

# PROJECT MANUAL

## Surgery Center of Lee's Summit

1950 SE Shenandoah Drive  
Lee's Summit, MO 64063

### **VOLUME 2 OF 4** (DIVISIONS 02 thru 10 and 12)

**ACI / Boland, Inc.**  
Architects & Planners

**BHC**  
Consulting Civil Engineers

**Bob D. Campbell & Company**  
Consulting Structural Engineers

**Branch Pattern**  
Consulting MEP Engineer

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Construction Manager

Project No. 3-22030

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11 72 00 OWNER FURNISHED MEDICAL EQUIPMENT

**SECTION 02 30 50  
AVAILABLE SITE INFORMATION**

**PART 1 GENERAL**

**1.01 EXISTING SITE CONDITIONS**

- A. Certain information relating to existing surface and subsurface conditions and structures is available to bidders.
- B. Neither the Owner nor the Architect guarantees the accuracy and completeness of information and data provided on the survey and geotechnical report, including that concerning type and location of underground materials and utilities.
- C. Report discrepancies between conditions shown and actual conditions to the Architect.

**1.02 SITE TOPOGRAPHIC SURVEY**

- A. Topographic Survey: Prepared by BHC, located at 712 State Avenue, Kansas City, KS 66101
  - 1. Availability:
    - a. A copy of the site survey is included in the Project Manual after the last page of this Section.
  - 2. This survey identifies grade elevations prepared primarily for the use in establishing new grades, identifying natural water shed, and other site features.
  - 3. Surveys are for Contractor review and information only. Bidder's are responsible for verifying elevations and measurements, and for making their own determination of site conditions the survey as may be necessary to prepare their bids and perform the Work.
    - a. Variations between conditions indicated and actual conditions will not be considered reason for change in Contract amount or time.

**1.03 GEOTECHNICAL REPORT**

- A. Geotechnical Report: Prepared by Alpha-Omega Geotech (1701 State Avenue, Kansas City, KS 66102), dated January 16, 2023.
  - 1. Availability:
    - a. A copy of the geotechnical report is included in the Project Manual after the last page of this Section.
- B. This report identifies properties of below grade conditions and offers recommendations for the design of foundations, prepared primarily for the use of Architect.
- C. The recommendations described shall not be construed as a requirement of this Contract, unless specifically referenced in Contract Documents.
- D. This report, by its nature, cannot reveal all conditions that exist on the site. Should subsurface conditions be found to vary substantially from this report, changes in the design and construction of foundations will be made, with resulting credits or expenditures to the Contract Price accruing to Owner.
- E. Geotechnical Report is for Bidder's and Contractor's review and information only. Contractor's and Bidder's are responsible for making their own determination of site conditions as may be necessary to prepare their bids and perform the Work.
  - 1. Variations between conditions indicated and actual conditions will not be considered reason for change in Contract amount or time.

**PART 2 PRODUCTS - NOT USED**

**PART 3 EXECUTION - NOT USED**

**END OF SECTION**

**SECTION 03 05 05  
UNDERSLAB VAPOR BARRIER**

**PART 1 - GENERAL**

**1.01 SECTION INCLUDES**

- A. Sheet vapor barrier under concrete slabs-on-grade.

**1.02 RELATED REQUIREMENTS**

- A. Section 03 30 00 - Cast-In-Place Concrete

**1.03 REFERENCES**

- A. ASTM E1643 - Standard Practice for Selection, Design, Installation, and Inspection of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs.
- B. ASTM E1745 - Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill Under Concrete Slabs.

**1.04 SUBMITTALS**

- A. Refer to Section 01 33 00, for requirements.
- B. Product Data: Submit manufacturers' data on manufactured products.
- C. Test Data: Submit report of tests showing compliance with specified requirements.
- D. Samples: Submit samples of underslab vapor barrier to be used.
- E. Manufacturer's Installation Instructions: Indicate installation procedures and interface required with adjacent construction.

**PART 2 - PRODUCTS**

**2.01 MANUFACTURER**

- A. Specified Manufacturer: Stego Industries, LLC.
  - 1. Other acceptable manufacturers with equivalent products to the specified manufacturer shall include:
    - a. Fortifiber Corporation: Moistop Ultra.
    - b. Raven Industries Inc.: Vapor Block.
    - c. Poly-America, LP: Husky Yellow Guard.
    - d. Insulation Solutions, Inc.: Viper Vaporcheck.
  - 2. Products of unnamed manufacturers with equivalent products to the specified manufacturer will be considered in accordance with the "or equal" provision specified in Division 01 "Product Requirements".
    - a. Product Substitutions: Comply with the requirements specified in Division 01 "Substitution Procedures".

**2.02 MATERIALS**

- A. Basis-of-Design Product: "Stego® Wrap Vapor Barrier"
  - 1. Performance Criteria:
    - a. Water Vapor Permeance: Not more than 0.010 perms (0.6 ng/(s m<sup>2</sup> Pa)) (maximum) when tested in accordance with ASTM E1745, Class A.
    - b. Strength: ASTM E1745, Class A.
    - c. Thickness: 15 mils (0.4 mm) minimum.
    - d. Provide third party documentation that all testing was performed on a single production roll per ASTM E1745, Section 8.1.

**2.03 ACCESSORIES**

- A. Seams:
  - 1. Stego Tape
- B. Sealing Penetrations of Vapor barrier:
  - 1. Stego Mastic.
  - 2. Stego Tape.

- C. Perimeter/Edge seal:
  - 1. Stego Crete Claw.
  - 2. Stego Term Bar.
  - 3. StegoTack Tape (double-sided sealant tape).
- D. Penetration Prevention:
  - 1. Beast Foot.
- E. Vapor Barrier-Safe Screed System
  - 1. Beast Screed.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Verify that surface over which vapor barrier is to be installed is complete and ready before proceeding with installation of vapor barrier.

#### **3.02 INSTALLATION**

- A. Install vapor barrier in accordance with manufacturer's instructions and ASTM E1643.
- B. Install vapor barrier under interior slabs on grade.
- C. Install vapor barrier on top of the granular fill.
- D. Unroll vapor barrier with the longest dimension parallel with the direction of the concrete placement and face laps away from the expected direction of the placement whenever possible.
- E. Extend vapor barrier to the perimeter of the slab. Terminate it at the top of the slab.
- F. Lap joints minimum 6 inches (150 mm).
- G. Seal joints, seams and penetrations watertight with manufacturer's recommended products and follow manufacturer's written instructions.
- H. No penetration of vapor barrier is allowed except for reinforcing steel and permanent utilities.
- I. Repair damaged vapor retarder before covering with other materials.

**END OF SECTION**

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

**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 SECTION INCLUDES**

- A. Cast-in place concrete, including formwork, reinforcement, concrete materials, mixture design, placement procedures, and finishes.
- B. Floor levelness and floor flatness requirements.

**1.03 RELATED REQUIREMENTS**

- A. Section 03 05 05 - Underslab Vapor Barrier
- B. Section 03 30 06 - Concrete Moisture Vapor Reduction Admixture (MVRA)
- C. Section 04 26 00 - Single-Wythe Unit Masonry
- D. Section 07 21 00 - Thermal Insulation
- E. Section 31 31 16 - Chemical Soil Treatment

**1.04 DEFINITIONS**

- A. Cementitious Materials: Portland cement alone or in combination with one or more of the following: blended hydraulic cement, fly ash and other pozzolans, ground granulated blast-furnace slag, and silica fume; subject to compliance with requirements.

**1.05 ACTION SUBMITTALS**

- A. Product Data: For each type of product indicated.
- B. Design Mixtures: For each concrete mixture. Submit alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.
  - 1. Indicate amounts of mixing water to be withheld for later addition at Project site.
- C. Steel Reinforcement Shop Drawings: Placing drawings that detail fabrication, bending, and placement. Include bar sizes, lengths, material, grade, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, splices and laps, mechanical connections, tie spacing, hoop spacing, and supports for concrete reinforcement.
- D. Formwork Shop Drawings: Prepared by or under the supervision of a qualified professional engineer detailing fabrication, assembly, and support of formwork.
- E. Shoring and Reshoring: Indicate proposed schedule and sequence of stripping formwork, shoring removal, and reshoring installation and removal.

**1.06 INFORMATIONAL SUBMITTALS**

- A. Qualification Data: For Installer, manufacturer and testing agency.
- B. Welding certificates.
- C. Material Certificates: For each of the following, signed by manufacturers:
  - 1. Cementitious materials.
  - 2. Admixtures.
  - 3. Form materials and form-release agents.
  - 4. Steel reinforcement and accessories.
  - 5. Aggregates. Include service record data indicating absence of deleterious expansion of concrete due to alkali aggregate reactivity.
- D. Field quality-control reports.

### **1.07 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.
- B. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities."
  - 1. Testing Agency Qualifications: An independent agency, acceptable to authorities having jurisdiction, qualified according to ASTM C 1077 and ASTM E 329 for testing indicated.
- C. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-1 or an equivalent certification program.
- D. Personnel performing laboratory tests shall be ACI-certified Concrete Strength Testing Technician and Concrete Laboratory Testing Technician - Grade I. Testing Agency laboratory supervisor shall be an ACI-certified Concrete Laboratory Testing Technician - Grade II.
  - 1. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, obtain aggregate from single source, and obtain admixtures from single source from single manufacturer.
  - 2. Welding Qualifications: Qualify procedures and personnel according to AWS D1.4/D 1.4M, "Structural Welding Code - Reinforcing Steel."
  - 3. ACI Publications: Comply with the following unless modified by requirements in the Contract Documents:
    - E. ACI 301, "Specifications for Structural Concrete," Sections 1 through 5.
    - F. ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."
- G. Concrete Testing Service: Engage a qualified independent testing agency to perform material evaluation tests and to design concrete mixtures.
- H. Before submitting design mixtures, review concrete design mixture and examine procedures for ensuring quality of concrete materials. Require representatives of each entity directly concerned with cast-in-place concrete to attend, including the following:
  - 1. Contractor's superintendent.
  - 2. Independent testing agency responsible for concrete design mixtures.
  - 3. Ready-mix concrete manufacturer.
  - 4. Concrete subcontractor.
- I. Review special inspection and testing and inspecting agency procedures for field quality control, cold- and hot-weather concreting procedures, curing procedures, construction contraction and isolation joints, joint-filler strips, forms and form removal limitations, shoring and reshoring procedures, anchor rod and anchorage device installation tolerances, steel reinforcement installation, concrete repair procedures, and concrete protection.

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

- A. Steel Reinforcement: Deliver, store, and handle steel reinforcement to prevent bending and damage. Avoid damaging coatings on steel reinforcement.

## **PART 2 PRODUCTS**

### **2.01 FORM-FACING MATERIALS**

- A. Smooth-Formed Finished Concrete: Form-facing panels that will provide continuous, true, and smooth concrete surfaces. Furnish in largest practicable sizes to minimize number of joints.
- B. Plywood, metal, or other approved panel materials.
- C. Exterior-grade plywood panels, suitable for concrete forms, complying with DOC PS 1, and as follows:
  - 1. High-density overlay, Class 1 or better.
  - 2. Medium-density overlay, Class 1 or better; mill-release agent treated and edge sealed.
  - 3. Structural 1, B-B or better; mill oiled and edge sealed.

4. B-B (Concrete Form), Class 1 or better; mill oiled and edge sealed.
  - a. Rough-Formed Finished Concrete: Plywood, lumber, metal, or another approved material. Provide lumber dressed on at least two edges and one side for tight fit.
  - b. Chamfer Strips: Wood, metal, PVC, or rubber strips, 3/4 by 3/4 inch (19 by 19 mm), minimum.
  - c. Rustication Strips: Wood, metal, PVC, or rubber strips, kerfed for ease of form removal.
  - d. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.
- D. Formulate form-release agent with rust inhibitor for steel form-facing materials.
  1. Form Ties: Factory-fabricated, removable or snap-off metal or glass-fiber-reinforced plastic form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.
- E. Furnish units that will leave no corrodible metal closer than 1 inch (25 mm) to the plane of exposed concrete surface.
- F. Furnish ties that, when removed, will leave holes no larger than 1 inch (25 mm) in diameter in concrete surface.
- G. Furnish ties with integral water-barrier plates to walls indicated to receive dampproofing or waterproofing.

## **2.02 STEEL REINFORCEMENT**

- A. Reinforcing Bars: ASTM A615/ A615M, Grade 60 (Grade 420), deformed.
- B. Low-Alloy-Steel Reinforcing Bars: ASTM A706/ A706M, deformed.
- C. Steel Bar Mats: ASTM A 184/ A184M, fabricated from ASTM A615/ A615M, Grade 60 (Grade 420), deformed bars, assembled with clips.
- D. Plain-Steel Wire: ASTM A82/ A82M, as drawn.
- E. Deformed-Steel Wire: ASTM A 96/ A496M.

## **2.03 REINFORCEMENT ACCESSORIES**

- A. Joint Dowel Bars: ASTM A615/ A615M, Grade 60 (Grade 420), plain-steel bars, cut true to length with ends square and free of burrs.
- B. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars in place. Manufacture bar supports from steel wire, plastic, or precast concrete according to CRSI's "Manual of Standard Practice," of greater compressive strength than concrete and as follows:

## **2.04 CONCRETE MATERIALS**

- A. Cementitious Material: Use the following cementitious materials, of the same type, brand, and source, throughout Project:
- B. Portland Cement: ASTM C150, Type I or II, gray. Supplement with the following:
  1. Fly Ash: ASTM C 618, Class C.
    - a. Normal-Weight Aggregates: ASTM C33, Class 3S coarse aggregate or better, graded. Provide aggregates from a single source with documented service record data of at least 10 years' satisfactory service in similar applications and service conditions using similar aggregates and cementitious materials.
- C. Maximum Coarse-Aggregate Size: 1-1/2 inches (38 mm) for mass pouring at piers only and 3/4 inch (19 mm) nominal typically.
- D. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.
  1. Water: ASTM C94/ C94M and potable.

## 2.05 ADMIXTURES

- A. Air-Entraining Admixture: ASTM C260.
- B. Chemical Admixtures: Provide admixtures certified by manufacturer to be compatible with other admixtures and that will not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.
- C. Water-Reducing Admixture: ASTM C494/ C494M, Type A.
- D. Retarding Admixture: ASTM C494/ C494M, Type B.
- E. Water-Reducing and Retarding Admixture: ASTM C494/ C494M, Type D.
- F. High-Range, Water-Reducing Admixture: ASTM C494/ C494M, Type F.
- G. High-Range, Water-Reducing and Retarding Admixture: ASTM C494/ C494M, Type G.
- H. Plasticizing and Retarding Admixture: ASTM C1017/ C1017M, Type II.

## 2.06 UNDERSLAB VAPOR BARRIER

- A. Plastic Vapor Retarder: ASTM E 1745, Class A, with a maximum permeance of 0.01 perms. Include manufacturer's recommended adhesive or pressure-sensitive tape.
  - 1. Available Products:
    - a. Stego Industries, LLC; Stego Wrap 15 mil
- B. Granular Fill: Clean mixture of crushed stone or crushed or uncrushed gravel; ASTM D 448, Size 57, with 100 percent passing a 1-1/2-inch (37.5-mm) sieve and 0 to 5 percent passing a No. 8 (2.36-mm) sieve.

## 2.07 DRAINAGE LAYER BELOW SLAB-ON-GRADE

- A. A 4-inch minimum layer of open-graded gravel, conforming to ASTM C33/C33M No. 57, shall be placed on the prepared subgrade as the future base for the building addition slab-on-grade.

## 2.08 LIQUID FLOOR TREATMENTS

- A. VOC Content: Liquid floor treatments shall have a VOC content of 200 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- B. Penetrating Liquid Floor Treatment: Clear, chemically reactive, waterborne solution of inorganic silicate or silicate materials and proprietary components; odorless; that penetrates, hardens, and densifies concrete surfaces.
- C. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
  - 1. ChemMasters; Chemisil Plus.
  - 2. ChemTec Int'l; ChemTec One.
  - 3. Conspec by Dayton Superior; Intraseal.
  - 4. Curecrete Distribution Inc.; Ashford Formula.
  - 5. Dayton Superior Corporation; Day-Chem Sure Hard (J-17).

## 2.09 CURING MATERIALS

- A. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.
  - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
    - a. BASF Construction Chemicals - Building Systems; Confilm.
    - b. ChemMasters; SprayFilm.
    - c. Conspec by Dayton Superior; Aquafilm.

- d. Dayton Superior Corporation; Sure Film (J-74).
  - e. Edoco by Dayton Superior; BurkeFilm.
  - f. Euclid Chemical Company (The), an RPM company; Eucobar.
- B. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. (305 g/sq. m) when dry.
- C. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.
- D. Water: Potable.
- E. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, nondissipating, certified by curing compound manufacturer to not interfere with bonding of floor covering.
- 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Anti-Hydro International, Inc.; AH Clear Cure WB.
    - b. BASF Construction Chemicals - Building Systems; Kure-N-Seal WB.
    - c. ChemMasters; Safe-Cure & Seal 20.
    - d. Conspec by Dayton Superior; Cure and Seal WB.
    - e. Cresset Chemical Company; Crete-Trete 309-VOC Cure & Seal.

## 2.10 WATERSTOPS

- A. Flexible PVC Waterstops: U.S. Army Corps of Engineers COE CRD-C 572, with factory-installed metal eyelets, for embedding in concrete to prevent the passage of fluids through joints, with factory fabricate corners, intersections, and directional changes.
- B. Self-Expanding Butyl Strip Waterstops: Manufactured rectangular or trapezoidal strip, butyl rubber with sodium bentonite or other hydrophilic polymers, for adhesive bonding to concrete, 3/4 by 1 inch.

## 2.11 RELATED MATERIALS

- A. Reglets: Fabricate reglets of not less than 0.022-inch thick, galvanized steel sheet. Temporarily fill or cover the face opening of the reglet to prevent intrusion of concrete or debris.
- B. Dovetail Anchor Slots: Hot-dip galvanized-steel sheet, not less than 0.034 inches thick, with bent tab anchors. Temporarily fill or cover the face opening of slots to prevent intrusion of concrete or debris.
- C. Chamfer Strips: Wood, metal, PVC, or rubber strips as required per Drawings.
- D. Rustication Strips: Wood, metal, PVC, or rubber strips, kerfed for ease of form removal. Profile per Drawings.
- E. Form-Release Agent: Commercially formulated form-release agent that does not bond with, stain, or adversely affect concrete surfaces and does not impair subsequent treatments of concrete surfaces.
  - 1. Formulate form-release agent with rust inhibitor for steel form-facing materials.
  - 2. Form release agent for form liners shall be acceptable to form liner manufacturer.
- F. Form Ties: Factory-fabricated, removable or snap-off, glass-fiber-reinforced plastic or metal form ties designed to resist the lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.
  - 1. Furnish units that leave no corrodible metal closer than 1 inch to the plane of exposed concrete surface.
  - 2. Furnish ties that, when removed, leave holes no larger than 1 inch in diameter on the concrete surface.
  - 3. Furnish ties with integral water-barrier plates to walls indicated to receive dampproofing or waterproofing.

## 2.12 RELATED MATERIALS

- A. Expansion- and Isolation-Joint-Filler Strips: ASTM D1751, asphalt-saturated cellulosic fiber or ASTM D1752, cork or self-expanding cork.
- B. Bonding Agent: ASTM C1059/ C1059M, Type II, non-redispersible, acrylic emulsion or styrene butadiene.
- C. Epoxy Bonding Adhesive: ASTM C881, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class suitable for application temperature and of grade to suit requirements, and as follows:

## 2.13 REPAIR MATERIALS

- A. Repair Underlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8 inch (3.2 mm) and that can be feathered at edges to match adjacent floor elevations.
  - 1. Cement Binder: ASTM C150, portland cement as defined in ASTM C219.
  - 2. Primer: Product of underlayment manufacturer recommended for substrate, conditions, and application.
  - 3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch (3.2 to 6 mm) or coarse sand as recommended by underlayment manufacturer.
  - 4. Compressive Strength: Not less than 4000 psi (27.6 MPa) at 28 days when tested according to ASTM C109/ C109M.
- B. Repair Overlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/4 inch (6.4 mm) and that can be filled in over a scarified surface to match adjacent floor elevations.

## 2.14 CONCRETE MIXTURES, GENERAL

- A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301.
- B. Use a qualified independent testing agency for preparing and reporting proposed mixture designs based on laboratory trial mixtures.
  - 1. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than portland cement in concrete as follows:
- C. Fly Ash: 15 percent.
- D. Combined Fly Ash and Pozzolan: 15 percent.
  - 1. Limit water-soluble, chloride-ion content in hardened concrete to 0.25 for exterior concrete and 1.00 percent by weight of cement for all interior concrete.
  - 2. Admixtures: Use admixtures according to manufacturer's written instructions.
- E. Use water-reducing, high-range water-reducing or plasticizing admixture in concrete, as required, for placement and workability.
- F. Use water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.
- G. Use water-reducing admixture in pumped concrete, concrete for heavy-use industrial slabs, concrete required to be watertight, and concrete with a water-cementitious materials ratio below 0.50.
- H. Use corrosion-inhibiting admixture in concrete mixtures where indicated.

## 2.15 CONCRETE MIXES FOR BUILDING ELEMENTS

- A. A. Footings: Proportion normal-weight concrete mixture as follows:
  - 1. Minimum Compressive Strength: 3500 psi (24.1 MPa) at 28 days.
  - 2. Minimum Cementitious Materials Content: 500 lb/cu. yd.

3. Maximum Water-Cementitious Materials Ratio: 0.50.
  4. Slump Limit: 4 inches (100 mm), plus or minus 1" max.
- B. Interior Slabs-on-Grade: Proportion normal-weight concrete mixture as follows:
1. Minimum Compressive Strength: 4000 psi (27.6 MPa) at 28 days.
  2. Minimum Cementitious Materials Content: 550 lb/cu. yd.
  3. Maximum Water-Cementitious Materials Ratio: 0.46.
  4. Slump Limit: 4 inches (100 mm), plus or minus 1" max.
- C. Exterior Slabs-on-Grade: Proportion normal-weight concrete mixture as follows:
1. Minimum Compressive Strength: 4500 psi (27.6 MPa) at 28 days.
  2. Minimum Cementitious Materials Content: 560 lb/cu. yd.
  3. Maximum Water-Cementitious Materials Ratio: 0.42.
  4. Slump Limit: 4 inches (100 mm), plus or minus 1" max.
  5. 6% +/- 1% air-entrainment.
- D. Elevated Rooftop RTU Slab: Proportion Light-weight concrete mixture as follows:
1. Minimum Compressive Strength: 4000 psi (27.6 MPa) at 28 days.
  2. Maximum Dry Density = 115 lb/cu. ft. +/- 3 lbs/cu. ft.
  2. Minimum Cementitious Materials Content: 660 lb/cu. yd.
  3. Maximum Water-Cementitious Materials Ratio: 0.42.
  4. Slump Limit: 4 inches (100 mm), plus or minus 1" max.
  5. 5.5% +/- 0.5% air-entrainment.

## **2.16 FABRICATING REINFORCEMENT**

- A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

## **2.17 CONCRETE MIXING**

- A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C94/C94M and furnish batch ticket information.
1. When air temperature is between 85 and 90 deg F (30 and 32 deg C), reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F (32 deg C), reduce mixing and delivery time to 60 minutes.
- B. On Project Site: Mix in drum type batch mixer, complying with ASTM C685/C685M. Mix each batch not less than 1-1/2 minutes and not more than 5 minutes.
1. Provide batch ticket for each batch discharged and used in the Work, indicating Project identification name and number, date, mixture type, mixture time, quantity, and amount of water added. Record approximate location of final deposit in structure.

## **PART 3 EXECUTION**

### **3.01 PREPARATION**

- A. Coordinate the concrete work with the chemical treatment of the soil under the building pad. Refer to Section 31 31 16 - Chemical Soil Treatment, for requirements.

### **3.02 UNDERSLAB VAPOR BARRIER**

- A. Refer to Section 03 05 05 - Underslab Vapor Barrier, for requirements.

### **3.03 FORMWORK**

- A. Design, erect, shore, brace, and maintain formwork, according to ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads.
- B. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.
- C. Limit concrete surface irregularities, designated by ACI 347 as abrupt or gradual, as follows:

1. Class A, 1/8 inch (3.2 mm) for smooth-formed finished surfaces.
2. Class B, 1/4 inch (6 mm) for rough-formed finished surfaces.
  - a. Construct forms tight enough to prevent loss of concrete mortar.
  - b. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical.
- D. Install keyways, reglets, recesses, and the like, for easy removal.
- E. Do not use rust-stained steel form-facing material.
- F. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces. Provide and secure units to support screed strips; use strike-off templates or compacting-type screeds.
- G. Provide temporary openings for cleanouts and inspection ports where interior area of formwork is inaccessible. Close openings with panels tightly fitted to forms and securely braced to prevent loss of concrete mortar. Locate temporary openings in forms at inconspicuous locations.
- H. Chamfer exterior corners and edges of permanently exposed concrete.
- I. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work. Determine sizes and locations from trades providing such items.
- J. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.
- K. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.
- L. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.

#### **3.04 EMBEDDED ITEMS**

- A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
- B. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of AISC's "Code of Standard Practice for Steel Buildings and Bridges."
- C. Install reglets to receive waterproofing and to receive through-wall flashings in outer face of concrete frame at exterior walls, where flashing is shown at lintels, shelf angles, and other conditions.
- D. Install dovetail anchor slots in concrete structures as indicated.

#### **3.05 INSTALLATION OF WATERSTOPS**

- A. Flexible Waterstops: Install in construction joints and at other joints indicated to form a continuous diaphragm.
  1. Install in longest lengths practicable.
  2. Locate waterstops in center of joint unless otherwise indicated on Drawings.
  3. Allow clearance between waterstop and reinforcing steel of not less than 2 times the largest concrete aggregate size specified in Section 03 30 00.
  4. Secure waterstops in the correct position at 12 inches on center.
  5. Field fabricate joints per manufacturer's instructions using heat welding.
    - a. Miter corners, intersections, and directional changes in waterstops.
    - b. Align center bulbs.

6. Clean waterstops immediately before placement of concrete.
  7. Support and protect exposed waterstops during the progress of the Work.
- B. Self-Expanding Strip Waterstops: Install in construction joints and at other locations indicated on Drawings, according to manufacturer's written instructions, by adhesive bonding, mechanically fastening, and firmly pressing into place.
1. Install in longest lengths practicable.
  2. Locate waterstops in center of joint unless otherwise indicated on Drawings.
  3. Protect exposed waterstops during the progress of the Work.

### **3.06 STEEL REINFORCEMENT**

- A. General: Comply with CRSI's "Manual of Standard Practice" for placing reinforcement.
- B. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.
- C. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that would reduce bond to concrete.
- D. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcement with bar supports to maintain minimum concrete cover. Do not tack weld crossing reinforcing bars.
- E. Weld reinforcing bars according to AWS D1.4/D 1.4M, where indicated.
- F. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.
- G. Install flat sheet welded wire reinforcement in longest practicable lengths on bar supports spaced to minimize sagging. Lap edges and ends of adjoining sheets at least one mesh spacing. Offset laps of adjoining sheet widths to prevent continuous laps in either direction. Lace overlaps with wire.

### **3.07 CONCRETE PLACEMENT**

- A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections have been performed.
- B. At floor areas to be constructed with moisture migration inhibitor admixture materials, manufacturers rep shall be contacted and scheduled to be present for concrete pours at the mix plant and on site to monitor proper dosage, water management and finishing techniques for this material.
- C. Do not add water to concrete during delivery, at Project site, or during placement unless approved by Architect.
- D. Before test sampling and placing concrete, water may be added at Project site, subject to limitations of ACI 301.
- E. Do not add water to concrete after adding high-range water-reducing admixtures to mixture.
- F. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete will be placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as indicated. Deposit concrete to avoid segregation.
- G. Deposit concrete in horizontal layers of depth to not exceed formwork design pressures and in a manner to avoid inclined construction joints.
- H. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.
  1. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6 inches (150 mm) into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity. At each insertion, limit duration of vibration to time

necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.

