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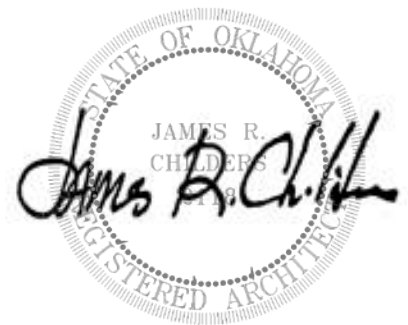
# Cherokee Nation Entertainment TAHLEQUAH CASINO

Tahlequah, Oklahoma

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April 16<sup>th</sup>, 2018



JAMES R. CHILDERS ARCHITECT, INC.

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**SECTION 03 4500**  
**PRECAST ARCHITECTURAL CONCRETE**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Architectural precast concrete wall caps.

**1.02 RELATED REQUIREMENTS**

- A. Section 07 2100 - Thermal Insulation: Integral Insulation.
- B. Section 07 6200 - Sheet Metal Flashing and Trim: Reglets recessed in units.
- C. Section 07 9200 - Joint Sealants: Sealing perimeter and intermediate joints.

**1.03 REFERENCE STANDARDS**

- A. ACI 318 - Building Code Requirements for Structural Concrete and Commentary; 2011.
- B. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2014.
- C. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2009.
- D. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength; 2014.
- E. ASTM A563 - Standard Specification for Carbon and Alloy Steel Nuts; 2007a (Reapproved 2014).
- F. ASTM A563M - Standard Specification for Carbon and Alloy Steel Nuts [Metric]; 2007.
- G. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon Steel Bars for Concrete Reinforcement; 2015.
- H. ASTM C150/C150M - Standard Specification for Portland Cement; 2015.
- I. PCI MNL-117 - Manual for Quality Control for Plants and Production of Architectural Precast Concrete Products; 2007.
- J. PCI MNL-120 - PCI Design Handbook - Precast and Prestressed Concrete; 2010, Seventh Edition.
- K. PCI MNL-122 - Architectural Precast Concrete; 2007, Third Edition.
- L. PCI MNL-123 - Design and Typical Details of Connections for Precast and Prestressed Concrete; 1988, Second Edition.
- M. PCI MNL-135 - Tolerance Manual for Precast and Prestressed Concrete Construction; 2000.

**1.04 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Manufacturer's information on accessory products, including pigments, admixtures, inserts, plates, etc.
- C. Shop Drawings: Indicate layout, unit locations, configuration, unit identification marks, reinforcement, integral insulation, insulated panel system connectors, connection details, support items, location of lifting devices, dimensions, openings, and relationship to adjacent materials. Provide erection drawings.
  - 1. Include details of mix designs.
- D. Samples: Submit two samples, 6 x 6 inch (\_\_\_\_x\_\_\_\_ mm) in size, illustrating surface finish, color and texture.
- E. Fabricator's Qualification Statement: Provide documentation showing precast concrete fabricator is accredited under IAS AC157.
- F. Fabricator Qualification Statement: \_\_\_\_\_.
- G. Maintenance Data: Indicate surface cleaning instructions.

## **1.05 QUALITY ASSURANCE**

- A. Design Engineer Qualifications: Design precast concrete units under direct supervision of a Professional Structural Engineer experienced in design of precast concrete and licensed in the State in which the Project is located.
- B. Fabricator Qualifications:
  - 1. Firm having at least 2 years of documented experience in production of precast concrete of the type required.

## **1.06 MOCK-UP**

- A. Provide on site mock-up, 8 feet (\_\_\_\_ m) long by 8 feet (\_\_\_\_ m) wide, with lifting device, and attachment points, and finish in accordance with approved sample.
- B. Locate where directed.
- C. Mock-up may remain as part of the Work.

## **1.07 DELIVERY, STORAGE, AND HANDLING**

- A. Handling: Lift and support precast units only from support points.
- B. Protect units to prevent staining, chipping, or spalling of concrete.

## **PART 2 PRODUCTS**

### **2.01 MANUFACTURERS**

- A. Architectural Precast Concrete:
  - 1. Any manufacturer holding a PCI Group A Plant Certification for the types of products specified; see [www.pci.org](http://www.pci.org).
  - 2. Substitutions: See Section 01 6000 - Product Requirements.

### **2.02 PRECAST UNITS**

- A. Precast Architectural Concrete Units: Comply with PCI MNL-120, PCI MNL-122, PCI MNL-123, PCI MNL-135, and ACI 318.
  - 1. Design Loads: Static loads, anticipated dynamic loading, including positive and negative wind loads, thermal movement loads, and erection forces as defined by applicable code.
  - 2. Calculate structural properties of units in accordance with ACI 318.
  - 3. Accommodate construction tolerances, deflection of building structural members, and clearances of intended openings.
  - 4. Provide connections that accommodate building movement and thermal movement and adjust to misalignment of structure without unit distortion or damage.
- B. Finish Type A: Ensure exposed-to-view finish surfaces of precast units are uniform in color and appearance.

### **2.03 REINFORCEMENT**

- A. Reinforcing Steel: ASTM A615/A615M, Grade 40 (40,000 psi) (280 MPa).
  - 1. Deformed billet-steel bars.
  - 2. Unfinished.

### **2.04 CONCRETE MATERIALS**

- A. Cement: ASTM C150/C150M, Type I - Normal Portland type.

### **2.05 SUPPORT DEVICES**

- A. Connecting and Support Devices; Anchors and Inserts: ASTM A36/A36M steel; hot-dip galvanized in accordance with ASTM A153/A153M.
  - 1. Clean surfaces of rust, scale, grease, and foreign matter.
- B. Bolts, Nuts, and Washers: ASTM A307 heavy hex bolts, Type A, hot-dip galvanized, with matching ASTM A563 (A563M) nuts and matching washers.

### **2.06 FABRICATION**

- A. Fabricate in conformance with PCI MNL-117 and PCI MNL-135.

## **2.07 FABRICATION TOLERANCES**

- A. Conform to PCI MNL-117 and PCI MNL-135, except as specifically amended below.
  - 1. Maximum Variation From Nominal Face Dimensions: Plus or minus 3/32 in (2.4 mm).
  - 2. Maximum Variation From Square or Designated Skew: Plus or minus 1/8 inch in 10 feet (1 mm per m).
  - 3. Maximum Variation from Thickness: Plus or minus 1/8 in (3 mm).
  - 4. Maximum Misalignment of Anchors, Inserts, Openings: Plus or minus 1/8 inch (3 mm).
  - 5. Maximum Bowing of Members: Plus or minus length/360.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that building structure, anchors, devices, and openings are ready to receive work of this section.

### **3.02 ERECTION**

- A. Erect units without damage to shape or finish. Replace or repair damaged panels.
- B. Erect units level and plumb within allowable tolerances.
- C. When units require adjustment beyond design or tolerance criteria, discontinue affected work; advise Architect.

### **3.03 TOLERANCES**

- A. Erect members level and plumb within allowable tolerances. Conform to PCI MNL-135, except as specifically amended below.
  - 1. Plan Location from Building Grid Datum: Plus or minus 3/8 in (9.5 mm).
  - 2. Top Elevation from Nominal Top Elevation: Plus or minus 3/8 inch (9.5 mm).

**END OF SECTION**

**SECTION 04 4301**  
**STONE MASONRY VENEER**

**PART 1 GENERAL**

**1.01**

**1.02 SECTION INCLUDES**

- A. Manufactured simulated stone veneer at exterior and interior walls.
- B. Reinforcement, anchorages, mortar, and accessories

**1.03 RELATED REQUIREMENTS**

- A. Section 04 2000 - Unit Masonry: Joint reinforcement, Ties, and Anchors.
- B. Section 07 6200 - Sheet Metal Flashing and Trim: Flashings.
- C. Section 07 9200 - Joint Sealants: Sealing joints indicated to be left open for sealant.

**1.04 REFERENCE STANDARDS**

- A. ASTM C270 - Standard Specification for Mortar for Unit Masonry; 2014a.

**1.05 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on stone units, mortar, and reinforcement.
- C. Samples: Submit two stone samples illustrating minimum and maximum stone sizes, 12 inches x 12 inches minimum, color range, texture, and markings.
- D. Samples: Submit mortar color samples.

**1.06 QUALITY ASSURANCE**

- A. Manufactured Stone Fabricator Qualifications: Company specializing in fabricating cut stone with minimum ten years of documented experience.

**1.07 MOCK-UP**

- A. Construct stone wall mock-up, 8 feet (\_\_\_\_ m) long by 4 feet (\_\_\_\_ m) wide; include stone anchor accessories, corner condition, and typical control joint in mock-up.
- B. Locate where directed.
- C. Mock-up may remain as part of the Work if acceptable to the Architect.

**1.08 DELIVERY, STORAGE, AND HANDLING**

- A. Protect stone from discoloration during storage on site.
- B. Provide ventilation to prevent condensation from forming on stone.

**1.09 PROJECT CONDITIONS**

- A. Sequence work to coordinate the installation of stone work with installation of adjacent construction.
- B. Environmental Requirements:
  - 1. Minimum air temperature of 40 degrees F (4 degrees C) prior to, during, and for 48 hours after completion of work; and

**1.10 FIELD CONDITIONS**

- A. Maintain materials and ambient air at minimum of 40 degrees F (5 degrees C) prior to, during, and for 48 hours after completion of work.

**PART 2 PRODUCTS**

**2.01 MANUFACTURERS**

- A. Stone Mill, Inc.
- B. 15 East 151 Street South

- C. Bixby, Oklahoma
- D. 74008
- E. 1-918-697-5623
  - 1. SV = see color and finish schedule
  - 2. Color = see color and finish schedule

## 2.02 STONE

- A. Simulated Stone:
  - 1. Precast simulated stone, composed of following materials:
  - 2. Portland Cement: ASTM C 150, Type 1, 2, or 3 depending upon color to be produced.
  - 3. Course Aggregates: ASTM C 330, lightweight type, color as necessary to obtain final approved color of stone.
  - 4. Sand: ASTM C 144, special color if required to match approved sample.
  - 5. Iron oxide colors.
  - 6. Water: Clean and free from deleterious substances.
- B. Trim and Accessories
  - 1. Sills & Moldings
    - a. Provide as indicated on the drawings
  - 2. Post Caps
    - a. Provide as indicated on the drawings
  - 3. Utility Boxes to match simulated stone as required at the following conditions:
    - a. Lights - large or small
    - b. Electrical boxes
    - c. Hose Bibs
    - d. Dryer Vents
    - e. All other penetrations as required for the project

## 2.03 MORTAR

- A. Setting Mortar: ASTM C270, Type S, using the Property Method .

## 2.04 ACCESSORIES

- A. Tyvek Stucco Wrap, by E.I. Dupont, or comparable product as approved by Architect. Provide tape to seal joints, seams, and tears, of same permeance as membrane
- B. Felt staples.
- C. Metal Lath: ASTM C 847; 18 gage, galvanized, flat diamond mesh, self furring, stamped sheet.
- D. Attachment: Galvanized nails, screws and other metal supports, of type and size to suit applications; to rigidly secure materials in place.
- E. Fasteners: Coated 1-1/2 inch nails, staples, or screws of type and for spacing as recommended by simulated stone manufacturer.
- F.
- G. Flashings: \_\_\_\_\_ type as specified in Section 07 6200.
- H. Cleaning Solution: Type that will not harm stone, joint materials, or adjacent surfaces.

## 2.05 STONE FABRICATION

- A. Stone veneer to produced of Type 1 Portland cement, expanded aggregate, and additives to meet or exceed the following specifications:
  - 1. Water Absorption: 3.3%.
  - 2. Compressive Strenght: 3,260 psi. minimum.
  - 3. Thermal Conductivity: 1.38 R Factor.
- B. Form stone corners to irregular joint profile. Clean jagged corners from stone in preparation for setting.
- C. Slope exposed top surfaces of stone and horizontal sill surfaces for shedding water.



- D. Cut drip slot in bottom surface of work projecting more than 1/2 inch (13 mm) over window frame. Size slot not less than 3/8 inch (10 mm) wide and 1/4 inch (6 mm) deep for full width of projection.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Verify that support work and site conditions are ready to receive work of this section.
- B. Verify that items built-in under other sections are properly located and sized.

#### **3.02 PREPARATION**

- A. Establish lines, levels, and coursing. Protect from disturbance.
- B. Clean stone prior to erection. Do not use wire brushes or implements that mark or damage exposed surfaces.

#### **3.03 INSTALLATION**

- A. Conform with manufacturers Specification Guide for installation materials and methods.
  - 1. Dry stack installation.
- B. Install flashings of longest practical length and seal watertight to back-up. Lap end joints minimum 6 inches (150 mm) and seal watertight.
- C. Set stone in full mortar setting bed to fully support stone over bearing surface. Use setting buttons or shims to maintain correct joint width.

#### **3.04 REINFORCEMENT AND ANCHORAGE**

- A. Conform with manufacturers Specification Guide for installation materials and methods.

#### **3.05 JOINTS**

- A. Leave the following joints open for sealant:
  - 1. Head joints in top courses, including copings, parapets, cornices, sills, and steps.
  - 2. Joints in projecting units.
  - 3. Joints between rigidly anchored units, including soffits, panels, and column covers.
  - 4. Joints below lugged sills and stair treads.
  - 5. Joints below ledge and relieving angles.
  - 6. Joints labeled "expansion joint".
- B. Dry Stack.

#### **3.06 CLEANING**

- A. Remove excess mortar as work progresses, and upon completion of work.
- B. Provide water repellants as noted in this project manual
- C. Clean soiled surfaces with cleaning solution.
- D. Use non-metallic tools in cleaning operations.

#### **3.07 PROTECTION**

- A. During temporary storage on site, at the end of working day, and during rainy weather, cover stone work exposed to weather with non-staining waterproof coverings, securely anchored.

**END OF SECTION**

**SECTION 05 1200  
STRUCTURAL STEEL FRAMING**

**PART 2 PRODUCTS  
1.01 MATERIALS**

**END OF SECTION**

**SECTION 05 5150  
FIXED METAL LADDERS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Fixed aluminum wall ladders.

**1.02 RELATED SECTIONS**

- A. Section 06100 - Rough Carpentry: Blocking in metal wall studs and partitions for anchorage of access ladders

**1.03 REFERENCES**

- A. ANSI A14.3 - American National Standard for Ladders -- Fixed -- Safety Requirements; 1992.
- B. ASTM B 209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2001.
- C. ASTM B 209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate (Metric); 2001.
- D. ASTM B 210 - Standard Specification for Aluminum and Aluminum-Alloy Drawn Seamless Tubes; 2002.
- E. ASTM B 221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2000.
- F. ASTM B 221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric); 2000.
- G. ASTM B 308 - Standard Specification for Aluminum - Alloy T6061-T6 Standard Structural; 2002
- H. ASTM B 308M - Standard Specification for Aluminum - Alloy T6061-T6 Standard Structural; 2002
- I. OSHA 29 CFR Standard 1910.27 - Fixed ladders; Occupational Safety and Health Standards; current edition

**1.04 SUBMITTALS**

- A. Submit under provisions of Section 01300.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
  - 1. Preparation instructions and recommendations.
  - 2. Storage and handling requirements and recommendations.
  - 3. Installation methods.
- C. Shop Drawings: Detailed drawings showing complete dimensions, all materials, mounting attachments, and fabrication details.

**1.05 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in the engineering and manufacturing of metal ladders, with not less than fifty years of experience.

**1.06 WARRANTY**

- A. See Section 01780 - Closeout Submittals, for additional warranty requirements.
- B. Provide manufacturer's standard limited five-year warranty against defects in materials and workmanship.

**PART 2 PRODUCTS**

**2.01 MANUFACTURERS**

- A. Alaco Ladder Company; 5167 G Street, Chino, California, 91710-5143, Phone 909-591-7561; [www.alacoladder.com](http://www.alacoladder.com)

## **2.02 MATERIALS**

- A. Extruded Aluminum Profiles: ASTM B 221/B 221M, ASTM B 210, ASTM B 308/B 308M, Alloy 6061-T6; standard mill finish.
- B. Aluminum Sheet and Plate: ASTM B 209/B 209M, Alloy 6061-T6; standard mill finish.
- C. Fasteners: Aluminum solid aircraft rivets rated at 300 lbs (1335 N) shear strength.
- D. Cast fittings, connectors and rung ends: Cast Aluminum alloy 356

## **2.03 LADDERS**

- A. Ladders - General: Comply with ANSI A14.3 and OSHA regulations.
  - 1. Fixed Wall Ladders: Extruded aluminum; serrated rungs 1-1/8 inches (29 mm) in diameter, connected to 2-7/8 inch (73 mm) side rail channels with cast aluminum rung connectors, each secured to rails by means of four solid aircraft rivets.
  - 2. Walk-Through and Parapet Railings: Aluminum extrusions; extend not less than 42 inches (1,067 mm) above landing, 24 in (610 mm) between side rails at step through.
  - 3. Security Doors: Form from aluminum sheet 0.188 inch (4.8 mm) in thickness; secure with stainless steel piano hinges and hasps.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Do not begin installation until substrates have been properly prepared.
- B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

### **3.02 INSTALLATION**

- A. Install in accordance with manufacturer's instructions and approved shop drawings, and in compliance with ANSI A14.3 and OSHA 1910.27.

### **3.03 PROTECTION**

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Substantial Completion.

**C.END OF SECTION**

## **PART 2 PRODUCTS**

**END OF SECTION**

**SECTION 06 1000  
ROUGH CARPENTRY**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Rough opening framing for doors, windows, and roof openings.
- B. Sheathing.
- C. Roof-mounted curbs.
- D. Roofing nailers.
- E. Roofing cant strips.
- F. Preservative treated wood materials.
- G. Fire retardant treated wood materials.
- H. Miscellaneous framing and sheathing.
- I. Communications and electrical room mounting boards.
- J. Concealed wood blocking, nailers, and supports.
- K. Miscellaneous wood nailers, furring, and grounds.

**1.02 RELATED REQUIREMENTS**

- A. Section 07 6200 - Sheet Metal Flashing and Trim: Sill flashings.
- B. Section 09 2116 - Gypsum Board Assemblies: Gypsum-based sheathing.

**1.03 REFERENCE STANDARDS**

- A. ASTM C1177/C1177M - Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing; 2013.
- B. ASTM D3273 - Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber; 2012.
- C. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2017.
- D. AWPA U1 - Use Category System: User Specification for Treated Wood; 2012.
- E. PS 20 - American Softwood Lumber Standard; 2010.

**1.04 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide technical data on insulated sheathing, wood preservative materials, and application instructions.
- C. Warranty: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

**1.05 DELIVERY, STORAGE, AND HANDLING**

- A. General: Cover wood products to protect against moisture. Support stacked products to prevent deformation and to allow air circulation.
- B. Fire Retardant Treated Wood: Prevent exposure to precipitation during shipping, storage, or installation.

**1.06 WARRANTY**

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

**PART 2 PRODUCTS**

**2.01 GENERAL REQUIREMENTS**

- A. Dimension Lumber: Comply with PS 20 and requirements of specified grading agencies.

1. If no species is specified, provide any species graded by the agency specified; if no grading agency is specified, provide lumber graded by any grading agency meeting the specified requirements.
2. Grading Agency: Any grading agency 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. Lumber fabricated from old growth timber is not permitted.

## **2.02 DIMENSION LUMBER FOR CONCEALED APPLICATIONS**

- A. Sizes: Nominal sizes as indicated on drawings, S4S.
- B. Moisture Content: S-dry or MC19.
- C. Miscellaneous Framing, Blocking, Nailers, Grounds, and Furring:
  1. Lumber: S4S, No. 2 or Standard Grade.
  2. Boards: Standard or No. 3.

## **2.03 CONSTRUCTION PANELS**

- A. Wall Sheathing: Glass mat faced gypsum, ASTM C1177/C1177M, square long edges, 5/8 inch Type X fire resistant (16 mm Type X fire resistant).
  1. At Assemblies Indicated with Fire-Rating: Use type required by indicated tested assembly.
  2. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
  3. Edges: Square, for vertical application.
  4. Glass Mat Faced Products:
    - a. CertainTeed Corporation; GlasRoc Brand: [www.certainteed.com](http://www.certainteed.com).
    - b. Georgia-Pacific Gypsum; DensGlass Sheathing: [www.gpgypsum.com](http://www.gpgypsum.com).
    - c. Substitutions: See Section 01 6000 - Product Requirements.
- B. Communications and Electrical Room Mounting Boards: PS 1 A-D plywood, or medium density fiberboard; 3/4 inch (19 mm) thick; flame spread index of 25 or less, smoke developed index of 450 or less, when tested in accordance with ASTM E84.

## **2.04 FACTORY WOOD TREATMENT**

- A. Treated Lumber and Plywood: Comply with requirements of AWPA 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 AWPA standards.
- B. Fire Retardant Treatment:
- C. Preservative Treatment:

## **PART 3 EXECUTION**

### **3.01 PREPARATION**

- A. Where wood framing bears on cementitious foundations, install full width sill flashing continuous over top of foundation, lap ends of flashing minimum of 4 inches (100 mm) and seal.
- B. Install sill gasket under sill plate of framed walls bearing on foundations; puncture gasket cleanly to fit tightly around protruding anchor bolts.
- C. Coordinate installation of rough carpentry members specified in other sections.

### **3.02 INSTALLATION - GENERAL**

- A. Select material sizes to minimize waste.
- B. Reuse scrap to the greatest extent possible; clearly separate scrap for use on site as accessory components, including: shims, bracing, and blocking.

- C. Where treated wood is used on interior, provide temporary ventilation during and immediately after installation sufficient to remove indoor air contaminants.

### **3.03 BLOCKING, NAILERS, AND SUPPORTS**

- A. Provide framing and blocking members as indicated or as required to support finishes, fixtures, specialty items, and trim.
- B. In framed assemblies that have concealed spaces, provide solid wood fireblocking as required by applicable local code, to close concealed draft openings between floors and between top story and roof/attic space; other material acceptable to code authorities may be used in lieu of solid wood blocking.
- C. In metal stud walls, provide continuous blocking around door and window openings for anchorage of frames, securely attached to stud framing.
- D. In walls, provide blocking attached to studs as backing and support for wall-mounted items, unless item can be securely fastened to two or more studs or other method of support is explicitly indicated.
- E. Where ceiling-mounting is indicated, provide blocking and supplementary supports above ceiling, unless other method of support is explicitly indicated.

### **3.04 ROOF-RELATED CARPENTRY**

- A. Coordinate installation of roofing carpentry with deck construction, framing of roof openings, and roofing assembly installation.
- B. Provide wood curb at all roof openings except where prefabricated curbs are specified and where specifically indicated otherwise. Form corners by alternating lapping side members.

### **3.05 INSTALLATION OF CONSTRUCTION PANELS**

- A. Wall Sheathing: Secure with long dimension perpendicular to wall studs, with ends over firm bearing and staggered, using nails, screws, or staples.
- B. Communications and Electrical Room Mounting Boards: Secure with screws to studs with edges over firm bearing; space fasteners at maximum 24 inches (610 mm) on center on all edges and into studs in field of board.
  - 1. At fire-rated walls, install board over wall board indicated as part of the fire-rated assembly.
  - 2. Where boards are indicated as full floor-to-ceiling height, install with long edge of board parallel to studs.
  - 3. Install adjacent boards without gaps.

### **3.06 SITE APPLIED WOOD TREATMENT**

- A. Apply preservative treatment compatible with factory applied treatment at site-sawn cuts, complying with manufacturer's instructions.
- B. Allow preservative to dry prior to erecting members.

### **3.07 TOLERANCES**

- A. Framing Members: 1/4 inch (6 mm) from true position, maximum.
- B. Variation from Plane (Other than Floors): 1/4 inch in 10 feet (2 mm/m) maximum, and 1/4 inch in 30 feet (7 mm in 10 m) maximum.

### **3.08 CLEANING**

- A. Waste Disposal: Comply with the requirements of Section 01 7419.
  - 1. Comply with applicable regulations.
  - 2. Do not burn scrap on project site.
  - 3. Do not burn scraps that have been pressure treated.
  - 4. Do not send materials treated with pentachlorophenol, CCA, or ACA to co-generation facilities or "waste-to-energy" facilities.
- B. Do not leave any wood, shavings, sawdust, etc. on the ground or buried in fill.

C. Prevent sawdust and wood shavings from entering the storm drainage system.

**END OF SECTION**



**SECTION 06 1110**  
**WOOD BLOCKING AND CURBING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Roof nailers and curbs.
- B. Blocking in walls at all interior doors for door stops.
- C. Blocking in wall and roof openings.
- D. Wood furring and grounds.
- E. Preservative treatment of wood.
- F. Telephone and electrical panel boards.
- G. Concealed wood blocking for support of toilet and bath accessories, wall cabinets, and other items.

**1.02 RELATED SECTIONS**

- A. Section 09260 - Gypsum Board Assemblies: Wall mounted cabinets, accessories and medical equipment to receive wood backing for mounting.

**1.03 REFERENCES**

- A. ASTM A 153/A 153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2005.
- B. AWPA C2 - Lumber, Timber, Bridge Ties and Mine Ties -- Preservative Treatment by Pressure Processes; American Wood-Preservers' Association; 2002.
- C. AWPA C20 - Structural Lumber -- Fire Retardant Treatment by Pressure Processes; American Wood-Preservers' Association; 2002.
- D. AWPA U1 - Use Category System: User Specification for Treated Wood; American Wood-Preservers' Association; 2005.
- E. PS 1 - Construction and Industrial Plywood; National Institute of Standards and Technology (Department of Commerce); 1995.
- F. PS 20 - American Softwood Lumber Standard; National Institute of Standards and Technology (Department of Commerce); 2005.
- G. RIS (GR) - Standard Specifications for Grades of California Redwood Lumber; Redwood Inspection Service; 2000.
- H. SPIB (GR) - Grading Rules; Southern Pine Inspection Bureau, Inc.; 2002.
- I. WCLB (GR) - Standard Grading Rules for West Coast Lumber No. 17; West Coast Lumber Inspection Bureau; 2004.
- J. WWPA G-5 - Western Lumber Grading Rules; Western Wood Products Association; 2005.

**1.04 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide technical data on wood preservative materials.

**1.05 QUALITY ASSURANCE**

- A. Lumber: Comply with PS 20 and approved grading rules and inspection agencies.
  - 1. Acceptable Lumber Inspection Agencies: RIS, SPIB, WCLB, and WWPA.
- B. Plywood: Comply with PS 1.

**PART 2 PRODUCTS**

**2.01 GENERAL REQUIREMENTS**

- A. Lumber fabricated from old growth timber is not permitted.

## **2.02 DIMENSION LUMBER**

- A. Grading Agency: Southern Pine Inspection Bureau, Inc. (SPIB).
- B. Sizes: Nominal sizes as indicated on drawings, .
- C. Moisture Content: S-dry or MC19.
- D. Miscellaneous Blocking, Furring, and Nailers:
  - 1. Lumber: S4S, No. 2 or Standard Grade.

## **2.03 CONSTRUCTION PANELS**

- A. Plywood Sheathing: PS 1, Grade C-D, Exposure I.
- B. Miscellaneous Panels:
  - 1. Concealed Plywood: PS 1, C-C Plugged, exterior grade.
  - 2. Exposed Plywood: PS 1, A-D, interior grade.
  - 3. Electrical Component Mounting: APA rated sheathing, fire retardant treated.

## **2.04 ACCESSORIES**

- A. Fasteners and Anchors:
  - 1. Fasteners: Hot-dipped galvanized steel per ASTM A 153/A 153M for high humidity and treated wood locations, unfinished steel elsewhere.

## **2.05 FACTORY WOOD TREATMENT**

- A. Treated Lumber and Plywood: Comply with requirements of AWPA U1 - Use Category System for wood treatments determined by use categories, expected service conditions, and specific applications.
- B. Fire Retardant Treatment: AWPA Treatment C20, Exterior Type, Chemically treated and pressure impregnated; capable of providing a maximum flame spread/smoke development rating comply with applicable codes.
- C. Preservative Pressure Treatment of Lumber Above Grade: AWPA Use Category UC3B, Commodity Specification A (Treatment C2) .
  - 1. Kiln dry after treatment to maximum moisture content of 19 percent.
  - 2. Treat wood in contact with roofing, flashing, or waterproofing.
  - 3. Treat wood in contact with masonry or concrete.
  - 4. Treat wood less than 18 inches (450 mm) above grade.

## **PART 3 EXECUTION**

### **3.01 FRAMING INSTALLATION**

- A. Set members level and plumb, in correct position.
- B. Place horizontal members with crown side up.
- C. Construct curb members of single pieces.
- D. Curb roof openings except where prefabricated curbs are provided. Form corners by alternating lapping side members.
- E. Coordinate curb installation with installation of decking and support of deck openings.
- F. Provide miscellaneous members as indicated or as required to support finishes, fixtures, specialty items, and trim.

### **3.02 INSTALLATION OF CONSTRUCTION PANELS**

- A. Sheathing: Secure with long dimension perpendicular to framing members, with ends over firm bearing and staggered, using nails, screws, or staples.
- B. Install telephone and electrical panel back boards made of plywood or other acceptable structural panels at locations indicated. Size back boards to be minimum 12 inches (300 mm) beyond size of telephone and electrical panels.

### **3.03 SITE APPLIED WOOD TREATMENT**

- A. Apply preservative treatment compatible with factory applied treatment at site-sawn cuts, complying with manufacturer's instructions.
- B. Allow preservative to dry prior to erecting members.

### **3.04 SCHEDULES**

- A. Roof Blocking: S/P/F species, 19 percent maximum moisture content, pressure preservative treatment, fire treated.
- B. Interior wall backing: two layers 3/4 inch thick, plywood, fire treated.
- C. Telephone and Electrical Panel Boards: 1/2 inch (\_\_\_\_ mm) thick, plywood , fire retardant treated.

**END OF SECTION**

**SECTION 07 1310  
WATER REPELLENTS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Water repellents for above grade surfaces of stone.

**1.02 RELATED SECTIONS**

- A. Section 04 2000 - Unit Masonry.

**1.03 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Manufacturer's technical literature, specifications and application instructions for specified products.
- C. Certification that the applicator has the specified experience, and operates and maintains the proper equipment in accordance with the water repellent manufacturer's recommendations; include a list of the names of several recent projects, locations, names of architects, and methods of application.

**1.04 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: A firm with not less than 10 years of experience in manufacturing the products specified in this section.
- B. Applicator Qualifications: A firm with not less than 3 years of experience in the application of the products specified in this section.
- C. Pre-Installation Meeting: Prior to application of water repellents, hold a meeting at the job site with representatives of the manufacturer and the applicator. Notify Owner and Architect at least 3 days in advance of the time of the meeting.

**1.05 DELIVERY, STORAGE, AND HANDLING**

- A. Packaging and Shipping: Deliver materials in original sealed containers, clearly marked with manufacturer's name, brand name, and type of material.
- B. Acceptance at Site: Verify that the product delivered matches the product applied to the approved mock-up.
- C. Storage and Protection:
  - 1. Store and handle materials in accordance with manufacturer's written instructions.
  - 2. Store materials indoors and away from sparks and open flame in a secure area to prevent tampering and contamination. Do not allow water-based materials to freeze.

**1.06 SCHEDULING**

- A. Notify Architect not less than 48 hours before each application of water repellent.

**1.07 WARRANTY**

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Installer's Warranty: Contractor and the installer shall jointly and severally warrant water repellents against failure in material and workmanship for a period of 5 years from the date of Substantial Completion.
- C. Manufacturer's Warranty: Provide manufacturer's written 5-year warranty.
  - 1. Submit completed manufacturer's written Request for Warranty Form to manufacturer 10 days prior to application.
  - 2. After Substantial Completion, submit Warranty Application to manufacturer for processing.
  - 3. Submit executed copy of warranty to Architect and Owner.

## **PART 2 PRODUCTS**

### **2.01 MANUFACTURERS**

- A. Manufacturer: Chemprobe Coating Systems, LP; 2805 Industrial Lane, Garland, TX 75041. ASD. Tel: (800) 760-6776 or (972) 271-5551. Fax: (972) 271-5553. Email: info@chemprobe.com. www.chemprobe.com.
- B. Other Acceptable Manufacturers:
  - 1. DeGussa Building Systems; www.DegussaBuildingSystems.com.
  - 2. Prosoco; www.procoso.com.
  - 3. Professional Products of Kansas, Inc.; www.watersealant.com.
- C. Substitutions: See Section 01 6000 - Product Requirements.

### **2.02 MATERIALS**

- A. Water Repellents - General: Siloxane- or silane- or siloxane-silane blend, without fillers, stearates, or paraffins.
  - 1. Products Containing Only Siloxane or Modified Siloxane: From 5 to 7 percent solids.
  - 2. Products Containing Silane: Minimum 40 percent solids.
  - 3. Silane-Siloxane Blend Products: Minimum 10 percent solids.
  - 4. Provide products that comply with federal, state, and local volatile organic compounds (VOC) regulations.
  - 5. Provide water repellents with the following properties based on testing manufacturer's standard products, according to test methods indicated, applied to substrates simulating project conditions using same materials and application methods to be used for project.
  - 6. Properties of Water Repellent for Vertical Surfaces:
    - a. Water-Vapor Transmission: At least 8 percent reduction in rate of vapor transmission by comparison of treated and untreated specimens, when tested in accordance with ASTM E 96.
    - b. Water Penetration and Leakage Through Masonry: At least 90 percent reduction in leakage rate by comparison of treated and untreated specimens, when tested in accordance with ASTM E 514.
    - c. Durability: Maximum 5 percent loss of water repellency after 2500 hours of weathering using ASTM G 154 (or G53) cycles, by comparison to specimens before weathering.
  - 7. For Horizontal Surfaces: Comply with Transportation Research Board, National Research Councils NCHRP Report 244, Series II tests, for chloride-ion intrusion in concrete.
- B. Water Repellent for Vertical Natural Stone Surfaces: Solvent based siloxane with crosslinker; Prime A Pell NS.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that new concrete, masonry, mortar, and stucco has cured for at least 21 days.
- B. Verify that all sealants have been installed.

### **3.02 PREPARATION**

- A. Protection:
  - 1. Prevent water repellent fumes from entering the building being treated, turn off ventilation system and close fresh air intakes.
  - 2. Protect shrubs, metal, wood trim, glass, asphalt, and hardware during application of water repellents.
  - 3. Do not permit spray mist or liquid to drift onto adjacent properties.
- B. Surface Preparation: Prepare surface so that it is free of cracks, dirt, oils, paint, and other contaminants that may affect the appearance and performance of the water repellents.

### **3.03 APPLICATION**

- A. Apply water repellents in accordance with manufacturer's printed instructions.
  - 1. Do not apply water repellents to surfaces below 40 degrees F (4.4 degrees C) or above 95 degrees F (35 degrees C) unless recommended by the manufacturer.
  - 2. Do not apply to wet substrate or substrate containing frozen water.
  - 3. Do not apply water repellents when rain is predicted within 48 hours or less than 5 days after surface has been wet.
  - 4. Do not apply water repellents in high or gusty winds.
- B. Apply water repellents using low pressure spray equipment designed for water repellent application.
- C. Apply water repellents as shipped by the manufacturer; do not dilute.
- D. Apply water repellents evenly until surface is totally saturated. Coverage rates are dependent on surface material. Only one saturation coat is required.

### **3.04 FIELD QUALITY CONTROL**

- A. After water repellent has dried for 24 hours at low humidity and a temperature between 70 and 90 degrees F (21 and 32 degrees C) or for 48 hours at high humidity and a temperature between 50 and 69 degrees F (10 and 20.5 degrees C), test all surfaces with a water spray. Recoat areas that indicate water absorption.

### **3.05 CLEANING**

- A. Remove excess material and waste resulting from the work from the project site.
- B. Dispose of water repellent containers in accordance with state and local regulations.

**END OF SECTION**

**SECTION 07 2100**  
**THERMAL INSULATION**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Board insulation and integral vapor retarder at perimeter foundation wall, underside of floor slabs, and exterior wall behind \_\_\_\_\_ wall finish.
- B. Batt insulation in exterior wall, ceiling, and roof construction.
- C. Batt insulation for filling perimeter window and door shim spaces and crevices in exterior wall and roof.

**1.02 RELATED REQUIREMENTS**

- A. Section 03 3000 - Cast-in-Place Concrete: Field-applied termiticide for concrete slabs and foundations.
- B. Section 05 4000 - Cold-Formed Metal Framing: Board insulation as wall sheathing.
- C. Section 06 1000 - Rough Carpentry: Supporting construction for batt insulation.
- D. Section 07 2400 - Exterior Insulation and Finish System: Board insulation on exterior side of walls, finished with weatherproof coating.
- E. Section 07 2500 - Weather Barriers: Separate air barrier and vapor retarder materials.
- F. Section 07 5100 - Built-Up Bituminous Roofing: Installation requirements for board insulation over low slope roof deck specified in this section.
- G. Section 09 2116 - Gypsum Board Assemblies: Acoustic insulation inside walls and partitions.

**1.03 REFERENCE STANDARDS**

- A. ASTM C578 - Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation; 2017a.
- B. ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing; 2017.
- C. ASTM D2842 - Standard Test Method for Water Absorption of Rigid Cellular Plastics; 2012.
- D. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2017.
- E. ASTM E136 - Standard Test Method for Behavior of Materials in a Vertical Tube Furnace At 750 Degrees C; 2016a.
- F. ASTM E2357 - Standard Test Method for Determining Air Leakage of Air Barrier Assemblies; 2017.

**1.04 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on product characteristics, performance criteria, and product limitations.
- C. Manufacturer's Installation Instructions: Include information on special environmental conditions required for installation and installation techniques.
- D. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

**1.05 FIELD CONDITIONS**

- A. Do not install insulation adhesives when temperature or weather conditions are detrimental to successful installation.

**PART 2 PRODUCTS**

**2.01 MANUFACTURERS**

- A. Insulation:
  - 1. Additional Noted Below:

2. Substitutions: See Section 01 6000 - Product Requirements.

## 2.02 APPLICATIONS

- A. Insulation at Perimeter of Foundation: Expanded polystyrene board.
  1. Applied at exterior face of foundation stem wall
  2. Provide protection board
  3. Shall remain below finish grade, 6 inch minimum
- B. Insulation in Metal Framed Walls: Batt insulation with separate vapor retarder.
  1. R value 19 minimum at exterior wall
- C. Insulation Above Lay-In Acoustical Ceilings: Batt insulation with no vapor retarder.
- D. Insulation Over Roof Deck: Polyisocyanurate board.
  1. R Value 30 minimum average at roof

## 2.03 FOAM BOARD INSULATION MATERIALS

- A. Expanded Polystyrene Board Insulation: ASTM C578; with the following characteristics:
  1. Flame Spread Index: 25 or less, when tested in accordance with ASTM E84.
  2. Smoke Developed Index: 450 or less, when tested in accordance with ASTM E84.
  3. Board Size: 48 x 96 inch (1220 x 2440 mm).
  4. Board Thickness: 1-1/2 inches (38 mm).
  5. Board Edges: Square.
  6. Water Absorption: 4 percent by volume, maximum, when tested in accordance with ASTM D2842.
  7. Board Density: 0.7 lb/cu ft (12 kg/cu m).
  8. Compressive Resistance: 5 psi (35 kPa).
  9. Thermal Conductivity (k factor) at 25 degrees F (-3.9 degrees C): 0.28 (0.48).
  10. Manufacturers:
    - a. AFM Corp: [www.r-control.com](http://www.r-control.com).
    - b. Diversifoam Products: [www.diversifoam.com](http://www.diversifoam.com).
  11. Substitutions: See Section 01 6000 - Product Requirements.

