trim shall be “vandal resistant” with substantial resistance to rotation when locked. Lever shall return to home position when released.

7. Device housing and all exposed surfaces of the device shall be manufactured from Brass, Bronze or Stainless Steel.
  8. Devices must be non-handed and convertible from one function to another in the field. .
  9. Device shall be secured to the door with sex bolts and through bolting at both ends.
  10. All devices shall be UL approved for all types and functions indicated in the Hardware Schedule.
  11. Devices shall have published five-year warranty.
  12. All exit devices shall be by the same manufacturer.
  13. Mullions shall be “keyed removable” type with only a key required for take down. No key or tools shall be required to reinstall. Mullions shall be by the same manufacturer as the exit devices.
- F. Closers: Shall be as scheduled with no substitutes accepted. Closers shall comply with ANSI Standard A156.4 Grade 1 modified as follows:
1. Closer shall be non-handed and have adjustable spring power range from size 1 to 6 plus 50% (ANSI PT-4C).
  2. Closer shall have R14 high silicone aluminum alloy cylinder body with 1 ½” diameter steel piston.
  3. Closer shall have 3 hydraulic adjustments to control backcheck, closing and latching speeds. Adjustment shall be by means of non-critical “v-slot” regulating valves. Closer shall not incorporate pressure relief valves on the opening or closing cycle.
  4. Closer shall have hydraulic fluid with a consistent viscosity range of no less than 0 to 100 degrees Fahrenheit to eliminate seasonal adjustment.
  5. Closer shall be U.L. Listed and meet positive pressure testing requirements of UL10C and UBC 7-2.
  6. Closers shall have forged main arms. Parallel mounted closers shall have Extra Duty (EDA) arm incorporating forged main and forearms, and a cast mounting shoe.
  7. Closer shall have thirty-year warranty.
- G. Overhead Stops/ HOLDERS: Shall be as scheduled.
1. Units shall have metal/plated end plugs.
  2. Units mounting screws shall be designed so that they go through housing and end plug.
  3. Units shall have metal slide.
  4. All stops shall be by same manufacturer.
- H. Silencers, Stops & Flush Bolts: Shall be as scheduled.
1. Silencers: Provide plug-type [not adhered type] silencers in all metal door frames unless continuous bumper-type weather-stripping is shown or specified. Provide 3 silencer units in door frames.
  2. All Stops [wall and floor] shall be by the same manufacturer.

3. Flush bolts shall have 3/4" throw with 2" vertical adjustment. Shall have override feature and stainless steel cams and rubplates. All flush bolts shall be by the same manufacturer.
- I. Door Stripping and Seals: Unless otherwise indicated, provide full-length weather-stripping at each edge of every exterior swing door leaf. All weather-stripping to be by same manufacturer.
- J. Thresholds: Extruded aluminum, smooth commercial mill finish, grooved tread, 4" minimum tread by full door width. Thickness of threshold shall be 0.5" at primary tread surfaces, 0.1875" for secondary tread surfaces, and 0.125" for concealed flanges and legs.
- K. Kick Plates, Mop Plates and Armor Plates: .050 material sized as follows:
  - Kick Plates: 8 x 2 LDW
  - Mop Plates: 4 x 2 LDW
  - Armor Plates: 16 x 2 LDW

### 2.3 SCHEDULE OF HARDWARE

- A. See Hardware Schedule at end of this Section.

## PART 3 – EXECUTION

### 3.1 INSTALLATION

- A. General: Apply hardware in accordance with templates and manufacturer's instructions; mortise and fit accurately; apply securely and adjust carefully.
  1. **All hardware (except aluminum door hardware) and cylinders/cores shall be installed by the hardware supplier. Final adjustments of all hardware shall be performed prior to building turn over. Installation shall be preformed by the hardware supplier using personnel that are experienced in the installation of hardware for schools. Personnel shall have a minimum of 5 years of documented experience doing this type of work.**
  2. Mount hardware units at heights recommended in "Recommended Locations for Builders Hardware" by DHI, except where shown otherwise on drawings.
  3. Install each hardware item in compliance with the manufacturer's instructions and recommendations. Do not install surface mounted items until finishes have been completed on the substrate.
  4. Set units level, plumb, and true to line and location. Adjust and reinforce the attachment substrate as necessary for proper installation and operation.
  5. Exercise care not to injure work when applying hardware. Review shop drawings and Contract Drawings for proper location. Cover door hardware with a heavy cloth until painting is completed. At completion of the work, examine doors and hardware, adjust as required and leave hardware in proper working order, free from defects.
  6. At all times be responsible for the distribution of keys for hardware installed during construction, and cause all keys to be returned prior to final completion of the building

**B. Preparation:**

1. Do not install finish hardware until the wet trades have been fully completed.
2. Supplier shall mark each item of hardware for location. Protect markings until each item is installed. If any item of hardware is delivered to the Project not properly marked, return it to the supplier for marking before attempting to install it.
3. Install and make necessary adjustments for proper working order. Hardware damaged by improper adjustments or abuse will be rejected.
4. Provide clean, properly sized, and accurately placed mortises and drilled holes for all mortise and surface mounted finish hardware. Use appropriate jigs, templates, and power mortising equipment for the installation of all mortised hardware items.
5. Metal frames to receive hardware items shall be drilled and tapped accurately.
6. Removal for Painting:
  - a. Before painters' finish is applied, remove all finish hardware except prime-coated items.
  - b. After final paint and finish coats are dry, permanently replace and adjust finish hardware for proper operation.

**C. Thresholds:**

1. Cut and fit threshold to profile door frames, with mitered corners and hairline joints. Screw thresholds to substrate with No. 10 or larger bronze or stainless steel screws.
2. Set thresholds in a bed of either butyl/rubber sealant or polyisobutylene mastic sealant to completely fill concealed voids and exclude moisture from every source. Do not plug drainage holes or block weeps. Remove excess sealant.

**D. Weatherstrip:** Accurately install weatherstrip to the door or frames where scheduled using proper type flush fasteners spaced not over 18" o.c. Installed work shall make continuous contact with the abutting surfaces and shall function for use intended. Adjust seals as required.

**E. Mounting Heights:** Shall be as follows, measured from finished floor except for top hinge which is measured from door top:

1. Bottom hinge: 10-3/8" [hinge center].
2. Top hinge: 9-3/4" [hinge center].
3. Intermediate hinges: Equally spaced between top and bottom hinges.
4. Locks and latches: 38" [operating spindle].
5. Pulls, pull and push plates: 42" [center].

### 3.2 ADJUST AND CLEAN:

- A. Adjust and check each operating item of hardware and each door to ensure proper operation or function of every unit. Lubricate moving parts with type lubricant recommended by manufacturer [graphite-type if no other recommended]. Replace units that cannot be adjusted and lubricated to operate freely and smoothly as intended for the application made.
- B. Upon completion of the work and before final acceptance demonstrate that all hardware is in satisfactory working order, that all keys fit in their respective locks, and upon acceptance of the work, tag and deliver all keys to the Owner.
- C. Final Adjustment: Wherever hardware installation is made more than one month prior to acceptance or occupancy of a space or area, return to the work during the week prior to acceptance or occupancy and make a final check and adjustment of all hardware items in such space or area. Clean and re-lubricate operating items as necessary to restore proper function and finish of hardware and doors. Adjust door control devices to compensate for final operation of heating and ventilating equipment.
- D. Instruct Owner's personnel in proper adjustment and maintenance of hardware and hardware finish during the final adjustment of hardware.

**Harnett County Schools  
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### 3.3 SCHEDULE OF HARDWARE

#### Hardware Set #1 – Doors# 600B, 600D, 600H, 600J

Each to have:

2 ea. Continuous Hinges	A110HD x Clear	ABH
1 ea. Exit Device	2103 x LD x US32D	PHI
1 ea. Access Control Trim	AD-400-993R-70-MT-SPA-4B-LRX x 626	SCH
1 ea. Exit Device	2102 x 1702A x LD x US32D	PHI
1 ea. Mullion	KR822 x MCS822 x Alum	PHI
2 ea. Cylinders	Rim	BES
2 ea. Closers	HD8016-SDST-BSHD-NFHD-689	BES
2 ea. Stops	1209	TRM
1 ea. Threshold	896SA	NGP
1 set Weatherstrip	A625A	NGP
1 ea. Door Bottoms	600A	NGP

**\*Access Control Trim by others**

**Hardware Set #2 – Doors# 600C, 600G, 600K**

Each to have:

2 ea. Continuous Hinges	A110HD x Clear	ABH
2 ea. Push Bars	673 x 1702 x US32D	PHI
2 ea. Closers	HD8016-SDST-BSHD-NFHD-689	BES
1 ea. Threshold	896SA	NGP
1 set Weatherstrip	A625A	NGP
2 ea. Door Bottoms	600A	NGP

**Hardware Set #3 – Doors# 601A, 602A, 603A, 604A, 706A, 707A, 708A, 709A, 710A, 711A, 712A, 713A, 714A, 715A**

Each to have:

1 ½ pr. Hinges	FBB179 x US26D 4 ½ x 4 ½	BES
1 ea. Electronic Lockset	NDE-80-BD-SPA x 626	SCH
1 ea. Core	1CM7 x 626	BES
1 ea. Stop	1270CV x US26D	TRM
3 ea. Silencers	1229A	TRM
<b>*Electronic Lockset by others</b>		

**Hardware Set #4 – Door# 717**

Each to have:

1 ½ pr. Hinges	FBB179 x US26D 4 ½ x 4 ½	BES
1 ea. Electronic Lockset	NDE-80-BD-SPA x 626	SCH
1 ea. Core	1CM7 x 626	BES
1 ea. Kick Plate	8 x 2 LDW x .050 x B4E x CSK x US32D	TRM
1 ea. Overhead Stop	4400 x US32D	ABH
3 ea. Silencers	1229A	TRM
<b>*Electronic Lockset by others</b>		

**Hardware Set #5 – Doors# 601, 602, 603, 604, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715**

Each to have:

1 ½ pr. Hinges	FBB179 x US26D 4 ½ x 4 ½	BES
1 ea. Electronic Lockset	NDE-80-BD-SPA x 626	SCH
1 ea. Core	1CM7 x 626	BES
1 ea. Closer	HD8016-SPA-689	BES
1 ea. Kick Plate	8 x 2 LDW x .050 x B4E x CSK x US32D	TRM
1 ea. Stop	1270CV x US26D	TRM
3 ea. Silencers	1229A	TRM
<b>*Electronic Lockset by others</b>		

**Hardware Set #6 – Doors# 704, 705**

Each to have:

1 ½ pr. Hinges	FBB179 x US26D 4 ½ x 4 ½	BES
1 ea. Electronic Lockset	NDE-80-BD-SPA x 626	SCH
1 ea. Core	1CM7 x 626	BES
1 ea. Closer	HD8016-AF80P-689	BES
1 ea. Kick Plate	8 x 2 LDW x .050 x B4E x CSK x US32D	TRM
1 ea. Stop	1270CV x US26D	TRM
3 ea. Silencers	1229A	TRM
<b>*Electronic Lockset by others</b>		

**Hardware Set #7 – Doors# 600E, 600F**

Each to have:

1 ½ pr. Hinges	FBB179 x US26D 4 ½ x 4 ½	BES
1 ea. Electronic Lockset	NDEB-BD-SPA x 626	SCH
1 ea. Kick Plate	8 x 2 LDW x .050 x B4E x CSK x US32D	TRM
1 ea. Overhead Stop	4400 x US32D	ABH
3 ea. Silencers	1229A	TRM
<b>*Electronic Lockset by others</b>		

**Hardware Set #8 – Door# 600A**

Each to have:

2 ea. Continuous Hinges	FRA110HD x Clear	ABH
2 ea. Exit Devices	FL2108 x V4908D x US32D	PHI
1 ea. Mullion	FLKR822 x MCS822 x Alum	PHI
3 ea. Cylinders	Rim	BES
2 ea. Closers	HD8016-SPA-689	BES
2 ea. Kick Plates	8 x 2 LDW x .050 x B4E x CSK x US32D	TRM
2 ea. Magnetic Holders	2120 x Extensions x US32D	ABH
1 set Intumescent Seal9450	NGP	
1 ea. Edge Seal	9500	NGP

**Hardware Set #9 - Doors# 716, 716A**

Each to have:

1 ea. Continuous Hinge	A110HD x Clear	ABH
1 ea. Electronic Lock	AD-400-MS-70-MT-SPA-4B-LRX x 626	SCH
1 ea. Cylinder	1E74 x 626	BES
1 ea. Closer	HD8016-SDST-689	BES
1 ea. Threshold	896SA	NGP
1 set Weatherstrip	A625A	NGP
1 ea. Door Bottom	600A	NGP
1 ea. Lock Guard	5001 x US32D	TRM
1 ea. Rain Drip	16A	NGP
<b>*Access Control Trim by others</b>		

**Hardware Set #10 – Access System Components**

To have:

1 ea. Software Licenses	By Others Open Options
2 ea. Interface Boards	By Others Open Options LP4502
1 ea.100 Proximity Cards	By Others
1 ea. System Installation	By Others
1 ea. Owner Training	By Others
1 ea. Computer	By Owner
1 ea. LAN Line (POE)	By Owner

**MANUFACTURER’S ABBREVIATIONS:**

ABH .....	ABH MANUFACTURING
BES.....	BEST ACCESS SYSTEMS
NGP.....	NATIONAL GUARD PRODUCTS
PHI .....	PRECISION HARDWARE
SCH .....	SCHLAGE
SDC .....	SECURITY DOOR CONTROLS
TRM .....	TRIMCO MANUFACTURING

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**SECTION 08 80 00****GLAZING****PART 1 GENERAL****1.1 SUMMARY**

- A. Section Includes:
  - 1. Glass glazing materials and installation requirements are included in this Section for frame assemblies specified in other Sections.
- B. Related Requirements:
  - 1. Section 07 90 00 - Joint Protection: Sealant and back-up material other than glazing sealants.
  - 2. Section 08 11 13 - Hollow Metal Doors and Frames: Doors and frames to receive glazing in this Section.
  - 3. Section 08 14 16 - Flush Wood Doors: Doors to receive glazing in this Section.
  - 4. Section 08 17 43 - Integrated Composite Door Opening Assemblies: Doors to receive glazing in this Section.
  - 5. Section 08 41 13 - Aluminum-Framed Entrances and Storefronts: Framing system to receive glazing in this Section.

**1.2 REFERENCES**

- A. American National Standards Institute (ANSI):
  - 1. ANSI Z97.1 - Safety Glazing Materials Used In Buildings - Safety Performance Specifications And Methods Of Test; 2015 (Reapproval 2020).
- B. American Society of Civil Engineers (ASCE):
  - 1. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures; Most Recent Edition Cited by Referring Code or Reference Standard.
- C. ASTM International (ASTM):
  - 1. ASTM C864 - Standard Specification for Dense Elastomeric Compression Seal Gaskets, Setting Blocks, and Spacers; 2005 (Reapproved 2019).
  - 2. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2018.
  - 3. ASTM C1036 - Standard Specification for Flat Glass; 2021.
  - 4. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass; 2018.
  - 5. ASTM C1172 - Standard Specification for Laminated Architectural Flat Glass; 2019.
  - 6. ASTM C1193 - Standard Guide for Use of Joint Sealants; 2016.
  - 7. ASTM C1376 - Standard Specification for Pyrolytic and Vacuum Deposition Coatings on Flat Glass; 2021.
  - 8. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements; 2009 (Reapproved 2016).
  - 9. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials; 2016a.
  - 10. ASTM E1300 - Standard Practice for Determining Load Resistance of Glass in Buildings; 2016.
  - 11. ASTM E2190 - Standard Specification for Insulating Glass Unit Performance and Evaluation; 2019.
- D. Code of Federal Regulations (CFR):
  - 1. 16 CFR 1201 - Safety Standard for Architectural Glazing; Current Edition.

- E. Glass Association of North America (GANA):
  1. GANA (GM) - GANA Glazing Manual; 2008.
  2. GANA (SM) - GANA Sealant Manual; 2008.
  3. GANA (LGRM) - Laminated Glazing Reference Manual; 2009.
- F. National Fenestration Rating Council Incorporated (NFRC):
  1. NFRC 100 - Procedures for Determining Fenestration Product U-Factors; 2020.
  2. NFRC 200 - Procedure for Determining Fenestration Product Solar Heat Gain Coefficient and Visible Transmittance at Normal Incidence; 2020.
  3. NFRC 300 - Test Method for Determining the Solar Optical Properties of Glazing Materials and Systems; 2020.
- G. National Fire Protection Association (NFPA):
  1. NFPA 80 - Standard for Fire Doors and Other Opening Protectives; 2019.
  2. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies; 2017.
  3. NFPA 257 - Standard on Fire Test for Window and Glass Block Assemblies; 2017.
- H. Underwriters Laboratories Inc. (UL):
  1. UL - Building Materials Directory; Current Edition.
  2. UL 10C - Positive Pressure Fire Tests of Door Assemblies; 2016 (Reapproval 2021).

### 1.3 PRE-INSTALLATION MEETING

- A. Section 01 30 00 - Administrative Requirements: Pre-installation meeting.
- B. Convene minimum one week before starting Work of this Section; require attendance by all affected installers.

### 1.4 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Product Data:
  1. Glass: Provide structural, physical, and environmental characteristics, size limitations, special handling, or installation requirements. Include manufacturer's full range of samples of glass tinting options for Architects selection.
  2. Glazing Sealants, Compounds and Accessories: Provide chemical, functional, and environmental characteristics, limitations, special application requirements. Identify full range of available colors.
- C. Shop Drawings:
  1. Indicate sizes, layout, thicknesses, and loading conditions for glass.
- D. Samples:
  1. Glass: Submit two samples, 12 x 12 inches in size, of each glass type.
  2. Glazing Units: Submit two samples, 12 x 12 inches size, of assembled sealed insulating glazing units.
  3. Glazing Materials: Submit 12 inch long bead of glazing sealant and gaskets, color as selected.
- E. Design Data: Submit design calculations indicating compliance with requirements for resistance of wind loads for glass and glazing units.
- F. Certifications: Submit the follow.
  1. Certify that products of this Section meet or exceed specified requirements.
  2. Manufacturer's qualification certification.
  3. Fabricator's qualification certification.
  4. Installer's qualification certification.

**1.5 QUALITY ASSURANCE**

- A. Perform Work in accordance with the following standards:
  - 1. GANA (GM) - GANA Glazing Manual.
  - 2. GANA (SM) - GANA Sealant Manual.
  - 3. GANA (LGRM) - Laminated Glazing Reference Manual.
  - 4. Maintain one copy of each document on site.
- B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this Section with minimum five (5) years of documented experience.
- C. Fabricator Qualifications: Fabricator certified by glass manufacturer for type of glass, glass unit, coating, and treatment involved and capable of providing requirements indicated in this Section.
- D. Installer Qualifications: Company specializing in performing work of this Section with minimum five (5) years of documented experience.

**1.6 ENVIRONMENTAL REQUIREMENTS**

- A. Section 01 60 00 - Product Requirements.
- B. Do not install glazing when ambient temperature is less than 50 degrees F.
- C. Maintain minimum ambient temperature before, during and 24 hours after installation of glazing compounds.

**1.7 WARRANTY**

- A. Section 01 77 00 - Closeout Procedures: Product warranties.
- B. Sealed Insulating Glass Units: Provide a ten (10) year warranty to include coverage for seal failure, interpane dusting, condensation or misting, and replacement of failed units.
- C. Laminated Glass: Provide a ten (10) year warranty to include coverage for delamination, including replacement of failed units.
- D. Spandrel Glass: Provide a five (5) year warranty to include coverage for deterioration of spandrel glass coating, including replacement of failed units.

**1.8 SPARE PARTS AND MAINTENANCE PRODUCTS**

- A. Section 01 60 00 - Product Requirements: Extra materials, spare parts, and maintenance products.
  - 1. Extra Insulating Glass Units: One (1) percent (minimum of one) of each type and size.

**PART 2 PRODUCTS****2.1 PERFORMANCE REQUIREMENTS**

- A. Provide glazing and glazing assemblies of type and thickness designed to support assembly dead loads and to withstand live loads caused by positive and negative wind pressure acting normal to plane of glass. Comply with the State Building Code for the State in which the project is located.
  - 1. Wind Loads: Design and size glazing and glazing assemblies to withstand dead loads and live loads caused by positive and negative wind loads acting normal to plane of wall, including increased wind loads at building corners.

- a. Design calculations of glass and glass assemblies to be in accordance with ASCE 7.
  - b. Comply with Design Loads indicated on Drawings and applicable code requirements based on geographical location.
  - c. Comply with ASTM E1300 for design load resistance of glass type, thickness, dimensions, and maximum lateral deflection of supported glass.
2. Seismic Loads: Design and size components and system to withstand seismic loads and sway displacement as calculated in accordance with ASCE 7 and applicable code requirements.
  3. Exterior Glass Deflection: Maximum of 1/175 of glass edge length or 3/4 inch, whichever is less with full recovery of glazing materials.
  4. Glass thickness listed in this Section and on Drawings is minimum. Actual thickness to be as required by design to comply with performance requirements.
- B. Fire Rated Door Glazing:
1. Provide glazing complying with NFPA 80 and tested in accordance with one of the following:
    - a. NFPA 252; with neutral pressure level at 40 inches maximum above sill at 5 minutes into test.
    - b. UL 10C.
    - c. Maintain one copy of each document on site.
  2. Apply label from agency approved by authority having jurisdiction to identify each fire rated glass lite.
- C. Vapor Retarder and Air Barrier Seals: Provide completed assemblies that maintain continuity of building enclosure vapor retarder and air barrier.
1. In conjunction with vapor retarder and joint sealer materials described in other Sections.
  2. To utilize the inner pane of multiple pane insulating glass units for the continuity of the vapor retarder and air barrier seal.
  3. To maintain a continuous vapor retarder and air barrier throughout the glazed assembly from glass pane to heel bead of glazing sealant.
- D. Thermal and Solar Optical Performance: Measured or calculated in accordance with the following:
1. U-Values: NFRC 100.
  2. Solar Heat Gain Coefficients: NFRC 200.
  3. Solar Optical Properties: NFRC 300.

## 2.2 GLASS MATERIALS

- A. Float Glass: Provide float glass based glazing unless noted otherwise.
1. Glass Lite Thicknesses: As indicated, but not less than 1/4 inch; provide greater thickness as required for exterior glazing wind load design.
  2. Annealed Glass: ASTM C1036, Type I (transparent flat), Class 1 (clear), Quality-Q3.
  3. Tinted Glass: ASTM C1036, Type 1 (transparent flat), Class 2 (tinted), Quality-Q3, color and performance characteristics as indicated.
  4. Heat-Strengthened Glass: ASTM C1048, Kind HS.
  5. Fully Tempered Safety Glass: ASTM C1048, Kind FT.
  6. Acid Etched Glass: ASTM C1036, Type II (transparent flat), Class 1 (clear), Quality-Q3.
  7. Tempered Acid Etched Glass: ASTM C1048 Kind FT (fully tempered), Type II (transparent flat), Class 1 (clear), Quality-Q3.
- B. Laminated Glass: Float glass laminated in accordance with ASTM C1172.
1. Laminated Safety Glass:

- a. Comply with ANSI Z97.1 - Class A or 16 CFR 1201 - Category II impact test requirements.
- 2. Interlayer:
  - a. Polyvinyl Butyral (PVB) Interlayer; 0.030 inch thick, minimum.
- C. Low-E Coating Types:
  - 1. Low-E (solar control): Manufactured using the magnetron sputtered vacuum deposition (MSVD) process and in compliance with ASTM C1376.

### 2.3 INSULATING GLASS UNITS - GENERAL

- A. Manufacturers:
  - 1. Cardinal Glass Industries.
  - 2. Guardian Industries Corporation.
  - 3. Pilkington North America Inc.
  - 4. Viracon (Subsidiary of Apogee Enterprises, Inc.)
  - 5. Vitro Architectural Glass (formerly PPG Glass).
  - 6. Substitutions: Section 01 60 00 - Product Requirements.
- B. Basis of Design: Guardian Industries Corporation.
- C. Fabricators:
  - 1. Fabricator certified by glass manufacturer for type of glass, glass unit, coating, and treatment involved and capable of providing requirements indicated in this Section.
- D. Insulating Glass Units: Types as indicated.
  - 1. Factory assembled units consisting of continuously sealed lites of glass separated by an aluminum (or stainless steel) spacer with sealants.
  - 2. Overall Unit Thickness: Dependent on assembled unit components.
  - 3. Durability: Certified by an independent testing agency to comply with ASTM E2190.
  - 4. Metal Edge Spacers:
    - a. Aluminum, mitered and spigoted.
      - 1) Desiccant: Molecular sieve or silica gel, or blend of both.
  - 5. Edge Seal: Dual Seal - Glass to elastomer with supplementary silicone sealant.
  - 6. Interpane Air Space: 1/2 inch, unless indicated otherwise in Schedule of IGU Types.
    - a. Purge interpane air space with dehydrated air, hermetically sealed.
    - b. Use Argon in lieu of Dehydrated Air only if indicated in Schedule of IGU Types.
  - 7. Primary IGU Seal:
    - a. The primary IGU sealant must be fully wetted against the glass and be continuous around the perimeter of each side with a targeted width of 5/32 inch and a minimum width of 3/32 inch.
    - b. The minimum thickness of the primary seal after pressing is 1/16 inch.

### 2.4 INSULATING GLASS UNITS

- A. **Type IG1** - Insulating Glass Unit:
  - 1. Outboard Lite:
    - a. Coating:
      - 1) Low-E Coating (solar control type), on #2 surface.
        - a) Basis of Design:
          - (1) Guardian - SunGuard SN 54.
    - b. Tint:
      - 1) Class 1 - Clear.
    - c. Glass Type:
      - 1) Fully Tempered Safety Glass.

- d. Glass Thickness: 1/4 inch (6 mm) minimum.
  2. Inboard Lite:
    - a. Coating:
      - 1) None.
    - b. Tint:
      - 1) Class 1 - Clear.
    - c. Glass Type:
      - 1) Fully Tempered Safety Glass.
    - d. Glass Thickness: 1/4 inch (6 mm) minimum.
  3. Interspace Content: Air, 1/2 inch (12mm) wide, hermetically sealed, dehydrated space.
  4. Overall Unit Thickness: 1 inch (25 mm).
  5. Provide labeling where safety glazing labeling is required.
- B. Type IG2 - Insulating Glass Unit:**
1. Outboard Lite:
    - a. Coating:
      - 1) Low-E Coating (solar control type), on #2 surface.
        - a) Basis of Design:
          - (1) Guardian - SunGuard SN 54.
    - b. Tint:
      - 1) Class 2 - Tinted:
        - a) Color:
          - (1) As selected by Architect from manufacturer's full range.
    - c. Glass Type:
      - 1) Laminated Safety Glass.
    - d. Glass Thickness: 1/4 inch (6 mm) minimum.
  2. Inboard Lite:
    - a. Coating:
      - 1) None.
    - b. Tint:
      - 1) Class 1 - Clear.
    - c. Translucent Finish Type:
      - 1) Acid etched texture on #3 surface.
        - a) Basis of Design: Gurardian - SatinDeco.
      - 2) Translucent Appearance/Design/Privacy:
        - a) Matte Frosted.
        - b) Object image presents as shadow but no form.
        - c) As selected by Architect from manufacturer's full range.
    - d. Glass Type:
      - 1) Laminated Safety Glass.
    - e. Glass Thickness: 1/4 inch (6 mm) minimum.
  3. Interspace Content: Air, 1/2 inch (12mm) wide, hermetically sealed, dehydrated space.
  4. Overall Unit Thickness: 1 inch (25 mm).
  5. Provide labeling where safety glazing labeling is required.
- C. Type IG3 - Insulating Glass Unit:**
1. Outboard Lite:
    - a. Coating:
      - 1) Low-E Coating (solar control type), on #2 surface.
        - a) Basis of Design:
          - (1) Guardian - SunGuard SN 54.
    - b. Tint:

- 1) Class 2 - Tinted:
    - a) Color:
      - (1) As selected by Architect from manufacturer's full range.
  - c. Glass Type:
    - 1) Fully Tempered Safety Glass.
  - d. Glass Thickness: 1/4 inch (6 mm) minimum.
2. Inboard Lite:
    - a. Coating:
      - 1) None.
    - b. Tint:
      - 1) Class 1 - Clear.
    - c. Glass Type:
      - 1) Fully Tempered Safety Glass.
    - d. Glass Thickness: 1/4 inch (6 mm) minimum.
  3. Interspace Content: Air, 1/2 inch (12mm) wide, hermetically sealed, dehydrated space.
  4. Overall Unit Thickness: 1 inch (25 mm).
  5. Provide labeling where safety glazing labeling is required.

## 2.5 GLASS UNITS - SINGLE PANE

- A. **Type FG** - Float Glass (non-safety type).
  1. Application: Locations as follows.
    - a. Locations as indicated on Drawings.
  2. Tint:
    - a. Class 1 - Clear.
      - 1) Exception: If adjacent glass is tinted, match tinted glass.
  3. Glass Type:
    - a. Heat-Strengthened float glass.
  4. Total Thickness: 1/4 inch.
- B. **Type SG** - Safety Glass, Tempered.
  1. Application: Locations as follows.
    - a. Locations as indicated on Drawings, and locations required by applicable federal, state, and local codes and regulations.
  2. Tint:
    - a. Class 1 - Clear.
      - 1) Exception: If adjacent glass is tinted, match tinted glass.
  3. Glass Type: Fully Tempered Safety Glass.
  4. Thickness: 1/4 inch.
- C. **Type LG** - Safety Glass, Laminated.
  1. Application: Locations as follows.
    - a. Locations indicated on Drawings.
  2. Tint:
    - a. Class 1 - Clear.
      - 1) Exception: If adjacent glass is tinted, match tinted glass.
  3. Glass Type: Laminated Safety Glass.
  4. Thickness: 1/4 inch.
- D. **Type MG**: Mirror Glass.
  1. Glass Type: Fully Tempered Safety Glass; ASTM C1048; Type I (transparent flat); Class 1 (clear), Quality-Q3, with copper and silver coatings, and protective overcoating.
  2. Edges:

- a. Pencil Polished/Ground.
3. Thickness: 1/4 inch.

## 2.6 GLAZING COMPOUNDS

- A. All materials to be approved by manufacturers of products to which glazing compounds are to be applied.
- B. Butyl Sealant: Single component; ASTM C920, Grade NS, Class 12-1/2, Uses M and A, Shore A hardness of 10 to 20; black color.
- C. Silicone Sealant: Single component; neutral curing; capable of water immersion without loss of properties; non-bleeding, non-staining; ASTM C920, Type S, Grade NS, Class 25, Uses M, A, and G; with cured Shore A hardness range of 15 to 25; Black color.

## 2.7 ACCESSORIES

- A. All accessories to be approved by manufacturers of products to which accessories are to be applied.
- B. Setting Blocks: Neoprene, with 80 to 90 Shore A durometer hardness; ASTM C864 Option II. Length of 0.1 inch for each square foot of glazing or minimum 4 inches x width of glazing rabbet space minus 1/16 inch x height to suit glazing method and pane weight and area.
- C. Spacer Shims: Neoprene, 50 to 60 Shore A durometer hardness; ASTM C864 Option II. Minimum 3 inches long x one half the height of the glazing stop x thickness to suit application, self-adhesive on one face.
- D. Glazing Tape, Back Bedding Mastic Type: Preformed, butyl-based, 100 percent solids compound with integral resilient spacer rod applicable to application indicated; 5 to 30 cured Shore A durometer hardness; coiled on release paper; black color.
  1. Width: As required for application.
  2. Thickness: As required for application.
  3. Manufacturers:
    - a. Pecora Corporation - Extru Seal Glazing Tape.
    - b. Tremco Sealants - Tremco 440 Glazing Tape.
- E. Spacer Rod Diameter: As required for application.
- F. Glazing Gaskets (Splines): Resilient silicone extruded shape to suit glazing channel retaining slot; ASTM C864 Option II; color black.
- G. Fire-Resistant Glazing Materials: Materials used to obtain required fire-resistant rating.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify that openings for glazing are correctly sized and within tolerances, including those for size, squareness, and offsets at corners.
- C. Verify that the minimum required face and edge clearances are being provided.
- D. Verify that surfaces of glazing channels or recesses are clean, free of obstructions that may impede moisture movement, weeps are clear, and support framing is ready to receive glazing system.



- E. Verify that sealing between joints of framing system members has been completed effectively.
- F. Proceed with glazing system installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this Section.
- B. Prepare materials to be installed and equipment used during installation.
- C. Clean contact surfaces with appropriate solvent and wipe dry within maximum of 24 hours before glazing. Remove coatings that are not tightly bonded to substrates.
- D. Seal porous glazing channels or recesses with substrate compatible primer or sealer.
- E. Prime surfaces scheduled to receive sealant where required for proper sealant adhesion.

### 3.3 INSTALLATION - GENERAL

- A. Perform installation in accordance with GANA Glazing Manual.
  - 1. Glazing Sealants: Comply with ASTM C1193.
  - 2. Fire Rated Openings: Comply with NFPA 80.
- B. Install glazing in compliance with written instructions of glass, gaskets, and other glazing material manufacturers, unless more stringent requirements are indicated, including those in glazing referenced standards.
- C. Install glazing sealants in accordance with ASTM C1193, GANA (SM), and manufacturer's instructions.
- D. Do not exceed edge pressures around perimeter of glass lites as stipulated by glass manufacturer.
- E. Set glass lites of system with uniform pattern, draw, bow, and similar characteristics.
- F. Set glass lites in proper orientation so that coatings face exterior or interior as indicated.
- G. Prevent glass from contact with any contaminating substances that may be the result of construction operations such as weld splatter, fire-safing, plastering, mortar droppings, etc.

### 3.4 INSTALLATION METHODS

- A. Utilize installation method required by manufacturer and glazing system design.
- B. Dry Glazing Method (Gasket Glazing):
  - 1. Application - Exterior and/or Interior Glazed: Set glazing infills from either the exterior or the interior of the building.
  - 2. Place setting blocks at 1/4 points with edge block no more than 6 inches from corners.
  - 3. Rest glazing on setting blocks and push against fixed stop with sufficient pressure on gasket to attain full contact.
  - 4. Install removable stops without displacing glazing gasket; exert pressure for full continuous contact.
- C. Dry Glazing Method (Tape and Gasket Spline Glazing):
  - 1. Application - Exterior Glazed: Set glazing infills from the exterior of the building.
  - 2. Cut glazing tape to length; install on glazing pane. Seal corners by butting tape and sealing junctions with butyl sealant.
  - 3. Place setting blocks at 1/4 points with edge block no more than 6 inches from corners.

4. Rest glazing on setting blocks and push against fixed stop with sufficient pressure to attain full contact.
  5. Install removable stops without displacing glazing spline. Exert pressure for full continuous contact.
  6. Carefully trim protruding tape with knife.
- D. Dry Glazing Method (Tape and Tape):
1. Application - Interior Glazed: Set glazing infills from the interior of the building.
  2. Cut glazing tape to length and set against permanent stops, projecting 1/16 inch above sight line.
  3. Place setting blocks at 1/4 points with edge block no more than 6 inches from corners.
  4. Rest glazing on setting blocks and push against tape for full contact at perimeter of pane or unit.
  5. Place glazing tape on free perimeter of glazing in same manner described above.
  6. Install removable stop without displacement of tape. Exert pressure on tape for full continuous contact.
  7. Carefully trim protruding tape with knife.
- E. Wet Glazing Method (Compound and Compound):
1. Application - Interior Glazed: Set glazing infills from the interior of the building.
  2. Install glazing resting on setting blocks. Install applied stop and center pane by use of spacer shims at 24 inches centers, kept 1/4 inch below sight line.
  3. Locate and secure glazing pane using glazers' clips.
  4. Fill gaps between glazing and stops with glazing compound until flush with sight line. Tool surface to straight line.
- F. Wet/Dry Glazing Method (Preformed Tape and Sealant):
1. Application - Exterior Glazed: Set glazing infills from the exterior of the building.
  2. Cut glazing tape to length and set against permanent stops, 3/16 inch below sight line. Seal corners by butting tape and dabbing with butyl sealant.
  3. Apply heel bead of butyl sealant along intersection of permanent stop with frame ensuring full perimeter seal between glass and frame to complete the continuity of the air and vapor seal.
  4. Place setting blocks at 1/4 points with edge block no more than 6 inches from corners.
  5. Rest glazing on setting blocks and push against tape and heel bead of sealant with sufficient pressure to attain full contact at perimeter of pane or glass unit.
  6. Install removable stops, with spacer strips inserted between glazing and applied stops 1/4 inch below sight lines.
    - a. Place glazing tape on glazing pane of unit with tape flush with sight line.
  7. Fill gap between glazing and stop with glazing manufacturer's required sealant type to depth equal to bite of frame on glazing, but not more than 3/8 inch below sight line.
  8. Apply cap bead of glazing manufacturer's required sealant type along void between the stop and the glazing, to uniform line, flush with sight line. Tool or wipe sealant surface smooth.