- I. Deposit and consolidate concrete for floors and slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.
- J. Consolidate concrete during placement operations so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
- K. Maintain reinforcement in position on chairs during concrete placement.
- L. Screed slab surfaces with a straightedge and strike off to correct elevations.
- M. Slope surfaces uniformly to drains where required.
- N. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, before excess bleedwater appears on the surface. Do not further disturb slab surfaces before starting finishing operations.
- O. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
  - 1. When average high and low temperature is expected to fall below 40 deg F (4.4 deg C) for three successive days, maintain delivered concrete mixture temperature within the temperature range required by ACI 301.
  - 2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
  - 3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.
- P. Hot-Weather Placement: Comply with ACI 301 and as follows:
  - 1. Maintain concrete temperature below 90 deg F (32 deg C) at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.

### 3.08 SLAB JOINTING

- A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.
- B. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.
- C. Place joints perpendicular to main reinforcement. Continue reinforcement across construction joints unless otherwise indicated. Do not continue reinforcement through sides of strip placements of floors and slabs.
- D. Form keyed joints as indicated. Embed keys at least 1-1/2 inches (38 mm) into concrete.
- E. Contraction Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of concrete thickness as follows:
- F. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint to a radius of 1/8 inch (3.2 mm). Repeat grooving of contraction joints after applying surface finishes. Eliminate groover tool marks on concrete surfaces.
- G. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch- (3.2-mm-) wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks.
- H. Isolation Joints in Slabs-on-Grade: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.

1. Extend joint-filler strips full width and depth of joint, terminating flush with finished concrete surface unless otherwise indicated.
2. Terminate full-width joint-filler strips not less than 1/2 inch (13 mm) or more than 1 inch (25 mm) below finished concrete surface where joint sealants occur.
3. Install joint-filler strips in lengths as long as practicable. Where more than one length is required, lace or clip sections together.
4. Doweled Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or asphalt coat one-half of dowel length to prevent concrete bonding to one side of joint.

### 3.09 FLOOR FLATNESS AND LEVELNESS REQUIREMENTS

#### A. Definitions:

1. Floor Levelness (FL): The FL number relates to the general floor slope of a concrete floor from an assumed datum elevation.
  - a. Elevation differences are measured every 10-feet within 72 hours after the concrete is placed and those measurements are entered into a calculation to determine floor levelness.
  - b. FL numbers generally only apply to slabs-on-grade.
  - c. FL numbers are only specified on elevated slabs when measurements are taken before shores and forms are removed and the slab has no camber.
2. Floor Flatness (FF): The FF number relates to the rate of change of the elevation of a concrete floor.
  - a. Elevation differences are taken every foot within 72 hours after the concrete is placed and a formula determines the FF measurement.
3. Specified Overall Values (SOV): The SOV number provides criteria for the entire project through average FF and FL values for all concrete floors on the project.
4. Minimum Local Values (MLV): The MLV number provides criteria for the minimum allowable FF and FL values for each section of concrete placed (or for each "pour") on a project, below which repair or replacement is required.

#### B. Finish Floors to the tolerances specified, in accordance ACI 302.1, ACI 117, and ASTM E1155:

1. Slabs-on-Grade (SOG):
  - a. Concrete floor areas exposed to view, without floorcoverings:
    - 1) Surface Profile: Conventional (using bullfloat)
    - 2) Floor Flatness (FF): SOV of 20, MLV of 13
    - 3) Floor Levelness (FL): SOV of 15, MLV of 10
    - 4) Application: Non-critical spaces, mechanical rooms, back-of-house (non-public) areas, and parking garage slabs
    - 5) Building Use: General office, light industrial, and commercial buildings
  - b. Concrete floor areas not exposed to view:
    - 1) Surface Profile: Conventional (using bullfloat)
    - 2) Floor Flatness (FF): SOV of 20, MLV of 13
    - 3) Floor Levelness (FL): SOV of 15, MLV of 10
    - 4) Application: Areas under raised access flooring.
    - 5) Building Use: General office, light industrial, and commercial buildings
  - c. Concrete floor areas under carpeting:
    - 1) Surface Profile: Conventional (using highway straightedge)
    - 2) Floor Flatness (FF): SOV of 25, MLV of 17
    - 3) Floor Levelness (FL): SOV of 20, MLV of 15
    - 4) Building Use: General office, light industrial, and commercial buildings
  - d. Concrete floor areas under thin-set tile, resilient flooring, and other thin flooring materials:
    - 1) Surface Profile: Flat
    - 2) Floor Flatness (FF): SOV of 35, MLV of 24

- 3) Floor Levelness (FL): SOV of 25, MLV of 17
  - 4) Building Use: General office, light industrial, and commercial buildings
2. Elevated Slabs:
- a. Match surface profile, FF values, of slabs-on-grade conditions noted above. FL values need not be taken.
- C. Correct the slab surface if composite overall value is less than specified and if local value is less than two-thirds of specified value or less than  $F(F) 13/F(L) 10$ .
- D. Correct defects by grinding or by removal and replacement of the defective work. Areas requiring corrective work will be identified. Re-measure corrected areas by the same process.

### 3.10 FINISHING FLOORS AND SLABS

- A. General: Comply with ACI 302.1R recommendations for screeding, restraighening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.
- B. Float Finish: Consolidate surface with power-driven floats or by hand floating if area is small or inaccessible to power driven floats. Restraighten, cut down high spots, and fill low spots. Repeat float passes and restraighening until surface is left with a uniform, smooth, granular texture.
1. Apply float finish to surfaces to receive trowel finish.
- C. Trowel Finish: After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel. Continue troweling passes and restraighten until surface is free of trowel marks and uniform in texture and appearance. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.
1. Apply a trowel finish to surfaces exposed to view or to be covered with resilient flooring, carpet, ceramic or quarry tile set over a cleavage membrane, paint, or another thin-film-finish coating system.
- D. Trowel and Fine-Broom Finish: Apply a first trowel finish to surfaces indicated and where Terrazzo or Porcelain tile is to be installed by thin-set method. While concrete is still plastic, slightly scarify surface with a fine broom.
- E. Comply with flatness and levelness tolerances for trowel-finished floor surfaces.

### 3.11 MISCELLANEOUS CONCRETE ITEMS

- A. Filling In: Fill in holes and openings left in concrete structures after work of other trades is in place unless otherwise indicated. Mix, place, and cure concrete, as specified, to blend with in-place construction. Provide other miscellaneous concrete filling indicated or required to complete the Work.
- B. Equipment Bases and Foundations: Provide machine and equipment bases and foundations as shown on Drawings. Set anchor bolts for machines and equipment at correct elevations, complying with diagrams or templates from manufacturer furnishing machines and equipment.
- C. Steel Pan Stairs: Provide concrete fill for steel pan stair treads, landings, and associated items. Cast-in inserts and accessories as shown on Drawings. Screed, tamp, and trowel finish concrete surfaces.

### 3.12 CONCRETE PROTECTING AND CURING

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and ACI 301 for hot-weather protection during curing.
- B. Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces if hot, dry, or windy conditions cause moisture loss before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.
- C. Cure concrete according to ACI 308.1.
1. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least

12 inches (300 mm), and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period using cover material and waterproof tape.

- a. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive floor coverings.
  - b. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive penetrating liquid floor treatments.
  - c. Cure concrete surfaces to receive floor coverings with a moisture-retaining cover.
- D. Curing and Sealing Compound: Apply uniformly to floors and slabs indicated in a continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Repeat process 24 hours later and apply a second coat. Maintain continuity of coating and repair damage during curing period.

### **3.13 LIQUID FLOOR TREATMENTS**

- A. Penetrating Liquid Floor Treatment: Prepare, apply, and finish penetrating liquid floor treatment according to manufacturer's written instructions.
- B. Remove curing compounds, sealers, oil, dirt, laitance, and other contaminants and complete surface repairs.
- C. Do not apply to concrete that has not completed the minimum manufacturers recommended curing time.
- D. Apply liquid until surface is saturated, scrubbing into surface until a gel forms; rewet; and repeat brooming or scrubbing. Rinse with water; remove excess material until surface is dry. Apply a second coat in a similar manner if surface is rough or porous.
  1. Sealing Coat: Uniformly apply a continuous sealing coat of curing and sealing compound to hardened concrete by power spray or roller according to manufacturer's written instructions.

### **3.14 JOINT FILLER**

- A. Prepare, clean, and install joint filler according to manufacturer's written instructions.
- B. Defer joint filling until concrete has aged at least one month. Do not fill joints until construction traffic has permanently ceased.
  1. Remove dirt, debris, saw cuttings, curing compounds, and sealers from joints; leave contact faces of joint clean and dry.
  2. Install semi-rigid joint filler full depth in saw-cut joints and at least 2 inches (50 mm) deep in formed joints. Overfill joint and trim joint filler flush with top of joint after hardening.

### **3.15 CONCRETE SURFACE REPAIRS**

- A. Patching Mortar: Mix dry-pack patching mortar, consisting of one part portland cement to two and one-half parts fine aggregate passing a No. 16 (1.18-mm) sieve, using only enough water for handling and placing.
- B. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.
- C. Repair finished surfaces containing defects. Surface defects include spalls, popouts, honeycombs, rock pockets, crazing and cracks in excess of 0.01 inch (0.25 mm) wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions.
- D. After concrete has cured at least 14 days, correct high areas by grinding.
- E. Correct localized low areas during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching mortar. Finish repaired areas to blend into adjacent concrete.

- F. Correct other low areas scheduled to receive floor coverings with a repair underlayment. Prepare, mix, and apply repair underlayment and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface. Feather edges to match adjacent floor elevations.
- G. Correct other low areas scheduled to remain exposed with a repair topping. Cut out low areas to ensure a minimum repair topping depth of 1/4 inch (6 mm) to match adjacent floor elevations. Prepare, mix, and apply repair topping and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.
- H. Repair random cracks and single holes 1 inch (25 mm) or less in diameter with patching mortar. Groove top of cracks and cut out holes to sound concrete and clean off dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding agent. Place patching mortar before bonding agent has dried. Compact patching mortar and finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours.
  - 1. Perform structural repairs of concrete, subject to Architect's approval, using epoxy adhesive and patching mortar.
  - 2. Repair materials and installation not specified above may be used, subject to Architect's approval.

### 3.16 FIELD QUALITY CONTROL

- A. Special Inspections: Owner shall engage the services of a special inspector to perform special inspections required by Section 01 45 33 - Code-Required Special Inspections, and prepare field reports.
- B. The Contractor will engage an independent testing agency to perform field quality control tests, as specified in Section 01 45 33 - Code-Required Special Inspections.
  - 1. General:
    - a. Provide free access to concrete operations at project site and cooperate with appointed firm.
    - b. Submit proposed mix design of each class of concrete to inspection and testing firm for review prior to commencement of concrete operations.
    - c. Tests of concrete and concrete materials may be performed at any time to ensure conformance with specified requirements.
  - 2. Concrete Tests: Testing of composite samples of fresh concrete obtained according to ASTM C172/C172M shall be performed according to the following requirements:
    - a. Compressive Strength Tests: ASTM C39/C39M. For each test, mold and cure three concrete test cylinders. Obtain test samples for every 100 cubic yards or less of each class of concrete placed. Take one additional test cylinder during cold weather concreting, cured on job site under same conditions as concrete it represents.
    - b. Take one additional test cylinder during cold weather concreting, cured on job site under same conditions as concrete it represents.
    - c. Slump Tests: ASTM C143/C143M; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture. Perform additional tests when concrete consistency appears to change.
    - d. Air Content: ASTM C 231, pressure method, for normal-weight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
    - e. Concrete Temperature: ASTM A1064/A1064M; one test hourly when air temperature is 40 deg F (4.4 deg C) and below and when 80 deg F (27 deg C) and above, and one test for each composite sample.
    - f. Unit Weight: ASTM C 567, fresh unit weight of structural lightweight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
    - g. Compression Test Specimens: ASTM C31/C31M.

- 1) A set of test cylinders shall consist of a minimum of four standard cylinder specimens for each composite sample. The number per set may be greater depending on the cylinder sizes.
- h. Compressive-Strength Tests: ASTM C39/C39M; test one cylinder of the laboratory-cured specimens at 7 days and one set of at least two cylinders at 28 days.
  - 1) Test one cylinder of a set at 7 days and one set of two 6" by 12" cylinders at 28 days.
  - 2) One cylinder shall be retained in reserve to be tested as directed by the Engineer.
  - 3) A compressive-strength test shall be the average compressive strength from a set of at least two cylinders obtained from the same composite sample and tested at age indicated.
- C. Test Results:
  1. Test results shall be reported in writing to Architect, concrete manufacturer, and Subcontractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.
  2. Non-destructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.
- D. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42/C 42M or by other methods as directed by Architect.
- E. Correct deficiencies in the Work that test reports and inspections indicate does not comply with the Contract Documents.
- F. Testing of Slabs containing MVRA:
  1. The moisture vapor reduction admixture (MVRA) manufacturer will perform all moisture testing in accordance with this specification and will issue project specific warranties prior to installation of any slab finishes; no further field slab moisture nor pH testing shall be required.
    - a. Failure to provide a product that meets or exceeds these requirements will result in all subsequent testing and slab remediation costs being borne by the Subcontractor.

### **3.17 DEFECTIVE CONCRETE**

- A. Test Results: The testing agency shall report test results in writing to Architect and Contractor within 24 hours of test.
- B. Defective Concrete: Concrete not conforming to required lines, details, dimensions, tolerances or specified requirements.
- C. Repair or replacement of defective concrete will be determined by the Architect. The cost of additional testing shall be borne by Contractor when defective concrete is identified.
- D. Do not patch, fill, touch-up, repair, or replace exposed concrete except upon express direction of Architect for each individual area.

### **3.18 PROTECTION OF LIQUID FLOOR TREATMENTS**

- A. Protect liquid floor treatment from damage and wear during the remainder of construction period. Use protective methods and materials, including temporary covering, recommended in writing by liquid floor treatments installer.

**END OF SECTION**

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

**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 SECTION INCLUDES**

- A. Cast-in place concrete, including formwork, reinforcement, concrete materials, mixture design, placement procedures, and finishes.
- B. Floor levelness and floor flatness requirements.

**1.03 RELATED REQUIREMENTS**

- A. Section 03 30 00 - Cast-in-Place Concrete
- B. Section {id\#1000036} - {t\#1000036}
- C. Section 04 26 00 - Single-Wythe Unit Masonry
- D. Section {id\#1000038} - {t\#1000038}
- E. Section 31 31 16 - Chemical Soil Treatment

**1.04 DEFINITIONS**

- A. Cementitious Materials: Portland cement alone or in combination with one or more of the following: blended hydraulic cement, fly ash and other pozzolans, ground granulated blast-furnace slag, and silica fume; subject to compliance with requirements.

**1.05 ACTION SUBMITTALS**

- A. Product Data: For each type of product indicated.
- B. Design Mixtures: For each concrete mixture. Submit alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.
  - 1. Indicate amounts of mixing water to be withheld for later addition at Project site.
- C. Steel Reinforcement Shop Drawings: Placing drawings that detail fabrication, bending, and placement. Include bar sizes, lengths, material, grade, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, splices and laps, mechanical connections, tie spacing, hoop spacing, and supports for concrete reinforcement.
- D. Formwork Shop Drawings: Prepared by or under the supervision of a qualified professional engineer detailing fabrication, assembly, and support of formwork.
- E. Shoring and Reshoring: Indicate proposed schedule and sequence of stripping formwork, shoring removal, and reshoring installation and removal.

**1.06 INFORMATIONAL SUBMITTALS**

- A. Qualification Data: For Installer, manufacturer and testing agency.
- B. Welding certificates.
- C. Material Certificates: For each of the following, signed by manufacturers:
  - 1. Cementitious materials.
  - 2. Admixtures.
  - 3. Form materials and form-release agents.
  - 4. Steel reinforcement and accessories.
  - 5. Aggregates. Include service record data indicating absence of deleterious expansion of concrete due to alkali aggregate reactivity.
- D. Field quality-control reports.

### **1.07 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.
- B. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities."
  - 1. Testing Agency Qualifications: An independent agency, acceptable to authorities having jurisdiction, qualified according to ASTM C 1077 and ASTM E 329 for testing indicated.
- C. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-1 or an equivalent certification program.
- D. Personnel performing laboratory tests shall be ACI-certified Concrete Strength Testing Technician and Concrete Laboratory Testing Technician - Grade I. Testing Agency laboratory supervisor shall be an ACI-certified Concrete Laboratory Testing Technician - Grade II.
  - 1. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, obtain aggregate from single source, and obtain admixtures from single source from single manufacturer.
  - 2. Welding Qualifications: Qualify procedures and personnel according to AWS D1.4/D 1.4M, "Structural Welding Code - Reinforcing Steel."
  - 3. ACI Publications: Comply with the following unless modified by requirements in the Contract Documents:
- E. ACI 301, "Specifications for Structural Concrete," Sections 1 through 5.
- F. ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."
- G. Concrete Testing Service: Engage a qualified independent testing agency to perform material evaluation tests and to design concrete mixtures.
- H. Before submitting design mixtures, review concrete design mixture and examine procedures for ensuring quality of concrete materials. Require representatives of each entity directly concerned with cast-in-place concrete to attend, including the following:
  - 1. Contractor's superintendent.
  - 2. Independent testing agency responsible for concrete design mixtures.
  - 3. Ready-mix concrete manufacturer.
  - 4. Concrete subcontractor.
- I. Review special inspection and testing and inspecting agency procedures for field quality control, cold- and hot-weather concreting procedures, curing procedures, construction contraction and isolation joints, joint-filler strips, forms and form removal limitations, shoring and reshoring procedures, anchor rod and anchorage device installation tolerances, steel reinforcement installation, concrete repair procedures, and concrete protection.

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

- A. Steel Reinforcement: Deliver, store, and handle steel reinforcement to prevent bending and damage. Avoid damaging coatings on steel reinforcement.

## **PART 2 PRODUCTS**

### **2.01 FORM-FACING MATERIALS**

- A. Smooth-Formed Finished Concrete: Form-facing panels that will provide continuous, true, and smooth concrete surfaces. Furnish in largest practicable sizes to minimize number of joints.
- B. Plywood, metal, or other approved panel materials.
- C. Exterior-grade plywood panels, suitable for concrete forms, complying with DOC PS 1, and as follows:
  - 1. High-density overlay, Class 1 or better.
  - 2. Medium-density overlay, Class 1 or better; mill-release agent treated and edge sealed.
  - 3. Structural 1, B-B or better; mill oiled and edge sealed.
  - 4. B-B (Concrete Form), Class 1 or better; mill oiled and edge sealed.

- a. Rough-Formed Finished Concrete: Plywood, lumber, metal, or another approved material. Provide lumber dressed on at least two edges and one side for tight fit.
  - b. Chamfer Strips: Wood, metal, PVC, or rubber strips, 3/4 by 3/4 inch (19 by 19 mm), minimum.
  - c. Rustication Strips: Wood, metal, PVC, or rubber strips, kerfed for ease of form removal.
  - d. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.
- D. Formulate form-release agent with rust inhibitor for steel form-facing materials.
1. Form Ties: Factory-fabricated, removable or snap-off metal or glass-fiber-reinforced plastic form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.
- E. Furnish units that will leave no corrodible metal closer than 1 inch (25 mm) to the plane of exposed concrete surface.
- F. Furnish ties that, when removed, will leave holes no larger than 1 inch (25 mm) in diameter in concrete surface.
- G. Furnish ties with integral water-barrier plates to walls indicated to receive dampproofing or waterproofing.

## **2.02 STEEL REINFORCEMENT**

- A. Reinforcing Bars: ASTM A615/ A615M, Grade 60 (Grade 420), deformed.
- B. Low-Alloy-Steel Reinforcing Bars: ASTM A706/ A706M, deformed.
- C. Steel Bar Mats: ASTM A 184/ A184M, fabricated from ASTM A615/ A615M, Grade 60 (Grade 420), deformed bars, assembled with clips.
- D. Plain-Steel Wire: ASTM A82/ A82M, as drawn.
- E. Deformed-Steel Wire: ASTM A 96/ A496M.

## **2.03 REINFORCEMENT ACCESSORIES**

- A. Joint Dowel Bars: ASTM A615/ A615M, Grade 60 (Grade 420), plain-steel bars, cut true to length with ends square and free of burrs.
- B. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars in place. Manufacture bar supports from steel wire, plastic, or precast concrete according to CRSI's "Manual of Standard Practice," of greater compressive strength than concrete and as follows:

## **2.04 CONCRETE MATERIALS**

- A. Cementitious Material: Use the following cementitious materials, of the same type, brand, and source, throughout Project:
- B. Portland Cement: ASTM C150, Type I, gray. Supplement with the following:
  1. Fly Ash: ASTM C 618, Class C.
    - a. Normal-Weight Aggregates: ASTM C33, Class 3S coarse aggregate or better, graded. Provide aggregates from a single source with documented service record data of at least 10 years' satisfactory service in similar applications and service conditions using similar aggregates and cementitious materials.
- C. Maximum Coarse-Aggregate Size: 1-1/2 inches (38 mm) for mass pouring at piers only and 3/4 inch (19 mm) nominal typically.
- D. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.
  1. Water: ASTM C94/ C94M and potable.

## **2.05 ADMIXTURES**

- A. Air-Entraining Admixture: ASTM C260.

- B. Chemical Admixtures: Provide admixtures certified by manufacturer to be compatible with other admixtures and that will not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.
- C. Water-Reducing Admixture: ASTM C494/ C494M, Type A.
- D. Retarding Admixture: ASTM C494/ C494M, Type B.
- E. Water-Reducing and Retarding Admixture: ASTM C494/ C494M, Type D.
- F. High-Range, Water-Reducing Admixture: ASTM C494/ C494M, Type F.
- G. High-Range, Water-Reducing and Retarding Admixture: ASTM C494/ C494M, Type G.
- H. Plasticizing and Retarding Admixture: ASTM C1017/ C1017M, Type II.

## **2.06 UNDERSLAB VAPOR BARRIER**

- A. Refer to Section 03 30 00 - Cast-in-Place Concrete, for requirements.

## **2.07 DRAINAGE LAYER BELOW SLAB-ON-GRADE**

- A. A 4-inch minimum layer of open-graded gravel, conforming to ASTM C33/C33M No. 57, shall be placed on the prepared subgrade as the future base for the building addition slab-on-grade.

## **2.08 LIQUID FLOOR TREATMENTS**

- A. VOC Content: Liquid floor treatments shall have a VOC content of 200 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- B. Penetrating Liquid Floor Treatment: Clear, chemically reactive, waterborne solution of inorganic silicate or silicate materials and proprietary components; odorless; that penetrates, hardens, and densifies concrete surfaces.
- C. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
  - 1. ChemMasters; Chemisil Plus.
  - 2. ChemTec Int'l; ChemTec One.
  - 3. Conspec by Dayton Superior; Intraseal.
  - 4. Curecrete Distribution Inc.; Ashford Formula.
  - 5. Dayton Superior Corporation; Day-Chem Sure Hard (J-17).

## **2.09 CURING MATERIALS**

- A. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.
  - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
    - a. BASF Construction Chemicals - Building Systems; Confilm.
    - b. ChemMasters; SprayFilm.
    - c. Conspec by Dayton Superior; Aquafilm.
    - d. Dayton Superior Corporation; Sure Film (J-74).
    - e. Edoco by Dayton Superior; BurkeFilm.
    - f. Euclid Chemical Company (The), an RPM company; Eucobar.
- B. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. (305 g/sq. m) when dry.
- C. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.
- D. Water: Potable.
- E. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, nondissipating, certified by curing compound manufacturer to not interfere with bonding of floor covering.
  - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

- a. Anti-Hydro International, Inc.; AH Clear Cure WB.
- b. BASF Construction Chemicals - Building Systems; Kure-N-Seal WB.
- c. ChemMasters; Safe-Cure & Seal 20.
- d. Conspec by Dayton Superior; Cure and Seal WB.
- e. Cresset Chemical Company; Crete-Trete 309-VOC Cure & Seal.

## 2.10 RELATED MATERIALS

- A. Expansion- and Isolation-Joint-Filler Strips: ASTM D1751, asphalt-saturated cellulosic fiber or ASTM D1752, cork or self-expanding cork.
- B. Bonding Agent: ASTM C1059/ C1059M, Type II, non-redispersible, acrylic emulsion or styrene butadiene.
- C. Epoxy Bonding Adhesive: ASTM C881, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class suitable for application temperature and of grade to suit requirements, and as follows:

## 2.11 REPAIR MATERIALS

- A. Repair Underlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8 inch (3.2 mm) and that can be feathered at edges to match adjacent floor elevations.
  1. Cement Binder: ASTM C150, portland cement as defined in ASTM C219.
  2. Primer: Product of underlayment manufacturer recommended for substrate, conditions, and application.
  3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch (3.2 to 6 mm) or coarse sand as recommended by underlayment manufacturer.
  4. Compressive Strength: Not less than 4100 psi (29 MPa) at 28 days when tested according to ASTM C109/ C109M.
- B. Repair Overlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/4 inch (6.4 mm) and that can be filled in over a scarified surface to match adjacent floor elevations.

## 2.12 CONCRETE MIXTURES, GENERAL

- A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301.
- B. Use a qualified independent testing agency for preparing and reporting proposed mixture designs based on laboratory trial mixtures.
  1. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than portland cement in concrete as follows:
- C. Fly Ash: 15 percent.
- D. Combined Fly Ash and Pozzolan: 15 percent.
  1. Limit water-soluble, chloride-ion content in hardened concrete to 0.25 for exterior concrete and 1.00 percent by weight of cement for all interior concrete.
  2. Admixtures: Use admixtures according to manufacturer's written instructions.
- E. Use water-reducing, high-range water-reducing or plasticizing admixture in concrete, as required, for placement and workability.
- F. Use water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.
- G. Use water-reducing admixture in pumped concrete, concrete for heavy-use industrial slabs, concrete required to be watertight, and concrete with a water-cementitious materials ratio below 0.50.
- H. Use corrosion-inhibiting admixture in concrete mixtures where indicated.

## 2.13 CONCRETE MIXES FOR BUILDING ELEMENTS

- A. Concrete Mixes: Provide concrete mixes to provide normal weight concrete with the following properties, for each class of concrete as indicated on the drawings and schedule:

Class of Mix	A	B	C	D	E	F
Min. Compressive Strength @ 28 days (psi)	4000	4500	4000	4000	4000	4500
Minimum Cement Content (lbs/CY)	---	588	564	564	564	0.588
Maximum Water/ Cement Ratio	0.514	0.45	0.41	0.42	0.42	0.42
Maximum Size Coarse Aggregate (inches)	3/4	3/4	1/2	3/4	3/4	3/4
Entrained/ Entrapped Air (%)	N/A	6% +/- 1.5%	N/A	N/A	N/A	N/A
Water-Reducer Required (Y/N)	Y	Y	Y	Y	Y	Y
Semi-Lightweight Concrete (115 pcf)	N	N	Y	N	N	N
Normal Weight Concrete (145 +/- pcf)	Y	Y	N	Y	Y	Y
Waterproofing Admixture	N	N	Y	Y	N	N
Maximum Slump (inches)	4	4	4	4	4	4
Exposure Class		F1, C1	F0, C0	F0, C0		

1. Key:
  - a. Class A: Use for footings and grade beams.
  - b. Class B: Use for foundations and walls.
  - c. Class C: Use for concrete over steel deck and metal pan stairs.
  - d. Class D: Use for interior slabs-on-grade.
  - e. Class E: Use for building framing members, building/ shear walls, columns poured monolithic with wall, and columns above the second floor.
  - f. Class F: Use for columns from foundation to underside of second floor.