## 2.04 BATT INSULATION MATERIALS

- A. Where batt insulation is indicated, either glass fiber or mineral fiber batt insulation may be used, at Contractor's option.
- B. Glass Fiber Batt Insulation: Flexible preformed batt or blanket, complying with ASTM C665; friction fit.
  1. Flame Spread Index: 25 or less, when tested in accordance with ASTM E84.
  2. Smoke Developed Index: 450 or less, when tested in accordance with ASTM E84.
  3. Combustibility: Non-combustible, when tested in accordance with ASTM E136, except for facing, if any.
  4. Formaldehyde Content: Zero.
  5. Thermal Resistance: R of 19 (all exterior walls).
  6. Manufacturers:
    - a. CertainTeed Corporation: [www.certainteed.com](http://www.certainteed.com).
    - b. Johns Manville Corporation: [www.jm.com](http://www.jm.com).
    - c. Owens Corning Corp: [www.owenscorning.com](http://www.owenscorning.com).
  7. Substitutions: See Section 01 6000 - Product Requirements.
- C. Mineral Fiber Batt Insulation: Flexible or semi-rigid preformed batt or blanket, complying with ASTM C665; friction fit; unfaced flame spread index of 0 (zero) when tested in accordance with ASTM E84.
  1. Where indicated, provide foil facing on one side; with flame spread index of 25 or less, when tested in accordance with ASTM E84.
  2. Smoke Developed Index: 0 (zero), when tested in accordance with ASTM E84.
  3. Thermal Resistance: R of 19 (all exterior walls).
  4. Manufacturers:



- a. Johns Manville International, Inc.; MinWool Sound Attenuation Fire Batts: [www.jm.com](http://www.jm.com).
- b. Thermafiber, Inc: [www.thermafiber.com](http://www.thermafiber.com).
- c. ROXUL, Inc; ComfortBatt: [www.rspec.com](http://www.rspec.com).
- d. Substitutions: See Section 01 6000 - Product Requirements.

## **2.05 ACCESSORIES**

- A. Tape: Bright aluminum self-adhering type, mesh reinforced, 2 inch (50 mm) wide.
- B. Tape joints of rigid insulation in accordance with roofing and insulation manufacturers' instructions.
- C. Insulation Fasteners: Impaling clip of unfinished steel with washer retainer and clips, to be adhered to surface to receive insulation, length to suit insulation thickness and substrate, capable of securely and rigidly fastening insulation in place.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that substrate, adjacent materials, and insulation materials are dry and that substrates are ready to receive insulation and adhesive.
- B. Verify substrate surfaces are flat, free of honeycomb, fins, irregularities, or materials or substances that may impede adhesive bond.

### **3.02 BOARD INSTALLATION AT FOUNDATION PERIMETER**

- A. Adhere a 6 inch (150 mm) wide strip of polyethylene sheet over construction, control, and expansion joints with double beads of adhesive each side of joint.
  - 1. Tape seal joints.
  - 2. Extend sheet full height of joint.
- B. Install boards horizontally on foundation perimeter.
  - 1. Place boards to maximize adhesive contact.
  - 2. Install in running bond pattern.
  - 3. Butt edges and ends tightly to adjacent boards and to protrusions.
- C. Extend boards over expansion joints, unbonded to foundation on one side of joint.
- D. Cut and fit insulation tightly to protrusions or interruptions to the insulation plane.
- E. Immediately following application of board insulation, place protective boards over exposed insulation surfaces.

### **3.03 BOARD INSTALLATION AT EXTERIOR WALLS**

- A. Adhere a 6 inch (150 mm) wide strip of polyethylene sheet over expansion joints with double beads of adhesive each side of joint.
  - 1. Tape seal joints between sheets.
  - 2. Extend sheet full height of joint.
- B. Install rigid insulation directly to steel studs or exterior grade sheathing at 16 inches (406 mm) on center with manufacturer recommended mechanical fasteners. Tape all joints with manufacturer's minimum 4 inch (102 mm) wide sealant tape; comply with ASTM E2357.
- C. Install boards horizontally on walls.
- D. Cut and fit insulation tightly to protrusions or interruptions to the insulation plane.

### **3.04 BOARD INSTALLATION UNDER CONCRETE SLABS**

- A. Place insulation under slabs on grade after base for slab has been compacted.
- B. Cut and fit insulation tightly to protrusions or interruptions to the insulation plane.
- C. Prevent insulation from being displaced or damaged while placing vapor retarder and placing slab.

### **3.05 BOARD INSTALLATION OVER LOW SLOPE ROOF DECK**

- A. Board Installation Over Roof Deck, General:
  - 1. See applicable roofing specification section for specific board installation requirements.
  - 2. Fasten insulation to deck in accordance with roofing manufacturer's written instructions and applicable Factory Mutual requirements.
  - 3. Do not apply more insulation than can be covered with roofing in same day.

### **3.06 BATT INSTALLATION**

- A. Install insulation and vapor retarder in accordance with manufacturer's instructions.
- B. Install in exterior wall and roof spaces without gaps or voids. Do not compress insulation.
- C. Trim insulation neatly to fit spaces. Insulate miscellaneous gaps and voids.
- D. Fit insulation tightly in cavities and tightly to exterior side of mechanical and electrical services within the plane of the insulation.
- E. Install with factory applied vapor retarder membrane facing warm side of building spaces. Lap ends and side flanges of membrane over framing members.
- F. Tape insulation batts in place.
- G. Tape seal butt ends, lapped flanges, and tears or cuts in membrane.
- H. At metal framing, place vapor retarder on warm side of insulation; lap and seal sheet retarder joints over member face.
- I. Tape seal tears or cuts in vapor retarder.
- J. Extend vapor retarder tightly to full perimeter of adjacent window and door frames and other items interrupting the plane of the membrane. Tape seal in place.
- K. Coordinate work of this section with requirements for vapor retarder specified in Section 07 2500.
- L. Coordinate work of this section with construction of air barrier seal specified in Section 07 2500.

**END OF SECTION**

**SECTION 07 2119**  
**FOAMED-IN-PLACE INSULATION**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Foamed-in-place insulation.
  - 1. In exterior framed walls.
  - 2. In exterior wall crevices.
  - 3. At junctions of dissimilar wall and roof materials.
- B. Foamed-in-place insulation at exterior wall crevices requiring a thermal seal.

**1.02 RELATED SECTIONS**

- A. Section 05400 Cold Formed Metal Framing
- B. Section 09260 Gypsum Board Assemblies

**1.03 REFERENCE STANDARDS**

- A. ASTM C1029 - Standard Specification for Spray-Applied Rigid Cellular Polyurethane Thermal Insulation; 2009.

**1.04 SUBMITTALS**

- A. Product Data: Provide product description, insulation properties, and preparation requirements.
- B. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention

**1.05 REGULATORY REQUIREMENTS**

- A. Conform to IBC 2003 Edition for flame and smoke limitations.

**1.06 PRE-INSTALLATION MEETING**

- A. Convene one week prior to commencing work of this section.

**1.07 PROJECT CONDITIONS**

- A. Sequence work to ensure timely placement of insulation within construction spaces.

**1.08 FIELD CONDITIONS**

- A. Do not install insulation when ambient temperature is lower than 70 degrees F (21 degrees C).

**PART 2 PRODUCTS**

**2.01 MANUFACTURERS**

- A. Foamed-In-Place Insulation:
  - 1. Dow Chemical
  - 2. Substitutions: See Section 01 6000 - Product Requirements.

**2.02 MATERIALS**

- A. Insulation: ASTM C 1149-90, Type II, dry treayed fire-resistant cellulose fiber insulation.

**PART 3 EXECUTION**

**3.01 EXAMINATION**

- A. Verify work within construction spaces or crevices is complete prior to insulation application.
- B. Verify that surfaces are clean, dry, and free of matter that may inhibit insulation adhesion.

**3.02 PREPARATION**

- A. Mask and protect adjacent surfaces from over spray or dusting.

**3.03 APPLICATION**

- A. Apply insulation in accordance with manufacturer's instructions.

### **3.04 PROTECTION**

- A. Do not permit subsequent construction work to disturb applied insulation.

**END OF SECTION**

**SECTION 07 2120**  
**POLYISOCYANURATE INSULATION**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Rigid board type roof insulation for thermal protection as part of roofing assemblies.

**1.02 RELATED SECTIONS**

- A. Section 05 3100 - Steel Decking.
- B. Section 07411 - Standing Seam Metal Roof Panels.
- C. Section 07550 - Modified Bituminous Membrane Roofing.

**1.03 REFERENCES**

- A. ASTM C 1289 - Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board; 2003.
- B. ASTM E 108 - Standard Test Methods for Fire Tests of Roof Coverings; 2000.
- C. ASTM E 119 - Standard Test Methods for Fire Tests of Building Construction and Materials; 2000a.
- D. FM 4450 - Class I Insulated Steel Roof Decks; 1989.
- E. FM P7825 - Approval Guide; current edition.
- F. PIMA 101 - Technical Bulletin No.101, Roof Insulation Specimen Conditioning Procedure; Polyisocyanurate Insulation Manufacturers Association; 2004.
- G. UL 263 - Fire Tests of Building Construction and Materials; 2003.
- H. UL 790 - Standard for Standard Test Methods for Fire Tests of Roof Coverings; 2004.
- I. UL 1256 - Fire Test of Roof Deck Constructions; 2002.

**1.04 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Manufacturer's specifications and installation instructions for insulation board and fasteners.
- C. Samples:
  - 1. Submit 6 inch by 6 inch (152 by 152 mm) samples of each board type required.
  - 2. Submit samples of each fastener type required.
- D. Shop Drawings: Roof plan showing layout of boards and fastening patterns.
- E. Certificates: Manufacturer's certification that materials meet specification requirements.
- F. Warranty: Submit sample warranty indicating conditions and limitations.

**1.05 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver insulation in packages labeled with material name, thermal value, and product code.
- B. When stored outdoors, stack insulation on pallets above ground or roof deck, slit or remove packaging, and cover with tarpaulin or other suitable waterproof coverings.

**1.06 PROJECT CONDITIONS**

- A. Comply with insurance underwriter's requirements applicable for products of this Section.
- B. Do not install insulation on roof deck when water of any type is present. Do not apply roofing materials when substrate is damp or wet or when proper adhesive temperature cannot be maintained.

**PART 2 PRODUCTS**

**2.01 MANUFACTURERS**

- A. Manufacturers:

1. Dow Chemical Co: [www.dow.com](http://www.dow.com).
- B. Substitutions: See Section 01 6000 - Product Requirements.
- C. Provide all roof board insulation from a single manufacturer.

## **2.02 MATERIALS**

- A. Glass Fiber-Faced Foam Roof Insulation at Membrane Roofing : ACFoam-III; Closed-cell polyisocyanurate foam core with ACUltra non-HCFC hydrocarbon blowing agent, integrally laminated to heavy coated glass fiber facers; conform to ASTM C 1289, Type II; UL 790 (ASTM E 108), Class A; FM 4450/4470, Class 1 fire rating.
  1. FM wind uplift classification: 1-90.
  2. Provide layers with staggered joints as required to achieve R Value of 25.
  3. Thickness: as required to achieve average R Value of 25.
- B. Tapered Foam Roof Insulation at Membrane Roofing: Tapered ACFoam; Closed-cell polyisocyanurate foam core with ACUltra non-HCFC hydrocarbon blowing agent, integrally laminated to heavy non-asphaltic fiber reinforced felt facers; conform to ASTM C 1289, Type II; UL 1256, No. 120 and 123; UL 790 (ASTM E 108), Class A; UL 263 (ASTM E 119); FM 4450/4470, Class 1 fire rating.
  1. FM wind uplift classification: 1-90.
  2. Provide one layer to achieve roof slopes indicated on Drawings.
  3. Thickness: As required to achieve roof slopes indicated on Drawings.
  4. Tapered insulation to be installed at Roof Crickets Only
- C. Nail Base Foam Roof Insulation at Standing Seam Metal Roof: ACFoam Nail Base; Closed-cell polyisocyanurate foam board with HCFC blowing agent, bonded to 7/16 inch (11.1 mm) thick APA rated OSB on the top side; conform to ASTM C 1289, Type V; UL 1256, No. 120 and 123; UL 790 (ASTM E 108); UL 263 (ASTM E 119); FM Standard 4450/4470 approval, Class 1 fire rating.
  1. FM Wind Uplift Classification: 1-90.
  2. Thickness: 4 1.2 inch.
- D. Insulation R Value: Minimum 25 when conditioned according to PIMA Technical Bulletin No. 101.

## **2.03 RELATED MATERIALS**

- A. Fasteners: Factory Mutual approved and as required by insulation manufacturer.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Examine roof deck for suitability to receive insulation. Verify that substrate is dry, clean, and free of foreign material that will damage insulation or impeded installation.
- B. Verify that roof drains, scuppers, roof curbs, nailers, equipment supports, vents, and other roof accessories, are secured properly and installed in conformance with drawings and submittals.
- C. Verify that deck is structurally sound to support installers, materials, and equipment without damaging or deforming work.
  1. Start of installation indicates installer accepts conditions of existing deck surfaces.

### **3.02 INSTALLATION**

- A. Install specified insulation in accordance with manufacturer's latest printed instructions and as required by governing codes and owner's insurance carrier.
  1. Use mechanical fasteners to secure insulation.
- B. Install with end joints staggered; avoid having insulation joints coinciding with joints in deck.
- C. In multi-layer installations, stagger joints in top and bottom layers.

### **3.03 CLEANING/PROTECTION**

- A. Remove trash and construction debris from insulation before application of roofing membrane.

- B. Do not leave installed insulation exposed to weather. Cover and waterproof immediately after installation.
  - 1. Temporarily seal exposed insulation edges at the end of each day by lapping roofing membrane over edge to form a seal.
  - 2. Remove membrane seal when work resumes.
  - 3. Remove installed insulation that has become wet or damaged and replace with new solid and dry insulation material.
- C. Protect installed insulation and roof membrane from traffic by use of protective covering materials during and after installation.

**END OF SECTION**

**SECTION 07 2400**  
**EXTERIOR INSULATION AND FINISH SYSTEMS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Composite wall and soffit cladding of rigid insulation and reinforced finish coating ("Class PB").
- B. Incidental uses of same finish coating applied directly to concrete and masonry.

**1.02 RELATED REQUIREMENTS**

- A. Section 05 4000 - Cold-Formed Metal Framing: Sheathing on metal studs.
- B. Section 06 1000 - Rough Carpentry: Sheathing on wood framing.
- C. Section 07 6200 - Sheet Metal Flashing and Trim: Perimeter flashings.
- D. Section 07 9005 - Joint Sealers: Perimeter and penetration sealants.

**1.03 REFERENCE STANDARDS**

- A. ASTM B117 - Standard Practice for Operating Salt Spray (Fog) Apparatus; 2011.
- B. ASTM C297/C297M - Standard Test Method for Flatwise Tensile Strength of Sandwich Constructions; 2015.
- C. ASTM C578 - Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation; 2017a.
- D. ASTM C1063 - Standard Specification for Installation of Lathing and Furring to Receive Interior and Exterior Portland Cement-Based Plaster; 2015a.
- E. ASTM C1397 - Standard Practice for Application of Class PB Exterior Insulation and Finish Systems (EIFS) and EIFS with Drainage; 2013.
- F. ASTM D968 - Standard Test Methods for Abrasion Resistance of Organic Coatings by Falling Abrasive; 2005 (Reapproved 2010).
- G. ASTM D2247 - Standard Practice for Testing Water Resistance of Coatings in 100% Relative Humidity; 2011.
- H. ASTM D3273 - Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber; 2012.
- I. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2017.
- J. ASTM E331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference; 2000 (Reapproved 2016).
- K. ASTM E2273 - Standard Test Method for Determining the Drainage Efficiency of Exterior Insulation and Finish Systems (EIFS) Clad Wall Assemblies; 2003 (reapproved 2011).
- L. ASTM G153 - Standard Practice for Operating Enclosed Carbon Arc Light Apparatus for Exposure of Nonmetallic Materials; 2013.
- M. ASTM G155 - Standard Practice for Operating Xenon Arc Light Apparatus for Exposure of Nonmetallic Materials; 2013.
- N. ICC-ES AC219 - Acceptance Criteria for Exterior Insulation and Finish Systems; 2009.
- O. NFPA 259 - Standard Test Method for Potential Heat of Building Materials; 2013.
- P. NFPA 268 - Standard Test Method for Determining Ignitibility of Exterior Wall Assemblies Using a Radiant Heat Energy Source; 2012.
- Q. NFPA 285 - Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Non-Load-Bearing Wall Assemblies Containing Combustible Components; 2012.

**1.04 SUBMITTALS**

- A. Shop Drawings: Indicate wall and soffit joint patterns, joint details, and molding profiles.



- B. Product Data: Provide data on system materials, product characteristics, performance criteria, and system limitations.
- C. Selection Samples: Submit manufacturer's standard range of samples illustrating available coating colors and textures.
- D. Manufacturer's Installation Instructions: Indicate preparation required, installation techniques, and jointing requirements.

#### **1.05 QUALITY ASSURANCE**

- A. Maintain copy of specified installation standard and manufacturer's installation instructions at project site at all times during installation.
- B. EIFS Manufacturer Qualifications: Provide all EIFS products other than insulation from the same manufacturer with qualifications as follows:
  - 1. Member in good standing of EIMA (EIFS Industry Members Association).
  - 2. Manufacturer of EIFS products for not less than 5 years.
- C. Insulation Manufacturer Qualifications: Approved by manufacturer of EIFS and approved and labeled under third party quality program as required by applicable building code.
- D. Installer Qualifications: Company specializing in EIFS work, with not less than 10 years of documented experience, and approved by the EIFS manufacturer.

#### **1.06 MOCK-UP**

- A. Construct mock-up of typical EIFS application on specified substrate, size as indicated on drawings, and including flashings, joints, and edge conditions.
- B. Locate mock-up as indicated on drawings.

#### **1.07 DELIVERY, STORAGE, AND HANDLING**

- A. Delivery: Deliver materials to project site in manufacturer's original, unopened containers with labels intact. Inspect materials and notify manufacturer of any discrepancies.
- B. Storage: Store materials as directed by manufacturer's written instructions.
  - 1. Protect adhesives and finish materials from freezing, temperatures below 40 degrees F (4 degrees C) and temperatures in excess of 90 degrees F (32 degrees C).
  - 2. Protect Portland cement based materials from moisture and humidity. Store under cover off the ground in a dry location.
  - 3. Protect insulation materials from exposure to sunlight.

#### **1.08 FIELD CONDITIONS**

- A. Do not prepare materials or apply EIFS under conditions other than those described in the manufacturer's written instructions.
- B. Do not prepare materials or apply EIFS during inclement weather unless areas of installation are protected. Protect installed EIFS areas from inclement weather until dry.
- C. Do not install coatings or sealants when ambient temperature is below 40 degrees F (5 degrees C).
- D. Do not leave installed insulation board exposed to sunlight for extended periods of time.

#### **1.09 WARRANTY**

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Provide manufacturer's standard material warranty, covering a period of not less than 5 years.

### **PART 2 PRODUCTS**

#### **2.01 MANUFACTURERS**

- A. Acceptable Manufacturers:
  - 1. Basis of Design: Dryvit Systems, Inc; Dryvit Outsulation Plus MD Exterior Insulation and Finish System, Class PB with Moisture Drainage: [www.dryvit.com](http://www.dryvit.com).
  - 2. Substitutions: See Section 01 6000 - Product Requirements.

## 2.02 EXTERIOR INSULATION AND FINISH SYSTEM

- A. Exterior Insulation and Finish System: DRAINAGE type; reinforced finish coating on insulation board with drainage grooves adhesive-applied to water-resistive coating over substrate; provide a complete system that has been tested to show compliance with the following characteristics; include all components of specified system and substrate(s) in tested samples.
- B. Exterior Insulation and Finish System: BARRIER type; reinforced finish coating on insulation board adhesive-applied direct to substrate; provide a complete system that has been tested to show compliance with the following characteristics; include all components of specified system and substrate in tested samples.
- C. Allowable wind loading shall conform with all applicable code requirements.
- D. Fire Characteristics:
  - 1. Flammability: Pass, when tested in accordance with NFPA 285.
  - 2. Ignitibility: No sustained flaming when tested in accordance with NFPA 268.
  - 3. Potential Heat of Foam Plastic Insulation Tested Independently of Assembly: No portion of the assembly having potential heat that exceeds that of the insulation sample tested for flammability (above), when tested in accordance with NFPA 259 with results expressed in Btu per square foot (mJ/sq m).
- E. Adhesion of Water-Resistive Coating to Substrate: For each combination of coating and substrate, minimum flatwise tensile bond strength of 15 psi (105 kPa), when tested in accordance with ASTM C297/C297M.
- F. Adhesion to Water-Resistive Coating: For each combination of insulation board and substrate, when tested in accordance with ASTM C297/C297M, maximum adhesive failure of 25 percent unless flatwise tensile bond strength exceeds 15 psi (105 kPa) in all samples.
- G. Water Penetration Resistance: No water penetration beyond the plane of the base coat/insulation board interface after 15 minutes, when tested in accordance with ASTM E331 at 6.24 psf (299 Pa) differential pressure with tracer dye in the water spray; include in tested sample at least two vertical joints and one horizontal joint of same type to be used in construction; disassemble sample if necessary to determine extent of water penetration.
- H. Salt Spray Resistance: No cracking, checking, crazing, erosion, blistering, peeling, delamination, or corrosion of finish coating after 300 hours exposure in accordance with ASTM B117, using at least three samples matching intended assembly, at least 4 by 6 inches (100 by 150 mm ) in size.
- I. Freeze-Thaw Resistance: No cracking, checking, crazing, erosion, blistering, peeling, delamination, or corrosion of finish coating when viewed under 5x magnification after 10 cycles, when tested in accordance with ICC-ES AC 219 or 235.
- J. Weathering Resistance: No cracking, checking, crazing, erosion, blistering, peeling, delamination, or corrosion of finish coating when viewed under 5x magnification after 2000 hours of accelerated weathering conducted in accordance with ASTM G153 Cycle 1 or ASTM G155 Cycle 1, 5, or 9.
- K. Water Degradation Resistance: No cracking, checking, crazing, erosion, blistering, peeling, delamination, or corrosion of finish coating after 14 days exposure, when tested in accordance with ASTM D2247.
- L. Mildew Resistance: No growth supported on finish coating during 28 day exposure period, when tested in accordance with ASTM D3273.
- M. Abrasion Resistance Of Finish: No cracking, checking or loss of film integrity when tested in accordance with ASTM D968 with 500 liters of sand.

## 2.03 MATERIALS

- A. Base Coat: Fiber-reinforced, acrylic or polymer-based product compatible with insulation board and reinforcing mesh.

- B. Insulation Board: Molded, expanded polystyrene board; ASTM C578, Type I; with the following characteristics:
  - 1. Grooved Board: Back side of board adjacent to sheathing grooved with vertical channels designed to allow moisture to drain; at drainage points provide board configuration that permits drainage to the exterior.
  - 2. Board Size: 24 by 48 inches (610 by 1220 mm).
  - 3. Board Size Tolerance: plus/minus 1/16 inch (1.5 mm) from square and dimension.
  - 4. Board Edges: Square.
  - 5. Thermal Resistance (R factor per 1 in (25.4 mm)) at 75 degrees F (24 degrees C): 3.60 (0.63).
  - 6. Board Density: 0.9 lb/cu ft (15 kg/cu m).
  - 7. Compressive Resistance: 10 psi (69 kPa).
  - 8. Surface Burning Characteristics: Flame spread/Smoke developed index of 25/450, when tested in accordance with ASTM E84.

#### **2.04 ACCESSORY MATERIALS**

- A. Insulation Adhesive: Type required by EIFS manufacturer for project substrate.
- B. Metal Flashings: As specified in Section 07 6200.
- C. Trim: EIFS manufacturer's standard PVC or galvanized steel trim accessories, as required for a complete project and including starter track and drainage accessories.
- D. Sealant Materials: As recommended by EIFS manufacturer.

### **PART 3 EXECUTION**

#### **3.01 GENERAL**

- A. Install in accordance with EIFS manufacturer's instructions and ASTM C1397.
- B. Where different requirements appear in either document, comply with the most stringent.
- C. Neither of these documents supercedes the provisions of the Contract Documents that define the contractual relationships between the parties or the scope of work.

#### **3.02 EXAMINATION**

- A. Verify that substrate is sound and free of oil, dirt, other surface contaminants, efflorescence, loose materials, or protrusions that could interfere with EIFS installation and is of a type and construction that is acceptable to EIFS manufacturer. Do not begin work until substrate and adjacent materials are complete and thoroughly dry.
- B. Verify that substrate surface is flat, with no deviation greater than 1/4 in (6 mm) when tested with a 10 ft (3 m) straightedge.

#### **3.03 PREPARATION**

- A. Install self-furring metal lath over solid substrates that are deemed unacceptable to receive adhesively applied insulation. Install in accordance with ASTM C1063, except for butt-lapping instead of overlapping..
  - 1. Attach to concrete and concrete masonry using corrosion-resistant power or powder actuated fasteners or hardened concrete stub nails not less than 3/4 inch (19 mm) long and with heads not less than 3/8 inch (9.5 mm) wide. Ensure that fasteners are securely attached to substrate and spaced at maximum 16 inches (406 mm) on center horizontally and 7 inches (178 mm) vertically.

#### **3.04 INSTALLATION - INSULATION**

- A. Install in accordance with manufacturer's instructions.
- B. Prior to installation of boards, install starter track and other trim level and plumb and securely fastened. Install only in full lengths, to minimize moisture intrusion; cut horizontal trim tight to vertical trim.
- C. Install back wrap reinforcing mesh at all openings and terminations that are not to be protected with trim.

- D. On wall surfaces, install boards horizontally. On horizontal surfaces, install boards \_\_\_\_\_.
- E. Place boards in a method to maximize tight joints. Stagger vertical joints and interlock at corners. Butt edges and ends tight to adjacent board and to protrusions. Achieve a continuous flush insulation surface, with no gaps in excess of 1/16 inch (1.6 mm).
- F. Fill gaps greater than 1/16 inch (1.6 mm) with strips or shims cut from the same insulation material.
- G. Rasp irregularities off surface of installed insulation board.
- H. Adhesive Attachment: Use method recommended by EIFS manufacturer.

### **3.05 INSTALLATION - FINISH**

- A. Base Coat: Apply in thickness as necessary to fully embed reinforcing mesh, wrinkle free, including back-wrap at all terminations of the EIFS. Install reinforcing fabric as recommended by EIFS manufacturer.
  - 1. Lap reinforcing mesh edges and ends a minimum of 2-1/2 inches (64 mm).
  - 2. Allow base coat to dry a minimum of 24 hours before next coating application.
- B. Apply finish coat after base coat has dried not less than 24 hours, embed finish aggregate, and finish to a uniform texture and color.
- C. Finish Coat Thickness: As recommended by manufacturer.
- D. Apply sealant at finish perimeter and expansion joints in accordance with Section 07 9005.

### **3.06 CLEANING**

- A. Clean EIFS surfaces and work areas of foreign materials resulting from EIFS operations.

### **3.07 PROTECTION**

- A. Protect completed work from damage and soiling by subsequent work.

**END OF SECTION**

## SECTION 07 2510

### FLUID APPLIED VAPOR PERMEABLE AIR BARRIER MEMBRANE

#### PART 1 GENERAL

##### 1.01 GENERAL REQUIREMENTS

- A. This Specification shall be read as a whole by all parties concerned. Each Section may contain more or less than the complete Work of any trade. The Contractor is solely responsible to make clear to the Subcontractors the extent of their Work.

##### 1.02 DESCRIPTION

- A. Supply labor, materials and equipment to complete the Work as shown on the Drawings and as specified herein to bridge and seal the following air leakage pathways and gaps:
  - 1. Connections of the walls to the roof air barrier.
  - 2. Connections of the walls to the foundations.
  - 3. Expansion joints.
  - 4. Openings and penetrations of window and door frames, store front, curtain wall.
  - 5. Piping, conduit, duct and similar penetrations.
  - 6. Masonry ties, screws, bolts and similar penetrations.
  - 7. All other air leakage pathways in the building envelope.
- B. Materials and installation methods of the primary vapor permeable air barrier membrane system and accessories.
- C. Materials and installation methods of through-wall flashing membranes.

##### 1.03 RELATED SECTIONS

- A. 033000 Cast In Place Concrete
- B. 044301 Exterior and Interior Stone Masonry Veneer
- C. 054000 Cold Formed Metal Framing
- D. 072400 Exterior Insulation and Finish Systems
- E. 079000 Joint Sealers
- F. 081113 Hollow Metal Doors and Frames
- G. 084233 Revolving Door Entrances
- H. 084300 Aluminum Storefront Entrances
- I. 084310 Aluminum Storefront Window Systems
- J. 084400 Glazed Aluminum Curtain Wall Systems
- K. 084410 Glazed Aluminum Curtain Wall Windows
- L. 092116 Gypsum Board Assemblies

##### 1.04 REFERENCES

- A. The following standards are applicable to this section:
  - 1. ASTM E2357: Standard Test Method for Determining Air Leakage of Air Barrier Assemblies.
  - 2. ASTM E2178: Standard Test Method for Air Permeance of Building Materials.
  - 3. ASTM E283: Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.
  - 4. ASTM E1677 Specification for Air Retarder (AR) Material or System for Low-Rise Framed Building Walls  
<[http://www.astm.org/cgi-bin/SoftCart.exe/DATABASE.CART/REDLINE\\_PAGES/E1677.htm?L+mystore+sxjz0304+1186523598](http://www.astm.org/cgi-bin/SoftCart.exe/DATABASE.CART/REDLINE_PAGES/E1677.htm?L+mystore+sxjz0304+1186523598)>.
  - 5. ASTM E330: Standard Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.

6. ASTM E331: Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference.
7. ASTM E96: Water Vapor Transmission of Materials.
8. CGSB 37-GP-56M: Membrane, Modified, Bituminous, Prefabricated, and Reinforced.
9. AMMA 2400: Standard Practice for Installation of Windows with a Mounting Flange in Stud Frame Construction.
10. ASTM E 2112: Standard Practice for Installation of Exterior Windows, Doors and Skylights.
11. ASTM D 5590: Standard Test Method for Determining the Resistance of Paint Films and Related Coatings to Fungal Defacement by Accelerated Four-Week Agar Plate Assay

#### **1.05 SUBMITTALS**

- A. Submit documentation from an approved independent testing laboratory certifying the air leakage and vapor permeance rates of the air barrier membranes, including primary membrane and transition sheets, exceed the requirements of the Massachusetts Energy Code and in accordance with ASTM E2178.
  1. Test report submittals shall include test results on porous substrate and include sustained wind load and gust load air leakage results.
- B. Submit manufacturers' current product data sheets for the air barrier membrane system.

#### **1.06 QUALITY ASSURANCE**

- A. Submit document stating the applicator of the primary air barrier membranes specified in this section is qualified by the manufacturer as suitable for the execution of the Work.
- B. Perform Work in accordance with manufacturer's written instructions and this specification.
- C. Maintain one copy of manufacturer's written instructions on site.
- D. Allow access to Work site by the air barrier membrane manufacturer's representative.
- E. Components used shall be sourced from one manufacturer, including sheet membrane, air barrier sealants, primers, mastics, and adhesives.
- F. Single-Source Responsibility:
  1. Obtain air barrier materials from a single manufacturer regularly engaged in manufacturing the product.
  2. Provide products which comply with all federal, state and local regulations controlling use of volatile organic compounds (VOCs).

#### **1.07 MOCK-UP**

- A. CONSTRUCT MOCK-UP.
- B. Where directed by [engineer] [architect] [consultant], construct typical exterior wall panel, 6 foot long by 6 foot wide, incorporating substrate, window frame, attachment of insulation and showing air barrier membrane application details.
- C. Allow 48 hours for inspection of mock-up by [engineer] [architect] [consultant] before proceeding with air barrier work. Mock-up may remain as part of the Work.
- D. Test mock-up for air and water infiltration to conform with Section 01400 - Quality Control, in accordance with ASTM E783 and ASTM E1105.

#### **1.08 DELIVERY, STORAGE AND HANDLING**

- A. Refer to current Product MSDS for proper storage and handling.
- B. Deliver materials to the job site in undamaged and original packaging indicating the name of the manufacturer and product.
- C. Store role materials on end in original packaging. Protect rolls from direct sunlight until ready for use.
- D. Store air barrier membranes, adhesives and primers at temperatures of 40 degrees F and rising.

- E. Keep solvent away from open flame or excessive heat.

### **1.09 CO-ORDINATION**

- A. Ensure continuity of the air barrier throughout the scope of this section.

### **1.10 ALTERNATES**

- A. Alternate submission to include:
  1. Evidence that alternate materials meet or exceed performance characteristics of Product requirements as well as documentation from an approved independent testing laboratory certifying the air leakage rates and vapor permeance rates of the air barrier membranes, including primary membrane and transition sheets, exceed the requirements of the Massachusetts Energy Code and in accordance with ASTM E2178 and has no fungal growth as tested to ASTM D 5590.
  2. Copies of the manufacturer's current ISO certification
  3. Ten (10) references clearly indicating the membrane manufacturer has successfully completed projects of similar scope and nature for a minimum of ten (10) years
  4. Manufacturer's complete set of details for air barrier membrane system showing a continuous plane of air tightness throughout the building envelope.
- B. Acceptable alternates will be confirmed by addendum. Substitute materials not approved in writing prior to bid date shall not be permitted for use on this project.

### **1.11 WARRANTY**

- A. Provide manufacturer's standard 10-year material warranty.

## **PART 2 - PRODUCTS**

### **2.01 MATERIALS**

- A. Air barrier membrane components and accessories must be obtained as a single-source from the membrane manufacturer to ensure total system compatibility and integrity.
- B. Acceptable Manufacturer: Henry Company.
  1. 909 N Sepulveda Blvd, Suite 650
  2. El Segundo, CA 90245
  3. (800) 598 7663
  4. Web Site: [www.Henry.com](http://www.Henry.com) <<http://www.bakor.com>>

### **2.02 MEMBRANES (BASIS-OF-DESIGN)**

- A. Primary air and rain barrier membrane for temperatures above 40 degrees F and rising shall be Air-Bloc 33 MR manufactured by Henry; a UV resistant one component water based elastomeric emulsion membrane, fire resistant and designed for permanent exposure, trowel or spray applied, having the following characteristics:
  1. Air permeability: 0.0016 CFM/ft<sup>2</sup> @ 1.6 lbs/ft<sup>2</sup> to ASTM E2178 and ASTM E283 and have no increased air leakage when subjected to a sustained wind load of 10.5 lbs/ft<sup>2</sup> for 1 hour and gust wind load pressure of 62.8 lbs/ft<sup>2</sup> for 10 seconds when tested at 1.6 lbs/ft<sup>2</sup> to ASTM E331
  2. Water vapor permeance: 11.6 perms to ASTM E96 Method B when tested at 58 mils dry film thickness.
  3. Rating 0 - No fungal growth as tested to ASTM D 5590
  4. Surface Burning: NFPA Class A, UBC Class 1, Flame Spread 25, Smoke Developed 85 to ASTM E84
  5. UV Resistance: Passes 73 Cycles to ASTM D4799 Cycle B (Q-UV)
  6. Low temperature flexibility and crack bridging: Pass -4 degrees F to ASTM C836
  7. Long term flexibility: Pass to CGSB 71-GP-24M
  8. Watertightness (CGSB 37-GP-56M): Pass
- B. Self-adhering vapor permeable air barrier membrane for head and jamb of wood frame windows, transition and joint treatment shall be Blueskin<sup>®</sup> Breather manufactured by Henry; a self-adhering membrane consisting of a microporous film laminate, backed with a specially

applied adhesive, which allows water vapor to permeate through while acting as a barrier to air and rain water. Membrane shall have the following physical properties:

1. Air leakage: <0.002 CFM/ft<sup>2</sup> @ 1.6 lbs/ft<sup>2</sup> to ASTM E283-91
  2. Water vapor permeance: 37 perms to ASTM E96
  3. Membrane Thickness: 17 mils
  4. Low temperature flexibility -40 degrees F: Pass to ASTM D3111
  5. Hydrostatic Water Resistance: 18 psi ASTM D751 Procedure A
- C. Alternate UV Resistant self-adhering membrane for all window and window sill flashings, door openings, inside and outside corners and other transitions shall be Foilskin or HE200 AM Metal Clad Weather Barrier manufactured by Henry; a UV resistant SBS modified bitumen, self-adhering sheet membrane complete with surface layer of metallic aluminum film. Membrane shall have the following physical:
1. Peel Adhesion to Primed Steel 15.0 to ASTM D 1000
  2. Vapor permeance: < 0.05 perms to ASTM E 96
  3. Membrane Thickness: 0.0443 inches (40 mils)
  4. Low temperature flexibility: -15 degrees F to ASTM D146 min
  5. Elongation: 40% to ASTM D412-modified min
- D. Alternate joint treatment: HE 183 yellow open weave glass fabric or approved equal.
- E. Through-wall flashing membrane (Self-Adhering) shall be Blueskin<sup>®</sup> TWF manufactured by Henry; an SBS modified bitumen, self-adhering sheet membrane complete with a cross-laminated polyethylene film, having the following physical properties:
1. Membrane Thickness: 0.0394 inches (40 mils)
  2. Film Thickness: 4.0 mils
  3. Flow (ASTM D5147): Pass @ 212 degrees F
  4. Puncture Resistance: 134 lbf to ASTM E154
  5. Tensile Strength (film): 5723 psi ASTM D882
  6. Tear Resistance: 13lbs. MD to ASTM D1004
  7. Low temperature flexibility: -22 degrees F to CGSB 37-GP-56M

### 2.03 ADHESIVES AND PRIMERS

- A. Primer for self-adhering membranes at temperatures above 25 degrees F shall be Aquatac<sup>®</sup> Primer manufactured by Henry; a polymer emulsion based adhesive, quick setting, having the following physical properties:
- B. Color: Aqua
1. Weight: 8.7 lbs/gal
  2. Solids by weight: 53%
  3. Water based, no solvent odors, low VOC
  4. Drying time (initial set): 30 minutes at 50% RH and 70 degrees F
- C. Adhesive for self-adhering membranes at all temperatures shall be Blueskin<sup>®</sup> Adhesive manufactured by Henry, a synthetic rubber based adhesive, quick setting, having the following physical properties:
1. Color: Blue,
  2. Weight: 6 lbs/gal,
  3. Solids by weight: 35%,
  4. Drying time (initial set): 30 minutes.
- D. Adhesive with low VOC content for self-adhering membranes at all temperatures shall be Blueskin<sup>®</sup> LVC Adhesive manufactured by Henry, a synthetic rubber based adhesive, quick setting, having the following physical properties:
1. Color: Blue,
    - a. VOC: <240 g/L,
      - 1) Solids by weight: 40%,
      - 2) Drying time (initial set): 30 minutes.



## **2.04 PENETRATION & TERMINATION SEALANT**

- A. Termination Sealant shall be HE925 BES Sealant manufactured by Henry; a moisture cure, medium modulus polymer modified sealing compound having the following physical properties:
  - 1. Compatible with sheet air barrier, roofing and waterproofing membranes and substrate,
  - 2. Complies with Fed. Spec. TT-S-00230C, Type II, Class A
  - 3. Complies with ASTM C 920, Type S, Grade NS, Class 25
  - 4. Elongation: 450 - 550%
  - 5. Remains flexible with aging
  - 6. Seals construction joints up to 1 inch wide

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that surfaces and conditions are ready to accept the Work of this section. Notify [engineer] [architect] [consultant] in writing of any discrepancies. Commencement of the Work or any parts thereof shall mean acceptance of the prepared substrates.
- B. All surfaces must be sound, dry, clean and free of oil, grease, dirt, excess mortar or other contaminants. Fill voids, gaps and spalled areas in substrate to provide an even plane. Strike masonry joints flush.
- C. Where curing compounds are used they must be clear resin based without oil, wax or pigments.
- D. Do not proceed with application of air barrier membrane when rain is expected within 24 hours.
- E. Condition materials to room temperature prior to application to facilitate handling.

### **3.02 SURFACE PREPARATION**

- A. Water Based Elastomeric Emulsion Air Barrier Membrane: liquid applied water based air barrier membrane may be applied to green concrete 16 hours after forms are removed.
- B. Ensure all preparatory Work is complete prior to applying primary air barrier membrane.
- C. Mechanical fasteners used to secure sheathing boards or penetrate sheathing boards shall be set flush with sheathing and fastened into solid backing.

### **3.03 INSTALLTION OF AIR BARRIER SYSTEM**

#### **A. JOINT TREATMENT**

- 1. Seal joints  $\frac{1}{4}$  inch and less between panels of exterior grade gypsum, DensGlass Gold, plywood, OSB or cementitious panels with joint treatment sealant.
  - a. Fill joint between sheathing with approved joint treatment sealant ensuring contact with all edges of sheathing board. Strike flush any excess sealant over joint layer to form a continuous layer over the joint.
- 2. Seal gaps and voids or irregular joints greater than  $\frac{1}{4}$  inch between panels of exterior grade gypsum, DensGlass Gold, plywood, OSB or cementitious panels with a strip of self-adhered air/vapor barrier transition membrane lapped a minimum of 1 1/2 inches on both sides of the joint.
  - a. Prime surfaces as per manufacturers' instructions and allow to dry.
  - b. Align and position self-adhering air/vapor barrier transition membrane, remove protective film and press firmly into place. Ensure minimum 2 inches overlap at all end and side laps of membrane.
  - c. Roll all laps and membrane with a counter top roller to ensure seal.
- 3. Alternately, joints not exceeding 1/8 inch can be sealed with yellow open weave glass fabric.
  - a. Apply yellow open weave glass fabric centered over joint followed by a 1/8 inch (120mils) thick trowel application of air/vapor barrier membrane.
    - 1) Allow to dry prior to application of primary vapor permeable air barrier membrane.