### 3.5 FIELD QUALITY CONTROL

- A. Section 01 40 00 - Quality Requirements: Monitor quality of installation, inspection, and testing.
- B. Glass and Glazing product manufacturers to provide field surveillance of the installation of their products.
- C. Monitor and report installation procedures and unacceptable conditions.

**3.6 CLEANING**

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures: Related to cleaning.
- B. Remove excess glazing materials from finish surfaces immediately after application using solvents or cleaners recommended by manufacturers.
- C. Remove non-permanent labels immediately after glazing installation is complete.
- D. Clean glass and adjacent surfaces after sealants are fully cured.
- E. Clean glass on both exposed surfaces not more than 4 days prior to Date of Substantial Completion in accordance with glass manufacturer's written recommendations.

**3.7 PROTECTION OF INSTALLED CONSTRUCTION**

- A. Section 01 73 00 - Execution: Protecting installed construction.
- B. Protect installed construction from damage.

**3.8 SCHEDULE**

- A. Refer to Drawings for locations of Glass Unit Types.

**END OF SECTION**



**SECTION 08 91 00****LOUVERS****PART 1 GENERAL****1.1 SUMMARY**

- A. Section includes louvers, frames, and accessories.
- B. Related Requirements:
  - 1. Section 07 90 00 - Joint Protection: Sealant at louver perimeter.
  - 2. Division 23 - Heating, Ventilating and Air-Conditioning (HVAC): Coordinate Work of this Section with requirements of HVAC systems.

**1.2 REFERENCES**

- A. American Architectural Manufacturers Association (AAMA):
  - 1. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2020.
- B. Air Movement and Control Association International, Inc. (AMCA):
  - 1. AMCA 500-L - Laboratory Methods of Testing Louvers for Rating; 2015.
  - 2. AMCA 511 - Certified Ratings Program Product Rating Manual for Air Control Devices; 2021.
- C. American Society of Civil Engineers (ASCE):
  - 1. ASCE 7-10 - Minimum Design Loads For Buildings And Other Structures; 2011.
- D. ASTM International (ASTM):
  - 1. ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2021.
  - 2. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2020.

**1.3 COORDINATION**

- A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.
- B. Coordinate Work with installation of masonry flashings.
- C. Coordinate Work with installation of mechanical ductwork and electrical services to motorized devices.
- D. Coordinate air-flow rate and capacity to comply with the design requirements indicated in the contract documents.
- E. Verify field measurements prior to fabrication.

**1.4 SUBMITTALS**

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Product Data: Submit data describing design characteristics, maximum recommended air velocity, design free area, materials, and finishes.
- C. Shop Drawings: Indicate louver layout plan and elevations, opening and clearance dimensions, tolerances; head, jamb, and sill details; blade configuration, screens, blank-off panel areas required, and frames.

- D. Samples for Initial Selection: Two manufacturer's color charts illustrating the full range of finishes and colors available for products with factory-applied finishes; submit for Architect's initial selection.
- E. Samples for Verification: From the Architect's initial selection, prepare two samples for each selected finish and color; samples on same product material type indicated for final Work; each sample 4 x 4 inches. Where finishes involve normal color and texture variations, include sample sets showing the full range of variations expected.
- F. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

## 1.5 QUALITY ASSURANCE

- A. Perform Work in accordance with AMCA 500-L testing and AMCA 511 certification. Attach AMCA seal to louvers.
- B. Maintain one copy of each document on site.

## 1.6 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing Products specified in this section with minimum five (5) years documented experience.

## 1.7 WARRANTY

- A. Section 01 77 00 - Closeout Procedures: Product warranties.
- B. Provide minimum fifteen (15) year manufacturer's warranty on finish.

## PART 2 PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Design and size system components and anchorage to safely withstand assembly dead loads, and to withstand live loads caused by positive and negative wind pressure acting normal to louver plane.
  - 1. Wind Design Pressure:
    - a. As indicated on Drawings, in accordance with ASCE 7-10, and in accordance with the State Building Code for the State in which the project is located.
- B. Louver Air Passage: To permit passage of air at velocity of 750 ft / min without blade vibration or noise, with maximum static pressure loss of 0.10 inches measured at 750 ft / min.
- C. Louver Free Area: To permit 50 percent free area.
- D. Louver Water Penetration: Not more than 0.01 oz/sq ft of free area at minimum 750 ft / min face velocity.

### 2.2 WALL LOUVERS

- A. Manufacturers:
  - 1. Airline Products Co.
  - 2. Airolite.
  - 3. Arrow United Industries.
  - 4. Construction Specialties Inc.
  - 5. Greenheck Corp.
  - 6. Ruskin.
  - 7. Substitutions: Section 01 60 00 - Product Requirements.

- B. Basis of Design: Construction Specialties, Inc. - Model RS-5300.
- C. Factory fabricated and assembled, complete with frame, mullions, and accessories; AMCA Certified in accordance with AMCA 511.
- D. Louver Construction: Extruded aluminum; size, configuration and face dimensions as indicated on Drawings.
- E. Louver Panel Depth: Minimum 5 inches deep, or deeper if required by size and performance requirements.
- F. Heads, sills, jambs, and mullions to be one-piece structural aluminum extrusion members; minimum extrusion wall thickness to be 0.081 inch and with integral perimeter formed with sealant slot and retaining bead to retain backer rod for sealant application.
  - 1. Intermediate Mullions: Concealed of extruded aluminum, profiled to suit louver frame.
- G. Louver Blades: Drainable blades to be one-piece aluminum extrusions; minimum extrusion wall thickness to be 0.060 inch and with integral front lip gutter and multiple secondary gutters designed to stop and drain moisture to exterior of building envelope.
  - 1. Storm proof, sloped at 45 degrees, chevron style.
- H. Sill Pan: Sill flashings to include sill pan, minimum 3 inch high by full depth formed from minimum 0.050 inch thick aluminum; single length one-piece construction; integral formed drip edge to divert moisture away from building face. End dam side panels to be continuous welded to sill pan and full height of sill pan.
- I. Hinged Units: Where indicated on Drawings, provide secondary frame to which louver frame is attached; non-ferrous hinges; all finishes to match colors selected by Architect.

### 2.3 MATERIALS

- A. Extruded Aluminum: ASTM B221; 6063 alloy, T5 temper typical, 6061 alloy, T6 temper for extruded structural members.
- B. Sheet Aluminum: ASTM B209/B209M, 5005 alloy, H15 or H34 temper, wall thickness as required for system application and use but not less than 0.050 inch.

### 2.4 ACCESSORIES

- A. Screens: Mechanically fasten to interior side of louver.
  - 1. Bird Screen: Interwoven wire mesh of aluminum, 0.063 inch diameter wire, 1/2 inch open weave, square design, set in aluminum frame.
  - 2. Insect Screen: 18 x 16 size aluminum mesh, set in aluminum frame.
- B. Blank-Off Panels: Furnish where indicated on the Drawings; fabricated by the louver manufacturer; metal type to be same as louver and frame metal type; metal finish type to be same as louver finish type.
  - 1. Panel Type:
    - a. Composite Metal Sheet Panel: Blank-off panels to be composite construction faced on both sides with 0.032 inch (0.81 mm) thick metal sheet and core to be expanded polystyrene (EPS) having R-value of 4, minimum. Panel perimeter frame to be 0.050 inch (1.27mm) thick-formed metal channels; mitered at the corners.
      - 1) Composite Panel Thickness:
        - a) 2 inches.
  - 2. Secure blank-off panels to interior side of louver and fully sealed weathertight.
  - 3. Blank-Off Panels Finish: In accordance with AAMA 2605, 70 percent resin fluoropolymer coating, minimum 1.4 mil (0.035mm) thick; color to be flat black.

- C. Fasteners and Anchors: Concealed; stainless steel type.
- D. Flashings: Sheet aluminum; finish to match louver finish.
- E. Sealants: Silicone type specified in Section 07 90 00.

## **2.5 FACTORY FINISHING**

- A. Powder Coat: Polyvinylidene fluoride (PVDF) powder coat system complying with AAMA 2605, minimum 70 percent PVDF resin with minimum total dry film thickness (DFT) of 1.5 mils, 0.0015 inch (0.038 mm).
- B. Colors and Gloss: As selected by Architect from full range of finish types.

## **PART 3 EXECUTION**

### **3.1 EXAMINATION**

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify prepared openings and flashings are ready to receive Work and opening dimensions are as indicated on shop drawings.

### **3.2 INSTALLATION**

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Provide continuous corrosion protection between dissimilar materials.
- C. Louver systems, including sill flashings, to be installed in accordance with Drawings the manufacturer's recommendations and to shed water to exterior of building envelope.
- D. Install flashings and align louver assembly to ensure moisture shed from flashings and diversion of moisture to exterior of building envelope.
- E. Sill pan to be embedded in full bed of sealant. Design system such that penetrations in flashings and sill pan are only for the purpose of structural anchoring of louver system.
- F. Fully seal anchor holes and heads to prevent water penetration.
- G. Install louvers level and plumb.
- H. Secure louvers in opening framing with concealed fasteners.
- I. Install bird and insect screen and frame to interior of louver.
- J. Install perimeter sealant and backing rod in accordance with Section 07 90 00.

### **3.3 CLEANING**

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures: Related to cleaning.
- B. In accordance with manufacturer's recommendations, strip protective finish coverings and clean surfaces and components.

**END OF SECTION**



**SECTION 09 21 16**  
**GYPSUM BOARD ASSEMBLIES**

**PART 1 GENERAL****1.1 SUMMARY**

- A. Section Includes:
1. Interior Gypsum Board.
  2. Exterior Gypsum Board.
  3. Framing.
  4. Suspension Support.
  5. Acoustic Attenuation.
  6. Accessories.
- B. Related Requirements:
1. Section 01 33 00 – Submittal Procedures: Delegated-Design Services.
  2. Section 05 40 00 - Cold-Formed Metal Framing.
  3. Section 06 10 53 - Miscellaneous Rough Carpentry: Wood blocking for support of wall cabinets, toilet accessories and other wall mounted Work.
  4. Section 07 21 00 - Thermal Insulation: Insulation for gypsum board assemblies requiring thermal insulation.
  5. Section 07 90 00 - Joint Protection.
  6. Section 09 30 00 - Tiling: Tile Backer Board to be installed on framing provided in this Section.

**1.2 REFERENCES**

- A. ASTM International (ASTM):
1. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2020.
  2. ASTM A1003/A1003M - Standard Specification for Steel Sheet, Carbon, Metallic- and Nonmetallic-Coated for Cold-Formed Framing Members; 2015.
  3. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2020.
  4. ASTM C303 - Standard Test Method for Dimensions and Density of Preformed Block and Board-Type Thermal Insulation; 2021.
  5. ASTM C473 - Standard Test Methods for Physical Testing of Gypsum Panel Products; 2019.
  6. ASTM C475/C475M - Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board; 2017.
  7. ASTM C635/C635M - Standard Specification for Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings; 2017.
  8. ASTM C645 - Standard Specification for Nonstructural Steel Framing Members; 2018.
  9. ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing; 2017.
  10. ASTM C754 - Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products; 2020.
  11. ASTM C834 - Standard Specification for Latex Sealants; 2017.
  12. ASTM C840 - Standard Specification for Application and Finishing of Gypsum Board; 2020.
  13. ASTM C919 - Standard Practice for Use of Sealants in Acoustical Applications; 2019.

14. ASTM C954 - Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs from 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness; 2018.
  15. ASTM C1002 - Standard Specification for Steel Self-Piercing Tapping Screws for Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs; 2020.
  16. ASTM C1104/C1104M - Standard Test Method for Determining the Water Vapor Sorption of Unfaced Mineral Fiber Insulation; 2019.
  17. ASTM C1047 - Standard Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base; 2019.
  18. ASTM C1177/C1177M - Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing; 2017.
  19. ASTM C1280 - Standard Specification for Application of Exterior Gypsum Panel Products for Use as Sheathing; 2018.
  20. ASTM C1338 - Standard Test Method for Determining Fungi Resistance of Insulation Materials and Facings; 2019.
  21. ASTM C1396/C1396M - Standard Specification for Gypsum Board; 2017.
  22. ASTM C1629/C1629M - Standard Classification for Abuse-Resistant Nondecorated Interior Gypsum Panel Products and Fiber-Reinforced Cement Panels; 2019.
  23. ASTM C1658/C1658M - Standard Specification for Glass Mat Gypsum Panels; 2019.
  24. ASTM D3273 - Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber; 2016.
  25. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2021a.
  26. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements; 2009 (Reapproval 2016).
  27. ASTM E136 - Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750°C; 2019.
  28. ASTM E970 - Standard Test Method for Critical Radiant Flux of Exposed Attic Floor Insulation Using a Radiant Heat Energy Source; 2017.
  29. ASTM G21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi; 2015 (Reapproval 2021).
- B. Gypsum Association (GA):
1. GA-216 - Application and Finishing of Gypsum Panel Products; 2016.
  2. GA-600 - Fire Resistance and Sound Control Design; 2018.
- C. International Organization for Standardization (ISO):
1. ISO 11600 - Building Construction - Jointing Products - Classification and Requirements For Sealants; 2002 with 2011 Amendments.
- D. Intertek Testing Services (Warnock Hersey Listed):
1. WH - Certification Listings; Current Edition.
- E. Underwriters Laboratories Inc. (UL):
1. UL - Fire Resistance Directory; Current Edition.
- F. California Department of Health Services:
1. Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers, including 2004 Addenda.

### 1.3 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Product Data: Submit data on metal framing; gypsum board and sheathing; joint treatment materials; and acoustic accessories.

- C. Shop Drawings: Indicate special details associated with fireproofing and acoustic accessories.
  - 1. Show type, weight, location, and spacing of members. Clearly identify attachments and connections using AWS symbols for welds, standard designations for fasteners. Show bracing, supplemental strapping, clips, and other accessories required.
  - 2. Delegated Engineering Design: Shop drawings shall be sealed by a licensed Professional Structural Engineer registered in the State in which the project is located and shall include structural calculations verifying compliance with the performance data specified and as noted on the Building Code Data Sheet and Structural requirements on the Drawings. Design is to comply the provisions of the State Building Code, for the State in which the Work is constructed.
    - a. Provide sealed calculations indicating that design of suspension systems provide compliance with seismic structural requirements indicated in the Performance and Design Requirements article in this Section.
    - b. Verify and coordinate stud depth with the partition schedule on the Drawings. Indicate component details, framed openings, bearing, anchorage, loading, welds, seismic design components, type and location of fasteners, accessories, and items required for the Work.
    - c. Show type, weight, location, and spacing of members. Clearly identify attachments and connections using AWS symbols for welds, standard designations for fasteners. Show bracing, supplemental strapping, clips, and other accessories required.
- D. Samples:
  - 1. Submit two sets of each item indicated in ACCESSORIES article in this Section, illustrating manufacturer's full range of options. Submit for selection by Architect.

## 1.4 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three (3) years documented experience.
- B. Installer: Company specializing in performing Work of this section with minimum three (3) years documented experience.
- C. Delegated Engineering Design: Design all metal stud and cold rolled steel framing using the engineering services of a Professional Structural Engineer experienced in design of this Work and licensed to perform professional engineering services in the State in which the project is located.

## PART 2 PRODUCTS

### 2.1 PERFORMANCE AND DESIGN 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 E19 by an independent testing agency.
- B. Fire Rated Wall Construction: Wall assembly fire rating to be as indicated on Drawings and as required by building code.
- C. Seismic Design is to comply with requirements for the Seismic Design Category as indicated on the Structural Drawings and Section 00 31 00 - Available Project Information.
- D. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E90 and classified according to ASTM E413 by an independent testing agency.

**2.2 MANUFACTURERS**

- A. CertainTeed Corporation (CTC).
- B. Georgia-Pacific Gypsum Corporation (GPG).
- C. National Gypsum Company (NGC).
- D. USG Corporation (USG).
- E. Substitutions: Section 01 60 00 - Product Requirements.

**2.3 INTERIOR GYPSUM BOARD MATERIAL**

- A. Standard Gypsum Board: ASTM C1396/C1396M; paper faced; maximum available length in place; tapered edges; suitable for finish and paint.
  - 1. 5/8 inch, Type X fire resistant complying with requirements of ASTM C1396/C1396M.
  - 2. Combustibility: Noncombustible complying with ASTM E136.
  - 3. Surface Burning Characteristics: When tested in accordance with ASTM E84.
    - a. Flame Spread: 15, maximum.
    - b. Smoke Development: Zero.
    - c. Class: Class A.
  - 4. Finish Level: Refer to Finish Levels Schedule at end of this Section.
  - 5. Basis of Design:
    - a. USG - Sheetrock Firecode X.
  - 6. Locations: All interior gypsum surfaces in the following areas unless indicated otherwise on Drawings.
    - a. All interior gypsum surfaces where no other gypsum board type is indicated.
- B. Mold Resistant Gypsum Board: ASTM C1396/C1396M; paper faced; maximum available length in place; ends square cut; tapered edges; suitable for finish and paint.
  - 1. 5/8 inch, Type X fire resistant complying with requirements of ASTM C1396/C1396M.
  - 2. Combustibility: Noncombustible complying with ASTM E136.
  - 3. Surface Burning Characteristics: When tested in accordance with ASTM E84.
    - a. Flame Spread: 15, maximum.
    - b. Smoke Development: 5, maximum.
    - c. Class: Class A.
  - 4. Water Absorption: 5 percent maximum by weight after two-hour immersion when tested in accordance with ASTM C473.
  - 5. Mold Growth Resistance: Score of 10 minimum, in accordance with ASTM D3273 for mold growth on interior coatings surface.
  - 6. Finish Level: Refer to Finish Levels Schedule at end of this Section.
  - 7. Basis of Design:
    - a. USG - Mold Tough Firecode X.
  - 8. Locations: All interior gypsum surfaces in the following areas unless indicated otherwise on Drawings.
    - a. Toilet Areas WITHOUT contiguous shower stalls.
    - b. Drinking Fountain Areas.
    - c. Walls With Sink(s): Entire wall length and minimum height from finish floor to 8 feet high above finish floor unless otherwise indicated on Drawings.
    - d. Janitor And Custodian Closets.
- C. Abuse and Mold Resistant Gypsum Board: ASTM C1396/C1396M; paper faced; maximum available length in place; ends square cut; tapered edges; suitable for finish and paint.
  - 1. 5/8 inch, Type X fire resistant complying with requirements of ASTM C1396/C1396M.
  - 2. Combustibility: Noncombustible complying with ASTM E136.
  - 3. Surface Burning Characteristics: When tested in accordance with ASTM E84.

- a. Flame Spread: 15, maximum.
- b. Smoke Development: 5, maximum.
- c. Class: Class A.
4. Water Absorption: 5 percent maximum by weight after two-hour immersion when tested per ASTM C473.
5. Mold Resistance: Score of 10 minimum, in accordance with ASTM D3273 for mold growth on interior coatings surface.
6. Finish Level: Refer to Finish Levels Schedule at end of this Section.
7. Basis of Design:
  - a. USG - Sheetrock Mold Tough AR Firecode X.
    - 1) Surface Abrasion: Level 2 minimum, per ASTM C1629/C1629M.
    - 2) Indentation: Level 1 minimum, per ASTM C1629/C1629M.
    - 3) Soft Body Impact: Level 2 minimum, per ASTM C1629/C1629M.
    - 4) Hard Body Impact: Level 1 minimum, per ASTM C1629/C1629M.
8. Locations: All interior gypsum surfaces in the following areas unless indicated otherwise on Drawings.
  - a. All classrooms and rooms of instruction and teaching; minimum height from finish floor to 8 feet above finish floor unless otherwise indicated on Drawings.
  - b. Media Center; minimum height from finish floor to 8 feet above finish floor unless otherwise indicated on Drawings.
  - c. All circulation areas, corridors, and passageways; minimum height from finish floor to 8 feet above finish floor unless otherwise indicated on Drawings.

## 2.4 EXTERIOR GYPSUM BOARD MATERIAL

- A. Exterior Soffit Gypsum Board: ASTM C1396/C1396M; maximum available length in place; tapered edges; suitable for finish and paint.
  1. 5/8 inch, Type X fire resistant complying with requirements of ASTM C1396/C1396M.
  2. Combustibility: Noncombustible complying with ASTM E136.
  3. Surface Burning Characteristics: When tested in accordance with ASTM E84.
    - a. Flame Spread: 20, maximum.
    - b. Smoke Development: Zero.
    - c. Class: Class A.
  4. At Assemblies Indicated with Fire-Rating: Use type required by indicated tested assembly; if no tested assembly is indicated, use Type X board, UL or WH listed.
  5. Comply with ASTM C1396/C1396M for water resistant and exterior gypsum soffit board.
  6. Finish Level: Refer to Finish Levels Schedule at end of this Section.
  7. Basis of Design:
    - a. USG - Sheetrock Exterior Gypsum Ceiling Board Firecode X.
  8. Locations: Exterior soffits and ceiling in protected areas unless indicated otherwise on Drawings.
- B. Exterior Gypsum Sheathing Board: ASTM C1177/C1177; glass mat faced gypsum substrate; maximum available length in place; tapered edges.
  1. 5/8 inch, Type X fire resistant complying with requirements of ASTM C1396/C1396M.
  2. Combustibility: Noncombustible complying with ASTM E136.
  3. Surface Burning Characteristics: When tested in accordance with ASTM E84.
    - a. Flame Spread: Zero.
    - b. Smoke Development: Zero.
    - c. Class: Class A.
  4. At Assemblies Indicated with Fire-Rating: Use type required by indicated tested assembly. If no tested assembly is indicated, use Type X board, UL or WH listed.
  5. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.

6. Fungal Resistance: No fungal growth when tested in accordance with ASTM G21.
7. Basis of Design:
  - a. USG - Securock Glass-Mat Sheathing Firecode X.
8. Locations: Exterior sheathing unless indicated otherwise on Drawings.

## 2.5 FRAMING MATERIAL

- A. Thicknesses provided here are minimum and subject to increase by Delegated Engineer's design requirements.
  1. Studs: ASTM C645; galvanized sheet steel.
    - a. 0.0312 inch thick, C shape.
  2. Runners and Tracks: ASTM C645; galvanized sheet steel.
    - a. 0.0312 inch thick, C shape.
  3. Furring, Framing, and Accessories: ASTM C645; galvanized sheet steel.
    - a. 0.0312 inch thick, C shape.
  4. Shaft Wall Studs and Accessories: ASTM C645; galvanized sheet steel.
    - a. 0.0312 inch thick, C shape.
- B. Galvanizing: Comply with ASTM A653/A653M zinc-coated hot dipped galvanized steel.
  1. Interior Framing: G40.
  2. Exterior Framing: G60.
- C. Framed Partition Head To Structure Connections: Provide one of the following types and coordinate to provide fire rated constructed assemblies as indicated on Drawings.
  1. Single Long-Leg Runner System: ASTM C645 top runner with 2-inch- deep flanges in thickness not less than indicated for studs, installed with studs friction fit into top runner and with continuous bridging located within 12 inches of the top of studs to provide lateral bracing.
  2. Double-Runner System: ASTM C645 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 inside runner.
  3. Deflection Track: Steel sheet top runner manufactured to prevent cracking of finishes applied to interior partition framing resulting from deflection of structure above; in thickness not less than indicated for studs and in width to accommodate depth of studs.
- D. Fasteners for Metal Framing: Of type, material, size, corrosion resistance, holding strength, and other properties required to fasten steel members to substrates. Use screws with low profile head where board, or other overlay sheathing, is to be applied.
- E. Anchorage to Substrate: Provide tie wire, fasteners, screws, metal supports, and other anchorage devices, of type and size to suit application, and to secure materials to building structural elements.

## 2.6 SUSPENSION SUPPORT MATERIAL

- A. Suspension Systems: ASTM C635/C635M heavy-duty main beam classification; ASTM A653/A653M zinc-coated hot dipped galvanized steel; ASTM C645 Standard specification for rigid furring channels for screw application of gypsum board.
- B. Accessories: Stabilizer bars, clips, splices, and perimeter moldings required for suspended grid system.
- C. Support Channels and Hangers: Primed steel; size and type to suit application, seismic requirements, and ceiling system flatness requirement specified.

## 2.7 ACOUSTIC ATTENUATION MATERIAL

- A. Acoustic Attenuation Insulation: Install at interior walls and ceilings as indicated on Drawings.
1. Mineral Wool Batt Insulation: Flexible or semi-rigid preformed batt or blanket, complying with ASTM C665; friction fit.
    - a. Unfaced Type: ASTM C665 Type-I (unfaced).
    - b. Combustibility: Noncombustible complying with ASTM E136.
    - c. Surface Burning Characteristics: When tested in accordance with ASTM E84.
      - 1) Flame Spread: 25, maximum.
      - 2) Smoke Development: 50, maximum.
    - d. Fungi Resistance: Passes when tested in accordance with ASTM C1338.
    - e. Nominal Density: Minimum 2.5 pcf when tested in accordance with ASTM C303.
    - f. Corrosivity to Steel: Passes when tested in accordance with ASTM C665.
    - g. Blanket Width: Sized to fully friction fit space between framing members.
    - h. Blanket Thickness: Sized to fully friction fit cavity, but not less than 3-1/2 inches.
    - i. Manufacturers:
      - 1) Johns Manville.
      - 2) Knauf Insulation.
      - 3) Owens Corning.
      - 4) Rockwool.
- B. Acoustic Sealant: For exposed and concealed joints and annular spaces around through-penetrations. Type to be non-sag, paintable, non-staining latex sealant complying with ASTM C834, ASTM C919 and as follows:
1. Basis of Design: As indicated on Drawings.
  2. Sealant to reduce airborne sound transmission through head-of-wall and bottom-of-wall joints and openings to accommodate through-penetrations in building construction as demonstrated by testing representative assemblies in accordance with ASTM E90.
  3. Sound Transmission Class: Sealant to maintain STC ratings at sound rated partitions as indicated on the drawings.
  4. Surface Burning Characteristics: When tested in accordance with ASTM E84.
    - a. Flame Spread: 10, maximum.
    - b. Smoke Development: 10, maximum.
  5. Mold and Mildew Resistance: Rating of zero (0), "no growth", in accordance with ASTM G21.
  6. Movement Capability: 10 percent minimum, in accordance with ISO 11600.
  7. Sealant materials and methods shall conform to applicable governing codes and authorities having jurisdiction.
  8. Maximum volatile organic compound content to be in accordance with California Department of Health Services Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers, including 2004 Addenda.
- C. Acoustic Sprays: For exposed and concealed locations; sprayable latex material complying with ASTM C919 and the following:
1. Basis of Design: As indicated on Drawings.
  2. Spray to reduce airborne sound transmission through head-of-wall joints in building construction as demonstrated by testing representative assemblies in accordance with ASTM E90.
  3. Sound Transmission Class: Spray to maintain STC ratings at sound rated partitions as indicated on the drawings.
  4. Surface Burning Characteristics: When tested in accordance with ASTM E84.
    - a. Flame Spread: 10, maximum.
    - b. Smoke Development: 10, maximum.

5. Mold and Mildew Resistance: Rating of zero (0), “no growth”, in accordance with ASTM G21.
6. Movement Capability: 10 percent minimum, in accordance with ISO 11600.
7. Spray materials and methods shall conform to applicable governing codes and authorities having jurisdiction.
8. Maximum volatile organic compound content to be in accordance with California Department of Health Services Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers, including 2004 Addenda.

## 2.8 ACCESSORIES

- A. Finishing Trim: ASTM C1047, galvanized steel or rolled zinc, unless noted otherwise. Includes trims such as corner beads, edge trim, control joints and expansion joints.
  1. Types: As detailed or required for finished appearance.
    - a. Continuous bead profile required for termination and protection of finish compound edge.
    - b. J-trim, without bead, is not allowed at gypsum board termination end unless indicated on Drawings.
  2. Special Shapes: In addition to conventional corner bead and control joints, provide U-bead at exposed panel edges.
  3. Vinyl Beads and Trim:
    - a. Not permitted.
- B. Expansion Joints:
  1. Type: Accordion profile with factory-installed protective tape.
- C. Control Joints:
  1. Type: V-shaped metal with factory-installed protective tape.
- D. Joint Materials: ASTM C475/C475M; reinforcing tape, joint compound, and water.
  1. Joint Tape:
    - a. Fiberglass Tape: 2 inch (50 mm) wide, open-weave coated glass fiber tape for joints and corners, except as otherwise indicated.
    - b. Paper Tape: 2 inch (50 mm) wide, creased paper tape for joints and corners, except as otherwise indicated.
  2. Joint Compound:
    - a. Drying-Type: Vinyl-based, ready-mixed.
    - b. Setting-Type: Chemical hardening, field-mixed.
- E. Screws for Fastening Board Materials to Steel Framing Members:
  1. Gypsum Board: Use S-Type screws complying with the following.
    - a. Metal thickness from 0.033 to 0.112 inch: ASTM C954; steel drill screws, corrosion resistant.
    - b. Metal thickness less than 0.033 inch: ASTM C1002; self-piercing tapping screws, corrosion resistant.
- F. Exterior Soffit Vents: One piece, perforated, ASTM B221 6063 T5 alloy aluminum, with edge suitable for direct application to gypsum board and manufactured especially for soffit application. Provide continuous vent unless otherwise indicated on Drawings.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.



- B. Verify site conditions are ready to receive work and opening dimensions are as indicated on shop drawings.

### 3.2 PREPARATION

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this Section.
- B. Prepare materials to be installed and equipment to be used during installation.

### 3.3 INSTALLATION - GENERAL

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Installation requirements in this Section are minimum requirements and are subject to more stringent requirements as may be indicated in the design by the Delegated Engineering Design.
- C. SUPPORT AND ANCHOR FRAMING SYSTEMS TO FLOOR SYSTEM BELOW AND BUILDING STRUCTURAL MEMBERS ABOVE. DO NOT SUSPEND, SUPPORT, OR ANCHOR FRAMING SYSTEMS TO NON-STRUCTURAL BUILDING ELEMENTS ABOVE SUCH AS ROOF DECKING AND FLOOR DECKING. DO NOT ALLOW ANCHORS OR SUPPORTS TO TOUCH OR DAMAGE EMBEDDED, CONCEALED OR VISIBLE WORK SUCH AS HVAC, ELECTRICAL, AND PLUMBING COMPONENTS.
- D. Environmental Limitations: Install gypsum board, joint treatment materials, finish materials, and adhesives in accordance with ASTM C840 requirements and gypsum board manufacturer's written recommendations.
- E. Do not install panels that are wet, moisture damaged, or 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.

### 3.4 METAL FRAMING INSTALLATION

- A. Install metal framing in accordance with GA-216, GA-600, ASTM C754, and manufacturer's recommendations.
- B. Wall Framing:
  - 1. Metal stud spacing to be 16 inches on center, minimum.
  - 2. Refer to Drawings for indication of partitions extending stud framing through ceiling to structure above. Maintain clearance under structural building members to avoid deflection transfer to studs. Provide extended leg ceiling runners.
  - 3. Door Opening Framing: Reinforce openings as required for to withstand the forces imposed by the weight and operation of specified doors or operable panels, using not less than double studs at jambs and increased reinforcing as needed.
  - 4. Blocking: Screw wood blocking to studs. Install blocking as required for support of wall mounted construction, devices, and equipment similar to, but not limited to, the following:
    - a. Toilet partitions and accessories; cabinet units; visual display surfaces; televisions and monitors; handrails; fixtures.
- C. Wall Furring:
  - 1. Erect wall furring for direct attachment to concrete masonry walls.

2. Erect furring channels vertically; space maximum 24 inches o.c., not more than 4 inches from abutting walls. Secure in place on alternate channel flanges at maximum 24 inches on center.
3. Erect metal stud framing spaced 1/2 inches from concrete masonry walls, attached by adjustable furring brackets.
4. Wall Furring for Fire Ratings: Install furring as required for fire resistance ratings indicated and to GA-600 requirements.

D. Ceiling Framing:

1. Coordinate location of hangers with other work.
2. Install ceiling framing independent of walls, columns, and above ceiling work.
3. Reinforce openings in ceiling suspension system which interrupt main carrying channels or furring channels, with lateral channel bracing. Extend bracing minimum 24 inches past each end of openings.
4. Laterally brace entire suspension system.

### 3.5 ACOUSTIC ACCESSORIES INSTALLATION

- A. Install acoustic accessories in accordance with GA-600 as related to sound control.
- B. Acoustic Attenuation Insulation: Friction fit insulation within framing cavity in partitions tight within spaces, around cut openings, behind and around electrical and mechanical items within or behind partitions, and tight to items passing through partitions. Thickness as required to fill cavity.
- C. Acoustic Sealant and Spray:
  1. General: Comply with Drawings and acoustic sealant and spray manufacturer's written installation instructions for products and applications indicated.
  2. Standards: Comply with recommendations of ASTM C919 for use of joint sealants in acoustical applications as applicable to materials, applications and conditions indicated.
  3. Install acoustic sealant backings of type indicated to support sealant and spray during application in accordance with manufacturer's written installation instructions.
  4. Install acoustic sealant and spray free of air pockets, embedded foreign matter, sags and ridges.
  5. Tooling of Non-sag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified 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.
    - a. Remove excess acoustic sealant from surfaces adjacent to joint.
    - b. Remove excess acoustic spray from surfaces adjacent to joint as indicated on the drawings.
    - c. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
    - d. Provide concave joint configuration unless otherwise indicated.

### 3.6 GYPSUM BOARD INSTALLATION

- A. Install gypsum board in accordance with ASTM C840, and GA-216.
- B. Gypsum Board:
  1. Use screws when fastening gypsum board to metal furring or framing.
  2. Erect single layer gypsum board in most economical direction, with ends and edges occurring over firm bearing. Exception as follows:
    - a. Erect single layer fire rated gypsum board vertically, with edges and ends occurring over firm bearing.

3. Erect exterior gypsum sheathing in accordance with ASTM C1280, horizontally, with edges butted and ends occurring over firm bearing.
4. Double Layer Applications: Secure second layer to first with fasteners. Place second layer parallel to first layer. Offset joints of second layer from joints of first layer.
5. Treat cut edges and holes in moisture resistant gypsum board and exterior gypsum soffit board with sealant.
6. Control Joints: Construct control joint in accordance with the drawings, GA-216, and as follows:
  - a. Place control joints consistent with lines of building space and features. When not indicated in the drawings, install control joints per GA-216 and as follows:
    - 1) Not more than 30 feet apart on walls over 50 feet long.
    - 2) At ceilings, not more than 30 feet apart in both directions.
    - 3) At interior and exterior gypsum and stucco soffits and bulkheads, at all inside corners of vertical surfaces not more than 30 feet apart on vertical and horizontal surfaces. Control joints installed on vertical surfaces shall continue, in alignment/direction and through corner finish, onto contiguous horizontal surface of like material (like treatment from horizontal surfaces to contiguous vertical surfaces).
    - 4) At interior and exterior soffits and bulkheads, not more than 30 feet apart on vertical and horizontal surfaces. Control joints installed on vertical surfaces shall continue, in alignment/direction and through corner finish, onto contiguous horizontal surface of like material (like treatment from horizontal surfaces to contiguous vertical surfaces).
7. Place corner beads at external corners. Use longest practical length.
8. Edge Trim: Install LC Bead edge trim at locations where gypsum board abuts dissimilar materials. Allow appropriate space for application of appropriate sealant to seal and bridge between the gypsum finished edge trim and the dissimilar material.
9. Exterior Soffit Vents: Install according to manufacturer's written instructions and in locations shown on the drawings. Provide vent area indicated.