**2.14 FABRICATING REINFORCEMENT**

- A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

**2.15 CONCRETE MIXING**

- A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C94/C94M and furnish batch ticket information.
  1. When air temperature is between 85 and 90 deg F (30 and 32 deg C), reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F (32 deg C), reduce mixing and delivery time to 60 minutes.
- B. On Project Site: Mix in drum type batch mixer, complying with ASTM C685/C685M. Mix each batch not less than 1-1/2 minutes and not more than 5 minutes.
  1. Provide batch ticket for each batch discharged and used in the Work, indicating Project identification name and number, date, mixture type, mixture time, quantity, and amount of water added. Record approximate location of final deposit in structure.

**PART 3 EXECUTION**

**3.01 PREPARATION**

- A. Coordinate the concrete work with the chemical treatment of the soil under the building pad. Refer to Section 31 31 16 - Chemical Soil Treatment, for requirements.

**3.02 UNDERSLAB VAPOR BARRIER**

- A. Refer to Section 03 30 00 - Cast-in-Place Concrete, for requirements.

### 3.03 FORMWORK

- A. Design, erect, shore, brace, and maintain formwork, according to ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads.
- B. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.
- C. Limit concrete surface irregularities, designated by ACI 347 as abrupt or gradual, as follows:
  - 1. Class A, 1/8 inch (3.2 mm) for smooth-formed finished surfaces.
  - 2. Class B, 1/4 inch (6 mm) for rough-formed finished surfaces.
    - a. Construct forms tight enough to prevent loss of concrete mortar.
    - b. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical.
- D. Install keyways, reglets, recesses, and the like, for easy removal.
- E. Do not use rust-stained steel form-facing material.
- F. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces. Provide and secure units to support screed strips; use strike-off templates or compacting-type screeds.
- G. Provide temporary openings for cleanouts and inspection ports where interior area of formwork is inaccessible. Close openings with panels tightly fitted to forms and securely braced to prevent loss of concrete mortar. Locate temporary openings in forms at inconspicuous locations.
- H. Chamfer exterior corners and edges of permanently exposed concrete.
- I. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work. Determine sizes and locations from trades providing such items.
- J. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.
- K. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.
- L. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.

### 3.04 EMBEDDED ITEMS

- A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
- B. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of AISC's "Code of Standard Practice for Steel Buildings and Bridges."
- C. Install reglets to receive waterproofing and to receive through-wall flashings in outer face of concrete frame at exterior walls, where flashing is shown at lintels, shelf angles, and other conditions.
- D. Install dovetail anchor slots in concrete structures as indicated.

### 3.05 STEEL REINFORCEMENT

- A. General: Comply with CRSI's "Manual of Standard Practice" for placing reinforcement.
- B. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.
- C. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that would reduce bond to concrete.

- D. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcement with bar supports to maintain minimum concrete cover. Do not tack weld crossing reinforcing bars.
- E. Weld reinforcing bars according to AWS D1.4/D 1.4M, where indicated.
- F. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.
- G. Install flat sheet welded wire reinforcement in longest practicable lengths on bar supports spaced to minimize sagging. Lap edges and ends of adjoining sheets at least one mesh spacing. Offset laps of adjoining sheet widths to prevent continuous laps in either direction. Lace overlaps with wire.

### 3.06 CONCRETE PLACEMENT

- A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections have been performed.
- B. At floor areas to be constructed with moisture migration inhibitor admixture materials, manufacturers rep shall be contacted and scheduled to be present for concrete pours at the mix plant and on site to monitor proper dosage, water management and finishing techniques for this material.
- C. Do not add water to concrete during delivery, at Project site, or during placement unless approved by Architect.
- D. Before test sampling and placing concrete, water may be added at Project site, subject to limitations of ACI 301.
- E. Do not add water to concrete after adding high-range water-reducing admixtures to mixture.
- F. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete will be placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as indicated. Deposit concrete to avoid segregation.
- G. Deposit concrete in horizontal layers of depth to not exceed formwork design pressures and in a manner to avoid inclined construction joints.
- H. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.
  - 1. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6 inches (150 mm) into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.
- I. Deposit and consolidate concrete for floors and slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.
- J. Consolidate concrete during placement operations so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
- K. Maintain reinforcement in position on chairs during concrete placement.
- L. Screed slab surfaces with a straightedge and strike off to correct elevations.
- M. Slope surfaces uniformly to drains where required.
- N. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, before excess bleedwater appears on the surface. Do not further disturb slab surfaces before starting finishing operations.
- O. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
  - 1. When average high and low temperature is expected to fall below 40 deg F (4.4 deg C) for three successive days, maintain delivered concrete mixture temperature within the temperature range required by ACI 301.

2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
  3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.
- P. Hot-Weather Placement: Comply with ACI 301 and as follows:
1. Maintain concrete temperature below 90 deg F (32 deg C) at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.

### 3.07 SLAB JOINTING

- A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.
- B. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.
- C. Place joints perpendicular to main reinforcement. Continue reinforcement across construction joints unless otherwise indicated. Do not continue reinforcement through sides of strip placements of floors and slabs.
- D. Form keyed joints as indicated. Embed keys at least 1-1/2 inches (38 mm) into concrete.
- E. Contraction Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of concrete thickness as follows:
- F. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint to a radius of 1/8 inch (3.2 mm). Repeat grooving of contraction joints after applying surface finishes. Eliminate groover tool marks on concrete surfaces.
- G. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch- (3.2-mm-) wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks.
- H. Isolation Joints in Slabs-on-Grade: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.
  1. Extend joint-filler strips full width and depth of joint, terminating flush with finished concrete surface unless otherwise indicated.
  2. Terminate full-width joint-filler strips not less than 1/2 inch (13 mm) or more than 1 inch (25 mm) below finished concrete surface where joint sealants occur.
  3. Install joint-filler strips in lengths as long as practicable. Where more than one length is required, lace or clip sections together.
  4. Doweled Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or asphalt coat one-half of dowel length to prevent concrete bonding to one side of joint.

### 3.08 FLOOR FLATNESS AND LEVELNESS REQUIREMENTS

- A. Definitions:
  1. Floor Levelness (FL): The FL number relates to the general floor slope of a concrete floor from an assumed datum elevation.
    - a. Elevation differences are measured every 10-feet within 72 hours after the concrete is placed and those measurements are entered into a calculation to determine floor levelness.
    - b. FL numbers generally only apply to slabs-on-grade.
    - c. FL numbers are only specified on elevated slabs when measurements are taken before shores and forms are removed and the slab has no camber.
  2. Floor Flatness (FF): The FF number relates to the rate of change of the elevation of a concrete floor.

- a. Elevation differences are taken every foot within 72 hours after the concrete is placed and a formula determines the FF measurement.
  3. Specified Overall Values (SOV): The SOV number provides criteria for the entire project through average FF and FL values for all concrete floors on the project.
  4. Minimum Local Values (MLV): The MLV number provides criteria for the minimum allowable FF and FL values for each section of concrete placed (or for each "pour") on a project, below which repair or replacement is required.
- B. Finish Floors to the tolerances specified, in accordance ACI 302.1, ACI 117, and ASTM E1155:
1. Slabs-on-Grade (SOG):
    - a. Concrete floor areas exposed to view, without floorcoverings:
      - 1) Surface Profile: Conventional (using bullfloat)
      - 2) Floor Flatness (FF): SOV of 20, MLV of 13
      - 3) Floor Levelness (FL): SOV of 15, MLV of 10
      - 4) Application: Non-critical spaces, mechanical rooms, back-of-house (non-public) areas, and parking garage slabs
      - 5) Building Use: General office, light industrial, and commercial buildings
    - b. Concrete floor areas not exposed to view:
      - 1) Surface Profile: Conventional (using bullfloat)
      - 2) Floor Flatness (FF): SOV of 20, MLV of 13
      - 3) Floor Levelness (FL): SOV of 15, MLV of 10
      - 4) Application: Areas under raised access flooring.
      - 5) Building Use: General office, light industrial, and commercial buildings
    - c. Concrete floor areas under carpeting:
      - 1) Surface Profile: Conventional (using highway straightedge)
      - 2) Floor Flatness (FF): SOV of 25, MLV of 17
      - 3) Floor Levelness (FL): SOV of 20, MLV of 15
      - 4) Building Use: General office, light industrial, and commercial buildings
    - d. Concrete floor areas under thin-set tile, resilient flooring, and other thin flooring materials:
      - 1) Surface Profile: Flat
      - 2) Floor Flatness (FF): SOV of 35, MLV of 24
      - 3) Floor Levelness (FL): SOV of 25, MLV of 17
      - 4) Building Use: General office, light industrial, and commercial buildings
  2. Elevated Slabs and Toppings:
    - a. Match surface profile, FF values, and FL values of slabs-on-grade conditions noted above, with the following exceptions:
      - 1) FL values of level elevated slabs shall be taken before shores and forms are removed
      - 2) FL values are not applicable if slab specified with camber
- C. Correct the slab surface if composite overall value is less than specified and if local value is less than two-thirds of specified value or less than  $F(F) 13/F(L) 10$ .
- D. Correct defects by grinding or by removal and replacement of the defective work. Areas requiring corrective work will be identified. Re-measure corrected areas by the same process.

### 3.09 FINISHING FLOORS AND SLABS

- A. General: Comply with ACI 302.1R recommendations for screeding, restraighening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.
- B. Float Finish: Consolidate surface with power-driven floats or by hand floating if area is small or inaccessible to power driven floats. Restraighten, cut down high spots, and fill low spots. Repeat float passes and restraighening until surface is left with a uniform, smooth, granular texture.
  1. Apply float finish to surfaces to receive trowel finish.

- C. Trowel Finish: After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel. Continue troweling passes and restraighen until surface is free of trowel marks and uniform in texture and appearance. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.
  - 1. Apply a trowel finish to surfaces exposed to view or to be covered with resilient flooring, carpet, ceramic or quarry tile set over a cleavage membrane, paint, or another thin-film-finish coating system.
- D. Trowel and Fine-Broom Finish: Apply a first trowel finish to surfaces indicated and where Terrazzo or Porcelain tile is to be installed by thin-set method. While concrete is still plastic, slightly scarify surface with a fine broom.
- E. Comply with flatness and levelness tolerances for trowel-finished floor surfaces.

### **3.10 MISCELLANEOUS CONCRETE ITEMS**

- A. Filling In: Fill in holes and openings left in concrete structures after work of other trades is in place unless otherwise indicated. Mix, place, and cure concrete, as specified, to blend with in-place construction. Provide other miscellaneous concrete filling indicated or required to complete the Work.
- B. Equipment Bases and Foundations: Provide machine and equipment bases and foundations as shown on Drawings. Set anchor bolts for machines and equipment at correct elevations, complying with diagrams or templates from manufacturer furnishing machines and equipment.
- C. Steel Pan Stairs: Provide concrete fill for steel pan stair treads, landings, and associated items. Cast-in inserts and accessories as shown on Drawings. Screed, tamp, and trowel finish concrete surfaces.

### **3.11 CONCRETE PROTECTING AND CURING**

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and ACI 301 for hot-weather protection during curing.
- B. Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces if hot, dry, or windy conditions cause moisture loss before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.
- C. Cure concrete according to ACI 308.1.
  - 1. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches (300 mm), and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
    - a. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive floor coverings.
    - b. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive penetrating liquid floor treatments.
    - c. Cure concrete surfaces to receive floor coverings with a moisture-retaining cover.
- D. Curing and Sealing Compound: Apply uniformly to floors and slabs indicated in a continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Repeat process 24 hours later and apply a second coat. Maintain continuity of coating and repair damage during curing period.

### **3.12 LIQUID FLOOR TREATMENTS**

- A. Penetrating Liquid Floor Treatment: Prepare, apply, and finish penetrating liquid floor treatment according to manufacturer's written instructions.
- B. Remove curing compounds, sealers, oil, dirt, laitance, and other contaminants and complete surface repairs.

- C. Do not apply to concrete that has not completed the minimum manufacturers recommended curing time.
- D. Apply liquid until surface is saturated, scrubbing into surface until a gel forms; rewet; and repeat brooming or scrubbing. Rinse with water; remove excess material until surface is dry. Apply a second coat in a similar manner if surface is rough or porous.
  - 1. Sealing Coat: Uniformly apply a continuous sealing coat of curing and sealing compound to hardened concrete by power spray or roller according to manufacturer's written instructions.

### 3.13 JOINT FILLER

- A. Prepare, clean, and install joint filler according to manufacturer's written instructions.
- B. Defer joint filling until concrete has aged at least one month. Do not fill joints until construction traffic has permanently ceased.
  - 1. Remove dirt, debris, saw cuttings, curing compounds, and sealers from joints; leave contact faces of joint clean and dry.
  - 2. Install semi-rigid joint filler full depth in saw-cut joints and at least 2 inches (50 mm) deep in formed joints. Overfill joint and trim joint filler flush with top of joint after hardening.

### 3.14 CONCRETE SURFACE REPAIRS

- A. Patching Mortar: Mix dry-pack patching mortar, consisting of one part portland cement to two and one-half parts fine aggregate passing a No. 16 (1.18-mm) sieve, using only enough water for handling and placing.
- B. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.
- C. Repair finished surfaces containing defects. Surface defects include spalls, popouts, honeycombs, rock pockets, crazing and cracks in excess of 0.01 inch (0.25 mm) wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions.
- D. After concrete has cured at least 14 days, correct high areas by grinding.
- E. Correct localized low areas during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching mortar. Finish repaired areas to blend into adjacent concrete.
- F. Correct other low areas scheduled to receive floor coverings with a repair underlayment. Prepare, mix, and apply repair underlayment and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface. Feather edges to match adjacent floor elevations.
- G. Correct other low areas scheduled to remain exposed with a repair topping. Cut out low areas to ensure a minimum repair topping depth of 1/4 inch (6 mm) to match adjacent floor elevations. Prepare, mix, and apply repair topping and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.
- H. Repair random cracks and single holes 1 inch (25 mm) or less in diameter with patching mortar. Groove top of cracks and cut out holes to sound concrete and clean off dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding agent. Place patching mortar before bonding agent has dried. Compact patching mortar and finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours.
  - 1. Perform structural repairs of concrete, subject to Architect's approval, using epoxy adhesive and patching mortar.
  - 2. Repair materials and installation not specified above may be used, subject to Architect's approval.

### 3.15 FIELD QUALITY CONTROL

- A. Special Inspections: Owner shall engage the services of a special inspector to perform special inspections required by Section 01 45 33 - Code-Required Special Inspections, and prepare

field reports.

- B. The Contractor will engage an independent testing agency to perform field quality control tests, as specified in Section 01 45 33 - Code-Required Special Inspections.
1. General:
    - a. Provide free access to concrete operations at project site and cooperate with appointed firm.
    - b. Submit proposed mix design of each class of concrete to inspection and testing firm for review prior to commencement of concrete operations.
    - c. Tests of concrete and concrete materials may be performed at any time to ensure conformance with specified requirements.
  2. Concrete Tests: Testing of composite samples of fresh concrete obtained according to ASTM C172/C172M shall be performed according to the following requirements:
    - a. Compressive Strength Tests: ASTM C39/C39M. For each test, mold and cure three concrete test cylinders. Obtain test samples for every 100 cubic yards (76 cu m) or less of each class of concrete placed. Take one additional test cylinder during cold weather concreting, cured on job site under same conditions as concrete it represents.
    - b. Take one additional test cylinder during cold weather concreting, cured on job site under same conditions as concrete it represents.
    - c. Slump Tests: ASTM C143/C143M; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture. Perform additional tests when concrete consistency appears to change.
    - d. Air Content: ASTM C 231, pressure method, for normal-weight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
    - e. Concrete Temperature: ASTM A1064/A1064M; one test hourly when air temperature is 40 deg F (4.4 deg C) and below and when 80 deg F (27 deg C) and above, and one test for each composite sample.
    - f. Unit Weight: ASTM C 567, fresh unit weight of structural lightweight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
    - g. Compression Test Specimens: ASTM C31/C31M.
      - 1) A set of test cylinders shall consist of a minimum of four standard cylinder specimens for each composite sample. The number per set may be greater depending on the cylinder sizes.
    - h. Compressive-Strength Tests: ASTM C39/C39M; test one cylinder of the laboratory-cured specimens at 7 days and one set of at least two cylinders at 28 days.
      - 1) Test one cylinder of a set at 7 days and one set of two 6" by 12" cylinders or three 4" by 8" cylinders at 28 days.
      - 2) One cylinder shall be retained in reserve to be tested as directed by the Engineer.
      - 3) A compressive-strength test shall be the average compressive strength from a set of at least two cylinders obtained from the same composite sample and tested at age indicated.
- C. Test Results:
1. Test results shall be reported in writing to Architect, concrete manufacturer, and Subcontractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.
  2. Non-destructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.

- D. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42/C 42M or by other methods as directed by Architect.
- E. Correct deficiencies in the Work that test reports and inspections indicate does not comply with the Contract Documents.
- F. Testing of Slabs containing MVRA:
  - 1. The moisture vapor reduction admixture (MVRA) manufacturer will perform all moisture testing in accordance with this specification and will issue project specific warranties prior to installation of any slab finishes; no further field slab moisture nor pH testing shall be required.
    - a. Failure to provide a product that meets or exceeds these requirements will result in all subsequent testing and slab remediation costs being borne by the Subcontractor.

### **3.16 DEFECTIVE CONCRETE**

- A. Test Results: The testing agency shall report test results in writing to Architect and Contractor within 24 hours of test.
- B. Defective Concrete: Concrete not conforming to required lines, details, dimensions, tolerances or specified requirements.
- C. Repair or replacement of defective concrete will be determined by the Architect. The cost of additional testing shall be borne by Contractor when defective concrete is identified.
- D. Do not patch, fill, touch-up, repair, or replace exposed concrete except upon express direction of Architect for each individual area.

### **3.17 PROTECTION OF LIQUID FLOOR TREATMENTS**

- A. Protect liquid floor treatment from damage and wear during the remainder of construction period. Use protective methods and materials, including temporary covering, recommended in writing by liquid floor treatments installer.

**END OF SECTION**

**SECTION 03 30 05**  
**MOISTURE VAPOR REDUCING ADMIXTURE FOR CAST-IN-PLACE CONCRETE**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Moisture vapor reducing admixture (MVRA) for cast-in-place concrete.

**1.02 RELATED REQUIREMENTS**

- A. Section 03 30 00 - Cast-in-Place Concrete

**1.03 REFERENCE STANDARDS**

- A. ACI 211.1 - Selecting Proportions for Normal-Density and High Density-Concrete - Guide.
- B. ASTM C494/C494M - Standard Specification for Chemical Admixtures for Concrete.
- C. ASTM D5084 - Standard Test Methods for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter.
- D. ASTM E1643 - Standard Practice for Selection, Design, Installation, and Inspection of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs.

**1.04 SUBMITTALS**

- A. See Section 01 33 00, for submittal procedures.
- B. Product Data: Submit manufacturers' data on manufactured products showing compliance with specified requirements and installation instructions.
- C. Field Quality Control Submittals: Include project name and number, date of MVRA application, name of testing agency, location of concrete batch in work, mix proportions, materials, and test result.
- D. Manufacturer's Qualification Statement.
- E. Concrete Supplier's Qualification Statement.
- F. Concrete Finisher's Qualification Statement.
- G. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

**1.05 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than ten years of documented experience.
- B. Concrete Supplier Qualifications: Company certified by MVRA manufacturer with not less than three years of documented experience.
- C. Concrete Finisher Qualifications: Company certified by MVRA manufacturer with not less than three years of documented experience, and approved by manufacturer.
- D. Moisture Testing: By MVRA manufacturer's representative.
- E. Bond Testing: By MVRA manufacturer's representative.

**1.06 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver materials in original, undamaged containers with labels intact.
- B. Comply with manufacturer's written MVRA handling and storage instructions prior to mixing.

**1.07 WARRANTY**

- A. Slabs with WVRA Admixture: The manufacturer agrees to repair, replace, or re-apply damaged floor covering or adhesive, surface treatment, coating, or paint materials that fail for 10 years from the Date of Substantial Completion.
  - 1. Failures include, but are not limited to, proven claims made on any floor covering or adhesive, surface treatment, coating or paint that sustains damage due to moisture vapor migration or alkali efflorescence attack, which had migrated through concrete, and includes blistering, peeling, leakage, seepage, or absorption of moisture, petroleum,

- sulfides, or acids.
- 2. Warranty does not apply to, or cover the following:
  - a. Water vapor migration moving laterally under a floor covering originating from external sources such as drains or broken pipes.
  - b. Structural cracks or damage or conditions caused by neglect, abuse, acts of God or nature; other materials and/or conditions resulting from inferior application or workmanship or design, whether intentional or not; or situations beyond its control.
  - c. Liquidated, incidental, and/or consequential damages or for contribution or indemnity.

## **PART 2 PRODUCTS**

### **2.01 MANUFACTURERS**

- A. Specified Manufacturer: Specialty Products Group (SPG)
  - 1. Other acceptable manufacturers with equivalent products to the specified manufacturer shall include:
    - a. ISE Logik Industries; MVRA 900; [www.iselogik.com](http://www.iselogik.com).
    - b. Concure Systems; Concure Systems Admixture; [www.concuresystems.com](http://www.concuresystems.com).
    - c. Barrier One; CPS Admixture; [www.barrierone.com](http://www.barrierone.com)
  - 2. Products of other unnamed manufacturers with equivalent products to the specified manufacturer will be considered in accordance with the "or equal" provision specified in Division 01 "Product Requirements".
    - a. Product Substitutions: Comply with the requirements specified in Division 01 "Substitution Procedures"

### **2.02 MOISTURE VAPOR REDUCING ADMIXTURE**

- A. Basis of Design: Specialty Products Group; Vapor Lock 20/20 Moisture Vapor Reducing Admixture (Web: [www.spggogreen.com](http://www.spggogreen.com))
  - 1. Description: ASTM C494/C494M, Type S; liquid, inorganic admixture free of volatile organic compounds (VOCs); formulated to react with cementitious material to integrally and permanently close capillary systems formed during curing.
    - a. Provide admixture in slabs-on-grade to receive adhesively applied flooring.
  - 2. Properties:
    - a. Capillary Break: Calcium silicate hydrate.
    - b. Water Seepage or Permeability: Not to exceed  $2.0 \times 10^9$  ft/s ( $6 \times 10^8$  cm/s), when tested according to ASTM D5084.
    - c. Toxicity: None.
    - d. Solvent: Water.
    - e. Hazardous Vapors: None.

### **2.03 ACCESSORY MATERIALS**

- A. Underslab Vapor Retarder: Refer to Section 03 05 05, for requirements.

### **2.04 CONCRETE MIX DESIGN**

- A. Admixtures: Add acceptable admixtures as recommended in ACI 211.1 and at rates required by manufacturer.

## **PART 3 EXECUTION**

### **3.01 PREPARATION**

- A. Where new concrete with MVRA is to be bonded to previously placed concrete, prepare surfaces according to admixture manufacturer's instructions.
- B. Install vapor retarder under interior slabs-on-grade, per Section 03 05 05.

### **3.02 INSTALLATION**

- A. Dispense MVRA according to the mix design, and the supplier's written instructions.
- B. Add MVRA to concrete according to manufacturer's written instructions.
- C. Place and cure concrete as specified in Section 03 30 00.

### **3.03 FIELD QUALITY CONTROL**

- A. Inspections: For concrete containing WVRA admixture provide the following:
  - 1. Moisture Testing: Conducted by WVRA manufacturer or appointed representative before installation of moisture-sensitive coatings and adhesives. No other moisture testing by installers is required.
  - 2. Bond Testing: Conducted by WVRA manufacturer or appointed representative on moisture-sensitive materials installed by Contractor.
  - 3. Ph Testing: Conducted by WVRA manufacturer or appointed representative.
  - 4. Report test results in writing to Architect and Contractor within 48 hours of testing.
  - 5. Authorization to proceed with the installation of moisture-sensitive coatings and materials must be obtained in writing from the WVRA manufacturer.
- B. Defective Concrete: Concrete not complying with specified requirements.
  - 1. When test results indicate concrete does not comply with specified requirements, conduct additional tests as directed by Architect. The cost of additional testing shall be borne by the Contractor when defective concrete is identified.
  - 2. Repair or replacement of defective concrete will be determined by the Architect.

**END OF SECTION**

**SECTION 04 20 00  
UNIT MASONRY**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Concrete Masonry Units (CMUs)
- B. Mortar and grout.
- C. Reinforcing steel.
- D. Masonry joint reinforcement.
- E. Ties and anchors.
- F. Embedded flashing.
- G. Miscellaneous masonry accessories.
- H. Products installed, but not furnished, under this Section include the following:
  - 1. Steel lintels and shelf angles for unit masonry, furnished under Division 5 Section "Metal Fabrications."

**1.02 RELATED REQUIREMENTS**

- A. Section 03 30 00 - Cast-In-Place Concrete
- B. Section 04 72 00 - Cast Stone Masonry
- C. Section 04 73 00 - Manufactured Stone Veneer
- D. Section 07 27 26 - Fluid-Applied Membrane Air Barriers
- E. Section 07 62 00 - Sheet Metal Flashing and Trim
- F. Section 07 84 00 - Penetration Firestopping
- G. Section 08 11 13 - Hollow Metal Doors and Frames
- H. Section 09 90 00 - Painting and Coating

**1.03 DEFINITIONS**

- A. Reinforced Masonry: Masonry containing reinforcing steel in grouted cells.

**1.04 DESIGN AND PERFORMANCE CRITERIA**

- A. General Design Criteria:
  - 1. Building Code: 2018 IBC
  - 2. Occupancy Risk Category: II
- B. Wind-Resistance Design Criteria:
  - 1. Refer to the Structural Drawings for the following design criteria:
    - a. Basic Design Wind Speed,  $V_{ULT}$
    - b. Exposure Category
    - c. Surface Roughness
- C. Provide structural unit masonry that develops indicated net-area compressive strengths ( $f'm$ ) at 28 days.
  - 1. For Concrete Unit Masonry (CMU):  $f'm = 2800$  psi

**1.05 SUBMITTALS**

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: For the following:
  - 1. Masonry Units: Show sizes, profiles, coursing, and locations of special shapes.
  - 2. Reinforcing Steel: Detail bending and placement of unit masonry reinforcing bars. Comply with ACI 315, "Details and Detailing of Concrete Reinforcement."
  - 3. Fabricated Flashing: Detail corner units, end-dam units, and other special applications.
- C. Qualification Data: For testing agency.

- D. Material Certificates: Include statements of material properties indicating compliance with requirements including compliance with standards and type designations within standards. Provide for each type and size of the following:
  - 1. Masonry units.
    - a. Include material test reports substantiating compliance with requirements.
  - 2. Cementitious materials. Include brand, type, and name of the manufacturer.
  - 3. Pre-blended, dry mortar mixes. Include a description of the type and proportions of ingredients.
  - 4. Grout mixes. Include a description of the type and proportions of ingredients.
  - 5. Reinforcing bars.
  - 6. Joint reinforcement.
  - 7. Anchors, ties, and metal accessories.
- E. Mix Designs: For each type of mortar and grout. Include a description of the type and proportions of ingredients.
  - 1. Include test reports, per ASTM C780, for mortar mixes required to comply with property specifications.
  - 2. Include test reports, per ASTM C1019, for grout mixes required to comply with compressive strength requirement.
- F. Statement of Compressive Strength of Masonry: For each combination of masonry unit type and mortar type, provide a statement of average net-area compressive strength of masonry units, mortar type, and resulting net-area compressive strength of masonry determined according to Tables 1 and 2 in ACI 530.1/ASCE 6/TMS 602.
- G. Cold-Weather Procedures: Detailed description of methods, materials, and equipment to be used to comply with cold-weather requirements.

#### **1.06 QUALITY ASSURANCE**

- A. Testing Agency Qualifications: An independent agency qualified according to ASTM C1093 for testing indicated, as documented according to ASTM E 548.
- B. Source Limitations for Masonry Units: Obtain exposed masonry units of a uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, through one source from a single manufacturer for each product required.
- C. Source Limitations for Mortar Materials: Obtain mortar ingredients of uniform quality, including color for exposed masonry, from a single manufacturer for each cementitious component and from one source or producer for each aggregate.