#### **B. INSIDE AND OUTSIDE CORNERS**

1. Seal inside and outside corners of sheathing boards with a strip of self-adhering transition membrane extending a minimum of 3 inches on either side of the corner detail.
    - a. Prime surfaces as per manufacturers' instructions and allow to dry.
    - b. Align and position self-adhering transition membrane, remove protective film and press firmly into place. Ensure minimum 2 inches overlap at all end and side laps of membrane.
    - c. Roll all laps and membrane with a counter top roller to ensure seal.
- C. CRACK TREATMENT - MASONRY AND CONCRETE
1. Seal cracks over 1/16 inches in masonry and concrete with a strip of self-adhering transition membrane lapped a minimum of 1 1/2 inches on both sides of the crack.
    - a. Prime surfaces as per manufacturers' instructions and allow to dry.
    - b. Align and position self-adhering transition membrane, remove protective film and press firmly into place. Ensure minimum 2 inches overlap at all end and side laps of membrane.
    - c. Roll all laps and membrane with a counter top roller to ensure seal.
  2. Alternately, static cracks 1/16 inch to 1/8 inch can be sealed with primary air barrier membrane.
    - a. Fill crack with primary air barrier membrane.
    - b. Allow to dry prior to application of primary vapor permeable air barrier membrane.
- D. TRANSITION AREAS
1. Tie-in to structural beams, columns, floor slabs and intermittent floors, parapet curbs, foundation walls, roofing systems and at the interface of dissimilar materials as indicated in drawings with self-adhering air barrier transition membrane.
    - a. Prime surfaces as per manufacturers' instructions and allow to dry.
    - b. Align and position self-adhering transition membrane, remove protective film and press firmly into place. Provide minimum 3 inch lap to all substrates.
    - c. Ensure minimum 2 inch overlap at all end and side laps of membrane.
    - d. Roll all laps and membrane with a counter top roller to ensure seal.
- E. WINDOWS AND ROUGH OPENINGS
1. Wrap head and jamb of rough openings with specified self-adhering transition membrane as detailed. Place specified sill flashing membrane across sills and end dam terminations.
    - a. Prime surfaces as per manufacturers' instructions and allow to dry.
    - b. Align and position self-adhering transition membrane, remove protective film and press firmly into place. Ensure minimum 2 inch overlap at all end and side laps of membrane.
    - c. Roll all laps and membrane with a counter top roller to ensure seal.
- F. THROUGH-WALL FLASHING MEMBRANE
1. Apply through-wall flashing membrane along the base of masonry veneer walls and over shelf angles as detailed.
    - a. Prime surfaces and allow to dry, press membrane firmly into place, over lap minimum 2 inches at all end and side laps. Promptly roll all laps and membrane to ensure the seal.
    - b. Applications shall form a continuous flashing membrane and shall extend up a minimum of 8 inches up the back-up wall.
    - c. Seal the top edge of the membrane where it meets the substrate using termination sealant. Trowel-apply a feathered edge to seal termination to shed water.
    - d. Install through-wall flashing membrane and extend 1/2 inch from outside edge of veneer. Provide "end dam" flashing as detailed.
- G. PRIMARY AIR BARRIER
1. Apply by spray or flat trowel a complete and continuous unbroken film of liquid air and rain barrier membrane.

- a. For temperatures above 40 degrees F and rising, apply one component water based elastomeric emulsion air barrier membrane at a rate of 16.7 sq.ft./gallon to a uniform wet film thickness of 100 mils to achieve an average dry film thickness of 58 mils.
2. Spray apply or trowel around all projections and penetrations ensuring a complete and continuous air barrier membrane. Lap liquid applied membrane 1 inch over self-adhering membranes to seal leading edge.
3. Allow air barrier membrane to dry as per manufacturers recommendations prior to placement of exterior wall finish materials.

#### **3.04 APPLICATION OF TERMINATION SEALANT**

- A. Seal membrane terminations, heads of mechanical fasteners, masonry tie fasteners, around penetrations, duct work, electrical and other apparatus extending through the primary water resistive air barrier membrane and around the perimeter edge of membrane terminations at window and door frames with specified termination sealant.

#### **3.05 FIELD QUALITY CONTROL**

- A. Make notification when sections of Work are complete to allow review prior to covering air barrier system.

#### **3.06 PROTECTION**

- A. Damp substrates must not be inhibited from drying out. Do not expose the backside of the substrate to moisture or rain.
- B. Cap and protect exposed back-up walls against wet weather conditions during and after application of membrane. Drying time varies depending on temperature and relative humidity. Protect air barrier Work against wet weather conditions for a minimum of 24 hours.
- C. Primary air barrier membrane is designed for permanent exposure.

**END OF SECTION**

**SECTION 07 4113  
METAL ROOF PANELS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Architectural roofing system of preformed steel panels.
- B. Fastening system.
- C. Factory finishing.
- D. Accessories and miscellaneous components.
- E. Snow Guards

**1.02 RELATED REQUIREMENTS**

- A. Section 05 1200 - Structural Steel Framing: Roof framing and purlins.
- B. Section 06 1000 - Rough Carpentry: Roof sheathing.
- C. Section 06 1500 - Wood Decking: Roof sheathing.
- D. Section 07 2100 - Thermal Insulation: Rigid roof insulation.
- E. Section 07 9005 - Joint Sealers: Field-installed sealants.

**1.03 REFERENCE STANDARDS**

- A. ASCE 7 - Minimum Design Loads for Buildings and Other Structures; 2010, with 2013 Supplements and Errata.
- B. ASTM A792/A792M - Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process; 2010 (Reapproved 2015).
- C. ASTM D1970/D1970M - Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection; 2017.
- D. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2017.
- E. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials; 2016.
- F. ASTM E108 - Standard Test Methods for Fire Tests of Roof Coverings; 2011.
- G. ASTM E1646 - Standard Test Method for Water Penetration of Exterior Metal Roof Panel Systems by Uniform Static Air Pressure Difference; 1995 (Reapproved 2011).
- H. ASTM E1680 - Standard Test Method for Rate of Air Leakage Through Exterior Metal Roof Panel Systems; 2011.
- I. IAS AC472 - Accreditation Criteria for Inspection Programs for Manufacturers of Metal Building Systems; 2012.
- J. ICC-ES AC188 - Acceptance Criteria for Roof Underlayments; 2012.

**1.04 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
  - 1. Summary of test results, indicating compliance with specified requirements.
  - 2. Storage and handling requirements and recommendations.
  - 3. Installation methods.
  - 4. Specimen warranty.
- C. Shop Drawings: Include layouts of roof panels, details of edge and penetration conditions, spacing and type of connections, flashings, underlayments, and special conditions.
  - 1. Show work to be field-fabricated or field-assembled.
  - 2. Include structural analysis signed and sealed by qualified structural engineer, indicating conformance of roofing system to specified loading conditions.

- D. Selection Samples: For each roofing system specified, submit color chips representing manufacturer's full range of available colors and patterns.
- E. Verification Samples: For each roofing system specified, submit samples of minimum size 12 inches (305 mm) square, representing actual roofing metal, thickness, profile, color, and texture.
  - 1. Include typical panel joint in sample.
  - 2. Include typical fastening detail.
- F. Manufacturer Qualification Statement: Provide documentation showing metal roof panel fabricator is accredited under IAS AC472.
- G. Test Reports: Indicate compliance of metal roofing system to specified requirements.
- H. Warranty: Submit specified manufacturer's warranty and ensure that forms have been completed in Owner's name and are registered with manufacturer.

#### **1.05 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in the manufacture of roofing systems similar to those required for this project.
  - 1. Not less than 5 years of documented experience.
- B. Installer Qualifications: Company trained and authorized by roofing system manufacturer.

#### **1.06 DELIVERY, STORAGE, AND HANDLING**

- A. Store roofing panels on project site as recommended by manufacturer to minimize damage to panels prior to installation.

#### **1.07 WARRANTY**

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Finish Warranty: Provide manufacturer's special warranty covering failure of factory-applied exterior finish on metal roof panels and agreeing to repair or replace panels that show evidence of finish degradation, including significant fading, chalking, cracking, or peeling within specified warranty period of 5 year period from date of Substantial Completion.
- C. Waterproofing Warranty: Provide manufacturer's warranty for weathertightness of roofing system, including agreement to repair or replace roofing that fails to keep out water within specified warranty period of 5 years from date of Substantial Completion.

### **PART 2 PRODUCTS**

#### **2.01 MANUFACTURERS**

- A. Design is based on Zee Lock Standing Seam Panel, manufactured by Berridge.
- B. Acceptable manufacturers are:
  - 1. Architectural Building Components: [www.archmetalroof.com](http://www.archmetalroof.com).
  - 2. ATAS International, Inc: [www.atas.com](http://www.atas.com).
  - 3. Firestone Building Products LLC: [www.firestonebpco.com](http://www.firestonebpco.com).
  - 4. Petersen Aluminum Corporation: [www.pac-clad.com](http://www.pac-clad.com).
- C. Substitutions: See Section 01 6000 - Product Requirements.

#### **2.02 ARCHITECTURAL METAL ROOF PANELS**

- A. Architectural Metal Roofing: Provide complete engineered system complying with specified requirements and capable of remaining weathertight while withstanding anticipated movement of substrate and thermally induced movement of roofing system.
- B. Metal Panels: Factory-formed panels with factory-applied finish.
  - 1. Steel Panels:
    - a. Aluminum-zinc alloy-coated steel conforming to ASTM A792/A792M; minimum AZ50 (AZM150) coating.
    - b. Steel Thickness: Minimum 0.023 inch (0.584 mm).

2. Profile: Standing seam, with minimum 1.0 inch (25 mm) seam height; concealed fastener system for field seaming with special tool.
3. Texture: Smooth, with intermediate ribs for added stiffness.
4. Length: Full length of roof slope, without lapped horizontal joints.
5. Width: Maximum panel coverage of 12 inches (305 mm).

### **2.03 ATTACHMENT SYSTEM**

- A. Concealed System: Provide manufacturer's standard stainless steel or nylon-coated aluminum concealed anchor clips designed for specific roofing system and engineered to meet performance requirements, including anticipated thermal movement.

### **2.04 PANEL FINISH**

- A. Fluoropolymer Coating System: Manufacturer's standard multi-coat thermocured coating system, including minimum 70 percent fluoropolymer color topcoat with minimum total dry film thickness of 0.9 mil (0.023 mm); color and gloss to match sample.
- B. Siliconized Polyester Coating: Epoxy primer and silicone-modified polyester enamel topcoat with minimum dry film thickness of 0.8 mil (0.02 mm); color and gloss to match sample.
- C. Acrylic Enamel Coating: Epoxy primer and acrylic enamel topcoat with minimum dry film thickness of 0.8 mil (0.02 mm); color and gloss to match sample.

### **2.05 ACCESSORIES AND MISCELLANEOUS ITEMS**

- A. Miscellaneous Sheet Metal Items: Provide flashings, gutters, downspouts, trim, moldings, closure strips, preformed crickets, caps, and equipment curbs 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.
- B. Rib and Ridge Closures: Provide prefabricated, close-fitting components of steel with corrosion resistant finish or combination steel and closed-cell foam.
- C. Sealants: As specified in Section 07 9005.
  1. Exposed sealant must cure to rubber-like consistency.
  2. Concealed sealant must be non-hardening type.
  3. Seam sealant must be factory-applied, non-skinning, non-drying type.
- D. Underlayment: Self-adhering rubber-modified asphalt sheet complying with ASTM D1970/D1970M; 22 mil (0.55 mm) total thickness; with strippable release film and woven polypropylene sheet top surface.
  1. Minimum Requirements: Comply with requirements of ICC-ES AC188 for non-self-adhesive sheet.
  2. Sheet Thickness: 22 mil (0.022 inch) (0.55 mm) minimum total thickness.
  3. Self Sealability: Passing nail sealability test specified in ASTM D1970/D1970M.
  4. Low Temperature Flexibility: Passing test specified in ASTM D1970/D1970M.
  5. Water Vapor Permeance: 0.067 perm (38 ng/(Pa s sq m)), maximum, when tested in accordance with ASTM E96/E96M Procedure A (desiccant method).
  6. Products:
    - a. Henry Company; Blueskin RF200: [www.henry.com](http://www.henry.com).
    - b. Henry Company; Blueskin PE200HT: [www.henry.com](http://www.henry.com).
    - c. System Components Corporation, Inc.; FelTex SA300: [www.systemcomponents.net](http://www.systemcomponents.net).
    - d. Substitutions: See Section 01 6000 - Product Requirements.

### **2.06 SNOW GUARDS**

- A. Manufacturer
  1. Alpine Snow Guards, Product: ASG4025 Snow Guard
  2. Color to be selected by Architect
  3. Components
    - a. snow guard bracket with three set screws
    - b. tubing - snow fence
    - c. couplings

- d. end caps
- e. end collars
- f. ice flags

## **2.07 FABRICATION**

- A. Panels: Fabricate panels and accessory items at factory, using manufacturer's standard processes as required to achieve specified appearance and performance requirements.
- B. Joints: Factory-install captive gaskets, sealants, or separator strips at panel joints to provide weathertight seals, eliminate metal-to-metal contact, and minimize noise from panel movements.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Do not begin installation of preformed metal roof panels until substrates have been properly prepared.
- B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

### **3.02 PREPARATION**

- A. Coordinate roofing work with provisions for roof drainage, flashing, trim, penetrations, and other adjoining work to assure that the completed roof will be free of leaks.
- B. Separate dissimilar metals by applying a bituminous coating, self-adhering rubberized asphalt sheet, or other permanent method approved by roof panel manufacturer.
- C. Where metal will be in contact with wood or other absorbent material subject to wetting, seal joints with sealing compound and apply one coat of heavy-bodied bituminous paint.

### **3.03 INSTALLATION**

- A. Overall: Install roofing system in accordance with approved shop drawings and panel manufacturer's instructions and recommendations, as applicable to specific project conditions. Anchor all components of roofing system securely in place while allowing for thermal and structural movement.
  - 1. Install roofing system with concealed clips and fasteners, except as otherwise recommended by manufacturer for specific circumstances.
  - 2. 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.
- B. Accessories: Install all components required for a complete roofing assembly, including flashings, gutters, downspouts, trim, moldings, closure strips, preformed crickets, caps, equipment curbs, rib closures, ridge closures, and similar roof accessory items.
- C. Roof Panels: Install panels in strict accordance with manufacturer's instructions, minimizing transverse joints except at junction with penetrations.

### **3.04 CLEANING**

- A. Clean exposed sheet metal work at completion of installation. Remove grease and oil films, excess joint sealer, handling marks, and debris from installation, leaving the work clean and unmarked, free from dents, creases, waves, scratch marks, or other damage to the finish.

### **3.05 PROTECTION**

- A. Do not permit storage of materials or roof traffic on installed roof panels. Provide temporary walkways or planks as necessary to avoid damage to completed work. Protect roofing until completion of project.
- B. Touch-up, repair, or replace damaged roof panels or accessories before date of Substantial Completion.

**END OF SECTION**

**SECTION 07 4213  
METAL WALL PANELS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Manufactured metal panels for walls, with related flashings and accessory components.

**1.02 RELATED REQUIREMENTS**

- A. Section 05 4000 - Cold-Formed Metal Framing: Wall panel substrate.
- B. Section 06 1000 - Rough Carpentry: Wall panel substrate.
- C. Section 07 2100 - Thermal Insulation.
- D. Section 07 2500 - Weather Barriers: Weather barrier under wall panels.
- E. Section 07 9200 - Joint Sealants: Sealing joints between metal wall panel system and adjacent construction.
- F. Section 09 2116 - Gypsum Board Assemblies: Wall panel substrate.

**1.03 REFERENCE STANDARDS**

- A. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2015.

**1.04 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate dimensions, layout, joints, construction details, and methods of anchorage.
- C. Samples: Submit two samples of wall panel and soffit panel, 12 inch by 12 inch (305 mm by 305 mm) in size illustrating finish color, sheen, and texture.

**1.05 QUALITY ASSURANCE**

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

**1.06 MOCK-UP**

- A. Construct mock-up, 4 feet (\_\_\_\_ m) long by 4 feet (\_\_\_\_ m) wide; include panel and soffit system, glazing, attachments to building frame, associated vapor retarder and air seal materials, weep drainage system, sealants and seals, related insulation, and \_\_\_\_\_ in mock-up.
- B. Locate where directed by Architect.
- C. Mock-up may remain as part of the Work.

**1.07 DELIVERY, STORAGE, AND HANDLING**

- A. Protect panels from accelerated weathering by removing or venting sheet plastic shipping wrap.
- B. Store prefinished material off the ground and protected from weather; prevent twisting, bending, or abrasion; provide ventilation; slope metal sheets to ensure proper drainage.
- C. Prevent contact with materials that may cause discoloration or staining of products.

**1.08 WARRANTY**

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

**PART 2 PRODUCTS**

**2.01 MANUFACTURERS**

- A. Metal Wall Panels - Exposed Fasteners:
  - 1. Bridger Steel, 7/8" Corrugated Panel



## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that building framing members are ready to receive panels.
- B. Verify that weather barrier has been installed over substrate completely and correctly.

### **3.02 PREPARATION**

### **3.03 INSTALLATION**

- A. Install panels on walls and soffits in accordance with manufacturer's instructions.

### **3.04 TOLERANCES**

- A. Maximum Offset From True Alignment Between Adjacent Members Butting or In Line: 1/16 inch (1.6 mm).
- B. Maximum Variation from Plane or Location Indicated on Drawings: 1/4 inch (6.4 mm).

### **3.05 CLEANING**

- A. Remove site cuttings from finish surfaces.
- B. Remove protective material from wall panel surfaces.

**END OF SECTION**

**SECTION 07 4600**  
**FIBER CEMENT SIDING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Siding of the following types:
  - 1. Fiber Cement Vertical Siding (RusticSeries).

**1.02 SUBMITTALS**

- A. Submit under provisions of Section 01300.
- B. Product Data: For each type of process and factory-fabricated product. Indicate component materials, dimensions, profiles, textures, and colors and include construction and application details.
  - 1. Preparation instructions and recommendations.
  - 2. Storage and handling requirements and recommendations.
  - 3. Installation methods.
- C. Research/Evaluation Reports: For fire-retardant-coated wood.
- D. Verification Samples: For each finish product specified, two samples, representing actual product and color.

**1.03 QUALITY ASSURANCE**

- A. Installer Qualifications: Installer shall be licensed, registered or otherwise acceptable to authorities having jurisdiction to install exterior building products.

**1.04 DELIVERY, STORAGE, AND HANDLING**

- A. Inspect the materials upon delivery to assure specified products have been received. Store products in a safe area, away from construction traffic. Store under cover and off the ground, protected from moisture.

**1.05 PROJECT CONDITIONS**

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's recommended limits.

**1.06 WARRANTY**

- A. Material Warranty: Provide manufacturer's standard warranty and as follows:
  - 1. AbsoluteSide: 50 year warranty against rot, delamination and excessive swelling for installation.
- B. Coating Warranty: Provide manufacturer's standard warranty and as follows:
  - 1. RusticSeries Coatings: 15 year warranty on the coating when factory applied.

**1.07 PART 2 PRODUCTS**

**1.08 MANUFACTURERS**

- A. Acceptable Manufacturer: Woodtone, which is located at: 8007 Aitken Rd.; Chilliwack, BC; Canada V2R 4H5; Toll Free Tel: 800-663-9844; Fax: 604-792-3976; Email: request info (info@woodtone.com)<<http://www.woodtone.com>>
- B. Requests for substitutions will be considered in accordance with provisions of Section 01600.

**1.09 SIDING**

- A. Substrate: Fiber Cement Siding; Certainteed Allura products as coated by Woodtone.
  - 1. Type: Vertical Fiber Cement Siding: WeatherBoards as coated by Woodtone.
    - a. Style: Cedar, no groove Panel; 4 feet wide.
    - b. Length: 8 feet.
    - c. Length: 9 feet.
    - d. Length: 10 feet.

2. Finish: Factory Finish Top Coating by Woodtone.

#### **1.10 FINISH COATING SYSTEM**

- A. Every order coated by Woodtone is done within a factory controlled environment, where we machine coat and even hand brush your project to achieve the look and finish that you want. Our commitment to quality goes beyond our factory--Our methods are approved by all the major paint manufacturers and as an Authorized Factory Applicator of their paint products, we are able to offer extended coating warranties that range up to 30 years on practically any paint or stain. With thousands of different paints available in the market Woodtone will continue to endeavor to select paint partners who produce products which offer both superior performance and environmental benefits.
- B. Primer: Ultra low VOC Hybrid Alkyd Emulsion™ primer. Tinted where scheduled or required.
- C. Finish Coating: Hybrid Alkyd Emulsion™ (HAE™). Polymer technology of alkyd-oil coating in a water emulsion providing environmental benefits. Borax for mold resistance and greater long-term appearance.
- D. System: Coated on all 6 six sides.
- E. Wood Appearance Proprietary Two Coat System (RusticSeries Coatings).

#### **1.11 FASTENERS**

- A. Nails for Fiber Cement Siding and Engineered Wood Siding with Woodtone RusticSeries Coating: As recommended by fiber cement siding manufacturer.

#### **1.12 PART 3 EXECUTION**

#### **1.13 PREPARATION**

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

#### **1.14 INSTALLATION**

- A. Install in accordance with manufacturer's instructions including the following:
  1. Coordinate work with related trades; scribe and cope siding boards for accurate fit. Allow for installation of related work to avoid cutting and patching.
  2. Select siding boards of longest practical lengths. Discard boards that are warped, twisted, bowed, crooked or otherwise defective.
  3. Comply with siding manufacturer's and substrate manufacturer's installation instructions. Comply with local building codes and regulations.
  4. Apply touch up coating on surfaces and ends cut during installation.
  5. As work proceeds, maintain premises free of unnecessary accumulation of tools, equipment, surplus materials, and debris related to this work.
- B. Finish materials on all ends and sides and ends. Apply touch up coating on new cuts. Factory finishing is preferred.

#### **1.15 PROTECTION**

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Substantial Completion.

#### **PART 2 PRODUCTS**

**END OF SECTION**

**SECTION 07 5200**  
**MODIFIED BITUMINOUS MEMBRANE ROOFING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Modified bituminous roofing membrane, conventional application.
- B. Insulation, flat and tapered.
- C. Base flashings.
- D. Roofing cant strips, accessories, roofing expansion joints, and walkway pads.

**1.02 RELATED REQUIREMENTS**

- A. Section 06 1000 - Rough Carpentry: Wood nailers and curbs.
- B. Section 06100 - Rough Carpentry: Wood nailers and curbs.
- C. Section 07 6200 - Sheet Metal Flashing and Trim: Counterflashings, reglets, and other required sheet metal trim.
- D. Section 7222 - Polyisocyanurate Roof Insulation
- E. Section 15000 - Plumbing Specialties: Roof drains.
- F. Section 15000 - Mechanical: Flashing collars.
- G. Section 15000 - Mechanical: Prefabricated curb for mechanical equipment.
- H. Section 16000 - Electrical: Lightning protection.

**1.03 REFERENCE STANDARDS**

- A. ASTM C726 - Standard Specification for Mineral Wool Roof Insulation Board; 2012.
- B. ASTM C1289 - Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board; 2017.
- C. ASTM D41/D41M - Standard Specification for Asphalt Primer Used in Roofing, Dampproofing, and Waterproofing; 2011.
- D. ASTM D312/D312M - Standard Specification for Asphalt Used in Roofing; 2015.
- E. ASTM D4586/D4586M - Standard Specification for Asphalt Roof Cement, Asbestos-Free; 2007 (Reapproved 2012).
- F. NRCA ML104 - The NRCA Roofing and Waterproofing Manual; National Roofing Contractors Association; Fifth Edition, with interim updates.
- G. Conform with all FM Global Standards

**1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Coordinate with installation of associated flashings and counterflashings installed by other sections.
- B. Preinstallation Meeting: Convene one week before starting work of this section.
  - 1. Review preparation and installation procedures and coordinating and scheduling required with related work.

**1.05 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturer's catalog data for membrane materials, base flashing materials, insulation, surfacing, and roofing accessories.
- C. Shop Drawings: Indicate joint or termination detail conditions, conditions of interface with other materials, setting plan for tapered insulation, mechanical fastener layout, and penetrations.
- D. Manufacturer's qualification data.
- E. Installer's qualification data.

- F. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.
- G. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- H. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

#### **1.06 QUALITY ASSURANCE**

- A. Perform work in accordance with manufacturer's instructions.
  - 1. Maintain one copy on site.
- B. Installer Qualifications: Company specializing in performing the work of this section with minimum 5 years experience and approved by manufacturer.
- C. Installer shall be required from a single source manufacturer

#### **1.07 PRE-INSTALLATION MEETING**

- A. Convene one week before starting work of this section.
- B. Review preparation and installation procedures and coordinating and scheduling required with related work.

#### **1.08 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver products in manufacturer's original containers, dry, undamaged, with seals and labels intact.
- B. Store products in weather protected environment, clear of ground and moisture; ballast materials may be stored outdoors.
- C. Protect foam insulation from direct exposure to sunlight.

#### **1.09 FIELD CONDITIONS**

- A. Do not apply roofing membrane when environmental conditions are outside the ranges recommended by manufacturer.

#### **1.10 WARRANTY**

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Roof Membrane Guarantee: Upon successful completion of the project, and after all post installation procedures have been completed, furnish the owner with the manufacturer's twenty (20) year labor and materials membrane guarantee. This guarantee shall be a term type, without deductibles or limitations on coverage amount (NDL), and shall be issued at no additional cost to the owner. The guarantee shall not exclude random areas of ponding from coverage. Correct defective work within a 10 year period after date of substantial completion.

### **PART 2 PRODUCTS**

#### **2.01 MANUFACTURERS**

- A. Membrane Materials:
  - 1. Siplast: [www.siplast.com](http://www.siplast.com).
- B. Other Acceptable Manufacturers:
  - 1. Soprema
  - 2. Derbigum
  - 3. Substitutions: See Section 01 6000 - Product Requirements.
- C. Insulation:
  - 1. Atlas Roofing Corporation: [www.atlasroofing.com](http://www.atlasroofing.com).
  - 2. RMAX
    - a. As specified in Section 7222 - Polyisocyanurate Roof Insulation and as required to obtain specified warranty from roofing membrane manufacturer.
- D. Other Acceptable Manufacturers:

## 2.02 ROOFING: DESCRIPTION OF SYSTEMS

- A. Roofing Assembly Requirements: A roof membrane assembly consisting of two plies of a prefabricated, reinforced, homogeneous Styrene-Butadiene-Styrene (SBS) block copolymer modified asphalt membrane, applied over a prepared substrate. Both reinforcement mats shall be impregnated/saturated and coated each side with an SBS modified bitumen blend. The roof system shall pass 500 cycles of ASTM D 5849 Resistance to Cyclic Joint Displacement (fatigue) at 14 degree F (-10 degree C). Passing results shall show no signs of membrane cracking or interply delamination after 500 cycles. The roof system shall pass 200 cycles of ASTM D 5849 after heat conditioning performed in accordance with ASTM D 5147. The assembly shall possess waterproofing capability, such that a phased roof application, with only the modified bitumen base ply in place, can be achieved for prolonged periods of time without detriment to the watertight integrity of the entire roof system.
- B. Modified Bituminous Roofing: Siplast Inc. - Paradiene 20 / Paradiene 30 FR / Veral Base Flashings. .
  - 1. Other Acceptable Products:
    - a. Johns Manville - Dynaply / Dynakap FR / Dynaclad Base Flashings..
    - b. GAF Materials Corp. - Ruberiod Mop Smooth / Ruberiod Mop Plus / Ruberiod Ultraclad SBS..
    - c. Substitutions: If a roof system other than those listed above are proposed, provide the Cyclic Joint Displacement information and results, per ASTM D5849, as tested and documented from an independent testing laboratory, with substitution request seven (7) days before prior to bid. The testing and documented results shall have been completed within the last 18 months. If acceptable and addendum will be issued prior to the bid date.
    - d. Surface Granule Color: Selected by Architect from Manufacturers standard color selections.

## 2.03 BITUMINOUS MATERIALS

- A. Bitumen: Asphalt, ASTM D312 Type IV; for adhering insulation, use Type III.
- B. Primer: ASTM D41, asphalt type.
- C. Roof Cement: ASTM D4586, Type II.
- D. Cold Applied Adhesive: Roofing systems manufacturer's standard asphalt-based, one or two part, asbestos-free, cold applied adhesive specially formulated for compatibility and use with roofing membrane.

## 2.04 INSULATION

- A. Polyisocyanurate Board Insulation: Rigid cellular foam, complying with ASTM C 1289, Type II, Class 1, cellulose felt or glass fiber mat both faces; Grade 1, minimum compressive strength 20 psi. Base layer to achieve average R Value of 25:
  - 1. Manufacturer:
    - a. As specified in Section 7222 - Polyisocyanurate Roof Insulation and as required to obtain specified warranty from roofing membrane manufacturer.
- B. Tapered Insulation: Provide factory tapered insulation boards fabricated to slope 1/4 inch per foot unless otherwise indicated on drawings. Tapered insulation at Crickets only.
- C. Cover Board: 1/4 inch thick silicone treated gypsum core rigid board with fiberglass mat facers embedded on both sides, and has top surface that is factory coated with low permeability, heat cured coating: "DenseDeck Duraguard" by Georgia Pacific.

## 2.05 SURFACING MATERIALS

- A. Walkway Pads: Suitable for maintenance traffic, contrasting color or otherwise visually distinctive from roof membrane.
  - 1. Composition: Asphaltic with mineral granule surface.
  - 2. Surface Color: White or yellow.

- B. Walkway Protection Course: Preformed, asphalt impregnated, puncture resistant polyester fabric core, coated with a polymer modified bitumen and topped with a ceramic-coated granule wearing surface. Specially designed for pedestrian traffic or mechanical abuse potential, contrasting Color to Roof Membrane.

## **2.06 ACCESSORIES**

- A. Cant and Edge Strips: Perlite board, compatible with roofing materials; cants formed to 45 degree angle.
- B. Insulation Joint Tape: Glass fiber reinforced type as recommended by insulation manufacturer, compatible with roofing materials; 6 inches (150 mm) wide; self adhering.
- C. Insulation Fasteners: Appropriate for purpose intended and approved by roofing manufacturer.
- D. Strip Reglet Devices: Galvanized steel, maximum possible lengths per location, with attachment flanges.
- E. Sealants: As recommended by membrane manufacturer.
- F. Walking Pads for Protection of Roof Materials - See Roof Plan for Placement

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that surfaces and site conditions are ready to receive work.
- B. Verify deck is supported and secure.
- C. Verify deck is clean and smooth, flat, free of depressions, waves, or projections, properly sloped and suitable for installation of roof system.
- D. Verify deck surfaces are dry and free of snow or ice.
- E. Verify that roof openings, curbs, and penetrations through roof are solidly set, and cant strips are in place.

### **3.02 METAL DECK PREPARATION**

- A. Install deck sheathing on metal deck:
  - 1. Lay with long side at right angle to flutes; stagger end joints; provide support at ends.
  - 2. Cut sheathing cleanly and accurately at roof breaks and protrusions to provide smooth surface.
  - 3. Tape joints.
  - 4. Mechanically fasten sheathing to roof deck, in accordance with roofing manufacturer's instructions.
    - a. Over entire roof area, fasten sheathing using 6 fasteners with washers per sheathing board.
    - b. At roof perimeter to a distance of 4 ft (1.5 m) in from edges, fasten sheathing using 6 fasteners with washers per board.

### **3.03 INSULATION INSTALLATION - CONVENTIONAL APPLICATION**

- A. Attachment of Insulation:
  - 1. Mechanically fasten first layer of insulation to deck in accordance with roofing manufacturer's instructions .
  - 2. Embed subsequent layer of insulation into flood coat mopping of hot bitumen in accordance with roofing and insulation manufacturers' instructions.
- B. Place tapered insulation to the required slope pattern in accordance with manufacturer's instructions.
- C. On metal deck, place boards parallel to flutes with insulation board edges bearing on deck flutes.
- D. Lay boards with edges in moderate contact without forcing. Cut insulation to fit neatly to perimeter blocking and around penetrations through roof.
- E. Tape joints of insulation in accordance with roofing and insulation manufacturers' instructions.

- F. At roof drains, use factory-tapered boards to slope down to roof drains over a distance of 18 inches (450 mm) to form sump.
- G. Do not apply more insulation than can be covered with membrane in same day.

### **3.04 MEMBRANE APPLICATION**

- A. Apply membrane in accordance with manufacturer's instructions. Base ply to be adhered in hot asphalt: Cap ply to be adhered in cold adhesive
- B. Apply membrane; lap and seal edges and ends permanently waterproof.
- C. Apply smooth, free from air pockets, wrinkles, fish-mouths, or tears. Ensure full bond of membrane to substrate.
- D. At end of day's operation, install waterproof cut-off. Remove cut-off before resuming roofing.
- E. At intersections with vertical surfaces:
  - 1. Extend membrane over cant strips and up a minimum of 8 inches (200 mm) onto vertical surfaces.
  - 2. Apply flexible flashing over membrane.
- F. At gravel stops, extend membrane and base sheet under gravel stop and to the outside face of the wall.
- G. Around roof penetrations, mop in and seal flanges and flashings with flexible flashing.
- H. Coordinate installation of roof drains and sumps and related flashings.

### **3.05 FIELD QUALITY CONTROL**

- A. See Section 01 4000 - Quality Requirements, for general requirements for field quality control and inspection.
- B. Require site attendance of roofing material manufacturers representative a minimum of two visits during installation of the Work.

### **3.06 CLEANING**

- A. Remove bituminous markings from finished surfaces.
- B. In areas where finished surfaces are soiled by bitumen or other source of soiling caused by work of this section, consult manufacturer of surfaces for cleaning advice and conform to their documented instructions.
- C. Repair or replace defaced or damaged finishes caused by work of this section.

### **3.07 PROTECTION**

- A. Protect installed roofing and flashings from construction operations.
- B. Where traffic must continue over finished roof membrane, protect surfaces using durable materials.

**END OF SECTION**



**SECTION 07 6200**  
**SHEET METAL FLASHING AND TRIM**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Fabricated sheet metal items, including flashings, counterflashings, gutters, downspouts, roof coping, and other items indicated in Schedule.
- B. Flashings, counterflashings and fabricated sheet metal items, as indicated in Schedule.
- C. Reglets and accessories.

**1.02 RELATED REQUIREMENTS**

- A. Section 05120 Structural steel
- B. Section 05300 Metal decking
- C. Section 05400 Cold formed metal decking
- D. Section 05810 Expansion joint covers assemblies
- E. Section 06 1000 - Rough Carpentry: Wood blocking for batten seams.
- F. Section 06 1054 - Wood Blocking and Curbing: Wood blocking 2950 and 4000 psi (20 and 27 MPa) and battens None - N/A for metal roofing substrate profiles.
- G. Section 07411 - Standing Seam Metal Roofing, including gutters and downspouts.
- H. Section 07550 - Modified Bitumen Membrane Roofing.
- I. Section 07 9005 - Joint Sealers.
- J. Section 01500 - Mechanical: Roof curbs for mechanical equipment.
- K. Section 01500 - Mechanical: Flashing sleeves and collars for mechanical items protruding through roofing membrane.
- L. Section 01600 - Electrical: Flashing sleeves and collars for electrical items protruding through roofing membrane.

**1.03 REFERENCE STANDARDS**

- A. AAMA 2603 - Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2015.
- B. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2015.
- C. ASTM B32 - Standard Specification for Solder Metal; 2008 (Reapproved 2014).
- D. ASTM D2178/D2178M - Standard Specification for Asphalt Glass Felt Used in Roofing and Waterproofing; 2013a.
- E. ASTM D4586/D4586M - Standard Specification for Asphalt Roof Cement, Asbestos-Free; 2007 (Reapproved 2012).
- F. SMACNA (ASMM) - Architectural Sheet Metal Manual; 2012.

**1.04 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate material profile, jointing pattern, jointing details, fastening methods, flashings, terminations, and installation details.
- C. Samples: Submit two samples 12x12 inch (\_\_\_\_x\_\_\_\_ mm) in size illustrating metal finish color.

**1.05 QUALITY ASSURANCE**

- A. Perform work in accordance with SMACNA Architectural Sheet Metal Manual requirements and standard details, except as otherwise indicated.

- B. Maintain one copy of each document on site.

#### **1.06 PRE-INSTALLATION CONFERENCE**

- A. Convene one week before starting work of this section.

#### **1.07 DELIVERY, STORAGE, AND HANDLING**

- A. Stack material to prevent twisting, bending, and abrasion, and to provide ventilation. Slope metal sheets to ensure drainage.
- B. Prevent contact with materials that could cause discoloration or staining.

### **PART 2 PRODUCTS**

#### **2.01 SHEET MATERIALS**

- A. Pre-Finished Galvanized Steel: ASTM A653/A653M, with G90/Z275 zinc coating; minimum 0.02 inch (0.6 mm) thick base metal, shop pre-coated with modified silicone coating.
  - 1. Modified Silicone Polyester Coating: Pigmented Organic Coating System, AAMA 2603; baked enamel finish system.
  - 2. Modified Silicone Polyester Coating: Pigmented Organic Coating System, AAMA 2603; baked enamel finish system; custom color to match approved sample.

#### **2.02 ACCESSORIES**

- A. Fasteners: Same material and finish as flashing metal, with soft neoprene washers.
- B. Underlayment: ASTM D2178, glass fiber roofing felt.
- C. Primer: Zinc chromate type.
- D. Protective Backing Paint: Zinc molybdate alkyd.
- E. Sealant: Type specified in Section 07 9005.
- F. Plastic Cement: ASTM D4586, Type I.
- G. Reglets: Recessed type, galvanized steel; face and ends covered with plastic tape.
- H. Solder: ASTM B32; Sn50 (50/50) type.

#### **2.03 FABRICATION**

- A. Form sections true to shape, accurate in size, square, and free from distortion or defects.
- B. Fabricate cleats of same material as sheet, minimum 12 inches (\_\_\_\_ mm) wide, interlocking with sheet.
- C. Form pieces in longest possible lengths.
- D. Hem exposed edges on underside 1/2 inch (13 mm); miter and seam corners.
- E. Form material with flat lock 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 (450 mm) long legs; seam for rigidity, seal with sealant.
- G. Fabricate vertical faces with bottom edge formed outward 1/4 inch (6 mm) and hemmed to form drip.
- H. Fabricate flashings to allow toe to extend 2 inches (50 mm) over roofing . Return and brake edges.

#### **2.04 INTEGRAL GUTTER FABRICATION**

- A. Gutters: SMACNA Architectural Sheet Metal Manual, Rectangular profile.
- B. Coordinate with Standing seam metal roofing manufacturer
- C. Downspouts: Profile as indicated. integral - see plumbing
- D. Gutters and Downspouts: Size for rainfall intensity determined by a storm occurrence of 1 in 5 years in accordance with SMACNA Architectural Sheet Metal Manual.

- E. Accessories: Profiled to suit gutters and downspouts.
  - 1. Anchorage Devices: In accordance with SMACNA requirements.
  - 2. Gutter Supports: integral to roof - see drawings.
- F. Downspout Boots: see plumbing.
- G. Seal metal joints.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Verify roof openings, curbs, pipes, sleeves, ducts, and vents through roof are solidly set, reglets in place, and nailing strips located.
- B. Verify roofing termination and base flashings are in place, sealed, and secure.

#### **3.02 PREPARATION**

- A. Install starter and edge strips, and cleats before starting installation.
- B. Back paint concealed metal surfaces with protective backing paint to a minimum dry film thickness of 15 mil (0.4 mm).

#### **3.03 INSTALLATION**

- A. Conform to drawing details.
- B. Insert flashings into reglets to form tight fit. Secure in place with plastic wedges. Seal flashings into reglets with sealant.
- C. Secure flashings in place using concealed fasteners.
- D. Apply plastic cement compound between metal flashings and felt flashings.
- E. Fit flashings tight in place. Make corners square, surfaces true and straight in planes, and lines accurate to profiles.
- F. Solder metal joints for full metal surface contact. After soldering, wash metal clean with neutralizing solution and rinse with water.
- G. Secure gutters and downspouts in place using concealed fasteners.
- H. Slope gutters 1/4 inch per foot (20 mm/m) minimum.
- I. Connect downspouts to downspout boots. Grout connection watertight.