### 3.7 JOINT TREATMENT AND FINISH

- A. Finish gypsum board materials in accordance with ASTM C840 and to Finish Level as indicated in Schedule at end of this Section.
- B. Fiberglass Joint Tape: Embed and finish with setting-type joint compound in the following locations and as otherwise recommended by board manufacturer for application conditions.
  1. Exterior Locations: All exterior locations.
  2. Interior Locations: Tile backer board locations.
  3. All Glass Mat Faced Board Locations: Interior and exterior.
- C. Paper Joint Tape: Embed with drying-type joint compound and finish with drying-type joint compound in the following locations.
  1. Exterior Locations: No paper joint tape to be used.
  2. Interior Locations: To be used at locations where fiberglass joint tape is not indicated.
- D. Tape, fill and sand joints, edges and corners, ready to receive finishes.

### 3.8 SHAFT WALL INSTALLATION

- A. Install in accordance with manufacturer's installation instructions, GA-216, GA-600, and ASTM C754.
- B. Fasten runners to structure with short leg to finished side, using appropriate power-driven fasteners at not more than 24 inches on center.
- C. Install studs at spacing required to meet performance requirements.

- D. Shaft Wall Liner: Cut panels to accurate dimension and install sequentially between special friction studs.
  - 1. On walls over sixteen feet high, screw-attach studs to runners top and bottom.
  - 2. Seal perimeter of shaft wall and penetrations with acoustical sealant.

### **3.9 ERECTION TOLERANCES**

- A. Section 01 40 00 - Quality Requirements: Tolerances.
- B. Maximum Variation of Finished Gypsum Board Surface from Flat Surface: 1/8 inch in 10 feet in any direction.

### **3.10 SCHEDULES**

- A. Finish Levels Schedule: Gypsum finish levels to be in accordance with ASTM C840:
  - 1. Level 1: Surfaces above finished ceilings and concealed from view.
  - 2. Level 5: All surfaces exposed to view (includes GWB that is painted or covered with adhered wall covering sheet materials).

**END OF SECTION**

**SECTION 09 30 00****TILING****PART 1 GENERAL****1.1 SUMMARY**

- A. Section Includes:
  1. Floor Tile and setting applications.
  2. Trim and accessories.
  3. Accessories.
- B. Related Requirements:
  1. Section 03 30 00 - Cast-In-Place Concrete: Substrate for floor tile.
  2. Section 04 20 00 - Unit Masonry: Substrate for wall tile.

**1.2 REFERENCE STANDARDS**

- A. American National Standards Institute (ANSI):
  1. ANSI A108/A118/A136 - Installation of Ceramic Tile; 2020:
    - a. Includes ANSI A108.01, .02, .1A, .1B, .1C, .4, .5, .6, .8, .9, .10, .11, .12, .13, .14, .15, .16, and .17 - defines the installation of ceramic tile.
      - 1) ANSI A108.1A - Installation of Ceramic Tile in the Wet-Set Method, with Portland Cement Mortar.
      - 2) ANSI A108.1B - Installation of Ceramic Tile on a Cured Portland Cement Mortar Setting Bed with Dry-Set or Latex-Portland Cement Mortar.
      - 3) ANSI A108.11 - Interior Installation of Cementitious Backer Units.
      - 4) ANSI A108.13 - Installation of Load Bearing, Bonded, Waterproof Membranes for Thin-Set Ceramic Tile and Dimension Stone.
    - b. Includes ANSI A118.1, .3, .4, .5, .6, .7, .8, .9, .10, .11, .12, .13, .15, and ANSI A136 - defines the test methods and physical properties for ceramic tile installation materials.
      - 1) ANSI A118.1 - Dry-Set Cement Mortar.
      - 2) ANSI A118.3 - Chemical Resistant, Water Cleanable Tile-Setting and - Grouting Epoxy and Water Cleanable Tile-Setting Epoxy Adhesive.
      - 3) ANSI A118.4 - Modified Dry-Set Cement Mortar
      - 4) ANSI A118.5 - Chemical Resistant Furan Mortars and Grouts for Tile Installation.
      - 5) ANSI A118.7 - High Performance Cement Grouts for Tile Installation.
      - 6) ANSI A118.8 - Modified Epoxy Emulsion Mortar/ Grout.
      - 7) ANSI A118.9 - Test Methods and Specifications for Cementitious Backer Units.
      - 8) ANSI A118.10 - Load Bearing, Bonded, Waterproof Membranes for Thin-Set Ceramic Tile and Dimension Stone Installation.
      - 9) ANSI A118.11 - EGP (Exterior Glue Plywood) Modified Dry-Set Mortar.
      - 10) ANSI A118.12 - Crack Isolation Membranes for Thin-Set Ceramic Tile and Dimension Stone Installation.
      - 11) ANSI A118.15 - Improved Modified Dry-Set Cement Mortar.
      - 12) ANSI A136.1 - Organic Adhesives for installation of Ceramic Tile.
  2. ANSI A137.1 - Standard Specification for Ceramic Tile; 2019.
  3. ANSI A137.2 - Standard Specifications for Glass Tile; 2019.

- B. ASTM International (ASTM):
  1. ASTM A1064/A1064M - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete; 2018.
  2. ASTM C171 - Standard Specification for Sheet Materials for Curing Concrete; 2020.
  3. ASTM C373 - Standard Test Methods for Determination of Water Absorption and Associated Properties by Vacuum Method for Pressed Ceramic Tiles and Glass Tiles and Boil Method for Extruded Ceramic Tiles and Non-tile Fired Ceramic Whiteware Products; 2018.
  4. ASTM C1278/C1278M - Standard Specification for Fiber-Reinforced Gypsum Panel; 2017.
  5. ASTM C1325 - Standard Specification for Fiber-Mat Reinforced Cementitious Backer Units; 2021.
- C. Tile Council of North America (TCNA):
  1. TCNA (HB) - Handbook for Ceramic, Glass, and Stone Tile Installation, 2018.
- D. California Department of Health Services (CA/DHS):
  1. Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers, including 2004 Addenda.

### 1.3 ADMINISTRATIVE REQUIREMENTS

- A. Preinstallation Meeting: Convene a preinstallation meeting one week before starting work of this Section; require attendance by all affected installers.

### 1.4 SUBMITTALS

- A. See Section 01 33 00 - Submittal Procedures, for submittal procedures.
- B. Product Data: Provide manufacturer's data sheets on tile, mortar, grout, and accessories. Include manufacturer's recommendations for using installation of system components including, but not limited to, tile, setting materials, accessories, trim, grouts, and adhesives.
- C. Shop Drawings: Indicate tile layout, patterns, color arrangement, perimeter conditions, trim shapes and locations, junctions with dissimilar materials, control and expansion joints, termination edge conditions, accessories, areas receiving waterproofing membrane, and setting details.
- D. Samples for Initial Selections: Two manufacturer's complete set of color samples illustrating the full range of finishes, textures, and colors available for each product; submit for Architect's initial selections.
- E. Samples for Verification: From the Architect's initial selections, prepare and submit two samples for each selected finish, texture, and color; samples to be same product material type indicated for final Work; each sample 12 x 12 inches. Where finishes involve normal color and texture variations, include sample sets showing the full range of variations expected.
- F. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

### 1.5 CLOSEOUT SUBMITTALS

- A. Section 01 78 23 - Operation and Maintenance Data.
- B. Operation and Maintenance Data: Include recommended cleaning methods, cleaning materials, and stain removal methods. Include recommended polishes, waxes and other restorative/protective products and methods.

**1.6 QUALITY ASSURANCE**

- A. Perform work in accordance with ANSI A108/A118/A136 and TCNA (HB).
- B. Manufacturer Qualifications: Company specializing in manufacturing the types of products specified in this Section, with minimum ten (10) years of documented experience.
- C. Installer Qualifications: Company specializing in performing tile installation, with minimum of five (5) years of documented experience.
- D. Prior to grouting, prepare and protect the finish surfaces of tile work as needed to prevent staining of tile work during the grouting process and cleanup. Tile work that is stained by grout or other material is not acceptable tile work.

**1.7 DELIVERY, STORAGE, AND HANDLING**

- A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Protect adhesives and other temperature sensitive materials from freezing or overheating in accordance with manufacturer's instructions.

**1.8 ENVIRONMENTAL REQUIREMENTS**

- A. Do not install solvent-based products in an unventilated environment.
- B. Maintain ambient and substrate temperature of 50 degrees F (10 degrees C) during installation of mortar materials.

**1.9 SPARE PARTS AND MAINTENANCE PRODUCTS**

- A. Section 01 60 00 - Product Requirements: Extra materials, spare parts, and maintenance products.
  - 1. Five percent (5%) full size units of each product type, size, color, shape, profile, and surface finish combination installed, but no less than the following:
    - a. Twenty (20) square feet of field tiles.
    - b. Five (5) units of each trim and accessory.
    - c. Sixteen (16) linear feet of threshold.

**PART 2 PRODUCTS****2.1 TILE**

- A. Manufacturers: All products of each type by the same manufacturer.
  - 1. Crossville Tile Company: [www.crossvilleinc.com](http://www.crossvilleinc.com).
  - 2. Daltile Corporation: [www.daltile.com](http://www.daltile.com).
  - 3. Trinity Tile: [www.trinitytile.com](http://www.trinitytile.com).
  - 4. Substitutions: Section 01 60 00 - Product Requirements.
- B. Porcelain Floor Tile: ANSI A137.1, Standard Grade.
  - 1. Moisture Absorption: 0.5 to 3.0 percent, tested in accordance with ASTM C373.
  - 2. Basis of Design:
    - a. As indicated on Drawings.
  - 3. Colors:
    - a. As indicated on Drawings.
  - 4. Grout Joints Size:
    - a. As recommended by manufacturer.
  - 5. Sizes:

- a. As indicated on Drawings.
- 6. Thickness: As indicated on Drawings, but not less than 3/8 inch.
- 7. Shapes:
  - a. As indicated on Drawings.
- 8. Edges:
  - a. Cushioned, unless indicated otherwise on Drawings.
- 9. Surface Finishes:
  - a. As indicated on Drawings.
- 10. Patterns:
  - a. As indicated on Drawings.
- 11. Tile Trim: Refer to TRIM AND ACCESSORIES article in this Section.
  - a. As indicated on Drawings.

## 2.2 TRIM AND ACCESSORIES

- A. Base Tile Trim Units - For Porcelain Floor Tile and with no wall tile above:
  - 1. Edge trim and other details to be as indicated on Drawings.
  - 2. Top Open Edges: Bullnosed open edge.
  - 3. Bottom:
    - a. Cove and edge to match floor tile edge type for flush transition.
  - 4. Inside Corners:
    - a. Miter.
  - 5. Outside Open Corners:
    - a. Bullnosed open edge and provide single outcorner shape to include smooth cove transition.
  - 6. Same manufacturer and color as floor tile type.
  - 7. Lengths and Joints:
    - a. Match lengths and joints with adjacent floor tile joints.
  - 8. Heights:
    - a. Manufacturer's standard height, but not less than 4 inches.
- B. Floor Tile Thresholds:
  - 1. Locations as follows, unless indicated otherwise on Drawings.
    - a. Doorways where tile terminates.
    - b. Open edges of floor tile where adjacent finish floor is dissimilar flooring material or is at different height.
  - 2. Marble, White Carrara color, honed finish; 2 inches wide by full width of wall or frame opening; both top edges beveled full length; without holes, cracks, or open seams.
    - a. Thickness as required such that the finish top of adjacent flooring and top of threshold are as indicated on Drawings.

## 2.3 SETTING MATERIALS

- A. Bond Coat Materials: As recommended by tile manufacturer and TCNA for substrate types and installation conditions.
  - 1. Latex/Polymer Modified Portland Cement Mortar:
    - a. Complying with ANSI A118.4.
  - 2. Modified Dry-Set Mortar for Large and Heavy Tile (LHT) Mortar:
    - a. Application: Bond coat for large tiles with at least one side measuring 15 inches or greater.
    - b. Complying with ANSI A118.4H.
    - c. Approved by manufacturer for application thickness 3/32 inch to 1/2 inch.
    - d. Manufacturers:
      - 1) Laticrete International, Inc. - LHT Plus.



- 2) Mapei Corporation - Ultraflex LHT.
- 3) H.B. Fuller Corporation, Inc. - TEC PermaFlex 300 LHT Mortar.

## 2.4 GROUT AND JOINT MATERIALS

- A. Manufacturers:
1. Ardex Engineered Cements: [www.ardexamericas.com/#sle](http://www.ardexamericas.com/#sle).
  2. Custom Building Products: [www.custombuildingproducts.com/#sle](http://www.custombuildingproducts.com/#sle).
  3. Laticrete International, Inc.: [www.laticrete.com/#sle](http://www.laticrete.com/#sle).
  4. MAPEI Corporation: [www.mapei.com](http://www.mapei.com).
  5. Merkrete, by Parex USA, Inc.: [www.merkrete.com/#sle](http://www.merkrete.com/#sle).
- B. High Performance Cement Grout: ANSI A118.7, polymer modified cement grout.
1. Applications:
    - a. Use this type of grout where indicated and where no other type of grout is indicated.
  2. Use sanded grout for joints 1/8 inch wide and larger; if joint design is indicated to be less than 1/8 inch wide, use unsanded grout.
  3. Color(s): To be selected by Architect from full range of colors
  4. Basis of Design: Laticrete PermaColor Grout.
- C. Tile Joint Sealant: Gunable, silicone, siliconized acrylic, or urethane sealant; moisture and mildew resistant type.
1. Applications: Control joints; tile surface change of plane; tile abutment joints to dissimilar materials such as, but not limited to, door frames, drains, gypsum wall board, concrete masonry units, and plumbing pipe penetrations.
  2. Color: Match grout color.
  3. Use sanded type for joints designed to be 1/8 inch or wider.
  4. Use unsanded type for joints designed to be less than 1/8 inch.
  5. Products: Same manufacturer as grout material or as per written recommendation from grout manufacturer.
- D. Grout Joint Sealer: Liquid-applied, moisture and stain protection for existing or new Portland cement grout.
1. Composition: Water-based colorless silicone.
  2. Products: Same manufacturer as grout material or as per written recommendation from grout manufacturer.

## 2.5 ACCESSORY MATERIALS

- A. Waterproofing Membrane: Provide membrane system designed for bonding to cementitious substrate under thick mortar bed or thin-set tile; complying with ANSI A118.10 (waterproofing).
1. Fluid or Trowel Applied Type:
    - a. Membrane Material: Synthetic rubber.
    - b. Thickness:
      - 1) 40 mils (1.00 mm), minimum, dry film thickness.
    - c. Products:
      - 1) Custom Building Products: RedGard Crack Prevention and Waterproofing Membrane: [www.custombuildingproducts.com](http://www.custombuildingproducts.com)
      - 2) Laticrete International, Inc.: Laticrete Hydro Ban: [www.laticrete.com](http://www.laticrete.com)
      - 3) Merkrete, by Parex USA, Inc.: Merkrete Hydro Guard 2000: [www.merkrete.com](http://www.merkrete.com)
      - 4) TEC, an H.B. Fuller Construction Products Brand; TEC HydraFlex Waterproofing Crack Isolation Membrane: [www.tecspecialty.com](http://www.tecspecialty.com)

2. Crack Isolation Reinforcing Fabric: Fabric type as recommended by waterproofing membrane manufacturer.
  3. When both a Crack Isolation Membrane and a Waterproofing Membrane are indicated, both membranes are to be manufactured by same manufacturer and designed to be compatible with each other, the substrate, and the subsequent applied materials.
- B. Crack Isolation Membrane: Provide membrane system designed for bonding to cementitious substrate under thick mortar bed or thin-set tile; complying with ANSI A118.12 (crack isolation).
1. Fluid or Trowel Applied Type:
    - a. Membrane Material: Synthetic rubber.
    - b. Thickness:
      - 1) 40 mils (1.00 mm), minimum, dry film thickness.
    - c. Products:
      - 1) Custom Building Products: RedGard Crack Prevention and Waterproofing Membrane: [www.custombuildingproducts.com](http://www.custombuildingproducts.com)
      - 2) Laticrete International, Inc.: Laticrete Hydro Ban: [www.laticrete.com](http://www.laticrete.com)
      - 3) Merkrete, by Parex USA, Inc.: Merkrete Hydro Guard 2000: [www.merkrete.com](http://www.merkrete.com)
      - 4) TEC, an H.B. Fuller Construction Products Brand; TEC HydraFlex Waterproofing Crack Isolation Membrane: [www.tecspecialty.com](http://www.tecspecialty.com)
  2. Crack Isolation Reinforcing Fabric: Fabric type as recommended by crack isolation membrane manufacturer.
  3. When both a Crack Isolation Membrane and a Waterproofing Membrane are indicated, both membranes are to be manufactured by same manufacturer and designed to be compatible with each other, the substrate, and the subsequent applied materials.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify that substrates to be tiled are sound, smooth, and flat within the tolerances specified for that type of work and are ready to receive tiling.
- C. Verify that cracks in substrates to be tiled can be repaired, to include compatible crack isolation membrane, as required to prevent defects from occurring in the tiling work and finish. Remove and replace defective substrate materials.
- D. Verify that sufficient solid anchorage materials are installed for anchoring other work elements that are to be secured through tile.
- E. Verify that substrates to be tiled are dust-free and free of substances that could impair bonding of membrane and setting materials to substrate surfaces.
- F. Verify that substrate slopes to drains where floor drains are indicated in contract documents.
- G. Verify the locations of areas that are to receive specified waterproofing membrane prior to proceeding with thin-set method and mortar bed method of tile installations.
- H. Verify that concrete and CMU substrates are ready for tile installation by testing for moisture emission rate and alkalinity; obtain instructions if test results are not within limits recommended by manufacturers of tile system components.

- I. Verify that required floor-and wall mounted utilities and devices are at correct location, alignment, and elevation.
- J. Verify that floor drains are aligned as indicated on Drawings. If alignment is not indicated on Drawings, aligned parallel with tile pattern joint lines.

### **3.2 PREPARATION**

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this Section.
- B. Prepare materials to be installed and equipment to be used during installation.
- C. Protect surrounding work from damage.
- D. Vacuum clean surfaces and damp clean.
- E. Seal substrate surface cracks with filler compatible with tiling system components. Level existing substrate surfaces to acceptable flatness tolerances.
- F. Prepare substrate surfaces for installation of waterproofing and crack isolation membrane in accordance with membrane manufacturer's instructions.
- G. Prepare substrate surfaces for adhesive installation in accordance with adhesive manufacturer's instructions.

### **3.3 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.

### **3.4 INSTALLATION - GENERAL**

- A. Install tile, transition and termination trim, accessories, setting materials, grout, joint sealants, and all tile work components in accordance with applicable requirements of ANSI A108/A118/A136, product manufacturer's instructions, TCNA (HB) recommendations, and the Drawings.
- B. Lay tile to pattern indicated. Do not interrupt tile pattern through openings.
- C. Cut and fit tile to penetrations through tile, leaving sealant joint space. Form corners and bases neatly. Align floor, base, and wall joints.
- D. Place tile joints uniform in width, subject to variance in tolerance allowed in tile size.
- E. Wall Corners: Form internal angles square and external angles bullnosed.
- F. Install non-ceramic trim in accordance with manufacturer's instructions.
- G. Install thresholds where indicated on Drawings and at floor tile open edges.
- H. Sound test tiles after setting. Replace hollow sounding tiles that are not fully bonded to substrate.
- I. Construct expansion, movement, control, contraction, perimeter, and soft joints in compliance with the applicable TCNA (HB) Methods prescribed for joint construction type indicated.

1. Keep such joints free of mortar, grout, adhesive and debris that can interfere with application of final joint construction components.
- J. Prior to grouting, allow installation to completely cure; minimum of 48 hours.
- K. Prior to grouting, prepare and protect the finish surfaces of tile work as needed to prevent staining of tile work during the grouting process and cleanup. Tile work that is stained by grout or other material is not acceptable tile work.
- L. Grout tile joints unless otherwise indicated. Grout joints to be without voids, cracks, excess mortar or excess grout, or too little grout.
- M. Tile Sealant Application: Use tile joint sealant instead of grout at the following locations.
  1. Tile changes in plane and tile-to-tile control joints. Use either bond breaker tape or backer rod as appropriate to prevent sealant from bonding to tiled substrate.
  2. Tile abutment joints to dissimilar materials such as door frames, drains, GWB, CMU, and penetrations such as plumbing piping and countertop support brackets.
- N. Apply grout sealer in accordance with grout and tile manufacturers' instructions.

### 3.5 INSTALLATION - CRACK ISOLATION MEMBRANE

- A. Install components to comply with ANSI A108.17 (crack isolation), and manufacturer's written instructions.
- B. Existing Cracks: Comply with TCNA Method F125-Partial; bridging existing cracks and include use of crack isolation reinforcing fabric.
- C. Full Substrate Coverage: Comply with TCNA Method F125-Full; full substrate coverage.
  1. Include bridging existing cracks; TCNA Method F125-Partial.
  2. Membrane to be uniform thickness and bonded securely to substrate.
  3. Allow membrane to cure before installing tile or setting materials.

### 3.6 INSTALLATION - WATERPROOFING MEMBRANE

- A. Install components to comply with ANSI A108.13 (waterproofing), and manufacturer's written instructions.
- B. Existing Cracks: Comply with TCNA Method F125-Partial for bridging existing cracks and include use of crack isolation reinforcing fabric.
- C. Full Substrate Coverage:
  1. Include bridging existing cracks; TCNA Method F125-Partial.
  2. Membrane to be waterproof, uniform thickness and bonded securely to substrate.
  3. Allow membrane to cure and verify waterproof condition by testing before installing tile or setting materials.
- D. Transition of waterproofing membrane from floor tile to wall:
  1. Extend continuous floor membrane up behind wall base tile.
  2. Extend continuous floor membrane up behind wall tile.
    - a. Where Drawings indicate wall tile to be "without" waterproofing membrane, extend membrane up behind wall tile 4 inches from floor.
- E. Transition of waterproofing membrane from shower area to floor tile beyond where floor tile beyond is indicated to be "without" waterproofing membrane:
  1. Extend continuous floor membrane beyond shower curtain line minimum 36 inches in front of shower and 24 inches left and right of shower opening, and up behind wall base tile contiguous to the extended membrane areas. Feather membrane edges at perimeters of extended membrane areas.

**3.7 INSTALLATION - INTERIOR FLOORS: THIN-SET METHOD**

- A. To be used at locations where concrete substrate IS NOT DEPRESSED.
- B. TCNA Method F122: On-ground concrete.
  - 1. Locations: Wet areas and as indicated here.
    - a. Group Toilet Rooms (floor tiling and wall base tiling only).
    - b. Single Occupancy Toilet Rooms (floor tiling and wall base tiling only).
    - c. Areas with similar surfaces subject to periods of running or standing water.
    - d. Other areas indicated on Drawings to receive waterproofing membrane.
  - 2. Waterproofing Membrane; ANSI A118.10.
  - 3. Crack Isolation Membrane; ANSI A118.12.
    - a. TCNA Method F125-Partial with crack isolation reinforcing fabric.
  - 4. Bonding Coat:
    - a. Latex/Polymer Modified Portland Cement Mortar; ANSI A118.4.
    - b. Modified Dry-Set Mortar for Large and Heavy Tile (LHT) Mortar; ANSI A118.4H.
  - 5. Grout:
    - a. High Performance Cement Grout; ANSI A118.7.

**3.8 ADJUSTING**

- A. Section 01 73 00 - Execution: Starting, testing, adjusting, and balancing.
- B. Remove and replace unacceptable tiles. Provide new matching units, installed as specified and in a manner to eliminate evidence of replacement. Unacceptable tiles include, but are not limited to, the following:
  - 1. Tile that is damaged.
  - 2. Tile that does not match adjoining tile or is not compliant with the color/pattern indicated.
  - 3. Tile that is not fully bonded to substrate.

**3.9 CLEANING**

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures: Related to cleaning.
- B. Clean all ceramic tile surfaces so they are free of foreign matter.
- C. Remove grout residue and stains from tile as soon as possible.
- D. Clean grout smears and haze from tile according to tile and grout manufacturer's written instructions and 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.

**3.10 PROTECTION**

- A. Section 01 73 00 - Execution: Protecting installed construction.
- B. Protect installed tile work with kraft paper or other heavy covering during construction period.
- C. Prohibit foot and wheel traffic from tiled floors for at least seven (7) days after grouting is completed.

- D. Remove protective coverings and clean for substantial completion inspection and for final inspection. Between inspections, reinstall protective coverings and maintain protection of work.

**END OF SECTION**

**SECTION 09 51 13**  
**ACOUSTICAL PANEL CEILINGS**

**PART 1 GENERAL**

**1.1 SUMMARY**

- A. Section Includes:
  - 1. Acoustic Ceiling Panels.
  - 2. Suspension Grid Systems.
- B. Related Requirements:
  - 1. Section 04 20 00 - Unit Masonry.
  - 2. Section 07 95 13 - Expansion Joint Cover Assemblies.
  - 3. Section 09 21 16 - Gypsum Board Assemblies.
  - 4. Division 21 - Fire Suppression: Coordinate with devices in areas of work.
  - 5. Division 23 - HVAC: Coordinate with devices in areas of work.
  - 6. Division 26 - Electrical: Coordinate with devices in areas of work.
  - 7. Division 27 - Communications: Coordinate with devices in areas of work.
  - 8. Division 28 - Electronic Safety and Security: Coordinate with devices in areas of work.

**1.2 REFERENCES**

- A. American Society of Civil Engineers (ASCE):
  - 1. ASCE 7 - Minimum Design Loads And Associated Criteria For Buildings And Other Structures; Most Recent Edition Cited by Referring Code or Reference Standard.
- B. ASTM International (ASTM):
  - 1. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy- Coated (Galvannealed) by the Hot-Dip Process; 2020.
  - 2. ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2021.
  - 3. ASTM C635/C635M - Standard Specification for the Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings; 2017.
  - 4. ASTM C636/C636M - Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels; 2019.
  - 5. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2021a.
  - 6. ASTM E580/E580M - Standard Practice for Installation of Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels in Areas Subject to Earthquake Ground Motions; 2020.
  - 7. ASTM E1264 - Standard Classification for Acoustical Ceiling Products; 2019.

**1.3 COORDINATION**

- A. Section 01 30 00 - Administrative Requirements: Requirements for coordination.
- B. Coordinate other construction that is concealed by or interfaces with the work of this Section. This includes, but is not limited to, wall devices, light fixtures, HVAC equipment, and fire suppression system components.

**1.4 SEQUENCING**

- A. Section 01 30 00 - Administrative Requirements: Scheduling and sequencing.
- B. Sequence work as to not install work until building is enclosed, sufficient air temperature and humidity level is provided, dust generating activities have terminated, and overhead work is completed, tested, and approved.
- C. Install ceiling panels after interior wet work is dry.

**1.5 SUBMITTALS**

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Product Data: Submit data on suspension grid system components, acoustic panels, and accessories.
- C. Shop Drawings: Show suspension grid layout and dimensioning, panel layouts, lighting fixtures, air diffusers, grilles, and all other items exposed in acoustical ceilings, locations of seismic braces and hangers, and suspension, seismic and bracing details. Show details of junctions with other work or ceiling finishes, and special conditions.
- D. Provide seismic design of suspended ceiling systems under direct supervision and sealed by Professional Structural Engineer.
  - 1. Provide sealed calculations indicating that design of suspension systems provide compliance with seismic structural requirements indicated in the Performance and Design Requirements article in this Section.
- E. Samples:
  - 1. Submit two samples 12 x 12 inches in size illustrating material, fabrication, and finish of acoustic panels.
  - 2. Submit two samples each, 6 inches long, of suspension system main runner, cross runner, perimeter wall molding and face trim, and seismic components.
- F. Designer's Qualification Statement.
- G. Manufacturer's Qualification Statement.
- H. Installer's Qualification Statement.
- I. Manufacturer's Installation Instructions: Submit special procedures, and perimeter conditions requiring special attention.

**1.6 QUALIFICATIONS**

- A. Designer Qualifications for Seismic Design: Perform under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed at the State in which the Project is located.
- B. Acoustical Panels and Suspension System Manufacturer Qualifications: Company specializing in manufacturing products indicated with minimum five (5) years documented experience.
- C. Installer: Company specializing in performing indicated work with minimum five (5) years documented experience.

**1.7 ENVIRONMENTAL REQUIREMENTS**

- A. Section 01 60 00 - Product Requirements.



- B. Maintain the following minimum environmental requirements prior to, during, and after acoustic panel installation. If manufacturer's requirements are more stringent, comply with manufacturer's requirements.
  1. Uniform minimum temperature of 60 degrees F, and maximum humidity of 40 percent.

## 1.8 SPARE PARTS AND MAINTENANCE PRODUCTS

- A. Section 01 60 00 - Product Requirements: Extra materials, spare parts, and maintenance products.
  1. Furnish 200 sq ft of extra panels of each type and size of acoustical panel to Owner.

## PART 2 PRODUCTS

### 2.1 PERFORMANCE AND DESIGN REQUIREMENTS:

- A. Seismic Loads: Design and size components to withstand seismic loads and sway displacement as calculated according to ASCE 7 and applicable codes.
  1. Design is to include compliance with ASTM E580/E580M.
  2. Seismic Design is to comply with requirements for the Seismic Design Category as indicated on the Structural Drawings and Section 00 31 00 - Available Project Information.
- B. Surface Burning Characteristics: Maximum 25/450 flame spread/smoke developed index when tested in accordance with ASTM E84.
- C. Suspension System: Secure acoustic ceiling system including integral mechanical and electrical components with maximum deflection of 1/360.

### 2.2 ACOUSTIC PANEL CEILING SYSTEMS

- A. Manufacturers:
  1. Armstrong World Industries.
  2. CertainTeed.
  3. USG Interiors.
  4. Substitutions: Section 01 60 00 - Product Requirements.

### 2.3 ACOUSTIC PANELS

- A. Acoustic Panels - **Type ACT-1**:
  1. Basis of Design: Armstrong - Ultima (1910).
  2. Classification: ASTM E1264, Type IV - Mineral fiber with acoustically transparent membrane and factory-applied latex paint.
    - a. Form: 2 - water felted.
    - b. Pattern:
      - 1) E - lightly textured.
    - c. Fire Class A.
    - d. Sag Resistant.
    - e. Mold and Mildew Resistant.
  3. Size: 24 x 24 inches.
  4. Thickness:
    - a. 3/4 inch.
  5. Light Reflectance: 88 percent.
  6. NRC: 0.75.
  7. CAC: 35.

8. Edge: Formed to suit grid profile.
  - a. Square Lay-in.
9. Surface Color: White.
10. Suspension Grid Type as indicated in this Section:
  - a. Suspension Grid Type SG-1.
11. Acoustic Attenuation Insulation: ASTM C665, mineral wool, unfaced batts.
  - a. Refer to Section 09 21 16 Gypsum Board Assemblies for material description.
  - b. Thickness: 6 inches.
  - c. Size: To fit acoustical suspension system.
  - d. Locations and Areas of Coverage: Entire ceiling area, full coverage.

## 2.4 SUSPENSION GRID SYSTEMS

- A. General:
  1. Support Channels and Hangers: Primed steel; size and type to suit application, seismic requirements, load support requirements, and ceiling system flatness requirements.
  2. Provide stabilizer bars, clips, splices, and perimeter wall moldings and face trim required for suspension grid system, and as indicated on Drawings and in this Section.
- B. Suspension Grid - **Type SG-1**: Exposed to view.
  1. Basis of Design: Manufacturer to be same as manufacturer of ceiling panels.
    - a. Armstrong - Prelude XL.
  2. Non-fire Rated Grid: ASTM C635/C635M, exposed T; components die cut and interlocking.
    - a. Structural Classification:
      - 1) Intermediate-duty.
  3. Grid Materials: Hot-dipped galvanized steel sheet complying with ASTM A653/A653M.
  4. Exposed Grid Surface Width:
    - a. 15/16 inch.
  5. Grid Finish Color:
    - a. Match color of Acoustic Panel. If no match is available, submit full range of colors available for selection by Architect.
  6. Perimeter Wall Moldings and Face Trim: As indicated in ACCESSORIES article.

## 2.5 ACCESSORIES

- A. Support Channels and Hangers: Galvanized steel; size and type to suit application, seismic requirements, and ceiling system flatness requirement specified.
- B. Perimeter Wall Moldings: Perimeter wall moldings for termination and support of suspension grid system at abutment to vertical construction and other grid system interruptions:
  1. Material, Finish Type and Color: Match suspension grid system.
  2. For Exposed Suspension Grid System:
    - a. L-shaped molding; 7/8 inch exposed face; mounted flush with grid face.
  3. For Concealed Suspension Grid System:
    - a. Concealed molding.
  4. Manufactured Corners: Provide single piece seamless corners conforming to corner angle or radius.
  5. Manufactured Radius: Provide seamless radius trim at maximum lengths practical but not less than 8 feet.
- C. Exposed fastener heads to be shop finished to match grid system finish type and color.

- D. Touch-up Paint: Type and color to match acoustic panels and grid components.

### **PART 3 EXECUTION**

#### **3.1 EXAMINATION**

- A. Section 01 73 00 - Execution: Examination, coordination, and project conditions.
- B. Verify layout of hangers will not interfere with other work.

#### **3.2 PREPARATION**

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this Section.
- B. Prepare materials to be installed and equipment to be used during installation.

#### **3.3 INSTALLATION**

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Suspension Grid System:
  1. Install suspension system in accordance with ASTM C636/C636M, ASTM E580/E580M, and manufacturer's instructions and as supplemented in this Section.
  2. Suspended ceilings are subject to special inspection.
  3. Locate system on room axis according to reflected ceiling plan in Drawings.
  4. Install after major above ceiling work is complete. Coordinate location of hangers with other work. Coordinate with sprinkler head penetrations for oversized trim if not braced. Ceilings without rigid bracing must have 2 inch oversized trim rings for sprinklers and other penetrations.
  5. Install suspension system in accordance with manufacturer's seismic requirements and installation guide, and in compliance with the Seismic Design Category design requirements.
  6. Ceiling areas over 1,000 SF must have horizontal restraint wire or rigid bracing.
  7. Ceiling areas over 2,500 SF must have seismic separation joints or full height partitions.
  8. Install system capable of supporting imposed loads to deflection of 1/360 maximum.
  9. Ends of cross tees to be locked into main beams to prevent their spreading.
  10. Hang suspension system from building structural members and independent of walls, columns, ducts, pipes, cable trays, and conduit. Do not hang suspension system from non-structural building elements Do not hang suspension system from roof deck. Do not allow suspension system components to touch ducts, pipes, conduit, or other ceiling installations
  11. Where carrying members are spliced, avoid visible displacement of face plane of adjacent members.
  12. Changes in ceiling plane must have positive bracing.
  13. Where ducts or other equipment prevent regular spacing of hangers, reinforce nearest affected hangers, and related carrying channels to span extra distance.
  14. Do not support components on main runners or cross runners when weight causes total dead load to exceed deflection capability. Support fixture loads by supplementary hangers located within 6 inches of each corner; or support components independently.
  15. Do not eccentrically load system or produce rotation of runners.
  16. Perimeter Wall Moldings:
    - a. Install perimeter wall molding at ceiling abutment to vertical construction.