#### **1.07 IN-PLACE (INCORPORATED) MOCKUP**

- A. Locate an in-place mock-up at a south-facing building corner, where directed by the Architect.
- B. Mock-up shall be full-thickness and of sufficient size to incorporate the following components:
  - 1. Provide the various types of masonry and mortar specified, installed over sheathing.
  - 2. Provide cavity insulation, masonry ties, anchorage devices, through-wall flashing, mortar netting, and weeps.
  - 3. Extend mockup to the first control joint from the building. Include a sealant-filled control joint at least 16 inches long in the mockup.
- C. Clean one-half of exposed faces of mockup with masonry cleaner.
- D. Approval of sample panels is for color, texture, and blending of masonry units; relationship of mortar and sealant colors to masonry unit colors; tooling of joints; aesthetic qualities of workmanship; and other material and construction qualities specifically approved by Architect in writing.
  - 1. Approval of sample panels does not constitute approval of deviations from the Contract Documents contained in sample panels unless such deviations are specifically approved by Architect in writing.
- E. Mock-up may remain as part of the Work.

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

- A. Store masonry units on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied. If units become wet, do not install until they are dry.
- B. Store cementitious materials on elevated platforms, undercover, and in a dry location. Do not use cementitious materials that have become damp.
- C. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.
- D. Deliver pre-blended, dry mortar mix in moisture-resistant containers designed for lifting and emptying into dispensing silo. Store preblended, dry mortar mix in delivery containers on elevated platforms, undercover, and in a dry location or a metal dispensing silo with a weatherproof cover.
- E. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

### **1.09 PROJECT CONDITIONS**

- A. Protection of Masonry: During construction, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress.
  - 1. Extend cover a minimum of 24 inches down both sides and hold the cover securely in place.
- B. Provide shoring as required by Code or Local Authorities.
- C. Brace all walls as required.
- D. Do not apply uniform floor or roof loads for at least 12 hours and concentrated loads for at least 3 days after building masonry walls or columns.
- E. Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or painted. Immediately remove grout, mortar, and soil that come in contact with such masonry.
- F. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with cold-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.
  - 1. Cold-Weather Cleaning: Use liquid cleaning methods only when the air temperature is 40 deg F and above and will remain so until masonry has dried, but not less than 7 days after completing cleaning.
- G. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.

## **PART 2 PRODUCTS**

### **2.01 MANUFACTURERS**

- A. Subject to compliance with the Contract Documents, provide products of the manufacturers named for each product type specified in this Section.
  - 1. Products of other manufacturers with equivalent products to the manufacturers listed will be considered in accordance with the "or equal" provision specified in Division 01 "Product Requirements".
    - a. Product Substitutions: Comply with the requirements specified in Division 01 "Substitution Procedures".

### **2.02 MASONRY UNITS, GENERAL**

- A. Masonry Standard: Comply with TMS 602, except as modified by requirements in the Contract Documents.
- B. Defective Units: Referenced masonry unit standards may allow a certain percentage of units to exceed tolerances and to contain chips, cracks, or other defects exceeding limits stated in the

standard. Do not use units where such defects are exposed in the completed Work or will impair the quality of completed masonry.

### 2.03 CONCRETE MASONRY UNITS (CMU)

- A. Shapes: Provide shapes indicated and as follows:
  - 1. Provide special shapes for lintels, corners, jambs, sashes, movement joints, headers, bonding, and other special conditions.
- B. Integral Water Repellent: Liquid polymeric, integral water-repellent admixture that does not reduce flexural bond strength. Units made with integral water repellent, when tested as a wall assembly made with mortar containing integral water-repellent manufacturer's mortar additive according to ASTM E514/E514M, with test period extended to 24 hours, show no visible water or leaks on the back of test specimen.
  - 1. Manufacturer/ Products:
    - a. Euclid Chemical Company (RPM); "Eucon Blocktite Admixture"
    - b. "RainBloc" by ACM Chemistries, Inc.
    - c. Addiment Incorporated; Block Plus W-10.
    - d. W.R. Grace Construction Products; "Dry-Block Admixture"
    - e. Master Builders, Inc.; Rheopel Plus

### 2.04 FACE BRICK

- A. General:
  - 1. Efflorescence: Provide brick that has been tested according to ASTM C67/C67M and is rated "not effloresced."
  - 2. Size (Actual Dimensions):
    - a. Modular: 7 5/8-inches long by 2 1/4-inches high by 3 5/8-inches deep.
    - b. Utility: 11 5/8-inches long by 3 5/8-inches high by 3 5/8-inches deep.
    - c. Norman: 11 5/8-inches long by 2 1/4-inches high by 3 5/8-inches deep.
    - d. Monarch: 15 5/8-inches long by 3 5/8-inches high by 3 5/8-inches deep.
    - e. Ambassador: 15 5/8-inches long by 2 1/4-inches high by 3 5/8-inches deep.
- B. Face Brick, designated in the Drawings as Brick Type FB- #
- C. Brick Type FB-1:
  - 1. Manufacturer: Glen-Gery, no substitutions.
  - 2. Color: Pear River Ironspot
  - 3. Size: Modular
  - 4. Style: Extruded
  - 5. Texture/Finish: Smooth
  - 6. Coursing: Running bond
  - 7. Compliance: ASTM C216, Type FBS
- D. Brick Type FB-2:
  - 1. Manufacturer: Endicott, no substitutions.
  - 2. Color: Manganese Ironspot
  - 3. Size: Modular
  - 4. Style: Extruded
  - 5. Texture/Finish: Smooth
  - 6. Coursing: Running bond
  - 7. Compliance: ASTM C216, Type FBS

### 2.05 MORTAR

- A. Mortar for use in masonry construction shall conform to Articles 2.1 and 2.6 A of TMS 602.
- B. Manufacturer:
  - 1. Specified Manufacturer: Amerimix Companies
    - a. Other Acceptable Manufacturer: Equivalent products of the manufacturers listed below will be acceptable.
      - 1) SPEC MIX®

- 2) The QUIKRETE Companies
  - 3) Sakrete
  - b. Products of other manufacturers with equivalent products to the manufacturers listed will be considered in accordance with the "or equal" provision specified in Division 01 "Product Requirements".
- C. Mortar Materials:
1. Portland Cement: ASTM C150/C150M, Type I.
    - a. Not more than 0.60-percent alkali.
    - b. Provide natural color or white cement as required to produce the mortar color indicated.
  2. Hydrated Lime: ASTM C207, Type S.
  3. Portland Cement-Lime Mix: A packaged blend of portland cement and hydrated lime containing no other ingredients.
  4. Masonry Cement: ASTM C91/C91M.
  5. Mortar Cement: ASTM C1329/C1329M.
  6. Mortar Aggregate: ASTM C144.
  7. Grout Aggregate: ASTM C404.
  8. Water shall be clean and free from deleterious amounts of acids, alkalis, or organic material.
  9. Sand shall be clean, natural sand conforming to ASTM C144, Loam content not to exceed 5% by volume.
- D. Pre-Blended, Water Repellent Mortar for Unit Masonry: Factory blend of portland cement, hydrated lime, dried sand, water repellent, and proprietary admixtures; complying with ASTM C387/C387M and capable of producing mortar of the specified strength in accordance with ASTM C270 with the addition of water only.
1. Product: "AMX 410 WRM" as manufactured by Amerimix Companies (Oldcastle).
    - a. Description: Water-repellent mortar for use with water repellent masonry units.
    - b. Type: Type N, Type S, or Type M as scheduled in this Section.
    - c. Pigment: Standard pigment color; compliant with ASTM C979/C979M
      - 1) Color: Standard gray.

## 2.06 GROUT

- A. Grout shall comply with Article 2.2 of TMS 602.
- B. Packaged Dry Material for Grout for Masonry: Premixed cementitious materials and dried aggregates; capable of producing grout of the specified strength in accordance with ASTM C476 with the addition of water only.
  1. Product: Amerimix; "AMX 600CG Pre-Blended Core Fill Grout - Coarse"
    - a. Type: Coarse.
    - b. Compliance:
      - 1) Meets or exceed ASTM C476
      - 2) Meets ACI 530 (Table 7) code and ICC requirements for masonry grout.
  2. Grout must achieve a minimum compressive strength of 2000 psi at the 28-day test.
  3. Slump Range: 8 to 10 inches.

## 2.07 REINFORCED MASONRY

- A. Reinforcing Steel: ASTM A615/A615M, Grade 60 (60,000 psi) (420 MPa), deformed billet bars; uncoated
  1. Rebar Positioners: For wall width as required in the hot-dipped galvanized finish (1.50 oz., p.s.f.) per ASTM A153/A153M - Class B-2.
    - a. Vertical Reinforcement: Hohmann & Barnard 'RB' Rebar Positioners.
    - b. Horizontal Reinforcement: Dur-o-Wall #DA-812, or approved equal.

## 2.08 JOINT REINFORCEMENT AND ANCHORAGE

- A. Manufacturers:
  1. Specified Manufacturer: Hohmann & Barnard, Inc (H-B)

- a. Other Acceptable Manufacturer: Equivalent products of the manufacturers listed below will be acceptable.
    - 1) Blok-Lok Limited .
    - 2) AA Wire Products.
    - 3) Wire-Bond.
    - 4) National Wire Products Corp.
  - b. Products of other manufacturers with equivalent products to the manufacturers listed will be considered in accordance with the "or equal" provision specified in Division 01 "Product Requirements".
    - 1) Product Substitutions: Comply with the requirements specified in Division 01 "Substitution Procedures".
- B. Single-Wythe Masonry Wall Joint Reinforcement:
1. Ladder type:
    - a. Steel Wire: ASTM A1064/A1064M steel wire, mill galvanized to 16 CFR 1201 Class 3; width as required to provide not more than 1 inch (25 mm) and not less than 1/2 inch (13 mm) of mortar coverage on each exposure.
    - b. Application: Masonry walls with vertical reinforcement.
    - c. Product: H-B; #220 Ladder Mesh Reinforcement.
      - 1) Provide pre-fabricated corners and tees.
  2. Truss type;
    - a. Steel Wire: ASTM A1064/A1064M steel wire, mill galvanized to 16 CFR 1201 Class 3; width as required to provide not more than 1 inch (25 mm) and not less than 1/2 inch (13 mm) of mortar coverage on each exposure.
    - b. Application: Masonry walls without vertical reinforcement.
    - c. Product: H-B; #120 Truss Mesh Reinforcement.
      - 1) Provide pre-fabricated corners and tees.
- C. Two-Piece Wall Ties: Formed steel wire, 0.1875 inch (4.8 mm) thick, adjustable, eye and pintle type, hot dip galvanized to ASTM A 153/A 153M, Class B, sized to provide not more than 1 inch (25 mm) and not less than 1/2 inch (13 mm) of mortar coverage from masonry face and to allow vertical adjustment of up to 1-1/4 in (32 mm).
1. Product: H-B; #HB-213-2X Adjustable Veneer Anchor.

## 2.09 EMBEDDED FLASHING MATERIALS

- A. Specified Manufacturer: Hohmann & Barnard, Inc. (H-B) (P: 800-645-0616 / Web: www.h-b.com)
1. Products of unnamed manufacturers with equivalent products to the specified manufacturer will be considered in accordance with the "or equal" provision specified in Division 01 "Product Requirements".
    - a. Product Substitutions: Comply with the requirements specified in Division 01 "Substitution Procedures"
- B. Membrane Flexible Flashing:
1. Product: H-B; TeXtrophlash Flashing, Thru-Wall/Surface-Mount Flashing.
    - a. Self-adhered Flashing Membrane with Stainless Steel Drip Plate: Standard type, elastomeric, and thermal plastic polymers combined with Dupont Elvaloy, reinforced with synthetic fibers and calendared into 40 mil thick sheets with adhesive.
      - 1) Width: 20".
      - 2) Color: White.
      - 3) Properties:
        - (a) Elongation: ASTM D412; 225 percent, minimum.
        - (b) Tensile Strength: ASTM D412; 875 psi, minimum.
        - (c) Tear Strength: ASTM D624; 270 psi.
        - (d) Low Temperature Flexibility: ASTM D146; minus 25 degrees F Pass.
        - (e) Water Absorption: ASTM D471; Less than 0.1 percent.
        - (f) Compatible with Urethane and Silicone sealant
        - (g) UV Stable

- C. Accessories
  - 1. Primer: Primer-SA Hohmann & Barnard's Water-Based Primer for Self-Adhering Flashing.
  - 2. Sealant: HB SEALANT, a moisture-curing polyether sealant, used for lapping and sealing flashings, drip edges, terminations, and end dams.
  - 3. Membrane Adhesive: Self Adhered.
  - 4. Termination Bar: H-B T-2 Termination Bar: A Stainless Steel termination bar used at top of flashing to mechanically secure it to backup, 26 ga. x 1 1/2" x 8' long. Has a 3/8" flange on top for caulking.
  - 5. Drip Edge: H-B Drip Plate: A Polymeric, Stainless Steel drip plate with Foam-Tite Seal and Flash-Adhere Adhesive Strip in 3" width.
- D. Adhesives, Primers, and Seam Tapes for Flashings: Flashing manufacturer's standard products or products recommended by flashing manufacturer for bonding flashing sheets to each other and substrates.

## 2.10 MISCELLANEOUS MASONRY ACCESSORIES

- A. Specified Manufacturer: Hohmann & Barnard, Inc (H-B) (Contact: P: 800-645-0616 / Web: [www.h-b.com](http://www.h-b.com))
  - 1. Products of other manufacturers with equivalent products to the manufacturers listed will be considered in accordance with the "or equal" provision specified in Division 01 "Product Requirements".
    - a. Product Substitutions: Comply with the requirements specified in Division 01 "Substitution Procedures".
- B. Compressible Filler (Soft Joints): 3/8-inch thick closed-cell Neoprene Sponge conforming to ASTM D1056, Grade 2A-1.
  - 1. Widths as required.
  - 2. Product: H-B Model 'NS - Closed Cell Neoprene Sponge'.
- C. Bond-Breaker Strips: Asphalt-saturated felt complying with ASTM D226/D226M, Type I (No. 15 asphalt felt).

## 2.11 CAVITY PROTECTION

- A. Manufacturer:
  - 1. Specified Manufacturer: Mortar Net Solutions (Contact: P: 800-664-6638 / Web: [www.mortarnet.com](http://www.mortarnet.com))
  - 2. Other Acceptable Manufacturer: Equivalent products of the manufacturers listed below will be acceptable.
    - a. Advanced Building Products, Inc.
    - b. CavClear/ Archovations, Inc.
    - c. Dayton Superior Corporation.
  - 3. Products of other manufacturers with equivalent products to the manufacturers listed will be considered in accordance with the "or equal" provision specified in Division 01 "Product Requirements".
    - a. Product Substitutions: Comply with the requirements specified in Division 01 "Substitution Procedures".
- B. Cavity Protection: Semi-rigid polyethylene or polyester mesh panels, sized to the thickness of wall cavity, and designed to prevent mortar droppings from clogging weeps and cavity vents and allow proper cavity drainage.
  - 1. Product: MortarNet™ with Insect Barrier™.
    - a. Type: Polyester mesh, 90-percent open.
    - b. Configuration: Strips, full-depth of cavity and 10-inches high, with dovetail-shaped notches 7-inches deep.
- C. Weeps:
  - 1. Product: Mortar Net; WeepVent™
  - 2. Type: UV stable polyester mesh, rectangular shape, inserted in brick cavity wall open head joint.

3. Size: 2 5/8-inches by 3 1/2-inches by 1/2-inch.
  4. Color: Selected from manufacturer's full line.
- D. Termination Bars: Stainless steel; compatible with membrane and adhesives.
- E. Lap Sealants and Tapes: As recommended by flashing manufacturer; compatible with membrane and adhesives.

## 2.12 CAVITY CONTINUOUS INSULATION

- A. Specified Manufacturer: Owens Corning.
1. Other acceptable manufacturers with equivalent products to the specified manufacturer shall include:
    - a. Diversifoam Products.
    - b. Dow Chemical.
  2. Products of other unnamed manufacturers with equivalent products to the specified manufacturer will be considered in accordance with the "or equal" provision specified in Division 01 "Product Requirements".
    - a. Product Substitutions: Comply with the requirements specified in Division 01 "Substitution Procedures"
- B. Product: Owens Corning; FOAMULAR® 250, Extruded polystyrene (XPS) rigid board insulation.
1. Standards:
    - a. Type Classification: ASTM C578, Type IV
    - b. UL Classification Certificate U-197
  2. Board Thickness: As required to achieve R-value required by the 2018 IECC for continuous insulation (ci):
    - a. 2-inches thick by 16-inches wide.
    - b. Continuous Cavity Wall Insulation: R 7.5
  3. Board Size: 48 by 96 inch (1220 by 2440 mm).
  4. Board Edges: Square.
  5. Physical Properties:
    - a. Flame Spread Index (ASTM E84): 5.
    - b. Smoke Developed Index (ASTM E84): 45-175.
    - c. Fire Propagation Characteristics: Passes NFPA 285 testing as part of an approved assembly.
    - d. Compressive Strength (ASTM D1621): 25 psi (173 kPa), minimum.
    - e. Thermal Resistance: R-value (RSI-value); 1 inch (25 mm) of material = R 5.0 (0.88) at 75 degrees F (24 degrees C) mean temperature.
    - f. Water Absorption, Maximum (ASTM C272/C272M): 0.10-percent, by volume.
    - g. Water Vapor Permeance (ASTM E96/E96M): 1.5 perms, maximum.

## 2.13 MASONRY CLEANERS

- A. Manufacturer/ Products: Subject to compliance with the Contract Documents, products of the manufacturers listed below will be acceptable.
1. ProSoCo.
  2. Sure Klean.
  3. Diedrich Technologies, Inc.
- B. Proprietary Acidic Cleaner: Manufacturer's standard-strength cleaner designed for removing mortar/grout stains, efflorescence, and other new construction stains from new masonry without discoloring or damaging masonry surfaces. Use product expressly approved for intended use by cleaner manufacturer and manufacturer of masonry units being cleaned.

## 2.14 MORTAR AND GROUT MIXES

- A. Do not lower the freezing point of mortar by use of admixtures or anti-freeze agents.
- B. Do not use calcium chloride in mortar or grout.
1. Add cold-weather admixture (if used) at the same rate for all mortar, regardless of weather conditions, to ensure that mortar color is consistent.

- C. Mortar for Unit Masonry: Comply with ASTM C270, Proportion, except limit materials to those specified herein, and limit cement/lime ratio (by volume) as follows:
  - 1. Type S: 1/2-part lime per part of portland cement (94# cement: 20# lime). Use Type S for masonry below grade on/in contact with the earth.
  - 2. Type N: 1-1/4 parts lime per part of portland cement (94# cement: 50# lime). Use Type N for masonry above grade.
  - 3. Preblended, Dry Mortar Mix: Furnish dry mortar ingredients in the form of a preblended mix. Measure quantities by weight to ensure accurate proportions, and thoroughly blend ingredients before delivering to project site.
- D. Grout for Unit Masonry: Comply with ASTM C476
  - 1. Use grout of type indicated or, if not otherwise indicated, of type (fine or coarse) that will comply with TMS 602/ACI 530.1/ASCE 6 for dimensions of grout spaces and pour height.
  - 2. Proportion grout in accordance with ASTM C476.
  - 3. Provide grout with a slump of 8- to 11-inches (200 to 280 mm) as measured in accordance with ASTM C143/C143M.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Verify that field conditions are acceptable and are ready to receive masonry.
- B. Verify that related items provided under other sections are properly sized and located.
- C. Verify that built-in items are in the proper location, and ready for roughing into masonry work.

#### **3.02 PREPARATION**

- A. Direct and coordinate placement of metal anchors supplied for installation under other sections.
- B. Provide temporary bracing during installation of masonry work. Maintain in place until the building structure provides permanent bracing.

#### **3.03 COLD AND HOT WEATHER REQUIREMENTS**

- A. Comply with requirements of TMS 402/602 or applicable building code, whichever is more stringent.

#### **3.04 COURSING**

- A. Establish lines, levels, and coursing indicated. Protect from displacement.
- B. Maintain masonry courses to uniform dimensions. Form vertical and horizontal joints of uniform thickness.
- C. Concrete Masonry Units:
  - 1. Bond: Running.
  - 2. Coursing: One unit and one mortar joint to equal 8 inches (200 mm).
  - 3. Mortar Joints: Concave.

#### **3.05 PLACING AND BONDING**

- A. Lay solid masonry units in a full bed of mortar, with full head joints, uniformly jointed with other work.
- B. Lay hollow masonry units with face shell bedding on head and bed joints.
- C. Buttering corners of joints or excessive furrowing of mortar joints are not permitted.
- D. Remove excess mortar and mortar smears as work progresses.
- E. Remove excess mortar with water repellent admixture promptly. Do not use acids, sandblasting, or high-pressure cleaning methods.
- F. Interlock intersections and external corners.
- G. Perform job site cutting of masonry units with proper tools to provide straight, clean, unchipped edges. Prevent broken masonry unit corners or edges.
- H. Cut mortar joints flush where wall tile is scheduled or resilient base is scheduled.

- I. Isolate masonry partitions from vertical structural framing members with a control joint as indicated.
- J. Isolate top joint of masonry partitions from horizontal structural framing members and slabs or decks with compressible joint filler.

### **3.06 WEEPS**

- A. Install weeps in veneer walls at 24 inches (600 mm) on center horizontally on top of through-wall flashing at bottom of walls.
- B. Install cavity vents in veneer and cavity walls at 32 inches (800 mm) on center horizontally below shelf angles and lintels and near top of walls.

### **3.07 CAVITY MORTAR CONTROL**

- A. Do not permit mortar to drop or accumulate into cavity air space or to plug weep/cavity vents.
- B. For cavity walls, build inner wythe ahead of outer wythe to accommodate accessories.
- C. Install cavity mortar control panels continuously throughout the full height of exterior masonry cavities during construction of exterior wythe, complying with manufacturer's installation instructions.
- D. Install cavity mortar diverter at the base of the cavity and at other flashing locations as recommended by the manufacturer to prevent mortar droppings from blocking weep/cavity vents.

### **3.08 REINFORCEMENT AND ANCHORAGE - MASONRY VENEER**

- A. Stud Back-Up: Secure veneer anchors to stud framed back-up and embed into masonry veneer at maximum 1.77 sq ft (0.16 sq m) of wall surface per anchor. Place additional anchors at the perimeter of openings and ends of panels, so the maximum spacing of anchors is 8 inches (200 mm) on-center.
- B. Seismic Reinforcement: Connect veneer anchors with continuous horizontal wire reinforcement before embedding anchors in mortar.

### **3.09 MASONRY FLASHINGS**

- A. Install masonry flashing to divert water to the exterior at all locations where the downward flow of water will be interrupted.
- B. Terminate flashing up 8 inches (203 mm) minimum on the vertical surface of backing:
  - 1. Install vertical leg of flashing over fluid-applied or self-adhered air/vapor barriers over backing or per manufacturer's directions.
  - 2. Terminate vertical leg of flashing into bed joint in masonry or reglet in concrete.
  - 3. Anchor vertical leg of flashing into the backing with a termination bar and sealant.
  - 4. Apply a cap bead of sealant on the top edge of the self-adhered flashing.
- C. Install flashing following manufacturer's instructions and BIA Technical Notes No. 7.
- D. Extend metal flashings through the exterior face of masonry and terminate in an angled drip with hemmed edge. Install joint sealer below drip edge to prevent moisture migration under the flashing.
- E. Support flexible flashings across gaps and openings.
- F. Lap end joints of flashings at least 6 inches (152 mm), minimum, and seal watertight with flashing sealant/adhesive.

### **3.10 CONTROL AND EXPANSION JOINTS**

- A. Do not continue horizontal joint reinforcement through control or expansion joints.
- B. Install preformed control joint device in continuous lengths. Seal butt and corner joints following the manufacturer's instructions.
- C. Vertical joints in masonry shall be [3/8] inch ([\_\_\_\_\_] mm) wide, the full height of the wall. Coordinate joint locations with the Architect. Maximum spacing = 25-feet.
- D. Form expansion joint as detailed on drawings.

### **3.11 TOLERANCES**

- A. Install masonry within the site tolerances found in the current edition of TMS 402/602.

### **3.12 CUTTING AND FITTING**

- A. Cut and fit for pipes, conduit, and sleeves, etc. Coordinate with other sections of work to provide the correct size, shape, and location.
- B. Obtain approval before cutting or fitting masonry work not indicated or where the appearance or strength of masonry work may be impaired.

### **3.13 FIELD QUALITY CONTROL**

- A. An independent testing agency will perform field quality control tests.
  - 1. Concrete Masonry Unit Tests: Test each variety of concrete unit masonry following ASTM C140/C140M for compliance with the requirements of this specification.
  - 2. Mortar Tests: Test each type of mortar following ASTM C780, testing with the same frequency as masonry samples.

### **3.14 CLEANING**

- A. Remove excess mortar and mortar droppings.
- B. Replace defective mortar. Match adjacent work.
- C. Clean soiled surfaces with a cleaning solution.
- D. Use non-metallic tools in cleaning operations.

### **3.15 PROTECTION**

- A. Without damaging completed work, provide protective boards at exposed external corners that are subject to damage by construction activities.

**END OF SECTION**

**SECTION 04 72 00  
CAST STONE MASONRY**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Architectural cast stone units, including trim, ornamentation, and facings.

**1.02 RELATED REQUIREMENTS**

- A. Section 04 72 00 - Cast Stone Masonry
- B. Section 04 73 13 - Calcium Silicate Masonry Unit Veneer
- C. Section 05 40 00 - Cold-Formed Metal Framing
- D. Section 06 16 00 - Glass-Mat Gypsum Sheathing
- E. Section 07 25 00 - Weather-Resistant Barriers (WRB)
- F. Section 07 27 26 - Fluid-Applied Membrane Air Barriers
- G. Section 07 62 00 - Sheet Metal Flashing and Trim
- H. Section 07 92 00 - Joint Sealants

**1.03 REFERENCE STANDARDS**

- A. ACI 318 - Building Code Requirements for Structural Concrete.
- B. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
- C. ASTM C33/C33M - Standard Specification for Concrete Aggregates.
- D. ASTM C150/C150M - Standard Specification for Portland Cement.
- E. ASTM C270 - Standard Specification for Mortar for Unit Masonry.
- F. ASTM C494/C494M - Standard Specification for Chemical Admixtures for Concrete.
- G. ASTM C1364 - Standard Specification for Architectural Cast Stone.

**1.04 SUBMITTALS**

- A. See Section 01 33 00, for submittal procedures.
- B. Product Data: For each type of product indicated. Include dimensions and finishes.
- C. Shop Drawings: Include elevations, dimensions, layouts, profiles, cross sections, reinforcement, exposed faces, arrangement of joints, anchoring methods, anchors, and piece numbers.
- D. Mortar Color Selection Samples.
- E. Verification Samples: Pieces of actual cast stone components not less than 6 inches (152 mm) square, illustrating range of color and texture to be anticipated in components furnished for the project.
- F. Source Quality Control Test Reports.
- G. Manufacturer's Qualification Data: Documentation showing compliance with specified requirements.

**1.05 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: A qualified manufacturer of cast stone units similar to those indicated for this Project, that has sufficient production capacity to manufacture required units, and is a plant certified by the Cast Stone Institute.

**1.06 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver cast stone components secured to shipping pallets and protected from damage and discoloration. Protect corners from damage.
- B. Number each piece individually to match shop drawings and schedule.

- C. Store cast stone components and installation materials in accordance with manufacturer's instructions.
- D. Store cast stone components on pallets with nonstaining, waterproof covers. Ventilate under covers to prevent condensation. Prevent contact with dirt.
- E. Protect cast stone components during handling and installation to prevent chipping, cracking, or other damage.
- F. Store mortar materials where contamination can be avoided.
- G. Schedule and coordinate production and delivery of cast stone components with unit masonry work to optimize on-site inventory and to avoid delaying the work.