#### **3.04 FIELD QUALITY CONTROL**

- A. See Section 01 4000 - Quality Requirements, for field inspection requirements.
- B. Inspection will involve surveillance of work during installation to ascertain compliance with specified requirements.

#### **3.05 SCHEDULE**

- A. Through-Wall Flashing in Masonry.
- B. Fascia and trim at membrane roof areas. Fascias and trim at Standing Seam Metal Roof is by metal roof supplier.
- C. Gutters
- D. Scuppers:
- E. Coping, Cap, Parapet, Sill and Ledge Flashings.
- F. Counterflashings at Roofing Terminations (over roofing base flashings):
- G. Counterflashings at Curb-Mounted Roof Items:
- H. Roofing Penetration Flashings, for Pipes, Structural Steel, and Equipment Supports:
- I. Beam Covers.

**END OF SECTION**

**SECTION 07 8100**  
**APPLIED FIREPROOFING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Fireproofing of interior structural steel.

**1.02 RELATED REQUIREMENTS**

- A. Section 05 1200 - Structural Steel Framing.
- B. Section 05 2100 - Steel Joist Framing.
- C. Section 05 3100 - Steel Decking.

**1.03 REFERENCE STANDARDS**

- A. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2017.
- B. ASTM E736 - Standard Test Method for Cohesion/Adhesion of Sprayed Fire-Resistive Materials Applied to Structural Members; 2000 (Reapproved 2011).
- C. ASTM E759 - Standard Test Method for Effect of Deflection on Sprayed Fire-Resistive Material Applied to Structural Members; 1992 (Reapproved 2011).
- D. ASTM E760/E760M - Standard Test Method for Effect of Impact on Bonding of Sprayed Fire-Resistive Material Applied to Structural Members; 1992, with Editorial Revision (2015).
- E. ASTM E937 - Standard Test Method for Corrosion of Steel by Sprayed Fire-Resistive Material (SFRM) Applied to Structural Members; 1993 (Reapproved 2011).
- F. ASTM G21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi; 2015.

**1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Preinstallation Meeting: Convene one week before starting work of this section.

**1.05 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittals procedures.
- B. Product Data: Provide data indicating product characteristics.
- C. Test Reports: Reports from reputable independent testing agencies for proposed products, indicating compliance with specified criteria, conducted under conditions similar to those on project, for:
  - 1. Bond Strength.
  - 2. Bond Impact.
  - 3. Compressive Strength.
  - 4. Fire tests using substrate materials similar those on project.
- D. Manufacturer's Installation Instructions: Indicate special procedures.
- E. Manufacturer's Certificate: Certify that sprayed-on fireproofing products meet or exceed requirements of contract documents.
- F. Manufacturer's Field Reports: Indicate environmental conditions under which fireproofing materials were installed.

**1.06 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of documented experience.

**1.07 MOCK-UP**

- A. Construct mock-up, 100 square feet (9 square meters) in size.
- B. Conform to project requirements for fire ratings.

- C. Locate where directed.
- D. Examine installation within one hour of application to determine variances from specified requirements due to shrinkage, temperature, and humidity.
- E. Where shrinkage and cracking are evident, adjust mixture and method of application as necessary. Remove materials and re-construct mock-up.
- F. Mock-up may remain as part of the Work.

#### **1.08 FIELD CONDITIONS**

- A. Do not apply spray fireproofing when temperature of substrate material and surrounding air is below 40 degrees F (4 degrees C) or when temperature is predicted to be below said temperature for 24 hours after application.
- B. Provide ventilation in areas to receive fireproofing during application and 24 hours afterward, to dry applied material.
- C. Provide temporary enclosure to prevent spray from contaminating air.

#### **1.09 WARRANTY**

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Correct defective Work within a five year period after Date of Substantial Completion.
  - 1. Include coverage for fireproofing to remain free from cracking, checking, dusting, flaking, spalling, separation, and blistering.
  - 2. Reinstall or repair failures that occur within warranty period.

### **PART 2 PRODUCTS**

#### **2.01 MANUFACTURERS**

- A. Sprayed-On Fireproofing:
  - 1. Substitutions: See Section 01 6000 - Product Requirements.

#### **2.02 FIREPROOFING ASSEMBLIES**

#### **2.03 MATERIALS**

- A. Sprayed Fire-Resistive Material for Interior Applications: Manufacturer's standard factory mixed material, which when combined with water is capable of providing the indicated fire resistance, and conforming to the following requirements:
  - 1. Bond Strength: 150 pounds per square foot (7.2 kPa), minimum, when tested in accordance with ASTM E736 when set and dry.
  - 2. Effect of Impact on Bonding: No cracking, spalling or delamination, when tested in accordance with ASTM E760.
  - 3. Corrosivity: No evidence of corrosion, when tested in accordance with ASTM E937.
  - 4. Surface Burning Characteristics: Maximum flame spread of 0 and maximum smoke developed of 0, when tested in accordance with ASTM E84.
  - 5. Effect of Deflection: No cracking, spalling, or delamination, when tested in accordance with ASTM E759.
  - 6. Fungal Resistance: No growth after 28 days when tested according to ASTM G21.
  - 7. Products:
    - a. Grace Construction Products; Monokote Z-106 G: [www.na.graceconstruction.com](http://www.na.graceconstruction.com).
    - b. Substitutions: See Section 01 6000 - Product Requirements.

#### **2.04 ACCESSORIES**

- A. Primer Adhesive: Of type recommended by fireproofing manufacturer.
- B. Overcoat: As recommended by manufacturer of fireproofing material.
- C. Water: Clean, potable.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that surfaces are ready to receive fireproofing.
- B. Verify that clips, hangers, supports, sleeves, and other items required to penetrate fireproofing are in place.
- C. Verify that ducts, piping, equipment, or other items that would interfere with application of fireproofing have not been installed.
- D. Verify that voids and cracks in substrate have been filled. Verify that projections have been removed where fireproofing will be exposed to view as a finish material.

### **3.02 PREPARATION**

- A. Perform tests as recommended by fireproofing manufacturer in situations where adhesion of fireproofing to substrate is in question.
- B. Remove incompatible materials that could affect bond by scraping, brushing, scrubbing, or sandblasting.
- C. Prepare substrates to receive fireproofing in strict accordance with instructions of fireproofing manufacturer.
- D. Protect surfaces not scheduled for fireproofing and equipment from damage by overspray, fall-out, and dusting.
- E. Close off and seal duct work in areas where fireproofing is being applied.

### **3.03 APPLICATION**

- A. Apply primer adhesive in accordance with manufacturer's instructions.
- B. Apply fireproofing in thickness and density necessary to achieve required ratings, with uniform density and texture.
- C. Apply overcoat to a thickness of 6 inches (152.4 mm).

### **3.04 FIELD QUALITY CONTROL**

- A. Inspect the installed fireproofing after application and curing for integrity, prior to its concealment. Ensure that actual thicknesses, densities, and bond strengths meet requirements for specified ratings and requirements of the Authority Having Jurisdiction.
- B. Re-inspect the installed fireproofing for integrity of fire protection, after installation of subsequent Work.

### **3.05 CLEANING**

- A. Remove excess material, overspray, droppings, and debris.
- B. Remove fireproofing from materials and surfaces not required to be fireproofed.
- C. At exposed fireproofing, clean surfaces that have become soiled or stained, using manufacturer's recommended procedures.

**END OF SECTION**

**SECTION 07 8400**  
**FIRESTOPPING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Firestopping systems.
- B. Firestopping of all joints and penetrations in fire-resistance rated and smoke-resistant assemblies, whether indicated on drawings or not, and other openings indicated.

**1.02 RELATED REQUIREMENTS**

- A. Section 09 2116 - Gypsum Board Assemblies: Gypsum wallboard fireproofing.

**1.03 REFERENCE STANDARDS**

- A. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials; 2016a.
- B. ASTM E814 - Standard Test Method for Fire Tests of Through-Penetration Fire Stops; 2013a.
- C. ASTM E1966 - Standard Test Method for Fire Resistive Joint Systems; 2007 (Reapproved 2011).
- D. ASTM E2307 - Standard Test Method for Determining Fire Resistance of Perimeter Fire Barriers Using Intermediate-Scale, Multi-story Test Apparatus; 2015a.
- E. ASTM E2837 - Standard Test Method for Determining the Fire Resistance of Continuity Head-of-Wall Joint Systems Installed Between Rated Wall Assemblies and Nonrated Horizontal Assemblies; 2013.
- F. ASTM G21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi; 2015.
- G. ITS (DIR) - Directory of Listed Products; current edition.
- H. FM P7825 - Approval Guide; Factory Mutual Research Corporation; current edition.
- I. SCAQMD 1168 - Adhesive and Sealant Applications; 1989 (Amended 2017).
- J. UL 2079 - Standard for Tests for Fire Resistance of Building Joint Systems; Current Edition, Including All Revisions.
- K. UL (FRD) - Fire Resistance Directory; Current Edition.

**1.04 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Schedule of Firestopping: List each type of penetration, fire rating of the penetrated assembly, and firestopping test or design number.
- C. Product Data: Provide data on product characteristics, performance ratings, and limitations.
- D. Manufacturer's Installation Instructions: Indicate preparation and installation instructions.
- E. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

**1.05 QUALITY ASSURANCE**

- A. Fire Testing: Provide firestopping assemblies of designs that provide the scheduled fire ratings when tested in accordance with methods indicated.
  - 1. Listing in the current-year classification or certification books of UL, FM, or ITS (Warnock Hersey) will be considered as constituting an acceptable test report.
- B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

## 1.06 FIELD CONDITIONS

- A. Comply with firestopping manufacturer's recommendations for temperature and conditions during and after installation. Maintain minimum temperature before, during, and for 3 days after installation of materials.

## PART 2 PRODUCTS

### 2.01 FIRESTOPPING - GENERAL REQUIREMENTS

- A. Manufacturers:
  - 1. A/D Fire Protection Systems Inc: [www.adfire.com](http://www.adfire.com).
  - 2. 3M Fire Protection Products: [www.3m.com/firestop](http://www.3m.com/firestop).
  - 3. Hilti, Inc: [www.us.hilti.com](http://www.us.hilti.com).
  - 4. Nelson FireStop Products: [www.nelsonfirestop.com](http://www.nelsonfirestop.com).
  - 5. Specified Technologies, Inc: [www.stifirestop.com](http://www.stifirestop.com).
  - 6. Substitutions: See Section 01 6000 - Product Requirements.
- B. Firestopping: Caulk or putty.
- C. Firestopping Materials with Volatile Content: Provide only products having lower volatile organic compound (VOC) content than required by South Coast Air Quality Management District Rule No.1168.
- D. Mold Resistance: Provide firestopping materials with mold and mildew resistance rating of 0 as determined by ASTM G21.
- E. Primers, Sleeves, Forms, Insulation, Packing, Stuffing, and Accessories: Type required for tested assembly design.
- F. Fire Ratings: See Drawings for required systems and ratings.

### 2.02 FIRESTOPPING ASSEMBLY REQUIREMENTS

- A. Perimeter Fire Containment Firestopping: Use any system that has been tested according to ASTM E2307 to have fire resistance F Rating equal to required fire rating of the floor assembly.
  - 1. Movement: In addition, provide systems that have been tested to show movement capability as indicated.
  - 2. Temperature Rise: In addition, provide systems that have been tested to show T Rating as indicated.
  - 3. Air Leakage: In addition, provide systems that have been tested to show L Rating as indicated.
  - 4. Where floor assembly is not required to have a fire rating, provide systems that have been tested to show L Rating as indicated.
- B. Head-of-Wall Firestopping at Joints Between Non-Rated Floor and Fire-Rated Wall: Use any system that has been tested according to ASTM E2837 to have fire resistance F Rating equal to required fire rating of floor or wall, whichever is greater.
  - 1. Movement: In addition, provide systems that have been tested to show movement capability as indicated.
- C. Floor-to-Floor, Wall-to-Wall, and Wall-to-Floor Joints, Except Perimeter, Where Both Are Fire-Rated: Use any system that has been tested according to ASTM E1966 or UL 2079 to have fire resistance F Rating equal to required fire rating of the assembly in which the joint occurs.
  - 1. Movement: In addition, provide systems that have been tested to show movement capability as indicated.
  - 2. Air Leakage: In addition, provide systems that have been tested to show L Rating as indicated.
  - 3. Watertightness: In addition, provide systems that have been tested to show W Rating as indicated.
  - 4. Listing by UL, FM, or Intertek in their certification directory will be considered evidence of successful testing.



- D. Through Penetration Firestopping: Use any system that has been tested according to ASTM E814 to have fire resistance F Rating equal to required fire rating of penetrated assembly.
  - 1. Temperature Rise: In addition, provide systems that have been tested to show T Rating as indicated.
  - 2. Air Leakage: In addition, provide systems that have been tested to show L Rating as indicated.
  - 3. Watertightness: In addition, provide systems that have been tested to show W Rating as indicated.
  - 4. Listing by UL, FM, or Intertek in their certification directory will be considered evidence of successful testing.

### **2.03 FIRESTOPPING FOR FLOOR-TO-FLOOR, WALL-TO-FLOOR, AND WALL-TO-WALL JOINTS**

- A. Concrete and Concrete Masonry Walls and Floors:
  - 1. Floor to Floor Joints:
    - a. 2 Hour Construction: UL System FF-D-1013; Hilti CFS-SP WB Firestop Joint Spray and CP 672.
  - 2. Top of Wall Joints at Concrete/Concrete Masonry Wall to Concrete Over Metal Deck Floor:
    - a. 2 Hour Construction: UL System HW-D-0181; Hilti CFS-SP WB Firestop Joint Spray and CP 672.
    - b. 2 Hour Construction: UL System HW-D-1037; Hilti CFS-SP WB Firestop Joint Spray and CP 672.
  - 3. Top of Wall Joints at Concrete/Concrete Masonry Wall to Concrete Floor:
    - a. 3 Hour Construction: UL System HW-D-1058; Hilti CFS-SP WB Firestop Joint Spray and CP 672.
    - b. 2 Hour Construction: UL System HW-D-0268; Hilti CP 606 Flexible Firestop Sealant.
  - 4. Concrete/Concrete Masonry Wall to Wall Joints:
    - a. 2 Hour Construction: UL System WW-D-0017; Hilti CFS-SP WB Firestop Joint Spray and CP 672.
    - b. 2 Hour Construction: UL System WW-D-0032; Hilti CP 606 Flexible Firestop Sealant.
- B. Gypsum Board Walls:
  - 1. Wall to Wall Joints:
    - a. 2 Hour Construction: UL System WW-D-0067; Hilti CP 606 Flexible Firestop Sealant.
    - b. 1 Hour Construction: UL System WW-D-0067; Hilti CP 606 Flexible Firestop Sealant.
  - 2. Top of Wall Joints at Underside of Steel Beam and Concrete Over Metal Deck Floor with Sprayed On Fireproofing:
    - a. 2 Hour Construction: UL System HW-D-0259; Hilti CFS-SP WB Firestop Joint Spray and CP 672.
    - b. 1 Hour Construction: UL System HW-D-0259; Hilti CFS-SP WB Firestop Joint Spray and CP 672.
  - 3. Top of Wall Joints at Underside of Flat Concrete:
    - a. 2 Hour Construction: UL System HW-D-1068; Hilti CFS-SP WB Firestop Joint Spray and CP 672.
    - b. 1 Hour Construction: UL System HW-D-1068; Hilti CFS-SP WB Firestop Joint Spray and CP 672.
  - 4. Top of Wall Joints at Concrete Over Metal Deck, Wall Parallel to Ribs:
    - a. 2 Hour Construction: UL System HW-D-0049; Hilti CFS-SP WB Firestop Joint Spray and CP 672.
    - b. 2 Hour Construction: UL System HW-D-0184; Hilti CP 606 Flexible Firestop Sealant.
    - c. 1 Hour Construction: UL System HW-D-0049; Hilti CFS-SP WB Firestop Joint Spray and CP 672.
    - d. 1 Hour Construction: UL System HW-D-0184; Hilti CP 606 Flexible Firestop Sealant.
  - 5. Top of Wall Joints at Concrete Over Metal Deck, Wall Perpendicular to Ribs, Cut to Fit Ribs:
    - a. 2 Hour Construction: UL System HW-D-0045; Hilti CP 606 Flexible Firestop Sealant.

- b. 1 Hour Construction: UL System HW-D-0045; Hilti CP 606 Flexible Firestop Sealant.
- 6. Top of Wall Joints at Concrete Over Metal Deck, Wall Perpendicular to Ribs, Not Cut to Fit:
  - a. 2 Hour Construction: UL System HW-D-0042; Hilti CFS-SP WB Firestop Joint Spray and CP 672.
  - b. 2 Hour Construction: UL System HW-D-0045; Hilti CP 606 Flexible Firestop Sealant.
  - c. 1 Hour Construction: UL System HW-D-0042; Hilti CFS-SP WB Firestop Joint Spray and CP 672.
  - d. 1 Hour Construction: UL System HW-D-0045; Hilti CP 606 Flexible Firestop Sealant.

## **2.04 FIRESTOPPING PENETRATIONS THROUGH CONCRETE AND CONCRETE MASONRY CONSTRUCTION**

- A. Blank Openings:
  - 1. In Floors or Walls:
    - a. 2 Hour Construction: UL System C-AJ-0090; Hilti FS-ONE Intumescent Firestop Sealant.
- B. Penetrations Through Floors or Walls By:
  - 1. Multiple Penetrations in Large Openings:
    - a. 2 Hour Construction: UL System C-AJ-8143; Hilti FS-ONE Intumescent Firestop Sealant.
  - 2. Bathtub Drains:
    - a. Up to 3 Hour Construction: UL System F-A-1037, F-A-1038, F-A-2094, or F-A-2095; Hilti CP 681 Tub Box Kit.
  - 3. Uninsulated Metallic Pipe, Conduit, and Tubing:
    - a. 2 Hour Construction: UL System C-AJ-1421; Hilti FS-ONE Intumescent Firestop Sealant or CP 604 Self-Leveling Firestop Sealant.
    - b. 2 Hour Construction: UL System C-AJ-1498; Hilti CP 680-P/M Cast-In Device.
  - 4. Uninsulated Non-Metallic Pipe, Conduit, and Tubing:
    - a. 2 Hour Construction: UL System C-AJ-2567; Hilti FS-ONE Intumescent Firestop Sealant.
    - b. 2 Hour Construction: UL System C-AJ-2109; Hilti CP 643N/644 Firestop Collar.
    - c. 2 Hour Construction: UL System C-BJ-2021; Hilti CP 643N Firestop Collar.
  - 5. Electrical Cables Not In Conduit:
    - a. 2 Hour Construction: UL System C-AJ-3216; Hilti CP 658 Firestop Plug.
    - b. 2 Hour Construction: UL System W-J-3198; Hilti CFS-SL RK Retrofit Sleeve Kit for existing cables.
    - c. 2 Hour Construction: UL System W-J-3199; Hilti CFS-SL SK Firestop Sleeve Kit.
    - d. 2 Hour Construction: UL System W-J-3200; Hilti CP653 Speed Sleeve.
  - 6. Cable Trays with Electrical Cables:
    - a. 2 Hour Construction: UL System C-AJ-4071; Hilti FS 657 Fire Block.
  - 7. Electrical Busways:
  - 8. Insulated Pipes:
    - a. 2 Hour Construction: UL System C-AJ-5091; Hilti FS-ONE Intumescent Firestop Sealant.
    - b. 2 Hour Construction: UL System C-AJ-5048; Hilti FS-ONE Intumescent Firestop Sealant, CP 606 Flexible Firestop Sealant, CP 601S Elastomeric Firestop Sealant, or CP 604 Self-Leveling Firestop Sealant.
  - 9. HVAC Ducts, Uninsulated:
    - a. 2 Hour Construction: UL System C-AJ-7111; Hilti FS-ONE Intumescent Firestop Sealant.
    - b. 2 Hour Construction: UL System C-AJ-7084; Hilti FS-ONE Intumescent Firestop Sealant, CP 606 Flexible Firestop Sealant, CP 601S Elastomeric Firestop Sealant, or CP 604 Self-Leveling Firestop Sealant.
- C. Penetrations Through Floors By:

1. Multiple Penetrations in Large Openings:
    - a. 2 Hour Construction: UL System F-A-8012; Hilti CP 604 Self-Leveling Firestop Sealant.
  2. Uninsulated Metallic Pipe, Conduit, and Tubing:
    - a. 2 Hour Construction: UL System F-A-1016; Hilti CP 680-P/M Cast-In Device.
  3. Uninsulated Non-Metallic Pipe, Conduit, and Tubing:
    - a. 2 Hour Construction: UL System F-A-2015; Hilti CP 643N Firestop Collar.
    - b. 2 Hour Construction: UL System F-A-2053; Hilti CP 680-P Cast-In Device.
    - c. 2 Hour Construction: UL System F-A-2058; Hilti FS-ONE Intumescent Firestop Sealant.
  4. Electrical Cables Not In Conduit:
    - a. 2 Hour Construction: UL System F-A-3033; Hilti CP 680-P/M Cast-In Device.
  5. Electrical Busways:
    - a. 2 Hour Construction: UL System F-A-6002; Hilti CP 604 Self-Leveling Firestop Sealant.
  6. Insulated Pipes:
    - a. 2 Hour Construction: UL System F-A-5015; Hilti CP 680-P/M Cast-In Device.
    - b. 2 Hour Construction: UL System F-A-5017; Hilti CP 680-P/M Cast-In Device.
- D. Penetrations Through Walls By:
1. Uninsulated Metallic Pipe, Conduit, and Tubing:
    - a. 2 Hour Construction: UL System W-J-1067; Hilti FS-ONE Intumescent Firestop Sealant.
    - b. 1 Hour Construction: UL System W-J-1067; Hilti FS-ONE Intumescent Firestop Sealant.
  2. Electrical Cables Not In Conduit:
    - a. 2 Hour Construction: UL System W-J-3060; Hilti FS-ONE Intumescent Firestop Sealant, CP 606 Flexible Firestop Sealant, CD 601S Elastomeric Firestop Sealant, or CP 618 Firestop Putty Stick.
    - b. 2 Hour Construction: UL System W-J-3143; Hilti CP 658T Firestop Plug.
  3. Insulated Pipes:
    - a. 2 Hour Construction: UL System W-J-5041; Hilti FS-ONE Intumescent Firestop Sealant.
    - b. 2 Hour Construction: UL System W-J-5042; Hilti FS-ONE Intumescent Firestop Sealant.
    - c. 2 Hour Construction: UL System W-J-5028; Hilti FS-ONE Intumescent Firestop Sealant.
    - d. 1 Hour Construction: UL System W-J-5041; Hilti FS-ONE Intumescent Firestop Sealant.
    - e. 1 Hour Construction: UL System W-J-5042; Hilti FS-ONE Intumescent Firestop Sealant.
    - f. 1 Hour Construction: UL System W-J-5028; Hilti FS-ONE Intumescent Firestop Sealant.
  4. HVAC Ducts, Uninsulated:
    - a. 2 Hour Construction: UL System W-J-7109; Hilti FS-ONE Intumescent Firestop Sealant or CP 606 Flexible Firestop Sealant.
  5. HVAC Ducts, Insulated:
    - a. 2 Hour Construction: UL System W-J-7112; Hilti FS-ONE Intumescent Firestop Sealant.

## **2.05 FIRESTOPPING PENETRATIONS THROUGH GYPSUM BOARD WALLS**

- A. Blank Openings:
  1. 2 Hour Construction: UL System W-L-3334; Hilti CP 653 Speed Sleeve.
  2. 1 Hour Construction: UL System W-L-3334; Hilti CP 653 Speed Sleeve.
- B. Penetrations By:

1. Multiple Penetrations in Large Openings:
  - a. 2 Hour Construction: UL System W-L-1389; Hilti FS-ONE Intumescent Firestop Sealant.
  - b. 2 Hour Construction: UL System W-L-1408; Hilti FS-ONE Intumescent Firestop Sealant.
  - c. 2 Hour Construction: UL System W-L-8071; Hilti FS-ONE Intumescent Firestop Sealant.
  - d. 2 Hour Construction: UL System W-L-8079; Hilti FS-ONE Intumescent Firestop Sealant.
  - e. 2 Hour Construction: UL System W-L-8087; Hilti FS 657 Fire Block.
  - f. 1 Hour Construction: UL System W-L-1389; Hilti FS-ONE Intumescent Firestop Sealant.
  - g. 1 Hour Construction: UL System W-L-1408; Hilti FS-ONE Intumescent Firestop Sealant.
  - h. 1 Hour Construction: UL System W-L-8071; Hilti FS-ONE Intumescent Firestop Sealant.
  - i. 1 Hour Construction: UL System W-L-8079; Hilti FS-ONE Intumescent Firestop Sealant.
  - j. 1 Hour Construction: UL System W-L-8087; Hilti FS 657 Fire Block.
2. Uninsulated Metallic Pipe, Conduit, and Tubing:
  - a. 2 Hour Construction: UL System W-L-1054; Hilti FS-ONE Intumescent Firestop Sealant.
  - b. 2 Hour Construction: UL System W-L-1164; Hilti FS-ONE Intumescent Firestop Sealant.
  - c. 2 Hour Construction: UL System W-L-1206; Hilti FS-ONE Intumescent Firestop Sealant.
  - d. 1 Hour Construction: UL System W-L-1054; Hilti FS-ONE Intumescent Firestop Sealant.
  - e. 1 Hour Construction: UL System W-L-1164; Hilti FS-ONE Intumescent Firestop Sealant.
  - f. 1 Hour Construction: UL System W-L-1206; Hilti FS-ONE Intumescent Firestop Sealant.
3. Uninsulated Non-Metallic Pipe, Conduit, and Tubing:
  - a. 2 Hour Construction: UL System W-L-2078; Hilti CP 643N/644 Firestop Collar.
  - b. 2 Hour Construction: UL System W-L-2411; Hilti CP 648-E Firestop Wrap Strip.
  - c. 2 Hour Construction: UL System W-L-2128; Hilti FS-ONE Intumescent Firestop Sealant.
  - d. 1 Hour Construction: UL System W-L-2078; Hilti CP 643N/644 Firestop Collar.
  - e. 1 Hour Construction: UL System W-L-2411; Hilti CP 648-E Firestop Wrap Strip.
  - f. 1 Hour Construction: UL System W-L-2128; Hilti FS-ONE Intumescent Firestop Sealant.
4. Electrical Cables Not In Conduit:
  - a. 2 Hour Construction: UL System W-L-3065; Hilti FS-ONE Intumescent Firestop Sealant, CP 606 Flexible Firestop Sealant, CD 601S Elastomeric Firestop Sealant, or CP 618 Firestop Putty Stick.
  - b. 2 Hour Construction: UL System W-L-3334; Hilti CP 653 Speed Sleeve.
  - c. 2 Hour Construction: UL System W-L-3393; Hilti CFS-SL RK Retrofit Sleeve Kit for existing cables.
  - d. 2 Hour Construction: UL System W-L-3394; Hilti CFS-SL SK Firestop Sleeve Kit.
  - e. 2 Hour Construction: UL System W-L-3395; Hilti CP653 Speed Sleeve.
  - f. 1 Hour Construction: UL System W-L-3065; Hilti FS-ONE Intumescent Firestop Sealant, CP 606 Flexible Firestop Sealant, CD 601S Elastomeric Firestop Sealant, or CP 618 Firestop Putty Stick.
  - g. 1 Hour Construction: UL System W-L-3334; Hilti CP 653 Speed Sleeve.
5. Cable Trays with Electrical Cables:

- a. 2 Hour Construction: UL System W-L-4011; Hilti FS 657 Fire Block.
  - b. 2 Hour Construction: UL System W-L-4060; Hilti FS-ONE Intumescent Firestop Sealant.
  - c. 1 Hour Construction: UL System W-L-4011; Hilti FS 657 Fire Block.
  - d. 1 Hour Construction: UL System W-L-4060; Hilti FS-ONE Intumescent Firestop Sealant.
6. Insulated Pipes:
- a. 2 Hour Construction: UL System W-L-5028; Hilti FS-ONE Intumescent Firestop Sealant.
  - b. 2 Hour Construction: UL System W-L-5029; Hilti FS-ONE Intumescent Firestop Sealant.
  - c. 2 Hour Construction: UL System W-L-5096; Hilti FS-ONE Intumescent Firestop Sealant.
  - d. 2 Hour Construction: UL System W-L-5257; Hilti FS-ONE Intumescent Firestop Sealant, CP 606 Flexible Firestop Sealant, or CP 601S Elastomeric Firestop Sealant.
  - e. 2 Hour Construction: UL System W-L-5244; Hilti CP 648-E Firestop Wrap Strip.
  - f. 1 Hour Construction: UL System W-L-5028; Hilti FS-ONE Intumescent Firestop Sealant.
  - g. 1 Hour Construction: UL System W-L-5029; Hilti FS-ONE Intumescent Firestop Sealant.
  - h. 1 Hour Construction: UL System W-L-5096; Hilti FS-ONE Intumescent Firestop Sealant.
  - i. 1 Hour Construction: UL System W-L-5096; Hilti FS-ONE Intumescent Firestop Sealant, CP 606 Flexible Firestop Sealant, or CP 601S Elastomeric Firestop Sealant.
7. HVAC Ducts, Insulated:
- a. 2 Hour Construction: UL System W-L-7156; Hilti FS-ONE Intumescent Firestop Sealant.
  - b. 1 Hour Construction: UL System W-L-7156; Hilti FS-ONE Intumescent Firestop Sealant.

## **2.06 FIRESTOPPING SYSTEMS**

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Verify openings are ready to receive the work of this section.

#### **3.02 PREPARATION**

- A. Clean substrate surfaces of dirt, dust, grease, oil, loose material, or other matter that could adversely affect bond of firestopping material.
- B. Remove incompatible materials that could adversely affect bond.
- C. Install backing materials to arrest liquid material leakage.

#### **3.03 INSTALLATION**

- A. Install materials in manner described in fire test report and in accordance with manufacturer's instructions, completely closing openings.
- B. Install labeling required by code.

#### **3.04 CLEANING**

- A. Clean adjacent surfaces of firestopping materials.

#### **3.05 PROTECTION**

- A. Protect adjacent surfaces from damage by material installation.

**END OF SECTION**

**SECTION 07 9000**  
**JOINT SEALERS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Sealing of joints specified in Schedule at end of Section.

**1.02 REFERENCES**

- A. ASTM C 881/C 881M - Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete; 2002.
- B. ASTM D 638 - Standard Test Method for Tensile Properties of Plastics; 2003.
- C. ASTM D 695 - Standard Test Method for Compressive Properties of Rigid Plastics; 2002a.
- D. ASTM D 816 - Standard Test Methods for Rubber Cements; 1982 (Reapproved 2001).
- E. ASTM D 3574 - Standard Test Methods for Flexible Cellular Materials--Slab, Bonded, and Molded Urethane Foams; 2003.
- F. ASTM G 154 - Standard Practice for Operating Fluorescent Light Apparatus for UV Exposure of Nonmetallic Materials; 2000a.
- G. UL 94 - Tests for Flammability of Plastic Materials for Parts in Devices and Appliances; Underwriters Laboratories Inc; 1996.

**1.03 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Manufacturer's data showing product characteristics and application methods.
- C. Selection Samples: Color charts for color selection.

**1.04 QUALITY ASSURANCE**

- A. Installer Qualifications: Trained and experienced in the installation of this type of sealant.

**1.05 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver joint seals to site in manufacturer's original unopened containers; store and move to installation location in original containers.
- B. Store materials in dry, enclosed area, off the ground, out of direct sunlight.
- C. Store materials at minimum of 68 degrees F (20 degrees C) for at least 24 hours prior to installation, regardless of temperature at location of installation.

**1.06 WARRANTY**

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Provide manufacturer's 10-year warranty against product defects.

**PART 2 PRODUCTS**

**2.01 MANUFACTURERS**

- A. Manufacturer: Dayton Superior Chemical Division; 636 S. 66th Terrace, Kansas City, KS 66226. ASD. Tel: (800) 745-3707.
- B. Other Acceptable Manufacturers:
  - 1. Saint-Gobain; [www.nortonfoam.com](http://www.nortonfoam.com).
  - 2. DeGussa; [www.DeGussaBuildingSystems.com](http://www.DeGussaBuildingSystems.com).
  - 3. Capital Services; [www.capitalservicesny.com](http://www.capitalservicesny.com).
- C. Substitutions: See Section 01 6000 - Product Requirements.

**2.02 PREFORMED JOINT SEALER MATERIALS**

- A. Preformed Joint Seals - Performance Requirements:
  - 1. Installed Water Resistance: No penetration at 50 percent compression.

2. Movement Capability: 100 percent compression and expansion, with 100 percent recovery.
  3. Water Absorption: Maximum 3 percent of weight, when tested at 50 percent compression for 100 hours under 6 ft (1830 mm) of water.
  4. Ultraviolet light resistant.
  5. Mildew resistant.
  6. Non-staining to adjacent materials.
  7. Non-bleeding, at up to 212 degrees F (100 degrees C) and 20 percent compression.
  8. Resistant to gasoline, diesel fuel, jet fuel, solvents, salts, anti-freeze, industrial cleaners, corrosive vapors, and acids.
  9. Flammability (UL 94): VO, self-extinguishing.
  10. Tensile Strength (ASTM D 3574): 21.8 psi (150 kPa), min.
  11. Compression Set (ASTM D 3574): 2 percent, max.
  12. Shear Strength: 8 N/cu cm, min.
  13. Resistance to Aging: No more than minor surface degradation, after 825 hrs exposure in accordance with ASTM G 154 (or G 53).
  14. Softening Point (ASTM D 816): 122 degrees F (50 degrees C), minimum.
  15. Flash Point: 590 degrees F (310 degrees C), min.
- B. Preformed Joint Seals (Standard): "Polytite"; precompressed, self-expanding polyurethane foam impregnated with hydrophobic polymer waterproofing agent, with self adhesive faces.
1. Exposed surfaces: Bond breaker release agent; "Polytite B."
  2. Density: 10 lb/cu ft (160 kg/cu m).
  3. Thickness: Selected by Contractor for minimum 50 percent material compression, based on manufacturer's data and expected width of actual joints under most extreme conditions.
  4. Color: Selected from manufacturer's full range.
- C. Traffic Joint Seals: "Polytite N"; precompressed, self-expanding polyurethane foam impregnated with neoprene copolymer waterproofing agent, with self-adhesive faces.
1. Density: 10 lb/cu ft (160 kg/cu m).
  2. Thickness: Selected by Contractor for minimum 50 percent material compression based on manufacturer's data and expected width of actual joint under most extreme conditions.
- D. Window Perimeters: Dow Corning 795
- E. Fiber Cement Siding Sealant: per manufacturers recommendations
- F. Dissimilar Metals: Sonolasatic 150

### 2.03 EPOXY JOINT FILLERS

- A. Flexible, Horizontal Joint Sealant: "Joint-Loc" flexible epoxy joint systems for floor joints; complying with ASTM C 881, Type III, Grade 1, Class B and C; and as follows:
1. Joints Subject to Extreme Movement: For joints 1/2 in (13 mm) or less and subject to movement over 100 percent, provide "Joint-Loc 35" with properties as follows:
    - a. Hardness: 35-A, per ASTM D 2240.
    - b. Elongation: 120 percent, per ASTM D 638.
  2. Joints Subject to High Movement: For joints 1/2 in (13 mm) or less and subject to movement up to 100 percent, provide "Joint-Loc 65" with properties as follows:
    - a. Hardness: 65-A, per ASTM D 2240.
    - b. Elongation: 100 percent, per ASTM D 638.
  3. Joints Subject to Moderate Movement: For joints 1/8 to 3/4 in (3.2 to 19 mm) and subject to movement up to 70 percent, provide "Joint-Loc 80" with properties as follows:
    - a. Hardness: 80-A, per ASTM D 2240.
    - b. Elongation: 70-80 percent, per ASTM D 638.
- B. Chemical Resistant, Flexible Joint Sealant: "Martar-LC" coal tar modified epoxy outdoor floor joint filler; complying with ASTM C 881, Type III, Grade 2, Class C, and with properties as follows:
1. Pot Life: 2 hours at 77 degrees F (25 degrees C).

2. Gel Time: 8-12 hours.
3. Compressive Strength: 600 psi (4.3 MPa), per ASTM D 695.
4. Elongation: 100 percent at 77 degrees F (25 degrees C); 50 percent at 40 degrees F (4.4 degrees C); and 25 percent at 0 degrees F (-18 degrees C).
5. Water Absorption: 0.35 percent.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Verify that joints are clean, dry, sound, smooth, straight and parallel, and otherwise ready to receive joint seals.
- B. For preformed joint sealers, verify that seals are of the correct width to provide specified compression.
- C. Verify joints are of sufficient depth.
- D. Do not proceed with installation until detrimental conditions have been corrected.

#### **3.02 PREPARATION**

- A. Clean and prime joints where required or recommended by manufacturer.
- B. Install bond breaker on back surface of joint if necessary.

#### **3.03 INSTALLATION**

- A. Install joint seals in accordance with manufacturer's instructions.
- B. Do not install joint seals when temperature is below -14 degrees F (-25 degrees C) or above 95 degrees F (35 degrees C).
- C. Do not install joint seals in rain or snow.
- D. Do not use scrap material.

#### **3.04 SCHEDULE**

- A. Preformed Joint Seals (Standard): Use in the following locations:
  1. Vertical exterior joints wider than 1-1/4 inches (32 mm).
  2. Masonry expansion and control joints.
  3. Vertical joints in concrete, stone, or masonry.
  4. Vertical joints between different materials.
  5. Below grade joints in foundation walls.
  6. Exterior joints around door and window openings.
  7. Concealed joints in metal curtain wall, metal panels, and similar applications.
  8. Joints in exterior insulation and finish system.
  9. Interior expansion and control joints.
  10. Other joints indicated to be sealed, that are not specified to be sealed with another material.
  11. All other joints in exterior envelope that are not specified to be sealed with another material, whether indicated to be sealed or not.
- B. Traffic Joint Seals: Use in the following locations:
  1. Concrete paving joints, including sidewalks, terraces, and drives.
  2. Interior floor expansion and control joints.
  3. Other joints so indicated.
- C. Flexible, Horizontal Joint Sealant: Use in the following locations:
  1. Interior floor joints subject to movement.
  2. Other joints so indicated.
- D. Chemical Resistant, Flexible Joint Sealant: Use in the following locations:
  1. Control and expansion joints in asphalt paving.
  2. Other joints so indicated.

**END OF SECTION**





**SECTION 08 1113**  
**HOLLOW METAL DOORS AND FRAMES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Non-fire-rated steel doors and frames.
- B. Steel frames for wood doors.
- C. Fire-rated steel doors and frames.
- D. Thermally insulated steel doors.
- E. Steel glazing frames.
- F. Accessories, including glazing.

**1.02 RELATED REQUIREMENTS**

- A. Section 06100 Rough Carpentry
- B. Section 05400 Cold formed metal fraing
- C. Section 06114 Wood Blocking and Curbing
- D. Section 08 7100 - Door Hardware.
- E. Section 08 8000 - Glazing: Glass for doors and borrowed lites.
- F. Section 09 9000 - Painting and Coating: Field painting.
- G. Section 09260 Gypsum Board Assemblies

**1.03 REFERENCE STANDARDS**

- A. ANSI/ICC A117.1 - American National Standard for Accessible and Usable Buildings and Facilities; International Code Council; 2009.
- B. ANSI/SDI A250.8 - Specifications for Standard Steel Doors and Frames (SDI-100); 2014.
- C. ANSI/SDI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames; 2011.
- D. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2015.
- E. BHMA A156.115 - American National Standard for Hardware Preparation in Steel Doors and Steel Frames; 2014.
- F. DHI A115 Series - Specifications for Steel Doors and Frame Preparation for Hardware; Door and Hardware Institute; 2000 (ANSI/DHI A115 Series).
- G. NAAMM HMMA 840 - Guide Specifications for Installation and Storage of Hollow Metal Doors and Frames; 2007.
- H. NFPA 80 - Standard for Fire Doors and Other Opening Protectives; 2016.
- I. UL (BMD) - Building Materials Directory; Underwriters Laboratories Inc.; current edition.
- J. UL 10C - Standard for Positive Pressure Fire Tests of Door Assemblies; Current Edition, Including All Revisions.