- b. Use longest practical lengths.
  - c. Install manufactured seamless corners.
  - d. Install manufactured seamless radius trim at curved walls and round columns.
  - e. Overlap and rivet corners.
17. Form expansion joints as detailed. Form to accommodate plus or minus 1 inch movement. Maintain visual closure.
- C. Acoustic Panels:
- 1. Fit acoustic panels in place, free from damaged edges or other defects detrimental to appearance and function.
  - 2. Lay directional patterned panels as shown on the Drawings. Fit border trim neatly against abutting surfaces.
  - 3. Install panels after above ceiling work is complete.
  - 4. Install acoustic panels level, in uniform plane, and free from twist, warp, and dents.
  - 5. Cutting Acoustic Panels:
    - a. Cut to fit irregular grid and perimeter edge trim.
    - b. Make field cut edges of same profile as factory edges.
    - c. Double cut and field finish exposed edges to match panel finish.
  - 6. Where round obstructions and bullnose concrete block corners occur, provide preformed closures to match perimeter wall molding or trim.
  - 7. Install hold-down clips on each panel to retain panels tight to grid system; comply with fire rating requirements.
  - 8. Install hold-down clips to retain panels tight to suspension grid system within 10 feet of exterior door.
  - 9. Install acoustical insulation as indicated on Drawings.

### 3.4 ERECTION TOLERANCES

- A. Section 01 40 00 - Quality Requirements: Tolerances.
- B. Maximum Variation from Flat and Level Surface: 1/8 inch in 10 feet.
- C. Maximum Variation from Plumb of Grid Members Caused by Eccentric Loads: 2 degrees.

### 3.5 CLEANING

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures: Clean installed work and comply with manufacturer's recommendations.
- B. Clean installed work in accordance with manufacturer's recommended materials and procedures.

### 3.6 PROTECTION OF INSTALLED CONSTRUCTION

- A. Section 01 73 00 - Execution: Protecting installed construction.
- B. Protect against modifications to completed suspension and hanger systems by unauthorized persons.
- C. Protect installed work from damage and marring of finishes. Remove and replace components that become damaged.

### 3.7 SCHEDULES

- A. Refer to Reflected Ceiling Plans, Finish Schedules, Details, and Notes on Drawings for locations and configurations of systems indicated in this Section.

**END OF SECTION**

**SECTION 09 65 00**  
**RESILIENT FLOORING**

**PART 1 GENERAL****1.1 SUMMARY**

- A. Section Includes:
  - 1. Resilient tile flooring.
  - 2. Resilient wall base - non-vented type.
- B. Related Requirements:
  - 1. Section 03 30 00 - Cast-In-Place Concrete: Finishing of floor slab for resilient floor application.
  - 2. Sections indicating Plumbing, Electrical and Mechanical utility boxes, devices and trim.

**1.2 REFERENCES**

- A. ASTM International (ASTM):
  - 1. ASTM D2240 - Standard Test Method for Rubber Property-Durometer Hardness; 2015 (reapproved 2021).
  - 2. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2021.
  - 3. ASTM E648 - Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source; 2019 (with changes through 2020).
  - 4. ASTM E662 - Standard Test Method for Specific Optical Density of Smoke Generated by Solid Materials; 2021.
  - 5. ASTM F710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring; 2021.
  - 6. ASTM F1066 - Standard Specification for Vinyl Composition Floor Tile; 2004 (Reapproved 2018).
  - 7. ASTM F1344 - Standard Specification for Rubber Floor Tile; 2021.
  - 8. ASTM F1700 - Standard Specification for Solid Vinyl Floor Tile; 2020.
  - 9. ASTM F1861 - Standard Specification for Resilient Wall Base; 2021.
  - 10. ASTM F1914 - Standard Test Methods for Short-Term Indentation and Residual Indentation of Resilient Floor Covering; 2018.
  - 11. ASTM F2170 - Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes; 2019.
  - 12. ASTM F2421 - Standard Test Method for Measurement of Resilient Floor Plank by Dial Gauge; 2019.
- B. National Fire Protection Association (NFPA):
  - 1. NFPA 253 - Standard Method of Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source, 2019.

**1.3 SUBMITTALS**

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Product Data: Submit data describing physical and performance characteristics; include manufacturer's full range of sizes, patterns, and colors available; include moldings, transition and edge trim as indicated on Drawings and otherwise recommended by manufacturer of Resilient Floor products; include installation instructions.

- C. Samples for Initial Selection: Two manufacturer's complete set of color samples illustrating the full range of finishes and colors available; submit for Architect's initial selections.
- D. Samples for Verification: From the Architect's initial selections, prepare and submit two samples for each selected finish and color; samples to be same product material type indicated for final Work; each sample 4 x 4 inches. Where finishes involve normal color and texture variations, include sample sets showing the full range of variations expected.
- E. Mock-Ups: Install at project site a job mock-up using acceptable products and manufacturer approved installation methods, including concrete substrate testing. Obtain Architect's acceptance of finish color, texture and pattern, and workmanship standards.
  - 1. Mock-up Size and Location: One typical room; location as indicated by Architect.
  - 2. Mock-up may be incorporated into the final construction upon Architect's approval.

#### **1.4 CLOSEOUT SUBMITTALS**

- A. Section 01 78 23 - Operation and Maintenance Data.
- B. Operation and Maintenance Data: Submit maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning, stripping, and re-waxing.

#### **1.5 QUALIFICATIONS**

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.
- B. Installer: Company specializing in performing Work of this section with minimum three years documented experience.

#### **1.6 DELIVERY, STORAGE, AND HANDLING**

- A. Section 01 60 00 - Product Requirements: Product storage and handling requirements.
- B. Upon receipt, immediately remove any shrink-wrap and check materials for damage and the correct style, color, quantity and run numbers.
- C. Store all materials off the floor in an acclimatized, weather-tight space.
- D. Maintain temperature in storage area between 55 degrees F and 90 degrees F.

#### **1.7 ENVIRONMENTAL REQUIREMENTS**

- A. Section 01 60 00 - Product Requirements.
- B. Maintain temperature in storage area between 55 degrees F and 90 degrees F.
- C. Store materials for not less than 48 hours prior to installation in area of installation at temperature of 70 degrees F to achieve temperature stability. Thereafter, maintain conditions above 55 degrees F.

#### **1.8 WARRANTY**

- A. Section 01 77 00 - Closeout Procedures: Product warranties.
- B. Vinyl Composition Tile: Provide five (5) year manufacturer's warranty.
- C. Luxury Vinyl Tile:
  - 1. Flooring Tiles of Class III, Type B - Embossed Surface with minimum of 0.020 inch (20 mil) Wear Layer: Provide fifteen (15) year manufacturer's warranty.

**1.9 SPARE PARTS AND MAINTENANCE PRODUCTS**

- A. Section 01 60 00 - Product Requirements: Extra materials, spare parts, and maintenance products.
  - 1. Resilient Flooring:
    - a. Vinyl Composition Tile (VCT) Flooring: 100 sq ft of each type and color.
  - 2. Resilient Wall Base: 100 lineal feet of each type and color.

**PART 2 PRODUCTS****2.1 PERFORMANCE REQUIREMENTS**

- A. Fire Performance Characteristics: Unless otherwise indicated, provide resilient tile flooring with the following fire performance characteristics in accordance with the standards. Testing to be by a certified testing laboratory or other testing agency acceptable to authorities having jurisdiction:
  - 1. Surface Burning Characteristics: Maximum 25/450 flame spread/smoke developed index when tested in accordance with ASTM E84.
  - 2. Critical Radiant Flux (CRF): Minimum 0.45 watt per square centimeter (Class 1) in accordance with ASTM E648 or NFPA 253.
  - 3. Smoke Density: 450 or less in accordance with ASTM E662.

**2.2 RESILIENT TILE FLOORING**

- A. Vinyl Composition Tile:
  - 1. Manufacturers:
    - a. Armstrong Flooring, Inc.
    - b. Johnsonite, a Tarkett Company.
    - c. Mannington Commercial.
    - d. Substitutions: Section 01 60 00 - Product Requirements.
  - 2. Basis of Design:
    - a. Armstrong Flooring, Inc. - Imperial Texture, Standard Excelon.
  - 3. Minimum Requirements: Comply with ASTM F1066, of Class specified.
    - a. Class 2 - Through pattern tile.
  - 4. Critical Radiant Flux (CRF): Minimum 0.45 watt per square centimeter (Class 1) in accordance with ASTM E648 or NFPA 253.
  - 5. Smoke Density: 450 or less in accordance with ASTM E662.
  - 6. Tile Size:
    - a. 12 x 12 inches.
  - 7. Total Thickness: 0.125 inch.
  - 8. Colors and Patterns:
    - a. To be selected by Architect from manufacturer's full range.
- B. Rubber Tile:
  - 1. Manufacturers:
    - a. Burke Flooring.
    - b. Flexco, Inc.
    - c. Johnsonite, a Tarkett Company.
    - d. Roppe Corporation.
    - e. Substitutions: See Section 01 60 00 - Product Requirements.
  - 2. Class and Type: Comply with ASTM F1344.
    - a. Class I - Homogeneous Rubber Floor Tile.
      - 1) Type A - Solid Color.
  - 3. Hardness: Comply with ASTM F1344 when tested in accordance with ASTM D2240.

- a. Grade 1, minimum 85 Shore A durometer.
4. Critical Radiant Flux (CRF): Minimum 0.45 watt per square centimeter (Class 1), when tested in accordance with ASTM E648 or NFPA 253.
5. Tile Size:
  - a. To be selected by Architect from manufacturer's full range.
6. Total Thickness: 0.125 inch (3.2 mm).
7. Pattern and Surface Texture:
  - a. Raised circular disks.
8. Color:
  - a. To be selected by Architect from manufacturer's full range.

### 2.3 RESILIENT WALL BASE - NON-VENTED TYPE

- A. Manufacturers:
  1. Burke Flooring.
  2. Johnsonite, a Tarkett Company.
  3. Roppe Corporation.
  4. Substitutions: Section 01 60 00 - Product Requirements.
- B. Basis of Design:
  1. Johnsonite, a Tarkett Company.
- C. Resilient Non-vented Wall Base:
  1. Comply with ASTM F1861.
    - a. Type:
      - 1) Type TS - Rubber, vulcanized thermoset.
    - b. Group:
      - 1) Group 1 - Solid.
    - c. Style:
      - 1) Style B - Top set, Cove.
  2. Critical Radiant Flux (CRF): Minimum 0.45 watt per square centimeter (Class 1), when tested in accordance with ASTM E648 or NFPA 253.
  3. Smoke Density: 450 or less in accordance with ASTM E662.
  4. Height:
    - a. 4 inches.
  5. Thickness: 0.125 inch thick.
  6. Finish: Satin.
  7. Length: Roll.
  8. Accessories: Premolded external corners and end stops.
  9. Colors: Solid.
    - a. To be selected by Architect from manufacturer's full range.

### 2.4 ACCESSORIES

- A. Subfloor Filler: Premix latex; types recommended by adhesive material manufacturer.
- B. Primers and Adhesives: Waterproof; types recommended by resilient flooring manufacturer.
- C. Moldings, Transition and Edge Strips: As indicated on Drawings or as otherwise selected by Architect from Product Data submittals.
- D. Feature Strips: Of same material as tile. Width as indicated on Drawings.
- E. Sealer and Wax: Types recommended by resilient flooring product manufacturer.



### **PART 3 EXECUTION**

#### **3.1 EXAMINATION**

- A. Section 01 73 00 - Execution: Examination, coordination, and project conditions.
- B. Verify that surfaces are flat and smooth to tolerances acceptable to flooring manufacturer, free of cracks that might telegraph through flooring, clean, dry, and free of curing compounds, surface hardeners, and other chemicals that might interfere with bonding of flooring to substrate.
- C. Verify that wall surfaces are smooth and flat within the tolerances specified for that type of work, are dust-free, and are ready to receive resilient base.
- D. Moisture Testing: Moisture emissions from concrete subfloors must not exceed 5 lbs per 1,000 psi per 24 hours via the Calcium Chloride Test Method and not exceed 85% internal concrete relative humidity as tested in accordance with ASTM F2170. If more restrictive value is required by flooring product manufacturer, comply with the more restrictive values.
- E. The pH level of the subfloor surface shall not be higher than 9.9. If higher, subfloor must be neutralized.
- F. Cementitious Sub-floor Surfaces:
  - 1. Verify that substrates are dry enough and ready for resilient flooring installation by testing for moisture and pH. Test in accordance with ASTM F710.
  - 2. Verify that substrates exhibit no carbonization or dusting.
- G. Obtain instructions if test results are not within limits recommended by resilient flooring manufacturer and adhesive materials manufacturer.
- H. Verify that required floor-mounted utilities are in correct location.

#### **3.2 PREPARATION**

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this Section.
- B. Prepare materials to be installed and equipment to be used during installation.
- C. Prepare substrates to receive work as recommended by work product manufacturers.
- D. Remove sub-floor ridges and bumps. Fill minor low spots, cracks, joints, holes, and other defects with sub-floor filler to achieve smooth, flat, hard surface.
- E. Prohibit traffic until filler is cured.
- F. Clean substrate.
- G. Apply primer as recommended by resilient flooring product manufacturer and where required to prevent "bleed-through" or interference with adhesion.

#### **3.3 INSTALLATION**

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. General:
  - 1. Starting installation constitutes acceptance of sub-floor conditions.
  - 2. Install in accordance with manufacturer's written instructions and recommendations to ensure warranty requirements.
  - 3. Spread only enough adhesive to permit installation of materials before initial set.
  - 4. Fit joints and butt seams tightly.

5. Set flooring in place, press with heavy roller to attain full adhesion. Sound top surface of installed flooring material to ensure there are no hollow sounds (a hollow sound may be an indication of flooring that is not adhered/bonded to substrate).
  6. Where type of floor finish, pattern, or color are different on opposite sides of door, terminate flooring under centerline of door (door in closed position).
  7. Install edge transition strips at unprotected or exposed edges, where flooring terminates, where flooring transitions to dissimilar flooring finishes and as indicated on Drawings.
  8. Resilient Strips: Attach to substrate using adhesive.
  9. Scribe flooring to walls, columns, cabinets, floor outlets, and other appurtenances to produce tight joints.
  10. Install flooring in recessed floor access covers, maintaining floor pattern.
  11. At movable partitions, install flooring under partitions without interrupting floor pattern.
  12. If feature strips/designs are indicated on Drawings, install feature strips/designs.
- C. Resilient Tile Flooring:
1. Mix tile from containers to ensure shade variations are consistent when tile is placed, unless otherwise indicated in manufacturer's installation instructions.
  2. Unless flooring layout design is indicated otherwise on Drawings, lay flooring with joints and seams parallel to building lines to produce symmetrical tile pattern.
  3. Install tile to pattern indicated on Drawings. Allow minimum 1/2 full size tile width at room or area perimeter.
- D. Resilient Wall Base:
1. Fit joints tightly and make vertical. Maintain minimum dimension of 18 inches between joints.
  2. Miter internal corners. At external corners, use premolded units. At exposed ends, use premolded units.
  3. Install base on solid backing. Bond tightly to wall and floor surfaces. Bottom edge of wall base should be consistently in contact with finished flooring.
  4. Scribe and fit to door frames and other interruptions.

### 3.4 CLEANING

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures: Related to cleaning.
- B. Remove excess adhesive from floor, base, and wall surfaces without damage.
- C. Clean, seal, and maintain resilient flooring products.

### 3.5 PROTECTION OF INSTALLED CONSTRUCTION

- A. Section 01 73 00 - Execution: Protecting installed construction.
- B. Prohibit traffic on resilient flooring for 48 hours after installation.
- C. Protect flooring work from stains and damage.

**END OF SECTION**

**SECTION 09 67 23**  
**RESINOUS FLOORING**

**PART 1 GENERAL****1.1 SUMMARY**

- A. Section Includes:
  - 1. Resinous flooring system and integral cove base.
- B. Related Requirements:
  - 1. Section 03 30 00 - Cast-In-Place Concrete: Concrete subfloor.

**1.2 REFERENCES**

- A. ASTM International:
  - 1. ASTM C579 - Standard Test Method for Compressive Strength of Chemical Resistant Mortars, Grouts, and Monolithic Surfacing and Polymer Concretes; 2018.
  - 2. ASTM C580 - Standard Test Method for Flexural Strength and Modulus of Elasticity of Chemical Resistant Mortars, Grouts, and Monolithic Surfacing and Polymer Concretes; 2018.
  - 3. ASTM D570 - Standard Test Method for Water Absorption of Plastics; 1998, reapproved 2018.
  - 4. ASTM D635 - Standard Test Method for Rate of Burning and/or Extent and Time of Burning of Plastics in a Horizontal Position; 2018.
  - 5. ASTM D638 - Standard Test Method for Tensile Properties of Plastics; 2014.
  - 6. ASTM D790 - Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials; 2017.
  - 7. ASTM D2240 - Standard Test Method for Rubber Property Durometer Hardness; 2015, reapproved 2021.
  - 8. ASTM D2794 - Standard Test Method for Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact); 1993, reapproved 2019.
  - 9. ASTM D4541 - Standard Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers; 2017.
  - 10. ASTM F710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring; 2021.
  - 11. ASTM F1869 - Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride; 2016a.
  - 12. ASTM F2170 - Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes; 2019a.
- B. International Concrete Repair Institute:
  - 1. ICRI 310.2R - Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, Polymer Overlays, and Concrete Repair; 2013.

**1.3 PRE-INSTALLATION MEETINGS**

- A. Section 01 30 00 - Administrative Requirements: Pre-installation meeting.
- B. Convene minimum one week prior to commencing work of this Section.

**1.4 SUBMITTALS**

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.

- B. Product Data: Submit data on specified products, describing physical and performance characteristics; sizes, patterns, and colors available.
- C. Shop Drawings: Submit scaled drawings indicating the following:
  1. Floor areas to receive the work and colors and patterns for each area.
  2. Indicate walls, floor drains, floor boxes, penetrations, and other surface interruptions.
  3. Indicate floor areas to be sloped and direction of slope.
  4. Indicate locations to receive waterproofing membrane.
  5. Indicate locations of substrate expansion, isolation and control joints requiring joint treatment at interface with flooring system; indicate materials to be used at each such joint type.
  6. Sectional detail drawings indicating termination and transition edges at interface with other construction work, key cuts, cove base details, treatments at substrate various joint types and cracks (moving and non-moving), interface with floor drains and other obstructions.
- D. Samples for Initial Selection: Two manufacturer's complete sets of color samples illustrating the full range of available finishes, colors, chip size and variations, chip gradation, resin colors, trim and accessories; submit for Architect's initial selections. Include sealant colors.
- E. Samples for Verification: From the Architect's initial selections, prepare and submit two samples for each selected finish and color; samples to be same product material type indicated for final Work; each sample 8 x 8 inches. Where finishes involve normal color and texture variations, include sample sets showing the full range of variations expected.
- F. Manufacturer's Certificate: Certify products meet or exceed specified requirements.
- G. Manufacturer's Installation Instructions: Submit special procedures and perimeter conditions requiring special attention.

### **1.5 CLOSEOUT SUBMITTALS**

- A. Section 01 77 00 - Closeout Procedures.
- B. Operation and Maintenance Data: Submit maintenance procedures, recommended maintenance materials, procedures for stain removal, repairing surface, and suggested schedule for cleaning.

### **1.6 QUALITY ASSURANCE**

- A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum five (5) years documented experience.
- B. Installer: Company specializing in performing work of this Section with minimum three (3) years documented experience and certified in writing by flooring system manufacturer as trained and approved by manufacturer as qualified to install manufacturer's flooring system.
- C. Source Limitations: Obtain primary flooring system materials, including primers, resins, hardening agents, grouting coats, and topcoats, from single source from single manufacturer. Obtain secondary flooring system materials, including patching and fill material, joint sealant, and repair materials, of type and from manufacturer recommended in writing by manufacturer of primary materials.

### **1.7 MOCKUP**

- A. Section 01 40 00 - Quality Requirements: Requirements for mockup.
- B. Locate where directed by Architect.

- C. Construct mockup, 10 x 10 feet, including flooring, base, and accessories to illustrate appearance of finished work.
- D. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
- E. Subject to compliance with requirements, approved mockups may become part of the completed Work if undamaged at time of Final Completion.

### **1.8 DELIVERY, STORAGE, AND HANDLING**

- A. Section 01 60 00 - Product Requirements: Product storage and handling requirements.
- B. Store resins and other materials in dry, secure area.
- C. Maintain minimum temperature in storage area of 65 degrees F.
- D. Store materials for 72 hours prior to installation in area of installation to achieve temperature stability.

### **1.9 ENVIRONMENTAL REQUIREMENTS**

- A. Section 01 60 00 - Product Requirements.
- B. Maintain ambient temperature required by manufacturer 72 hours prior to installation, during installation, and 24 hours after floor system has cured.
- C. Comply with resinous flooring manufacturer's written instructions for substrate temperature, ambient temperature, moisture, ventilation, and other conditions affecting resinous flooring application.
- D. Lighting: Provide permanent lighting or, if permanent lighting is not in place, simulate permanent lighting conditions during resinous flooring application.
- E. Close spaces to traffic during resinous flooring application and for 24 hours after application unless manufacturer recommends a longer period.

### **1.10 COORDINATION**

- A. Section 01 30 00 - Administrative Requirements: Requirements for coordination.
- B. Coordinate curing materials to be used during concrete substrate installation with requirements for flooring system materials. The intent is to prevent installation of curing materials that may inhibit the flooring system's bond/adhesion to concrete substrate.
- C. Coordinate slopes to floor drains during concrete substrate installation.

### **1.11 SPARE PARTS AND MAINTENANCE PRODUCTS**

- A. Section 01 60 00 - Product Requirements: Extra materials, spare parts, and maintenance products.
  - 1. Supply two (2) gallons of flooring system materials of each color and finish selected. Include related flooring system material in quantities required to produce floor system finish equal to flooring system(s) installed.

## **PART 2 PRODUCTS**

### **2.1 RESINOUS FLOORING**

- A. Manufacturers:

1. BASF Corporation.
  2. Dex-O-Tex.
  3. Dur-A-Flex, Inc.
  4. Stonhard, Inc.
  5. Substitutions: Section 01 60 00 - Product Requirements.
- B. Basis of Design:
1. Dur-A-Flex, Inc. - Hybri-Flex EC.
- C. Performance Requirements:
1. Compressive Strength: In accordance with ASTM C579.
    - a. 11,000 psi minimum.
  2. Tensile Strength: In accordance with ASTM D638.
    - a. 4,000 psi minimum.
  3. Flexural Strength: In accordance with ASTM D790 or C580.
    - a. 4,000 psi minimum.
  4. Water Absorption: In accordance with ASTM D570.
    - a. Less than 0.05 percent for 24 hours.
  5. Impact Resistance: In accordance with ASTM D2794.
    - a. Greater than 160 in/lb.
  6. Bond Strength (to concrete): In accordance with ASTM D4541.
    - a. 400 psi minimum.
  7. Hardness: In accordance with ASTM D2240.
    - a. 75 - 80, Shore D, minimum.
  8. Mildew Resistance: No growth.
  9. Flammability:
    - a. Self-extinguishing according to ASTM D635.
- D. Components:
1. Resinous Flooring (self-leveling aggregate broadcast): Epoxy aliphatic urethane topcoat seamless flooring system.
    - a. Base Coat: Resin with hardener and decorative chip broadcast.
    - b. Broadcast Coat: Epoxy based two-component resin.
      - 1) Basis of Design: Dur-A-Flex, Inc. - Dur-A-Glaze #4.
    - c. Seal Coat: Epoxy based two-component resin.
      - 1) Basis of Design: Dur-A-Flex, Inc. - Dur-A-Glaze #4.
    - d. Top Coat: Aliphatic urethane two-component resin.
      - 1) Provide two (2) applications of topcoat.
      - 2) Basis of Design: Dur-A-Flex, Inc. - Armor Top.
    - e. Aggregate:
      - 1) Quartz chips.
      - 2) Fine silica sand.
      - 3) Basis of Design: Dur-A-Flex, Inc. - Macro or Micro Chip.
    - f. Top Edge of Resinous Base:
      - 1) Top Trim: Zinc angle trim, 1/8 x 1/2 inch for termination and protection of top edge of integral resinous flooring base.
    - g. Overall System Thickness: 3/16 inch thick.
    - h. Colors, Grit or Smooth Finish and Gloss: To be selected by Architect from full range.
- E. Accessories:
1. Waterproofing Membrane: Type recommended by flooring system manufacturer for substrate and primer and flooring system materials to be installed.
  2. Reinforcing Membrane: Type recommended by flooring system manufacturer for substrate and primer and flooring system materials to be installed.

3. Subfloor Fillers: Types recommended by flooring system material manufacturer, specific to the filling, sloping or patching conditions.
4. Primers and Adhesives: Waterproof; types recommended by flooring manufacturer.
5. Joint Sealant: Type recommended or produced by resinous flooring system manufacturer for type of flooring system finish performance, user traffic, service and joint condition indicated.

## **PART 3 EXECUTION**

### **3.1 EXAMINATION**

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify that surfaces and conditions are as required to accept the work of this Section. Proceed with installation only after unsatisfactory conditions have been corrected.
- C. Examine products to be installed for damage and other conditions detrimental to completion of the Work. Proceed with installation only after unsatisfactory conditions have been corrected.
- D. Verify floor surfaces are smooth and flat with maximum variation as specified in Section 03 30 00 and are ready to receive work.
- E. Verify concrete floors have cured minimum 28 days, exhibit negative alkalinity, carbonization, and dusting, and are acceptable to flooring manufacturer.
- F. Verify floor and lower wall surfaces are free of substances capable of impairing adhesion of flooring system materials.
- G. Where floor drains are scheduled to be installed as per the Drawings, verify the drains are installed, properly aligned and are at finish elevations to allow flooring application to slope to drains.
  1. If floor drains are rectangular in shape, verify that the side are properly aligned with room features such as dominate walls.

### **3.2 PREPARATION**

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this section.
- B. Prepare materials to be installed and equipment to be used during installation.
- C. Concrete surfaces shall be free of oil, grease, curing compounds, loose particles, moss, algae growth, laitance, friable matter, dirt, and bituminous products.
- D. Mechanical Surface Preparation: Perform preparation on substrate as recommended by manufacturer and as follows.
  1. Shot blast all surfaces to receive flooring system with a mobile steel shot, dust recycling machine (Blastrac or equal). All surface and embedded accumulations of paint, toppings hardened concrete layers, laitance, power trowel finishes, and other similar surface characteristics shall be completely removed leaving a bare concrete surface having a minimum profile of CSP 4-5 in accordance with ICRI 310.2R.
  2. Floor areas inaccessible to the mobile blast machines shall be mechanically abraded to the same degree of cleanliness, soundness and profile using diamond grinders, needle guns, bush hammers, or other suitable equipment.
  3. Where the perimeter of the substrate to be coated is not adjacent to a wall or curb, a minimum 1/4 inch key cut shall be made to properly seat the system, providing a

- smooth transition between areas. The detail cut shall also apply to drain perimeters and expansion joint edges.
4. Remove substrate ridges and bumps.
  5. Treat non-moving cracks and joints to prevent cracks from reflecting through the flooring system. Perform treatments and repairs in accordance with flooring system manufacturer's recommendations.
- E. At spalled or worn areas, mechanically remove loose or delaminated concrete to a sound concrete and patch per manufactures recommendations.
- F. Moisture, Humidity and Alkalinity Testing: Perform tests on substrate as recommended by manufacturer and as follows.
1. Moisture Vapor Emission Testing: Perform anhydrous calcium chloride test, ASTM F1869. Moisture vapor emission rate from the slab is to be less than or equal to 3 lbs of water per 1,000 sf in 24 hrs.
  2. Relative Humidity Testing: Perform test using situ probes, ASTM F2170. Humidity level of substrates is to measure no more than 75 percent relative humidity level.
  3. Alkalinity and Adhesion Testing: Perform test, ASTM F710. Measurement for pH range is to be not less than 5 pH and not more than 9 pH.
  4. If Moisture, Humidity or Alkalinity Testing measurements are not as indicated, provide corrective measures as required, and in accordance with manufacturer's recommendations, to achieve the acceptable limits.
- G. Fill depressions and minor holes with subfloor filler.
- H. Apply, trowel, and float subfloor filler to achieve smooth, flat, hard surface. Grind irregularities above surface level. Prohibit traffic until filler is cured.
1. Use subfloor filler in accordance with manufacturer's recommendations to slope floors away from walls and toward floor drains if floor drains are present.
- I. Clean substrate.

### 3.3 INSTALLATION

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Apply components of resinous flooring system according to manufacturer's written instructions to produce a uniform, monolithic wearing surface of thickness indicated.
1. Apply each coat of flooring system at thickness recommended by flooring system manufacturer.
  2. Coordinate application of components to provide optimum adhesion of resinous flooring system to substrate, and optimum intercoat adhesion.
  3. Cure resinous flooring components according to manufacturer's written instructions. Prevent contamination during application and curing processes.
  4. Expansion, Isolation and Control Joint Treatment: At substrate expansion and isolation joints, comply with resinous flooring manufacturer's written instructions and details for each joint type and condition. Apply joint sealant to comply with manufacturer's written recommendations.
- C. Primer: Apply primer over prepared substrate at manufacturer's recommended spreading rate.
1. Coordinate use of primer with flooring system manufacturer recommendations at locations where waterproofing membrane and reinforcing membrane are installed.
- D. Waterproofing Membrane: At elevated floors, apply waterproofing membrane over entire substrate surface and including behind integral cove base. Comply with flooring system manufacturer's recommendations for application and thickness.



- E. Reinforcing Membrane:
  - 1. Apply reinforcing membrane to non-moving cracks and joints.
- F. Integral Cove Base: Apply cove base mix to wall surfaces before applying flooring. Apply according to manufacturer's written instructions and details, including those for taping, mixing, priming, troweling, sanding, and topcoating of cove base. Round internal and external corners. Transitions in planes, terminations, abutments, and cove formed base are to be carefully crafted with accurate lines and smooth contouring.
  - 1. Integral Cove Base Height: 4 inches (100 mm) high.
  - 2. If base top termination trim is indicated for resinous base, install integrally with resinous base.

### **3.4 ERECTION TOLERANCES**

- A. Section 01 40 00 - Quality Requirements: Tolerances.
- B. Maximum Variation from Flat Surface: 1/4 inch in 10 feet.
- C. Maximum Variation from Level (Except Surfaces Sloping to Drain): 1/8 inch.

### **3.5 CLEANING**

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures: Clean installed work and comply with manufacturer's recommendations.
- B. Clean installed work in accordance with manufacturer's recommended materials and procedures.

### **3.6 PROTECTION OF INSTALLED CONSTRUCTION**

- A. Section 01 73 00 - Execution: Protecting installed construction.
- B. Prohibit traffic on floor finish until cured; barricade as required.
- C. 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 system manufacturer.

**END OF SECTION**



**SECTION 09 68 13****TILE CARPETING****PART 1 GENERAL****1.1 SUMMARY**

- A. Section Includes:
  - 1. Tile carpeting.
  - 2. Accessories.
- B. Related Requirements:
  - 1. Section 03 30 00 - Cast-In-Place Concrete: Flooring substrate.
  - 2. Section 09 65 00 - Resilient Flooring: Wall base.
  - 3. Section 09 68 16: Sheet Carpeting

**1.2 REFERENCES**

- A. American Association of Textile Chemists and Colorists (AATCC):
  - 1. AATCC 134 - Test Method for Electrostatic Propensity of Carpets, 2019.
  - 2. AATCC 174 - Test Method for Antimicrobial Activity Assessment of New Carpets, 2016.
- B. ASTM International (ASTM):
  - 1. ASTM C423 - Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method, 2017.
  - 2. ASTM C1028 - Standard Test Method for Determining the Static Coefficient of Friction of Ceramic Tile and Other Like Surfaces by the Horizontal Dynamometer Pull-Meter Method, 2007.
  - 3. ASTM D2859 - Standard Test Method for Ignition Characteristics of Finished Textile Floor Covering Materials, 2016.
  - 4. ASTM D5116 - Standard Guide for Small-Scale Environmental Chamber Determinations of Organic Emissions from Indoor Materials/Products, 2010.
  - 5. ASTM E648 - Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source, 2017.
  - 6. ASTM E662 - Standard Test Method for Specific Optical Density of Smoke Generated by Solid Materials, 2017.
- C. Carpet and Rug Institute (CRI):
  - 1. CRI 104 - Standard for Installation of Commercial Carpet.
- D. Consumer Products Safety Commission (CPSC):
  - 1. CPSC 16 CFR 1630 - Standard for the Surface Flammability of Carpets and Rugs.
  - 2. CPSC FF 1-70 - Standard for the Surface Flammability of Carpets and Rugs.
- E. National Fire Protection Association (NFPA):
  - 1. NFPA 253 - Standard Method of Test for Critical Radiant Flux for Floor Covering Systems Using a Radiant Heat Energy Source.

**1.3 PRE-INSTALLATION MEETINGS**

- A. Section 01 30 00 - Administrative Requirements: Pre-installation meeting.
- B. Convene minimum one week prior to commencing work of this Section. Review the work requirements, application procedures, quality control, testing and inspection and production schedule.

**1.4 SUBMITTALS**

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Product Data: Submit data on specified products, describing physical and performance characteristics; sizes, patterns, colors available, and method of installation.
- C. Shop Drawings: Indicate layout of joints, direction of carpet tiles, location of moldings and transition edge strips.
- D. Samples for Initial Selection: Two manufacturer's complete sets of color samples illustrating the full range of colors, textures and pattern designs available; submit for Architect's initial selections. Include 6 inches long samples of moldings and transition edge strips.
- E. Samples for Verification: From the Architect's initial selections, prepare and submit two samples for each selected colors, textures, and pattern designs; samples to be same product material type indicated for final Work; each sample 12 x 12 inches. Where finishes involve normal color and texture variations, include sample sets showing the full range of variations expected.
- F. Manufacturer's Installation Instructions: Submit special procedures, perimeter conditions requiring special attention.

**1.5 CLOSEOUT SUBMITTALS**

- A. Section 01 77 00 - Closeout Procedures.
- B. Operation and Maintenance Data: Submit maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning.

**1.6 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this Section with minimum five (5) years documented experience.
- B. Installer Qualifications: Company specializing in performing work of this Section with minimum three (3) years documented experience and approved by carpet manufacturer.
- C. Testing Agency Qualifications: Independent firm specializing in performing testing and inspections of the type specified in this section.

**1.7 DELIVERY, STORAGE, AND HANDLING**

- A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Store materials in compliance with the manufacturer's recommendations.

**1.8 WARRANTIES**

- A. Section 01 77 00 - Closeout Procedures: Product warranties.
- B. Carpet Tile: Provide manufacturer's warranties covering the following:
  - 1. Lifetime Commercial Limited Warranty: Includes coverage for Fiber Abrasive Wear, Fiber Static Protection, Fiber Stain Warranty, Fiber Colorfastness to Light and Fiber Atmospheric Contaminants.

**1.9 SPARE PARTS AND MAINTENANCE PRODUCTS**

- A. Section 01 60 00 - Product Requirements: Extra materials, spare parts, and maintenance products.
  - 1. Supply 100 square feet of carpet tiles of each pattern and color installed.