### **1.07 WARRANTY**

- A. Special Extended Warranty - Time: Manufacturer shall warrant the products specified in this Section against material defects or defects in manufacturing, for a period of ten (10) years from the Date of Substantial Completion.
- B. Installation Warranty: The installing subcontractor shall warrant the installation to be free of defects in material and workmanship for a period of one (1) year from the Date of Substantial Completion.

## **PART 2 PRODUCTS**

### **2.01 MANUFACTURER**

- A. Specified Manufacturer: Arriscraft International
  - 1. Substitutions: Not permitted

### **2.02 MATERIALS**

- A. Portland Cement: ASTM C150/C150M, Type I or III, white and/or gray.
- B. Coarse Aggregate: ASTM C33/C33M, except for gradation.
- C. Fine Aggregate: Manufactured or natural sands, to ASTM C33/C33M, except for gradation.
- D. Pigments: ASTM C979, inorganic iron oxides; do not use carbon black.
- E. Retarding, Accelerating, and High-Range Admixtures: ASTM C494/C494M, Types A-G
- F. Water Repellents and Other Chemical Admixtures: previously established as suitable for use in concrete by proven field performance or through laboratory testing.
- G. Dark Mineral Admixtures: to ASTM C618
- H. Water: Potable.

### **2.03 COMPONENTS**

- A. Basis of Design: Arriscraft; "Arris-Cast", as manufactured by Arriscraft International, or equivalent.
  - 1. Description: Architectural concrete product manufactured to simulate appearance of natural granite, complying with ASTM C1364, such that units are suitable for use at or below grade.
  - 2. Texture: Smooth finish on exposed faces and ends.
  - 3. Color: Limestone
  - 4. Bed Depth: 3-5/8 inches, unless indicated otherwise.
- B. Physical Properties:
  - 1. Compressive Strength (ASTM C1194): Maximum 6,500 psi at 28 days
  - 2. Absorption (ASTM C1195): Less than 6.0% percent at 28 days.
- C. Shapes: Provide shapes indicated on drawings, including:
  - 1. Wall Cap:
    - a. Location: Monument Sign.
    - b. Size: As indicated in the drawings
    - c. Provide a minimum slope of 1:12 on horizontal surfaces.

- d. Provide drips on projecting components, wherever possible.
- e. Provide finished ends where ends are exposed.
2. Window Sills:
  - a. Locations: As indicated in the drawings
  - b. Profile: As indicated in the drawings
  - c. Provide a minimum slope of 1:12 on horizontal surfaces.
  - d. Provide drips on projecting components, wherever possible.
  - e. Provide finished ends where ends are exposed.
  - f. Provide built-in raised fillets at the back (and ends) of window sills.
3. Accent Bands/Water Tables:
  - a. Locations: As indicated in the drawings
  - b. Profile: As indicated in the drawings
  - c. Provide a minimum slope of 1:12 on horizontal surfaces.
  - d. Provide drips on projecting components, wherever possible.
  - e. Provide mitered ends at inside and outside corners
- D. Mortar: Portland cement-hydrated lime-sand mix, Type N to ASTM C270
- E. Grout: Maximum 6,500 psi at 28 days
- F. Embedded Anchors, Dowels, and Inserts: Type 304 stainless steel, of type and size as required for conditions.
- G. Cleaner: General-purpose cleaner designed for removing mortar and grout stains, efflorescence, and other construction stains from new masonry surfaces without discoloring or damaging masonry surfaces; approved for intended use by cast stone manufacturer and by cleaner manufacturer for use on cast stone and adjacent masonry materials.
- H. Reinforcement: Provide reinforcement as required to withstand handling and structural stresses; comply with ACI 318.
  1. Provide full-length two-way reinforcement for pieces more than 24 inches (610 mm) in any dimension.
- I. Sealants: Refer to Section 07 92 00.

#### **2.04 FABRICATION**

- A. Fabricate cast stone masonry units to sizes and profiles as indicated on Drawings.
- B. Fabricate units using the Vibrant Dry Tamp Casting method.
- C. Do not use dark mineral admixtures in surfaces intended to be exposed to view
- D. Steam cure cast stone units at a minimum temperature of 104 degrees F for a minimum of 10 hours at 100% humidity.

#### **2.05 TOLERANCES**

- A. Cross Section Dimensions: Plus or minus 1/8 inch from approved dimensions.
- B. Length of Units: No more than L/360 or plus or minus 1/8 inch, whichever is greater, maximum plus or minus 1/4 inch.
- C. Maximum Length of any Unit: Maximum 15 times the average thickness of the unit.
- D. Warp, Bow, or Twist of Units: Maximum L/360 or plus or minus 1/8 inch, whichever is greater.
- E. Location of Dowel Holes, Anchor Slots, Flashing Grooves, False Joints: maximum deviation as follows:
  1. On Formed Sides of Unit: 1/8 inch,
  2. On Unformed Sides of Unit: 3/8 inch.

#### **2.06 FINISHES**

- A. Exposed Surfaces: fine-grained texture similar to natural stone, color as specified, free of cracks, chips, or other defects that would affect the strength or serviceability of the unit or become exposed once installed and visible when viewed from a distance of not less than 15 feet under diffused light.

## **2.07 SOURCE QUALITY CONTROL**

- A. Test compressive strength and absorption of specimens selected at random from plant production to ASTM C1194 and ASTM C1195
  - 1. Test samples taken from every 500 cubic feet of product produced.
  - 2. Test new and existing mix designs for strength and absorption compliance before producing units.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify site conditions are ready to receive work.
- B. Inspect materials for fit and finish before installation. Do not set unacceptable units.
- C. Beginning of installation means acceptance of existing conditions.

### **3.02 INSTALLATION**

- A. Install in accordance with manufacturer's instructions.
- B. Setting:
  - 1. Drench cast stone components with clear, running water immediately before installation.
  - 2. Set units in a full bed of mortar unless otherwise indicated.
  - 3. Fill vertical joints with mortar.
  - 4. Fill dowel holes and anchor slots with mortar or non-shrink grout.
  - 5. Maintain 3/8 inch wide joints.
  - 6. Leave joints with exposed tops or under relieving angles open for sealant.
  - 7. Leave head joints in copings and projecting components open for sealant.
  - 8. Rake mortar joints 3/4 inch for pointing or sealing.
  - 9. Remove excess mortar from unit faces immediately after setting.
  - 10. Tuckpoint unit joints to a slight concave profile, except those designated to receive joint sealant.
  - 11. Seal remaining joints with backer rod and joint sealant.

### **3.03 SITE TOLERANCES**

- A. Variation in Alignment from Unit to Adjacent Unit: 1/16 inch maximum.
- B. Variation of Mortar Joint Thickness: 1/8 inch every 3 feet.

### **3.04 FIELD QUALITY CONTROL**

- A. Perform inspection and testing as specified in Section 01 45 00
- B. Test one randomly selected sample from the field for each 500 cubic feet delivered to the job site. Verify compliance with the following:
  - 1. Three field cut cube specimens from each of these samples shall have an average minimum compressive strength of not less than 85 percent with no single specimen testing less than 75 percent of design strength as allowed by ACI 318.
  - 2. Three field cut cube specimens from each of these samples shall have an average maximum cold-water absorption of 6 percent.

### **3.05 REPAIR**

- A. Repair chips and other surface damage that is noticeable when viewed in direct daylight at 20 feet (6 m).
- B. Repair with matching touch-up material provided by the manufacturer and in accordance with manufacturer's instructions.
- C. Repair methods and results subject to Architect 's approval.

### **3.06 CLEANING**

- A. Clean completed exposed cast stone after mortar is thoroughly set and cured.
  - 1. Wet surfaces with water before applying cleaner.
  - 2. Apply cleaner to cast stone in accordance with manufacturer's instructions.

3. Remove cleaner promptly by rinsing thoroughly with clear water.
4. Do not use acidic cleaners.

**3.07 PROTECTION**

- A. Protect completed work from damage.
- B. Clean, repair, or restore damaged or mortar-splashed work to condition of new work.

**END OF SECTION**

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

**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 SECTION INCLUDES**

- A. Structural steel.
- B. Grout.

**1.03 RELATED REQUIREMENTS**

- A. Section 05 21 00 - Steel Joist Framing.
- B. Section 05 31 00 - Steel Decking
- C. Section 05 40 00 - Cold-Formed Metal Framing
- D. Section 05 50 00 - Metal Fabrications

**1.04 REFERENCES**

- A. AISC 303 - Code of Standard Practice for Steel Buildings and Bridges; 2016.
- B. AISC 341 - Seismic Provisions for Structural Steel Buildings; 2016.
- C. AISC 360 - Specification for Structural Steel Buildings; 2010.
- D. ASTM A325 - Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength; 2014.
- E. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2014.
- F. ASTM A490 - Standard Specification for Structural Bolts, Alloy Steel, Heat Treated, 150 ksi Minimum Tensile Strength; 2014a.
- G. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2018.
- H. ASTM A108 - Standard Specification for Steel Bar, Carbon and Alloy, Cold Finished; 2018.
- I. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.
- J. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes; 2013.
- K. ASTM A563 - Standard Specification for Carbon and Alloy Steel Nuts; 2015.
- L. ASTM A563M - Standard Specification for Carbon and Alloy Steel Nuts (Metric); 2007 (Reapproved 2013).
- M. ASTM A572/A572M - Standard Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel; 2018.
- N. ASTM A992/A992M - Standard Specification for Structural Steel Shapes; 2011 (Reapproved 2015).
- O. ASTM C1107/C1107M - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink); 2017.
- P. ASTM F1852 - Standard Specification for "Twist Off" Type Tension Control Structural Bolt/Nut/Washer Assemblies, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength; 2011.
- Q. ASTM F959/F959M - Standard Specification for Compressible-Washer-Type Direct Tension Indicators for Use with Structural Fasteners, Inch and Metric Series; 2017a.

- R. ASTM F1554 - Standard Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength; 2018.
- S. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2015, with Errata (2016).
- T. SSPC-SP 1 - Solvent Cleaning; 2015.
- U. SSPC-SP 2 - Hand Tool Cleaning; 1982 (Ed. 2004).

#### 1.05 DEFINITIONS

- A. Structural Steel: Elements of structural-steel frame, as classified by AISC 303, "Code of Standard Practice for Steel Buildings and Bridges."
- B. Heavy Sections: Rolled and built-up sections as follows:
  - 1. Shapes included in ASTM A 6/A 6M with flanges thicker than 1-1/2 inches (38 mm).
  - 2. Welded built-up members with plates thicker than 2 inches (50 mm).
  - 3. Column base plates thicker than 2 inches (50 mm).

#### 1.06 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: Show fabrication of structural-steel components.
  - 1. Include details of cuts, connections, splices, camber, holes, and other pertinent data.
  - 2. Include embedment drawings.
  - 3. Indicate welds by standard AWS symbols, distinguishing between shop and field welds, and show size, length, and type of each weld. Show backing bars that are to be removed and supplemental fillet welds where backing bars are to remain.
  - 4. Indicate type, size, and length of bolts, distinguishing between shop and field bolts. Identify pretensioned and slip-critical high-strength bolted connections.
  - 5. For structural-steel connections indicated to comply with design loads, include structural design data signed and sealed by the qualified professional engineer, licensed in the state in which the project is located, responsible for their preparation.
    - a. Calculations must be submitted with the shop drawings for review.
    - b. Indicate all applicable piece marks on calculations sheets.
    - c. Design simple shear connections for maximum reaction indicated in the drawings. If no reaction has been indicated, design simple shear connections to withstand 40% of the total beam shear capacity  $V_n/\Omega$  noted in the AISC Steel Construction Manual Table.
    - d. Design moment connections for reactions indicated. If no reaction is provided, design the moment connection for the maximum available moment capacity of the smaller beam member framing into the joint.
    - e. Design axial loaded members of trusses and bracing for the unfactored (ASD) reactions indicated in the drawings. If no reaction is indicated, design the member for the maximum tension and compression forces available to the member based on size and length. All bolted connection design shall account for net area reduction of the members.
- C. Welding Procedure Specifications (WPSs) and Procedure Qualification Records (PQRs): Provide according to AWS D1.1/D1.1M, "Structural Welding Code - Steel," for each welded joint whether prequalified or qualified by testing, including the following:
  - 1. Power source (constant current or constant voltage).
  - 2. Electrode manufacturer and trade name, for demand critical welds.
- D. Qualification Data: For qualified Installer, fabricator, professional engineer, and testing agency.
  - 1. Qualification Data must be submitted to Engineer prior to commencing work.
- E. Welding certificates.
- F. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers, certifying that shop primers are compatible with topcoats.
- G. Mill test reports for structural steel, including chemical and physical properties.

- H. Product Test Reports: For the following:
  - 1. Bolts, nuts, and washers including mechanical properties and chemical analysis.
  - 2. Direct-tension indicators.
  - 3. Tension-control, high-strength bolt-nut-washer assemblies.
  - 4. Shear stud connectors.
  - 5. Shop primers.
  - 6. Non-shrink grout.
- I. Source quality-control reports.

### 1.07 QUALITY ASSURANCE

- A. Fabricator Qualifications: A qualified fabricator that participates in the AISC Quality Certification Program and is designated an AISC-Certified Plant, Category STD.
  - 1. As an exception, non-AISC certified fabricators will be accepted provided the fabricator includes in their bid the services of the owner's special inspection and testing agency to provide inspection / testing services for in-shop work to meet the requirements of IBC Section 1704 and any additional requirements noted in the construction documents. Final costs of these services will be as required by the owner's special inspection and testing agency, which may or may not be hired at the time of bidding the project. It will be the fabricator's responsibility for estimating these costs. Cost will be withheld from the fabricator to pay for these services. Refer to IBC Section 1705 for verification and inspection requirements.
  - 2. All inspection costs incurred by the Owner's inspection and testing agency for this exception will be tracked and invoiced to the owner independently of other special inspection costs to allow withholding from the relevant contractor's regular payments.
- B. Installer Qualifications: Engage an experienced Installer who has completed structural steel work similar in material, design and extent to that indicated for this Project and with a record of continuous successful in-service performance for a minimum of 5 years. Installer shall provide
- C. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."
  - 1. Welders and welding operators performing work on bottom-flange, demand-critical welds shall pass the supplemental welder qualification testing, as required by AWS D1.8. FCAW-S and FCAW-G shall be considered separate processes for welding personnel qualification.
- D. Comply with applicable provisions of the following specifications and documents:
  - 1. AISC 303.
  - 2. AISC 341 and AISC 341s1.
  - 3. AISC 360.
  - 4. RCSC's "Specification for Structural Joints Using ASTM A325 or ASTM A490 Bolts."

### 1.08 PERFORMANCE REQUIREMENTS

- A. Connections: Provide details of simple shear connections required by the Contract Documents to be selected or completed by structural-steel fabricator, including comprehensive engineering design by a qualified professional engineer licensed in the state which the project is located, to withstand loads indicated and comply with other information and restrictions indicated.
  - 1. Select and complete connections using schematic details indicated and AISC 360
  - 2. Use ASD; data are given at factored-load level.
  - 3. For beams where no factored shear reaction is indicated, design connections to sustain 40% of the total beam shear capacity ( $V_n/\Omega$ ) as indicated in AISC 360, Table 3-6.
- B. Moment Connections: Type FR, fully restrained.
- C. Construction: As indicated.

### 1.09 DELIVERY, STORAGE, AND HANDLING

- A. Store materials to permit easy access for inspection and identification. Keep steel members off ground and spaced by using pallets, dunnage, or other supports and spacers. Protect steel members and packaged materials from corrosion and deterioration.
  - 1. Do not store materials on structure in a manner that might cause distortion, damage, or overload to members or supporting structures. Repair or replace damaged materials or structures as directed.
- B. Store fasteners in a protected place in sealed containers with manufacturer's labels intact.
  - 1. Fasteners may be repackaged provided Owner's testing and inspecting agency observes repackaging and seals containers.
  - 2. Clean and relubricate bolts and nuts that become dry or rusty before use.
  - 3. Comply with manufacturers' written recommendations for cleaning and lubricating ASTM F1852 fasteners and for retesting fasteners after lubrication.

### 1.10 COORDINATION

- A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' recommendations to ensure that shop primers and topcoats are compatible with one another.
- B. Coordinate installation of anchorage items to be embedded in or attached to other construction without delaying the Work. Provide setting diagrams, sheet metal templates, instructions, and directions for installation.

## PART 2 - PRODUCTS

### 2.01 STRUCTURAL STEEL MATERIALS

- A. W-Shapes: ASTM A992/A992M.
- B. Channels, Angles, S-Shapes: ASTM A36/A36M.
- C. Plate and Bar: ASTM A36/A36M, unless otherwise indicated on Drawings.
- D. Plate and Bar for Plate Girders: ASTM A992/A992M (Grade 50). ASTM A572/A572M, Grade 50 is an acceptable substitute.
- E. Cold-Formed Hollow Structural Sections: ASTM A500/A500M, Grade C, structural tubing.
- F. Steel Pipe: ASTM A53/A53M, Type E or S, Grade B.
  - 1. Weight Class: Standard, unless otherwise indicated.
  - 2. Finish: Black except where indicated to be galvanized.
  - 3. Steel Castings: ASTM A216/A216M, Grade WCB with supplementary requirement S11.
  - 4. Steel Forgings: ASTM A 668/A 668M.
  - 5. Welding Electrodes: Comply with AWS requirements.

### 2.02 BOLTS, CONNECTORS, AND ANCHORS

- A. High-Strength Bolts, Nuts, and Washers: ASTM A325 (ASTM A325M), Type 1, heavy-hex steel structural bolts; ASTM A563, Grade C, (ASTM A563M, Class 8S) heavy-hex carbon- steel nuts; and ASTM F436/F436M, Type 1, hardened carbon-steel washers; all with plain finish.
  - 1. Direct-Tension Indicators: ASTM F959, Type 325 (ASTM F 959M, Type 8.8), compressible-washer type with plain finish.
- B. Tension-Control, High-Strength Bolt-Nut-Washer Assemblies: ASTM F 1852, Type 1, heavy-hex head assemblies consisting of steel structural bolts with splined ends, heavy-hex carbon-steel nuts, and hardened carbon-steel washers.
  - 1. Finish: Plain.
- C. Shear Connectors: ASTM A108, Grades 1015 through 1020, headed-stud type, cold-finished carbon steel; AWS D1.1/D1.1M, Type B.
- D. Headed Anchor Rods: ASTM F1554, Grade 55, weldable, straight.
  - 1. Nuts: ASTM A563 (ASTM A563M) heavy-hex carbon steel.
  - 2. Plate Washers: ASTM A36/A36M carbon steel.

3. Washers: ASTM F436/F436M, Type 1, hardened carbon steel.
4. Finish: Plain.
- E. Threaded Rods: ASTM A36/A36M.
  1. Nuts: ASTM A563 (ASTM A563M) heavy-hex carbon steel.
  2. Washers: ASTM F436/F436M, Type 1, hardened carbon steel.
  3. Finish: Plain, unless otherwise indicated.
- F. Clevises and Turnbuckles: Made from cold-finished carbon steel bars, ASTM A108, Grade 1035.
- G. Eye Bolts and Nuts: Made from cold-finished carbon steel bars, ASTM A108, Grade 1030.
- H. Sleeve Nuts: Made from cold-finished carbon steel bars, ASTM A108, Grade 1018.

### **2.03 PRIMER**

- A. Primer: Fabricator's standard lead- and chromate-free, non-asphaltic, rust-inhibiting primer complying with MPI#79 and compatible with topcoat.
- B. Galvanizing Repair Paint: ASTM A780/A780M.

### **2.04 GROUT**

- A. Nonmetallic, Shrinkage-Resistant Grout: ASTM C1107/C1107M, factory-packaged, nonmetallic aggregate grout, non-corrosive and non-staining, mixed with water to consistency suitable for application and a 30-minute working time.

### **2.05 FABRICATION**

- A. Structural Steel: Fabricate and assemble in shop to greatest extent possible. Fabricate according to AISC's "Code of Standard Practice for Steel Buildings and Bridges" and AISC 360.
  1. Camber structural-steel members where indicated.
  2. Fabricate beams with rolling camber up.
  3. Identify high-strength structural steel according to ASTM A6/A6M and maintain markings until structural steel has been erected.
  4. Mark and match-mark materials for field assembly.
  5. Complete structural-steel assemblies, including welding of units, before starting shop-priming operations.
- B. Thermal Cutting: Perform thermal cutting by machine to greatest extent possible.
  1. Plane thermally cut edges to be welded to comply with requirements in AWS D1.1/D1.1M.
- C. Bolt Holes: Cut, drill, or punch standard bolt holes perpendicular to metal surfaces.
- D. Finishing: Accurately finish ends of columns and other members transmitting bearing loads.
- E. Cleaning: Clean and prepare steel surfaces that are to remain unpainted according to SSPC-SP 1, "Solvent Cleaning" and at architecturally exposed steel SSPC SP 3, "Power Tool Cleaning."
- F. Shear Connectors: Prepare steel surfaces as recommended by manufacturer of shear connectors. Use automatic end welding of headed-stud shear connectors according to AWS D1.1/D1.1M and manufacturer's written instructions.
- G. Holes: Provide holes required for securing other work to structural steel and for other work to pass through steel framing members.
  1. Cut, drill, or punch holes perpendicular to steel surfaces. Do not thermally cut bolt holes or enlarge holes by burning.
  2. Baseplate Holes: Cut, drill, or punch holes perpendicular to steel surfaces.
  3. Weld threaded nuts to framing and other specialty items indicated to receive other work.

### **2.06 SHOP CONNECTIONS**

- A. High-Strength Bolts: Shop install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A325 or ASTM A490 Bolts" for type of bolt and type of joint specified.

1. Joint Type: Snug tightened, unless otherwise indicated.
- B. Weld Connections: Comply with AWS D1.1/D1.1M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.
  1. Assemble and weld built-up sections by methods that will maintain true alignment of axes without exceeding tolerances in AISC 303 for mill material.

## **2.07 SHOP PRIMING**

- A. Shop prime steel surfaces except the following:
  1. Surfaces to be field welded.
  2. Surfaces to be high-strength bolted with slip-critical connections.
  3. Surfaces to receive sprayed fire-resistive materials (applied fireproofing).
  4. Galvanized surfaces.
- B. Surface Preparation: Clean surfaces to be painted. Remove loose rust and mill scale and spatter, slag, or flux deposits. Prepare surfaces according to the following specifications and standards:
  1. SSPC-SP 3, "Power Tool Cleaning."
- C. Priming: Immediately after surface preparation, apply primer according to manufacturer's written instructions and at rate recommended by SSPC to provide a minimum dry film thickness of 1.5 mils (0.038 mm). Use priming methods that result in full coverage of joints, corners, edges, and exposed surfaces.
  1. Apply two coats of shop paint to surfaces that are inaccessible after assembly or erection. Change color of second coat to distinguish it from first.
- D. Painting: Apply a 1-coat, nonasphaltic primer complying with SSPC-PS Guide 7.00, "Painting System Guide 7.00: Guide for Selecting One-Coat Shop Painting Systems," to provide a dry film thickness of not less than 1.5 mils (0.038 mm).

## **2.08 GALVANIZING**

- A. Hot-Dip Galvanized Finish: Apply zinc coating by the hot-dip process to structural steel according to ASTM A123/A123M.
  1. Fill vent and drain holes that will be exposed in the finished Work unless they will function as weep holes, by plugging with zinc solder and filing off smooth.
  2. Galvanize lintels and shelf angles attached to structural-steel frame and located in exterior walls. Galvanize all structural steel not located in conditioned space in the final construction.

## **2.09 SOURCE QUALITY CONTROL**

- A. Owner will engage an independent testing and inspecting agency to perform shop tests and inspections and prepare test reports.
  1. Provide testing agency with access to places where structural-steel work is being fabricated or produced to perform tests and inspections.
- B. Correct deficiencies in Work that test reports and inspections indicate does not comply with the Contract Documents.
- C. Bolted Connections: Shop-bolted connections will be tested and inspected according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."
- D. Welded Connections: In addition to visual inspection, all complete penetrations and shop-welded connections will be tested and inspected according to AWS D1.1 and the following inspection procedures, at testing agency's option:
  1. Liquid Penetrant Inspection: ASTM E 165.
  2. Magnetic Particle Inspection: ASTM E 709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration will not be accepted.
  3. Ultrasonic Inspection: ASTM E 164.
  4. Radiographic Inspection: ASTM E 94.

- E. In addition to visual inspection, shop-welded shear connectors will be tested and inspected according to requirements in AWS D1.1 for stud welding and as follows:
  - 1. Bend tests will be performed if visual inspections reveal either a less-than-continuous 360-degree flash or welding repairs to any shear connector.
  - 2. Tests will be conducted on additional shear connectors if weld fracture occurs on shear connectors already tested, according to requirements in AWS D1.1.

### **PART 3 - EXECUTION**

#### **3.01 EXAMINATION**

- A. Verify, with steel Erector present, elevations of concrete- and masonry-bearing surfaces and locations of anchor rods, bearing plates, and other embedments for compliance with requirements.
  - 1. Prepare a certified survey of bearing surfaces, anchor rods, bearing plates, and other embedments showing dimensions, locations, angles, and elevations.
  - 2. Proceed with installation only after unsatisfactory conditions have been corrected.

#### **3.02 PREPARATION**

- A. Provide temporary shores, guys, braces, and other supports during erection to keep structural steel secure, plumb, and in alignment against temporary construction loads and loads equal in intensity to design loads. Remove temporary supports when permanent structural steel, connections, and bracing are in place unless otherwise indicated.
  - 1. Do not remove temporary shoring supporting composite deck construction until cast-in-place concrete has attained its design compressive strength.

#### **3.03 ERECTION**

- A. Set structural steel accurately in locations and to elevations indicated and according to AISC 303 and AISC 360.
- B. Base Bearing and Leveling Plates: Clean concrete- and masonry-bearing surfaces of bond-reducing materials and roughen surfaces prior to setting plates. Clean bottom surface of plates.
  - 1. Set plates for structural members on wedges, shims, or setting nuts as required.
  - 2. Weld plate washers to top of baseplate.
  - 3. Snug tighten anchor rods after supported members have been positioned and plumbed. Do not remove wedges or shims but, if protruding, cut off flush with edge of plate before packing with grout.
  - 4. Promptly pack grout solidly between bearing surfaces and plates so no voids remain. Neatly finish exposed surfaces; protect grout and allow to cure. Comply with manufacturer's written installation instructions for shrinkage-resistant grouts.
- C. Maintain erection tolerances of structural steel within AISC's "Code of Standard Practice for Steel Buildings and Bridges."
- D. Align and adjust various members that form part of complete frame or structure before permanently fastening. Before assembly, clean bearing surfaces and other surfaces that will be in permanent contact with members. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.
  - 1. Level and plumb individual members of structure.
  - 2. Make allowances for difference between temperature at time of erection and mean temperature when structure is completed and in service.
- E. Splice members only where indicated.
- F. Do not use thermal cutting during erection.
- G. Do not enlarge unfair holes in members by burning or using drift pins. Ream holes that must be enlarged to admit bolts.
- H. Shear Connectors: Prepare steel surfaces as recommended by manufacturer of shear connectors. Use automatic end welding of headed-stud shear connectors according to AWS D1.1/D1.1M and manufacturer's written instructions.

### **3.04 FIELD CONNECTIONS**

- A. High-Strength Bolts: Install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.
  - 1. Joint Type: Snug-tightened.
- B. Weld Connections: Comply with AWS D1.1/D1.1M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.
  - 1. Comply with AISC 303 and AISC 360 for bearing, alignment, adequacy of temporary connections, and removal of paint on surfaces adjacent to field welds.
  - 2. Remove backing bars or runoff tabs where indicated, back gouge, and grind steel smooth.
  - 3. Assemble and weld built-up sections by methods that will maintain true alignment of axes without exceeding tolerances in AISC's "Code of Standard Practice for Steel Buildings and Bridges" for mill material.