**1.04 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Product Data: Materials and details of design and construction, hardware locations, reinforcement type and locations, anchorage and fastening methods, and finishes.
- C. Shop Drawings: Details of each opening, showing elevations, glazing, frame profiles, and identifying location of different finishes, if any.
- 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.

#### **1.05 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
- B. Maintain at the project site a copy of all reference standards dealing with installation.

#### **1.06 DELIVERY, STORAGE, AND HANDLING**

- A. Store in accordance with NAAMM HMMA 840.
- B. Protect with resilient packaging; avoid humidity build-up under coverings; prevent corrosion.

### **PART 2 PRODUCTS**

#### **2.01 MANUFACTURERS**

- A. Steel Doors and Frames:
  - 1. Assa Abloy Ceco, Curries, or Fleming: [www.assaabloydss.com](http://www.assaabloydss.com).
  - 2. Ceco Door Products: [www.cecodoor.com](http://www.cecodoor.com).
  - 3. Steelcraft: [www.steelcraft.com](http://www.steelcraft.com).
  - 4. Ingersoll Rand
  - 5. Substitutions: See Section 01 6000 - Product Requirements.

#### **2.02 DOORS AND FRAMES**

- A. Requirements for All Doors and Frames:
  - 1. Accessibility: Comply with ANSI/ICC A117.1.
  - 2. Door Top Closures: Flush with top of faces and edges.
  - 3. Door Edge Profile: Beveled on both edges.
  - 4. Door Texture: Smooth faces.
  - 5. Glazed Lights: Non-removable stops on non-secure side; sizes and configurations as indicated on drawings.
  - 6. Hardware Preparation: In accordance with BHMA A156.115, with reinforcement welded in place, in addition to other requirements specified in door grade standard.
  - 7. Finish: Factory primed, for field finishing.
- B. Combined Requirements: If a particular door and frame unit is indicated to comply with more than one type of requirement, comply with all the specified requirements for each type; for instance, an exterior door that is also indicated as being sound-rated must comply with the requirements specified for exterior doors and for sound-rated doors; where two requirements conflict, comply with the most stringent.

#### **2.03 STEEL DOORS**

- A. Exterior Doors :
  - 1. Grade: ANSI A250.8 Level 3, physical performance Level A, Model 2, seamless.
  - 2. Core: Polyurethane.
  - 3. Galvanizing: All components hot-dipped zinc-iron alloy-coated (galvannealed) in accordance with ASTM A653/A653M, with manufacturer's standard coating thickness.
  - 4. Weatherstripping: Separate, see Section 08 7100.
  - 5. Finish: Factory primed, for field finishing.
- B. Interior Doors, Non-Fire-Rated:
  - 1. Grade: ANSI A250.8 Level 1, physical performance Level C, Model 1, full flush.
  - 2. Core: Cardboard honeycomb.
  - 3. Thickness: 1-3/4 inches (44 mm).
  - 4. Finish: Factory primed, for field finishing.
- C. Interior Doors, Fire-Rated:
  - 1. Grade: ANSI A250.8 Level 2, physical performance Level B, Model 1, full flush.
  - 2. Fire Rating: As indicated on Door and Frame Schedule, tested in accordance with UL 10C ("positive pressure").

3. Fire Rating: As indicated on Door and Frame Schedule, with temperature rise ratings as required by code, tested in accordance with NFPA 252.
  - a. Provide units listed and labeled by UL.
  - b. Attach fire rating label to each fire rated unit.
4. Core: Mineral fiberboard.
5. Finish: Factory primed, for field finishing.

#### **2.04 STEEL FRAMES**

- A. General:
  1. Comply with the requirements of grade specified for corresponding door, except:
    - a. ANSI A250.8 Level 1 Doors: 16 gage frames.
    - b. ANSI A250.8 Level 3 Doors: 14 gage frames.
    - c. Frames for Wood Doors: Comply with frame requirements specified in ANSI A250.8 for Level 1, 18 gage
  2. Finish: Factory primed, for field finishing.
  3. Provide plaster guard boxes for hardware cut-outs in frames to be installed in interior partitions.
  4. Provide mortar guard boxes for hardware cut-outs in frames to be installed in masonry or to be grouted.
  5. Frames in Masonry Walls: Size to suit masonry coursing with head member 4 inches (100 mm) high to fill opening without cutting masonry units.
  6. Frames Wider than 48 Inches (1200 mm): Reinforce with steel channel fitted tightly into frame head, flush with top.
- B. Exterior Door Frames: Face welded, seamless with joints filled.
  1. Galvanizing: All components hot-dipped zinc-iron alloy-coated (galvannealed) in accordance with ASTM A653/A653M, with manufacturer's standard coating thickness.
  2. Weatherstripping: Separate, see Section 08 7100.
- C. Interior Door Frames, Non-Fire-Rated: Face welded type.
- D. Interior Door Frames, Fire-Rated: Face welded type.
  1. Fire Rating: Same as door, labeled.
- E. Frames for Interior Glazing or Borrowed Lights: Construction and face dimensions to match door frames, and as indicated on drawings.

#### **2.05 ACCESSORY MATERIALS**

- A. Glazing: As specified in Section 08 8000, factory installed.
- B. Astragals for Double Doors: Specified in Section 08 7100.
  1. Fire-Rated Doors: Steel, shape as required to accomplish fire rating.
- C. Grout for Frames: Portland cement grout of maximum 4-inch slump for hand troweling; thinner pumpable grout is prohibited.
- D. Silencers: Resilient rubber, fitted into drilled hole; 3 on strike side of single door, 3 on center mullion of pairs, and 2 on head of pairs without center mullions.
- E. Temporary Frame Spreaders: Provide for all factory- or shop-assembled frames.

#### **2.06 FINISH MATERIALS**

- A. Primer: Rust-inhibiting, complying with ANSI A250.10, door manufacturer's standard.
- B. Bituminous Coating: Asphalt emulsion or other high-build, water-resistant, resilient coating.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Verify existing conditions before starting work.
- B. Verify that opening sizes and tolerances are acceptable.
- C. Verify that finished walls are in plane to ensure proper door alignment.

### **3.02 PREPARATION**

- A. Coat inside of frames to be installed in masonry or to be grouted, with bituminous coating, prior to installation.
- B. Coat inside of frames with bituminous coating to a thickness of 1/16 inch (1.5 mm).

### **3.03 INSTALLATION**

- A. Install in accordance with the requirements of the specified door grade standard and NAAMM HMMA 840.
- B. In addition, install fire rated units in accordance with NFPA 80.
- C. Coordinate frame anchor placement with wall construction.
- D. Grout frames in masonry construction, using hand trowel methods; brace frames so that pressure of grout before setting will not deform frames.
- E. Coordinate installation of hardware.
- F. Coordinate installation of glazing.
- G. Coordinate installation of electrical connections to electrical hardware items.

### **3.04 TOLERANCES**

- A. Maximum Diagonal Distortion: 1/16 in (1.5 mm) measured with straight edge, corner to corner.

### **3.05 ADJUSTING**

- A. Adjust for smooth and balanced door movement.

### **3.06 SCHEDULE**

- A. Refer to Door and Frame Schedule on the drawings.

**END OF SECTION**

**SECTION 08 3323**  
**OVERHEAD COILING DOORS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Overhead coiling doors, operating hardware, non-fire-rated and exterior, electric operation.
- B. Wiring from electric circuit disconnect to operator to control station.

**1.02 RELATED REQUIREMENTS**

- A. Section 07 9200 - Joint Sealants: Sealing joints between frames and adjacent construction.
- B. Section 08 7100 - Door Hardware: Cylinder cores and keys.
- C. Section 09 9113 - Exterior Painting: Field paint finish.
- D. Section 26 0583 - Wiring Connections: Power to disconnect.

**1.03 REFERENCE STANDARDS**

- A. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2014.
- B. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2015.
- C. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2015.
- D. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2015.
- E. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2014.
- F. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes [Metric]; 2013.
- G. ITS (DIR) - Directory of Listed Products; current edition.
- H. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2014.
- I. NEMA ICS 2 - Industrial Control and Systems Controllers, Contactors and Overload Relays Rated 600 Volts; 2000 (R2005), with errata, 2008.
- J. NEMA MG 1 - Motors and Generators; 2017.
- K. NFPA 80 - Standard for Fire Doors and Other Opening Protectives; 2016.
- L. UL (DIR) - Online Certifications Directory; current listings at database.ul.com.
- M. UL 325 - Standard for Door, Drapery, Gate, Louver, and Window Operators and Systems; Current Edition, Including All Revisions.

**1.04 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate pertinent dimensioning, anchorage methods, hardware locations, and installation details.
- C. Samples: Submit two slats, 2 x 2 inch (\_\_\_\_\_ mm) in size illustrating shape, color and finish texture.
- D. Manufacturer's Installation Instructions: Indicate installation sequence and procedures, adjustment and alignment procedures.

**1.05 QUALITY ASSURANCE**

- A. Products Requiring Electrical Connection: Listed and classified by \_\_\_\_\_ as suitable for the purpose specified and indicated.

## **PART 2 PRODUCTS**

### **2.01 MANUFACTURERS**

- A. Overhead Coiling Doors:
  - 1. Cornell Iron Works, Inc.[Thermiser]: [www.cornelliron.com](http://www.cornelliron.com).

### **2.02 COILING DOORS**

- A. Cornell Innovative Door Solutions, Thermiser Insulated Rolling Doors
- B. Moel: ESD20
  - 1. Electric Operation
  - 2. Cylinder Bolt Locking
  - 3. Entrapment Protection
  - 4. Spectrashield Powder Coat Opearation, architect to select color.

### **2.03 MATERIALS**

- A. Curtain Construction: Interlocking slats.
  - 1. Slat Ends: Alternate slats fitted with end locks to act as wearing surface in guides and to prevent lateral movement.
  - 2. Curtain Bottom: Fitted with angles to provide reinforcement and positive contact in closed position.
- B. Guide Construction: Continuous, of profile to retain door in place with snap-on trim, mounting brackets of same metal.
- C. Lock Hardware:
- D. Roller Shaft Counterbalance: Steel pipe and helical steel spring system, capable of producing torque sufficient to ensure smooth operation of curtain from any position and capable of holding position at mid-travel; with adjustable spring tension; requiring 25 lb (10 kg) nominal force to operate.

### **2.04 ELECTRIC OPERATION**

- A. Operator, Controls, Actuators, and Safeties: Comply with UL 325; provide products listed by.
  - 1. Provide interlock switches on motor operated units.
- B. Electric Operators:
  - 1. Motor Rating: 1/3 hp (250 W); continuous duty.
  - 2. Motor Controller: NEMA ICS 2, full voltage, reversing magnetic motor starter.
  - 3. Controller Enclosure: NEMA 250, Type 1.
  - 4. Opening Speed: 12 inches per second (300 mm/s).
  - 5. Brake: Adjustable friction clutch type, activated by motor controller.
  - 6. Manual override in case of power failure.
- C. Control Station: Standard three button (OPEN-STOP-CLOSE) momentary control for each operator.
  - 1. 24 volt circuit.
- D. Safety Edge: Located at bottom of curtain, full width, electro-mechanical sensitized type, wired to stop operator upon striking object, hollow neoprene covered.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that opening sizes, tolerances and conditions are acceptable.

### **3.02 INSTALLATION**

- A. Install units in accordance with manufacturer's instructions.
- B. Use anchorage devices to securely fasten assembly to wall construction and building framing without distortion or stress.

- C. Securely and rigidly brace components suspended from structure. Secure guides to structural members only.
- D. Fit and align assembly including hardware; level and plumb, to provide smooth operation.
- E. Coordinate installation of electrical service with Section 26 0583.
- F. Complete wiring from disconnect to unit components.

### **3.03 TOLERANCES**

- A. Maintain dimensional tolerances and alignment with adjacent work.
- B. Maximum Variation From Plumb: 1/16 inch (1.6 mm).
- C. Maximum Variation From Level: 1/16 inch (1.6 mm).
- D. Longitudinal or Diagonal Warp: Plus or minus 1/8 inch per 10 ft (3.2 mm per 3 m) straight edge.

### **3.04 ADJUSTING**

- A. Adjust operating assemblies for smooth and noiseless operation.

### **3.05 CLEANING**

- A. Clean installed components.
- B. Remove labels and visible markings.

**END OF SECTION**



**SECTION 08 4229**  
**AUTOMATIC ENTRANCES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Packaged power-operated door assemblies.
  - 1. Sliding type.
- B. Controllers, actuators and safety devices.
- C. Maintenance.

**1.02 RELATED REQUIREMENTS**

- A. Section 08 4233 - Revolving Door Entrances: Automatic revolving doors.

**1.03 REFERENCE STANDARDS**

- A. ASTM E1996 - Standard Specification for Performance of Exterior Windows, Curtain Walls, Doors, and Impact Protective Systems Impacted by Windborne Debris in Hurricanes; 2014.
- B. BHMA A156.10 - American National Standard for Power Operated Pedestrian Doors; 2011.
- C. UL 325 - Standard for Door, Drapery, Gate, Louver, and Window Operators and Systems; Current Edition, Including All Revisions.

**1.04 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings:
  - 1. Indicate layout and dimensions; head, jamb, and sill conditions; elevations; components, anchorage, recesses, materials, and finishes, electrical characteristics and connection requirements.
  - 2. Identify installation tolerances required, assembly conditions, routing of service lines and conduit, and locations of operating components and boxes.
- C. Product Data: Provide data on system components, sizes, features, and finishes.
- D. Samples: Submit two samples of exposed to view hardware, carpet with frame, and attachment hardware.
- E. Manufacturer's Installation Instructions: Indicate special procedures, perimeter conditions requiring special attention, and manufacturer's hardware and component templates.
- F. Project Record Documents: Record actual locations of concealed equipment, services, and conduit.
- G. Maintenance Data: Include manufacturer's parts list and maintenance instructions for each type of hardware and operating component.
- H. Warranty: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.
- I. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
  - 1. Wrenches and other tools required for maintenance of equipment.

**1.05 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of documented experience.
- B. Installer Qualifications: Company specializing in performing the work of this section with minimum 10 years of experience.

**1.06 WARRANTY**

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Provide two year manufacturer warranty.

## **PART 2 PRODUCTS**

### **2.01 MANUFACTURERS**

- A. Sliding Automatic Entrance Door Assemblies:
  - 1. ASSA ABLOY Entrance Solutions; Besam SL500 CGL: [www.besam-usa.com](http://www.besam-usa.com).
  - 2. Substitutions: See Section 01 6000 - Product Requirements.

### **2.02 POWER OPERATED DOORS**

- A. All Power Operated Doors: Provide products that comply with the requirements of the authorities having jurisdiction; unless otherwise indicated, provide equipment selected for the actual weight of the doors and for light pedestrian traffic.
  - 1. Sliding and Folding Door Operators: In the event of power failure, provide for manual open, close, and break-away operation of door leaves.
  - 2. Packaged Door Assemblies: Provide all components by single manufacturer, factory-assembled, including doors, frames, operators, actuators, and safeties.
    - a. Finish exposed equipment components to match door and frame finish.
  - 3. Wind-Borne-Debris Resistance: Where indicated, provide identical full-size glazed assembly without auxiliary protection tested by independent agency in accordance with ASTM E1996 for Wind Zone 4, Basic Protection, for Large and Small Missile impact and pressure cycling at design wind pressure.
  - 4. Exterior and Vestibule Doors: Provide equipment suitable for operating temperature range of minus 20 to plus 140 degrees F (minus 7 to plus 60 degrees C) ambient.
- B. Sliding and Folding Doors with Full Power Operators: Comply with BHMA A156.10; safeties required; provide break-away operation unless otherwise indicated; in the event of break-away operation, interrupt power operation.
  - 1. Comply with UL 325; acceptable evidence of compliance includes current UL or ULC listing.
  - 2. Force Required to Swing Break-Away Panel: 50 pounds-force (220 N), maximum, measured at 1 inch (25 mm) from the latch edge of the door at any point in the closing cycle.

### **2.03 PACKAGED AUTOMATIC ENTRANCE DOOR ASSEMBLIES**

- A. Sliding Automatic Door Type Besam SL500 CGL: Bi-parting double leaf track-mounted, electric operation, extruded aluminum glazed door, with frame, and operator concealed overhead.
  - 1. Operation: Power open, spring close operation.
  - 2. Provide products tested for wind-borne-debris resistance as indicated.
  - 3. Actuator(s): As indicated on drawings.
  - 4. Hold Open: Toggle switch at inside head of doors; this is not a fire-rated door.
  - 5. Door and Frame Finish: Anodized, dark bronze.

### **2.04 CONTROLLERS, ACTUATORS, AND SAFETIES**

- A. Controller: Provide microprocessor operated controller for each door.
- B. Comply with BHMA A156.10 for actuator and safety types and zones.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that surfaces are ready to receive work and dimensions are as indicated on shop drawings.
- B. Verify that electric power is available and is of the correct characteristics.

### **3.02 INSTALLATION**

- A. Install equipment in accordance with manufacturer's instructions.
- B. Provide for thermal expansion and contraction of door and frame units and live and dead loads that may be transmitted to operating equipment.
- C. Coordinate installation of components with related and adjacent work; level and plumb.

**3.03 ADJUSTING**

- A. Adjust door equipment for correct function and smooth operation.

**3.04 CLEANING**

- A. Remove temporary protection, clean exposed surfaces.

**3.05 CLOSEOUT ACTIVITIES**

- A. Demonstrate operation, operating components, adjustment features, and lubrication requirements.

**3.06 MAINTENANCE**

- A. Provide service and maintenance of operating equipment for one year from Date of Substantial Completion, at no extra charge to Owner.

**END OF SECTION**

**SECTION 08 4233  
REVOLVING DOOR ENTRANCES**

**PART I - GENERAL**

**1.01 SECTION INCLUDES**

- A. This section covers the furnishing and installation of a complete Automatic Revolving Door System. Provide complete system that has been fabricated, and tested for proper operation at the factory. It includes curved sidewalls, canopy, ceiling, door wings, hardware, glass, drive system, sensor system and emergency collapsing mechanism as required for installation.

**1.02 RELATED SECTIONS**

- A. Section 07915 - Sealants, Caulking and Seals
- B. Section 08400 - Entrances and Storefronts
- C. Section 08710 - Door Hardware
- D. Section 08810 - Glass and Glazing
- E. Section 09600 - Flooring
- F. Section 16123 - Electrical Supply and Termination

**1.03 QUALITY ASSURANCE**

- A. Manufacturer shall be a company specializing in the supply of wide-body automatic revolving doors with a minimum of 10 years experience.
- B. Installer shall supply a factory-trained supervisor during installation of the door.

**1.04 SUBMITTALS**

- A. Submit project specific shop drawings, finish samples.
- B. Indicate pertinent dimensions, general construction, component connections and locations, anchorage methods and locations, hardware, and installation details.

**1.05 DELIVERY, STORAGE AND HANDLING**

- A. Deliver materials to job site in manufacturer's packaging undamaged, complete with installation instructions.
- B. Store off ground, under cover, protected from weather and construction activities.

**1.06 PROJECT/SITE CONDITIONS**

- A. Revolving doors install on finished floor only. Floor must be dead level at any point within the footprint of the revolving door.

**1.07 WARRANTY**

- A. Boon Edam, Inc. warranties its products against defects in material and workmanship for a period of twelve (12) months from the date of shipment of the product. This warranty excludes glass breakage, normal wear on finishes or damage that occurs due to abuse, misuse or acts of God.

**PART II - PRODUCTS**

**2.01 MANUFACTURER**

**2.02 TOURNEX AUTOMATIC REVOLVING DOOR MODEL STAR OR MODEL SHOWCASE AS MANUFACTURED BY:**

- A. Boon Edam, Inc., 402 McKinney Parkway, Lillington, NC 27546.
  - 1. (910) 814-3800 Fax: (910) 814-3899 Homepage: [www.boonedam.us](http://www.boonedam.us)

**2.03 DOOR CONSTRUCTION**

- A. Curved Side Walls and Canopy: Shall have a standard outside diameter of 12'-0", 14'-0", 16'-0", 18'-0" or 20'-0" and be manufactured from six (6) aluminum posts, six (6) 12" high one-piece extruded aluminum canopy and four (4) extruded aluminum bottom rails.

- B. Door Wings: Three or four door wings as designed shall be 2" wide aluminum extrusions and reinforced in the corners with aluminum machined extrusions for strength. Door wings must utilize removable horsehair weather stripping on all four sides. Double-acting doors with hydraulic closers are held in position with non-jamming electromagnetic locks. Upon release by door controls, or building/fire/smoke alarm, door must be capable of folding forward or backward to allow for emergency egress.
- C. Showcase: Shall be fabricated from steel tubing, aluminum extrusions, aluminum sheet and glass in a configuration that provides a functional display case in the center of the door.
- D. Ceiling: Shall be fabricated of formed aluminum sheet in a pie-shaped configuration. Each section must be secured in position and removed only by authorized personnel.

#### **2.04 EQUIPMENT**

- A. Drive System: Overhead drive system with one 1/2 HP AC motor attached to the internal structural framing. The door shall be powered by a 208-230 VAC, 1-phase service. The motor shall utilize an internal angle encoder for constant monitoring of door position and a Frequency Controller to provide for the following characteristics:
  - 1. Adjustment of rotation speed through a digital setting
    - a. Constant regulation of rotation speed
    - b. Independent adjustment of startup and run torque through a digital setting to minimize force required to stop door
    - c. Adjustment of stopping distance through a digital setting
    - d. Removable remote control programmer for security over Frequency Control settings
- B. Braking Assembly: Positive braking and stopping, shall be performed by DC dynamic braking incorporated within the drive system. Other auxiliary disc brakes are not considered to be equal.
- C. Controls: Microprocessor-based electronics utilizing a 2000-step Programmable Logic Controller (PLC) with the following characteristics:
  - 1. RAM & ROM memory
    - a. Self-diagnostics for quick detection of problem source
    - b. Visual display of problem source
- D. Storm Coupling: Three or four fail-safe electromagnetic lock devices connected to the top shaft of each door wing to hold the door wings firmly during normal operation. Upon signal from the building/fire/smoke alarm system, storm couplings retract allowing the door wings to be collapsed, or folded, allowing for emergency egress.
- E. Electric Locking: A fail-safe electromagnetic shaft lock in conjunction with the electromagnetic storm coupling door wing locks with a three (3) position post-mounted key switch to activate locking. When engaged, the electric locking will prevent rotation or collapsing of the door wings. Electric locking is disengaged by loss of power or signal from building/fire/smoke alarm.
- F. Surface Applied Slide Bolt Locks with Microswitch (Optional): Two (2) standard 1 3/4" x 5 5/8" surface-mounted deadbolt locks finished to match door with removable, keyed cylinders that lock into the ceiling or floor on the two interior door wings, and microswitch for lock detection.
- G. Lights: Provide (3) or (4) 12V 20W Halogen lamps, 4 3/4" diameter lights to be recessed into rotating ceiling. (110V power service required from above by others.), (6) lights recessed into the non-rotating ceiling, and (3) or (4) lights recessed into the showcase ceiling.

#### **2.05 2.04 SENSOR SYSTEM**

- A. Motion Detectors: Minimum of 2 motion detectors mounted to the canopy on each side of the door that will start the rotation of the door upon actuation. Detection pattern can be adjustable directly.
- B. P.I.R (Passive Infrared Sensor) (Optional): The (2) recessed sensors are located in the canopy rim above, on each side of the door and are used in place of the motion sensors listed above.
- C. T.R.S. (Top Rail Sensors): Active infrared sensors mounted to the top rail of each door wing that can detect presence in front of the each door wing and slow or stop the door immediately,

depending on traffic conditions. Sensors can be adjusted for pattern size and distance from door wings.

- D. S.C.S. (Show Case Sensors): Active infrared sensor mounted in front of each door wings pivot point that can detect the presence of a person and stop the door immediately. Sensors can be adjusted for pattern size and distance from door wing.
- E. E.B.S. (Endwall Buffer Sensors): Two (2) active infrared sensors mounted vertically in front of each of the curved sidewalls that will detect presence and stop the door immediately. The EBS sensors should be capable of switching on as each door wing approaches the endpost of the sidewall and switches off as each door wing departs the endpost of each sidewall.
- F. S.R.B. (Sensor Rail Bentwall): A multi-directional, closed-contact pressure sensitive switch contained within a black rubber profile mounted to the edge of each inbound endpost that will immediately stop the door's rotation if compressed.
- G. S.R.D. (Sensor Rail Doorwing): A multi-directional, closed-contact pressure sensitive switch contained within a black rubber profile mounted to the bottom rail of each door wing that will immediately stop the door's rotation if compressed.
- H. Push To Slow Button: Two (2) "Push to Slow" Buttons mounted on the inbound that will reduce the rotating speed of the revolving door for approximately one revolution.
- I. Emergency Stop Button: Two (2) Emergency Stop Buttons mounted on the inbound endposts that will immediately stop the door when pressed.
- J. Key Switch: A key switch mounted on the interior endpost that will turn the door on/off or night lock.

## **2.06 2.05 HARDWARE/MATERIALS**

- A. Tempered Glass: All flat glass in door wings shall be 1/4" clear tempered safety glass, all curved glass shall be 1/4" clear bent tempered safety glass. All glass shall meet ANSI standard Z 97.1.
- B. Aluminum Extrusions: All commercial grade extrusions shall be of aluminum alloy 6063-T6 per ASTM B-221.
- C. Aluminum Sheets: Shall meet ASTM B-209 and be of .063 minimum thickness.
- D. Weather Stripping: Genuine horsehair weather stripping on all required edges of door wings to provide a seal between door wings and drum that meets ASTM E-283.
- E. Glazing Seal: All glass to be sealed with push in glazing vinyl.
- F. Pivot Bearing: Floor mounted pivot bearing under the center section to provide smooth rotation. Bearing can be replaced without removal of the center section.

## **2.07 2.06 FINISH**

- A. The following finishes are available for the enclosure walls, rotating door wings and ceiling.
- B. Anodized Coatings
  - 1. AAMA 611 Architectural Class 1 anodized Type AA-M10C22 A42: Light, Medium and Dark

## **PART III - EXECUTION**

### **3.01 INSTALLATION**

- A. Inspection: Installer must examine the location and advise the Contractor of any site conditions unacceptable for proper installation of product. These conditions include but are not limited to the following:
  - 1. 1. Floor must be dead level at any point within the footprint of the door

### **3.02 2. DOOR MUST BE INSTALLED ON FINISHED FLOOR**

- A. Power supply must be installed
  - 1. Installation shall not begin until these unacceptable conditions are rectified.

- B. Erection: Install revolving doors in accordance with manufacturer's printed instructions. Set units level, plumb, and with uniform hairline joints. The door should be anchored to the building, storefront or curtain wall for lateral support. Use only factory-trained installers.
- C. Adjustment: Installer shall adjust door, hardware and sensors for smooth operation and proper performance.
- D. Instruction: A factory-trained installer shall demonstrate to the owner's maintenance crew the proper operation of the door and the necessary service requirements such as lubrication, cleaning, and inspection of components upon completion of installation.
- E. Cleaning: Clean metal and glass surfaces carefully after installation to remove excess caulk, dirt and labels.

**END OF SECTION**

**SECTION 08 4300**  
**ALUMINUM STOREFRONT ENTRANCES**

**PART 1 - GENERAL**

**1.01 RELATED DOCUMENTS**

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

**1.02 SUMMARY**

- A. This Section includes Kawneer Aluminum Entrances, glass and glazing, and door hardware and components.
1. Types of Kawneer Aluminum Entrances include:
    - a. 350 Swing Door; Medium stile, 3-1/2" (89 mm) vertical face dimension, 1-3/4" (44.5 mm) depth, high traffic applications.
- B. Related Sections:
1. Division 072700 "Air Barriers" for materials used to bridge between aluminum sliding glass door and building intersection
  2. Division 078466 "Fire-Resistant Joint systems" for fire resistive material installed between aluminum sliding door system and floor intersections
  3. Division 079200 "Joint Sealants" for joint sealants installed as part of the aluminum sliding door system
  4. Division 083213 "Sliding Aluminum-Framed Glass Doors"
  5. Division 084113 "Aluminum-Framed Entrances and Storefronts"
  6. Division 084313 "Aluminum-Framed Storefronts"
  7. Division 084329 "Sliding Storefronts"
  8. Division 084413 "Glazed Aluminum Curtain Walls"
  9. Division 084433 "Sloped Glazing Assemblies"
  10. Division 086300 "Metal-Framed Skylights"
  11. Division 087000 "Hardware"
  12. Division 088000 "Glazing"

**1.03 DEFINITIONS**

- A. Definitions: For fenestration industry standard terminology and definitions refer to American Architectural Manufacturers Association (AAMA) - AAMA Glossary (AAMA AG).

**1.04 PERFORMANCE REQUIREMENTS**

- A. General Performance: Aluminum-framed storefront system shall withstand the effects of the following performance requirements without exceeding performance criteria or failure due to defective manufacture, fabrication, installation, or other defects in construction:
1. Design Wind Loads: Determine design wind loads applicable to the Project from basic wind speed indicated in miles per hour, according to ASCE 7, Section 6.5, "Method 2-Analytical Procedure," based on mean roof heights above grade indicated on Drawings.
    - a. Basic Wind Speed (MPH): (90 mph)
    - b. Importance Factor (I): (1.0)
    - c. Exposure Category (A, B, C, D): (B)
- B. Aluminum Framed Entrance Performance Requirements:
1. Wind loads: Provide storefront system; include anchorage, capable of withstanding wind load design pressures of (-Zone 4 : 50 = -27 ; 100 = -26) lbs./sq. ft. and (-Zone 5 : 50 = -46 ; 100 = -42) lbs./sq. ft. The design pressures are based on the (IBC) Building Code; (2009) Edition.
  2. Air Infiltration: For single acting offset pivot or butt hung entrances in the closed and locked position, the test specimen shall be tested in accordance with ASTM E 283 at a pressure differential of 6.24 psf (300 Pa) for single doors and 1.567 psf (75 PA) for pairs of doors. A single 3'0" x 7'0" (915 mm x 2134 mm) entrance door and frame shall not exceed 0.50 cfm



per square foot. A pair of 6'0" x 7'0" (1830 mm x 2134 mm) entrance doors and frame shall not exceed 1.0 cfm per square foot.

3. Structural Performance: Corner strength shall be tested per the Kawneer dual moment load test procedure and certified by an independent testing laboratory to ensure weld compliance and corner integrity [Testing procedure and certified test results available upon request].

#### **1.05 SUBMITTALS**

- A. Product Data: Include construction details, material descriptions, and fabrication methods, dimensions of individual components and profiles, hardware, finishes, and installation instructions for each type of aluminum-framed entrance door indicated.
- B. Shop Drawings: Include plans, elevations, sections, details, hardware, and attachments to other work, operational clearances and installation details.
- C. Samples for Initial Selection: For units with factory-applied color finishes including samples of hardware and accessories involving color selection.
- D. Samples for Verification: For sliding aluminum-framed glass door and components required.
- E. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency for each type, class, grade, and size of aluminum-framed entrance doors. Test results based on use of downsized test units will not be accepted.
- F. Warranty: Special warranty specified in this Section.
- G. Fabrication Sample: Of each vertical-to-horizontal intersection of aluminum-framed systems, made from 12" (300 mm) lengths of full-size components and showing details of the following:
  1. Joinery, including welds.
  2. Anchorage.
  3. Expansion provisions.
  4. Glazing.
- H. Other Action Submittals:
  1. Entrance Door Hardware Schedule: Prepared by or under the supervision of supplier, detailing fabrication and assembly of entrance door hardware, as well as procedures and diagrams. Coordinate final entrance door hardware schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of entrance door hardware.

#### **1.06 QUALITY ASSURANCE**

- A. Installer Qualifications: An installer which has had successful experience with installation of the same or similar units required for the project and other projects of similar size and scope.
- B. Manufacturer Qualifications: A manufacturer capable of fabricating aluminum-framed entrance doors and storefronts that meet or exceed performance requirements indicated and of documenting this performance by inclusion of test reports, and calculations.
- C. Source Limitations: Obtain sliding aluminum-framed glass door through one source from a single manufacturer.
- D. Product Options: Drawings indicate size, profiles, and dimensional requirements of aluminum-framed glass entrance doors and are based on the specific system indicated. Refer to Division 01 Section "Product Requirements." Do not modify size and dimensional requirements.
  1. Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If modifications are proposed, submit comprehensive explanatory data to Architect for review.
- E. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
  1. Build mockup for type(s) of swing entrance door(s) indicated, in location(s) shown on Drawings.

- F. Pre-installation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination."

### **1.07 PROJECT CONDITIONS**

- A. Field Measurements: Verify actual dimensions of sliding aluminum-framed glass door openings by field measurements before fabrication and indicate field measurements on Shop Drawings.

### **1.08 WARRANTY**

- A. Manufacturer's Warranty: Submit, for Owner's acceptance, manufacturer's standard warranty.
  - 1. Warranty Period: Two (2) years from Date of Substantial Completion of the project provided however that the Limited Warranty shall begin in no event later than six months from date of shipment by manufacturer.

## **PART 2 - PRODUCTS**

### **2.01 MANUFACTURERS**

- A. Basis-of-Design Product:
  - 1. Kawneer Company Inc.
  - 2. The door stile and rail face dimensions of the [190] entrance door will be as follows
  - 3. Vertical Stile                      Top Rail                      Bottom Rail
  - 4. 3-1/2" (89 mm)                      3-1/2" (58 mm)                      6-1/2" (99 mm)
  - 5. Major portions of the door members to be 0.125" (3.2) nominal in thickness and glazing molding to be 0.05" (1.3) thick.
  - 6. Glazing gaskets shall be either EPDM elastomeric extrusions or a thermoplastic elastomer.
  - 7. Provide adjustable glass jacks to help center the glass in the door opening.
- B. Subject to compliance with requirements, provide a comparable product by the following:
  - 1. Manufacturer:YKK
- C. Substitutions: Refer to Substitutions Section for procedures and submission requirements
  - 1. Pre-Contract (Bidding Period) Substitutions: Submit written requests ten (10) days prior to bid date.
  - 2. Post-Contract (Construction Period) Substitutions: Submit written request in order to avoid storefront installation and construction delays.
  - 3. Product Literature and Drawings: Submit product literature and drawings modified to suit specific project requirements and job conditions.
  - 4. Certificates: Submit certificate(s) certifying substitute manufacturer (1) attesting to adherence to specification requirements for storefront system performance criteria, and (2) has been engaged in the design, manufacturer and fabrication of aluminum storefronts for a period of not less than ten (10) years. (Company Name)
  - 5. Test Reports: Submit test reports verifying compliance with each test requirement required by the project.
  - 6. Samples: Provide samples of typical product sections and finish samples in manufacturer's standard sizes.
- D. Substitution Acceptance: Acceptance will be in written form, either as an addendum or modification, and documented by a formal change order signed by the Owner and Contractor.

### **2.02 MATERIALS**

- A. Aluminum Extrusions: Alloy and temper recommended by sliding aluminum-framed glass door manufacturer for strength, corrosion resistance, and application of required finish and not less than 0.090" wall thickness at any location for the main frame and sash members.
- B. Fasteners: Aluminum, nonmagnetic stainless steel or other materials to be non-corrosive and compatible with sliding aluminum-framed glass door members, trim hardware, anchors, and other components.

- C. Anchors, Clips, and Accessories: Aluminum, nonmagnetic stainless steel, or zinc-coated steel or iron complying with ASTM B 633 for SC 3 severe service conditions or other suitable zinc coating; provide sufficient strength to withstand design pressure indicated.
- D. Reinforcing Members: Aluminum, nonmagnetic stainless steel, or nickel/chrome-plated steel complying with ASTM B 456 for Type SC 3 severe service conditions, or zinc-coated steel or iron complying with ASTM B 633 for SC 3 severe service conditions or other suitable zinc coating; provide sufficient strength to withstand design pressure indicated.
  - 1. Weather Seals: Provide weather stripping with integral barrier fin or fins of semi-rigid, polypropylene sheet or polypropylene-coated material. Comply with AAMA 701/702.

## **STOREFRONT FRAMING SYSTEM**

### **3.01 STOREFRONT ENTRANCE FRAMING (TRIFAB® VG 451T):**

- A. Thermally Broken entrance Framing - Kawneer IsoLock® Thermal Break with a 1/4" (6.4 mm) separation consisting of a two-part chemically curing, high-density polyurethane, which is mechanically and adhesively joined to aluminum storefront sections.
  - 1. Thermal Break shall be designed in accordance with AAMA TIR-A8 and tested in accordance with AAMA 505.
- B. Non-Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining, nonferrous shims for aligning system components.
- C. Fasteners and Accessories: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials. Where exposed shall be stainless steel.
- D. Perimeter Anchors: When steel anchors are used, provide insulation between steel material and aluminum material to prevent galvanic action.
- E. Packing, Shipping, Handling and Unloading: Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.
- F. Storage and Protection: Store materials protected from exposure to harmful weather conditions. Handle storefront material and components to avoid damage. Protect storefront material against damage from elements, construction activities, and other hazards before, during and after storefront installation.

### **3.02 GLAZING**

- A. Glazing: As specified in Division 08 Section "Glazing."
- B. Glazing Gaskets: Manufacturer's standard compression types; replaceable, extruded EPDM rubber.
- C. Spacers and Setting Blocks: Manufacturer's standard elastomeric type.
- D. Bond-Breaker Tape: Manufacturer's standard TFE-fluorocarbon or polyethylene material to which sealants will not develop adhesion.

### **3.03 HARDWARE**

- A. General: Provide manufacturer's standard hardware fabricated from aluminum, stainless steel, or other corrosion-resistant material compatible with aluminum; designed to smoothly operate, tightly close, and securely aluminum-framed entrance doors.
- B. Standard Hardware:
  - 1. Weatherstripping:
    - a. Meeting stiles on pairs of doors shall be equipped with an adjustable astragal utilizing wool pile with polymeric fin.
    - b. The door weathering on a single acting offset pivot or butt hung door and frame (single or pairs) shall be Kawneer Sealair® weathering. This is comprised of a thermoplastic elastomer weathering on a tubular shape with a semi-rigid polymeric backing.

- c. Sill Sweep Strips: EPDM blade gasket sweep strip in an aluminum extrusion applied to the interior exposed surface of the bottom rail with concealed fasteners (Necessary to meet specified performance tests).
  - d. Threshold: Extruded aluminum, one piece per door opening, with ribbed surface.
  - e. Offset Pivots: [Kawneer - Top Offset Pivot, Bottom Offset Pivot, & Standard Intermediate Pivot].
  - f. Push/Pull: [Rockwood Manufacturing Company - MegaCurve - Long Bow Pulls - RM2010 Bronze Finish] style.
  - g. Exit Device: [None].
  - h. Closer: [LCN 2030 Concealed Overhead/Single Action].
  - i. Security Lock/Dead Lock: Active Leaf [Kawneer - Adams Rite MS - 1850 Deadlock]; Inactive Leaf [Kawneer Flush Bolt].
  - j. Cylinder(s)/Thumbturn: [Kawneer Lock Cylinders - Keyed Cylinder].
- C. Optional Hardware:
- 1. Adams Rite MS 1850A-505 Hookbolt Lock.
  - 2. Mortise cylinder, interior or exterior.
  - 3. Thumbturn, interior.
  - 4. Flush pull.

### 3.04 FABRICATION

- A. Fabricate aluminum-framed glass entrance doors in sizes indicated. Include a complete system for assembling components and anchoring doors.
- B. Fabricate aluminum-framed glass doors that are reglazable without dismantling perimeter framing.
  - 1. Door corner construction shall consist of mechanical clip fastening, SIGMA deep penetration plug welds and 1-1/8" (29 mm) long fillet welds inside and outside of all four corners. Glazing stops shall be hook-in type with EPDM glazing gaskets reinforced with non-stretchable cord.
  - 2. Accurately fit and secure joints and corners. Make joints hairline in appearance.
  - 3. Prepare components with internal reinforcement for door hardware.
  - 4. Arrange fasteners and attachments to conceal from view.
- C. Weather Stripping: Provide weather stripping locked into extruded grooves in door panels or frames as indicated on manufactures drawings and details.

### 3.05 FINISHES, GENERAL

- A. Comply with AAMA-AFPA "Anodic Finishes/Painted Aluminum" for recommendations for applying and designating finishes.
- B. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

### 3.06 ALUMINUM FINISHES

- A. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.
- B. Factory Finishing:
  - 1. Kawneer Permanodic® AA-M10C22A44, AAMA 611, Architectural Class I Color Anodic Coating (Color #40 Dark Bronze).