## PART 2 PRODUCTS

### 2.1 GENERAL REQUIREMENTS

- A. Materials to comply with the following independently tested performance criteria:
1. Flammability: Passes, Pill Test (ASTM D2859 or CPSC FF 1-70).
  2. Critical Radiant Flux (CRF): In compliance with ASTM E648 or NFPA 253.
    - a. Class I, minimum 0.45 watt per square centimeter.
  3. Smoke Density: 450 or less in accordance with ASTM E662.
  4. Noise Reduction Coefficient: NRC Rating 0.30 (ASTM C423).
  5. Slip Resistance: Comply with ADA Guidelines, level surface (ASTM C1028).
  6. Carpet shall have been tested against and passed the Indoor Air Quality Carpet Testing Program requirements of CRI.
  7. Dimensional Stability: 0.1 % or less change Stability (Aachen Method Din 54318)
  8. Static Generation:
    - a. 3.5 kV or less at 20% R.H. at 70° F (AATCC 134 w/ neolite).
  9. Antimicrobial: Broad spectrum antimicrobial; permanent application in backing. Application must pass AATCC 174.
  10. VOC Limits: Provide carpet tile that complies with the following limits for VOC content when tested according to ASTM D5116:
    - a. Total VOCs: 0.5 mg/sq. m x h.
    - b. 4-PC (4-Phenylcyclohexene): 0.05 mg/sq. m x h.
    - c. Formaldehyde: 0.05 mg/sq. m x h.
    - d. Styrene: 0.4 mg/sq. m x h.
  11. Adhesive: Comply with the following criteria unless the manufacturer's warranty requirements indicate otherwise.
    - a. Water-resistant, mildew-resistant, non-staining, pressure-sensitive type to suit products and subfloor conditions indicated, that complies with flammability requirements for installed carpet tile and is recommended by carpet tile manufacturer for releasable installation.
    - b. Adhesive VOC Limits: Provide adhesives that comply with the following limits for VOC content when tested according to ASTM D5116:
      - 1) Total VOCs: 10.00 mg/sq. m x h.
      - 2) Formaldehyde: 0.05 mg/sq. m x h.
      - 3) 2-Ethyl-1-Hexanol: 3.00 mg/sq. m x h.

### 2.2 CARPET TILE

- A. Manufacturers:
1. Bentley.
  2. Collins & Aikman.
  3. Interface, Inc.
  4. Lees.
  5. Mannington.
  6. Shaw Contract.
  7. Tandus, a Tarkett Brand.
  8. Substitutions: Section 01 60 00 - Product Requirements
- B. Carpet Tile **Type CPT-1**: Manufactured in one color dye lot; conforming to the following criteria:
1. Basis of Design:
    - a. As indicated on Drawings.
  2. Tile Size:
    - a. 24 x 24 inches.
  3. Pile Thickness:

- a. 0 112 inch.
- 4. Total Thickness:
  - a. 0.260 inch.
- 5. Tufted Weight: 17.0 oz/sq yd.
- 6. Construction:
  - a. Multi-level pattern loop.
- 7. Dye Method: 100 percent solution dyed.
- 8. Fiber:
  - a. Eco Solution Q nylon.
- 9. Gauge:
  - a. 1/12.
- 10. Stitches:
  - a. 9 per inch.
- 11. Average Density:
  - a. 5,464 ounces per cubic yard.
- 12. Protective Treatment: SSP-Shaw Soil Protection.
- 13. Primary Backing Material:
  - a. Synthetic.
- 14. Secondary Backing Material:
  - a. Ecoworx.
- 15. Installation Pattern and Layout:
  - a. Ashlar, unless indicated otherwise on Drawings.

### 2.3 WALL BASE

- A. Wall Base Type: As indicated in Section 09 65 00 - Resilient Flooring.
  - 1. Color: As selected by Architect from samples submitted under Section 09 65 00.

### 2.4 ACCESSORIES

- A. Sub-Floor Filler: Latex type recommended by flooring material manufacturer and compatible with substrate materials and conditions.
- B. Moldings, Transition, and Edge Strips:
  - 1. Rubber: Colors and profiles to be selected by Architect from manufacturer's full range.
- C. Contact Adhesive: Comply with requirements of this Section and as recommended by carpet manufacturer and compatible with substrate materials and conditions.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Section 01 73 00 - Execution: Examination, coordination, and project conditions.
- B. Verify floor surfaces are smooth and flat within tolerances and are ready to receive work.
- C. In areas of installation, achieve substrates and air conditions that are compliant with manufacturer's recommendations prior to beginning installation. After recommended conditions have been achieved, store materials in area of installation for 48 hours prior to installation.

### 3.2 PREPARATION

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this Section.

- B. Prepare materials to be installed and equipment to be used during installation.
- C. Remove sub-floor ridges and bumps. Fill minor or local low spots, cracks, joints, holes, and other defects with sub-floor filler.
- D. Apply, trowel, and float filler to achieve smooth, flat, hard surface. Prohibit traffic until filler is cured.
- E. Clean substrate.
- F. Verify concrete floors are ready for carpet installation by testing for moisture emission rate and alkalinity. Obtain instructions when test results are not within specified limits.
  - 1. Moisture emission rate: As recommended by carpet manufacturer and not greater than 3 lbs per 1,000 sq ft per 24 hours when tested using calcium chloride moisture test kit for 72 hours.
  - 2. Alkalinity: As recommended by carpet manufacturer and not greater than pH range of 5-9.

### **3.3 INSTALLATION**

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Comply with CRI 104 and manufacturer's recommendations.
- C. Do not mix carpet from different cartons unless from same dye lot.
- D. Cut carpet clean. Fit carpet tight to intersection with vertical surfaces without gaps.
- E. Locate change of color or pattern between rooms under door centerline.
- F. Fully adhere carpet tile to substrate using adhesives and instructions in accordance with carpet manufacturer's recommendations.
- G. Trim carpet neatly at walls and around interruptions.
- H. Install wall base.
- I. Complete installation of moldings and transition edge strips, concealing exposed edges.

### **3.4 CLEANING**

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures: Related to cleaning.
- B. Remove excess adhesive from floor, base, and wall surfaces without damage.
- C. Clean and vacuum carpet surfaces.

### **3.5 PROTECTION OF INSTALLED CONSTRUCTION**

- A. Section 01 73 00 - Execution: Protecting installed construction.
- B. Protect installed construction from damage and soiling.

**END OF SECTION**





**SECTION 09 68 16**  
**SHEET CARPETING**

**PART 1 GENERAL****1.1 SUMMARY**

- A. Section Includes:
  - 1. Sheet carpet, fully adhered.
  - 2. Accessories.
- B. Related Requirements:
  - 1. Section 03 30 00 - Cast-In-Place Concrete: Flooring substrate.
  - 2. Section 09 65 00 - Resilient Flooring: Wall base.
  - 3. Section 09 68 13 - Tile Carpet.

**1.2 REFERENCES**

- A. American Association of Textile Chemists and Colorists (AATCC):
  - 1. AATCC 134 - Electrostatic Propensity of Carpets, 2016.
  - 2. AATCC 174 - Antimicrobial Activity Assessment of New Carpets, 2016.
- B. ASTM International (ASTM):
  - 1. ASTM C423 - Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method, 2017.
  - 2. ASTM C1028 - Standard Test Method for Determining the Static Coefficient of Friction of Ceramic Tile and Other Like Surfaces by the Horizontal Dynamometer Pull-Meter Method, 2007.
  - 3. ASTM D2859 - Standard Test Method for Ignition Characteristics of Finished Textile Floor Covering Materials, 2016.
  - 4. ASTM D5116 - Standard Guide for Small-Scale Environmental Chamber Determinations of Organic Emissions from Indoor Materials/Products, 2010.
  - 5. ASTM E648 - Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source, 2017.
  - 6. ASTM E662 - Standard Test Method for Specific Optical Density of Smoke Generated by Solid Materials, 2017.
- C. Carpet and Rug Institute (CRI):
  - 1. CRI 104 - Standard for Installation of Commercial Carpet.
  - 2. CRI Green Label Plus Testing Program.
- D. Consumer Products Safety Commission (CPSC):
  - 1. CPSC 16 CFR 1630 - Standard for the Surface Flammability of Carpets and Rugs.
  - 2. CPSC FF 1-70 - Standard for the Surface Flammability of Carpets and Rugs.
- E. National Fire Protection Association (NFPA):
  - 1. NFPA 253 - Standard Method of Test for Critical Radiant Flux for Floor Covering Systems Using a Radiant Heat Energy Source.

**1.3 PRE-INSTALLATION MEETINGS**

- A. Section 01 30 00 - Administrative Requirements: Pre-installation meeting.
- B. Convene minimum one week prior to commencing work of this Section. Review the work requirements, application procedures, quality control, testing and inspection and production schedule.

**1.4 SUBMITTALS**

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Product Data: Submit data on specified products, describing physical and performance characteristics; sizes, patterns, colors available, and method of installation.
- C. Shop Drawings: Indicate layout of joints, direction of carpet pile, location of edge moldings.
- D. Samples for Initial Selection: Two manufacturer's complete sets of color samples illustrating the full range of colors, textures and pattern designs available; submit for Architect's initial selections. Include 6 inches long samples of moldings and transition edge strips.
- E. Samples for Verification: From the Architect's initial selections, prepare and submit two samples for each selected colors, textures and pattern designs; samples to be same product material type indicated for final Work; each sample 12 x 12 inches. Where finishes involve normal color and texture variations, include sample sets showing the full range of variations expected.
- F. Manufacturer's Installation Instructions: Submit special procedures, perimeter conditions requiring special attention.

**1.5 CLOSEOUT SUBMITTALS**

- A. Section 01 77 00 - Closeout Procedures.
- B. Operation and Maintenance Data: Submit maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning.

**1.6 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this Section with minimum five (5) years documented experience.
- B. Installer Qualifications: Company specializing in performing work of this Section with minimum three (3) years documented experience and approved by carpet manufacturer.
- C. Testing Agency Qualifications: Independent firm specializing in performing testing and inspections of the type specified in this section.

**1.7 DELIVERY, STORAGE, AND HANDLING**

- A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Store materials in compliance with the manufacturer's recommendations.

**1.8 WARRANTY**

- A. Section 01 70 00 - Execution and Closeout Requirements: Product warranties and product bonds.
- B. Furnish Flooring Contractor's ten (10) year warranty for defects in materials and workmanship.
- C. Furnish manufacturer's standard warranties covering the following:
  - 1. Lifetime Limited Warranty: Includes coverage for Face Wear, Moisture Barrier, Wick-Back, Delamination, Tuft Bind, Unraveling, and Static Protection.
  - 2. Fifteen (15) Year Limited Warranty Against Color Loss from Bleach Spills.
  - 3. Fifteen (15) Year Limited Warranty Against Staining.

**1.9 SPARE PARTS AND MAINTENANCE PRODUCTS**

- A. Section 01 60 00 - Product Requirements: Extra materials, spare parts, and maintenance products.
1. Supply two (2) percent of each carpet color and pattern selected for the project.

**PART 2 PRODUCTS****2.1 GENERAL REQUIREMENTS**

- A. Materials to comply with the following independently tested performance criteria:
1. Flammability: Passes, Pill Test (ASTM D2859 or CPSC FF 1-70).
  2. Critical Radiant Flux (CRF): In compliance with ASTM E648 or NFPA 253.
    - a. Class I, minimum 0.45 watt per square centimeter.
  3. Smoke Density: 450 or less in accordance with ASTM E662.
  4. CPSC 16 CFR 1630.
  5. Slip Resistance: Comply with ADA Guidelines, level surface (ASTM C1028).
  6. Carpet shall have been tested against and passed the Indoor Air Quality Carpet Testing Program requirements of CRI.
  7. Dimensional Stability: 0.1 % or less change Stability (Aachen Method Din 54318)
  8. Static Generation:
    - a. 3.0 kV or less at 20% R.H. at 70° F (AATCC 134 w/ neolite).
  9. Antimicrobial: Broad spectrum antimicrobial; permanent application in backing. Application must pass AATCC 174.
  10. VOC Limits: Provide carpet tile that complies with the following limits for VOC content when tested according to ASTM D5116:
    - a. Total VOCs: 0.5 mg/sq. m x h.
    - b. 4-PC (4-Phenylcyclohexene): 0.05 mg/sq. m x h.
    - c. Formaldehyde: 0.05 mg/sq. m x h.
    - d. Styrene: 0.4 mg/sq. m x h.
  11. Adhesive: Comply with the following criteria, unless the manufacturer's warranty requirements indicate otherwise.
    - a. Water-resistant, mildew-resistant, non-staining, pressure-sensitive type to suit products and subfloor conditions indicated, that complies with flammability requirements for installed carpet tile and is recommended by carpet tile manufacturer for releasable installation.
    - b. Adhesive VOC Limits: Provide adhesives that comply with the following limits for VOC content when tested according to ASTM D5116:
      - 1) Total VOCs: 10.00 mg/sq. m x h.
      - 2) Formaldehyde: 0.05 mg/sq. m x h.
      - 3) 2-Ethyl-1-Hexanol: 3.00 mg/sq. m x h.

**2.2 CARPET**

- A. Manufacturers:
1. Bentley.
  2. Interface, Inc.
  3. Mannington.
  4. Shaw Contract.
  5. Tandus, a Tarkett Brand.
  6. Substitutions: Section 01 60 00 - Product Requirements

**2.3 COMPONENTS**

- A. Carpet to be manufactured in one color dye lot and conforming to the following criteria:
- B. Sheet Carpet **Type CRP-1**:
  - 1. Basis of Design:
    - a. Mannington.
  - 2. Roll Size: Twelve (12) feet wide.
  - 3. Fiber:
    - a. Antron Legacy Type 6,6 nylon.
  - 4. Construction:
    - a. Pattern loop.
  - 5. Dye Method:
    - a. Solution/yarn.
  - 6. Gauge: 1/12 inch.
  - 7. Stitches:
    - a. 10 per inch.
  - 8. Tufted Weight:
    - a. 20 oz/sq yd.
  - 9. Density Factor:
    - a. 6206 ounces per cubic yard.
  - 10. Primary Backing Material: Synthetic.
  - 11. Secondary backing material:
    - a. Ultrabac RE with 10% Recycled Content.
  - 12. Color:
    - a. Attest 3404.

**2.4 ACCESSORIES**

- A. Sub-Floor Filler: Latex Type recommended by flooring material manufacturer.
- B. Moldings and Edge Strips: Extruded aluminum, color as selected.
  - 1. Reducer and edge strips are to be mechanically fastened to the sub floor. Glue down strips shall not be allowed.
- C. Contact Adhesive: Recommended by carpet manufacturer.
- D. Seam Adhesive: Recommended by manufacturer.
- E. Provide banding for all exposed carpet edges.

**PART 3 EXECUTION****3.1 EXAMINATION**

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify floor surfaces are smooth and flat within tolerances and are ready to receive work.
- C. In areas of installation, achieve substrates and air conditions that are compliant with manufacturer's recommendations prior to beginning installation. After recommended conditions have been achieved, store materials in area of installation for 48 hours prior to installation.

**3.2 PREPARATION**

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this Section.

- B. Prepare materials to be installed and equipment to be used during installation.
- C. Remove sub-floor ridges and bumps. Fill minor or local low spots, cracks, joints, holes, and other defects with sub-floor filler.
- D. Apply, trowel, and float filler to achieve smooth, flat, hard surface. Prohibit traffic until filler is cured.
- E. Clean substrate.
- F. Verify concrete floors are ready for carpet installation by testing for moisture emission rate and alkalinity. Obtain instructions when test results are not within specified limits.
  - 1. Moisture emission rate: Not greater than 3 lb per 1,000 sq ft per 24 hours when tested using calcium chloride moisture test kit for 72 hours.
  - 2. Alkalinity: pH range of 5-9.
- G. Store materials in area of installation for 48 hours prior to installation.
  - 1. Cut carpet and lay in place to allow it to acclimate and “relax” prior to installation.

### 3.3 INSTALLATION

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Install carpet tile in accordance with CRI 104 and carpet manufacturer.
- C. Verify carpet match before cutting to ensure minimal variation between dye lots.
- D. Lay out carpet and locate seams in accordance with CRI 104 section 7.2 shop drawings:
  - 1. Locate seams in area of least traffic, out of areas of pivoting traffic, and parallel to main traffic.
  - 2. Do not locate seams perpendicular through door openings.
  - 3. Align run of pile in same direction as anticipated traffic and in same direction on adjacent pieces.
  - 4. Provide monolithic color, pattern, and texture match within each contiguous area.
- E. Install carpet tight and flat on subfloor, well fastened at edges, with uniform appearance.
- F. Double cut carpet seams, with accurate pattern match. Make cuts straight, true, and unfrayed. Apply seam adhesive to cut edges of woven carpet immediately.
  - 1. Seam sealer is required at all seams.
- G. Direct Glue-Down Installation: CRI 104 Section 8.
  - 1. Apply contact adhesive to floor uniformly at rate recommended by manufacturer. After sufficient open time, press carpet into adhesive.
  - 2. Apply seam adhesive. Lay adjoining piece with seam straight, not overlapped or peaked, and free of gaps.
  - 3. Roll with appropriate roller for complete contact of adhesive to carpet backing.
- H. Trim carpet neatly at walls and around interruptions.
  - 1. No saddle or T-seams shall be allowed in doorways or high traffic areas.
- I. Complete installation of edge strips, concealing exposed edges.

### 3.4 CLEANING

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures: Clean installed work in accordance with manufacturer’s recommendations including cleaning procedures and materials.
- B. Remove excess adhesive from floor, base, and wall surfaces without damage.
- C. Clean and vacuum carpet surfaces.

**3.5 PROTECTION OF INSTALLED CONSTRUCTION**

- A. Section 01 73 00 - Execution: Protecting installed construction.
- B. Ventilate thoroughly all carpeted areas during and after installation, prior to occupancy.
- C. Protect the work against damage from construction operations and placement of equipment.

**END OF SECTION**

**SECTION 09 77 23****FABRIC WRAPPED PANELS****PART 1 GENERAL****1.1 SUMMARY**

- A. Section Includes:
  - 1. Fabric wrapped glass fiber panels.
- B. Related Requirements:
  - 1. Section 04 20 00 - Unit Masonry: Mounting substrate.
  - 2. Section 09 21 16 - Gypsum Board Assemblies: Mounting substrate.

**1.2 REFERENCES**

- A. ASTM International (ASTM):
  - 1. ASTM C423 - Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method; 2017.
  - 2. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2017.
- B. Forest Stewardship Council (FSC):
  - 1. FSC Guidelines - Forest Stewardship Council Guidelines.
- C. California Department of Health Services (CA/DHS):
  - 1. CA/DHS/EHLB/R-174 - Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers, including 2004 Addenda.

**1.3 SUBMITTALS**

- A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.
- B. Product Data: Submit data including core construction and profile options, fabric, mounting options and accessory materials.
- C. Shop Drawings:
  - 1. Indicate layout and dimensions of acoustical wall panels, edge profiles, core materials, and fabric face.
  - 2. Indicate interface with adjacent materials.
- D. Samples for Initial Selection: Two manufacturer's complete set of color charts illustrating the full range and premium range of fabrics, patterns, finishes and colors available; include 12 x 12 inches panel core with mounting hardware secured, illustrating core construction; submit for Architect's initial selections.
- E. Samples for Verification: From the Architect's initial selections, prepare and submit two samples for each selected fabric, pattern, finish, and color; each sample to be 12 x12 inches illustrating actual panel construction with mounting hardware secured. Where finishes involve normal color and texture variations, include sample sets showing the full range of variations expected.
- F. Manufacturer's Installation Instructions:
  - 1. Submit manufacturers written installation instructions.
  - 2. Submit special procedures, and perimeter conditions requiring special attention.
- G. Manufacturer's Certificate: Certify Products meet or exceed specified requirements.

**1.4 CLOSEOUT SUBMITTALS**

- A. Section 01 78 23 - Operation and Maintenance Data.
- B. Submit fabric care and maintenance procedures, recommended fabric maintenance materials, and suggested schedule for fabric cleaning.

**1.5 QUALIFICATIONS**

- A. Manufacturer: Company specializing in manufacturing Products specified in this section with minimum three (3) years documented experience.
- B. Installer: Company specializing in performing work of this section with minimum five (5) years documented experience.

**1.6 DELIVERY, STORAGE, AND HANDLING**

- A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Accept materials on site in manufacturer's original packaging. Inspect for damage.
- C. Store materials indoors with environmental conditions as specified for installation.
- D. Acclimate materials to installation conditions for seventy-two (72) hours prior to installation.

**1.7 ENVIRONMENTAL REQUIREMENTS**

- A. Section 01 60 00 - Product Requirements: Environmental conditions affecting products on site.
- B. Do not install acoustical wall treatment until space has been enclosed and is watertight, wet work is complete and dry and adjacent and related work is completed.
- C. Do not install acoustical wall until ambient temperature and humidity level will be continuously maintained at conditions indicated for Owner occupancy.

**1.8 SPARE PARTS AND MAINTENANCE PRODUCTS**

- A. Section 01 60 00 - Product Requirements: Extra materials, spare parts, and maintenance products.
  - 1. Provide 20 percent extra panels for each panel size, color, and pattern provided or furnished.
    - a. Where calculation of required extra panels generates a fraction of a panel, the fraction is to be rounded up to another full panel.
    - b. Include mounting hardware for each extra panel provided. Hardware to be same as was used for installed panels.

**PART 2 PRODUCTS****2.1 PERFORMANCE REQUIREMENTS**

- A. Surface Burning Characteristics: Maximum 25/450 flame spread/smoke developed index (Class 1/Class A) when tested in accordance with ASTM E84.

**2.2 FABRIC WRAPPED GLASS FIBER PANELS**

- A. Manufacturers:
  - 1. AVL Systems, Inc.
  - 2. Conwed Designscape.



3. Decoustics.
  4. Lamvin, Inc.
  5. Sound Seal.
  6. Wenger/JR Clancy.
  7. Substitutions: Section 01 60 00 - Product Requirements.
- B. Basis of Design:
1. AVL Systems, Inc.: AcousTech.
- C. Acoustic Performance: Tested per ASTM C423 (Type A, F5, or F6 mounting). Minimum values indicated.
1. 2 Inch Thick Panels:
    - a. Noise Reduction Coefficient (NRC):
      - 1) NRC: 1.10
    - b. Sound Absorption Coefficients (SAC):
      - 1) 125 Hz: 0.38
      - 2) 250 Hz: 0.96
      - 3) 500 Hz: 1.16
      - 4) 1000 Hz: 1.16
      - 5) 2000 Hz: 1.11
      - 6) 4000 Hz: 1.28
- D. Core Material:
1. Rigid Glass Fiber Board:
    - a. Density: 6 pcf, minimum.
    - b. Resin hardened at edges and hardware attachment locations.
- E. Thickness:
1. 2 inches thick, unless indicated otherwise on Drawings.
- F. Edge Profile:
1. Chamfered edges, unless indicated otherwise on Drawings.
- G. Fabric Covering: Manufacturer's premium acoustic fabric with fire retardant treatment.
1. Basis of Design:
    - a. As indicated on Drawings.
      - 1) Pattern/Color: To be selected by Architect from manufacturer's full range and premium range of patterns and colors.
- H. Panel Sizes and Locations:
1. Provide panels as indicated on Drawings.
- I. Accessories:
1. Mounting Hardware:
    - a. Manufacturer's standard concealed mechanical clip system.
- J. Fabrication:
1. Bond fabric covering directly to the core material and return minimum 1-1/4 inch onto back of panel to provide finished and secured edges.
  2. Attach mounting hardware to back of panel.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify substrate is flat, plumb, and level and ready to receive the work of this section.

- C. Verify adjacent and related work is complete.

### **3.2 INSTALLATION**

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Install panels plumb, level, in plane, and aligned.
- C. Line up edge and end joints.

### **3.3 ERECTION TOLERANCES**

- A. Section 01 40 00 - Quality Requirements: Tolerances.
- B. Maximum Variation From Indicated Position: 1/4 inch.
- C. Maximum Offset From Indicated Alignment: 1/16 inch.
- D. Maximum Out of Square: 1/4 inch difference in panel diagonals.

### **3.4 CLEANING**

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures: Related to cleaning.
- B. Clean exposed fabric faces in accordance with manufacturer's recommendations.

### **3.5 PROTECTION OF INSTALLED CONSTRUCTION**

- A. Section 01 73 00 - Execution: Protecting installed construction.

**END OF SECTION**

**SECTION 09 90 00**  
**PAINTING AND COATING**

**PART 1 GENERAL****1.1 SUMMARY**

- A. Section includes surface preparation and field application of painting and coating systems.
- B. Related Requirements:
  - 1. Sections including work indicated to receive painting and coating.

**1.2 REFERENCES**

- A. ASTM International (ASTM):
  - 1. ASTM D16 - Standard Terminology for Paint, Related Coatings, Materials, and Applications; 2016.
  - 2. ASTM D4442 - Standard Test Methods for Direct Moisture Content Measurement of Wood and Wood-Base Materials; 2020.
- B. Master Painters Institute (MPI):
  - 1. MPI (APL) - Approved Products List; Master Painters and Decorators Association; Current Edition.
  - 2. MPI (APSM) - Architectural Painting Specification Manual; Current Edition.
- C. Painting and Decorating Contractors of America (PDCA):
  - 1. PDCA - Architectural Painting Specification Manual; Current Edition.
- D. The Society for Protective Coatings (SSPC):
  - 1. SSPC V1 (PM1) - Good Painting Practice: Painting Manual Volume 1; 2016.
  - 2. SSPC V2 (PM2) - Systems and Specifications: Steel Structures Painting Manual Volume 2; 2015.
  - 3. SSPC SP 13 - Surface Preparation of Concrete; 1997 (reaffirmed 2003).
- E. Green Seal (GS):
  - 1. GS-11 - Standard For Paints, Coatings, Stains, And Sealers; 2021.

**1.3 DEFINITIONS**

- A. Conform to ASTM D16 for interpretation of terms used in this section.

**1.4 SUBMITTALS**

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Product Data: Submit data on all finishing products.
- C. Samples for Initial Selection: Submit two paper chip samples; 2 x 3 inches in size; illustrating range of colors, sheens, and textures available for each surface finishing product indicated; submit for Architect's initial selections.
  - 1. For clear top coats on stained wood, samples to illustrate range of colors and sheens available as applied to wood species required in construction.
  - 2. For clear top coats on non-stained wood, samples to illustrate sheens available as applied to wood species required in construction.
- D. Samples for Verification: From the Architect's initial selections, prepare and submit two samples for each selected color, sheen, and texture. Where finishes involve normal color and texture variations, include sample sets showing the full range of variations expected.

1. For opaque paint samples, submit each on tempered hardboard; minimum 8 x 8 inches.
  2. For clear top coats on stained and non-stained wood; submit each on finished wood species required in construction; minimum 8 x 8 inches.
- E. Manufacturer's Installation Instructions: Submit special surface preparation procedures and substrate conditions requiring special attention.

### **1.5 CLOSEOUT SUBMITTALS**

- A. Section 01 77 00 - Closeout Procedures.
- B. Operation and Maintenance Data: Submit data on cleaning, touch-up, and repair of painted and coated surfaces.

### **1.6 QUALIFICATIONS**

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum five (5) years documented experience.
- B. Applicator: Company specializing in performing work of this section with minimum ten (10) years documented experience.

### **1.7 MOCKUP**

- A. Section 01 40 00 - Quality Requirements: Mock-up requirements.
- B. Construct mockup, in one room, illustrating coating color, sheen, texture, and finish.
- C. Locate where directed by Architect.
- D. Incorporate accepted mockup as part of Work.

### **1.8 DELIVERY, STORAGE, AND HANDLING**

- A. Section 01 60 00 - Product Requirements: Product storage and handling requirements.
- B. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.
- C. Container Label: Include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.
- D. Paint Materials: Store at minimum ambient temperature of 45 degrees F and maximum of 90 degrees F, in ventilated area, and as required by manufacturer's instructions.

### **1.9 ENVIRONMENTAL REQUIREMENTS**

- A. Section 01 60 00 - Product Requirements.
- B. Do not apply materials when surface and ambient temperatures are outside temperature ranges required by paint product manufacturer.
- C. Do not apply exterior coatings during rain or snow when relative humidity is outside humidity ranges, or moisture content of surfaces exceed those required by paint product manufacturer.
- D. Minimum Application Temperatures for Latex Paints: 45 degrees F for interiors; 50 degrees F for exterior, unless required otherwise by manufacturer's instructions.
- E. Minimum Application Temperature for Varnish Finishes: 65 degrees F for interior or exterior, unless required otherwise by manufacturer's instructions.

- F. Provide lighting level of 80 ft candle measured mid-height at substrate surface.

### 1.10 WARRANTY

- A. Section 01 77 00 - Closeout Procedures: Product warranties.
- B. Furnish five (5) year manufacturer warranty for paints and coatings.
- C. Contractor to provide a one (1) year warranty on all defects.
- D. Installer to provide a two (2) year warranty on all materials and workmanship.

### 1.11 SPARE PARTS AND MAINTENANCE PRODUCTS

- A. Section 01 60 00 - Product Requirements: Extra materials, spare parts, and maintenance products.
  - 1. Supply 1 gallon of each color, sheen, type, and surface texture; store as directed by Owner.
  - 2. Label each container with color, sheen, type, surface texture and room locations, in addition to manufacturer's label.

## PART 2 PRODUCTS

### 2.1 PAINTS AND COATINGS

- A. Manufacturers:
  - 1. Benjamin Moore (BM).
  - 2. PPG Paints (PPG).
  - 3. Sherwin-Williams Company (SW).
  - 4. Substitutions: Section 01 60 00 - Product Requirements.
- B. Basis of Design Manufacturer (BOD):
  - 1. Sherwin-Williams Company (SW) unless indicated otherwise as follows:
    - a. Comply with SCHEDULE article in PART 3 of this Section if BOD is indicated other than that indicated above.
    - b. Comply with Drawings if BOD is indicated other than that indicated in this Section.
    - c. Manufacturer, product, and finish sheen to be as indicated in SCHEDULE article in this Section unless indicated otherwise on Drawings.
- C. Provide paints and finishes from the same manufacturer to the greatest extent possible.
  - 1. If a single manufacturer cannot provide specified products, minor exceptions will be permitted provided approval by Architect is obtained using the specified procedures for substitutions.

### 2.2 COMPONENTS

- A. Conditioners, primers, and other undercoating products are to be of same manufacturer as top coat manufacturer unless top coat manufacturer recommends otherwise in writing.
- B. All materials and paints shall be lead and mercury free and shall have low VOC content where possible.
- C. Coatings: Ready mixed, except field catalyzed coatings. Prepare coatings:
  - 1. Prepare coatings to soft paste consistency, capable of being readily and uniformly dispersed to homogeneous coating.
  - 2. Prepare coatings for consistent flow and brushing properties.
  - 3. Prepare coatings capable of drying and curing free of streaks or sags.

4. Interior Flat and Non-Flat Paints:
    - a. Maximum volatile organic compound content in accordance with California Department of Health Services Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers, including 2004 Addenda.
  5. Interior Anti-Corrosive Paints:
    - a. Maximum volatile organic compound content in accordance with California Department of Health Services Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers, including 2004 Addenda.
  6. Interior Clear Wood Finishes: Maximum volatile organic compound content in accordance with California Department of Health Services Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers, including 2004 Addenda.
- D. Accessory Materials: Linseed oil, shellac, turpentine, paint thinners and other materials not specifically indicated but required to achieve finishes specified; commercial quality.
1. Interior Clear Wood Finishes: Maximum volatile organic compound content in accordance with California Department of Health Services Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers, including 2004 Addenda.
- E. Patching Materials: To be compatible with the substrate and paint/coating materials; use latex patching materials where compatible with substrate and paint/coating materials; use tinted or stainable patch materials where wood substrates are indicated to be stained.
- F. Recessed Fastener Head Filler Materials: To be compatible with the substrate and paint/coating materials; use latex filler materials where compatible with substrate and paint/coating materials; use tinted or stainable patch materials where wood substrates are indicated to be stained.

### 2.3 COLORS, SHEENS, AND LOCATIONS FOR APPLICATION:

- A. Drawings and Schedules on Drawings provide additional information regarding Colors, Sheens, Basis of Design (BOD), and Locations.
  1. Other Colors and Locations to be as selected by Architect from manufacturer's full range.
- B. Sheen designation indicated on Drawings supersedes sheen designations indicated in this Section.
  1. In such case, provide manufacturer and named products indicated in this Section, but with sheen indicated on Drawings.
- C. Indicated color codes in this Section and on Drawings are only for the purpose of color matching and does not alter requirements for products, manufacturers, or named products.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify surfaces are ready to receive Work as instructed by product manufacturer.
- C. Examine surfaces indicated to be finished prior to commencement of work. Report conditions capable of affecting proper application.

- D. Test shop applied primer for compatibility with subsequent cover materials.
- E. Measure moisture content of surfaces using electronic moisture meter. Do not apply finishes unless moisture content of surfaces is in accordance with the coating manufacturer's recommendations and is below the following maximums:
  1. Gypsum Wallboard: 12 percent.
  2. Masonry, Concrete and Concrete Unit Masonry: 12 percent.
  3. Interior Wood: 15 percent, measured in accordance with ASTM D4442.
  4. Exterior Wood: 15 percent, measured in accordance with ASTM D4442.
  5. Concrete Floors and Traffic Surfaces: 8 percent.

### 3.2 PREPARATION

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this section. Prepare materials to be installed and equipment used during installation.
- B. Preparations to be executed with methods and materials compatible with paints and coatings to be applied.
- C. Surface Appurtenances: Remove electrical plates, hardware, light fixture trim, escutcheons, and fittings prior to preparing surfaces or finishing.
- D. Surfaces: Correct defects and clean surfaces thoroughly prior to applications.
- E. Seal marks and surfaces that might cause bleed through or staining of top coat.
- F. Remove marks and foreign matter from substrates indicated for transparent or semi-transparent coatings.
- G. Impervious Surfaces: Remove mildew by scrubbing with solution of tri-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.
- H. Aluminum Surfaces Indicated for Paint Finish: Remove surface contamination by steam or high pressure water. Remove oxidation with acid etch and solvent washing. Apply etching primer immediately following cleaning.
- I. Insulated Coverings: Remove dirt, grease, and oil from canvas and cotton.
- J. Gypsum Board Surfaces: Must be clean and dry. All nail heads must be set and spackled. Joints must be taped and covered with a joint compound. Spackled fastener heads and tape joints must be sanded smooth, and all dust removed prior to painting. Exterior surfaces must be spackled with exterior grade compounds. Fill minor defects with filler compound. Spot prime defects after repair.
- K. Galvanized Surfaces: Remove surface contamination and oils and wash with solvent. Apply coat of etching primer.
- L. Concrete: Remove release agents, curing compounds, efflorescence, irregular surfacing, foreign matter, stains, chalk, and laitance. Prepare surface as recommended by finishes manufacturer and according to SSPC SP 13. Do not coat surfaces if moisture content or alkalinity of surfaces to be coated exceeds the lesser of that permitted in manufacturer's written instructions and that indicated in this Section. Remove stains caused by weathering of corroding metals with solution of sodium metasilicate after thoroughly wetting with water. Allow to dry.
- M. Concrete Floors Requiring Seal Finish (Does not include Polished Concrete Floor Finishing, see Division 3):
  1. Use preparation procedures and products as recommended by manufacturer of concrete floor sealer.

- N. Unit Masonry Surfaces Indicated to Receive Paint Finish: Remove dirt, loose mortar, scale, salt or alkali powder, and other foreign matter. Remove oil and grease with solution of tri-sodium phosphate; rinse well and allow to dry. Remove stains caused by weathering of corroding metals with solution of sodium metasilicate after thoroughly wetting with water. Allow to dry.
- O. Plaster and Parged Surfaces: Fill hairline cracks, small holes, and imperfections with patching material compatible with the plaster and the indicated coatings. Make smooth and flush with adjacent surfaces. Wash and neutralize high alkali surfaces.
- P. Uncoated Steel and Iron Surfaces: Remove grease, mill scale, weld splatter, dirt, and rust. Where heavy coatings of scale are evident, remove by hand power tool wire brushing or sandblasting; clean by washing with solvent. Apply treatment of phosphoric acid solution, ensuring weld joints, bolts, and nuts are similarly cleaned. Spot prime paint after repairs.
- Q. Shop Primed Steel Surfaces: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Prime bare steel surfaces.
- R. Surfaces Indicated to Receive Fire-Retardant Intumescent Paint: Use preparation procedures and products as recommended by manufacturer of Intumescent Paint system.
- S. Metal Doors and Frames Indicated for Painting: Prime metal door top and bottom edge surfaces.
- T. Wood Surfaces:
  1. Opaque Finish: Wipe off dust and grit prior to priming. Seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after primer has dried. Prime filled areas, sanding between coats. For exterior applications, back prime concealed surfaces of material before installation.
  2. Transparent Finish: Wipe off dust and grit prior to application of finishing materials. Fill nail holes and cracks with stainable filler or filler tinted to match the intended final wood appearance. For exterior applications, prime concealed surfaces with indicated finish material.
- U. Glue-Laminated Wood Beams Indicated for Field Applied Finishing: Prior to finishing, wash surfaces with solvent, remove grease and dirt.
- V. Floor and Roof Concrete Planks: Where underside of planks is exposed to view, install continuous joint sealant materials to seal joints including joints between planks, around perimeters and voids.
- W. PVC, Vinyl and Architectural Plastic: Clean and lightly sand surfaces to be coated. Use preparation procedures and products as recommended by substrate manufacturer and manufacturer of coating system.