### **3.05 FIELD QUALITY CONTROL**

- A. The Owner will employ the services of a Special Inspection Agency to perform inspections of the structural steel framing in accordance with the 2015 International Building Code (IBC)
  - 1. Refer to Section 01 45 33 - Code-Required Special Inspections.

### **3.06 REPAIRS AND PROTECTION**

- A. Galvanized Surfaces: Clean areas where galvanizing is damaged or missing and repair galvanizing to comply with ASTM A780/A780M.
- B. Touchup Painting: Immediately after erection, clean exposed areas where primer is damaged or missing and paint with the same material as used for shop painting to comply with SSPC- PA 1 for touching up shop-painted surfaces.
  - 1. Clean and prepare surfaces by SSPC-SP 2 hand-tool cleaning or SSPC-SP 3 power-tool cleaning.
- C. Touchup Painting: Cleaning and touchup painting are specified in Division 09 painting Sections.

**END OF SECTION**

**SECTION 05 21 00**  
**STEEL JOIST FRAMING**

**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 SECTION INCLUDES**

- A. K-series and KCS-series steel joists.
- B. Joist accessories.

**1.03 RELATED REQUIREMENTS**

- A. Section 05 12 00 - Structural Steel Framing
- B. Section 05 31 00 - Steel Decking
- C. Section 05 40 00 - Cold-Formed Metal Framing
- D. Section 05 50 00 - Metal Fabrications

**1.04 REFERENCES**

- A. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2014.
- B. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength; 2014 (Editorial 2017).
- C. ASTM A490 - Standard Specification for Structural Bolts, Alloy Steel, Heat Treated, 150 ksi Minimum Tensile Strength; 2014a.
- D. ASTM A563 - Standard Specification for Carbon and Alloy Steel Nuts; 2015.
- E. ASTM A563M - Standard Specification for Carbon and Alloy Steel Nuts(Metric); 2007 (Reapproved 2013).
- F. ASTM E94 - Standard Guide for Radiographic Examination; 2004 (Reapproved 2010).
- G. ASTM E164 - Standard Practice for Contact Ultrasonic Testing of Weldments; 2019.
- H. ASTM E165/E165M - Standard Test Method for Liquid Penetrant Examination for General Industry; 2018.
- I. ASTM E709 - Standard Guide for Magnetic Particle Testing; 2015.
- J. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2015, with Errata (2016).
- K. SJI 100 - Catalog of Standard Specifications Load Tables and Weight Tables for Steel Joists and Joist Girders; 2011.
- L. SSPC-Paint 15 - Steel Joist Shop Primer/Metal Building Primer; 1999 (Ed. 2004).
- M. SSPC-SP 2 - Hand Tool Cleaning; 1982 (Ed. 2004).
- N. SSPC-SP 3 - Power Tool Cleaning; 1982 (Ed. 2004).

**1.05 DEFINITIONS**

- A. SJI's "Specifications": Steel Joist Institute's "Standard Specifications, Load Tables and Weight Tables for Steel Joists and Joist Girders."
- B. Special Joists: Steel joists or requiring modification by manufacturer to support nonuniform, unequal, or special loading conditions that invalidate load tables in SJI's "Specifications."

**1.06 SUBMITTALS**

- A. Product Data: For each type of joist, accessory, and product.
- B. Shop Drawings:
  - 1. Include layout, designation, number, type, location, and spacing of joists.

2. Include joining and anchorage details, bracing, bridging, and joist accessories; splice and connection locations and details; and attachments to other construction.
  3. Indicate locations and details of bearing plates to be embedded in other construction.
  4. Comprehensive engineering analysis of special joists signed and sealed by the qualified professional engineer licensed in the state which the project is located, responsible for its preparation, and included with the shop drawing submittal. Shop drawings without signed and sealed calculations will be considered incomplete and grounds for rejection.
- C. Qualification Data: For manufacturer and professional engineer.
  - D. Welding certificates.
  - E. Manufacturer certificates: Signed by manufacturer certifying that joist comply with requirements.
  - F. Mill Certificates: Signed by bolt manufacturer certifying that bolts comply with requirements.
  - G. Field quality-control test and inspection reports.
  - H. Research/Evaluation Reports: For joists.

#### **1.07 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: A manufacturer certified by SJI to manufacture joists complying with applicable standard specifications and load tables in SJI's "Specifications."
  1. Manufacturer's responsibilities include providing professional engineering services for designing special joists to comply with performance requirements.
- B. SJI Specifications: Comply with standard specifications in SJI's "Specifications" that are applicable to types of joists indicated.
- C. Welding Qualifications: Qualify field-welding procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

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

- A. Deliver, store, and handle joists as recommended in SJI's "Specifications."
- B. Protect joists from corrosion, deformation, and other damage during delivery, storage, and handling.

#### **1.09 SEQUENCING**

- A. Deliver steel bearing plates to be built into cast-in-place concrete and masonry construction.

### **PART 2 - PRODUCTS**

#### **2.01 PERFORMANCE REQUIREMENTS**

- A. Structural Performance: Provide special joists and connections capable of withstanding design loads indicated.
  1. Use ASD; data are given at service-load level.
  2. Design special joists to withstand design loads with live-load deflections no greater than the following:
    - a. Roof Joists: Vertical deflection of 1/240 of the span.

#### **2.02 STEEL JOISTS - GENERAL**

- A. Steel joists shall be detailed, fabricated and erected in accordance with SJI Specifications (Latest Edition).
  1. Structural Performance: Provide special joists and connections capable of withstanding design loads indicated.
  2. Design special joists to withstand design loads with live-load deflections no greater than indicated on the structural drawings.
- B. Joist Bearing Ends:
  1. Minimum Bearing Requirements:
    - a. As indicated on structural drawings for each type of bearing material.

2. Equip bearing ends of joists with manufacturer's standard beveled ends or sloped shoes if joist slope exceeds 1/4 inch per 12 inches.
- C. Attachment to Supporting Steel: As indicated on structural drawings.
- D. See structural details for attachment to concrete or masonry.

### **2.03 K-SERIES STEEL JOISTS**

- A. Manufacture steel joists of type indicated according to "Standard Specifications for Open Web Steel Joists, K-Series" in SJI's "Specifications," with steel-angle top- and bottom-chord members, underslung ends, and parallel top chord.
  1. Joist Type: K-series steel joists and KCS-type K-series steel joists.
  2. Steel Joist Substitutes: Manufacture according to "Standard Specifications for Open Web Steel Joists, K-Series" in SJI's "Specifications," with steel-angle or -channel members.
- B. Comply with AWS requirements and procedures for shop welding, appearance, quality of welds, and methods used in correcting welding work.
- C. Provide holes in chord members for connecting and securing other construction to joists.
- D. Top-Chord Extensions: Extend top chords of joists with SJI's Type S, top-chord extensions where indicated, complying with SJI's "Specifications."
- E. Extended Ends: Extend bearing ends of joists with SJI's Type R extended ends where indicated, complying with SJI's "Specifications."
- F. Camber joists according to SJI's "Specifications."

### **2.04 PRIMERS**

- A. Primer: SSPC-Paint 15, or manufacturer's standard shop primer complying with performance requirements in SSPC-Paint 15.
- B. Primer: Provide shop primer that complies with Division 09 painting Sections.

### **2.05 JOIST ACCESSORIES**

- A. Bridging: Provide bridging anchors and number of rows of horizontal or diagonal bridging of material, size, and type required by SJI's "Specifications" for type of joist, chord size, spacing, and span. Furnish additional erection bridging if required for stability.
- B. Fabricate steel bearing plates from ASTM A36/A36M steel with integral anchorages of sizes and thicknesses indicated. Shop prime paint.
- C. Steel bearing plates with integral anchorages are specified in Section 05 12 00 - Structural Steel Framing.
- D. Furnish ceiling extensions, either extended bottom-chord elements or a separate extension unit of enough strength to support ceiling construction. Extend ends to within 1/2 inch of finished wall surface unless otherwise indicated.
- E. Carbon-Steel Bolts and Threaded Fasteners: ASTM A307, Grade A, carbon-steel, hex-head bolts and threaded fasteners; carbon-steel nuts; and flat, unhardened steel washers.
  1. Finish: Plain, uncoated, unless otherwise noted.
- F. High-Strength Bolts, Nuts, and Washers: ASTM A325, Type 1, heavy hex steel structural bolts; ASTM A563 heavy hex carbon-steel nuts; and ASTM F436 hardened carbon-steel washers.
  1. Finish: Plain, unless otherwise indicated.
- G. Welding Electrodes: Comply with AWS standards.
- H. Furnish miscellaneous accessories including splice plates and bolts required by joist manufacturer to complete joist assembly.

### **2.06 CLEANING AND SHOP PAINTING**

- A. Clean and remove loose scale, heavy rust, and other foreign materials from fabricated joists and accessories by hand-tool cleaning, SSPC-SP 2 or power-tool cleaning, SSPC-SP 3.

- B. Do not prime paint joists and accessories to receive sprayed fire-resistive materials.
- C. Apply one coat of shop primer to joists and joist accessories to be primed to provide a continuous, dry paint film not less than 1 mil thick.

### **PART 3 - EXECUTION**

#### **3.01 EXAMINATION**

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

#### **3.02 INSTALLATION**

- A. Do not install joists until supporting construction is in place and secured.
- B. Install joists and accessories plumb, square, and true to line; securely fasten to supporting construction according to SJI's "Specifications," joist manufacturer's written recommendations, and requirements in this Section.
  - 1. Before installation, splice joists delivered to Project site in more than one piece.
  - 2. Space, adjust, and align joists accurately in location before permanently fastening.
  - 3. Install temporary bracing and erection bridging, connections, and anchors to ensure that joists are stabilized during construction.
  - 4. Delay rigidly connecting bottom-chord extensions to columns or supports until dead loads are applied.
- C. Field weld joists to supporting steel bearing plates and framework. Coordinate welding sequence and procedure with placement of joists. Comply with AWS requirements and
- D. Bolt joists to supporting steel framework using carbon-steel bolts.
- E. Bolt joists to supporting steel framework using high-strength structural bolts. Comply with Research Council on Structural Connection's "Specification for Structural Joints Using ASTM A325 or ASTM A490 Bolts" for high-strength structural bolt installation and tightening requirements.
- F. Install and connect bridging concurrently with joist erection, before construction loads are applied. Anchor ends of bridging lines at top and bottom chords if terminating at walls or beams.

#### **3.03 FIELD QUALITY CONTROL**

- A. The Owner will employ the services of a Special Inspection Agency to perform inspections of the steel joist framing in accordance with the 2015 International Building Code (IBC)
  - 1. Refer to Section 01 45 33 - Code-Required Special Inspections.

#### **3.04 PROTECTION**

- A. Touchup Painting: After installation, promptly clean, prepare, and prime or reprime field connections, rust spots, and abraded surfaces of prime-painted joists, bearing plates, abutting structural steel, and accessories.
  - 1. Clean and prepare surfaces by hand-tool cleaning according to SSPC-SP 2, or power-tool cleaning according to SSPC-SP 3.
  - 2. Apply a compatible primer of same type as primer used on adjacent surfaces.
- B. Touchup Painting: Cleaning and touchup painting are specified in Division 09 painting Sections.
- C. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer that ensure that joists and accessories are without damage or deterioration at time of Substantial Completion.

**END OF SECTION**

**SECTION 05 31 00**  
**STEEL DECKING**

**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 SECTION INCLUDES**

- A. Steel roof deck.
- B. Composite steel floor deck.

**1.03 RELATED REQUIREMENTS**

- A. Section 03 30 00 - Cast-In-Place Concrete
- B. Section 05 12 00 - Structural Steel Framing
- C. Section 05 21 00 - Steel Joist Framing

**1.04 REFERENCES**

- A. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2018.
- B. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable; 2016.
- C. ASTM A780/A780M - Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings; 2009 (Reapproved 2015).
- D. ASTM E329 - Standard Specification for Agencies Engaged in Construction Inspection, Testing, or Special Inspection; 2014a.
- E. AWS D1.3/D1.3M - Structural Welding Code - Sheet Steel; 2008.

**1.05 SUBMITTALS**

- A. Product Data: For each type of deck, accessory, and product indicated.
- B. Shop Drawings: Show layout and types of deck panels, anchorage details, reinforcing channels, pans, cut deck openings, special jointing, accessories, and attachments to other construction.
- C. Product Certificates: For each type of steel deck, signed by product manufacturer.
- D. Welding certificates.
- E. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, indicating that each of the following complies with requirements:
  - 1. Power-actuated mechanical fasteners.
  - 2. Acoustical roof deck
- F. Research/Evaluation Reports: For steel deck.

**1.06 QUALITY ASSURANCE**

- A. Installer Qualifications: An experienced installer who has completed steel deck similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.
- B. Testing Agency Qualifications: An independent agency qualified according to ASTM E329 for testing indicated.
- C. Welding: Qualify procedures and personnel according to AWS D1.3/D1.3M, "Structural Welding Code - Sheet Steel."

- D. Fire-Test-Response Characteristics: Where indicated, provide steel deck units identical to those steel deck units tested for fire resistance per ASTM E 119 by a testing and inspection agency acceptable to authorities having jurisdiction.
  - 1. Fire-Resistance Ratings: Indicated by design designations from UL's "Fire Resistance Directory" or from the listings of another testing and inspecting agency.
  - 2. Steel deck units shall be identified with appropriate markings of applicable testing and inspecting agency.
- E. AISI Specifications: Calculate structural characteristics of steel deck according to AISI's "Specification for the Design of Cold-Formed Steel Structural Members."
- F. FM Listing: Provide steel roof deck evaluated by FM and listed in FM's "Approval Guide, Building Materials" for Class 1 fire rating and Class 1-90 windstorm ratings.

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

- A. Protect steel deck from corrosion, deformation, and other damage during delivery, storage, and handling.
- B. Stack steel deck on platforms or pallets and slope to provide drainage. Protect with a waterproof covering and ventilate to avoid condensation.

### **PART 2 - PRODUCTS**

#### **2.01 MANUFACTURERS**

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - 1. BHP Steel Building Products USA Inc.
  - 2. Canam United States; Canam Group, Inc.
  - 3. Consolidated Systems, Inc.
  - 4. Epic Metals Corp.
  - 5. Marlyn Steel Products, Inc.
  - 6. Nucor Corp.; Vulcraft Div.
  - 7. Roof Deck, Inc.
  - 8. United Steel Deck, Inc.
  - 9. Verco Manufacturing Co.
- B. Substitutions: Equivalent products complying with specified requirements will be considered, provided a manufacturer submit a request for consideration to the Architect prior to date established for receiving bids.

#### **2.02 STEEL ROOF DECK**

- A. Steel Roof Deck: Fabricate panels, without top-flange stiffening grooves, to comply with "SDI Specifications and Commentary for Steel Roof Deck," in SDI Publication No. 29, and the following:
  - 1. Galvanized Steel Sheet: ASTM A 653/A 653M, Structural Steel (SS), Grade 33, G60 zinc coating.
  - 2. Deck Profile: Type WR, wide rib.
  - 3. Profile Depth: 1-1/2 inches and others as indicated
  - 4. Design Uncoated-Steel Thickness: 22 ga. as indicated on drawings.

#### **2.03 COMPOSITE FLOOR DECK (@AHU Roof Slabs)**

- A. Depth of deck and slab, type of deck, steel gauges and slab reinforcing are shown on the structural drawings.
- B. The deck acting compositely with the slab shall be capable of supporting both the design live load and the superimposed dead load indicated on the structural drawings.
- C. Fabrication: Fabricate panels, with integrally embossed or raised pattern ribs and interlocking side laps, to comply with "SDI Specifications and Commentary for Composite Steel Floor Deck," in SDI Publication No. 30, with the minimum section properties indicated, and with the following:

- D. Material: Galvanized Steel Sheet: ASTM A653/A653M, Structural Steel (SS), Grade 40 (275), G60 (Z180) zinc coating.
- E. Profile Depth: As indicated on Structural Drawings.
- F. Design Uncoated-Steel Thickness: As indicated on Structural Drawings.
- G. Span Condition: Fabricate deck in lengths to span 3 or more support spacings.

#### **2.04 ACCESSORIES**

- A. General: Provide manufacturer's standard accessory materials for deck that comply with requirements indicated.
- B. Mechanical Fasteners:
  - 1. Corrosion-resistant, low-velocity, power-actuated or pneumatically driven, or
  - 2. Self-drilling, self-threading screws.
- C. Side-Lap Fasteners: Corrosion-resistant, hexagonal washer head; self-drilling, carbon-steel screws, No. 10 (4.8-mm) minimum diameter.
- D. Flexible Closure Strips: Vulcanized, closed-cell, synthetic rubber.
- E. Miscellaneous Sheet Metal Deck Accessories: Steel sheet, minimum yield strength of 33,000 psi (230 MPa), not less than 0.0359-inch (0.91-mm) design uncoated thickness, of same material and finish as deck; of profile indicated or required for application.
- F. Column Closures, End Closures, Z-Closures, and Cover Plates: Steel sheet, of same material, finish, and thickness as deck, unless otherwise indicated.
- G. Piercing Hanger Tabs: Piercing steel sheet hanger attachment devices for use with floor deck.
- H. Weld Washers: Uncoated steel sheet, shaped to fit deck rib, 0.0598 inch (1.52 mm) thick, with factory-punched hole of 3/8-inch (9.5-mm) minimum diameter.
- I. Flat Sump Plate: Single-piece steel sheet, 0.0747 inch (1.90 mm) thick, of same material and finish as deck. For drains, cut holes in the field.
- J. Galvanizing Repair Paint: ASTM A780/A780M.
- K. Repair Paint: Manufacturer's standard rust-inhibitive primer of same color as primer.

### **PART 3 - EXECUTION**

#### **3.01 EXAMINATION**

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

#### **3.02 INSTALLATION, GENERAL**

- A. Install deck panels and accessories according to applicable specifications and commentary in SDI Publication No. 30, manufacturer's written instructions, and requirements in this Section.
- B. Install temporary shoring before placing deck panels, if required to meet deflection limitations.
- C. Locate deck bundles to prevent overloading of supporting members.
- D. Place deck panels on supporting frame and adjust to final position with ends accurately aligned and bearing on supporting frame before being permanently fastened. Do not stretch or contract side-lap interlocks.
- E. Place deck panels flat and square and fasten to supporting frame without warp or deflection.
- F. Cut and neatly fit deck panels and accessories around openings and other work projecting through or adjacent to deck.
- G. Provide additional reinforcement and closure pieces at openings as required for strength, continuity of deck, and support of other work.
- H. Comply with AWS requirements and procedures for manual shielded metal arc welding, appearance and quality of welds, and methods used for correcting welding work.

- I. Mechanical fasteners may be used in lieu of welding to fasten deck, except at perimeter edges of deck. Locate mechanical fasteners and install according to deck manufacturer's written instructions. Mechanical fasteners must meet the same pull out and shear values as welds. Engineering calculations must be provided for Engineer's review.

### **3.03 ROOF DECK INSTALLATION**

- A. Fasten roof deck to all supporting steel as indicated on the structural drawings.
- B. Side-Lap and Perimeter Edge Fastening: As indicated on the structural drawings.
- C. Fasten roof-deck panels to steel supporting members by arc spot (puddle) welds of the surface diameter indicated or arc seam welds with an equal perimeter that is not less than 1-1/2 inches (38 mm) long, and as follows:
  1. Weld Diameter: 5/8-inch (16 mm) nominal.
  2. Weld Spacing: Weld edge and interior ribs of deck units with a minimum of two welds per deck unit at each support. Space welds as indicated.
  3. Weld Washers: Install weld washers at each weld location.
- D. Side-Lap Fastening: Fasten side laps of panels between supports, at intervals not exceeding the lesser of 1/2 of the span or 18 inches (450 mm), and as follows, unless otherwise noted:
  1. Mechanically fasten with self-drilling, No. 10 (4.8-mm-) diameter or larger, carbon-steel screws.
- E. End Bearing: Install deck ends over supporting frame with a minimum end bearing of 1-1/2 inches (38 mm), with end joints as follows:
  1. End Joints: Lapped 2 inches (51 mm) minimum.
- F. Roof Sump Pans and Sump Plates: Install over openings provided in roof deck. Weld flanges to top of deck.
  1. Install reinforcing channels or zees in ribs to span between supports and weld.
  2. Space welds not more than 12-inches (305 mm) apart with at least one weld at each corner.
- G. Miscellaneous Roof Deck Accessories: Install ridge and valley plates, finish strips, end closures, and reinforcing channels according to deck manufacturer's written instructions. Weld to substrate to provide a complete deck installation.
  1. Weld cover plates at changes in direction of roof-deck panels, unless otherwise indicated.
- H. Flexible Closure Strips: Install flexible closure strips over partitions, walls, and where indicated. Install with adhesive according to manufacturer's written instructions to ensure complete closure.

### **3.04 COMPOSITE DECK INSTALLATION**

- A. Fasten floor deck to all supporting steel by arc spot (puddle) welds of surface diameter and spacing indicated on the structural drawings.
- B. Side-Lap and Perimeter Edge Fastening: Weld or Mechanically fasten with self-drilling screws of size and spacing indicated on the structural drawings.
- C. End Bearing: Install deck ends over supporting frame with a minimum end bearing of 1-1/2 inches (38 mm) with end joints as follows:
  1. End Joints: Butted.
- D. Pour Stops and Girder Fillers: Weld steel sheet pour stops and girder fillers to supporting structure according to SDI recommendations, unless otherwise indicated.

### **3.05 FIELD QUALITY CONTROL**

- A. The Owner will employ the services of a Special Inspection Agency to perform inspections of the steel joist framing in accordance with the 2015 International Building Code (IBC)
  1. Refer to Section 01 45 33 - Code-Required Special Inspections.

### **3.06 REPAIRS AND PROTECTION**

- A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on both surfaces of deck with galvanized repair paint according to ASTM A780/A780M and manufacturer's written instructions.
- B. Repair Painting: Wire brush and clean rust spots, welds, and abraded areas on both surfaces of prime-painted deck immediately after installation and apply repair paint.
  - 1. Apply repair paint, of same color as adjacent shop-primed deck, to bottom surfaces of deck exposed to view.
- C. Provide final protection and maintain conditions to ensure that steel deck is without damage or deterioration at time of Substantial Completion.

**END OF SECTION**

**SECTION 05 40 00**  
**COLD-FORMED METAL FRAMING**

**PART 1 GENERAL**

**1.01 RELATED DOCUMENTS**

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

**1.02 SECTION INCLUDES**

- A. Formed steel stud exterior wall framing.

**1.03 RELATED REQUIREMENTS**

- A. Section 06 10 00 - Rough Carpentry
- B. Section 06 16 00 - Glass-Mat Gypsum Sheathing
- C. Section 07 21 00 - Thermal Insulation
- D. Section 07 25 00 - Weather Barriers
- E. Section 07 27 26 - Fluid-Applied Membrane Air Barriers
- F. Section 07 92 00 - Joint Sealants
- G. Section 09 21 16 - Gypsum Board Assemblies
- H. Section 09 22 16 - Non-Structural Metal Framing

**1.04 REFERENCES**

- A. AISI S100-12 - North American Specification for the Design of Cold-Formed Steel Structural Members; American Iron and Steel Institute; 2012.
- B. ASTM A1003/A1003M - Standard Specification for Steel Sheet, Carbon, Metallic- and Nonmetallic-Coated for Cold-Formed Framing Members; 2015.
- C. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2016a.
- D. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2018.
- E. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable; 2016.
- F. ASTM A780/A780M - Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings; 2009 (Reapproved 2015).
- G. ASTM B633 - Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel; 2015.
- H. ASTM C955 - Standard Specification for Load-Bearing (Transverse and Axial) Steel Studs, Runners (Tracks), and Bracing or Bridging for Screw Application of Gypsum Panel Products and Metal Plaster Bases; 2015.
- I. ASTM C1007 - Standard Specification for Installation of Load Bearing (Transverse and Axial) Steel Studs and Related Accessories; 2011a (Reapproved 2015).
- J. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials; 2016a.
- K. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2015, with Errata (2016).
- L. AWS D1.3/D1.3M - Structural Welding Code - Sheet Steel; 2008.
- M. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic"); 2002 (Ed. 2004).

### 1.05 SUBMITTALS

- A. Product Data: Provide data on standard framing members; describe materials and finish, product criteria, limitations.
- B. Product Data: Provide manufacturer's data on factory-made framing connectors, showing compliance with requirements.
- C. Shop Drawings: Indicate component details, framed openings, bearing, anchorage, loading, welds, and type and location of fasteners, and accessories or items required of related work.
  - 1. Indicate stud and ceiling joist layout.
  - 2. Describe method for securing studs to tracks and for bolted framing connections.
  - 3. Delegated Design Submittal:
    - a. Submit structural calculations prepared by manufacturer for approval. Submittal shall be sealed by a professional engineer registered in the state of Missouri.
    - b. Design Criteria:
      - 1) Engineering analysis depicting stress and deflection (stiffness) requirements for each framing application.
      - 2) Selection of framing components, accessories and welded connection requirements.
      - 3) Verification of attachments to structure and adjacent framing components.

### 1.06 QUALITY ASSURANCE

- A. Designer Qualifications: Design framing system under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in Missouri.
- B. Manufacturer Qualifications: Company specializing in manufacturing the types of products specified in this section, and with minimum three years of documented experience.
- C. Installer Qualifications: Company specializing in performing the work of this section with minimum three years documented experience.
- D. Welding: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code--Steel," and AWS D1.3/D1.3M, "Structural Welding Code--Sheet Steel."
  - 1. Qualify welding processes and welding operators in accordance with AWS "Standard Qualification Procedure."
- E. Fire-Test-Response Characteristics: Where metal framing is part of a fire-resistance-rated assembly, provide framing identical to that of assemblies tested for fire resistance per ASTM E119 by a testing and inspecting agency acceptable to authorities having jurisdiction.
  - 1. Fire-Resistance Ratings: Indicated by GA File Numbers in GA-600, "Fire Resistance Design Manual," or by design designations from UL's "Fire Resistance Directory" or from the listings of another testing and inspecting agency.
  - 2. AISI Specifications: Comply with AISI's "Specification for the Design of Cold-Formed Steel Structural Members" for calculating structural characteristics of cold-formed metal framing:

### 1.07 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.
- B. Protect and store materials protected from exposure to rain, snow or other harmful weather conditions. Products to be handled per AISI S202 "Code of Standard Practice for Cold-Formed Steel Structural Framing."

### 1.08 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 absolute limits.

### 1.09 MOCK-UP

- A. Provide mock-up of exterior framed wall, including components specified elsewhere, such as insulation, sheathing, window frame, door frame, exterior wall finish, and interior wall finish. Refer to Section 01 43 39 - Mockup Requirements, for additional requirements.

## PART 2 PRODUCTS

### 2.01 MANUFACTURERS

- A. Specified Manufacturer: ClarkDietrich. Other acceptable manufacturers with equivalent products to the specified manufacturer shall include:
  - 1. CEMCO
  - 2. Jaimes Industries
  - 3. Marino Ware
  - 4. R-stud, LLC
  - 5. SCAFCO Corporation
  - 6. Steel Construction Systems
  - 7. The Steel Network, Inc
  - 8. United Products, Inc.
- B. Products of unnamed manufacturers with equivalent products to the specified manufacturer will be considered in accordance with the "or equal" provision specified in Section 01 60 00 – Product Requirements.
  - 1. Product Substitutions: Comply with the requirements specified in Division 01 "Substitution Procedures"
- C. Framing Connectors and Accessories:
  - 1. Same manufacturer as metal framing.