## PART 3 - EXECUTION

### 4.01 EXAMINATION

- A. Examine openings, substrates, structural support, anchorage, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions

affecting performance of work. Verify rough opening dimensions, levelness of sill plate and operational clearances. Examine wall flashings, vapor retarders, water and weather barriers, and other built-in components to ensure a coordinated, weather tight sliding door installation.

1. Masonry Surfaces: Visibly dry and free of excess mortar, sand, and other construction debris.
2. Wood Frame Walls: Dry, clean, sound, well nailed, free of voids, and without offsets at joints. Ensure that nail heads are driven flush with surfaces in opening and within 3 inches (76 mm) of opening.
3. Metal Surfaces: Dry; clean; free of grease, oil, dirt, rust, corrosion, and welding slag; without sharp edges or offsets at joints.
4. Proceed with installation only after unsatisfactory conditions have been corrected.

#### **4.02 INSTALLATION**

- A. Comply with Drawings, Shop Drawings, and manufacturer's written instructions for installing aluminum swing entrance doors, hardware, accessories, and other components.
- B. Install aluminum swing entrance doors level, plumb, square, true to line, without distortion or impeding thermal movement, anchored securely in place to structural support, and in proper relation to wall flashing and other adjacent construction.
- C. Set sill threshold in bed of sealant, as indicated, for weather tight construction.
- D. Separate aluminum and other corrodible surfaces from sources of corrosion or electrolytic action at points of contact with other materials.

#### **4.03 FIELD QUALITY CONTROL**

- A. Manufacturer's Field Services: Upon Owner's written request, provide periodic site visit by manufacturer's field service representative.

#### **4.04 ADJUSTING, CLEANING, AND PROTECTION**

- A. Clean aluminum surfaces immediately after installing aluminum framed storefronts. Avoid damaging protective coatings and finishes. Remove excess sealants, glazing materials, dirt, and other substances.
- B. Clean glass immediately after installation. Comply with glass manufacturer's written recommendations for final cleaning and maintenance. Remove nonpermanent labels, and clean surfaces.
- C. Remove and replace glass that has been broken, chipped, cracked, abraded, or damaged during construction period.

**END OF SECTION**

## SECTION 08 4310

### ALUMINUM STOREFRONT WINDOW SYSTEMS

#### PART 1 - GENERAL

##### 1.01 RELATED DOCUMENTS

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

##### 1.02 SUMMARY

- A. Section Includes: Kawneer Architectural Aluminum Storefront Systems, including perimeter trims, stools, accessories, shims and anchors, and perimeter sealing of storefront units.
  - 1. Types of Kawneer Aluminum Storefront Systems include:
    - a. Trifab® VG 451T Storefront System - 2" x 4-1/2" (50.8 mm x 114.3 mm) nominal dimension; Thermal; Center; Screw Spline.

##### 1.03 RELATED SECTIONS:

- A. Division 072700 "Air Barriers" for materials used to bridge between aluminum storefront system and building intersection
- B. Division 078466 "Fire-Resistant Joint systems" for fire resistive material installed between aluminum storefront system and floor intersections
- C. Division 079200 "Joint Sealants" for joint sealants installed as part of the aluminum storefront system system
- D. Division 083213 "Sliding Aluminum-Framed Glass Doors"
- E. Division 084113 "Aluminum-Framed Entrances and Storefronts"
- F. Division 084313 "Aluminum-Framed Storefronts"
- G. Division 084329 "Sliding Storefronts"
- H. Division 084413 "Glazed Aluminum Curtain Walls"
- I. Division 084433 "Sloped Glazing Assemblies"
- J. Division 086300 "Metal-Framed Skylights"

##### 1.04 DEFINITIONS

- A. Definitions: For fenestration industry standard terminology and definitions refer to American Architectural Manufacturers Association (AAMA) - AAMA Glossary (AAMA AG).

##### 1.05 PERFORMANCE REQUIREMENTS

- A. General Performance: Aluminum-framed storefront system shall withstand the effects of the following performance requirements without exceeding performance criteria or failure due to defective manufacture, fabrication, installation, or other defects in construction:
  - 1. Design Wind Loads: Determine design wind loads applicable to the Project from basic wind speed indicated in miles per hour, according to ASCE 7, Section 6.5, "Method 2-Analytical Procedure," based on mean roof heights above grade indicated on Drawings.
    - a. Basic Wind Speed (MPH): (90 mph)
    - b. Importance Factor (I): (1.0)
    - c. Exposure Category (A, B, C, D): (B)
- B. Storefront System Performance Requirements:
  - 1. Wind loads: Provide storefront system; include anchorage, capable of withstanding wind load design pressures of (-Zone 4 : 50 = -27 ; 100 = -26) lbs./sq. ft. and (-Zone 5 : 50 = -46 ; 100 = - 42) lbs./sq. ft. The design pressures are based on the (IBC) Building Code; (2009) Edition.
  - 2. Air Infiltration: The test specimen shall be tested in accordance with ASTM E 283. Air infiltration rate shall not exceed 0.06 cfm/ft<sup>2</sup> (0.3 l/s · m<sup>2</sup>) at a static air pressure differential of 6.24 psf (300 Pa).

3. Water Resistance: The test specimen shall be tested in accordance with ASTM E 331. There shall be no leakage at a minimum static air pressure differential of 8 psf (383 Pa) as defined in AAMA 501.
4. Uniform Load: A static air design load of 20 psf (958 Pa) shall be applied in the positive and negative direction in accordance with ASTM E 330. There shall be no deflection in excess of  $L/175$  of the span of any framing member. At a structural test load equal to 1.5 times the specified design load, no glass breakage or permanent set in the framing members in excess of 0.2% of their clear spans shall occur.
5. Thermal Transmittance (U-factor): When tested to AAMA Specification 1503, the thermal transmittance (U-factor) shall not be more than:
  - a. Glass to Exterior - 0.47 (low-e) or 0.61 (clear) or Project Specific (\_\_\_\_) BTU/hr/ft<sup>2</sup>/°F.
  - b. Glass to Center - 0.44 (low-e) or 0.61 (clear) or Project Specific (\_\_\_\_) BTU/hr/ft<sup>2</sup>/°F.
  - c. Glass to Interior - 0.41 (low-e) or 0.56 (clear) or Project Specific (\_\_\_\_) BTU/hr/ft<sup>2</sup>/°F
6. Condensation Resistance (CRF): When tested to AAMA Specification 1503, the condensation resistance factor shall not be less than:
  - a. Glass to Exterior - 70frame and 69glass (low-e) or 69 frame and 58 glass (clear).
  - b. Glass to Center - 62 frame and 68glass (low-e) or 63 frame and 56 glass (clear).
  - c. Glass to Interior - 56 frame and 67 glass (low-e) or 54 frame and 58 glass (clear).
7. Sound Transmission Class (STC) and Outdoor-Indoor Transmission Class (OITC): When tested to AAMA Specification 1801 and in accordance with ASTM E1425 and ASTM E90, the STC and OITC Rating shall not be less than:
  - a. Glass to Exterior - 38 (STC) and 31 (OITC)
  - b. Glass to Center - 37 (STC) and 30 (OITC)
  - c. Glass to Interior - 38 (STC) and 30 (OITC)
8. Windborne-Debris-Impact-Resistance Performance: Shall be tested in accordance with ASTM E 1886 and information in ASTM E 1996 and /or AAMA 506.
  - a. Large-Missile Impact: For aluminum-framed systems located within 30 feet (9.1 m) of grade.
  - b. Small-Missile Impact: For aluminum-framed systems located more than 30 feet (9.1 m) above grade.

#### 1.06 SUBMITTALS

- A. Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, hardware, finishes, and installation instructions for each type of aluminum frame storefront system indicated.
- B. Shop Drawings: Include plans, elevations, sections, details, hardware, and attachments to other work, operational clearances and installation details.
- C. Samples for Initial Selection: For units with factory-applied color finishes including samples of hardware and accessories involving color selection.
- D. Samples for Verification: For aluminum framed storefront system and components required.
- E. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency for each type of aluminum-framed storefront.
- F. Fabrication Sample: Of each vertical-to-horizontal intersection of aluminum-framed systems, made from 12" (300 mm) lengths of full-size components and showing details of the following:
  1. Joinery, including concealed welds.
  2. Anchorage.
  3. Expansion provisions.
  4. Glazing.
  5. Flashing and drainage.
- G. Other Action Submittals:
  1. Entrance Door Hardware Schedule: Prepared by or under the supervision of supplier, detailing fabrication and assembly of entrance door hardware, as well as procedures and diagrams. Coordinate final entrance door hardware schedule with doors, frames, and

related work to ensure proper size, thickness, hand, function, and finish of entrance door hardware.

### **1.07 QUALITY ASSURANCE**

- A. Installer Qualifications: An installer which has had successful experience with installation of the same or similar units required for the project and other projects of similar size and scope.
- B. Manufacturer Qualifications: A manufacturer capable of providing aluminum framed storefront system that meet or exceed performance requirements indicated and of documenting this performance by inclusion of test reports, and calculations.
- C. Source Limitations: Obtain aluminum framed storefront system through one source from a single manufacturer.
- D. Product Options: Drawings indicate size, profiles, and dimensional requirements of aluminum framed storefront system and are based on the specific system indicated. Refer to Division 01 Section "Product Requirements." Do not modify size and dimensional requirements.
  - 1. Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If modifications are proposed, submit comprehensive explanatory data to Architect for review.
- E. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
  - 1. Build mockup for type(s) of storefront elevation(s) indicated, in location(s) shown on Drawings.
- F. Pre-installation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination."
- G. Structural-Sealant Glazing: Comply with ASTM C 1401, "Guide for Structural Sealant Glazing" for design and installation of structural-sealant-glazed systems.
- H. Structural-Sealant Joints: Design reviewed and approved by structural-sealant manufacturer.

### **1.08 PROJECT CONDITIONS**

- A. Field Measurements: Verify actual dimensions of aluminum framed storefront openings by field measurements before fabrication and indicate field measurements on Shop Drawings.

### **1.09 WARRANTY**

- A. Manufactures Warranty: Submit, for Owner's acceptance, manufacturer's standard warranty.
  - 1. Warranty Period: Two (2) years from Date of Substantial Completion of the project provided however that the Limited Warranty shall begin in no event later than six months from date of shipment by manufacturer.

## **PART 2 - PRODUCTS**

### **2.01 MANUFACTURERS**

- A. Basis-of-Design Product:
  - 1. Kawneer Company Inc.
  - 2. Trifab® 451T (thermal) Storefront System
  - 3. 2" x 4-1/2" (50.8 mm x 114.3 mm) System Dimensions
  - 4. Glass: Center
- B. Subject to compliance with requirements, provide a comparable product by the following:
  - 1. Manufacturer: (\_\_\_\_\_)
  - 2. Series: (\_\_\_\_\_)
  - 3. Profile dimension: (\_\_\_\_\_)
- C. Substitutions: Refer to Substitutions Section for procedures and submission requirements
  - 1. Pre-Contract (Bidding Period) Substitutions: Submit written requests ten (10) days prior to bid date.
  - 2. Post-Contract (Construction Period) Substitutions: Submit written request in order to avoid storefront installation and construction delays.



3. Product Literature and Drawings: Submit product literature and drawings modified to suit specific project requirements and job conditions.
  4. Certificates: Submit certificate(s) certifying substitute manufacturer (1) attesting to adherence to specification requirements for storefront system performance criteria, and (2) has been engaged in the design, manufacturer and fabrication of aluminum storefronts for a period of not less than ten (10) years. (Company Name)
  5. Test Reports: Submit test reports verifying compliance with each test requirement required by the project.
  6. Samples: Provide samples of typical product sections and finish samples in manufacturer's standard sizes.
- D. Substitution Acceptance: Acceptance will be in written form, either as an addendum or modification, and documented by a formal change order signed by the Owner and Contractor.

## 2.02 MATERIALS

- A. Aluminum Extrusions: Alloy and temper recommended by aluminum storefront manufacturer for strength, corrosion resistance, and application of required finish and not less than 0.070" wall thickness at any location for the main frame and complying with ASTM B 221: 6063-T6 alloy and temper.
- B. Fasteners: Aluminum, nonmagnetic stainless steel or other materials to be non-corrosive and compatible with aluminum window members, trim hardware, anchors, and other components.
- C. Anchors, Clips, and Accessories: Aluminum, nonmagnetic stainless steel, or zinc-coated steel or iron complying with ASTM B 633 for SC 3 severe service conditions or other suitable zinc coating; provide sufficient strength to withstand design pressure indicated.
- D. Reinforcing Members: Aluminum, nonmagnetic stainless steel, or nickel/chrome-plated steel complying with ASTM B 456 for Type SC 3 severe service conditions, or zinc-coated steel or iron complying with ASTM B 633 for SC 3 severe service conditions or other suitable zinc coating; provide sufficient strength to withstand design pressure indicated.
- E. Sealant: For sealants required within fabricated storefront system, provide permanently elastic, non-shrinking, and non-migrating type recommended by sealant manufacturer for joint size and movement.
- F. Tolerances: Reference to tolerances for wall thickness and other cross-sectional dimensions of storefront members are nominal and in compliance with AA Aluminum Standards and Data.

## 2.03 STOREFRONT FRAMING SYSTEM

- A. Thermal Barrier (Trifab® VG 451T):
  1. Kawneer IsoLock® Thermal Break with a 1/4" (6.4 mm) separation consisting of a two-part chemically curing, high-density polyurethane, which is mechanically and adhesively joined to aluminum storefront sections.
    - a. Thermal Break shall be designed in accordance with AAMA TIR-A8 and tested in accordance with AAMA 505.
- B. Trifab® SunShade: An aluminum sunshade (consisting of outriggers, louvers, and fascia which may be selected from standard configurations), that is anchored directly to the vertical mullions. Outriggers shall be painted (Select from Kawneer's standard paints and colors. Custom colors are available upon request). Louvers and fascia shall be painted or anodized (Select from Kawneer's standard paints and colors, custom colors are available upon request or Kawneer's anodized finishes).
- C. Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining, nonferrous shims for aligning system components.
- D. Fasteners and Accessories: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials. Where exposes shall be stainless steel.
- E. Perimeter Anchors: When steel anchors are used, provide insulation between steel material and aluminum material to prevent galvanic action

- F. Packing, Shipping, Handling and Unloading: Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.
- G. Storage and Protection: Store materials protected from exposure to harmful weather conditions. Handle storefront material and components to avoid damage. Protect storefront material against damage from elements, construction activities, and other hazards before, during and after storefront installation.

#### **2.04 GLAZING SYSTEMS**

- A. Glazing: As specified in Division 08 Section "Glazing."
- B. Glazing Gaskets: Manufacturer's standard compression types; replaceable, extruded EPDM rubber.
- C. Spacers and Setting Blocks: Manufacturer's standard elastomeric type.
- D. Bond-Breaker Tape: Manufacturer's standard TFE-fluorocarbon or polyethylene material to which sealants will not develop adhesion.
- E. Glazing Sealants: For structural-sealant-glazed systems, as recommended by manufacturer for joint type, and as follows:
  - 1. Structural Sealant: ASTM C 1184, single-component neutral-curing silicone formulation that is compatible with system components with which it comes in contact, specifically formulated and tested for use as structural sealant and approved by a structural-sealant manufacturer for use in aluminum-framed systems indicated.
    - a. Color: Black
  - 2. Weatherseal Sealant: ASTM C 920 for Type S, Grade NS, Class 25, Uses NT, G, A, and O; single-component neutral-curing formulation that is compatible with structural sealant and other system components with which it comes in contact; recommended by structural-sealant, weatherseal-sealant, and aluminum-framed-system manufacturers for this use.
    - a. Color: Matching structural sealant.

#### **2.05 ENTRANCE DOOR SYSTEMS**

- A. Entrance Doors: As specified in Division 08 41 13 Section "Aluminum Framed Entrances."
- B. Entrance Door Hardware: As specified in Division 08 41 13 Section "Door Hardware."

#### **2.06 ACCESSORY MATERIALS**

- A. Joint Sealants: For installation at perimeter of aluminum-framed systems, as specified in Division 07 Section "Joint Sealants."
- B. Bituminous Paint: Cold-applied, asphalt-mastic paint complying with SSPC-Paint 12 requirements except containing no asbestos; formulated for 30 mil (0.762 mm) thickness per coat.

#### **2.07 FABRICATION**

- A. Framing Members, General: Fabricate components that, when assembled, have the following characteristics:
  - 1. Profiles that are sharp, straight, and free of defects or deformations.
  - 2. Accurately fit joints; make joints flush, hairline and weatherproof.
  - 3. Means to drain water passing joints, condensation within framing members, and moisture migrating within the system to exterior.
  - 4. Physical and thermal isolation of glazing from framing members.
  - 5. Accommodations for thermal and mechanical movements of glazing and framing to maintain required glazing edge clearances.
  - 6. Provisions for field replacement of glazing.
  - 7. Fasteners, anchors, and connection devices that are concealed from view to greatest extent possible.
- B. Mechanically Glazed Framing Members: Fabricate for flush glazing without projecting stops.

- C. Structural-Sealant-Glazed Framing Members: Include accommodations for using temporary support device to retain glazing in place while structural sealant cures.
- D. Storefront Framing: Fabricate components for assembly using manufactures standard installation instructions.
- E. After fabrication, clearly mark components to identify their locations in Project according to Shop Drawings.

## **2.08 ALUMINUM FINISHES**

- A. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.
- B. Factory Finishing:
  - 1. Kawneer Permanodic® AA-M12C22A44, AAMA 611, Architectural Class I Color Anodic Coating (Color #40 Dark Bronze).

## **PART 3 - EXECUTION**

### **3.01 EXAMINATION**

- A. Examine openings, substrates, structural support, anchorage, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work. Verify rough opening dimensions, levelness of sill plate and operational clearances. Examine wall flashings, vapor retarders, water and weather barriers, and other built-in components to ensure a coordinated, weather tight framed aluminum storefront system installation.
  - 1. Masonry Surfaces: Visibly dry and free of excess mortar, sand, and other construction debris.
  - 2. Wood Frame Walls: Dry, clean, sound, well nailed, free of voids, and without offsets at joints. Ensure that nail heads are driven flush with surfaces in opening and within 3 inches (76 mm) of opening.
  - 3. Metal Surfaces: Dry; clean; free of grease, oil, dirt, rust, corrosion, and welding slag; without sharp edges or offsets at joints.
  - 4. Proceed with installation only after unsatisfactory conditions have been corrected.

### **3.02 INSTALLATION**

- A. Comply with Drawings, Shop Drawings, and manufacturer's written instructions for installing aluminum framed storefront system, accessories, and other components.
- B. Install aluminum framed storefront system level, plumb, square, true to line, without distortion or impeding thermal movement, anchored securely in place to structural support, and in proper relation to wall flashing and other adjacent construction.
- C. Set sill members in bed of sealant or with gaskets, as indicated, for weather tight construction.
- D. Install aluminum framed storefront system and components to drain condensation, water penetrating joints, and moisture migrating within sliding door to the exterior.
- E. Separate aluminum and other corrodible surfaces from sources of corrosion or electrolytic action at points of contact with other materials.

### **3.03 FIELD QUALITY CONTROL**

- A. Field Tests: Architect shall select storefront units to be tested as soon as a representative portion of the project has been installed, glazed, perimeter caulked and cured. Conduct tests for air infiltration and water penetration with manufacturer's representative present. Tests not meeting specified performance requirements and units having deficiencies shall be corrected as part of the contract amount.
  - 1. Testing: Testing shall be performed by a qualified independent testing agency. Refer to Testing Section for payment of testing and testing requirements. Testing Standard per AAMA 503, including reference to ASTM E 783 for Air Infiltration Test and ASTM E 1105 Water Infiltration Test.

- a. Air Infiltration Tests: Conduct tests in accordance with ASTM E 783. Allowable air infiltration shall not exceed 1.5 times the amount indicated in the performance requirements or 0.09 cfm/ft<sup>2</sup>, whichever is greater.
  - b. Water Infiltration Tests: Conduct tests in accordance with ASTM E 1105. No uncontrolled water leakage is permitted when tested at a static test pressure of two-thirds the specified water penetration pressure but not less than 6.24 psf (300 Pa).
- B. Manufacturer's Field Services: Upon Owner's written request, provide periodic site visit by manufacturer's field service representative.

#### **3.04 ADJUSTING, CLEANING, AND PROTECTION**

- A. Clean aluminum surfaces immediately after installing aluminum framed storefronts. Avoid damaging protective coatings and finishes. Remove excess sealants, glazing materials, dirt, and other substances.
- B. Clean glass immediately after installation. Comply with glass manufacturer's written recommendations for final cleaning and maintenance. Remove nonpermanent labels, and clean surfaces.
- C. Remove and replace glass that has been broken, chipped, cracked, abraded, or damaged during construction period.

#### **PART 2 PRODUCTS**

**END OF SECTION**

## SECTION 08 4400

### GLAZED ALUMINUM CURTAIN WALL SYSTEMS

#### PART 1 - GENERAL

##### 1.01 SUMMARY

- A. Section Includes: Kawneer Architectural Aluminum Curtain Wall Systems, including perimeter trims, stools, accessories, shims and anchors, and perimeter sealing of curtain wall framing.
  - 1. Types of Kawneer Aluminum Curtain Wall include:
    - a. 1600 Wall System@1 - 2-1/2" x 6" (63.5 x 152.4) outside glazed pressure plate format.
- B. Related Sections:
  - 1. Division 08 32 13 "Sliding Aluminum-Framed Glass Doors"
  - 2. Division 08 41 13 "Aluminum-Framed Entrances and Storefronts"
  - 3. Division 08 43 13 "Aluminum-Framed Storefronts"
  - 4. Division 08 43 29 "Sliding Storefronts"
  - 5. Division 08 44 33 "Sloped Glazing Assemblies"
  - 6. Division 08 51 13 "Aluminum Windows"
  - 7. Division 08 63 00 "Metal-Framed Skylights"
  - 8. Division 08 70 00 "Hardware"
  - 9. Division 08 80 00 "Glazing"

##### 1.02 REFERENCES (INDUSTRY STANDARDS)

##### 1.03 SYSTEM DESCRIPTION

- A. Curtain Wall System Performance Requirements:
  - 1. Wind loads: Provide Curtain Wall system; include anchorage, capable of withstanding wind load design pressures of (-Zone 4: 50 = -27; 100 = -26) lbs./sq. ft. and (-Zone 5: 50 = -46 ; 100 = -42) lbs./sq. ft. The design pressures are based on the (IBC) Building Code; (2009) Edition
  - 2. Air Infiltration: The test specimen shall be tested in accordance with ASTM E 283. Air infiltration rate shall not exceed 0.06 cfm/ft<sup>2</sup> (0.3 l/s · m<sup>2</sup>) at a static air pressure differential of 6.24 psf (300 Pa).
  - 3. Water Resistance, (static): The test specimen shall be tested in accordance with ASTM E 331. There shall be no leakage at a static air pressure differential of 12 psf (575 Pa) as defined in AAMA 501.
  - 4. Water Resistance, (dynamic): The test specimen shall be tested in accordance with AAMA 501.1. There shall be no leakage at an air pressure differential of 12 psf (575 Pa) as defined in AAMA 501.
  - 5. Uniform Load: A static air design load of 40 psf (1915 Pa) shall be applied in the positive and negative direction in accordance with ASTM E 330. There shall be no deflection in excess of L/175 of the span of any framing member at design load. At structural test load equal to 1.5 times the specified design load, no glass breakage or permanent set in the framing members in excess of 0.2% of their clear spans shall occur.
  - 6. Seismic: When tested to AAMA 501.4, system must meet design displacement of 0.010 x the story height and ultimate displacement of 1.5 x the design displacement.
  - 7. Thermal Transmittance (U-factor): When tested to AAMA Specification 1503, the thermal transmittance (U-factor) shall not be more than: 0.66 (clear) or Project Specific ( ) BTU/hr/ft<sup>2</sup> /°F. per AAMA 507 or ( ) BTU/hr/ft<sup>2</sup> /°F. per NFRC 100.
  - 8. Condensation Resistance (CRF): When tested to AAMA Specification 1503, the condensation resistance factor shall not be less than 66frame and 60glass (clear),
  - 9. or
  - 10. Condensation Index (I): when tested to CSA-A440-00, the Condensation Index shall not be less than 68frame and 54glass (clear).
  - 11. Thermal Transmittance (U-factor): When tested to AAMA Specification 1503, the thermal transmittance (U-factor) shall not be more than: 0.43 (HP glass) or Project Specific ( ) BTU/hr/ft<sup>2</sup> /°F. per AAMA 507 or ( ) BTU/hr/ft<sup>2</sup> /°F. per NFRC 100.

12. Condensation Resistance (CRF): When tested to AAMA Specification 1503, the condensation resistance factor shall not be less than 71frame and 71glass (HP glass).
13. Sound Transmission Loss: When tested to ASTM E90 and ASTM E1425, the Sound Transmission Class (STC) and Outdoor/Indoor Transmission Class (OITC) shall not be less than:
  - a. STC 31 or OITC 26 based upon 1" insulating glass (1/4", 1/2" AS, 1/4"),
  - b. STC 37 or OITC 30 based upon 1" laminated glass (1/4" laminated, 1/2" AS, 1/4" laminated).

#### **1.04 SUBMITTALS**

- A. General: Prepare, review, approve, and submit specified submittals in accordance with "Conditions of the Contract" and Submittals Sections. Product data, shop drawings, samples, and similar submittals are defined in "Conditions of the Contract."
- B. Quality Assurance/Control Submittals:
  1. Test Reports: Submit certified test reports showing compliance with specified performance characteristics.

#### **1.05 WARRANTY**

- A. Project Warranty: Refer to "Conditions of the Contract" for project warranty provisions.
- B. Manufacturer's Product Warranty: Submit, for Owner's acceptance, manufacturer's warranty for curtain wall system as follows:
  1. Warranty Period: Two (2) years from Date of Substantial Completion of the project provided however that the Limited Warranty shall begin in no event later than six months from date of shipment by Kawneer.

#### **1.06 QUALITY ASSURANCE**

- A. Qualifications:
  1. Installer Qualifications: Installer experienced (as determined by contractor) to perform work of this section who has specialized in the installation of work similar to that required for this project and who is acceptable to product manufacturer.
  2. Manufacturer Qualifications: Manufacturer capable of providing structural calculations, applicable independent product test reports, installation instructions, a review of the application method, customer approval and periodic field service representation during construction.
- B. Pre-Installation Meetings: Conduct pre-installation meeting to verify project requirements, substrate conditions, manufacturer's installation instructions, and manufacturer's warranty requirements.

#### **1.07 DELIVERY, STORAGE, AND HANDLING**

- A. Ordering: Comply with manufacturer's ordering instructions and lead time requirements to avoid construction delays.
- B. Packing, Shipping, Handling, and Unloading: Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.
- C. Storage and Protection: Store materials protected from exposure to harmful weather conditions. Handle material and components to avoid damage. Protect curtain wall material against damage from elements, construction activities, and other hazards before, during and after curtain wall installation.

### **PART 2 - PRODUCTS**

#### **2.01 MANUFACTURERS (ACCEPTABLE MANUFACTURERS/PRODUCTS)**

- A. Acceptable Manufacturers:
  1. Address: Kawneer Company, Inc.
  2. 555 Guthridge Court,
  3. Technology Park/Atlanta,
  4. Norcross, GA 30092

5. Telephone: 770 449 5555
  6. 770 734 1560
  7. Proprietary Product(s)/System(s): Kawneer Aluminum Curtain Wall
    - a. Series: 1600 Wall System®1
    - b. Finish/Color: (See 2.06 Finishes)
- B. Alternate (Manufacturers/Products): In lieu of providing below specified base bid/contract manufacturer, provide below specified alternate manufacturers. Refer to Alternates Section.
1. Base Bid/Contract Manufacturer/Product: Kawneer Company, Inc.
    - a. Product: Kawneer Aluminum Curtain Wall
    - b. Series: 1600 Wall System®1
    - c. Framing Member Profile:
  2. Alternate # \_\_\_\_ Manufacturer/Product:
    - a. Product:
    - b. Series:
    - c. Framing Member Profile:
  3. Alternate # \_\_\_\_ Manufacturer/Product:
    - a. Product:
    - b. Series:
    - c. Framing Member Profile:
- C. Substitutions:
1. General: Refer to Substitutions Section for procedures and submission requirements.
    - a. Pre-Contract (Bidding Period) Substitutions: Submit written requests ten (10) days prior to bid date.
    - b. Post-Contract (Construction Period) Substitutions: Submit written request in order to avoid curtain wall installation and construction delays.
  2. Substitution Documentation
    - a. Product Literature and Drawings: Submit product literature and drawings modified to suit specific project requirements and job conditions.
    - b. Certificates: Submit certificate(s) certifying substitute manufacturer (1) attesting to adherence to specification requirements for curtain wall system performance criteria, and (2) has been engaged in the design, manufacturer and fabrication of aluminum curtain wall for a period of not less than ten (10) years. (Company Name)
    - c. Test Reports: Submit test reports verifying compliance with each test requirement for curtain wall required by the project.
    - d. Product Sample and Finish: Submit product sample, representative of curtain wall for the project, with specified finish and color.
  3. Substitution Acceptance: Acceptance will be in written form, either as an addendum or modification, and documented by a formal change order signed by the Owner and Contractor.

## 2.02 MATERIALS

- A. Aluminum (Curtain Wall and Components):
1. Material Standard: Extruded Aluminum, ASTM B 221, 6063-T6 alloy and temper.
  2. Member Wall Thickness: Each framing member shall have a wall thickness sufficient to meet the specified structural requirements.
  3. Tolerances: Reference to tolerances for wall thickness and other cross-sectional dimensions of curtain wall members are nominal and in compliance with AA Aluminum Standards and Data.

## 2.03 ACCESSORIES

- A. Fasteners: Where exposed, shall be Stainless Steel.
- B. Gaskets: Glazing gaskets shall comply with ASTM C 864 and be extruded of a silicone compatible EPDM rubber that provides for silicone adhesion.

- C. Perimeter Anchors: Aluminum. When steel anchors are used, provide insulation between steel material and aluminum material to prevent galvanic action.
- D. Thermal Barrier: Thermal separator shall be extruded of a silicone compatible elastomer that provides for silicone adhesion.
- E. 1600 PowerShade®: An aluminum sunshade consisting of strut anchors and strut arms and three louvers per bay with integral amorphous silicon (photovoltaic or P.V.) panels which produce nominal 45 watts of electrical generation per bay at peak performance. Optional aluminum panels are also available, if selected, in lieu of the P.V. panels. Strut anchors and strut arms shall be painted (Select from Kawneer's standard paints and colors. Custom colors are available upon request.). Louvers shall be painted or anodized (Select from Kawneer's standard paints and colors, custom colors are available upon request, or Kawneer's anodized finishes.).
- F. 1600 SunShade™: An aluminum sunshade (consisting of outriggers, louvers, and fascia which may be selected from standard configurations, modified configurations, or customized) that is anchored directly to the vertical curtain wall mullions. Outriggers shall be painted (Select from Kawneer's standard paints and colors. Custom colors are available upon request.). Louvers and fascia shall be painted or anodized (Select from Kawneer's standard paints and colors, custom colors are available upon request, or Kawneer's anodized finishes.).
- G. InLighten™ (light shelf): aluminum light shelf system consisting of anchor channels, support beams, fascia trims and Aluminum Composite Material (ACM) panels that is anchored directly to the Curtain Wall intermediate horizontal members.
  - 1. Light shelf location shall be as detailed on the architectural drawings.
  - 2. Specifier to choose light shelf end treatment as described below:
    - a. "Wall to Wall" light shelf end treatment; recommended for wall to wall applications (with open-end assembly) or
    - b. "End Caps" light shelf end treatment; recommended for punched opening applications (with closed-end assembly).
  - 3. Specifier to choose light shelf model as described below:
  - 4. Standard designs shall be "Fascia Cap" or "Continuous Panel" models.
    - a. Fascia Cap model: Consists of top and bottom ACM panel surfaces with separate interior extruded aluminum fascia trim as selected from standard profiles, (custom profiles are available on request).
    - b. Continuous Panel model: Consists of a single ACM panel formed to create the overall shelf profile.
  - 5. Light shelf assembly dimensions shall be as follows:
    - a. Overall light shelf assembly nominal thickness shall be 2-1/2" (63.5)
    - b. Overall projection depth shall be as detailed on the architectural drawings, maximum depth is 30" (762).
    - c. ACM panels shall be 3mm or 4mm thick.
  - 6. Anchor channels and fascia trims shall be painted or anodized.
    - a. Select from Kawneer standard paint colors or anodized finishes.
    - b. Custom paint colors are available on request.
  - 7. Aluminum Composite Material (ACM) panels shall be painted.
    - a. Top panel of Fascia Cap model and Continuous Panel model shall be painted white.
    - b. Bottom panel of Fascia Cap model shall be painted as specified.
  - 8. Panel Joint Trim for Fascia Cap model.
  - 9. Select color for top and bottom trim: Black, Gray or White.

#### **2.04 RELATED MATERIALS**

- A. Sealants: Refer to Joint Treatment (Sealants) Section.
- B. Glass: Refer to Glass and Glazing Section.

#### **2.05 FABRICATION**

- A. General:



1. Fabricate components per manufacturer's installation instructions and with minimum clearances and shim spacing around perimeter of assembly, yet enabling installation and dynamic movement of perimeter seal.
2. Accurately fit and secure joints and corners. Make joints flush, hairline and weatherproof.
3. Prepare components to receive anchor devices. Fabricate anchors.
4. Arrange fasteners and attachments to conceal from view.

## **2.06 FINISHES**

- A. Shop Finishing:
  1. Kawneer Permanodic® AA-M12C22A44, AAMA 611, Architectural Class I Color Anodic Coating (Color #40 Dark Bronze).

## **2.07 SOURCE QUALITY CONTROL**

- A. Source Quality: Provide aluminum curtain walls specified herein from a single source.
  1. Building Enclosure System: When aluminum curtain wall are part of a building enclosure system, including entrances, entrance hardware, windows, storefront framing and related products, provide building enclosure system products from a single source manufacturer.

## **PART 3 - EXECUTION**

### **3.01 EXAMINATION**

- A. Site Verification of Conditions: Verify substrate conditions (which have been previously installed under other sections) are acceptable for product installation in accordance with manufacturer's instructions. Verify openings are sized to receive curtain wall system and sill plate is level in accordance with manufacturer's acceptable tolerances.
  1. Field Measurements: Verify actual measurements/openings by field measurements before fabrication; show recorded measurements on shop drawings. Coordinate field measurements, fabrication schedule with construction progress to avoid construction delays.

### **3.02 INSTALLATION**

- A. General: Install curtain wall systems plumb, level, and true to line, without warp or rack of frames with manufacturer's prescribed tolerances and installation instructions. Provide support and anchor in place.
  1. Dissimilar Materials: Provide separation of aluminum materials from sources of corrosion or electrolytic action contact points.
  2. Glazing: Glass shall be outside glazed and held in place with extruded aluminum pressure plates anchored to the mullion using stainless steel fasteners spaced no greater than 9" on center.
  3. Water Drainage: Each light of glass shall be compartmentalized using joint plugs and silicone sealant to divert water to the horizontal weep locations. Weep holes shall be located in the horizontal pressure plates and covers to divert water to the exterior of the building.
- B. Related Products Installation Requirements:
  1. Sealants (Perimeter): Refer to Joint Treatment (Sealants) Section.
  2. Glass: Refer to Glass and Glazing Section.
    - a. Reference: ANSI Z97.1, CPSC 16 CFR 1201 and GANA Glazing Manual

### **3.03 FIELD QUALITY CONTROL**

- A. Field Tests: Architect shall select curtain wall units to be tested as soon as a representative portion of the project has been installed, glazed, perimeter caulked and cured. Conduct tests for air infiltration and water penetration with manufacturer's representative present. Tests not meeting specified performance requirements and units having deficiencies shall be corrected as part of the contract amount.
  1. Testing: Testing shall be performed per AAMA 503 by a qualified independent testing agency. Refer to Testing Section for payment of testing and testing requirements.

- a. Air Infiltration Tests: Conduct tests in accordance with ASTM E 783. Allowable air infiltration shall not exceed 1.5 times the amount indicated in the performance requirements or 0.09 cfm/ft<sup>2</sup>, which ever is greater.
  - b. Water Infiltration Tests: Conduct tests in accordance with ASTM E 1105. No uncontrolled water leakage is permitted when tested at a static test pressure of two-thirds the specified water penetration pressure but not less than 8 psf (383 Pa).
- B. Manufacturer's Field Services: Upon Owner's written request, provide periodic site visit by manufacturer's field service representative.

### **3.04 PROTECTION AND CLEANING**

- A. Protection: Protect installed product's finish surfaces from damage during construction. Protect aluminum curtain wall system from damage from grinding and polishing compounds, plaster, lime, acid, cement, or other harmful contaminants.
- B. Cleaning: Repair or replace damaged installed products. Clean installed products in accordance with manufacturer's instructions prior to owner's acceptance. Remove construction debris from project site and legally dispose of debris.

### **3.05 DISCLAIMER STATEMENT**

- A. This guide specification is intended to be used by a qualified construction specifier. The guide specification is not intended to be verbatim as a project specification without appropriate modifications for the specific use intended. The guide specification must be used and coordinated with the procedures of each design firm, and the particular requirements of a specific construction project.

## **PART 2 PRODUCTS**

**END OF SECTION**

**SECTION 08 7100  
DOOR HARDWARE**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Hardware for wood and hollow steel doors.
- B. Hardware for fire-rated doors.
- C. Electrically operated and controlled hardware.
- D. Lock cylinders for doors for which hardware is specified in other sections.
- E. Thresholds.
- F. Weatherstripping, seals and door gaskets.

**1.02 RELATED REQUIREMENTS**

- A. Section 08 1416 - Flush Wood Doors.
- B. Section 08 4313 - Aluminum-Framed Storefronts: Hardware for same except cylinders; installation of cylinders.
- C. Section - Automatic Entrances: Hardware for same except cylinders; installation of cylinders.
- D. Section 16000 - Electrical: Power supply to electric hardware devices.
- E. Section 28 3105 - Fire Alarm System Equipment: Electrical connection to activate door closers and release magnetic holders.

**1.03 REFERENCE STANDARDS**

- A. DHI (LOCS) - Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames; 2004.
- B. DHI WDHS.3 - Recommended Locations for Architectural Hardware for Flush Wood Doors; 1993; also in WDHS-1/WDHS-5 Series, 1996.
- C. NFPA 80 - Standard for Fire Doors and Other Opening Protectives; 2016.
- D. UL (DIR) - Online Certifications Directory; current listings at [database.ul.com](http://database.ul.com).

**1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Coordinate the manufacture, fabrication, and installation of products onto which door hardware will be installed.

**1.05 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings:
  - 1. Indicate locations and mounting heights of each type of hardware, schedules, catalog cuts, electrical characteristics and connection requirements .
  - 2. Submit manufacturer's parts lists and templates.
- C. Samples: Prior to preparation of hardware schedule:
  - 1. Submit 1 sample of hinge, latchset, lockset, and closer illustrating style, color, and finish.
  - 2. Samples will be incorporated into the Work.
- D. Manufacturer's Installation Instructions: Indicate special procedures, perimeter conditions requiring special attention.
- E. Project Record Documents: Record actual locations of concealed equipment, services, and conduit.
- F. Maintenance Data: Include data on operating hardware, lubrication requirements, and inspection procedures related to preventative maintenance.
- G. Keys: Deliver with identifying tags to Owner by security shipment direct from hardware supplier.

- H. Warranty: Submit manufacturer's warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

#### **1.06 QUALITY ASSURANCE**

- A. Standards for Fire-Rated Doors: Maintain one copy of each referenced standard on site, for use by Architect and Contractor.
- B. Hardware Supplier Qualifications: Company specializing in supplying commercial door hardware approved by manufacturer and employing an Architectural Hardware Consultant with 5 years of experience in commercial hardware.
- C. Hardware Supplier Personnel: Employ an Architectural Hardware Consultant (AHC) to assist in the work of this section.

#### **1.07 PRE-INSTALLATION MEETING**

- A. Convene one week prior to commencing work of this section.

#### **1.08 DELIVERY, STORAGE, AND HANDLING**

- A. Package hardware items individually; label and identify each package with door opening code to match hardware schedule.