### 3.3 APPLICATION

- A. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.
- B. Apply each coat to uniform appearance. Apply each coat of paint slightly darker than preceding coat unless specified otherwise.
- C. For concrete masonry units and other porous masonry and cementitious materials indicated to receive painting/coating, apply the primer coating as needed to fill all pinholes prior to applying finish top coats.
- D. Sand surfaces lightly between coats to achieve required finish.



- E. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.
- F. Where clear finishes are required, tint fillers to match wood and apply to match wood texture. Remove excess from surface.
- G. Prime concealed surfaces of interior woodwork with primer paint.
- H. Finishing Mechanical and Electrical Equipment:
  - 1. Paint shop primed equipment. Paint shop finished items occurring at interior areas.
  - 2. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately. Reinstall after paint is cured.
  - 3. Prime and paint insulated and exposed pipes, conduit, boxes, insulated and exposed ducts, hangers, brackets, collars and supports, except where items are shop finished.
  - 4. Paint interior surfaces of air ducts visible through grilles and louvers with one coat of flat black paint to visible surfaces. Paint dampers exposed behind louvers, grilles, to match face panels.
  - 5. Paint exposed conduit and electrical equipment occurring in finished areas.
  - 6. Paint both sides and edges of plywood backboards for electrical and telephone equipment before installing equipment.
  - 7. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.
- I. Finishing Overhead Construction Indicated as Open To Structure (exposed to view):
  - 1. This provision includes finishing of overhead construction above suspended ceilings and clouds that do not extend to wall. This condition allows overhead construction to be seen above and over the suspended ceiling or cloud. Therefore, such overhead construction must be painted to eliminate unsightly overhead conditions that are visible.
  - 2. This provision does not include mechanical and electrical utility rooms, unless indicated otherwise on Drawings.
  - 3. Apply fast-drying, flat interior dry-fall type alkyd to all overhead construction Work and surfaces. Such surfaces include, but are not limited to, roof decking, structural steel, bracing and supports, and mechanical and electrical work.
    - a. Dry-Fall application does not apply to the following:
      - 1) Items with manufacturer's fully prefinished final coatings such as light fixtures, life safety devices and required warning postings.
      - 2) Surfaces scheduled to receive manufacturer's fully prefinished final coatings or field applied coatings other than Dry-Fall. Such surfaces may include wood laminated beams and underside of wood plank ceilings.

### 3.4 CLEANING

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures: Related to cleaning.
- B. Collect waste material which may constitute fire hazard, place in closed metal containers, and remove daily from site.

### 3.5 SCHEDULE - EXTERIOR SURFACES

- A. Steel - Unprimed:
  - 1. One coat of alkyd primer.
    - a. BM - Super Spec HP Alkyd Metal Primer P06.
    - b. PPG - Pitt-Tech Plus 4020 PF DTM Acrylic Primer.
    - c. SW - All Surface Enamel Interior-Exterior Alkyd Primer.
  - 2. Two top coats of alkyd enamel finish.

- a. BM - Advance Waterborne Interior-Exterior Alkyd High Gloss N794.
  - b. PPG - Pitt-Tech Plus EP DTM Acrylic Gloss.
  - c. SW - SWP Exterior Oil Base Gloss.
- B. Steel - Primed:
- 1. One coat of alkyd primer.
    - a. BM - Super Spec HP Alkyd Metal Primer P06.
    - b. PPG - Pitt-Tech Plus 4020 PF DTM Acrylic Primer.
    - c. SW - All Surface Enamel Interior-Exterior Alkyd Primer.
  - 2. Two top coats of alkyd enamel finish.
    - a. BM - Advance Waterborne Interior-Exterior Alkyd High Gloss N794.
    - b. PPG - Pitt-Tech Plus EP DTM Acrylic Gloss.
    - c. SW - SWP Exterior Oil Base Gloss.
- C. Steel - Galvanized:
- 1. One coat of alkyd primer.
    - a. BM - Ultra Spec HP Acrylic Metal Primer HP04.
    - b. PPG - Pitt-Tech Plus 4020 PF DTM Acrylic Primer.
    - c. SW - Galvite HS Alkyd Modified Acrylic Primer.
  - 2. Two top coats of alkyd enamel finish.
    - a. BM - Advance Waterborne Interior-Exterior Alkyd High Gloss N794.
    - b. PPG - Pitt-Tech Plus EP DTM Acrylic Gloss.
    - c. SW - SWP Exterior Oil Base Gloss.
- D. Aluminum - Mill Finish:
- 1. One coat of alkyd primer.
    - a. BM - Ultra Spec HP Acrylic Metal Primer HP04.
    - b. PPG - Pitt-Tech Plus 4020 PF DTM Acrylic Primer.
    - c. SW - Galvite HS Alkyd Modified Acrylic Primer.
  - 2. Two top coats of alkyd enamel finish.
    - a. BM - Advance Waterborne Interior-Exterior Alkyd High Gloss N794.
    - b. PPG - Pitt-Tech Plus EP DTM Acrylic Gloss.
    - c. SW - SWP Exterior Oil Base Gloss.
- E. Concrete Masonry Units:
- 1. Two coats of block filler.
    - a. BM - Ultra Spec Hi-Build Masonry Block Filler 571.
    - b. PPG - Speedhide Interior-Exterior Masonry Hi Fill Latex Block Filler.
    - c. SW - Loxon Acrylic Block Surfacer A24/LX01 Series.
  - 2. Two top coats of latex finish.
    - a. BM - Ultra Spec EXT Finish Satin N448.
    - b. PPG - Speedhide Exterior Acrylic Flat.
    - c. SW - SuperPaint Exterior Acrylic Latex Flat.
- F. PVC, Vinyl, and Architectural Plastic:
- 1. One coat of primer.
    - a. BM - INSL-X Stix Waterborne Bonding Primer.
    - b. PPG - Rust-Oleum XIM UMA Advanced Technology Primer Sealer Bonder.
    - c. SW - Extreme Bond Interior-Exterior Bonding Primer.
  - 2. Two top coats of acrylic finish.
    - a. BM - Command Waterborne Acrylic Urethane Satin.
    - b. PPG - Break-Through 50 Interior-Exterior Acrylic Satin.
    - c. SW - A-100 Exterior Latex Flat.

**3.6 SCHEDULE - INTERIOR SURFACES**

- A. Surfaces Indicated to Receive Fire-Retardant Intumescent Paint System:
1. Refer to Drawings for designated locations, required fire-retardant rating, and applicable UL Design.
  2. The intumescent paint system includes application of the intumescent paint and its primer.
  3. Thicknesses of intumescent paint system components are to be as required to achieve the required fire-retardant rating.
  4. Confirm with the intumescent paint system manufacturer, the paint system adhesion compatibility with the substrate material.
  5. Intumescent Paint System:
    - a. Albi Clad 800 with primer as recommended by manufacturer.
    - b. Isolatak - WB5 with primer as recommended by manufacturer.
  6. Comply with intumescent paint system manufacturer's recommendations for cure time prior to application of finish paint system.
  7. Finish paint system is to be applied over fully cured intumescent paint system and is to be as indicated below in accordance with the substrate type. Confirm compatibility of finish paint system with respective paint system manufacturers.
- B. Concrete Masonry Units:
1. Special Requirement:
    - a. Three coats of block filler at following locations.
      - 1) Corridors, Stairs, and Lobby areas.
  2. Two coats of block filler.
    - a. BM - Ultra Spec Hi-Build Masonry Block Filler 571.
    - b. PPG - Speedhide Interior-Exterior Masonry Hi Fill Latex Block Filler.
    - c. SW - PrepRite Interior-Exterior Latex Block Filler.
  3. Two top coats of latex finish.
    - a. BM - Ultra Spec 500 Interior Acrylic Finish Semi-Gloss T546.
    - b. PPG - Speedhide Zero VOC Interior Latex Semi-Gloss.
    - c. SW - ProMar 200 Zero VOC Interior Latex Semi-Gloss.
- C. Concrete Masonry Units - Epoxy Paint:
1. Special Requirement:
    - a. Locations:
      - 1) Toilets and Janitor Closets.
    - b. Three coats, minimum, of epoxy block filler.
    - c. Two top coats, minimum, of acrylic epoxy.
  2. Two coats of epoxy block filler.
    - a. BM - Corotech Acrylic Block Filler V114.
    - b. PPG - Speedhide Interior-Exterior Masonry Hi Fill Latex Block Filler 6-15XI.
    - c. SW - Pro Industrial Heavy Duty Block Filler.
  3. Two top coats of acrylic epoxy finish.
    - a. BM - Corotech Pre-Catalyzed Waterborne Epoxy Semi-Gloss.
    - b. PPG - Pitt-Glaze WB1 Interior Pre-Catalyzed Acrylic Epoxy Semi-Gloss.
    - c. SW - Pro Industrial Pre-Catalyzed Waterbased Epoxy Semi-Gloss.
- D. Concrete Floors Requiring Seal Finish: This provision is only for concrete floors indicated to have Sealed Concrete Finish. It is not intended for Stained and Polished Concrete Floors that would be indicated in Section 03 35 43 - Polished Concrete Finishing.
1. One coat Penetrating Liquid Densifier: Lithium silicate sealer, hardener, and densifier.
    - a. Prosoco - Consolideck LS Hardener/Densifier. (Basis of Design)
    - b. Convergent Concrete Technologies - Pentra-Sil (HD).
    - c. Substitutions: Section 01 60 00 - Product Requirements.

2. Two coats Protective Surface Treatment: Lithium silicate hardener.
    - a. Prosoco - Consolideck PolishGuard Finish. (Basis of Design)
    - b. Convergent Concrete Technologies - Pentra-Finish (HG).
    - c. Substitutions: Section 01 60 00 - Product Requirements.
- E. Steel - Unprimed:
1. One coat of acrylic primer.
    - a. BM - Corotech Acrylic Metal Primer V110.
    - b. PPG - Pitt-Tech Plus 4020 PF DTM Acrylic Primer.
    - c. SW - Pro Industrial Pro-Cryl Universal Primer.
  2. Two top coats of acrylic enamel finish.
    - a. BM - Corotech Acrylic DTM Enamel Semi-Gloss V331.
    - b. PPG - Pitt-Tech Plus EP DTM Acrylic Semi-Gloss.
    - c. SW - Pro Industrial Waterbased Alkyd Urethane Enamel Semi-Gloss.
- F. Steel - Primed:
1. One coat of acrylic primer.
    - a. BM - Corotech Acrylic Metal Primer V110.
    - b. PPG - Pitt-Tech Plus 4020 PF DTM Acrylic Primer.
    - c. SW - Pro Industrial Pro-Cryl Universal Primer.
  2. Two top coats of acrylic enamel finish.
    - a. BM - Corotech Acrylic DTM Enamel Semi-Gloss V331.
    - b. PPG - Pitt-Tech Plus EP DTM Acrylic Semi-Gloss.
    - c. SW - Pro Industrial Waterbased Alkyd Urethane Enamel Semi-Gloss.
- G. Steel - Galvanized:
1. One coat acrylic primer.
    - a. BM - Ultra Spec HP Acrylic Metal Primer HP04.
    - b. PPG - Pitt-Tech Plus 4020 PF DTM Acrylic Primer.
    - c. SW - Pro Industrial Pro-Cryl Universal Primer.
  2. Two top coats of acrylic enamel finish.
    - a. BM - Advance Waterborne Interior Alkyd Semi-Gloss.
    - b. PPG - Pitt-Tech Plus EP DTM Acrylic Semi-Gloss.
    - c. SW - Pro Industrial Waterbased Alkyd Urethane Enamel Semi-Gloss.
- H. Aluminum - Mill Finish:
1. One coat acrylic primer.
    - a. BM - Ultra Spec HP Acrylic Metal Primer HP04.
    - b. PPG - Pitt-Tech Plus 4020 PF DTM Acrylic Primer.
    - c. SW - Pro Industrial Pro-Cryl Universal Primer.
  2. Two top coats of acrylic enamel finish.
    - a. BM - Advance Waterborne Interior Alkyd Semi-Gloss.
    - b. PPG - Pitt-Tech Plus EP DTM Acrylic Semi-Gloss.
    - c. SW - Pro Industrial Waterbased Alkyd Urethane Enamel Semi-Gloss.
- I. Gypsum Board - Walls:
1. One coat latex primer sealer.
    - a. BM - Ultra Spec 500 Interior Latex Primer.
    - b. PPG - Pure Performance Interior Acrylic Primer.
    - c. SW - ProMar 200 Zero VOC Interior Latex Primer.
  2. Two top coats of latex finish.
    - a. BM - Ultra Spec 500 Interior Latex Finish Eggshell
    - b. PPG - Speedhide Zero VOC Interior Latex Eggshell.
    - c. SW - ProMar 200 Zero VOC Interior Latex Eg-Shel.
- J. Gypsum Board Walls - Epoxy Paint:

1. Locations Include:
    - a. Toilets and Janitor Closets.
  2. One coat of epoxy primer sealer.
    - a. BM - INSL-X Aqua Lock Plus.
    - b. PPG - Pure Performance Interior Acrylic Primer.
    - c. SW - ProMar 200 Zero VOC Interior Latex Primer.
  3. Two top coats of acrylic epoxy finish.
    - a. BM - Corotech Pre-Catalyzed Waterborne Epoxy Semi-Gloss.
    - b. PPG - Pitt-Glaze WB1 Interior Pre-Catalyzed Acrylic Epoxy Semi-Gloss.
    - c. SW - Pro Industrial Pre-Catalyzed Waterbased Epoxy Semi-Gloss.
- K. Gypsum Board - Ceilings and Bulkheads:
1. One coat latex primer sealer.
    - a. BM - Ultra Spec 500 Interior Latex Primer.
    - b. PPG - Pure Performance Interior Acrylic Primer.
    - c. SW - ProMar 200 Zero VOC Interior Latex Primer.
  2. Two top coats of latex finish.
    - a. BM - Ultra Spec 500 Interior Latex Finish Flat.
    - b. PPG - Speedhide Zero VOC Interior Latex Flat.
    - c. SW - ProMar 200 Zero VOC Interior Latex Flat.
- L. Insulated Coverings - Canvas and Cotton:
1. One coat of latex primer sealer.
    - a. Same as Gypsum Board - Ceilings and Bulkheads.
  2. Two top coats of latex finish.
    - a. Same as Gypsum Board - Ceilings and Bulkheads.
      - 1) Sheen: Flat.
- M. Dry Fall (Dry Fog):
1. One coat of primer sealer.
    - a. Product recommended by top coat manufacturer for each substrate type.
  2. Two top coats of acrylic finish.
    - a. BM - Coronado Super Kote 5000 Dry Fall Acrylic Latex Flat.
    - b. PPG - Speedhide Super Tech WB Interior Dry Fog Flat.
    - c. SW - Pro Industrial Waterborne Acrylic Dryfall Flat.
- N. Wood - Painted:
1. One coat of primer sealer.
    - a. BM - Ultra Spec 500 Interior Latex Primer.
    - b. PPG - Pure Performance Interior Acrylic Primer.
    - c. SW - PrepRite ProBlock Interior-Exterior Latex Primer.
  2. Two top coats of latex finish.
    - a. BM - Ultra Spec 500 Interior Semi-Gloss
    - b. PPG - Speedhide Interior Latex Semi-Gloss
    - c. SW - ProMar 200 Zero VOC Interior Latex Semi-Gloss.
- O. Wood - Stain:
1. Stain:
    - a. BM - Product recommended by top coat manufacturer for substrate type.
    - b. PPG - DEFT Interior Oil Based Stain.
    - c. SW - Minwax Performance Series Tintable Interior Wood Stain.
  2. Three top coats finish:
    - a. Refer to Wood - Transparent Top Coat on Stained below.
- P. Wood - Transparent Top Coat on Stained Wood and Non-Stained Wood:
1. One coat sealer.

- a. Product recommended by top coat manufacturer for substrate type.
2. Three top coats of transparent acrylic coating.
  - a. BM - Lenmar Aqua-Plastic Acrylic Urethane Clear Semi-Gloss.
  - b. PPG - DEFT Interior Polyurethane Water Based Acrylic Semi-Gloss.
  - c. SW - Minwax Water-Based Oil-Modified Polyurethane Clear Semi-Gloss.

**END OF SECTION**

**SECTION 10 11 00**  
**VISUAL DISPLAY UNITS**

**PART 1 GENERAL**

**1.1 SUMMARY**

- A. Section Includes:
  - 1. Markerboards.
  - 2. Tackboards.
- B. Related Requirements:
  - 1. Section 04 20 00 - Unit Masonry: Substrate construction.
  - 2. Section 09 21 16 - Gypsum Board Assemblies: Substrate construction.

**1.2 REFERENCES**

- A. American National Standards Institute (ANSI):
  - 1. ANSI A135.4 - Basic Hardboard; 2020.
  - 2. ANSI A208.1 - Particleboard; 2016.
- B. ASTM International (ASTM):
  - 1. ASTM A424/A424M - Standard Specification for Steel, Sheet, for Porcelain Enameling; 2018.
  - 2. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2020.
- C. California Department of Health Services (CA/DHS):
  - 1. CA/DHS/EHLB/R-174 - Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers, including 2004 Addenda.

**1.3 SUBMITTALS**

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Product Data: Submit data on types of visual display surfaces, components and accessories included in this Section.
- C. Shop Drawings: Indicate wall elevations, dimensions, anchor details and joint locations of units and finishes. Include a schedule of unit descriptions to be installed, sorted by room numbers from Drawings.
- D. Samples for Initial Selection: Two manufacturer's complete sets of color samples illustrating the full range of finishes and colors available for each visual display type; include full range of finish trim options. Submit for Architect's initial selections.
- E. Samples for Verification: From the Architect's initial selections, prepare and submit two samples for each selected finish and color; samples to be same product material type indicated for final Work; each sample 12 x 12 inches. Where finishes involve normal color and texture variations, include sample sets showing the full range of variations expected.

**1.4 CLOSEOUT SUBMITTALS**

- A. Section 01 77 00 - Closeout Procedures.
- B. Submit Operation and Maintenance Data. Include specifications for manufacturer recommended markers to be used on markerboards.

**1.5 QUALIFICATIONS**

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three (3) years documented experience.

**1.6 WARRANTY**

- A. Section 01 77 00 - Closeout Procedures: Product warranties.
- B. Furnish five (5) year manufacturer's warranty for visual display surfaces other than markerboards.
  - 1. Warranty shall cover replacement of Work found to be defective in material or installation.
- C. Furnish fifty (50) year manufacturer's warranty for Porcelain-on-Steel Markerboards.
  - 1. Warranty shall cover replacement of defective Porcelain-on-Steel Markerboards due to discoloration, excessive fading of color, crazing, cracking, or flaking. Warranty does not cover the cost of removal or reinstallation.

**1.7 SPARE PARTS AND MAINTENANCE PRODUCTS**

- A. Section 01 60 00 - Product Requirements: Extra materials, spare parts, and maintenance products.
  - 1. Markers: Provide one (1) pack of red, blue, and green markers for each markerboard installed. Markers to be type as recommended by markerboard manufacturer.

**PART 2 PRODUCTS****2.1 VISUAL DISPLAY UNITS**

- A. Manufacturers:
  - 1. Claridge Products and Equipment.
  - 2. Ghent Manufacturing Inc.
  - 3. Marsh Industries Inc.
  - 4. Substitutions: Section 01 60 00 - Product Requirements.
- B. Markerboards:
  - 1. Manufactured and factory assembled units
  - 2. Outer Face Sheet: 24 gauge steel face with porcelain enamel finish fused to the steel sheet face.
    - a. Face Sheet shall be a magnetic, non-porous surface and shall wipe clean with an eraser or dry cloth.
    - b. Deposition coat of 2.0 to 2.5 mils on front of steel.
    - c. Deposition coat of 1.5 to 2.0 mils on back of steel.
    - d. Porcelain enamel steel writing and erasing coat system, totaling 3.5 to 4.5 mils over front surface.
    - e. Firing temperature must be no less than 1450 deg. F.
    - f. Hardness of writing surface shall be uniform in color and texture.
    - g. Reflectance Factor: To be no more than 20%, no less than 15%, and without variance resulting from wear.
    - h. Writing surface shall be no less than 6.5 MOH's scale.
    - i. Color: As selected from manufacturer's standard colors.
  - 3. Backing Core: Particle board, 1/2 inch thick.
  - 4. Backing Surface: 0.015 in. aluminum sheet vapor barrier; moisture retardant, laminated with suitable, low VOC emitting adhesive to prevent delamination.



5. Lamination of all materials to be factory type only, with adhesives. Hand lamination is not acceptable.
  6. Splice Joint: Concealed metal spline type.
  7. Chalkrail: Extruded aluminum; triangular profile, one piece full length of markerboard, cast aluminum end closures; concealed fasteners.
    - a. At physical activity spaces such as weight lifting rooms, dance studios, gyms and multi-purpose rooms, do not provide protruding chalkrails; rather, provide recessed type for markers and erasers.
  8. Map Rail with Tackstrip: Extruded aluminum with one (1) inch wide continuous tackable composition cork insert and with map rail end stops/closures. Provide along top of full length of visual display unit.
  9. Size: As indicated on Drawings.
  10. Locations: As indicated on Drawings.
- C. Tackboards:
1. Manufactured and factory assembled units.
  2. Outer Facing:
    - a. Seamless composition cork sheet; 1/4 inch thick; laminated under pressure to backing core.
    - b. Color: As selected by Architect from submitted samples.
  3. Backing Core: Hardboard, 1/4 inch thick.
  4. Backing Surface: 0.015 in. aluminum sheet vapor barrier; moisture retardant, laminated with suitable, low VOC emitting adhesive to prevent delamination.
  5. Lamination of all materials to be factory applied only, with adhesives. Hand lamination is not acceptable.
  6. Splice Joint: Concealed metal spline type.
  7. Edges: Framed with extruded aluminum with flush mitered joints.
  8. Frame: Extruded aluminum with flush mitered joints.
  9. Map Rail with Tackstrip: Extruded aluminum with one (1) inch wide continuous tackable composition cork insert and with map rail end stops/closures. Provide along top of full length of visual display unit.
  10. Size: As indicated on Drawings.
  11. Locations: As indicated on Drawings.

## 2.2 MATERIALS

- A. Porcelain Enameled Steel Sheet: ASTM A424/A424M, Type I, Commercial Steel, with fired-on vitreous finish.
- B. Sheet Steel: ASTM A424, Type I, commercial quality.
- C. Particleboard: ANSI A208.1, wood chips, set with waterproof resin binder, sanded faces.
  1. Interior Composite Wood Products: Comply with CA/DHS/EHLB/R-174.
- D. Hardboard: ANSI A135.4, tempered, smooth face.
- E. Foil Backing: Aluminum foil sheet, 0.015 inch thick.
- F. Composition Cork: Formulation of pure cork granules, compounded with linseed oils, rosin binders, mineral fillers, and pigments to form a solid uniform colored composition cork on burlap backing reinforcing; color as selected.
- G. Frames, Map Rails, Tackstrips, Trim and Chalkrails: Aluminum extrusions, ASTM B221, 6061 alloy, T5 temper.
- H. Adhesives: Type used by manufacturer.
  1. Interior Adhesives: Maximum volatile organic compound content in accordance with CA/DHS/EHLB/R-174.

**2.3 ACCESSORIES**

- A. Aluminum Frames, Trim and Components: Extruded aluminum; not less than 0.062 inch thick aluminum alloy; size and shape as indicated and to suite use and installation type; straight factory applied for factory assembled display units; single length extrusions when possible; keep joints to a minimum; concealed fasteners; miter corners to an aligned, hairline closure without sharp edges.
  - 1. Color:
    - a. Clear anodized aluminum.
- B. Map Supports: Formed aluminum sliding roller brackets, to fit map rail. Provide one pair of map supports for each markerboard type.
- C. Flag Holders: Formed steel bored to receive 1 inch diameter flag staff, bracketed to fit top rail of markerboard. Provide one flag holder for each markerboard type.
- D. Cleaning Instruction Plate: Provide instructions for markerboard cleaning on metal plate fastened to perimeter frame near Chalkrail.
- E. Temporary Protective Cover: Sheet polyethylene, 8 mil thick.

**PART 3 EXECUTION****3.1 EXAMINATION**

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify that surfaces and conditions are ready to accept the work of this section. Proceed with installation only after unsatisfactory conditions have been corrected.
- C. Examine products to be installed for damage and other conditions detrimental to completion of the Work.
- D. Verify substrate construction and required internal wall blocking is sufficient and ready to receive Work.
- E. Verify that positioning dimensions are as indicated on Drawings.

**3.2 PREPARATION**

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this section.
- B. Prepare materials to be installed and equipment to be used during installation.

**3.3 INSTALLATION**

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Install units as locations and heights as shown on the Drawings.
- C. Secure all work and factory assembled units level and plumb with concealed fastening hardware.
- D. Butt adjoining panels tight with concealed spline to hairline joint.

**3.4 CLEANING**

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures: Related to cleaning.
- B. Cover markerboard surfaces with protective cover, taped to frame.

- C. Remove temporary protective cover at Final Inspection.

**3.5 PROTECTION OF INSTALLED CONSTRUCTION**

- A. Section 01 73 00 - Execution: Protecting installed construction.
- B. Protect installed construction from damage.

**END OF SECTION**



**SECTION 10 14 00****SIGNAGE****PART 1 GENERAL****1.1 SUMMARY**

- A. Section Includes:
  - 1. Room Identification Signs.
  - 2. Applied Vinyl Graphics.
  - 3. Dimensional Letter Signs.
  - 4. Notification Signs.
  - 5. Fire Protection Signs.
  - 6. Warning Stencils.
  - 7. Dedication Plaque.
- B. Related Requirements:
  - 1. Sections related to identification of Plumbing, HVAC, and Electrical work.

**1.2 REFERENCES**

- A. American Iron and Steel Institute (AISI).
- B. American National Standards Institute (ANSI):
  - 1. ANSI Z97.1 - Safety Glazing Materials Used In Buildings - Safety Performance Specifications And Methods Of Test; 2015.
- C. Americans with Disabilities Act (ADA):
  - 1. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design; 2010.
- D. Code of Federal Regulations (CFR):
  - 1. 36 CFR 1191 - Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities; Architectural Barriers Act (ABA) Accessibility Guidelines; current edition.
- E. International Code Council (ICC):
  - 1. ICC A117.1 - Accessible and Usable Building and Facilities; 2017.
- F. Ingress Protection Code (IP Code):
  - 1. IP Code - Degree of Protection Provided by Enclosures; ANSI/IEC 60529 2020.
- G. UL Standards (UL):
  - 1. UL 48 - Electric Signs; Edition 15, 2011, ANSI Approved 2021.
  - 2. UL 50 - Enclosures for Electrical Equipment, Non-Environmental Considerations; Edition 13, 2015.

**1.3 SUBMITTALS**

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Product Data: Submit data describing the material, fabrication standards and characteristics of the sign systems indicated in the Section and other Contract Documents.
- C. Shop Drawings: Indicate sign types, styles, lettering font, copy, graphics, features, foreground and background colors, locations, overall dimensions of each sign and attachment method.

- D. Samples for Initial Selection: Two manufacturer's color charts illustrating the full range of finishes and colors available for each sign type; include color options for backgrounds, graphics, and copy; submit for Architect's initial selections.
- E. Samples for Verification: From the Architect's initial selections, prepare and submit two samples for each selected finish and color; samples on same product material type indicated for final Work; each sample 6 x 8 inches illustrating sign type, sign features, graphics, and method of attachment. Where finishes involve normal color and texture variations, include sample sets showing the full range of variations expected.
- F. Manufacturer's Installation Instructions: Submit installation template and attachment devices.

#### 1.4 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing Products specified in this section with minimum five (5) years documented experience.

#### 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 - Product Requirements: Product storage and handling requirements.
- B. Package signs, labeled in name groups.
- C. Store adhesive attachment tape at ambient room temperatures.

#### 1.6 ENVIRONMENTAL REQUIREMENTS

- A. Section 01 60 00 - Product Requirements: Environmental conditions affecting products on site.
- B. Do not install signs when ambient temperature is lower than recommended by manufacturer.
- C. Maintain this minimum temperature during and after installation of signs.

### PART 2 PRODUCTS

#### 2.1 PERFORMANCE AND DESIGN REQUIREMENTS

- A. Conform to current local and state building codes; ADA Standards; 36 CFR 1191; and ICC A117.1 guidelines for manufacture and installation of interior identification signs.
- B. Conform to current International Fire Code requirements.

#### 2.2 MANUFACTURES

- A. Signs and Accessories:
  1. Acorn Sign Graphics.
  2. APCO Graphics.
  3. ASI Sign Systems.
  4. Bayuk Graphic Systems, Inc.
  5. Best Sign Systems.
  6. Interface Architectural Signage, Inc.
  7. InPro Corporation (Signscape).
  8. Mohawk Sign Systems.
  9. Rowmark, LLC.
  10. Scott Sign Systems, Inc.
  11. Signage Industries Corporation.

### 2.3 ROOM IDENTIFICATION SIGNS

- A. Includes signs for rooms and area identification, fire extinguishers and fire extinguisher cabinets, unlighted exit signs, room capacity signs, areas of refuge, and elevators and stairs related signs as indicated on Drawings.
1. Photopolymer face fused to phenolic sheet; 0.145 inch total thickness; matte finish.
  2. "Tactile" signage, with copy raised minimum 1/32 inch above sign surface using photopolymer bonded process and with Grade II Braille located below copy.
  3. Clear Window Insertion Slots: As indicated on Drawings.
  4. Copy and graphics to be uniformly opaque.
  5. Copy Font: Helvetica Medium, uppercase.
  6. Copy Height: As indicated on Drawings.
  7. Braille Height: As indicated on Drawings.
  8. Symbol Size: As indicated on Drawings.
  9. Total Thickness: As indicated on Drawings, but not less than 0.145 inch.
  10. Corners: Radiused, 1/2 inch.
  11. Edges: Beveled and smooth.
  12. Graphic Style: International type.
  13. Colors:
    - a. Background: As selected by Architect from submitted samples.
    - b. Copy:
      - 1) As selected by Architect from submitted samples.
    - c. Symbols and Graphics:
      - 1) As selected by Architect from submitted samples.
  14. Room Identification Sign Types:
    - a. Drawings indicate Sign Type Designations, Size, Copy, Symbols, and Insert Window requirements.
    - b. Signs required at all door openings and spaces and as indicated on Drawings.
    - c. Refer to Signage Schedule, Elevations, and Details on Drawings.
    - d. Include twelve (12) additional identification signs with graphics to be determined during construction. Type to be the type with insert window.
    - e. Back Cover Plate: Where sign must be secured to glass, acquire Architect approval prior to fabrication and installation of a Backing Cover (blank solid sign) on the opposite side of the glass. The backing cover material shall match the size, shape, base color, thickness, and finish of the sign. The intent is to hide the unsightly back view of the sign when viewed on the opposite side of the glass. (Back Cover Plate, also referenced in ACCESSORIES, and INSTALLATION articles in this Section.)

### 2.4 APPLIED VINYL GRAPHICS

- A. Vinyl film, die-cut characters; 2 inches high, 3 mils thick.
1. Adhesive backing to be pressure-sensitive and exterior application grade type.
- B. Provide door graphics for each of the following:
1. Copy: **VISITORS REPORT TO MAIN OFFICE** (3 signs required)
  2. Copy: **TOBACCO FREE PROPERTY** (3 signs required)
  3. Copy: **DELIVERIES ONLY** (2 signs required)

### 2.5 DIMENSIONAL LETTER SIGNS

- A. Exterior Metal Letters: Architectural grade aluminum.
1. Thickness:
    - a. 1 inch.
  2. Height:

- a. Refer to Copy and Locations in following paragraphs.
  - 3. Copy Style: Helvetica Medium, unless indicated otherwise on Drawings.
  - 4. Finish: Brushed.
  - 5. Copy and Locations: Characters to be designated by Architect.
- B. Interior Metal Letters: Architectural grade aluminum.
- 1. Thickness:
    - a. 1 inch.
  - 2. Height:
    - a. 8 inches, unless indicated otherwise on Drawings.
  - 3. Copy Style: Helvetica Medium, unless indicated otherwise on Drawings.
  - 4. Finish:
    - a. Painted: Manufacturer's standard finish paint system; color to be as selected by Architect from manufacturer's full range.
  - 5. Copy:
    - a. Copy: **XXX CLASSROOM WING** (2 signs required; XXX is to be a 3 digit prefix number as determined by Architect)
    - b. Copy: **GIRLS** (1 signs required)
    - c. Copy: **BOYS** (1 signs required)

## 2.6 NOTIFICATION SIGNS

- A. Material: Plastic with radius corners.
- 1. Size: 1/8 inch thick; H x W to be as required for Copy.
  - 2. Color: White background.
  - 3. Letters: 2 inch high black letters.
  - 4. Copy: **DELIVERIES ONLY** (1 sign required)

## 2.7 FIRE PROTECTIONS SIGNS

- A. Engineering Grade (Type I) Reflective Aluminum: Red reflective lettering on white background, unless indicated otherwise on Drawings.
- B. Comply with requirements of International Fire Code requirements.
- C. Size: As indicated on Drawings.
- D. Characters: Style and copy as required by NCBC 2018 standards.
- E. Sign Types: Sign and Copy sizes vary; refer to Drawings.
- 1. Fire Department Connection Sign with directional arrows as required. (2 signs required)
    - a. Copy: **FDC**
  - 2. Fire Sprinkler Riser Room Sign. (2 signs required)
    - a. Copy: **FIRE SPRINKLER RISER ROOM**
  - 3. Fire Alarm Control Panel Sign. (2 signs required).
    - a. Copy: **FACP**
  - 4. Fire Hose Valve Connection Sign. (4 signs required; locations and final copy to be determined).
    - a. Copy: **FIRE HOSE VALVE CONNECTION**

## 2.8 WARNING STENCILS

- A. Reusable stencils for painting warning on both sides of rated walls, above hung ceiling.
- 1. Copy: **X-HOUR RATED WALL - PROTECT ALL OPENINGS** (X is to be the actual numeral that represents the wall fire rated time designation).
  - 2. Letter Color: Red.



3. Letter Size: 3 inches tall.
4. Spacing: Apply at 15 feet o.c. at all rated walls above ceilings on both sides of walls.
5. Quantity: Since stencils are reusable, quantity is determined by Contractor.

## 2.9 DEDICATION PLAQUE

- A. Dedication Plaque:
  1. Material: Cast bronze.
  2. Quantity: One.
  3. Size:
    - a. 12 x 18 inches.
  4. Border:
    - a. None.
  5. Finish: Pebble texture, oxidized finish.
  6. Letter Finish: Satin polish.
  7. Mounting: Standard concealed mounting to comply with the manufacturer's written instructions for type of wall surface indicated.
  8. Characters: Style and copy to be selected by Architect and Owner from manufacturer's full range of options.
    - a. Plaque to include the following information:
      - 1) Project Name. To be determined by Architect and Owner.
      - 2) Date of Construction.
      - 3) School System Information:
        - a) Names and Title of all the Board of Education Members.
        - b) Name and Title of the School System Superintendent.
      - 4) Architect's Name and Location.
      - 5) General Contractor's Name.