### 2.02 FRAMING SYSTEM - DESIGN DATA

- A. Provide primary and secondary framing members, bridging, bracing, plates, gussets, clips, fittings, reinforcement, and fastenings as required to provide a complete framing system.
- B. Design Requirements: Provide completed framing system having the following characteristics:
  - 1. Design: Calculate structural characteristics of cold-formed steel framing members according to AISI S100-16.
  - 2. Structural Performance: Design, engineer, fabricate, and erect to withstand specified design loads for project conditions within required limits.
  - 3. Design Loads: Includes live and dead loads on floor and roofs, snow loads, and wind loads:
    - a. As indicated on the structural drawings, .
  - 4. Live load deflection meeting the following, unless otherwise indicated:
    - a. Floors: Maximum vertical deflection under live load of 1/480 of span.
    - b. Roofs: Maximum vertical deflection under live load of 1/240 of span.
    - c. Exterior Walls: Maximum horizontal deflection under wind load of 1/360 of span (1/600 for walls with Brick/Stone Veneer, Thin-Set Surface Applied Masonry or other brittle fascia materials).
    - d. Design non-axial loadbearing framing to accommodate not less than 1/2 in vertical deflection.
  - 5. Able to tolerate movement of components without damage, failure of joint seals, undue stress on fasteners, or other detrimental effects when subject to seasonal or cyclic day/night temperature ranges.
  - 6. Able to accommodate construction tolerances, deflection of building structural members, and clearances of intended openings.
- C. Shop fabricate framing system to the greatest extent possible.
- D. Deliver to site in largest practical sections.

### 2.03 FRAMING MATERIALS

- A. Studs and Track: ASTM C955; studs formed to channel, "C", or "Sigma" shape with punched web; U-shaped track in matching nominal width and compatible height.
  - 1. Gage and Depth: As required to meet specified performance levels.
  - 2. Galvanized in accordance with ASTM A653/A653M, G90/Z275 coating.
  - 3. Provide components fabricated from ASTM A1008/A1008M, Designation SS (structural steel).
- B. Joists and Purlins: Fabricated from ASTM A653/A653M steel sheet, with G90/Z275 hot dipped galvanized coating.
  - 1. Base Metal: As required to meet specified performance levels within maximum depths indicated.
  - 2. Gage and Depth: As required to meet specified performance levels.
- C. Framing Connectors: Factory-made, formed steel sheet.
  - 1. Material: ASTM A653/A653M SS Grade 33 and 40 (minimum), with G90/Z275 hot dipped galvanized coating for base metal thickness less than 10 gage, 0.1345 inch, and factory punched holes and slots.
  - 2. Structural Performance: Maintain load and movement capacity required by applicable code, when evaluated in accordance with AISI S100-16.
  - 3. Movement Connections: Provide mechanical anchorage devices that accommodate movement using slotted holes, shouldered screws or screws and anti-friction or stepped bushings, while maintaining structural performance of framing. Provide movement connections where indicated on drawings.
    - a. Where top of stud wall terminates below structural floor or roof, connect studs to structure in manner allowing vertical and horizontal movement of slab without affecting studs; allow for minimum movement of 1/2 inch.
    - b. Provide top track preassembled with connection devices spaced to fit stud spacing indicated on drawings; minimum track length of 10 feet.
    - c. Products:
      - 1) ClarkDietrich; Drift FastClip Slide Clip D-FCSC: [www.clarkdietrich.com/#sle](http://www.clarkdietrich.com/#sle).
      - 2) ClarkDietrich; FastClip Slide Clip FCSC: [www.clarkdietrich.com/#sle](http://www.clarkdietrich.com/#sle).
  - 4. Fixed Connections: Provide non-movement connections for tie-down to foundation, floor-to-floor tie-down, roof-to-wall tie-down, joist hangers, gusset plates, and stiffeners.
    - a. Products:
      - 1) Simpson Strong Tie: [www.strongtie.com/#sle](http://www.strongtie.com/#sle).
  - 5. Wall Stud Bridging Connections: Provide mechanical load-transferring devices that accommodate wind load torsion and weak axis buckling induced by axial compression loads. Provide bridging connections where indicated on the drawings.
  - 6. Products:
    - a. ClarkDietrich; Spazzer 5400 Bridging Bar: [www.clarkdietrich.com/#sle](http://www.clarkdietrich.com/#sle).
    - b. ClarkDietrich; FastBridge Clip: [www.clarkdietrich.com/#sle](http://www.clarkdietrich.com/#sle).
    - c. Simpson Strong Tie: [www.strongtie.com/#sle](http://www.strongtie.com/#sle).

### 2.04 MATERIALS

- A. Cold-Formed Steel Sheet: Complying with ASTM A1003/A1003M; unless indicated otherwise.
- B. Protective Coating: CP60 coating designator minimum (G60, A60, AZ50, GF30), complying with ASTM C955 and AISI S240.
  - 1. Where required: CP90 coating designator minimum (G90, AZ50, GF45), complying with ASTM C955 and AISI S240.

### 2.05 FRAMING SYSTEM - COMPONENTS

- A. Structural Studs:
  - 1. ClarkDietrich; "Cold-Formed Steel C-Studs".
  - 2. Gage and Web Depth: As required to meet specified performance levels.
  - 3. Minimum Yield Strength: As required for design.

- B. Structural Track:
  - 1. ClarkDietrich; "Cold-Formed Steel Track".
  - 2. Web Depth: Match stud web size.
  - 3. Minimum Yield Strength: As required for design.
  - 4. Material Thickness (Gage): Match stud/joist thickness unless design dictates heavier thickness.
- C. Slotted Deflection Track:
  - 1. ClarkDietrich; "MaxTrak (SLT), MaxTrak 2D (SLT/H), or BlazeFrame DSL".
  - 2. Gage and Web Depth: As required to meet specified performance levels.
  - 3. Minimum Yield Strength: As required for design.
  - 4. Slotted or un-slotted.
- D. Deflection and Drift Clips:
  - 1. Material Thickness: As required for design, based on application.
- E. Clip Angles (Support Clips):
  - 1. ClarkDietrich; "EasyClip Series".
  - 2. Size and Material Thickness: As required for design, based on application.
- F. U-Channel:
  - 1. ClarkDietrich; "U-Channel and FastBridge Clip".
  - 2. Size and Material Thickness: As required for design.
- G. Furring Channel:
  - 1. ClarkDietrich; "Furring Channel".
  - 2. Size and Material Thickness: As required for design.
- H. Bridging/Spacer Bar:
  - 1. ClarkDietrich; "TradeReady Spazzer 5400 Bridging and Spacing Bar".
  - 2. Material Thickness: As required for design.
- I. Web Stiffeners:
  - 1. ClarkDietrich; "EasyClip Quick Twist Web Stiffener".
  - 2. Size and Material Thickness: As required for design.
- J. Load-Bearing Headers:
  - 1. ClarkDietrich; "Heavy Duty Stud (HDS) or Header Bracket (HDSC), cold-formed galvanized one-piece load-bearing header.
  - 2. Size and Material Thickness: As required for design.
- K. Partial Height Wall Framing:
  - 1. ClarkDietrich; "Pony Wall (PW)"
  - 2. Material Thickness: 12 gauge, 0.0966 inch (2.45mm).
  - 3. Size: As required for design.
- L. Framing Component Accessories: Provide the following accessories as required for a complete system.
  - 1. Flat strapping.
  - 2. Angles, plates, sheets.
  - 3. Custom brake-formed shapes.
- M. Fasteners: Self-drilling, self-tapping screws; Steel, complying with ASTM C1513; Galvanized coating, plated or oil-phosphate coated complying with ASTM B633 as needed for required corrosion resistance.
- N. Touch-Up Paint: Complying with ASTM A780/A780M - Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings. Zinc rich, containing 95-percent metallic zinc.

## 2.06 FASTENERS

- A. Self-Drilling, Self-Tapping Screws, Bolts, Nuts and Washers: Hot dip galvanized per ASTM A153/A153M.

1. Products:
  - a. ITW Commercial Construction North America; ITW CCNA-Buildex Tek's Select Series.
  - b. Substitutions: Refer to Division 01 "Product Requirements".
- B. Anchorage Devices: Powder actuated.
- C. Welding: Comply with AWS D1.1/D1.1M.

## **2.07 WALL SHEATHING**

- A. Plywood Sheathing: Refer to Section 06 15 00.
- B. Glass-Mat Gypsum Sheathing: Refer to Section 06 15 00.

## **2.08 ACCESSORIES**

- A. Bracing, Furring, Bridging: Formed sheet steel, thickness determined for conditions encountered; finish to match framing components.
- B. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, Type I - Inorganic, complying with VOC limitations of authorities having jurisdiction.

## **2.09 FABRICATION**

- A. General: Framing components may be pre-assembled into panels prior to erecting.
- B. Fabricate panels square, with components attached in a manner so as to prevent racking or distortion.
- C. Cut all framing components squarely for attachment to perpendicular members, or as required for an angular fit against abutting members. Hold members positively in place until properly fastened.
- D. Provide insulation as specified elsewhere in all double jamb studs and double header members, which will not be accessible to the insulation Subcontractor.
- E. Axially Loaded Studs:
  1. Install studs to have full bearing against inside track web (1/8 inches (3.2 mm) maximum gap) prior to stud and track attachment.
  2. Splices in axially loaded studs are not permitted.
- F. Fasteners: Fasten components using self-tapping screws or welding.
- G. Welding: Welding is permitted on 18 gauge or heavier material only.
  1. Specify welding configuration and size on the Structural Calculation submittal.
  2. Qualify welding operators in accordance with Section 6.0 of AWS D.1.3.
  3. Touch up all welds with zinc-rich paint in compliance with ASTM A 780.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Prior to installation, inspect previous work of all other trades. Verify that all work is complete and accurate to the point where this installation may properly proceed in strict accordance with framing shop drawings.

### **3.02 ERECTION**

- A. General Requirements:
  1. Install components in accordance with manufacturers' instructions and ASTM C1007 requirements.
  2. Weld in compliance with AWS D.1.3.
  3. Install in compliance with applicable sections of the AISI S240 "North American Standard for Cold-Formed Steel Structural Framing."
- B. Wall Systems:
  1. Erect framing and panels plumb, level and square in strict accordance with approved shop drawings.

2. Handle and lift prefabricated panels in a manner so as not to cause distortion in any member.
3. Anchor track securely to the supporting structure as shown on the erection drawings. Install concrete anchors only after full compressive strength has been achieved.
4. Butt all track joints. Securely anchor abutting pieces of track to a common structural element, or butt-weld or splice them together.
5. Align and plumb studs, and securely attach to the flanges or webs of both upper and lower tracks except when vertical movement is specified.
6. Install jack studs or cripples below window sills, above window and door heads, at freestanding stair rails and elsewhere to furnish support, securely attached to supporting members.
7. Attach wall stud bridging in a manner to prevent stud rotation. Space bridging rows according to manufacturer's recommendations.
8. Frame wall openings to include headers and supporting studs as shown in the drawings.
9. Provide temporary bracing until erection is completed.
10. Provide stud walls at locations indicated on plans as "shear walls" for frame stability and lateral load resistance.
11. Where indicated in the drawings, provide for structural vertical movement using a vertical slide clip or other means in accordance with manufacturer's recommendations.

### **3.03 FIELD QUALITY CONTROL**

- A. Inspection: Periodic special inspections are required by local code authorities.
  1. Owner will hire and pay inspection agency.
  2. Submit schedule showing when the following activities will be performed and resubmit schedule when timing changes.
  3. Inspections are required during welding operations, screw attachment, bolting, anchoring and other fastening of components within the force resisting structural system, including struts, braces, and hold-downs.

### **3.04 PROTECTION**

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

**END OF SECTION**

**SECTION 05 43 00  
SLOTTED CHANNEL FRAMING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Strut-type metal framing system shall be used to support mechanical and electrical equipment and devices

**1.02 RELATED REQUIREMENTS**

- A. Section 04 73 00 - Manufactured Stone Veneer
- B. Section 06 10 00 - Rough Carpentry
- C. Section 09 22 16 - Non-Structural Metal Framing.

**1.03 REFERENCES**

- A. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.  
ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
- B. ASTM A36/A36M - Standard Specification for Carbon Structural Steel.
- C. ASTM A576 - Standard Specification for Steel Bars, Carbon, Hot-Wrought, Special Quality.
- D. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- E. ASTM A907 - Standard Specification for Steel, Sheet, and Strip, Heavy-Thickness Coils, Carbon, Hot-Rolled, Structural Quality
- F. ASTM A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength.
- G. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
- H. ASTM B633 - Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel.
- I. ASTM C1059/C1059M - Standard Specification for Latex Agents for Bonding Fresh to Hardened Concrete.
- J. ASTM C635/C635M - Standard Specification for Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings.
- K. ASTM F1136 – Standard Specification for Chromium/Zinc Corrosion Protective Coatings for Fasteners
- L. AWS D1.1/D1.1M - Structural Welding Code - Steel.

**1.04 SUBMITTALS**

- A. Structural calculations by a Registered Professional or Structural Engineer in the State of Missouri. Calculations may include, but are not limited to:
  - 1. Description of design criteria
    - a. Stress and deflection analysis
  - 2. Selection of framing members, fittings, and accessories.
- B. Assembly drawings necessary to install the Strut System in compliance with the Contract Documents.
- C. Pertinent manufacturers published data

**1.05 QUALITY ASSURANCE**

- A. Manufacturer's qualifications:
  - 1. The manufacturer shall have at least 10 years of experience in manufacturing Strut Systems.

2. The manufacturer must certify in writing all components supplied have been produced in accordance with an established quality assurance program.
- B. Work shall meet the requirements of the following standards:
1. Federal, State, and Local codes
  2. American Iron and Steel Institute (AISI) Specification for the Design of ColdFormed Steel Structural Members 2001 Edition
  3. American Society for Testing And Materials (ASTM)
  4. Metal Framing Manufacturer's Association (MFMA)

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

- A. All material is to be delivered to the work site in original factory packaging to avoid damage to the finish.
- B. Store strut systems and components in original cartons and clean dry space; protect from weather and construction traffic.

#### **1.07 WARRANTY**

- A. Manufacturer's Warranty: Manufacturer shall warrant the products specified in this Section against material defects or defects in manufacturing, for a period of ten (10) years from the Date of Substantial Completion.
- B. Installation Warranty: The installing subcontractor shall warrant the installation to be free of defects in material and workmanship for a period of one (1) year from the Date of Substantial Completion.

### **PART 2 PRODUCTS**

#### **2.01 MANUFACTURER**

- A. Specified Manufacturer: Unistrut Corporation. Other acceptable manufacturers with an equivalent product to the specified manufacturer shall include:
1. Haydon Corporation
  2. Cooper B-Line, Inc.
  3. Hilti, Inc.
  4. Flex-Strut, Inc.
- B. Products of unnamed manufacturers with equivalent products to the specified manufacturer will be considered in accordance with the "or equal" provision specified in Section 01 60 00 – Product Requirements.
1. Product Substitutions: Comply with the requirements specified in Division 01 "Substitution Procedures".

#### **2.02 MATERIALS**

- A. All channel members shall be fabricated conforming to one of the following ASTM specifications:
1. Plain Carbon Steel: ASTM A1011/A1011M SS Grade 33
  2. Pre-Galvanized Carbon Steel: ASTM A653/A653M Grade 33
  3. UNISTRUT DEFENDER™: ASTM A1046 SS Grade 33
- B. All fittings shall be fabricated conforming to one of the following ASTM specifications:
1. Carbon Steel: All carbon steel fittings shall be fabricated from steel that meets/exceeds the physical requirements of ASTM A1011 SS Grade 33 and conforms to one of the following ASTM specifications:
    - a. ASTM A575
    - b. ASTM A576
    - c. ASTM A36/A36M
    - d. ASTM C635/C635M
    - e. ASTM C1059/C1059M
    - f. ASTM A1046
- C. Aluminum:

1. ASTM B209 (Type 1100F or Type 5052-H32)

### **2.03 FASTENERS**

- A. Bolts, Nuts, and Washers: Hot-dip galvanized per ASTM A153/A153M.
- B. Welding: In conformance with AWS D1.1/D1.1M.

### **2.04 FINISHES**

- A. Electro-Galvanized per ASTM B633, Type III SC 1
- B. Hot-Dipped Galvanized per ASTM A123/A123M or ASTM A153/A153M
  1. Zinc coated after all manufacturing operations are complete
  2. Zinc coating thickness shall be G65 (2.6 mils = 1.50 oz./ sq. ft. surface area)

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. The installer shall inspect the work area before installation. If work area conditions are unsatisfactory, installation shall not proceed until satisfactory corrections are completed.
- B. Verify field measurements and adjust installation as required.

### **3.02 INSTALLATION**

- A. Installation shall be accomplished by a fully trained manufacturer authorized installer.
- B. Set Strut System components into final position true to line, level, and plumb, in accordance with approved drawings.

### **3.03 CLEANING**

- A. Upon completion of this section of work, remove all protective wraps and debris. Repair any damage due to the installation of this section of work.

### **3.04 PROTECTION**

- A. Upon completion of this scope of work, protect this work from damage during the remainder of construction on the project and until substantial completion.

**END OF SECTION**

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

**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 SECTION INCLUDES**

- A. Provide metal fabrications, miscellaneous metal, and related accessory items, galvanized and prime painted, complete, as shown and specified. The work includes, but is not limited to, the following:
  - 1. Steel framing and supports for operable partitions, overhead doors, coiling shutters, etc.
  - 2. Steel framing and supports for mechanical and electrical equipment.
  - 3. Steel railings, guardrails, handrails, brackets, and sockets.
  - 4. Steel ladders.
  - 5. Elevator hoist way door sill angles, sump grates, and frames.
  - 6. Metal floor plate or grating.
  - 7. Loose steel lintels.
  - 8. Steel Bollards.
  - 9. Anchor bolts, steel pipe sleeves, slotted-channel inserts, and wedge-type inserts indicated to be cast into concrete or built into unit masonry.
  - 10. Miscellaneous steel framing, supporting angles, plates, brackets, clips, anchors and bolts for equipment, and other work which is not specifically included in Section 05 12 00, but which is required to complete the Project.

**1.03 RELATED REQUIREMENTS**

- A. Section 03 30 00 - Cast-In-Place Concrete
- B. Section 04 20 00 - Brick and Concrete Masonry
- C. Section 05 12 00 - Structural Steel Framing
- D. Section 05 43 00 - Slotted Channel Framing
- E. Section 05 51 00 - Metal Stairs, Handrails and Guards
- F. Section 07 72 00 - Roof Accessories

**1.04 PERFORMANCE REQUIREMENTS**

- A. Delegated Design: Design ladders, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.
  - 1. Structural Performance of Aluminum Ladders: Aluminum ladders, including landings, shall withstand the effects of loads and stresses within limits and under conditions specified in ANSI A14.3.
- B. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes acting on exterior metal fabrications by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects.
  - 1. Temperature Change: 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

**1.05 ACTION SUBMITTALS**

- A. Product Data: Submit manufacturer's literature including product characteristics, accessories and limitations.
- B. Selection Samples: Submit samples of colors and finishes if requested by architect.
- C. Verification Samples: Submit samples of selected materials specified to verify color and finish.
- D. Industry Certifications and Standards: Submit copy of documentation indicating compliance.

- E. Test and Evaluation Reports: Submit reports showing compliance with specified performance characteristics and physical properties.
- F. Delegated-Design Submittal: For installed products indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

#### **1.06 INFORMATIONAL SUBMITTALS**

- A. Qualification Data: For qualified professional engineer.
- B. Mill Certificates: Signed by manufacturers of stainless-steel certifying that products furnished comply with requirements.
- C. Welding certificates.
- D. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers certifying that shop primers are compatible with topcoats.

#### **1.07 QUALITY ASSURANCE**

- A. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

#### **1.08 PROJECT CONDITIONS**

- A. Field Measurements: Verify actual locations of walls and other construction contiguous with metal fabrications by field measurements before fabrication.

#### **1.09 COORDINATION**

- A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written recommendations to ensure that shop primers and topcoats are compatible with one another.

### **PART 2 PRODUCTS**

#### **2.01 METALS, GENERAL**

- A. Metal Surfaces, General: Provide materials with smooth, flat surfaces without blemishes.

#### **2.02 FERROUS METALS**

- A. Steel Sections: ASTM A992, hot-dip galvanized for exterior use.
- B. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
- C. Steel Tubing: ASTM A 500, cold-formed steel tubing, Grade C.
- D. Steel Pipe: ASTM A 53/A 53M, Type S, Grade B, Schedule 40, unless otherwise indicated.
- E. Slotted Channel Framing: Cold-formed metal box channels (struts) complying with MFMA-4.
  - 1. Size of Channels: 1-5/8 by 1-5/8 inches (41 by 41 mm).
  - 2. Material: Cold-rolled steel, ASTM A 1008/A 1008M, structural steel, Grade 33 (Grade 230); 0.0677-inch (1.7-mm) minimum thickness; coated with rust-inhibitive, baked-on, acrylic enamel.
- F. Stainless Steel: Steel: ASTM A240 for plate or sheet, A269 for tubing and A312 for pipe.
  - 1. Interior Use: Type 304, 18-8 grade, USS gauge, #4 finish.
  - 2. Exterior Use: Type 316L, 18-8 grade, USS gauge, #4 finish.

#### **2.03 NON-FERROUS METALS**

- A. Aluminum Plate and Sheet: ASTM B 209 (ASTM B 209M), Alloy 6061-T6.
- B. Aluminum Extrusions: ASTM B 221 (ASTM B 221M), Alloy 6063-T6.
- C. Aluminum-Alloy Rolled Tread Plate: ASTM B 632/B 632M, Alloy 6061-T6.

#### **2.04 FASTENERS**

- A. General: Unless otherwise indicated, provide Type 304 stainless-steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM B 633 or ASTM F 1941 (ASTM F 1941M), Class Fe/Zn 5, at exterior walls.

1. Provide stainless-steel fasteners for fastening aluminum.
  2. Provide stainless-steel fasteners for fastening stainless steel.
- B. Steel Bolts and Nuts: Regular hexagon-head bolts, ASTM A 307, Grade A (ASTM F 568M, Property Class 4.6); with hex nuts, ASTM A 563 (ASTM A 563M); and, where indicated, flat washers.
- C. Stainless-Steel Bolts and Nuts: Regular hexagon-head annealed stainless-steel bolts, ASTM F 593 (ASTM F 738M); with hex nuts, ASTM F 594 (ASTM F 836M); and, where indicated, flat washers; Alloy Group 1 (A1).
- D. Anchor Bolts: ASTM F 1554, Grade 36, of dimensions indicated; with nuts, ASTM A 563; and, where indicated, flat washers.
1. Hot-dip galvanize or provide mechanically deposited, zinc coating where item being fastened is indicated to be galvanized.
- E. Eyebolts: ASTM A 489.
- F. Machine Screws: ASME B18.6.3 (ASME B18.6.7M).
- G. Lag Screws: ASME B18.2.1 (ASME B18.2.3.8M).
- H. Wood Screws: Flat head, ASME B18.6.1.
- I. Plain Washers: Round, ASME B18.22.1 (ASME B18.22M).
- J. Lock Washers: Helical, spring type, ASME B18.21.1 (ASME B18.21.2M).
- K. Anchors, General: Anchors capable of sustaining, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing according to ASTM E 488, conducted by a qualified independent testing agency.
- L. Cast-in-Place Anchors in Concrete: Either threaded type or wedge type unless otherwise indicated; galvanized ferrous castings, either ASTM A 47/A 47M malleable iron or ASTM A 27/A 27M cast steel. Provide bolts, washers, and shims as needed, all hot-dip galvanized per ASTM F 2329.
- M. Post-Installed Anchors: Torque-controlled expansion anchors or chemical anchors.
1. Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B 633 or ASTM F 1941 (ASTM F 1941M), Class Fe/Zn 5, unless otherwise indicated.
  2. Material for Exterior Locations and Where Stainless Steel is Indicated: Alloy Group 1 (A1) stainless-steel bolts, ASTM F 593 (ASTM F 738M), and nuts, ASTM F 594 (ASTM F 836M).

## **2.05 MISCELLANEOUS MATERIALS**

- A. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.
- B. Universal Shop Primer: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with MPI#79 and compatible with topcoat.
- C. Galvanizing Repair Paint: High-zinc-dust-content paint complying with SSPC-Paint 20 and compatible with paints specified to be used over it.
- D. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187.
- E. Non-shrink, Nonmetallic Grout: Factory-packaged, non-staining, noncorrosive, nongaseous grout complying with ASTM C 1107. Provide grout specifically recommended by manufacturer for interior and exterior applications.

## **2.06 MANUFACTURED UNITS**

- A. Handrail Brackets: Provide Julius Blum & Co. Inc. No. 385, Blumcraft of Pittsburgh, or equal, cast malleable iron wall bracket.
1. Provide metal bracket filler (spacer) between base of bracket and stud where bracket is mounted against gypsum board wall.

2. Provide [galvanized][powder coated] finish for exterior applications.
- B. Trench Drain: Heavy duty cast iron trench frame and grated cover, for 200mm wide trenches, 6mm slot width top with cast iron support angle frame, and galvanized steel-form pan. Provide Neenah Foundry "Model R4990-AX with Trench Type P", McKinley "Model TGMB-8", or equal.
- C. Tread Nosings: Nosings at concrete treads shall be Wooster Type WP2C, Balco, or equal. Color shall be contrasting to the concrete step color and shall be as selected by the Architect.

## **2.07 FABRICATION - GENERAL**

- A. Verify dimensions on site prior to shop fabrication. Coordinate metalwork with adjoining work for details of attachment and fit. Be responsible for fabrication detailing and correct fitting of steel members to each other and to their supports.
- B. Use materials of size and thickness shown or, if not shown, of size and thickness to produce strength and durability in the finished product for the utility intended.
- C. Fabricate items with joints tightly fitted and secured. Make exposed joints butt tight, flush, and hairline.
- D. Grind exposed welds flush and smooth with adjacent finished surface. Ease exposed edges to small uniform radius.
- E. Fit and shop assemble in largest practical sections, for delivery to site and handling through building openings.
- F. Provide components required for anchorage of metal fabrications. Fabricate anchorage and related components of same material and finish as metal fabrication, except where specifically noted otherwise.

## **2.08 WELDING**

- A. All surfaces shall be clean, free of rust, paint, and foreign matter of any kind. Burned edges to be welded shall be chipped clean and wire brushed before welding. Clamp members as required, space and alternate welds, as may be necessary to prevent warping or misalignment.
- B. Weld Metal: Weld metal shall be thoroughly fused with the base metal along surfaces and edges of the union. Penetration shall be 1/8 inch (4 mm) minimum and shall be into the root of the joint.
- C. Weld Quality: Welds shall present a uniform surface, free of imperfections, without undercutting or overlapping, and free from excessive oxides, gas pockets, and nonmetallic inclusions. Welds shall be made with the proper number of beads or passes to secure sound, thoroughly fused joints. Provide backup bars, temporary backup bars, or backup welds for full-penetration butt welds. Each deposit shall not exceed 1/2 inch (12 mm) of weld for each pass of bead. Preceding layers shall be cleaned by wire brushing or preening to remove scale and slag before placing new weld material.
- D. Faulty and Defective Welding: Welding showing cracks, slag inclusion, lack of fusion, bad undercut, or other defects ascertained by visual or other means of inspection, shall be chipped out and properly replaced.

## **2.09 RAILS**

- A. Form rails and posts from steel pipe and shapes as shown on Drawings, with welded jointing. Fabricate right-angle and 45 degree bends of rail with 3 inches (75 mm) radius to center line of pipe without flattening the rail member noticeably.
- B. Coordinate with the work of Section 05 51 00.
- C. For fittings, elbows, wall brackets, and escutcheons provide machined steel. Provide splice connectors of steel as shown.
- D. Provide return at free ends of handrails to 1 inch (25 mm) from face of wall. Provide end cap for free ends of tube handrails and railings. Weld joints, end caps, returns, and transitions. Grind smooth and make flush.

- E. Provide extension for handrails and railings at edges of stairs and ramp to comply with the applicable building code, and ADA regulations.
- F. Provide mounting brackets and flanges, for secure anchorage of handrails and railings.
- G. Fabricate guardrails to comply with the specified loading requirements.