#### **1.09 COORDINATION**

- A. Coordinate the work with other directly affected sections involving manufacture or fabrication of internal reinforcement for door hardware.
- B. Furnish templates for door and frame preparation.
- C. Sequence installation to ensure utility connections are achieved in an orderly and expeditious manner.
- D. Coordinate Owner's keying requirements during the course of the Work.

#### **1.10 WARRANTY**

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Provide five year warranty for door closers.

#### **1.11 MAINTENANCE PRODUCTS**

- A. Provide special wrenches and tools applicable to each different or special hardware component.
- B. Provide maintenance tools and accessories supplied by hardware component manufacturer.

#### **1.12 EXTRA MATERIALS**

- A. Provide five extra key lock cylinders for each master keyed group.

### **PART 2 PRODUCTS**

#### **2.01 MANUFACTURERS - BASIS OF DESIGN**

#### **2.02 DOOR HARDWARE - GENERAL**

- A. Provide all hardware specified or required to make doors fully functional, compliant with applicable codes, and secure to the extent indicated.
- B. Provide all items of a single type of the same model by the same manufacturer.
- C. Provide products that comply with the following:
  - 1. Applicable provisions of federal, state, and local codes.
  - 2. Fire-Rated Doors: NFPA 80.
  - 3. Fire-Rated Doors: NFPA 80.
  - 4. All Hardware on Fire-Rated Doors : Listed and classified by UL as suitable for the purpose specified and indicated.
  - 5. Hardware for Smoke and Draft Control Doors (Indicated as "S" on Drawings): Provide hardware that enables door assembly to comply with air leakage requirements of the applicable code.

### **2.03 LOCKS AND LATCHES**

- A. Locks: Provide a lock for every door, unless specifically indicated as not requiring locking.
  - 1. If no hardware set is indicated for a swinging door provide an office lockset.
  - 2. Trim: Provide lever handle or pull trim on outside of all locks unless specifically stated to have no outside trim.
  - 3. Lock Cylinders: Provide key access on outside of all locks unless specifically stated to have no locking or no outside trim.
- B. Lock Cylinders: Manufacturer's standard tumbler type, six-pin standard core.
  - 1. Provide cams and/or tailpieces as required for locking devices required.
- C. Keying: Grand master keyed.
- D. Latches: Provide a latch for every door that is not required to lock, unless specifically indicated "push/pull" or "not required to latch".

### **2.04 HINGES**

- A. Hinges:
- B. Hinges: Provide hinges on every swinging door.
  - 1. Provide five-knuckle full mortise butt hinges unless otherwise indicated.
  - 2. Provide ball-bearing hinges at all doors having closers.
  - 3. Provide hinges in the quantities indicated.
  - 4. Provide non-removable pins on exterior outswinging doors.
  - 5. Where electrified hardware is mounted in door leaf, provide power transfer hinges.

### **2.05 LOCKS AND LATCHES**

- A. Locks: Provide a lock for every door, unless specifically indicated as not requiring locking.
  - 1. Hardware Sets indicate locking functions required for each door.
  - 2. If no hardware set is indicated for a swinging door provide an office lockset.
  - 3. Trim: Provide lever handle or pull trim on outside of all locks unless specifically stated to have no outside trim.
  - 4. Lock Cylinders: Provide key access on outside of all locks unless specifically stated to have no locking or no outside trim.
- B. Lock Cylinders: Manufacturer's standard tumbler type, six-pin standard core.
  - 1. Provide cams and/or tailpieces as required for locking devices required.
- C. Keying: Grand master keyed.
- D. Latches: Provide a latch for every door that is not required to lock, unless specifically indicated "push/pull" or "not required to latch".

### **2.06 GENERAL REQUIREMENTS FOR DOOR HARDWARE PRODUCTS**

- A. Provide products that comply with the following:
  - 1. Applicable provisions of Federal, State, and local codes.
  - 2. ANSI/ICC A117.1, American National Standard for Accessible and Usable Buildings and Facilities.
  - 3. Applicable provisions of NFPA 101, Life Safety Code.
  - 4. Fire-Rated Doors: NFPA 80.
  - 5. All Hardware on Fire-Rated Doors : Listed and classified by UL as suitable for the purpose specified and indicated.
  - 6. Products Requiring Electrical Connection: Listed and classified by UL as suitable for the purpose specified and indicated.
- B. Finishes: Identified in schedule at end of section.

### **2.07 KEYING**

- A. Door Locks: Master key each department.
  - 1. Include construction keying.
  - 2. Key to existing keying system.

- B. Supply keys in the following quantities:
  - 1. 5 master keys.
  - 2. 5 construction keys.
  - 3. 2 change keys for each lock.

## **2.08 KEY CABINET**

- A. Cabinet Construction: Sheet steel construction, piano hinged door with cylindrical type lock master keyed to building system; Key cabinet manufactured by Telkee Inc.
- B. Cabinet Size: Size for project keys plus 10 percent growth.
- C. Hooks for each door key plus 5 additional key hooks.
- D. Horizontal metal strips for key hook labelling with clear plastic strip cover over labels.
- E. Finish: Baked enamel, color as selected.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that doors and frames are ready to receive work; labeled, fire-rated doors and frames are present and properly installed, and dimensions are as indicated on shop drawings.
- B. Verify that electric power is available to power operated devices and of the correct characteristics.

### **3.02 INSTALLATION**

- A. Install hardware in accordance with manufacturer's instructions and applicable codes.
- B. Use templates provided by hardware item manufacturer.
- C. Install hardware on fire-rated doors and frames in accordance with code and NFPA 80.
- D. Mounting heights for hardware from finished floor to center line of hardware item:
  - 1. For steel doors and frames: Comply with DHI "Recommended Locations for Architectural Hardware for Steel Doors and Frames."
  - 2. For wood doors: Comply with DHI "Recommended Locations for Architectural Hardware for Wood Flush Doors."

### **3.03 FIELD QUALITY CONTROL**

- A. Field inspection and testing will be performed under provisions of Section 01 4000.
- B. Provide an Architectural Hardware Consultant to inspect installation and certify that hardware and installation has been furnished and installed in accordance with manufacturer's instructions and as specified.

### **3.04 ADJUSTING**

- A. Adjust work under provisions of Section 01 7000.
- B. Adjust hardware for smooth operation.

### **3.05 PROTECTION**

- A. Protect finished Work under provisions of Section 01 7000.
- B. Do not permit adjacent work to damage hardware or finish.

### **3.06 SCHEDULE - ATTACHED.**

**END OF SECTION**

## SECTION 08 8150

### GLASS

#### PART 1 GENERAL

##### 1.01 SECTION INCLUDES

- A. Flat glass materials.
- B. Insulating glass units.
- C. Glazing accessories.

##### 1.02 RELATED SECTIONS

- A. Section 07900 - Joint Sealers.
- B. Section 08110 - Steel Doors and Frames.
- C. Section 08211 - Flush Wood Doors.
- D. Section 08410 - Metal-Framed Storefronts.
- E. Section 08910 - Metal-Framed Curtain Wall.

##### 1.03 REFERENCES

- A. ASTM C 864 - Standard Specification for Dense Elastomeric Compression Seal Gaskets, Setting Blocks, and Spacers; 1999.
- B. ASTM C 1036 - Standard Specification for Flat Glass; 2001.
- C. ASTM C 1048 - Standard Specification for Heat-Treated Flat Glass--Kind HS, Kind FT Coated and Uncoated Glass; 1997b.
- D. ASTM E 773 - Standard Test Method for Accelerated Weathering of Sealed Insulating Glass Units; 2001.
- E. ASTM E 774 - Standard Specification for the Classification of the Durability of Sealed Insulating Glass Units; 1997.

##### 1.04 DEFINITIONS

- A. Sealed Insulating Glass Unit Surfaces:
  - 1. Side 1 - Exterior surface of outer pane.
  - 2. Side 2 - Interior surface of outer pane.
  - 3. Side 3 - Interior surface of inner pane.
  - 4. Side 4 - Exterior surface of inner pane.

##### 1.05 SYSTEM DESCRIPTION

- A. Design requirements:
  - 1. Size glass to withstand dead loads and positive and negative live loads acting normal to plane of glass in accordance with Arkansas Fire Prevention Code 2002 Edition building code.
  - 2. Limit glass deflection to 3/4 inch (19 mm) or flexure limit of glass with full recovery of glazing materials, whichever is less.

##### 1.06 SUBMITTALS

- A. See Section 01300 - Administrative Requirements, for submittal procedures.
- B. Product Data: Flat glass materials manufacturer's descriptive literature indicating conformance to specified performance requirements for specified flat glass materials.
- C. Verification Samples:
  - 1. Flat Glass Materials: Two 4 by 4 inch (100 by 100 mm) samples of each glass type specified.
  - 2. Sealed Insulating Glass Units: Two 12 by 12 inch (300 by 300 mm) samples representative of unit construction.

## 1.07 QUALITY ASSURANCE

- A. Manufacturer Qualifications, Flat Glass Materials: Minimum five (5) years of documented experience producing glass products of the types specified in this section.
- B. Fabricator Qualifications, Sealed Insulating Glass Units: Minimum five (5) years of documented experience producing sealed insulating glass units of the type specified in this section.
- C. Installer Qualifications: Minimum five (5) years of documented experience installing products of the type specified in this section, and approved by fabricator.

## 1.08 PROJECT/SITE CONDITIONS

- A. Environmental Requirements: Installation of glass products at ambient air temperature below 50 degrees F (10 degrees C) is prohibited.
- B. Field Measurements: When construction schedule permits, verify field measurements with drawing dimensions prior to fabrication of glass products.

## 1.09 WARRANTY

- A. See Section 01780 - Closeout Submittals, for additional warranty requirements.
- B. Provide ten (10) year warranty to include replacement of sealed glass units exhibiting seal failure, interpane dusting or misting.

## PART 2 PRODUCTS

### 2.01 MANUFACTURERS

- A. Manufacturer: Pilkington/Libbey-Owens-Ford Company Building Products; P.O. Box 799, 811 Madison Ave., Toledo, OH 43697-0799; Telephone 419-247-4721, FAX 419-247-4517.
  - 1. Substitutions: See Section 01600 - Product Requirements.
    - a. Versalux Grey 2000 by Visteon Glass Systems, Allen Park, MI., 800-521-6346 may be substituted for exterior lite of Pilkington-LOF SuperGrey in insulated glass panel, if substitution is made, all exterior glass must be by same manufacturer.

### 2.02 MATERIALS

- A. Insulated Glass Units:
  - 1. 1" insulated glass units shall be fabricated with an exterior lite of 1/4" Grey with an interior lite of 1/4" (low emissivity) glass.
  - 2. Insulated glass units shall have 1/2" airspace.
  - 3. Low Emissivity coating shall be on the third glass surface from building exterior.
  - 4. All insulated glass units must have a CBA rating under the provisions of the IGCC certification program.
  - 5. Exterior lite of Pilkington-LOF Grey must be heat treated.
  - 6. All glass in areas requiring safety glazing materials must be fully tempered and conform to applicable provisions of ASTM C 1048.
- B. Clear tempered glass:
  - 1. Nominal Glass Thickness: 1/4".
  - 2. Fully tempered.
- C. Tinted tempered glass:
  - 1. Grey tint.
  - 2. Nominal Glass Thickness: 1/4".
  - 3. Fully tempered.
- D. Wire Glass:
  - 1. Nominal Glass Thickness: 1/4".
- E. Tinted Uncoated Float Glass:
  - 1. Acceptable Product: LOF Grey Tint Float Glass.
  - 2. Description: Annealed tinted float glass meeting requirements of ASTM C 1036, Type 1, Class 2, Quality Q3.
  - 3. Nominal Glass Thickness: 1/4 inch (6 mm).



- F. Low-Emissivity Coated Float Glass:
  - 1. Acceptable Product: LOF Energy Advantage Low-E Glass.
  - 2. Description: Annealed clear coated float glass meeting requirements of ASTM C 1036, Type 1, Class 1, Quality Q3; with pyrolytic coating.
  - 3. Nominal Glass Thickness: 1/4 inch (6 mm).
- G. Transparent Mirror:
  - 1. Acceptable Product: LOF Mirropane E.P. Transparent Mirror.
  - 2. Description: ASTM C 1036, Type 1, Class 3, Quality Q3; with pyrolytic coating.
  - 3. Nominal Glass Thickness: 1/4 inch (6 mm).
- H. Setting Blocks: ASTM C 864, neoprene, 80 to 90 Shore A durometer hardness; length 4 inches (100 mm), width of glazing rabbet space less 1/16 inch (1.5 mm), height required for glazing method, pane weight, and pane area.
- I. Spacer Shims: ASTM C 864, neoprene, 50 to 60 Shore A durometer hardness; length 3 inches (75 mm), one half height of glazing stop, thickness required for application, one face self-adhesive.
- J. Glazing Tape: Butyl compound tape with integral resilient tube spacer, 10 to 15 Shore A durometer hardness, black color, coiled on release paper; widths required for specified installation.
- K. Glazing Splines: ASTM C 864, resilient polyvinyl chloride, extruded shape to fit glazing channel retaining slot; black color.
- L. Glazing Gaskets: ASTM C 864, resilient polyvinyl chloride, extruded shape to fit glazing channel retaining slot; black color.
- M. Sealants: Specified in Section 07900.

## 2.03 FABRICATION

- A. Tempered Glass:
  - 1. Cut float glass materials to indicated sizes and provide cut-outs and holes, if indicated, before heat strengthening.
  - 2. Fully temper float glass materials in accordance with ASTM C 1048, Kind FT.
- B. Sealed Insulating Glass Units:
  - 1. Fabricate units in accordance with ASTM E 774, Class CBA:
    - a. Outer Pane:
      - 1) Glass Type: Tinted Uncoated Float Glass.
      - 2) Glass Color: Grey Tint.
      - 3) Glass Thickness: 1/4 inch (6 mm).
      - 4) Heat Treating: Fully tempered.
    - b. Air Space: 1/2 inch (\_\_\_ mm) wide, hermetically sealed, argon gas filled, dehydrated air space.
    - c. Inner Pane:
      - 1) Glass Type: Clear Uncoated Float Glass.
      - 2) Glass Thickness: 1/4 inch (6 mm).
      - 3) Heat Treating: Fully tempered.
  - 2. Provide unit edge seals meeting requirements of ASTM E 773, with aluminum spacers having mitered corners, and silicone sealant for glass-to-spacer seals.

## PART 3 EXECUTION

### 3.01 EXAMINATION

- A. Verify that openings for glazing are correct size and within tolerance.
- B. Verify that glazing channels and recesses are clean and free of obstructions, that weeps are clear, and that channels and recesses are ready for glazing.

### **3.02 PREPARATION**

- A. Clean contact surfaces to receive sealant with solvent; wipe dry.
- B. Seal porous glazing channels and recesses with primer or sealer compatible with substrate.
- C. Prime surfaces to receive sealant in accordance with sealant manufacturer's instructions.

### **3.03 INSTALLATION**

- A. Install coated monolithic glass with coated surface to interior (Surface 2).
- B. Install sealants in accordance with Section 07900.
- C. Exterior Wet/Dry Method (Formed Tape and Sealant):
  - 1. Apply glazing tape to permanent stops, 1/4 inch (6 mm) below sight line; butt-joint tape edges; seal joints with butyl sealant.
  - 2. Apply heel bead of butyl sealant along intersection of permanent stop with frame; ensure full perimeter seal between glass and frame for continuity of air and vapor seal.
  - 3. Place setting blocks with edge blocks maximum 6 inches (150 mm) from glass edges and intermediate blocks at 1/4 points of glass panel length.
  - 4. Set glass unit on setting blocks; apply pressure against fixed stop for full contact.
  - 5. Install removable stops without displacing glazing tape; insert spacer strips between glazing and applied stops; terminate spacer strips 1/4 inch (6 mm) below sight line; apply pressure for full continuous contact.
  - 6. Fill gap between glazing and stop with sealant to depth equal to bite of frame on glazing and to 3/8 inch (9.5 mm) below sight line.
  - 7. Apply cap bead of sealant along void between stop and glazing to uniform line flush with sight line; tool sealant surface smooth.
- D. Interior Dry Method (Tape and Tape):
  - 1. Apply glazing tape to permanent stops, allowing tape edge to project 1/16 inch (1.5 mm) above stop; butt-joint tape edges; seal joints with butyl sealant.
  - 2. Place setting blocks with edge blocks maximum 6 inches (150 mm) from glass edges and intermediate blocks at 1/4 points of glass panel length.
  - 3. Set glass unit on setting blocks; apply pressure against fixed stop for full contact.
  - 4. Apply glazing tape on free perimeter of glazing as described above.
  - 5. Install removable stops without displacing glazing tape; apply pressure for full continuous contact.
  - 6. Trim sight-exposed tape flush with stop.
- E. Installation of glazing in steel doors and borrowed-lite partitions is specified in Section 08110.
- F. Installation of glazing in flush wood doors is specified in Section 08211.
- G. Installation of glazing in aluminum entrances and storefronts is specified in Section 08410.
- H. Installation of glazing in aluminum curtain wall system is specified in Section 08910.

### **3.04 CLEANING**

- A. Remove glazing materials from finish surfaces.
- B. Remove labels after glass installation is complete.
- C. Clean glass surfaces and adjacent surfaces.

### **3.05 SCHEDULES**

- A. Installation Methods:
  - 1. Interior Metal Borrowed-Lite Partitions: Interior Dry Method.
  - 2. Exterior Aluminum Framed Fixed Windows: Exterior Wet/Dry Method.

**END OF SECTION**

**SECTION 09 2116**  
**GYP SUM BOARD ASSEMBLIES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Metal stud wall framing.
- B. Metal channel ceiling framing.
- C. Fire rated area separation walls.
- D. Exterior sheathing.
- E. Cementitious backing board.
- F. Gypsum wallboard.
- G. Joint treatment and accessories.
- H. Security Mesh at Security Walls
- I. Water-resistive barrier over exterior wall sheathing.

**1.02 RELATED REQUIREMENTS**

- A. Section 03300 Cast in place concrete
- B. Section 05500 Metal Fabrications
- C. Section 05 5214 Ornametal and misc Metals
- D. Section 06 2000 Finish Carpentry
- E. Section 06 8300 High Pressure Decrative Laminates
- F. Section 06 4100 Architectural Wood Casework
- G. Section 06 6100 Simulated Stone Fabrications
- H. Section 08110 Steel doors and frmaes
- I. Section 08410 Metal framed storefronts
- J. Section 08462 Automatic sliding doors
- K. Section 08520 Aluminum windows
- L. Section 09300 Tile
- M. Section 09650 Resilient flooring
- N. Section 09685 Carpet
- O. Section 09900 Paints and coatings
- P. Section 10170 Plastic toilet compartments
- Q. Section 10523 Fire extinguisher cabinets
- R. Section 10810 Toilet Accessories
- S. Section 05 4000 - Cold-Formed Metal Framing: Exterior wind-load-bearing metal stud framing.
- T. Section 06 1000 - Rough Carpentry: Building framing and sheathing.
- U. Section 06 1054 - Wood Blocking and Curbing: Wood blocking for support of wall mounted equipment and cabinets.
- V. Section 07 2100 - Thermal Insulation: Acoustic insulation.
- W. Section - Joint Sealers: Acoustic sealant.
- X. Section 09511 - Suspended Acoustical Ceilings: Suspension and trim for specialty gypsum ceilings.

### 1.03 REFERENCE STANDARDS

- A. ANSI A108/A118/A136.1 - American National Standard Specifications for the Installation of Ceramic Tile (Compendium); 2017.
- B. ANSI A108/A118/A136.1 - American National Standard Specifications for the Installation of Ceramic Tile (Compendium); 2017.
- C. ASTM C 36/C 36M - Standard Specification for Gypsum Wallboard; 2001.
- D. ASTM C 442/C 442M - Standard Specification for Gypsum Backing Board, Gypsum Coreboard, and Gypsum Shaftliner Board; 1999a.
- E. ASTM C475/C475M - Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board; 2015.
- F. ASTM C645 - Standard Specification for Nonstructural Steel Framing Members; 2014, with Editorial Revision (2015).
- G. ASTM C754 - Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products; 2017.
- H. ASTM C840 - Standard Specification for Application and Finishing of Gypsum Board; 2017a.
- I. 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; 2015.
- J. 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; 2016.
- K. ASTM C1047 - Standard Specification for Accessories For Gypsum Wallboard and Gypsum Veneer Base; 2014a.
- L. ASTM C1280 - Standard Specification for Application of Exterior Gypsum Panel Products for Use as Sheathing; 2013a.
- M. ASTM C1325 - Standard Specification for Non-Asbestos Fiber-Mat Reinforced Cementitious Backer Units; 2017a.
- N. ASTM C1396/C1396M - Standard Specification for Gypsum Board; 2014.
- O. ASTM C1658/C1658M - Standard Specification for Glass Mat Gypsum Panels; 2013.
- P. ASTM D3273 - Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber; 2012.
- Q. GA-216 - Application and Finishing of Gypsum Panel Products; 2016.
- R. GA-226 - Application of Gypsum Board to Form Curved Surfaces; Gypsum Association; 2016.

### 1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate special details associated with fireproofing.
- C. Product Data: Provide data on metal framing, gypsum board, accessories, joint finishing system, and cementitious backer board.
- D. Product Data: Provide manufacturer's data on partition head to structure connectors, showing compliance with requirements.
- E. Test Reports: For all stud framing products that do not comply with ASTM C645 or C 754, provide independent laboratory reports showing maximum stud heights at required spacings and deflections.

### 1.05 QUALITY ASSURANCE

- A. Perform in accordance with ASTM C 840. Comply with requirements of GA-600 for fire-rated assemblies.
  - 1. Maintain one copy of standards at project site.

## **1.06 REGULATORY REQUIREMENTS**

- A. Conform to IBC 2003 code for fire rated assemblies as indicated on drawings.

## **PART 2 PRODUCTS**

### **2.01 GYPSUM BOARD ASSEMBLIES**

- A. Provide completed assemblies complying with ASTM C840 and GA-216.

### **2.02 METAL FRAMING MATERIALS**

- A. Manufacturers - Metal Framing, Connectors, and Accessories:
  - 1. Clarkwestern Dietrich Building Systems LLC: [www.clarkdietrich.com](http://www.clarkdietrich.com).
  - 2. Dale/Incor: [www.daleincor.com](http://www.daleincor.com).
  - 3. Dietrich Metal Framing: [www.dietrichindustries.com](http://www.dietrichindustries.com).
  - 4. Marino: [www.marinoware.com](http://www.marinoware.com).
  - 5. Substitutions: See Section 01 6000 - Product Requirements.
- B. Metal Framing Connectors and Accessories:
  - 1. Same manufacturer as framing.
  - 2. Substitutions: See Section 01 6000 - Product Requirements.
- C. Non-Loadbearing Framing System Components: ASTM C645; galvanized sheet steel, of size and properties necessary to comply with ASTM C754 for the spacing indicated, with maximum deflection of wall framing of L/240 at 5 psf (240 Pa).
  - 1. Exception: The minimum metal thickness and section properties requirements of ASTM C 645 are waived provided steel of 40 ksi (275 MPa) minimum yield strength is used, the metal is continuously dimpled, the effective thickness is at least twice the base metal thickness, and maximum stud heights are determined by testing in accordance with ASTM E 72 using assemblies specified by ASTM C 754.
  - 2. Studs: 25 gauge C shaped with knurled faces.
  - 3. Runners: U shaped, sized to match studs.
  - 4. Ceiling Channels: C shaped.
  - 5. Furring: Hat-shaped sections, minimum depth of 7/8 inch (22 mm).
- D. Loadbearing Studs for Application of Gypsum Board: As specified in Section 05 4000.
- E. Shaft Wall Studs and Accessories: ASTM C645; galvanized sheet steel, of size and properties necessary to comply with ASTM C754 .
  - 1. Manufacturers - Shaft Wall Studs and Accessories:
    - a. Same manufacturer as other framing materials.
    - b. Phillips Manufacturing Co: [www.phillipsmfg.com](http://www.phillipsmfg.com).
    - c. Substitutions: See Section 01 6000 - Product Requirements.
- F. Shaft Wall Studs and Accessories: ASTM C 645; galvanized sheet steel, of size and properties necessary to comply with ASTM C 754 .
- G. Ceiling Hangers: Type and size as specified in ASTM C754 for spacing required.
- H. Partition Head To Structure Connections: Provide track fastened to structure with legs of sufficient length to accommodate deflection, for friction fit of studs cut short and screwed to secondary deflection channel set inside but unattached to top track.

### **2.03 BOARD MATERIALS**

- A. Manufacturers - Gypsum-Based Board:
  - 1. Georgia-Pacific Gypsum: [www.gpgypsum.com](http://www.gpgypsum.com).
  - 2. National Gypsum Company: [www.nationalgypsum.com](http://www.nationalgypsum.com).
  - 3. USG Corporation: [www.usg.com](http://www.usg.com).
  - 4. Substitutions: See Section 01 6000 - Product Requirements.
- B. Gypsum Wallboard: Paper-faced gypsum panels as defined in ASTM C1396/C1396M; sizes to minimize joints in place; ends square cut.
  - 1. Application: Use for vertical surfaces and ceilings, unless otherwise indicated.

2. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
    - a. Mold-resistant board is required at all locations.
  3. Thickness:
    - a. Vertical Surfaces: 5/8 inch (16 mm).
- C. Cement Backing Board For Wet Areas: One of the following products:
1. Application: Surfaces behind plastic paneling at all kitchens walls.
  2. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
  3. ANSI Cement-Based Board: Non-gypsum-based; aggregated Portland cement panels with glass fiber mesh embedded in front and back surfaces complying with ANSI A108/A118/A136.1 or ASTM C1325.
    - a. Thickness: 1/2 inch (12.7 mm).
    - b. Products:
      - 1) Custom Building Products; Wonderboard.
      - 2) National Gypsum Company; PermaBase Brand Cement Board.
      - 3) National Gypsum Company; PermaBase Flex Brand Cement Board.
      - 4) USG Corporation; Durock Brand Cement Board.
- D. Gypsum Wallboard: ASTM C 1396/C 1396M. Sizes to minimize joints in place; ends square cut. All gypsum board shall be "Mold Resistant" type.
1. Regular Type, Mold & Water Resistant:
    - a. Application: Use for vertical surfaces, unless otherwise indicated.
    - b. Thickness: 5/8 inch (16 mm).
    - c. Edges: Tapered.
  2. Fire Resistant Type: Mold & Water Resistant, Complying with Type X requirements; UL or WH rated.
    - a. At Assemblies Indicated with Fire-Rating: Use type required by indicated tested assembly; if no tested assembly is indicated, use Type X.
    - b. Application: Where required for fire-rated assemblies, unless otherwise indicated.
    - c. Thickness: 5/8 inch (16 mm).
    - d. Edges: Tapered.
  3. Ceiling Board: Special sag-resistant type.
    - a. Mold & Water Resistant
    - b. Application: Ceilings, unless otherwise indicated.
    - c. Thickness: 1/2 inch (13 mm).
    - d. Edges: Tapered.
- E. Exterior Sheathing Board: Sizes to minimize joints in place; ends square cut.
1. Basis of Design: National Gypsum Company; Gold Bond® BRAND eXP® Extended Exposure Sheathing & Gold Bon Brand eXP Fire-Shield Extended Exposure Gypsum Sheathing
  2. Description
    - a. Core: [Regular gypsum core] [Type X gypsum core], with additives to enhance [fire resistance], moisture and mold resistant
    - b. Facing: water resistant glass mat on both face and back surfaces
    - c. long edges wrapped with water repellent glass mat
    - d. overall thickness 1/2"
  3. Application: Exterior sheathing, unless otherwise indicated.
  4. Physical Characteristics
    - a. Panel complies with requirements of both ASTM C 1177 / C 1177M and C 1396 / C 1396M
    - b. Class: Type X when tested in accordance with ASTM E 119
    - c. Racking strength - Ultimate 711 lbs / Lin Ft. when tested in accordance with ASTM E72
    - d. Humidified Deflection: less than 1/8 inch when tested in accordance with ASTM C473
    - e. Nail pull resistance: [80] [90] lbs, when tested in accordance with ASTM C473

- f. Water Absorption: less than 10% when tested in accordance with ASTM C473
  - g. Surface Water Absorption: less than 1% when tested in accordance with ASTM C473
  - h. Permeance: greater than 10 perms, when tested in accordance with ASTM E96
  - i. Combustibility: Noncombustible when tested in accordance with ASTM E136
  - j. Flame spreads/Smoke Developed: 5/0 when tested in accordance with ASTM E84
  - k. Mold/Mildew Resistance: 10 when tested in accordance with ASTM D 3273
- F. Exterior Soffit Board: Exterior gypsum soffit board as defined in ASTM C1396/C1396M; sizes to minimize joints in place; ends square cut. Mold & Water Resistant.
- 1. Application: Ceilings and soffits in protected exterior areas, unless otherwise indicated.
  - 2. At Assemblies Indicated with Fire-Rating: Use type required by indicated tested assembly; if no tested assembly is indicated, use Type X.
  - 3. Types: Regular and Type X, in locations indicated.
  - 4. Type X Thickness: 5/8 inch (16 mm).
  - 5. Regular Type Thickness: 1/2 inch (13 mm).
  - 6. Edges: Tapered.
  - 7. Products:
    - a. American Gypsum; Exterior Soffit Wallboard.
    - b. CertainTeed Corporation; ProRoc Brand Exterior Soffit Board.
    - c. Georgia-Pacific Gypsum; ToughRock Soffit Board.
    - d. Lafarge North America Inc; Soffitboard.
    - e. National Gypsum Company; Gold Bond Brand Exterior Soffit Board.
    - f. Pacific Coast Building Products, Inc; PABCO.
    - g. Temple-Inland Inc; Exterior Gypsum Soffit Board.
    - h. USG Corporation; Sheetrock Exterior Gypsum Ceiling Board.
    - i. Substitutions: See Section 01 6000 - Product Requirements.
- G. Shaftwall and Coreboard: Type X; 1 inch (25 mm) thick by 24 inches (610 mm) wide, beveled long edges, ends square cut.
- 1. Glass Mat Faced Type: Glass mat shaftliner gypsum panel or glass mat coreboard gypsum panel as defined in ASTM C1658/C1658M.
  - 2. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
  - 3. Products:
    - a. American Gypsum; Shaft Liner.
    - b. Georgia-Pacific Gypsum; DensGlass Shaftliner (mold-resistant).
    - c. National Gypsum Company; Gold Bond Brand 1" Fire-Shield Shaftliner XP (mold-resistant).
    - d. National Gypsum Company; Gold Bond Brand e2XP Extended Exposure Shaftliner.
    - e. Temple-Inland Inc; GreenGlass Liner Panel.
- H. Gypsum Shaftwall or Coreboard: ASTM C 1396/C 1396M; Type X core; sizes to minimize joints in place; 1 inch (25 mm) thick; square, tongue and groove, or double beveled edges, ends square cut. Mold & Water resistant.

#### **2.04 ACCESSORIES**

- A. Acoustic Insulation: As specified in Section 07 2100.
- B. Acoustic Sealant: As specified in Section .
- C. Water-Resistive Barrier: .
- D. Water-Resistive Barrier: No. 15 asphalt felt.
- E. Finishing Accessories: ASTM C1047, galvanized steel or rolled zinc, unless otherwise indicated.
  - 1. Types: As detailed or required for finished appearance.
  - 2. Special Shapes: In addition to conventional cornerbead and control joints, provide U-bead at exposed panel edges.
- F. Joint Materials: ASTM C475 and as recommended by gypsum board manufacturer for project conditions.

1. Tape: 2 inch (50 mm) wide, coated glass fiber tape for joints and corners.
  2. Ready-mixed vinyl-based joint compound.
- G. High Build Drywall Surfer: Vinyl acrylic latex-based coating for spray application, designed to take the place of skim coating and separate paint primer in achieving Level 5 finish.
- H. Screws for Attachment to Steel Members Less Than 0.03 inch (0.7 mm) In Thickness, to Wood Members, and to Gypsum Board: ASTM C1002; self-piercing tapping type; cadmium-plated for exterior locations.
- I. Screws for Attachment to Steel Members From 0.033 to 0.112 inch (0.8 to 2.8 mm) in Thickness: ASTM C954; steel drill screws for application of gypsum board to loadbearing steel studs.
- J. Screws: ASTM C 1002; self-piercing tapping type; cadmium-plated for exterior locations.
- K. Screws: ASTM C 954; steel drill screws for application of gypsum board to loadbearing steel studs.

## **2.05 SECURITY MESH**

- A. Examet Flattened Security Mesh - 50-76MF
- B. Instal as indicated on drawings
- C. Instal per manufacturers requirements

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that project conditions are appropriate for work of this section to commence.

### **3.02 SHAFT WALL INSTALLATION**

- A. Shaft Wall Framing: Install in accordance with manufacturer's installation instructions.
  1. Fasten runners to structure with short leg to finished side, using appropriate power-driven fasteners at not more than 24 inches (600 mm) on center.
  2. Install studs at spacing required to meet performance requirements.
- B. Shaft Wall Liner: Cut panels to accurate dimension and install sequentially between special friction studs.

### **3.03 FRAMING INSTALLATION**

- A. Metal Framing: Install in accordance with ASTM C754 and manufacturer's instructions.
- B. Suspended Ceilings and Soffits: Space framing and furring members as indicated.
  1. Level ceiling system to a tolerance of 1/1200.
  2. Laterally brace entire suspension system.
  3. Install bracing as required at exterior locations to resist wind uplift.
- C. Studs: Space studs at 16 inches (400 mm) on center.
  1. Extend partition framing to structure in all locations.
  2. Partitions Terminating at Structure: Attach top runner to structure, maintain clearance between top of studs and structure, and connect studs to track using specified mechanical devices in accordance with manufacturer's instructions; verify free movement of top of stud connections; do not leave studs unattached to track.
- D. Openings: Reinforce openings as required for weight of doors or operable panels, using not less than double studs at jambs.
- E. Standard Wall Furring: Install at concrete and masonry walls scheduled to receive gypsum board, not more than 4 inches (100 mm) from floor and ceiling lines and abutting walls. Secure in place on alternate channel flanges at maximum 24 inches (600 mm) on center.
  1. Orientation: Horizontal.
  2. Spacing: As indicated.
- F. Blocking: Install blocking for support of plumbing fixtures, toilet partitions, wall cabinets, toilet accessories, and hardware. Comply with Section 06 1054 for wood blocking.



### **3.04 BOARD INSTALLATION**

- A. Comply with ASTM C 840 and manufacturer's instructions. Install to minimize butt end joints, especially in highly visible locations.
- B. Single-Layer Non-Rated: Install gypsum board in most economical direction, with ends and edges occurring over firm bearing.
  - 1. Exception: Tapered edges to receive joint treatment at right angles to framing.
- C. Fire-Rated Construction: Install gypsum board in strict compliance with requirements of assembly listing.
- D. Exterior Sheathing: Comply with ASTM C1280. Install sheathing vertically, with edges butted tight and ends occurring over firm bearing.
  - 1. Paper-Faced Sheathing: Immediately after installation, protect from weather by application of water-resistive barrier.
- E. Exterior Soffit Board: Install perpendicular to framing, with staggered end joints over framing members or other solid backing.
- F. Cementitious Backing Board: Install over steel framing members where indicated, in accordance with ANSI A108/A118/A136.1 and manufacturer's instructions.
- G. Installation on Metal Framing: Use screws for attachment of all gypsum board .
- H. Curved Surfaces: Apply gypsum board to curved substrates in accordance with GA-226.
- I. Moisture Protection: Treat cut edges and holes in moisture resistant gypsum board with sealant.

### **3.05 INSTALLATION OF TRIM AND ACCESSORIES**

- A. Control Joints: Place control joints consistent with lines of building spaces and as directed.
  - 1. Not more than 30 feet (10 meters) apart on walls over 50 feet (16 meters) long and at each side of all windows, doors, cased openings and all other openings (coordinate final locations with architect prior to installation).
- B. Corner Beads: Install at external corners, using longest practical lengths.
- C. Edge Trim: Install at locations where gypsum board abuts dissimilar materials .

### **3.06 JOINT TREATMENT**

- A. Paper Faced Gypsum Board: Use fiberglass joint tape, bedded with ready-mixed vinyl-based joint compound and finished with ready-mixed vinyl-based joint compound.
- B. Finish gypsum board in accordance with levels defined in ASTM C840, as follows:
  - 1. Level 4: Walls and ceilings to receive satin, eggshell or flat paint finish or wall coverings, unless otherwise indicated.
  - 2. Level 1: Fire rated wall areas above finished ceilings, whether or not accessible in the completed construction.
- C. Finish gypsum board in scheduled areas in accordance with levels defined in ASTM C 840 and as scheduled below.
  - 1. Above Finished Ceilings Concealed From View: Level 1.
  - 2. Utility Areas and Areas Behind Cabinetry: Level 2.
  - 3. Walls and Ceilings to Receive Flat or Eggshell Paint Finish: Level 4.
  - 4. Walls and Ceilings to Receive Semi-Gloss or Gloss Paint Finish: Level 5.
- D. Tape, fill, and sand exposed joints, edges, and corners to produce smooth surface ready to receive finishes.
  - 1. Feather coats of joint compound so that camber is maximum 1/32 inch (0.8 mm).
  - 2. Taping, filling, and sanding is not required at surfaces behind adhesive applied ceramic tile and fixed cabinetry.
- E. Where Level 5 finish is indicated, spray apply high build drywall surfacer over entire surface after joints have been properly treated; achieve a flat and tool mark-free finish.

- F. Spray apply high build drywall surfacer over entire surface after joints have been properly treated to achieve Level 5 finish in areas indicated.
- G. Fill and finish joints and corners of cementitious backing board as recommended by manufacturer.

**3.07 TOLERANCES**

- A. Maximum Variation of Finished Gypsum Board Surface from True Flatness: 1/8 inch in 10 feet (3 mm in 3 m) in any direction.

**3.08 FINISH LEVEL SCHEDULE**

- A. Level 1: Above finished ceilings concealed from view.
- B. Level 2: Utility areas and areas behind cabinetry.
- C. Level 5: Walls and ceilings scheduled to receive semi-gloss or gloss paint finish.

**END OF SECTION**

**SECTION 09 5100**  
**ACOUSTICAL CEILINGS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Suspended metal grid ceiling system.
- B. Supplementary acoustical insulation above ceiling.

**1.02 RELATED REQUIREMENTS**

- A. Section 07 2100 - Thermal Insulation: Acoustical insulation.
- B. Section 08 3100 - Access Doors and Panels: Access panels.
- C. Section 09 2116 - Gypsum Board Assemblies: Installation of gypsum board ceilings.
- D. Section 05 4000 Cold Formed Metal Framing
- E. Section 09 3050 Tile
- F. Section 09 9100 Acoustical Ceilings
- G. Section 16000 - Fire Alarm System: Fire alarm components in ceiling system.
- H. Section 15300 - Fire Suppression Sprinklers: Sprinkler heads in ceiling system.
- I. Section 15932 - Air Outlets and Inlets: Air diffusion devices in ceiling.
- J. Section 16515 - Interior Luminaires: Light fixtures in ceiling system.

**1.03 REFERENCE STANDARDS**

- A. ASTM E1264 - Standard Classification for Acoustical Ceiling Products; 2014.
- B. NFPA 286 - Standard Methods of Fire Tests for Evaluating Contribution of Wall and Ceiling Interior Finish to Room Fire Growth; 2015.

**1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Sequence work to ensure acoustical ceilings are not installed until building is enclosed, sufficient heat is provided, dust generating activities have terminated, and overhead work is completed, tested, and approved.
- B. Do not install acoustical units until after interior wet work is dry.

**1.05 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate grid layout and related dimensioning and junctions with other ceiling finishes.
- C. Product Data: Provide data on suspension system components and acoustical units.
- D. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.

**1.06 FIELD CONDITIONS**

- A. Maintain uniform temperature of minimum 60 degrees F (16 degrees C), and maximum humidity of 40 percent prior to, during, and after acoustical unit installation.

**1.07 PROJECT CONDITIONS**

- A. Sequence work to ensure acoustical ceilings are not installed until building is enclosed, sufficient heat is provided, dust generating activities have terminated, and overhead work is completed, tested, and approved.
- B. Install acoustical units after interior wet work is dry.