## 2.10 ACCESSORIES

- A. Mounting Hardware: Screws; stainless steel; countersunk phillips flat head screws.
- B. Tape Adhesive: Double sided foam tape; permanent adhesive.
- C. Back Cover Plate: Where sign must be secured to glass, acquire Architect approval prior to fabrication and installation of a Backing Cover (blank solid sign) on the opposite side of the glass. The backing cover material shall match the size, shape, base color, thickness, and finish of the sign. The intent is to hide the unsightly back view of the sign when viewed on the opposite side of the glass. (Back Cover Plate, also referenced in ROOM IDENTIFICATION SIGNS and INSTALLATION articles in this Section.)

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify substrate if finished to include finish coating(s).
- C. Verify adequate blocking and supports to structure are installed and ready to receive work.

### 3.2 PREPARATION

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this section.
- B. Prepare materials to be installed and equipment to be used during installation.

**3.3 INSTALLATION**

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Install work at locations indicated on Drawings. Install signs level and plumb unless indicated otherwise.
- C. Room Identification Signs: Mount with double sided foam tape and countersunk phillips flat head screws. Screw head is to finish flush with sign surface. Finish of screw heads is to match the color and finish of the portion of the sign that the screw is seated into.
  - 1. Position of Room Identification Signs:
    - a. Signage mounting heights must conform to ADA accessibility requirements including the height of Braille notations. Mount center of sign 9 inches from strike side of door and top of sign at 60 inches from floor.
  - 2. Where sign must be secured to glass, acquire Architect approval prior to fabrication and installation of a Backing Cover (blank solid sign) on the opposite side of the glass. The backing cover material shall match the size, shape, base color, thickness, and finish of the sign. The intent is to hide the unsightly back view of the sign when viewed on the opposite side of the glass. (Back Cover Plate, also referenced in ROOM IDENTIFICATION SIGNS and ACCESSORIES articles in this Section.)
- D. Applied Vinyl Graphics: Mount on exterior of glass doors.
- E. Dimensional Letter Signs: Mount with stainless steel threaded rods into expansion shields. All hardware shall be stainless steel.
- F. Mount fire protection system signage in accordance with International Fire Code requirements.
- G. Dedication Plaque: Mount with stainless steel threaded rods into expansion shields.

**3.4 CLEANING**

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures: Clean installed work and comply with manufacturer's recommendations.

**3.5 PROTECTION OF INSTALLED CONSTRUCTION**

- A. Section 01 73 00 - Execution: Protecting installed construction.

**END OF SECTION**

**SECTION 10 21 13.19**  
**PLASTIC TOILET COMPARTMENTS**

**PART 1 GENERAL**

**1.1 SUMMARY**

- A. Section includes solid plastic toilet compartments and urinal screens.
- B. Related Requirements:
  - 1. Section 10 28 13 - Toilet Accessories.

**1.2 REFERENCES**

- A. ASTM International (ASTM):
  - 1. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2015.
  - 2. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2021a.
- B. National Fire Protection Association (NFPA):
  - 1. NFPA 286 - Standard Methods of Fire Tests for Evaluating Contribution of Wall and Ceiling Interior Finish to Room Fire Growth; 2019.

**1.3 COORDINATION**

- A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.
- B. Coordinate Work with placement of support framing and anchors in wall.

**1.4 SUBMITTALS**

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Product Data: Submit data on panel construction, hardware, and accessories.
- C. Shop Drawings: Indicate partition plans, door swings, elevation views, dimensions, details of wall and floor supports.
- D. Samples for Initial Selection: Two manufacturer's complete sets of color samples illustrating the full range of finishes and colors available. Submit for Architect's initial selections.
- E. Samples for Verification: From the Architect's initial selections, prepare and submit two samples for each selected finish and color; samples to be same product material type indicated for final Work; each sample 4 x 4 inches. Where finishes involve normal color and texture variations, include sample sets showing the full range of variations expected.
- F. Manufacturer's Installation Instructions: Include special procedures and perimeter conditions requiring special attention.

**PART 2 PRODUCTS**

**2.1 PERFORMANCE REQUIREMENTS:**

- A. Fire Resistance: Partition materials shall comply with the following requirements, when tested in accordance with ASTM E 84:
  - 1. Class A: 25 maximum flame spread index; 450 maximum smoke developed index.

- B. Material Fire Ratings:
  1. National Fire Protection Association (NFPA) 286: Pass.
  2. International Code Council (ICC): Class B.

## 2.2 SOLID PLASTIC TOILET COMPARTMENTS

- A. Manufacturers:
  1. All American Metal Corp - AAMCO.
  2. ASI Accurate Partitions.
  3. Metpar Corporation.
  4. Partition Systems International of South Carolina (PSiSC).
  5. Scranton Products.
  6. Substitutions: Section 01 60 00 - Product Requirements.

## 2.3 COMPONENTS

- A. Toilet Compartments: Solid, molded thermoset, and waterproof; high-density polyethylene (HDPE) plastic panels, doors, and pilasters. Dimensions to be as indicated unless indicated otherwise on Drawings.
  1. Panels:
    - a. Thickness: 1 inch.
    - b. Width: As indicated on Drawings.
    - c. Height:
      - 1) As indicated on Drawings.
  2. Doors:
    - a. Thickness: 1 inch.
    - b. Width:
      - 1) Accessible (H/C) Compartment Doors: Out-swinging with opening clearance of 32 inches (with no obstructions). Coordinate with door thickness and hardware to ensure there are no obstructions within the required 32 inches clear opening.
      - 2) Standard Compartment Doors: 28 inches.
    - c. Height:
      - 1) Match compartment panels.
  3. Urinal Screens:
    - a. Thickness: 1 inch.
    - b. Width: Total projection from wall to be 23 inches. Dimension includes pilaster assembly where pilaster is indicated on Drawings.
    - c. Height:
      - 1) As indicated on Drawings.
  4. Pilasters:
    - a. Thickness: 1 inch.
    - b. Widths: As required to fit space and not less than 3 inches.
    - c. Height:
      - 1) As indicated on Drawings.
  5. Color:
    - a. As selected by Architect from manufacturer's full range.

## 2.4 ACCESSORIES

- A. All finish metal components and accessories to be as follows, unless otherwise indicated:
  1. Satin Finish.
- B. Pilaster Shoe: Formed ASTM A666 Type 304 stainless steel, 3 inches high, concealing floor mounting and adjustment hardware. Provide adjustment for floor variations with screw jack

- through steel saddles integral with pilaster. All metal mounting and adjustment hardware to be stainless steel.
- C. Head Rails: Extruded aluminum tube, color clear anodized 1 x 1-5/8 inch size, with anti-grip profiles and cast socket wall brackets. Maximum lengths practical.
  - D. Vertical Brackets: Double flange type.
    - 1. Extruded aluminum; color clear anodized.
      - a. Continuous length.
  - E. Attachments, Screws, and Bolts: Stainless steel, tamper proof type.
    - 1. Attaching panels and pilasters to brackets: Binding Post through-bolts and nuts.
    - 2. Attaching hardware: Binding Post through-bolts and nuts; tamper proof.
  - F. Hardware:
    - 1. Material:
      - a. Stainless steel.
    - 2. Hinges:
      - a. Continuous hinges, self-closing.
    - 3. Door Latch: Slide type with exterior emergency access feature.
    - 4. Door Strike and Keeper: Include rubber bumper; mounted on pilaster in alignment with door latch.
    - 5. Coat Hook: Include rubber bumper; one for each compartment, mounted on door.
    - 6. Provide door pull on each side of door for out-swinging doors.
    - 7. Provide metal heat sink at bottom of doors and partitions.

### **PART 3 EXECUTION**

#### **3.1 EXAMINATION**

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify field measurements are as indicated on shop drawings.
- C. Verify correct spacing of and between plumbing fixtures.
- D. Verify correct location and adequate support of built-in framing, anchorage, and bracing.

#### **3.2 INSTALLATION**

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Install work level and plumb.
- C. Attach panel brackets securely to support framing and anchor points using anchor devices.
- D. Attach panels and pilasters to brackets.
- E. Locate head rail joints at pilaster center lines.
- F. Adjust pilaster shoe leveling screws to produce level and plumb panel construction on sloped floors.

#### **3.3 ERECTION TOLERANCES**

- A. Section 01 40 00 - Quality Requirements: Tolerances.
- B. Maximum Variation from Indicated Position: 1/4 inch.
- C. Maximum Variation from Plumb: 1/8 inch.

**3.4 ADJUSTING**

- A. Section 01 73 00 - Execution: Adjusting.
- B. Adjust and align hardware to uniform clearance at vertical edge of doors, not exceeding 3/16 inch.
- C. Adjust hinges to position in-swinging doors in partial open position (about 3 inches open) when unlatched. Return out-swinging doors to closed position.
- D. Adjust adjacent components for consistency of line or plane.

**3.5 CLEANING**

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures: Clean installed work and comply with manufacturer's recommendations.
- B. Clean installed work in accordance with manufacturer's recommended materials and procedures.

**3.6 PROTECTION OF INSTALLED CONSTRUCTION**

- A. Section 01 73 00 - Execution: Protecting installed construction.

**END OF SECTION**

**SECTION 10 22 39****FOLDING PANEL PARTITIONS****PART 1 GENERAL****1.1 SUMMARY**

- A. Section Includes:
  - 1. Top-supported folding panel partitions, horizontal opening.
  - 2. Manual operation.
- B. Related Requirements:
  - 1. Division 08 - Openings: Door Hardware for door locks.
  - 2. Division 09 - Finishes: Sections related to ceiling type interface.

**1.2 REFERENCES**

- A. Americans with Disabilities Act (ADA):
  - 1. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design; current edition.
- B. ASTM International (ASTM):
  - 1. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2021.
  - 2. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements; 2016.
  - 3. ASTM E336 - Standard Test Method for Measurement of Airborne Sound Attenuation between Rooms in Buildings; 2020.
  - 4. ASTM E413 - Classification for Rating Sound Insulation; 2016.
  - 5. ASTM E557 - Standard Guide for Architectural Design and Installation Practices for Sound Isolation between Spaces Separated by Operable Partitions; 2020.
- C. National Fire Protection Association (NFPA):
  - 1. NFPA 286 - Standard Methods of Fire Tests for Evaluating Room Fire Growth Contribution of Wall and Ceiling Interior Finish; 2019.

**1.3 ADMINISTRATIVE REQUIREMENTS**

- A. Section 01 30 00 - Administrative Requirements: Coordination and pre-installation meeting.
- B. Coordination:
  - 1. Coordinate adjacent construction to comply with the requirements of, and to interface with, the work of this Section. Include coordination of preparation of building structural members for support of loads imposed and mounting hardware.
  - 2. Coordinate construction of plenum closure at top to permit maintenance and track height adjustments.
  - 3. Coordinate adjacent construction to provide for sound isolation between spaces in accordance with ASTM E557.
  - 4. Coordinate installation with electric service work if there are electrical requirements.
- C. Pre-installation Meeting: Convene at project site seven calendar days prior to scheduled beginning of construction activities of this section to review section requirements.
  - 1. Require attendance by representatives of installer and other entities directly affecting, or affected by, construction activities of this Section.
  - 2. Notify Architect four (4) calendar days in advance of scheduled meeting date.

**1.4 SUBMITTALS**

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Product Data: Provide data on partition materials, operation, hardware and accessories, track switching components, and colors and finishes available. Include electrical components if any are required.
- C. Shop Drawings: Indicate opening sizes, track layout, details of support track and required supports, static and dynamic loads, detailed plan/elevation/sectional views, interface with adjacent construction, finish trim, and stacking configuration and sizes.
  - 1. Include electrical and switch control details if electrical motorized operation is indicated.
- D. Samples for Initial Selection: Two manufacturer's color charts illustrating the full range of panel and frame finishes to include panel face coverings and colors available for products with factory-applied finishes; submit for Architect's initial selection.
- E. Samples for Verification: From the Architect's initial selection, prepare two samples for each selected finish and color; sample on same product material type indicated for final Work; each sample 4 x 4 inches. Where finishes involve normal color and texture variations, include sample sets showing the full range of variations expected.
- F. Manufacturer's Instructions: Submit special procedures, perimeter conditions requiring special attention, and installation sequence.
- G. Certificates: Certify partition system complies with specified acoustic requirements.

**1.5 CLOSEOUT SUBMITTALS**

- A. Section 01 77 00 - Closeout Procedures.
- B. Operation and Maintenance Data: Include recommended cleaning methods, cleaning materials, and stain removal methods. Describe cleaning materials detrimental to finish surfaces and hardware finish.

**1.6 QUALIFICATIONS**

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum ten (10) years documented experience.
- B. Installer: Company specializing in performing work of this section with minimum five (5) years documented experience and approved by manufacturer.

**1.7 DELIVERY, STORAGE, AND HANDLING**

- A. Comply with manufacturer's recommendations and maintain in undamaged conditions.

**1.8 WARRANTY**

- A. Section 01 77 00 - Closeout Procedures: Product warranties.
- B. Provide manufacturer's two (2) year warranty against defects in system's material and workmanship.

**1.9 SPARE PARTS AND MAINTENANCE PRODUCTS**

- A. Section 01 60 00 - Product Requirements: Extra materials, spare parts, and maintenance products.



1. Furnish extra materials from the same production run, matching products installed, and packaged with protective covering for storage and identified with labels describing contents.
  - a. Panel Finish Facing Material: Furnish full width and length (include excess for installation) in quantity to cover both sides of two (2) panels when installed.

## **PART 2 PRODUCTS**

### **2.1 PERFORMANCE REQUIREMENTS**

- A. Performance Requirements:
  1. Surface Burning Characteristics:
    - a. Maximum 25/450 flame spread/smoke developed index when tested in accordance with ASTM E84.
    - b. Comply with applicable codes when tested in accordance with NFPA 286.
  2. Acoustic Performance:
    - a. Sound Transmission Classification (STC): Tested in accordance with ASTM E90 and classified in accordance with ASTM E413.
      - 1) 54 STC, minimum.

### **2.2 FOLDING PANEL PARTITIONS - HORIZONTAL OPENING**

- A. Manufacturers:
  1. Hufcor, Inc.
  2. Kwik-Wall Company.
  3. Moderco, Inc.
  4. Modernfold, a DORMA Group Company.
  5. Substitutions: Section 01 60 00 - Product Requirements.
- B. Basis of Design:
  1. Hufcor, Inc. - Manual Operation Model 642 (Paired Hinged Panels).
- C. Panel Construction:
  1. Panel Configuration and Operation:
    - a. Paired hinged panels; manual operation.
  2. Panel Width: Nominal 48 inches unless indicated otherwise on Drawings.
  3. Panel Thickness: To be as required to maintain structural integrity, rigid/planar alignment, STC rating and intended functionality and operation.
  4. Panel Core: Minimum 16 gage, painted steel frame top, bottom, jambs, and intermediates; welded construction; internally reinforced for suspension and operating loads imposed; with acoustical insulation fill.
  5. Panel Facing: Steel sheet pressure laminated to structural acoustical panel. Provide the following minimum requirements unless more stringent requirement are needed to achieve structural and STC rating:
    - a. Steel Sheet: Minimum 20 gage thick, tension-leveled, galvanized.
    - b. Acoustical Panel: Minimum 1/2 inch Type X fire resistant gypsum board complying with requirements of ASTM C1396/C1396M.
    - c. Mechanically joined to the steel frame to form a rigid, unitized and structural panel.
  6. Panel Finish: Factory applied; Class-A fire rated in accordance with ASTM E84.
    - a. Vinyl: Reinforced vinyl with woven backing; stain resistant surface treatment.
      - 1) Minimum 30 oz/lin yd, heavy duty vinyl.
    - b. Colors and Patterns: As selected by Architect from manufacturer's full range.

7. Panel Trim: Aluminum with interlocking edges to enclose all edges of surface material. Exposed panel trim of one consistent color to be selected by Architect from manufacturer's full range of finish options.
  8. Panel Hinges: Manufacturer's standard butt type.
- D. Panel Seals: Manufacturer's standard resilient seals unless otherwise indicated; seals materials and profiles are to inhibit sound leakage and produce partition systems complying with performance requirements. Seals are to fit tight along entire contact surfaces, sealing between adjacent panels and between operable panel partition perimeter and adjacent surfaces, when operable panel partition is extended and closed.
1. Vertical Seals Between Panels: Interlocking roll-formed steel astragals, with tongue and groove configuration in each panel edge.
  2. Horizontal Top Seals: Seal exerting uniform constant pressure on track when extended.
    - a. Continuous Contact: Top seal to be in continuous contact with track.
  3. Horizontal Bottom Seals: Extended seal is to exert nominal 120 pounds downward force to the floor throughout operating range.
    - a. Operating Clearance: Applies to Automatic or Manual operating bottom seals.
      - 1) 2 inches (range of +1/2 to -1.5 inches).
    - b. Automatic: Bottom seals to extend automatically as panels are positioned.
- E. Suspension System:
1. Suspension Track: Extruded aluminum or steel; thickness and profile designed to support loads with maximum deflection of 1/360 of span.
  2. Suspension Carriers: Wheels with integral encased ball bearing rotation on trolley carriers at top of each panel; quantity and size as required to carry imposed loads, with threaded pendant bolt for vertical adjustment. Suspension system shall provide automatic indexing of panels into stack area using preprogrammed switches and trolleys without electrical, pneumatic, or mechanical activation.
    - a. Carrier Wheels:
      - 1) Hardened steel or nylon type.
- F. Pass Doors: ADA compliant; hinged and 3 ft wide x 7 ft high; of same construction, thickness, and finish as adjacent partition panels. Push/pull latching handle with keyed lock. No threshold.
- G. Stacked storage to be as indicated on Drawings.
1. Storage Area Pocket Doors: Same manufacturer, style, construction, finish, and appearance as the stored partition panels. Manually operated.
    - a. Size and Configuration: Full height of partition panels and configured to be fully closed when partition panels are fully stored or fully deployed. Provide all components necessary to include, but not limited to, foot bolts, door and panel expander edges, hinges, hardware, and acoustic seals. Coordinate and comply with requirements indicated on Drawings.
      - 1) Unless indicated otherwise on Drawings, final closure of panel partition is not permitted to be located at the face of pocket doors, provide double doors with expander seal edge to allow with pocket door closure against pass-thru panel partitions.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.

- B. Verify field measurements are as indicated on shop drawings.
- C. Verify required utilities are available, of correct characteristics, in proper location, and ready for use.
- D. Verify track supports are laterally braced and will permit track to be level within 1/4 inch of required position and parallel to floor surface.
- E. Verify floor flatness of 1/8 inch in 10 feet, non-cumulative.
- F. Verify wall plumbness of 1/8 inch in 10 feet, non-cumulative.

### **3.2 PREPARATION**

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this Section.
- B. Prepare materials to be installed and equipment to be used during installation.

### **3.3 INSTALLATION**

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Install partition in accordance with manufacturer's instructions and ASTM E557.
- C. Fit and align partition assembly and pocket doors level and plumb.
- D. Lubricate moving components.

### **3.4 ADJUSTING**

- A. Section 01 73 00 - Execution: Starting, testing, adjusting, and balancing.
- B. Adjust partition assembly to provide smooth operation from stacked position to fully open position. Do not over-compress acoustic seals.
- C. Visually inspect partition in full extended position for light leaks to identify potential acoustical leak.
- D. Adjust partition assembly to achieve lightproof seal.

### **3.5 CLEANING**

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures: Related to cleaning.
- B. Clean finish surfaces and partition accessories.

### **3.6 PROTECTION OF INSTALLED CONSTRUCTION**

- A. Section 01 73 00 - Execution: Protecting installed construction.

### **3.7 DEMONSTRATION AND TRAINING**

- A. Section 01 79 00 - Demonstration and Training.
- B. Demonstrate operation of partition, identify potential operational problems, and service requirements.

**END OF SECTION**



**SECTION 10 28 00**  
**TOILET ACCESSORIES**

**PART 1 GENERAL****1.1 SUMMARY**

- A. Section Includes:
  - 1. Toilet room accessories.
  - 2. Utility room accessories.
- B. Related Requirements:
  - 1. Section 04 20 00 - Unit Masonry.
  - 2. Section 06 10 53 - Miscellaneous Rough Carpentry: Blocking in framed walls.
  - 3. Division 09 - Finishes: Sections describing wall materials and finishes.
  - 4. Division 10 - Specialties: Sections describing Toilet Compartments.
  - 5. Division 26 - Electrical: Construction related to electric devices.

**1.2 REFERENCES**

- A. Americans with Disabilities Act (ADA):
  - 1. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design; current edition.
- B. ASTM International (ASTM):
  - 1. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.
  - 2. ASTM A269/A269M - Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service, 2015.
  - 3. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2020.
  - 4. ASTM A666 - Standard Specification for Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar, 2015.
  - 5. ASTM B86 - Standard Specification for Zinc and Zinc-Aluminum (ZA) Alloy Foundry and Die Castings; 2018.
  - 6. ASTM B456 - Standard Specification for Electrodeposited Coatings of Copper Plus Nickel Plus Chromium and Nickel Plus Chromium; 2017.
  - 7. ASTM C1036 - Standard Specification for Flat Glass; 2021.
  - 8. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass; 2018.
  - 9. ASTM C1503 - Standard Specification for Silvered Flat Glass Mirror; 2018.
  - 10. ASTM F593 - Standard Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs; 2017.

**1.3 COORDINATION**

- A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.
- B. Coordinate the Work with placement of internal wall reinforcement and reinforcement of toilet partitions to receive anchor attachments.
- C. Coordinate electrical requirements with electrical service construction.

**1.4 SUBMITTALS**

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Product Data: Submit data on accessories describing size, finish, details of function, attachment methods.
- C. Manufacturer's Installation Instructions: Submit special procedures, conditions requiring special attention.

**1.5 QUALITY ASSURANCE**

- A. Single Source Responsibility: Provide products of same manufacturer for each type of accessory unit and for units exposed to view in same areas, unless otherwise acceptable to Architect (Exception: Electric hand dryers.).

**PART 2 PRODUCTS****2.1 GENERAL REQUIREMENTS**

- A. All devices to be compliant with applicable codes and ADA standards.
- B. Manufactured and shop assembled, free of dents and scratches and packaged complete with anchors and fittings, steel anchor plates, adapters, and anchor components for installation.
  - 1. Grind welded joints smooth.
  - 2. Fabricate units made of metal sheet of seamless sheets, with flat surfaces.
- C. Design grab bars, attachments, anchors and provide blocking to resist minimum 250 lbs concentrated load applied at any point in any direction.
- D. Keys: Furnish two (2) keys for each accessory to Owner; master key lockable accessories.

**2.2 TOILET AND BATH ACCESSORIES**

- A. Manufacturers:
  - 1. American Specialties, Inc. (ASI).
  - 2. Bobrick Washroom Accessories.
  - 3. Bradley Corporation.
  - 4. Electric Hand Dryers:
    - a. Bobrick Washroom Accessories.
    - b. Dyson.
    - c. Excel Dryer, Inc.
    - d. Pinnacle Dryer Corporation.
  - 5. Substitutions: Section 01 60 00 - Product Requirements.

**2.3 MATERIALS**

- A. Stainless Steel Sheet: ASTM A666, Type 304.
- B. Stainless Steel Tubing: ASTM A269/A269M, Grade T316.
- C. Galvanized Sheet Steel: Hot-dipped galvanized steel sheet, ASTM A653/A653M, with G90/Z275 coating.
- D. Zinc Alloy: Die cast, ASTM B86.
- E. Mirror Glass:
  - 1. Fully tempered safety glass, ASTM C1048; and ASTM C1036 Type I, Class 1, Quality Q2, with silvering as required.

- F. Adhesive: Two component epoxy type, waterproof.
- G. Fasteners, Screws, and Bolts: Stainless steel, ASTM F593; tamper-proof, security type.
- H. Expansion Shields: Fiber, lead, stainless steel, or rubber as recommended by accessory manufacturer for component and substrate.

## 2.4 TOILET ROOM ACCESSORIES

- A. Toilet Tissue Dispenser (TD): Open roll type with both rolls accessible.
  - 1. Double Roll Type: Surface mounted bracket, satin finished cast aluminum brackets.
    - a. Controlled Delivery Type: To be in all stalls and toilets except ADA accessible stalls and toilets. Eccentric-shaped plastic spindles for 1/2 revolution delivery, designed to prevent theft of tissue roll.
      - 1) Basis of Design:
        - a) [Bobrick B-274](#) (surface mounted).
    - b. Non-Controlled Delivery Type: To be in all ADA accessible stalls and toilets. Eccentric-shaped plastic spindles, designed to prevent theft of tissue roll.
      - 1) Basis of Design:
        - a) [Bobrick B-2740](#) (surface mounted).
- B. Paper Towel Dispenser (PTD):
  - 1. In addition to locations indicated on Drawings, provide PTD at all sinks where PTD or EHD is not indicated.
  - 2. Folded paper type, stainless steel, hinged door with tumbler lock, minimum capacity of 350 C-fold towels.
    - a. Basis of Design:
      - 1) [Bobrick B-262](#) (surface mounted, view slot).
- C. Soap Dispenser (SD):
  - 1. In addition to locations indicated on Drawings, provide SD at all sinks where SD is not indicated.
  - 2. Liquid soap dispenser; stainless steel body, back, lid and working parts; lid hinged and special key access; push type soap valve; window gage refill indicator; 40 ounces minimum capacity.
    - a. Basis of Design:
      - 1) [Bobrick B-4112](#) (surface mounted, horizontal tank).
- D. Framed Mirrors (MIR):
  - 1. Mirror Glass: 1/4 inch thick tempered mirror glass; ASTM C1048, abrasion-resistant coated mirror.
  - 2. Frame: Stainless steel; 3/4 inch angle shapes (0.05 inch thick); mitered and welded and ground corners; satin finish; tamperproof hanging system.
  - 3. Backing: Full-mirror sized, minimum 0.03 inch galvanized steel sheet and non-absorptive filler material.
  - 4. Size and Configuration: As indicated on Drawings.
  - 5. Basis of Design:
    - a. [Bobrick B-2908 Series](#).
- E. Grab Bars (GB):
  - 1. Stainless steel, 1-1/2 inch outside diameter, minimum 0.05 inch (18 gauge) wall thickness, safety grip peened grasping surface finish; concealed flange mounting; 1-1/2 inches clearance between wall and inside of grab bar.
  - 2. Push/Pull Point Load: 250 pound-force (1112 N), minimum.
  - 3. Length and Configuration: As indicated on Drawings.
  - 4. Basis of Design:
    - a. [Bobrick B-6806.99](#) (1-1/2 O.D.).

- F. Sanitary Napkin Disposal Unit (SND):
1. Stainless steel; self-closing door; locking bottom panel with full-length stainless steel piano-type hinge and removable receptacle.
  2. For thru-partition, 2 side access units, coordinate fit with toilet partition thickness.
  3. Basis of Design:
    - a. [Bobrick B-254](#) (surface mounted).
    - b. [Bobrick B-353](#) (recess mounted).
    - c. [Bobrick B-354](#) (thru-partition, 2 sides).
- G. Electric Hand Dryers (EHD): Coordinate electrical requirements.
1. Stainless steel case; fan-in-case type; downward fixed nozzle.
  2. Operation: Automatic sensor-operated on and off; or pushbutton on and timer off.
  3. Basis of Design:
    - a. [Dyson Airblade db](#) (surface mounted).
- H. Coat Hook (CH): Solid aluminum casting, matte finish; rubber bumper protects wall and partition surfaces; 4 screws attachment base.
1. For toilet stall doors that swing into the stall, provide one (1) per each stall; locate inside stall door.
  2. For toilet stall doors that swing out of the stall, provide two (2) per each stall (one on the inside and one on the outside of door).
  3. Secure hooks with machine screws from hook side and pan head sleeve nuts (hex socket) from opposite end for thru-bolt assembly.
  4. Basis of Design:
    - a. [Bobrick B-212](#).

## 2.5 UTILITY ROOM ACCESSORIES

- A. Mop and Broom Holder (MH): 0.05 inch thick (18 gage), Type 304 stainless steel.
1. Mop Holders: Four (4) spring-loaded rubber cam holders, holds mops 8 inches from wall.
  2. Shelf: 18 gage, 8 inches deep.
  3. Rag Hooks: One each, midway between mop holders.
  4. Length: 36 inches.
  5. Basis of Design:
    - a. [Bobrick B-224 x 36](#).
- B. Mop Sink Wall Splash Guard: 16 gage, Type 304 Stainless steel.
1. Provide wall guard at each mop sink in project.
  2. Wall guard height to be from mop sink top rim to 6 inches above wall penetrations at water faucet plumbing pipes.
  3. Fabrication: Custom fit to wall configuration; one piece fabrication; configured to protect all wall surfaces adjacent to mop sink rim; all edges to be single hemmed; corners to be ground smooth.
  4. Fasteners: Stainless steel, low profile pan head screws with EPDM bonded seal washer.
  5. Installation: Ensure that mop sink rim has been fully sealed to wall prior to installation of wall guard. At frame walls, ensure that adequate blocking is behind wall finish to engage with fasteners. Bottom of wall guard to be 1/8 inch above mop sink rim (allowing gap for application of sealant bead). After attaching wall guard to wall, apply sealant around entire perimeter of wall guard.

## 2.6 FACTORY FINISHING

- A. Stainless Steel: No. 4 satin brushed finish, unless otherwise noted.



- B. Chrome/Nickel Plating: ASTM B456, Type SC 2 polished finish, unless otherwise noted.
- C. Baked Enamel: Pretreat to clean condition, apply one coat primer and minimum two coats epoxy baked enamel.
- D. Powder-Coated Steel: Clean, degrease, and neutralize. Follow immediately with a phosphatizing treatment, prime coat, and two finish coats of powder coat enamel.
- E. Galvanizing for Items Other than Sheet: Comply with ASTM A123/A123M; galvanized ferrous metal and fastening devices; minimum 1.2 oz/sq ft coating thickness; galvanized after fabrication.
- F. Shop Primed Ferrous Metals: Pretreat and clean, spray apply one coat primer and bake.
- G. Back paint components where contact is made with building finishes to prevent electrolysis.

### **PART 3 EXECUTION**

#### **3.1 EXAMINATION**

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify exact location of accessories for installation.
- C. Verify that internal wall reinforcement and reinforcement of toilet partitions, to receive anchor attachments, is installed and adequate to attach the work securely.
- D. Coordinate electrical requirements with electrical service construction.
- E. Verify field measurements are as indicated on product data instructed by manufacturer.

#### **3.2 PREPARATION**

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this section.
- B. Prepare materials to be installed and equipment used during installation.
- C. Deliver inserts and rough-in frames to site for timely installation.
- D. Provide templates and rough-in measurements as required.

#### **3.3 INSTALLATION**

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Install plumb and level, securely and rigidly anchored to substrate.
- C. Mounting Heights and Locations: As required by accessibility regulations and as indicated on Drawings.

#### **3.4 ADJUSTING**

- A. Section 01 73 00 - Execution: Starting, testing, adjusting, and balancing.
- B. Adjust and test installed Work for proper functionality.

#### **3.5 CLEANING**

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures: Related to cleaning.
- B. Clean installed Work and comply with manufacturer's recommendations.

**3.6 PROTECTION OF INSTALLED CONSTRUCTION**

- A. Section 01 73 00 - Execution: Protecting installed construction.
- B. Protect installed Work from damage.

**END OF SECTION**

**SECTION 10 44 00**  
**FIRE PROTECTION SPECIALTIES**

**PART 1 GENERAL****1.1 SUMMARY**

- A. Section Includes:
  - 1. Fire extinguishers.
  - 2. Fire extinguisher cabinets.
  - 3. Accessories.
- B. Related Requirements:
  - 1. Section 04 20 00 - Unit Masonry; walls for mounting equipment.
  - 2. Section 09 21 16 - Gypsum Board Assemblies; walls for mounting equipment.

**1.2 REFERENCE STANDARDS**

- A. ASTM International (ASTM):
  - 1. ASTM E814 - Standard Test Method for Fire Tests of Penetration Firestop Systems; 2013a (reapproved 2017).
- B. Factory Mutual (FM):
  - 1. FM (AG) - FM Approval Guide; current edition.
- C. National Fire Protection Association (NFPA):
  - 1. NFPA 10 - Standard for Portable Fire Extinguishers; 2017 (with Errata 2018).
- D. Underwriters Laboratories Inc. (UL):
  - 1. UL (DIR) - Online Certification Directory; current edition.

**1.3 SUBMITTALS**

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Product Data:
  - 1. Submit extinguisher operational features; full range of colors and finishes; anchorage details.
  - 2. Submit cabinet product data; operational features; full range of colors and finishes; anchorage details.
- C. Shop Drawings:
  - 1. Indicate mounting measurements for brackets; locations and fire ratings.
  - 2. Indicate cabinet physical dimensions, rough-in measurements for recessed cabinets, installation measurements for cabinets; locations and fire ratings.
- D. Manufacturer's Installation Instructions: Submit special criteria and wall opening coordination requirements.
- E. Manufacturer's Certificate: Certify that Products meet or exceed specified requirements.

**1.4 CLOSEOUT SUBMITTALS**

- A. Section 01 78 23 - Operation and Maintenance Data.
- B. Operation and Maintenance Data: Submit test, refill or recharge schedules and re-certification requirements.

**1.5 ENVIRONMENTAL REQUIREMENTS**

- A. Section 01 60 00 - Product Requirements: Environmental conditions affecting products on site.
- B. Do not install extinguishers when ambient temperature is capable of freezing extinguisher ingredients.

**PART 2 PRODUCTS****2.1 FIRE EXTINGUISHERS**

- A. Manufacturers:
  1. Activar Construction Products Group Inc. - JL Industries.
  2. Ansul, a Tyco Business.
  3. Kidde, a unit of United Technologies Corporation.
  4. Nystrom, Inc.
  5. Potter-Roemer.
  6. Pyro-Chem, a Tyco Business.
  7. Substitutions: Section 01 60 00 - Product Requirements.
- B. Fire Extinguishers - General: Comply with product requirements of NFPA 10 and applicable codes, whichever is more stringent.
  1. Provide extinguishers labeled by UL (DIR) or FM (AG) for purpose specified and as indicated.
- C. Multipurpose Dry Chemical Type Fire Extinguishers: Carbon steel tank, with pressure gage.
  1. Class: A:B:C type.
  2. Size: 10 pounds.
  3. Finish: Baked polyester powder coat, red color.
  4. Temperature range: Minus 40 degrees F to 120 degrees F.

**2.2 FIRE EXTINGUISHER CABINETS**

- A. Manufacturers:
  1. Activar Construction Products Group, Inc. - JL Industries.
  2. Kidde, a unit of United Technologies Corp.
  3. Larsen's Manufacturing Company.
  4. Nystrom Inc.
  5. Potter-Roemer.
  6. Substitutions: Section 01 60 00 - Product Requirements.
- B. Basis of Design: Activar - JL Industries - Academy Series.
- C. Fire Extinguishers Cabinets: Comply with product requirements of NFPA 10 and applicable codes, whichever is more stringent.
  1. Fire Rating: Listed and labeled in accordance with ASTM E814 requirements for fire resistance rating of walls where being installed.
  2. Provide fire extinguisher cabinets classified and labeled by UL for purpose specified and indicated.
- D. Non-Fire Rated Cabinet Construction:
  1. Formed aluminum; 0.036 inch thick base metal.
- E. Fire Rated Cabinet Construction: Fire rating to be as required by rating of wall construction.
  1. Steel; double wall or outer and inner boxes with minimum 5/8 inch thick fire barrier material.