**PART 2 PRODUCTS**

**2.01 ACOUSTICAL UNITS**

- A. Manufacturers:

1. Armstrong World Industries, Inc: [www.armstrong.com](http://www.armstrong.com).
- B. Other Acceptable Manufacturers:
  1. CertainTeed Corporation: [www.certainteed.com](http://www.certainteed.com).
  2. Hunter Douglas Contract: [www.hunterdouglascontract.com](http://www.hunterdouglascontract.com).
  3. USG: [www.usg.com](http://www.usg.com).
  4. Substitutions: See Section 01 6000 - Product Requirements.
- C. Acoustical Units - General: ASTM E1264, Class A.
- D. Acoustical Panels, ULTIMA, Tegular fine Texture, Type SA1 & SA2: Painted mineral fiber, ASTM E1264 Type III, with the following characteristics:
  1. SA1 = Size: 24 x 48 inches (600 x 1200 mm).
  2. SA2 = Size 24 x 24 inch (600 x 600 mm).
  3. Thickness: 3/4 inches (19 mm).
  4. Light Reflectance:.84 percent, determined as specified in ASTM E1264.
  5. NRC Range:.70 as determined as specified in ASTM E 1264.
  6. Edge: Tegular.
  7. Surface Color: White.
    - a. Provide Black at areas required by Owner
  8. Surface Pattern: Perforated.
  9. Product Tiles: Ultima Tegular Fine Texture by Armstrong.
  10. Suspension System: Exposed gridType Ultima Silhouette with 1/4" reveal.
- E. Fiberglass Lay-in Ceiling Panels Type SA3 & SA4: complying with NFPA 286, ASTM E84, ASTM E1264, Class A: for Kitchen Areas.
  1. OPTIMA Health Zone Square Lay-in Tegular by Armstrong
  2. SA3 = Size 24 x 48 inches (600 x 1200 mm)
  3. SA4 = Size: 24 x 24 inches (600 x 600 mm).
  4. Surface Texture: Square Tegular.
  5. Composition: Light transmitting PETG (polyethylene terephthalate) plastic.
  6. Panel Edge: Tegular.
  7. Color: White.
  8. Suspension System: Exposed grid Type Interlude XL 9/16" suspension system for Optima health zone square tegular - white .

## **2.02 SUSPENSION SYSTEM**

- A. Open Grid System at Casino Floor
- B. Manufacturers:
  1. Chicago Metallic Corporation; Product Beam Grid: [www.chicagometallic.com](http://www.chicagometallic.com).
  2. Substitutions: See Section 01 6000 - Product Requirements.
- C. Suspension System
- D. BeamGrid 1 x 1 inch beams, 24 x 24 inch module
- E. color: black - all sides
- F. Concealed Suspension System Type Drywall Furring System: Formed steel, commercial quality cold rolled; light-duty.

## **2.03 ACCESSORIES**

- A. Support Channels and Hangers: Galvanized steel; size and type to suit application and ceiling system flatness requirement specified.
- B. Perimeter Moldings: Same material and finish as grid.
  1. At Concealed Grid: Provide exposed L-shaped molding.
- C. Acoustical Insulation: Specified in Section 07 2100.
  1. Thickness: 2 inch (50 mm).
  2. Size: To fit acoustical suspension system.

- D. Touch-up Paint: Type and color to match acoustical and grid units.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Verify existing conditions before starting work.
- B. Verify that layout of hangers will not interfere with other work.

#### **3.02 INSTALLATION - SUSPENSION SYSTEM**

- A. Install suspension system in accordance with ASTM C 636, ASTM E 580, and manufacturer's instructions and as supplemented in this section.
- B. Rigidly secure system, including integral mechanical and electrical components, for maximum deflection of 1:360.
- C. Locate system on room axis according to reflected plan.
- D. Install after major above-ceiling work is complete. Coordinate the location of hangers with other work.
- E. Hang suspension system independent of walls, columns, ducts, pipes and conduit. Where carrying members are spliced, avoid visible displacement of face plane of adjacent members.
- F. Where ducts or other equipment prevent the regular spacing of hangers, reinforce the nearest affected hangers and related carrying channels to span the extra distance.
- G. Do not support components on main runners or cross runners if weight causes total dead load to exceed deflection capability.
- H. Support fixture loads using supplementary hangers located within 6 inches (150 mm) of each corner, or support components independently.
- I. Do not eccentrically load system or induce rotation of runners.
- J. Perimeter Molding: Install at intersection of ceiling and vertical surfaces and at junctions with other interruptions.
  - 1. Use longest practical lengths.
  - 2. Overlap and rivet corners.

#### **3.03 INSTALLATION - ACOUSTICAL UNITS**

- A. Install acoustical units in accordance with manufacturer's instructions.
- B. Fit acoustical units in place, free from damaged edges or other defects detrimental to appearance and function.
- C. Fit border trim neatly against abutting surfaces.
- D. Install units after above-ceiling work is complete.
- E. Install acoustical units level, in uniform plane, and free from twist, warp, and dents.
- F. Cutting Acoustical Units:
  - 1. Make field cut edges of same profile as factory edges.
  - 2. Double cut and field paint exposed reveal edges.
- G. Install hold-down clips on panels within 20 ft (6 m) of an exterior door.
- H. Install plastic lay-in panels at following minimum distance from conventional light sources:

#### **3.04 TOLERANCES**

- A. Maximum Variation from Flat and Level Surface: 1/8 inch in 10 feet (3 mm in 3 m).
- B. Maximum Variation from Plumb of Grid Members Caused by Eccentric Loads: 2 degrees.

#### **3.05 SCHEDULE: SEE DRAWINGS.**

#### **3.06 ATTIC STOCK**

- A. Provide owner with two un-opened boxes of each type of ceiling tile specified in this section or used on this project as attic stock.

B. Each box should be clearly labeled, unopened and undamaged.

**END OF SECTION**

**SECTION 09 9000**  
**PAINTINGS AND COATINGS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Use products specified in this section to finish all surfaces exposed to view, unless otherwise indicated, including but not limited to the following:
  - 1. Interior wall surfaces.
  - 2. Opening frames and trim.
  - 3. Exterior hollow metal doors and frames.
    - a. Remove rust and scale, prime and repaint.
    - b. Finish aluminum, stainless steel, copper, and bronze only if specifically indicated to receive field finish.
  - 4. All shop-primed items.
- B. Do not paint the following:
  - 1. Items specified or provided with factory finish.
  - 2. Items indicated to receive other finish.
  - 3. Items indicated to remain naturally finished.
  - 4. Brick, concrete or integrally colored plaster.
  - 5. Copper flashing at steel lintels.
  - 6. Concrete masonry in utility, mechanical, and electrical spaces.
  - 7. Stainless steel, anodized aluminum, bronze, terne, or lead.
  - 8. Equipment nameplates, fire rating labels, and operating parts of equipment.
  - 9. Acoustical materials.
  - 10. Concealed piping, ductwork, and conduit.
- C. Materials and products having factory-applied primer are not considered factory finished.
- D. For paint systems, see Schedules at end of Section.

**1.02 RELATED SECTIONS**

- A. Section 05120 - Structural Steel: Shop priming.
- B. Section 05500 - Metal Fabrications: Shop priming.
- C. Section 07620-Sheet Metal Flashing and Trim: Factory finish.
- D. Section 08211-Flush Wood Doors: Factory finish.
- E. Section 15000 - Mechanical Identification: Markers and color coding scheme.
- F. Section 16000 - Electrical Identification: Markers and color coding scheme.

**1.03 REFERENCES**

- A. ASTM D 16 - Standard Terminology Relating to Paint, Varnish, Lacquer, and Related Products; 1996a.

**1.04 DEFINITIONS**

- A. Conform to definitions of terms in ASTM D 16 in interpreting requirements of this specification section.

**1.05 SUBMITTALS**

- A. See Section 01300 - Administrative Requirements, for submittal procedures.
- B. Product Data: Manufacturer's descriptive literature for coating materials and coating application accessories.
- C. Selection Samples: For each finish coating specified, two sets of color chips representing manufacturer's full range of available colors and finishes.
- D. Verification Samples: Two samples, minimum size 6 inches (152 mm) square, representing actual color and finish of each finish coating type, color, and finish to be applied.

- E. Manufacturer's printed application instructions for each product, including product storage requirements and surface preparation requirements.

#### **1.06 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacture of coatings of quality specified with minimum of 10 years experience.
- B. Installer Qualifications: Company specializing in commercial painting and finishing with three years documented experience and approved by the coating manufacturer.

#### **1.07 DELIVERY, STORAGE, AND HANDLING**

- A. Store products of this section in manufacturer's unopened packaging until installation.
- B. Establish and maintain storage area conditions for products of this section in accordance with manufacturer's instructions until installation.
- C. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction over project.

#### **1.08 PROJECT CONDITIONS**

- A. Do not apply coatings to exterior surfaces except under environmental conditions recommended by coating manufacturer.
- B. Establish and maintain environmental conditions recommended by coating manufacturer before, during, and after application of coatings to interior surfaces.
- C. During application of coating materials, post "WET PAINT" signs.
- D. During application of solvent-based materials, post "NO SMOKING" signs.

#### **1.09 SEQUENCING**

- A. Do not allow application of finish coats in an area until moisture-producing construction activities, dust-producing construction activities, and other construction activities which could impair performance or appearance of finish coatings, have been completed in that area.

#### **1.10 EXTRA MATERIALS**

- A. See Section 01600 - Product Requirements, for additional provisions.
- B. Extra Materials: Supply for each finish coating material, color, and finish specified two gallons (7.75 L) of coating material, in sealed 1 gallon (3.875 L) containers, marked with color and finish identification.

### **PART 2 PRODUCTS**

#### **2.01 MANUFACTURERS**

- A. Manufacturer: Sherwin Williams, Saint Louis, MO, Tel: 314-997-0557.
- B. Acceptable Manufacturers:
  - 1. PPG; [www.pittsburghpaints.com](http://www.pittsburghpaints.com).
  - 2. Benjamin Moore; [www.benjaminmoore.com](http://www.benjaminmoore.com).
  - 3. Duron; [www.duron.com](http://www.duron.com).
- C. Substitutions: See Section 01600 - Product Requirements.
- D. Unless otherwise specified for an individual product or material, supply all products specified in this section from the same manufacturer.
- E. See below for Concrete Stain Products:

#### **2.02 MATERIALS**

- A. Paints and Coatings - General:
  - 1. Acceptable products: Indicated in Schedules at the end of this section.
  - 2. Unless otherwise indicated, provide factory-mixed coatings. When required, mix coatings to correct consistency in accordance with manufacturer's instructions before application. Do not dilute or thin coatings, except as instructed.



3. Do not add additives, except as instructed or recommended by coating manufacturer.
  4. Supply each coating material in quantity required for this section from a single production run.
  5. Colors: To be selected from manufacturer's full range of available colors.
- B. Coating Application Accessories: Specified in this section or in coating manufacturer's application instructions, including but not limited to thinners, sealers, primers, cleaning agents, etching agents, cleaning cloths, sanding materials, and clean-up materials.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Immediately prior to coating application, ensure that surfaces to receive coatings are dry.
- B. Ensure that moisture-retaining substrates to receive coatings have moisture content within tolerances allowed by coating manufacturer, using moisture measurement techniques recommended by coating manufacturer.
- C. Immediately prior to coating application, examine surfaces to receive coatings for surface imperfections and for contaminants which could impair performance or appearance of coatings, including but not limited to, loose primer, rust, scale, oil, grease, mildew, algae, or fungus, stains or marks, cracks, indentations, or abrasions.
- D. Correct the above conditions and other conditions which could impair performance or appearance of coatings in accordance with specified surface preparation procedures before proceeding with coating application.

### **3.02 PREPARATION**

- A. Do not start work until surfaces to be finished are in proper condition to produce finished surfaces of uniform, satisfactory appearance.
- B. Stains and Marks: Remove completely, if possible, using materials and methods recommended by coating manufacturer; cover stains and marks which cannot be completely removed with isolating primer or sealer recommended by coating manufacturer to prevent bleed-through.
- C. Mildew, Algae, and Fungus: Remove using materials and methods recommended by coating manufacturer.
- D. Remove dust and loose particulate matter from surfaces to receive coatings immediately prior to coating application.
- E. Remove or protect hardware, electrical equipment plates, mechanical grilles and louvers, lighting fixture trim, and other items not indicated to receive coatings which are adjacent to surfaces to receive coatings.
- F. Disconnect equipment adjacent to surfaces indicated to receive coatings.
- G. Move equipment and fixtures adjacent to surfaces indicated to receive coatings to allow application of coatings.
- H. Protect surfaces not indicated to receive coatings which are adjacent to surfaces indicated to receive coatings.
- I. Do not allow coatings on surfaces not indicated to receive them.
- J. Prepare surfaces in accordance with manufacturer's instructions for specified coatings and indicated materials, using only methods and materials recommended by coating manufacturer, and as follows:
- K. Concrete Floors: Remove contaminants which could impair coating performance or appearance, acid-etch, flush with clean water; verify alkaline-acid balance recommended by coating manufacturer; mechanically abrade surface, if required, to achieve medium-sandpaper texture.
- L. Ferrous Metals, Unprimed: Remove rust or scale, if present, by wire brush cleaning, power tool cleaning, or sandblast cleaning; remove grease, oil, and other contaminants which could impair

coating performance or appearance by solvent cleaning, with phosphoric-acid solution cleaning of welds, bolts and nuts; spot-prime repaired welds with specified primer.

- M. Ferrous Metals, Shop-Primed: Remove loose primer and rust, if present, by scraping and sanding, feathering edges of cleaned areas to produce uniform flat surface; solvent-clean surfaces and spot-prime bare metal with specified primer, feathering edges to produce uniform flat surface.
- N. Galvanized Steel: Wipe down surfaces using clean, lint-free cloths saturated with mineral spirits or lacquer thinner; wipe dry using clean, lint-free cloths.
- O. Gypsum Board: Repair cracks, holes, indentations, and other surface defects using joint compound to produce surface flush with adjacent undamaged surface; sand to produce uniform flat surface when dry.

### **3.03 APPLICATION**

- A. Apply each coat to uniform coating thickness in accordance with manufacturer's instructions, not exceeding manufacturer's specified maximum spread rate for indicated surface; thins, brush marks, roller marks, orange-peel, or other application imperfections are not permitted.
- B. Allow manufacturer's specified drying time, and ensure correct coating adhesion, for each coat before applying next coat.
- C. Inspect each coat before applying next coat; touch-up surface imperfections with coating material, feathering, and sanding if required; touch-up areas to achieve flat, uniform surface without surface defects visible from 5 feet (1.5 m).
- D. Remove dust and other foreign materials from substrate immediately prior to applying each coat.
- E. Where coating application abuts other materials or other coating color, terminate coating, making clean sharp termination line without coating overlap.
- F. Where color changes occur between adjoining spaces, through framed openings which are of same color as adjoining surfaces, change color at outside stop corner nearest to face of closed door.
- G. Re-prepare and re-coat unsatisfactory finishes; refinish entire area to corners or other natural terminations.

### **3.04 MECHANICAL AND ELECTRICAL EQUIPMENT**

- A. HVAC Ductwork: Finish interior surfaces visible through grilles and louvers with one coat alkyd flat wall paint, color black.
- B. Piping, Ductwork, and Conduit Exposed to View in Finished Spaces: Finish in accordance with requirements for unprimed ferrous metal items, color matching adjacent surfaces unless otherwise indicated.
- C. Piping, Ductwork, and Conduit Exposed to View in Finished Utility, Mechanical, and Electrical Spaces: Finish in accordance with requirements for unprimed ferrous metal items.
  - 1. Identification markings will be provided by others.
  - 2. Use color matching adjacent surfaces unless otherwise indicated.
  - 3. Do not allow coatings on identification tags or markings.
  - 4. Replace identification markings when painted accidentally.
- D. Access Panels, Electrical Panels, and Cover Plates: Finish in accordance with requirements for shop-primed ferrous metal items, including doors, door backs and sight-exposed cabinet surfaces, color matching adjacent surfaces unless otherwise indicated; do not allow coatings on identification plates, tags, or markings.

### **3.05 RE-INSTALLATION**

- A. Re-install hardware, electrical equipment plates, mechanical grilles and louvers, lighting fixture trim, and other items which have been removed to protect from contact with coatings.
- B. Reconnect equipment adjacent to surfaces indicated to receive coatings.

- C. Relocate to original position equipment and fixtures which have been moved to allow application of coatings.
- D. Remove protective materials.

### **3.06 CLEANING**

- A. Clean excess coating materials, and coating materials deposited on surfaces to indicated to receive coatings, as construction activities of this section progress; do not allow to dry.

### **3.07 PROTECTION**

- A. Protected completed coating applications from damage by subsequent construction activities.
- B. Repair to Architect's acceptance coating applications which are damaged by subsequent construction activities in accordance with specified application procedures; re-apply finish coating to nearest adjacent change of surface plane, in both horizontal and vertical directions, where repairs cannot be made to Architect's acceptance.

### **3.08 SCHEDULE - EXTERIOR PAINT SYSTEMS**

- A. Ferrous Metals:
  - 1. Unprimed:
    - a. One coat Sherwin-Williams Kem Kromik Universal Primer, B50Z series.
    - b. Two coats of Sherwin-Williams Industrial Enamel, B54 series.
  - 2. Shop-primed:
    - a. Touch-up: Sherwin-Williams Kem Kromik Universal Primer, B50Z series.
    - b. Two coats Sherwin-Williams Industrial Enamel, B54 series.
  - 3. Galvanized:
    - a. One coat Sherwin-Williams Calvite HS Primer, B50WZ30.
    - b. Two coats Sherwin-Williams Industrial Enamel, B54 series.

### **3.09 SCHEDULE - INTERIOR PAINT SYSTEMS**

- A. Ferrous Metals:
  - 1. Unprimed:
    - a. One coat Sherwin-Williams Kem Kromik Universal Primer, B50Z series.
    - b. Two coats of Sherwin-Williams Industrial Enamel, B54 series.
  - 2. Shop-primed:
    - a. Touch-up: Sherwin-Williams Kem Kromik Universal Primer, B50Z series.
    - b. Two coats Sherwin-Williams Industrial Enamel, B54 series
  - 3. Galvanized:
    - a. One coat Sherwin-Williams Galvite HS Primer, B50WZ30.
    - b. Two coats Sherwin-Williams Industrial Enamel, B54 series.
- B. Wood - Transparent finish:
  - 1. Untinted, polyurethane:
    - a. One coat Sherwin-Williams Wood Classics Oil Stain A49-200 series
    - b. Two coats Sherwin-Williams Wood Classics polyurethane, A67 series.
      - 1) First coat of polyuranthane to be thinned 25% with mineral spirits.
- C. Gypsum Board:
  - 1. Eggshell finish:
    - a. One coat Duron Ultra Deluxe Interior Drywall Vinyl Primer Sealer 04-126.
    - b. Two coats Duron Plastic Kote Interior Acrylic (latex) Eggshell Enamel, 20 Series.

### **3.10 ATTIC STOCK**

- A. The GC shall provide the owner with the following Attic Stock:
  - 1. One unopened, undamaged & clearly labeled can of each type of paint used on this project.

**END OF SECTION**

**SECTION 10 2226**  
**OPERABLE PARTITIONS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Paired panel partitions, 3 inch (76 mm) thick panels.

**1.02 RELATED SECTIONS**

- A. Section 03300 - Cast-In-Place Concrete; concrete tolerances required.
- B. Section 05500 - Metal Fabrications; primary structural support, including pre punching of support members by steel supplier in accordance with template supplied by operable partition suppliers template.
- C. Section 06100 - Rough Carpentry; wood framing and supports, and blocking at head and jambs as required.
- D. Section 09260 - Gypsum Board Assemblies; metal framing and gypsum board wall systems adjacent to operable partitions, including blocking and insulation.
- E. Section 09260 - Gypsum Board Assemblies; wall and ceiling framing at head and jambs.

**1.03 REFERENCES**

- A. ASTM E 90 (UL 723) - Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements.
- B. ASTM E 413 - Classification for Rating Sound Insulation.
- C. ASTM E 557 - Standard Practice for the Installation of Operable Partitions.
- D. ASCE 7 - Minimum Design Loads of Buildings and Other Structures
- E. CAN/ULC-S102M - Flame Spread Rating of a Ceiling Material.
- F. NFPA 70 - National Electrical Code.
- G. UL 508A - Industrial Control Panels.

**1.04 SUBMITTALS**

- A. Submit under provisions of Section 01300.
- B. Product Data: Material descriptions, construction details, finishes, installation details, and operating instructions for each type of operable partition, component, and accessory specified.
- C. Shop Drawings: Show location and extent of operable partitions. Include plans, elevations, sections, details, attachments to other construction, and accessories. Indicate dimensions, weights, conditions at openings, and at storage areas, and required installation, storage, and operating clearances. Indicate location and installation requirements for hardware and track, including floor tolerances required and direction of travel. Indicate blocking to be provided by others.
- D. Setting Drawings: Show imbedded items and cutouts required in other work, including support beam punching template.
- E. Samples: Color samples demonstrating full range of finishes available. Verification samples shall be available in same thickness and material indicated for the work.
- F. Manufacturer's Certificates: Certify products meet or exceed specified requirements.
- G. Closeout Submittals: Provide manufacturer's maintenance instructions that include recommendations for periodic checking and maintenance of all components.

**1.05 QUALITY ASSURANCE**

- A. Installer Qualifications: Experienced installer, certified by the operable partition manufacturer, as qualified to install the manufacturer's partition systems for work similar in material, design, and extent to that indicated for this Project.

- B. Acoustical Performance: Test operable partitions in accordance with ASTM E 90 test procedure to attain no less than the STC rating specified. Provide a complete and unedited written test report by the testing laboratory upon request.
- C. Preparation of Opening: Conform to ASTM E 557.

#### **1.06 DELIVERY, STORAGE, AND HANDLING**

- A. Clearly mark packages and panels with numbering systems used on Shop Drawings. Do not use permanent markings on panels.
- B. Protect panels during delivery, storage, and handling to comply with manufacturer's instructions and as required to prevent damage.

#### **1.07 WARRANTY**

- A. Provide operable partition manufacturer's written warranty agreeing to repair or replace components with manufacturing defects for a period of two years.

### **PART 2 PRODUCTS**

#### **2.01 MANUFACTURERS**

- A. Acceptable Manufacturer: Modernfold, Inc., which is located at: 215 W. New Rd. ; Greenfield, IN 46140; Toll Free Tel: 800-869-9685; Tel: 317-468-6700; Fax: 866-410-5016; Email: request info (info@modernfold.com) <<http://www.modernfold.com>>
- B. Requests for substitutions will be considered in accordance with provisions of Section 01600.

#### **2.02 PAIRED PANEL PARTITIONS, THREE INCH (76 MM) THICK PANELS**

- A. Product: Acousti-Seal 932 Operable Partition by Modernfold, Inc., manually operated paired flat panels, top supported with operable floor seals.
  - 1. Final closure:
    - a. Horizontally expanding panel edge with removable crank.
- B. Panel Construction and STC Rating: Nominal 3 inch (76 mm) thick in manufacturer's standard 48 inch (1220 mm) width by height required, with horizontal and vertical framing elements fabricated from 18 gage formed steel with overlapped and welded corners; reinforced top channel to support suspension system components; frame with concealed formed steel at vertical edges.
  - 1. Panel Skin: 1/2 inch (12.7 mm) NAUF medium density fiberboard, single material or composite layers continuously bonded to panel frame with minimum STC as follows:
    - a. STC 50.
  - 2. Hinges for Closure Panels, Pass Doors and Pocket Doors: Full leaf butt hinges, attached directly to the panel frame with welded hinge anchor plates within panel to further support hinge mounting to frame. Hinges mounted into panel edge or vertical astragal are not acceptable.
  - 3. Panel Trim: No vertical trim required or allowed on vertical edges of panels; minimal groove appearance at panel joints.
  - 4. Panel Weight: As standard with manufacturer for STC selected, 6.5 to 8.5 lbs/SF.
- C. Panel Finish and Exposed Trim: Factory applied as follows:
  - 1. Panel Finish: Fabric:
    - a. Maharam, Tek Wall Sum, 399592, Woven Wallcovering, 006 Barley
    - b. 72% Polyolefin, 54" Wide, High Traffic, Bleach Cleanable, Washable & Scrubbable
  - 2. Exposed Panel Trim Color: Dark bronze.
- D. Sound Seals and Bottom Seals:
  - 1. Vertical Interlocking Sound Seals Between Panels: Roll-formed steel astragals, with reversible tongue and groove configuration in each panel edge for universal panel operation. Rigid plastic or aluminum astragals or astragals in only one panel edge are not acceptable.

2. Horizontal Top Seals: Continuous contact extruded vinyl bulb shape with pairs of non-contacting vinyl fingers to prevent distortion without the need for mechanically operated parts.
  3. Horizontal Bottom Floor Seals: Modernfold IA2 Bottom Seal. Automatic operable seals providing nominal 2 inches (51 mm) operating clearance with an operating range of plus 1/2 inch (12.7 mm) to minus 1-1/2 inches (38 mm) which automatically drop as panels are positioned without the need for tools or cranks.
- E. Suspension System:
1. Suspension System: Modernfold No. 14 Suspension System:
    - a. Track: Nominal 7 gage formed steel track with adjustable steel hanger brackets supporting the load bearing surface of the track, connected to structural support by pairs of 1/2 inch (12.7 mm) diameter threaded rods; no failure of track or brackets at 5,000 lb. (2268 kg) static point loading at mid-span with brackets at 48 inch (1220 mm) centers.
    - b. Exposed Track Soffit: Steel, removable for service and maintenance, attached to track bracket without exposed fasteners and pre-painted off-white. Wood or aluminum soffits are not acceptable.
    - c. Carriers: All-steel with four or eight steel tired ball-bearing wheels. Non-steel tires are not acceptable.
- F. Special Components:
1. Single Pass Door: Same thickness and appearance as panels. Trimless ADA compliant pass door with friction latch, automatic door closures and flush pulls for panic operation. Threshold is not acceptable.
    - a. Prime painted for field finishing.
- G. Finished End Caps: Finished end caps at 90 degrees and 135 degrees.
- H. Partition Interface: Intersecting partition interface.

## **2.03 PART 3 EXECUTION**

### **2.04 EXAMINATION**

- A. Do not begin installation until supports and substrates have been properly prepared.
- B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

### **2.05 PREPARATION**

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

### **2.06 INSTALLATION**

- A. Install in accordance with manufacturer's instructions and ASTM E 557 installation procedures. Test for proper operation and make necessary adjustments until satisfactory results are obtained.

### **2.07 PROTECTION**

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Substantial Completion.

**END OF SECTION**

**SECTION 10 7500**  
**FLAGPOLES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Aluminum Flagpoles.

**1.02 RELATED REQUIREMENTS**

- A. Section 02316 Fill and Backfill
- B. Section 02751 Portland Cement Concrete Paving
- C. Section 03300 - Cast-in-Place Concrete: Concrete base and foundation construction.
- D. Section 26 0583 - Wiring Connections: Electrical characteristics and wiring connections.

**1.03 REFERENCE STANDARDS**

- A. AASHTO M 36 - Standard Specification for Corrugated Steel Pipe, Metallic-Coated, for Sewers and Drains; 2016.
- B. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2014.
- C. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes [Metric]; 2013.

**1.04 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on pole, accessories, and configurations.
- C. Shop Drawings: Indicate detailed dimensions, base details, anchor requirements, and imposed loads.
- D. Operation Data: Provide operating data for the controller .
- E. Maintenance Data: Provide lubrication and periodic maintenance requirement schedules.

**1.05 QUALITY ASSURANCE**

- A. Design flagpole foundation under direct supervision of a Professional Structural Engineer experienced in design of this Work and licensed at the place where the Project is located.

**1.06 DELIVERY, STORAGE, AND HANDLING**

- A. Spiral wrap flagpole with protective covering and pack in protective shipping tubes or containers.
- B. Protect flagpole and accessories from damage or moisture.

**PART 2 PRODUCTS**

**2.01 MANUFACTURERS**

- A. Flagpoles:
  - 1. American Flagpole: [www.americanflagpole.com](http://www.americanflagpole.com).
  - 2. Concord Industries, Inc: [www.concordindustries.com](http://www.concordindustries.com).
  - 3. Pole-Tech Co., Inc: [www.poletech.com](http://www.poletech.com).
  - 4. Substitutions: See Section 01 6000 - Product Requirements.

**2.02 FLAGPOLES**

- A. Flagpoles: Aluminum.
  - 1. Design: Cone tapered.
  - 2. Mounting: Ground mounted type.
  - 3. Halyard: Interior type .

**2.03 POLE MATERIALS**

- A. Aluminum: ASTM B221 (ASTM B221M), 6063 alloy, T6 temper.

## **2.04 ACCESSORIES**

- A. Finial Ball: Aluminum, 6 inch (150 mm) diameter.
- B. Truck Assembly: Cast aluminum; revolving, stainless steel ball bearings, non-fouling.
- C. Cleats: 9 inch (230 mm) size, aluminum with galvanized steel fastenings, two per halyard.
- D. Cleat Box: Aluminum, with built-in hinge and hasp assembly, attached to pole with tamper proof screws inside box.
- E. Halyard: 5/16 inch (8 mm) diameter polypropylene, braided, white.

## **2.05 OPERATORS**

- A. Hand Crank: Removable type.

## **2.06 MOUNTING COMPONENTS**

- A. Foundation Tube Sleeve: AASHTO M 36M, corrugated 16 gage (1.5 mm) steel, galvanized .
- B. Pole Base Attachment: Flush; aluminum base with base cover.
- C. Lighting Ground Rod: copper rod, 3/4 inch (19 mm) diameter.
- D. Lightning Ground Cable: Copper No. 6 AWG, soft drawn.

## **2.07 FINISHING**

- A. Metal Surfaces in Contact With Concrete: Asphaltic paint.
- B. Concealed Steel Surfaces: Prime painted.
- C. Aluminum: Mill finish.
- D. Finial: Spun finish.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that concrete foundation is ready to receive work and dimensions are as indicated on shop drawings.

### **3.02 PREPARATION**

- A. Coat metal sleeve surfaces below grade and surfaces in contact with dissimilar materials with asphaltic paint.

### **3.03 INSTALLATION**

- A. Install flagpole, base assembly, and fittings in accordance with manufacturer's instructions.
- B. Fill foundation tube sleeve with concrete specified in Section 03 3000.
- C. Install foundation plate and centering wedges for flagpoles base set in concrete base and fasten.

### **3.04 TOLERANCES**

- A. Maximum Variation From Plumb: 1 inch (25 mm).

### **3.05 ADJUSTING**

- A. Adjust operating devices so that halyard and flag function smoothly.

### **3.06 SCHEDULES**

- A. Center Flagpole United States Flag Pole: One 40 feet.
- B. Flanking Flagpole Cherokee Nation Flag Pole: One 40 Feet
- C. Flanking Flagpole State of Oklahoma Flag Pole: One 30 feet.

**END OF SECTION**



## SECTION 10 8200

### ROOF TOP EQUIPMENT SCREENS

#### SECTION 10 82 00 - LOUVERED ROOF TOP EQUIPMENT SCREENS

##### GENERAL

##### SUMMARY

##### 3.01 SECTION INCLUDES:

- A. Fixed, extruded-aluminum louvered roof top equipment screens
- B. See Division 5 Section "Structural Metal Framing" for structural framing supporting louver sections.

##### 3.02 PERFORMANCE REQUIREMENTS

- A. Design: Design louvers, including comprehensive engineering analysis by a qualified engineer, using structural performance requirements and design criteria indicated.
- B. Structural Performance: Louvers shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated without permanent deformation of louver components, noise or metal fatigue caused by louver blade rattle or flutter, or permanent damage to fasteners and anchors.
- C. Wind Loads: Determine loads based on a uniform pressure of 30 lb./sq. ft. (1435 Pa), acting inward or outward.

##### 3.03 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: For equipment screens and accessories. Include plans, elevations, sections, details, and attachments to other work. Show frame profiles and blade profiles, angles, and spacing.
- C. Samples: For each type of metal finish required.
- D. Submittal: For louvers indicated to comply with structural performance requirements and design criteria indicated.

##### 3.04 PRODUCTS

- A. MATERIALS
  - 1. Aluminum Extrusions: ASTM B 221M, Alloy 6063-T5.
  - 2. Aluminum Sheet: ASTM B 209M, Alloy 3003 with temper as required for forming.
  - 3. Fasteners: Use types and sizes to suit unit installation conditions.
  - 4. For fastening aluminum, use aluminum or 300 series stainless-steel fasteners.

##### 3.05 FABRICATION, GENERAL

- A. Join concealed frame members to each other and to fixed louver blades with fillet welds concealed from view welds, threaded fasteners, or both, as standard with louver manufacturer unless otherwise indicated or size of louver assembly makes bolted connections between frame members necessary.

##### 3.06 VERTICAL BLADE LOUVERED ROOF TOP EQUIPMENT SCREEN

- A. Basis-of-Design Product: Architectural Louvers; Model V4YV. Subject to compliance with requirements, provide the specified product or comparable product by one of the following:
  - 1. Manufacturers of equivalent products submitted and approved in accordance with Section 01630 - Product Substitution Procedures.
- B. Louver Blade Depth: 4 inches (100 mm)
- C. Blade Profile: Sight-proof chevron with blades vertical.
- D. Blade Nominal Thickness: Not less than 0.080 inch (2.03 mm).
- E. Framing Support Nominal Thickness: Not less than 0.125 inch (3.2 mm)

- F. Louver Performance Requirements:
  - 1. Free Area: Not less than 5.2 sq. ft. (0.48 sq. m) for 48-inch- (1220-mm-) wide by 48-inch- (1220-mm-) high louver assembly.
  - 2. Horizontal Drag Coefficient: Not greater than 0.81 on a cross sectional profile, allowing for a 19% reduction in wind load imposed horizontally upon supporting structural framing.

**3.07 ALUMINUM FINISHES**

- A. High-Performance Organic Finish: 3-coat fluoropolymer finish complying with AAMA 2605 and containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pre-treat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
- B. Color and Gloss: As selected by Architect from manufacturer's full range.
- C. EXECUTION

**3.08 INSTALLATION**

- A. Locate and place equipment screens level, plumb, and at indicated alignment with adjacent work.
- B. Use concealed anchorages where possible. Provide brass or lead washers fitted to screws where required to protect metal surfaces and to make a weather-tight connection.
- C. Provide perimeter reveals and openings of uniform width to allow for thermal expansion, as indicated.
- D. Repair damaged finishes so no evidence remains of corrective work. Return items that cannot be refinished in the field to the factory and refinish entire unit or provide new units.

**END OF SECTION**

**PART 2 PRODUCTS**

**END OF SECTION**

**SECTION 11 1313  
LOADING DOCK BUMPERS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Dock bumpers of reinforced rubber with attachment frame.

**1.02 RELATED REQUIREMENTS**

- A. Section 03300 - Cast-in-Place Concrete: Placement of bumper anchors into concrete.

**1.03 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Indicate unit dimensions, method of anchorage, and details of construction.
- C. Manufacturer's Installation Instructions: Indicate special installation requirements.

**PART 2 PRODUCTS**

**2.01 MANUFACTURERS**

- A. Dock Bumpers:
  - 1. Beacon Material Handling Equipment: [www.beacontechnology.com](http://www.beacontechnology.com).
- B. Other Acceptable Manufacturers:
  - 1. Blue Giant Equipment Corporation: [www.bluegiant.com](http://www.bluegiant.com).
  - 2. Chalfant Sewing Fabricators, Inc.: [www.chalfantusa.com](http://www.chalfantusa.com).
  - 3. Durable Corp: [www.durablecorp.com](http://www.durablecorp.com).
  - 4. Substitutions: See Section 01 6000 - Product Requirements.

**2.02 COMPONENTS**

- A. Bumpers: Beacon Model Number B1024-4.5.
- B. Attachment Hardware: 3/4 inch (19 mm) diameter galvanized bolts and expansion shields.
- C. Touch-up Primer: Zinc rich type.

**PART 3 EXECUTION**

**3.01 EXAMINATION**

- A. Verify that anchor placement is acceptable.

**3.02 INSTALLATION**

- A. Install dock bumpers in accordance with manufacturer's instructions.
- B. Set plumb and level.

**END OF SECTION**

**SECTION 11 1316**  
**LOADING DOCK SEALS AND SHELTERS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Compression door seals.

**1.02 RELATED REQUIREMENTS**

- A. Section 03 1000 - Concrete Forming and Accessories: Placement of seal and shelter frame into concrete.

**1.03 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate framed wall opening, dimensions and tolerances, adjacent construction and fittings required for anchorages, and anchor points.
- C. Maintenance Data: Provide unit maintenance information, lubrication cycles, spare parts manual.

**PART 2 PRODUCTS**

**2.01 MANUFACTURERS**

- A. Loading Dock Seals and Shelters:
  - 1. Rite-Hite Corp; Dock Seal - Performer: [www.ritehite.com](http://www.ritehite.com).

**2.02 COMPONENTS**

- A. Door Seal: Compressible construction: per manufacturer

**PART 3 EXECUTION**

**3.01 EXAMINATION**

- A. Verify that rough-in wall opening and anchors are acceptable, correctly sized and aligned to tolerances.

**3.02 INSTALLATION**

- A. Install seal and shelter components in accordance with manufacturer's instructions.
- B. Set plumb and level.
- C. Attach anchors and fittings to prepared wall construction and opening frame.

**3.03 ADJUSTING**

- A. Adjust installed unit for smooth and balanced operation.

**END OF SECTION**

**SECTION 11 1319.13**  
**LOADING DOCK LEVELERS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Prefabricated steel leveler .
- B. Operating hardware.
- C. Mechanical restraint safety vehicle lock.

**1.02 RELATED REQUIREMENTS**

- A. Section 03 3000 - Cast-in-Place Concrete: Concrete pit.
- B. Section 11 1313 - Loading Dock Bumpers.

**1.03 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide materials and finish, installation details, roughing-in measurements, and operation of unit and safety lock device.
- C. Shop Drawings: Indicate required opening dimensions, tolerances of opening dimensions, placement dimensions of safety lock device, perimeter conditions of construction.
- D. Manufacturer's Installation Instructions: Indicate special requirements.
- E. Operation Data: Provide operating instructions, identify unit limitations.
- F. Maintenance Data: Provide unit maintenance information, lubrication cycles, spare parts manual.

**PART 2 PRODUCTS**

**2.01 MANUFACTURERS**

- A. Dock Levelers:
  - 1. Rite-Hite Corp: [www.ritehite.com](http://www.ritehite.com).
- B. Other Acceptable Manufacturers:
  - 1. Blue Giant Equipment Corporation: [www.bluegiant.com](http://www.bluegiant.com).
  - 2. Kelly Company: [www.kelleycompany.com](http://www.kelleycompany.com).
  - 3. Substitutions: See Section 01 6000 - Product Requirements.

**2.02 COMPONENTS**

- A. Dock Leveler:
  - 1. Rite-Hite Corp. Product: RHH 4000 with RHR600 Dok-Lok and Dock Commander Control Box with Leveler to lock interconnect.
  - 2. Operation: Hydraulic.
  - 3. Deck Width: 6 foot 6 inch (\_\_\_\_ mm).
  - 4. Deck Length: 6 foot 0 inch (\_\_\_\_ mm).
  - 5. Operating Range: 12 inches (\_\_\_\_ mm) above dock level, 12 inches (\_\_\_\_ mm) below dock level.
  - 6. Capacity: 12000 lbs (\_\_\_\_ kg).
  - 7. Railing: To resist lateral thrust of 100 lbs (445 N) without permanent deformation or set.
- B. Vehicle Restraint: Mechanical lock, fabricated and welded steel plate construction, spring loaded to automatically latch when activated, to conform to ICC semitrailer vehicle bumper requirements for dimension and placement.
- C. Pit Frame: Steel angle, 3 x 3 x 1/4 inch (75 x 75 x 6 mm); welded corners, fitted with anchors 12 inch (\_\_\_\_ mm) on center for concrete embedment.

**2.03 ACCESSORIES**

- A. Dock Bumpers: Specified in Section 11 1313.

## **2.04 FINISHES**

- A. Leveler Platform: Factory enameled finish.
- B. Leveler Frame: Factory enameled finish.
- C. Pit Frame: Primed finish.
- D. Vehicle Restraint: Yellow painted hook, zinc plated steel operating mechanism.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that rough-in openings are acceptable.

### **3.02 INSTALLATION**

- A. Install dock leveler and mechanical safety vehicle lock unit in prepared opening in accordance with manufacturer's instructions.
- B. Set square and level.
- C. Anchor unit securely, flush with dock. Weld back of leveling dock to pit frame. Touch-up weld with primer.
- D. Anchor safety lock securely and flush with vertical dock face.

### **3.03 ADJUSTING**

- A. Adjust installed unit and safety device for smooth and balanced operation.

**END OF SECTION**