- F. Cabinet Installation Configuration and Trim:
  - 1. Semi-Recessed Trim Type: 1-1/2 inch projection from wall surface; face width to be 1-1/2 inch.
- G. .Cabinet Tub Size: Provide tube size as needed to accommodate required extinguisher and accessories content.
- H. Door: Minimum 0.036 inch thick base metal formed to 5/8 inch thickness, reinforced for flatness and rigidity with nylon catch. Continuous hinge door for 180 degree opening. Pull to be surfaced mounted handle type with two through-door bolts.
  - 1. Glazing: Acrylic plastic, clear, 1/8 inch thick, flat shape and set in resilient channel glazing gasket.
    - a. Full door glazed panel.
  - 2. Signage:
    - a. Diecut vinyl letters, self adhering; uppercase helvetica font; vertical descending composition.
      - 1) Application:
        - a) Reverse adhered on inside face of door glazing panel.
      - 2) Letters color to be as selected by Architect from full range of options.
- I. Cabinet Mounting Hardware: Appropriate to cabinet, with pre-drilled holes for placement of anchors; no visible fasteners on exterior of cabinet.
- J. Weld, fill, and grind joinery and components smooth.
- K. Finishes:
  - 1. Non-Fire Rated Cabinets:
    - a. Cabinet Exterior Trim and Door Finish:
      - 1) Aluminum Construction: Clear anodized finish.
    - b. Cabinet Tub Finish: Match exterior material and finish.
  - 2. Fire Rated Cabinets:
    - a. Cabinet Exterior Trim, Door, and Tub Finish:
      - 1) Steel Construction: Powder coat finish; color as selected by Architect from manufacturer's full range.

## 2.3 ACCESSORIES

- A. Extinguisher Brackets:
  - 1. Formed stainless steel.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify locations and mounting heights for each unit.
- C. Verify rough openings for cabinets are correctly sized and located.

### 3.2 PREPARATION

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this Section.
- B. Prepare materials to be installed and equipment to be used during installation.

**3.3 INSTALLATION**

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Install cabinets plumb and level in wall openings and as indicated on Drawings.
- C. Install wall brackets at location indicated on Drawings.
- D. Secure rigidly in place.
- E. Install extinguishers and accessories in cabinets or on wall brackets as indicated on Drawings.

**3.4 CLEANING**

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures.
- B. Clean installed work in accordance with manufacturer's recommendations including cleaning procedures and materials.

**3.5 PROTECTION OF INSTALLED CONSTRUCTION**

- A. Section 01 73 00 - Execution: Protecting installed construction.
- B. Protect installed construction from damage.

**3.6 SCHEDULES**

- A. Fire Extinguisher Cabinet Locations: As indicated on Drawings.
  - 1. In fire rated construction, provide fire rated cabinets in compliance with the requirements for the fire rated construction.
- B. Fire Extinguisher Locations by Type:
  - 1. Type A:B:C fire extinguishers:
    - a. All locations not indicated to be other Type. Areas include, but are not limited to the following:
      - 1) Corridors.
      - 2) Work Areas.
      - 3) Mechanical Rooms (bracket installed if no cabinet indicated).
      - 4) Electrical Rooms (bracket installed if no cabinet indicated).

**END OF SECTION**

**SECTION 10 56 16**  
**FABRICATED WOOD STORAGE SHELVING**

**PART 1 GENERAL****1.1 SUMMARY**

- A. Section includes factory fabricated and finished modular wood storage shelving units.

**1.2 SUBMITTALS**

- A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.
- B. Product Data: Submit manufacturer's detailed product data. Include unit construction and finishes. Provide data for all components.
- C. Shop Drawings: Submit shop drawings for shelving units describing dimensions, locations, room layout, materials, and finishes. Include methods of assembly and jointing, thickness of parts, hardware to be used.
- D. Manufacturer's Installation Instructions: Indicate special precautions for installation.

**1.3 QUALIFICATIONS**

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three (3) years documented experience.
- B. Installer: Company specializing in installation of products specified in this section with minimum three (3) years documented experience.

**1.4 DELIVERY, STORAGE, AND HANDLING**

- A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Accept components on site in manufacturer's original packaging. Inspect for damage.
- C. Protect components from moisture damage.

**PART 2 PRODUCTS****2.1 FABRICATED WOOD STORAGE SHELVING**

- A. Manufacturers:
1. Excalibur Wood Products.
  2. Lundia USA.
  3. Palmetto Shelving Systems.
  4. Substitutions: Section 01 60 00 - Product Requirements.
- B. Basis of Design: Palmetto Shelving Systems.
- C. Shelving Unit Size: 36W x 12D x 84H inches, unless indicated otherwise on Drawings.
1. Where Drawings indicate shelving to be continuous from wall-to-wall, adjust shelving unit width accordingly, but not as to exceed shelf length of 42 inches in non-book shelving units. Shelf lengths for book shelving units are not to exceed 36 inches.

**2.2 COMPONENTS**

- A. Vertical Uprights: Hemlock, spruce or douglas fir species wood; minimum 1-5/8 x 1-1/4 inches. Groove-cut entire length of uprights on one face to receive shelf end support channels. Groove to be 3/8 x 5/8 inch deep. Along length of uprights, for shelf support pins and shelf adjustment, drill holes of 3/16 diameter at 1 inch centers for insertion of shelf support pins. Drilled hole centers to be measured from finish top of each upright to ensure level shelf installation.
- B. Vertical Shelving End Panels: Open framed stiles and rails. Fabricate with two uprights as stiles, bridged by three or more wood rails joined to uprights with mortised, glued, and pinned wood joinery. Rails to be at panel top and bottom, and others equally distributed.
- C. Shelves: White pine species wood; minimum 3/4 inch thick. Each end to be machined to accept roll formed steel end channels shaped to fit over each end of the shelf and to rest on the shelf support pins. Finger joints are not acceptable.
  - 1. Provide minimum seven (7) shelves per each shelving unit.
  - 2. Provide shelf support pins for each shelf and four (4) extra pins per each shelving unit.
- D. Lateral Cross Bracing: Provide lateral bracing at back of each shelving unit between each set of shelving end panels (uprights). Bracing to be 2 steel straps assembled with riveted center to form X-shape. Each steel strap to be minimum 18 gauge by 3/4 inch wide, galvanized or powder coated steel. Pre-drill each end of each strap for fastening to shelving end panels (uprights).
- E. Base Kickboard: Provide continuous 4 inch pine kickboard for each elevation.

### 2.3 ACCESSORIES

- A. Shelf Support Pins: Zinc plated steel, 3/16 inch diameter x 1-1/4 inches long, with 5/16 inch diameter head.
  - 1. Provide shelf support pins for each shelf and four (4) extra pins per each shelving unit.
- B. Hardware: Fasteners and anchoring devices to be formed from non-corrosive metal and of size and strength suitable for intended use.

### 2.4 FACTORY FINISHING

- A. Wood Components: Edges to be eased. All surfaces to be sanded smooth; sealed and lacquered.
- B. Steel Components: Smooth finish, with burrs; galvanized or powder coat.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify dimensions, tolerances, and methods of attachment with other work.
- C. Verify spaces are ready to receive work of this Section.

### 3.2 INSTALLATION

- A. Section 01 73 00 - Execution: Related to installation of work.
- B. Install components according to manufacturer's written instructions, using fasteners appropriate to substrate indicated and recommended by manufacturer.
- C. Install units and components level, plumb, and firmly anchored to substrate structure to prevent tip-over.



**3.3 CLEANING**

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures: Related to cleaning.
- B. Replace damaged or defective components.
- C. Remove temporary labels and protective coatings.
- D. Clean exposed surfaces.

**3.4 PROTECTION OF INSTALLED CONSTRUCTION**

- A. Section 01 73 00 - Execution: Protecting installed construction.
- B. Protect installed construction from damage.

**END OF SECTION**



**SECTION 10 73 16****CANOPIES****PART 1 GENERAL****1.1 SUMMARY**

- A. Section Includes:
  1. Factory finished metal canopies suspended from building face structure.
- B. Related Requirements:
  1. Division 05 - Metals: Sections related to structural steel for supporting structure.
  2. Division 08 - Openings: Sections related to framed opening infill.

**1.2 REFERENCES**

- A. American Architectural Manufacturers Association (AAMA):
  1. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum; 2014 (2015 Errata).
  2. AAMA 612 - Voluntary Specification, Performance Requirements, and Test Procedures for Combined Coatings of Anodic Oxide and Transparent Organic Coatings on Architectural Aluminum; 2017a.
  3. AAMA 2604 - Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2017a.
  4. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2017a.
  5. AAMA CW-10 - Care and Handling of Architectural Aluminum from Shop to Site; 2015.
- B. American Society of Civil Engineers (ASCE):
  1. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures; Most Recent Edition Cited by Referring Code or Reference Standard.
- C. ASTM International (ASTM):
  1. ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2021.
  2. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2020.
- D. American Welding Society, Inc. (AWS):
  1. AWS D1.2/D1.2M - Structural Welding Code - Aluminum; 2014 (with Errata).

**1.3 COORDINATION**

- A. Section 01 30 00 - Administrative Requirements: Requirements for coordination.
- B. Coordinate base components and requirements for attachment and anchorage to structure.
- C. Coordinate work of other Sections that interface and are related to the work of this Section (drainage, sidewalks, building openings, exterior walls, roofing, soffits, fascia, lighting, etc.).

**1.4 SUBMITTALS**

- A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.

- B. Product Data: Manufacturer's product information, specifications and installation instructions for components and accessories.
- C. Shop Drawings: Indicate system and component profiles, sizes, connection attachments, anchorage, size, and type of fasteners; anticipated deflection under load; affected related work; expansion and contraction joint locations and details; drainage details and flow diagrams; field welding; and accessories.
  - 1. Prepare shop drawings indicating attachment system, framing, transverse cross sections, covering and trim details, and installation details to clearly indicate proper assembly of components.
  - 2. Shop drawings and engineering data indicating compliance with requirements of this Section are to be designed and sealed by a licensed professional Engineer. Include test results of previous testing meeting performance criteria, and other supportive data.
- D. Engineering Certification: Submit written certification prepared and signed by a licensed professional Engineer indicating compliance with applicable codes and Performance Requirements indicated in this Section.
- E. Samples for Initial Selection: Two manufacturer's color charts illustrating the full range of finishes and colors available for products with factory-applied color finishes; submit for Architect's initial selections.
- F. Samples for Verification: From the Architect's initial selections, prepare and submit two samples for each selected finish and color; samples on same product material type indicated for final work; each sample 4 x 4 inches. Where finishes involve normal color and texture variations, include sample sets showing the full range of variations expected.

## 1.5 QUALITY ASSURANCE

- A. Designer Qualifications: Design of canopy systems included in this Section are to be designed and sealed by a licensed Professional Engineer, experienced in design of work of this type and licensed in the State in which the Project is located. Engineer is to certify that all applicable code requirements have been met. Engineer may be in the employ of the manufacturer of the covering systems, provided Engineer is compliant with the above registration requirement.
- B. Comply with the current provisions of the following unless otherwise indicated:
  - 1. Applicable codes and authorities having jurisdiction (AHJ).
  - 2. AWS (American Welding Society) standards for structural welding.
- C. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum five (5) years documented experience.
- D. Installer Qualifications: Company specializing in performing the work specified in this Section with minimum five (5) years documented experience.

## 1.6 DELIVERY, STORAGE, AND PROTECTION

- A. Section 01 60 00 - Product Requirements: Product storage and handling requirements.
- B. Comply with AAMA CW-10.
- C. Protect prefinished aluminum surfaces with wrapping. Do not use adhesive papers or sprayed coatings which bond when exposed to sunlight or weather. Provide for adequate ventilation through wrappings.

## 1.7 WARRANTY

- A. Section 01 77 00 - Closeout Procedures: Product warranties.

- B. Provide five (5) year manufacturer's warranty for finish.
- C. Provide manufacturer's standard one (1) year warranty that includes, but is not limited to, coverage for structural performance, water tightness and finish.

## **PART 2 PRODUCTS**

### **2.1 PERFORMANCE REQUIREMENTS**

- A. Design system and size components, and anchorage to safely withstand Live Loads, Snow Loads, Wind Loads (+ and -), and Seismic Loads as indicated on Drawings for the Structural Design Criteria and in compliance with ASCE 7 and the State Building Code for the State in which the project is located.
- B. System to provide for expansion and contraction within system components caused by a cycling temperature range of 120 degrees F without causing detrimental effects to system or components.
- C. System to accommodate, without damage to system or components, movement within system, movement between system and perimeter framing components, dynamic loading and release of loads, and deflection of structural support framing.
- D. Conform to applicable code for fire resistance ratings for items.

### **2.2 MANUFACTURERS**

- A. Manufacturers:
  1. AVAdek, Inc.
  2. Dittmer Architectural Aluminum.
  3. Mitchell Metals.
  4. Mapes Architectural Products.
  5. Peachtree Protective Covers.
  6. Perfection Architectural Systems, Inc.
  7. Tennessee Valley Metals, Inc., East Coast TVM.
  8. Substitutions: Section 01 60 00 - Product Requirements.

### **2.3 MATERIALS**

- A. Extruded Aluminum: ASTM B221; 6063 alloy, heat treated to T-6 temper.
- B. Sheet Aluminum: ASTM B209/B209M; 6061 alloy, heat treated to T6 temper.
- C. Fasteners:
  1. Deck Screws (rivets not permitted): Type 18-8 non-magnetic stainless steel sealed with a neoprene "O" ring beneath 5/8 inch outside dimension, conical washer.
  2. Rivets: Size 3/16 x 1/2 inch grip range aluminum rivets with aluminum mandrel.
  3. Bolts: All bolts, nuts, and washers to be 18-8 non-magnetic stainless steel.
  4. Tek Screws: Not permitted.

### **2.4 COMPONENTS**

- A. Decking: Extruded self-flashing aluminum sections; interlocking into a watertight composite unit. Extrusion thickness to be a required to withstand imposed loads.
- B. Soffit Type: Flush bottom, unless indicated otherwise on Drawings.
- C. Fascia: Extruded aluminum.
  1. For integral fascia and structural frame extrusion, 0.125 inch thick, minimum.
  2. For separate fascia extrusion secured to structural frame, 0.050 inch thick, minimum.

3. Shape and size to be as indicated on Drawings.
- D. Flashing: Extruded aluminum, 0.040 inch thick; same finish as for system components; secured with concealed fastening method.

## 2.5 FABRICATION

- A. Field Measurements: Verify actual supporting and adjoining construction by field measurements before fabrication; and indicate recorded measurements on final Shop Drawings. Verify that supporting construction is as required for support of the Sun Control Devices. Coordinate construction to ensure that sun control assemblies fit properly to supporting and adjoining construction and coordinate schedule with construction progress to avoid delaying the Work.
  1. Established Dimensions: Where field measurements cannot be made without delaying the Work, coordinate related construction to ensure that Sun Control Devices correspond to established dimensions and construction.
- B. Fabricate assemblies to comply with design as indicated on Drawings.
- C. Fit and shop assemble components in largest practical sizes, for delivery to site.
- D. Fabricate components with joints tightly fitted and secured. Provide allowance for expansion and contraction of entire system.
- E. Provide drainage pathway without leaks and to point of drainage discharge.
- F. For canopies suspended from building (and without columns for drainage), provide for drainage openings with water diverters along bottom of canopy outer edge member. Drainage openings to be as indicated on Drawings. If drainage openings are not indicated on Drawings, locate drainage openings away from building face and not in direct line of door openings.
- G. Arrange fasteners, attachments and jointing to ensure concealment from view.
- H. Supply components required for anchorage of framing. Fabricate anchors and related components of same material and finish as framing, except where specifically noted otherwise.
- I. Continuously seal joined pieces by continuous welds.
- J. Welding In accordance with ANSI/AWS D1.2/D1.2M.
- K. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, hairline, and waterproof. Ease exposed edges to small uniform radius.
- L. Accurately form components to suit each other and to building structure.
- M. Deck Construction: Deck shall be manufactured of extruded modules that interlock in a self-flashing manner. Interlocking joints shall be positively fastened at not less than 18 inches o.c. creating a monolithic structural unit capable of developing the full strength of the sections. The fastenings must have minimum shear strength of 350 pounds each. Deck shall be assembled with sufficient camber to offset dead load deflection.

## 2.6 ACCESSORIES

- A. Fittings: Elbows, T-shapes, wall brackets; cast aluminum.
- B. Splice Connectors: Concealed spigot; cast aluminum.
- C. Struts: Manufacturer's standard rod type and material.
- D. Wall Brackets: Manufacturer's standard decorative type for mounting in wall structure, unless shape, profile, or configuration is otherwise indicated on Drawings.

- E. Exposed Fasteners: Flush countersunk stainless steel screws, bolts, and rivets; finish to be same as factory finish indicated.
- F. Protective Coating for dissimilar materials: Clear acrylic; two coats; compatible with materials to be coated.

## **2.7 FACTORY FINISHING**

- A. All surfaces of components, fabrications, and accessories to be factory finished to match colors selected by Architect from full range of colors.
- B. Anodized Aluminum Finish:
  - 1. Class I Clear Anodized Finish: AAMA 611, AA-M12C22A41 Clear anodic coating not less than 0.7 mils thick.

## **PART 3 EXECUTION**

### **3.1 EXAMINATION**

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify that substrates and anchor conditions are acceptable and are ready to receive work.
- C. Verify dimensions, tolerances, and method of attachment with other work.

### **3.2 PREPARATION**

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this Section.
- B. Prepare materials to be installed and equipment to be used during installation.

### **3.3 INSTALLATION**

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Install as indicated on Drawings and in accordance with Engineer's and manufacturer's instructions.
- C. Install components plumb and level, accurately fitted, free from distortion or defects.
- D. Apply two coats of clear acrylic coating to aluminum surfaces in contact with dissimilar materials and cementitious embedment. Application to be concealed from view.
- E. Install anchors required for connecting framing to structure.

### **3.4 ERECTION TOLERANCES**

- A. Section 01 40 00 - Quality Requirements: Tolerances.
- B. Maximum Variation from Plumb: 1/4 inch per story, non-cumulative.
- C. Maximum Misalignment from True Position: 1/4 inch.
- D. Maximum Variation from Plane: 1/4 inch every 10 feet, non-cumulative.
- E. Maximum Variation from Alignment of Two Adjoining Members Abutting in Plane: 0.015 inch.

### **3.5 CLEANING**

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures: Clean installed work and comply with manufacturer's recommendations.
- B. Clean installed work in accordance with manufacturer's recommended materials and procedures.

**3.6 PROTECTION OF INSTALLED CONSTRUCTION**

- A. Section 01 73 00 - Execution: Protect installed construction.

**END OF SECTION**



**SECTION 12 21 13**  
**HORIZONTAL LOUVER BLINDS**

**PART 1 GENERAL**

**1.1 SUMMARY**

- A. Section includes horizontal metal slat louver blinds and operating hardware.

**1.2 COORDINATION**

- A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.
- B. Coordinate the Work with window installation and placement of concealed blocking to support blinds.

**1.3 SUBMITTALS**

- A. Section 01 33 00 - Submittal Procedures: Submittal requirements.
- B. Product Data: Submit data indicating physical and dimensional characteristics, and operating features.
- C. Shop Drawings: Indicate opening sizes, tolerances required, method of attachment, clearances, and operation.
- D. Samples for Initial Selection: For each finish product specified, submit two sets of samples representing manufacturer's full range of available finishes, colors and patterns for all exposed components of product.
- E. Samples for Verification: From the Architect's initial selections, prepare and submit two samples for each selection. Samples to be presented on actual product sections no less than 12 inches long.
- F. Manufacturer's Installation Instructions: Submit special procedures, perimeter conditions requiring special attention.

**1.4 QUALIFICATIONS**

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum five (5) years documented experience.
- B. Installer: Company specializing in installing products specified in this section with minimum five (5) years documented experience.

**1.5 SPARE PARTS AND MAINTENANCE PRODUCTS**

- A. Section 01 60 00 - Product Requirements: Extra materials, spare parts, and maintenance products.
  - 1. Extra Blind Assemblies: Two of each size.
  - 2. Extra Slats: 20 of each type and size.
  - 3. Extra Lift Cords, Control Cords, and Wands: One of each type.

**PART 2 PRODUCTS**

**2.1 HORIZONTAL LOUVER BLINDS**

- A. Manufacturers:

1. Bali Window Treatments.
2. Caco, Inc.
3. Hunter Douglas Window Fashions.
4. Levolor Contract.
5. Substitutions: Section 01 60 00 - Product Requirements.

## 2.2 COMPONENTS

- A. Blinds: Horizontal slat louvers hung from full-width headrail with full-width bottom rail; between the window jambs; manual control of raising and lowering by cord with full range locking; variable blade angle adjustable by control wand.
- B. Metal Slats: Spring tempered pre-finished aluminum; radiused slat corners, with manufacturing burrs removed.
  1. Width: 1 inch.
  2. Thickness: 0.008 inch.
  3. Color: As selected by Architect from submitted samples.
- C. Slat Support: Woven polypropylene cord, ladder configuration.
- D. Headrail: Pre-finished, formed aluminum box, with end caps; internally fitted with hardware, pulleys, and bearings for operation; same depth as width of slats; height 1-7/8 inches.
  1. Color: Same as slats.
- E. Bottom Rail: Pre-finished, formed aluminum with top side shaped to match slat curvature; with end caps.
  1. Color: Same as slats.
- F. Lift Cord: Braided polypropylene; continuous loop.
  1. Free end weighted.
  2. Color: As selected by Architect from submitted samples.
- G. Control Wand: Extruded hollow plastic; round shape.
  1. Non-removable type.
  2. Length to be window opening height less 3 inches.
  3. Color: Clear.
- H. Headrail Attachment: Wall brackets, or as otherwise indicated on Drawings.
- I. Accessory Hardware: Type recommended by blind manufacturer.

## 2.3 FABRICATION

- A. Verify field measurements prior to fabrication.
- B. Fabricate blinds to fit within openings with uniform edge clearance of 1/4 inch.
- C. At openings requiring multiple blind units, fabricate separate blind assemblies with space of 1/2 inch between assemblies, occurring at window mullion centers.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify openings are ready to receive work.
- C. Verify structural blocking and supports are correctly placed.

**3.2 PREPARATION**

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this Section.
- B. Prepare materials to be installed and equipment to be used during installation.

**3.3 INSTALLATION**

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Install blinds.
- C. Secure in place with flush countersunk concealed fasteners.
- D. Place intermediate head supports at 24 inch o.c., or closer for adequate support of imposed operating loads.

**3.4 ERECTION TOLERANCES**

- A. Section 01 40 00 - Quality Requirements: Tolerances.
- B. Maximum Variation of Gap at Window Opening Perimeter: 1/8 inch.
- C. Maximum Offset From Level: 1/8 inch.

**3.5 ADJUSTING**

- A. Section 01 73 00 - Execution: Starting, testing, adjusting, and balancing.
- B. Adjust blinds for smooth operation.

**3.6 CLEANING**

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures: Related to cleaning.
- B. Clean blind surfaces just prior to occupancy.

**3.7 PROTECTION OF INSTALLED CONSTRUCTION**

- A. Section 01 73 00 - Execution: Protect installed construction.

**3.8 SCHEDULE**

- A. Blind locations and configurations to be as indicated on Drawings.

**END OF SECTION**



**SECTION 12 32 16****MANUFACTURED PLASTIC-LAMINATE-CLAD CASEWORK****PART 1 GENERAL****1.1 SUMMARY**

- A. Section Includes:
  - 1. Manufactured plastic-laminate-clad casework.
  - 2. Countertops.
  - 3. Casework hardware.
- B. Related Requirements:
  - 1. Section 09 65 00 - Resilient Flooring: Rubber base.
  - 2. Division 22 - Plumbing Fixtures: Sinks set in countertops.

**1.2 DEFINITIONS**

- A. Identification of Casework Parts by Surface Visibility:
  - 1. Unit Body with Open Interior: Storage unit surfaces without solid door or drawer fronts, and units with glass sliding or glass framed doors.
  - 2. Unit Body with Closed Interior: Storage unit surfaces with closable solid door or drawer fronts.
  - 3. Exposed Surface: Surface that is visible.
  - 4. Concealed Surface: Surface that is not visible after installation.

**1.3 REFERENCES**

- A. American National Standards Institute (ANSI):
  - 1. ANSI A135.4 - Basic Hardboard; 2020.
  - 2. ANSI A208.1 - Particleboard; 2016.
- B. ASTM International (ASTM):
  - 1. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2021a.
- C. Architectural Woodwork Manufacturers Association of Canada (AWMAC) and the Woodwork Institute (WI):
  - 1. AWMAC/WI (NAAWS) - North American Architectural Woodwork Standards; 2017, with Errata 2019.
- D. California Department of Health Services (CA/DHS):
  - 1. CA/DHS - Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers, including 2004 Addenda.
- E. National Electrical Manufacturers Association (NEMA):
  - 1. NEMA LD 3 - High Pressure Decorative Laminates; 2005.

**1.4 ADMINISTRATIVE REQUIREMENTS**

- A. Preinstallation Meeting: Convene a preinstallation meeting not less than one week before starting work of this section; require attendance by all affected installers.

**1.5 SUBMITTALS**

- A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.

- B. Product Data: Submit data describing casework finishes and construction.
- C. Shop Drawings:
  - 1. Scale of Drawings: 1-1/2 inch to 1 foot, minimum.
  - 2. Provide the information required by AWMAC/WI (NAAWS) and to include the following:
    - a. Indicate component dimensions, configurations, elevations, cross-sections, construction details, joint details, hardware locations, service run spaces and location of services. Include layout of units with relation to surrounding walls, doors, windows, and other building components.
    - b. Include details for fabrication of vanity and countertop supports, brackets, and finishes.
- D. Samples for Initial Selection: Two manufacturer's color samples illustrating the full range of finishes, patterns, and colors available for each finish surface type, trim and hardware indicated; submit for Architect's initial selections.
- E. Samples for Verification: From the Architect's initial selections, prepare and submit two samples for each selected finish, pattern, and color; minimum 4 x 4 inch samples and actual hinge and pull. Where finishes involve normal color and texture variations, include sample sets showing the full range of variations expected.
- F. Certificate: Submit labels and certificates required by quality assurance and quality control programs.

## 1.6 QUALITY ASSURANCE

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum ten (10) years documented experience.
- B. Installer: Company specializing in the installation of casework with minimum five (5) years documented experience and approved by the manufacturer.

## 1.7 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Store completed casework and countertops in a ventilated space with relative humidity range of 20 to 50 percent.

## 1.8 ENVIRONMENTAL REQUIREMENTS

- A. Section 01 60 00 - Product Requirements: Environmental conditions affecting products on site.
- B. Do not install casework in unconditioned spaces, or in spaces where relative humidity is not within acceptable limits.

## PART 2 PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

- A. Work of this Section is to comply with AWMAC/WI (NAAWS), unless indicated otherwise.
- B. AWMAC/WI (NAAWS) Quality Standard:
  - 1. Custom Grade.

### 2.2 MANUFACTURED PLASTIC-LAMINATE-CLAD CASEWORK

- A. Manufacturers:
  1. Biggs Casework, Inc.
  2. Blair-Dumond, Inc.
  3. Cabinets by Design, Inc., Duluth GA.
  4. Case Systems.
  5. Cleora Sterling Corporation.
  6. Interior Wood Specialties, Inc.
  7. Kewaunee Scientific Corporation.
  8. Pridgen Cabinetworks.
  9. Stevens Industries Inc.
  10. TMI Systems Design Corporation.
  11. Substitutions: Section 01 60 00 - Product Requirements.

### 2.3 COMPONENTS

- A. Particleboard: ANSI A208.1; 45 pound density, fir, or pine.
  1. Interior Composite Wood Products: Conform to California Department of Health Services Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers, including 2004 Addenda.
  2. Use Moisture Resistant Particleboard on countertops in wet areas and at sinks.
- B. Hardboard: ANSI A135.4; prefinished; 1/4 inch thick.
- C. Melamine: Melamine resin laminate sheet; thermally fused to panel core material. Colors indicated in FINISHES article in this Section.
- D. PVC Edging: Extruded PVC, self-locking serrated tongue, of width to match component thickness. Colors indicated in FINISHES article in this Section.
  1. Convex face with smooth finish.
- E. Plastic Laminate: High Pressure Decorative Laminate (HPDL) complying with AWMAC/WI (NAAWS) and NEMA LD 3. Colors indicated in FINISHES article in this Section.
- F. Solid Surface Material: Cast polymeric resin.
  1. Provide finished products having flame spread index of 35 or less, and smoke developed index of 15 or less, when tested in accordance with ASTM E84 in thickness of 3/4 inch.
  2. Resin: Polyester type, with integral coloring, stain resistant to domestic chemicals and cleaners.
  3. Colors indicated in FINISHES article in this Section.
  4. Polishing Cream: Compatible polishing cream to achieve specified finish sheen.
  5. Adhesive: Type recommended by solid surface manufacturer and coordinated for bonding to substrate type.
- G. Cabinet Hardware:
  1. Pulls:
    - a. Attachment:
      - 1) 4 inch centers.
    - b. Finish and Color:
      - 1) Powder coated wire; color as selected by Architect from manufacturer's full range.
  2. Hinges: Heavy duty, exposed 5 knuckle, fixed pin, hospital-tip style.
    - a. Finish and Color:
      - 1) To match Pulls.
  3. Magnetic Catches: Aluminum case with zinc plated steel strike, 6 lb. pull minimum.

4. Door & Drawer Locks: Cam type, disc tumbler capable of being master keyed; stainless steel, satin finish. Each room, keyed alike and separate from other rooms and all locks master keyed.
    - a. Drawers: Lock quantities and locations.
      - 1) Provide keyed locks at locations indicated on Drawings.
    - b. Doors: Lock quantities and locations.
      - 1) Provide keyed locks at locations indicated on Drawings. For double door cabinet units receiving keyed lock, provide interior release/latch for adjacent door.
  5. Coat Hooks: Ceiling and wall surface mounted types.
    - a. Double prong wardrobe design; stainless steel.
    - b. Finish and Color: To match Pulls.
    - c. Hook quantities and locations; to be mounted in casework units as follows:
      - 1) Provide coat hooks at locations indicated on Drawings.
  6. Hardware Fasteners: Exposed fasteners to match material and finish of installed device.
  7. Where door opens against adjacent construction, provide chain or other restraint device to prevent door and door hardware from contacting adjacent construction.
  8. Drawer Slides:
    - a. Standard Drawers: Nylon ball bearing, self-closing; 75 pound capacity.
    - b. File Drawers: Full extension, ball bearing, self-closing; 100 pound capacity.
  9. Adjustable Shelf Supports:
    - a. Heavy duty, polycarbonate; clear; pin type; shelf locking clip.
  10. Casters: Double ball bearing mounting to heavy gage zinc plated fork; 5 inch soft rubber wheels. Provide two brake units per mobile unit.
- H. Fixed Vanity and Countertop Brackets:
1. Brackets to comply with Americans with Disabilities Act (ADA) where applicable.
  2. Material:
    - a. Stainless steel; satin finish.
- I. :Bolts, Nuts, Washers, Lags, Anchors, Pins, Fasteners, and Screws: As indicated on Drawings and otherwise to be of size and type to suit application; galvanized finish in concealed locations and stainless steel in exposed locations.

## 2.4 FABRICATION

- A. Verify field measurements prior to fabrication.
- B. Fabricate laminate clad casework to dimensions, profiles and details shown.
- C. Joinery Dowels: Industrial grade hardwood dowels, glued and clamped tight.
- D. Construct cabinet bodies with 3/4 inch particleboard for sides, fixed intermediates, subtops, and bottoms. Stretchers, where allowed, to be minimum 4 inch wide.
  1. Subtops to be solid particleboard; no stretchers allowed for subtops.
- E. Construct shelving up to 30 inches wide with 3/4 inch particleboard. Construct shelving greater than 30 inches wide with 1 inch particleboard.
- F. Construct cabinet backs with 1/2 inch particleboard.
- G. Construct drawers with 1/2 inch particleboard for sides, back, and subfront. Construct drawer bottoms with 1/2 inch prefinished hardboard.
- H. Construct doors, and drawer fronts with 3/4 inch particleboard.
- I. Construct countertops as follows:
  1. Use Moisture Resistant Particleboard in wet areas and countertops with sinks.



2. Use 1-1/8 inch particleboard for countertops finished with Plastic Laminate.
  3. Use 3/4 inch particleboard for countertops finished with Solid Surface (Synthetic Surface) type material.
- J. All components to be of balanced construction. Plastic laminate faced particleboard to be balanced with high pressure cabinet liner on opposite side unless otherwise noted. Melamine faced particleboard to be balanced with melamine.
- K. Wall Hung Units:
1. Top surfaces of wall hung units to be finished with same material as visible vertical end panels.
  2. Bottom surfaces of wall hung units to be finished with melamine on surfaces and color matching PVC panel edging.

## 2.5 FINISHES

- A. Doors:
1. Front and Interior: Plastic laminate VGS28 with 3mm PVC edging.
- B. Drawers:
1. Fronts: Plastic laminate VGS28 with 3mm PVC edging.
  2. Interiors: Melamine with 1mm PVC edging.
- C. Unit Body with Closed and Open Interiors:
1. Interior Surfaces: Melamine with 1mm PVC edging.
  2. Exposed Surfaces: Plastic laminate VGS28 with 1mm PVC edging.
  3. Shelves: Melamine on both sides.
    - a. Shelf Edging for Closed Interiors: 1mm PVC edging.
    - b. Shelf Edging for Open Interiors: 3mm PVC edging.
- D. Countertops:
1. Plastic Laminate Clad Type: HGS/HGP48 with 3mm PVC edging.
    - a. Locations: All countertops unless otherwise indicated.
  2. Solid Surface Material Type: Cast polymeric resin.
    - a. Locations: As indicated on Drawings.
- E. Finishes Colors and Textures:
1. Melamine: White.
  2. PVC Edging:
    - a. Colors and textures as selected by Architect from manufacturer's full range.
  3. Plastic Laminate:
    - a. Colors and textures as selected by Architect from manufacturer's full range.
  4. Solid Surface Material:
    - a. Colors and textures as selected by Architect from manufacturer's full range.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify adequacy of backing and support framing.
- C. Verify location and sizes of utility rough-in associated with work of this Section.

### 3.2 PREPARATION

- A. Section 01 73 00 - Execution: Prepare field conditions and existing construction for installation of work of this section.
- B. Prepare materials to be installed and equipment to be used during installation.

### **3.3 INSTALLATION**

- A. Section 01 73 00 - Execution: Related to installation of Work.
- B. Install work in accordance with AWMAC/WI (NAAWS) requirements for grade indicated.
- C. Set and secure casework in place; rigid, plumb, and level.
- D. Use fixture attachments in concealed locations for wall mounted components.
- E. Use concealed joint fasteners to align and secure adjoining cabinet units and counter tops.
- F. Carefully scribe casework abutting other components and construction, with maximum gaps of 1/32 inch. Do not use additional overlay trim for this purpose.
- G. Secure cabinets, brackets and bases to floor and wall substrates using appropriate angles and anchorages.
- H. Seal joints at abutment to other construction with appropriate sealant matching casework finish.
- I. Sequence installation and erection to ensure mechanical and electrical connections are achieved in an orderly and expeditious manner.

### **3.4 ADJUSTING**

- A. Section 01 73 00 - Execution: Starting, testing, adjusting, and balancing.
- B. Adjust moving or operating parts to function smoothly, without binding and correctly.
- C. Repair or remove and replace defective work to new condition.

### **3.5 CLEANING**

- A. Section 01 73 00 - Execution and Section 01 77 00 - Closeout Procedures: Related to cleaning.
- B. Clean casework, counters, shelves, hardware, fittings, and fixtures.

### **3.6 PROTECTION OF INSTALLED CONSTRUCTION**

- A. Section 01 73 00 - Execution: Protecting installed construction.
- B. Protect Work from damage, including damage from detrimental air temperature and humidity levels.

**END OF SECTION**