#### **2.10 MISCELLANEOUS FRAMING AND SUPPORTS**

- A. General: Provide steel framing and supports not specified in other Sections as needed to complete the Work.
- B. Fabricate units from steel shapes, plates, and bars of welded construction unless otherwise indicated. Fabricate to sizes, shapes, and profiles indicated and as necessary to receive adjacent construction.
  - 1. Fabricate units from slotted channel framing where indicated.
  - 2. Furnish inserts for units installed after concrete is placed.
- C. Galvanize miscellaneous framing and supports where indicated.
- D. Prime miscellaneous framing and supports with zinc-rich primer where indicated.

#### **2.11 MISCELLANEOUS STEEL TRIM**

- A. Unless otherwise indicated, fabricate units from steel shapes, plates, and bars of profiles shown with continuously welded joints and smooth exposed edges. Miter corners and use concealed field splices where possible.
- B. Provide cutouts, fittings, and anchorages as needed to coordinate assembly and installation with other work.
- C. Galvanize exterior miscellaneous steel trim.
- D. Prime miscellaneous steel trim with zinc-rich primer.

#### **2.12 METAL BOLLARDS**

- A. Fabricate metal bollards from Schedule 80 steel pipe.
- B. Prime bollards with zinc-rich primer.

#### **2.13 LOOSE BEARING AND LEVELING PLATES**

- A. Provide loose bearing and leveling plates for steel items bearing on masonry or concrete construction. Drill plates to receive anchor bolts and for grouting.

#### **2.14 STEEL WELD PLATES AND ANGLES**

- A. Provide steel weld plates and angles not specified in other Sections, for items supported from concrete construction as needed to complete the Work. Provide each unit with no fewer than two integrally welded steel strap anchors for embedding in concrete.

#### **2.15 FINISH - STEEL**

- A. Cleaning: Thoroughly clean mill scale, rust, dirt, grease, and other foreign matter from ferrous metal prior to galvanizing, powder coating or painting.
  - 1. Remove scale, rust, and other deleterious materials before applying shop coat. Clean off heavy rust and loose mill scale in accordance with SSPC SP-6, "Commercial Blast Cleaning."
- B. Shop Priming: Shop-paint metal work except members or portions of members to be embedded in concrete, surfaces and edges to be field welded, and galvanized surfaces.
  - 1. Immediately after surface preparation, brush or spray on primer in accordance with the paint manufacturer's instructions. Use painting methods which will result in full coverage of joints, corners, edges, and exposed surfaces.
  - 2. Apply one shop coat to metal items, except apply two coats to surfaces inaccessible after assembly or erection. Change color of the second coat to distinguish it from the first.
- C. Galvanizing: Provide a zinc coating for exposed exterior items (unless specified to be powder coated) and items to be embedded in concrete, complying with the following:

1. For galvanizing iron and steel hardware, ASTM A153.
2. For galvanizing rolled, pressed, and forged steel shapes, plates, bars, and strips 3mm thick and heavier, ASTM A123.

## **2.16 FINISH - ALUMINUM**

- A. Class I, Clear Anodic Finish: AA-M12C22A41 (Mechanical Finish: nonspecular as fabricated; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class I, clear coating 0.018 mm or thicker) complying with AAMA 611.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Examine the substrate and conditions in which the work is to be installed. Correct unsatisfactory substrate and conditions prior to start of installation.

### **3.02 PREPARATION**

- A. Furnish setting drawings, diagrams, templates, instructions, and directions for installation of anchorages, such as concrete inserts, anchor bolts, and miscellaneous items having integral anchor, which are to be embedded in concrete construction. Coordinate delivery of such items to project site.
- B. Coordinate metalwork with adjoining work. Do cutting, shearing, drilling, punching, threading, tapping, etc., required for metal work and for attachment of adjacent work. Drill or punch holes; do not use cutting torch. Shearing and punching shall leave true lines and surfaces.
- C. Obtain Architect-Engineer's review prior to site cutting or making adjustments to structural members not indicated to be cut or adjusted.
- D. Clean and strip primed steel items to bare metal where site welding is to be done.
- E. Make provision for erection loads with temporary bracing. Keep work in alignment.

### **3.03 INSTALLATION**

- A. Fastening to In-Place Construction: Provide anchorage devices and fasteners for securing metal work to in-place construction, including threaded fasteners for concrete inserts, through bolts, lag bolts, screws, and other connectors as required.
  1. Conceal fastenings where practical. Thickness of metal and details of assembly and supports shall give ample strength and stiffness. Form joints exposed to weather to exclude water.
- B. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installation of metal work. Set work accurately in location, alignment, and elevation, plumb, level, true, and free of rack, measured from established lines and levels. Provide temporary bracing anchors in formwork for items which are to be built into concrete or similar construction.
  1. Fit exposed connections accurately together to form tight hairline joints. Weld connections which are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Grind exposed joints smooth and touch up shop paint coat. Do not weld, cut, or abrade the surfaces of exterior units which have been hot-dip galvanized after fabrication and are intended for bolted or screwed field connections.
- C. Field Welding: Comply with AWS D1.1 for procedures of manual shielded metal-arc welding, appearance and quality of welds made, and methods used in correcting welding work.
- D. Corrosion Protection: Protect dissimilar metals from galvanic corrosion by pressure tapes, coating, or isolators as acceptable to Architect-Engineer.
- E. Grouting: Do grouting of frames, plates, sills, bolts, and similar items with nonshrink grout.
- F. Alignment: Verify alignment of items with adjacent construction. Coordinate related work.
- G. Handrails: Secure steel handrails with bracket. Unless otherwise noted, locate brackets 6 inches (150 mm) from ends of handrail, 6 feet (1.8 m) on center maximum, and space brackets equidistant at each handrail. Where bracket is fastened to stud wall, provide steel plate backing securely fastened to studs; toggle bolt secured to gypsum wallboard is not acceptable.

**3.04 ADJUSTING AND CLEANING**

- A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas. Paint uncoated and abraded areas with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.
- B. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A 780.

**END OF SECTION**

**SECTION 05 51 33  
METAL LADDERS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Interior metal ladders for roof hatch access.
- B. Ladder accessories.

**1.02 RELATED REQUIREMENTS**

- A. Section 06 10 00 - Rough Carpentry
- B. Section 07 54 23.10 - TPO Single-Ply Roofing System (Mechanically Attached)
- C. Section 07 42 23 - Formed Metal Building Panels

**1.03 REFERENCE STANDARDS**

- A. ANSI A14.3 - American National Standard for Ladders -- Fixed -- Safety Requirements; 1992.
- B. OSHA 29 CFR Standard 1910.28 - Fixed ladders; Occupational Safety and Health Standards; current edition

**1.04 SUBMITTALS**

- A. 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.
- B. 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 a record of successful in-service performance.
- B. Installer Qualifications: Competent and experienced firm capable of selecting fasteners and installing ladders to attain designed operational and structural performance.
- C. Product Qualification: Product design shall comply with OSHA 1910.27 minimum standards for ladders.

**1.06 PROJECT CONDITIONS**

- A. Field Measurements: Verify dimensions by field measurement before fabrication.
  - 1. Established Dimensions: Where field measurements cannot be made without delaying the Work, indicate established dimensions on shop drawing submittal and proceed with fabrication.

**1.07 SEQUENCING**

- A. Ensure that products of this section are supplied to affected trades in time to prevent interruption of construction progress.

**1.08 WARRANTY**

- A. The manufacturer shall warrant the metal ladders to be free of defects in material and workmanship for a period of five (5) years from the Date of Substantial Completion.
- B. Installation Warranty: The installing subcontractor shall warrant the installation to be free of defects in material and workmanship for a period of one (1) year from the Date of Substantial Completion.

**PART 2 PRODUCTS**

**2.01 MANUFACTURER**

- A. Aluminum Ladders:
  - 1. Specified Manufacturer: Alaco Ladder Company

- a. Other acceptable manufacturers with equivalent products to the specified manufacturer shall include:
  - 1) O'Keeffe's, Inc.
  - 2) Precision Ladders, LLC.
  - 3) Royalite Manufacturing, Inc.
  - 4) UPNOVR, Inc.
  - 5) Cotterman Ladders
- b. Products of unnamed manufacturers with equivalent products to the specified manufacturer will be considered in accordance with the "or equal" provision specified in Section 01 60 00 – Product Requirements.
  - 1) Product Substitutions: Comply with the requirements specified in Section 01 25 00 - Substitution Procedures.

## **2.02 MATERIALS - ALUMINUM**

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

## **2.03 ALUMINUM ROOF HATCH ACCESS LADDER**

- A. Roof Hatch Access Ladder.
- B. Roof Hatch Access Folding Wall Ladder:
  1. Product: Alaco; Model #HP70 (460) 70-degree Folding Wall Ladder.
    - a. Ladder includes side rails with 3-inch or 4-inch wide flat steps (with non-slip ridges), mounted 12-inches on-center vertically.
    - b. Furnish with mounting bracket-slide assembly for flat storage against wall, non-marking solid rubber feet for secure installation at a 70° angle.
    - c. Furnish 1-1/4 inch round serrated aluminum handrails with cast aluminum fittings on both sides of the ladder
    - d. Ladder Width: 24-inches.
    - e. Furnish with mounting bracket-slide assemblies to allow flat storage against wall and non-marking solid rubber feet for secure installation.
    - f. Capacity: 500 lbs (225 kg).
    - g. Ladder Height from floor to top of roof hatch: Field verify each instance.
      - 1) Maximum Height: 17'-10".

## **2.04 FINISH**

- A. Aluminum Ladders:
  1. Mill finish. As extruded.

## **2.05 ACCESSORIES**

- A. Refer to Section 07 72 00 - Roof Accessories

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Coordinate anchorages. Furnish setting drawings, templates, and anchorage structural loads for fastener resistance.
- B. Do not begin installation until supporting structure is complete and ladder installation will not interfere with supporting structure work.

- C. If supporting structure is the responsibility of another installer, notify Architect of unsatisfactory supporting work before proceeding.

**3.02 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.

**3.03 INSTALLATION**

- A. Install in accordance with manufacturer's instructions and approved shop drawings, and in compliance with ANSI A14.3 and OSHA 1910.28.

**3.04 PROTECTION**

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

**END OF SECTION**

**SECTION 06 10 00  
ROUGH CARPENTRY**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Structural dimension lumber framing.
- B. Non-structural dimension lumber framing.
- C. Rough opening framing for doors, windows, and roof openings.
- D. Fire-retardant treated wood materials.
- E. Concealed wood blocking, nailers, and supports.

**1.02 RELATED REQUIREMENTS**

- A. Section 09 21 16 - Gypsum Board Assemblies
- B. Section 09 22 16 - Non-Structural Metal Framing

**1.03 REFERENCES**

- A. ASTM C557 - Standard Specification for Adhesives for Fastening Gypsum Wallboard to Wood Framing.
- B. ASTM D3498 - Standard Specification for Adhesives for Field-Gluing Wood Structural Panels (Plywood or Oriented Strand Board) to Wood Based Floor System Framing.
- C. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
- D. AWPA U1 - Use Category System: User Specification for Treated Wood.
- E. PS 1 - Structural Plywood.
- F. SPIB (GR) - Standard Grading Rules.

**1.04 SUBMITTALS**

- A. Submit under the provisions of Section 01 33 00 - Submittal Procedures
- B. Product Data: Provide technical data on wood preservative materials and application instructions.
- C. ABAA Field Quality Control Submittals: Submit third-party reports of testing and inspection required by ABAA QAP.
- D. Manufacturer's Certificate: Certify that wood products supplied for rough carpentry meet or exceed specified requirements.
- E. ABAA Manufacturer Qualification: Submit documentation of current evaluation of proposed manufacturer and materials.
- F. ABAA Installer Qualification: Submit documentation of current contractor accreditation and current installer certification. Keep copies of all contractor accreditation and installer certification on site during and after installation. Present on-site documentation upon request.

**1.05 QUALITY ASSURANCE**

- A. Air Barrier Association of America (ABAA) Quality Assurance Program (QAP); [www.airbarrier.org/#sle](http://www.airbarrier.org/#sle):
  - 1. Installer Qualification: Use accredited contractor, certified installers, evaluated materials, and third-party field quality control audit.
  - 2. Manufacturer Qualification: Use evaluated materials from a single manufacturer regularly engaged in air barrier material manufacture. Use secondary materials approved in writing by primary material manufacturer.

**1.06 DELIVERY, STORAGE & 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.

### **1.07 WARRANTY**

- A. Installation Warranty: The installing subcontractor shall warrant the installation to be free of defects in material and workmanship for a period of one (1) year from the Date of Substantial Completion.
- B. Special Warranty: Provide manufacturer's standard 20-year limited warranty for pressure-treated FRTW wood, beginning from Date of Substantial Completion.

## **PART 2 PRODUCTS**

### **2.01 WOOD PRODUCTS, GENERAL**

- A. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, provide lumber that complies with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Provide lumber graded by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated
  1. Species: Douglas Fir-Larch
  2. Factory mark each piece of lumber with grade stamp of grading agency.
  3. Where nominal sizes are indicated, provide actual sizes required by DOC PS 20 for moisture content specified. Where actual sizes are indicated, they are minimum dressed sizes for dry lumber.
  4. Provide dressed lumber, S4S, unless otherwise indicated.
- B. Maximum Moisture Content of Lumber: 15 percent unless otherwise indicated.

### **2.02 MISCELLANEOUS LUMBER**

- A. General: Provide miscellaneous lumber indicated and lumber for support or attachment of other construction, including blocking, nailers, grounds, and furring.
  1. Dimensional Lumber: S4S, Construction or No. 2 grade lumber of any species.
  2. For blocking not used for attachment of other construction: Utility, Stud, or No.3.
- B. Grading Agency: Southern Pine Inspection Bureau, Inc; SPIB (GR).
- C. Sizes: Nominal sizes as indicated on drawings, S4S.
- D. Moisture Content: S-dry or MC19.

### **2.03 CONSTRUCTION PANELS**

- A. 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 FIRE-RETARDANT TREATED LUMBER**

- A. Interior Type: AWPA U1, Use Category UCFA, Commodity Specification H, low temperature (low hygroscopic) type, chemically treated and pressure impregnated; capable of providing a maximum flame spread index of 25 when tested in accordance with ASTM E84, with no evidence of significant combustion when test is extended for an additional 20 minutes.
  1. Kiln dry wood after treatment to a maximum moisture content of 19 percent for lumber and 15 percent for plywood.
  2. Treat rough carpentry items as indicated .
  3. Do not use treated wood in applications exposed to weather or where the wood may become wet.
- B. Acceptable Manufacturers:
  1. Lonza Group: [www.wolmanizedwood.com/#sle](http://www.wolmanizedwood.com/#sle).
  2. Hoover Treated Wood Products, Inc.: [www.frtw.com/#sle](http://www.frtw.com/#sle).
  3. Koppers, Inc: [www.koppersperformancechemicals.com/#sle](http://www.koppersperformancechemicals.com/#sle).
  4. Viance, LLC: [www.treatedwood.com/#sle](http://www.treatedwood.com/#sle).
  5. Substitutions: See Section 01 60 00 - Product Requirements

## **2.05 ACCESSORIES**

- A. Fasteners: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.
- B. Construction Adhesives: Adhesives complying with ASTM C557 or ASTM D3498.

## **PART 3 EXECUTION**

### **3.01 INSTALLATION, GENERAL**

- A. Set rough carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit rough carpentry to other construction; scribe and cope as needed for accurate fit. Locate nailers, blocking, and similar supports to comply with requirements for attaching other construction.
- B. Install plywood backing panels by fastening to studs; coordinate locations with utilities requiring backing panels. Install fire-retardant treated plywood backing panels with classification marking of testing agency exposed to view.
- C. Provide blocking and framing as indicated and as required to support facing materials, fixtures, specialty items, and trim.
- D. Sort and select lumber so that natural characteristics will not interfere with installation or with fastening other materials to lumber. Do not use materials with defects that interfere with function of member or pieces that are too small to use with minimum number of joints or optimum joint arrangement.
- E. Comply with AWPA M4 for applying field treatment to cut surfaces of preservative-treated lumber.

### **3.02 INSTALLATION, BLOCKING, NAILERS & 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.
- F. Provide the following specific non-structural framing and blocking:
  - 1. Cabinets and shelf supports
  - 2. Wall brackets
  - 3. Grab bars
  - 4. Towel and bath accessories
  - 5. Wall-mounted door stops
  - 6. Chalkboards and marker boards
  - 7. Wall paneling and trim
  - 8. Joints of rigid wall coverings that occur between studs

### **3.03 INSTALLATION - CONSTRUCTION PANELS**

- A. 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.
4. Size and Location: As indicated on drawings.

#### **3.04 CLEANING**

- A. Waste Disposal:
  1. Comply with applicable regulations.
  2. Do not burn scrap on project site.
  3. 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 15 00  
PLYWOOD SHEATHING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Parapet wall and coping sheathing.
- B. Fire retardant treatment of exterior plywood (when applicable).
- C. Preservative treatment of exterior plywood.

**1.02 RELATED REQUIREMENTS**

- A. Section 06 10 00 - Rough Carpentry
- B. Section 06 16 00 - Glass-Mat Gypsum Sheathing

**1.03 REFERENCE STANDARDS**

- A. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
- B. ASTM D2898 - Standard Practice for Accelerated Weathering of Fire-Retardant-Treated Wood for Fire Testing.
- C. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials.
- D. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
- E. AWPA U1 - Use Category System: User Specification for Treated Wood.
- F. PS 1 - Structural Plywood.
- G. PS 2 - Performance Standard for Wood Structural Panels.

**1.04 PERFORMANCE REQUIREMENTS**

- A. Fire-Resistance Ratings (when applicable): As tested according to ASTM E119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
  - 1. Fire-Resistance Ratings: Indicated by design designations from UL's "Fire Resistance Directory" or from the listings of another qualified testing agency.

**1.05 SUBMITTALS**

- A. See Section 01 33 00 - Submittal Procedures
- B. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.

**1.06 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Capable of demonstrating that all wood procurement operations are conducted in accordance with procedures and policies of the Sustainable Forestry Initiative (SFI) Program.
- B. Code Compliance: Comply with requirements of the following:
  - 1. International Code Council Evaluation Service, ICC-ES ESR-1785.
  - 2. Voluntary Product Standard, DOC PS 2, "Performance Standard for Wood-Based Structural-Use Panels."

**1.07 DELIVERY, STORAGE, AND HANDLING**

- A. Outdoor Storage: Comply with manufacturer's recommendations:
  - 1. Set panel bundles on supports to keep off ground.
  - 2. Cover panels loosely with waterproof protective material.
  - 3. Anchor covers on top of stack, but keep away from sides and bottom to assure adequate air circulation.
  - 4. When high moisture conditions exist, cut banding on panel stack to prevent edge damage.

- B. Fire Retardant Treated Wood: Prevent exposure to precipitation during shipping, storage, or installation.

#### **1.08 WARRANTY**

- A. The manufacturer shall warrant the product against material defects, or defects in manufacturing, for the lifetime of the products specified, beginning at the Date of Substantial Completion.
- B. Installation Warranty: The installing subcontractor shall warrant the installation to be free of defects in material and workmanship for a period of one (1) year from the Date of Substantial Completion.

### **PART 2 PRODUCTS**

#### **2.01 MANUFACTURER**

- A. Manufacturers: Subject to compliance with the Contract Documents, provide products of the following manufacturers:
  - 1. Boise Cascade Company.
  - 2. Georgia-Pacific LLC.
  - 3. Weyerhaeuser Company.
- B. Products of unnamed manufacturers with equivalent products to the manufacturers listed will be considered in accordance with the "or equal" provision specified in Section 01 60 00 – Product Requirements.
  - 1. Product Substitutions: Comply with the requirements specified in Division 01 "Substitution Procedures".

#### **2.02 PERFORMANCE REQUIREMENTS**

- A. Fire-Resistance Ratings: As tested according to ASTM E119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
  - 1. Fire-Resistance Ratings: Indicated by design designations from UL's "Fire Resistance Directory" or from the listings of another qualified testing agency.

#### **2.03 PLYWOOD SHEATHING**

- A. Plywood Sheathing: DOC PS 1 veneer plywood; Exterior Grade; APA Structural I; Exposure 1 sheathing
  - 1. Thickness: 5/8-inch.
  - 2. Edge Profile: Square Edge.
    - a. Parapet Wall Sheathing: Square edge.

#### **2.04 ACCESSORIES**

- A. Fasteners and Anchors: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.
  - 1. Provide fasteners with hot-dip zinc coating complying with ASTM A153/A153M or of Type 304 stainless steel.

#### **2.05 PLYWOOD TREATMENT**

- A. Factory-Treated 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 (if applicable):
  - 1. Manufacturers:
    - a. Hoover Treated Wood Products, Inc: [www.frtw.com/#sle](http://www.frtw.com/#sle).
    - b. Lonza Group: [www.wolmanizedwood.com/#sle](http://www.wolmanizedwood.com/#sle).
    - c. Koppers, Inc: <http://www.koppersperformancechemicals.com/#sle>.
    - d. Osmose Utilities Services, Inc: [www.osmose.com/#sle](http://www.osmose.com/#sle).
    - e. Viance, LLC; D-Blaze: [www.treatedwood.com/#sle](http://www.treatedwood.com/#sle).
  - 2. Type: AWPA U1, Use Category UCFB, Commodity Specification H, chemically treated and pressure impregnated; with maximum flame spread index of 25 when tested in

accordance with ASTM E84 and with no evidence of significant combustion when test is extended for an additional 20 minutes both before and after accelerated weathering test performed in accordance with ASTM D2898.

- a. Kiln dry wood after treatment to a maximum moisture content of 19 percent for lumber and 15 percent for plywood.
- C. Preservative Pressure Treatment:
1. Manufacturers:
    - a. Lonza Group: [www.wolmanizedwood.com/#sle](http://www.wolmanizedwood.com/#sle).
    - b. Osmose Utilities Services, Inc: [www.osmose.com/#sle](http://www.osmose.com/#sle).
    - c. Viance, LLC: [www.treatedwood.com/#sle](http://www.treatedwood.com/#sle).
  2. Plywood: AWPA U1, Use Category UC2 and UC3B, Commodity Specification F using waterborne preservative to 0.25 lb/cu ft retention ( to 4.0 kg/cu m retention).
    - a. Kiln dry plywood after treatment to maximum moisture content of 18 percent.
  3. Marking: Mark each piece with stamp of an ALSC-accredited testing agency, certifying level and type of treatment in accordance with AWPA standards.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Verify that support framing is ready to receive plywood roof and parapet wall sheathing.

#### **3.02 SITE APPLIED WOOD TREATMENT**

- A. Apply preservative treatment in accordance with manufacturer's instructions.
- B. Brush apply one coat of preservative treatment on wood in contact with roofing and related metal flashings. Treat site-sawn cuts.
- C. Allow preservative to dry prior to erecting members.

#### **3.03 PARAPET SHEATHING INSTALLATION**

- A. Install sheathing on the backside of the parapet walls in accordance with manufacturer's instructions.

**END OF SECTION**

**SECTION 06 16 00**  
**GLASS-MAT GYPSUM SHEATHING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Fiberglass-mat faced moisture and mold-resistant gypsum sheathing.

**1.02 RELATED REQUIREMENTS**

- A. Section 04 72 00 - Cast Stone Masonry
- B. Section 05 40 00 - Cold-Formed Metal Framing

**1.03 REFERENCES**

- A. ASTM D 5516 - Standard Test Method for Evaluating the Flexural Properties of Fire-Retardant Treated Softwood Plywood Exposed to Elevated Temperatures.
- B. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials.

**1.04 SUBMITTALS**

- A. Submit under provisions of Section 01 33 00.
- B. Product Data:
  - 1. Manufacturer's data sheets on each product to be used.
  - 2. Preparation instructions and recommendations.
  - 3. Storage and handling requirements and recommendations.
  - 4. Typical installation methods.
  - 5. Design data.
  - 6. Test Reports: Provide manufacturer test reports indicating product compliance with indicated requirements.
- C. Shop Drawings: Include details of materials, construction, and finish. Include relationship with adjacent construction.

**1.05 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with a minimum of five years documented experience.
- B. Installer Qualifications: Company specializing in performing Work of this section with a minimum of two years documented experience with projects of similar scope and complexity.
- C. Source Limitations: Provide each type of product from a single manufacturing source to ensure uniformity.

**1.06 DELIVERY, STORAGE, AND HANDLING**

- A. Store and handle in strict compliance with manufacturer's written instructions and recommendations.

**1.07 WARRANTY**

- A. The manufacturer shall warrant the product against in-place exposure damage (delamination, deterioration, and decay) for a period of one (1) year from the date of Substantial Completion.
- B. The manufacturer shall warrant the product against defects in manufacturing, for a period of five (5) years from the date of Substantial Completion.

**PART 2 PRODUCTS**

**2.01 MANUFACTURER**

- A. Specified Manufacturer: Georgia-Pacific (G-P) Gypsum .
  - 1. Other acceptable manufacturers with equivalent products to the specified manufacturer shall include:
    - a. CertainTeed Corporation; GlasRoc
    - b. National Gypsum Company; Gold Bond e(2)XP
    - c. Temple-Inland Inc.; GreenGlass

- d. United States Gypsum Co.; Securock
2. Products of unnamed manufacturers with equivalent products to the specified manufacturer will be considered in accordance with the "or equal" provision specified in Section 01 60 00 – Product Requirements.
  - a. Product Substitutions: Comply with the requirements specified in Section 01 25 00 - Substitution Procedures.

## 2.02 GYPSUM SHEATHING

- A. Product: G-P Gypsum; DensGlass® Gold Sheathing
  1. Fiberglass-Mat Faced Gypsum Sheathing: ASTM C1177/C1177M, Type X.
  2. Thickness: 5/8-inch
  3. Edges: Square
  4. Surfacing: Fiberglass mat on face, back, and long edges.
  5. Installation: Screw to cold-formed metal framing.
  6. Width (nom.): 48-inches
  7. Length: 8-, 9-, or 10-feet
  8. Physical Properties:
    - a. Compressive Strength: 500 psi (3445 kPa), minimum.
    - b. Permeance (ASTM E96/E96M): Not less than 23 perms.
    - c. R-Value (ASTM C518): 0.56.
    - d. Mold Resistance (ASTM D3273): Passes
    - e. Microbial Resistance (ASTM D6329): Will not support microbial growth
    - f. Air Barrier Compliance: Per the International Energy Conservation Code® (IECC), gypsum sheathing shall comply with the prescriptive code language for use as a continuous air barrier when the joints and openings are properly sealed.
  9. Performance Characteristics:
    - a. Combustibility: The sheathing panels are considered non-combustible building materials in accordance with IBC Section 703.5 based on testing in accordance with ASTM E136.
    - b. Surface Burning Characteristics: The sheathing panels are considered Class A building materials complying with IBC Section 803.1 based on testing per ASTM E84.
    - c. Wind Resistance: The sheathing panels may be used to resist transverse wind loads as permitted by the applicable code for gypsum sheathing.
    - d. Shear Resistance: The sheathing panels may be used as a component of engineered shear walls when designed per IBC Section 2211.6 for light-gauge steel-framed walls.

## 2.03 ACCESSORIES

- A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.
- B. Screws for Fastening Gypsum Sheathing to Cold-Formed Metal Framing: Steel drill screws, in length recommended by sheathing manufacturer for the thickness of sheathing to be attached, according to ASTM B117
  1. For steel framing less than 0.0329 inches (0.835 mm) thick, use screws that comply with ASTM C1002.
  2. For steel framing from 0.033 to 0.112 inch (0.84 to 2.84 mm) thick, use screws that comply with ASTM C954.

## PART 3 EXECUTION

### 3.01 INSTALLATION

- A. Following GA-253, ASTM C1280, and the manufacturer's written instructions.
- B. Coordinate sheathing installation with flashing and joint-sealant installation so these materials are installed in sequence and manner that prevent exterior moisture from passing through the completed assembly.

- C. Do not bridge building expansion joints; cut and space edges of panels to match the spacing of structural support elements.
- D. Coordinate sheathing installation with the installation of materials installed over sheathing so sheathing is not exposed to precipitation or left exposed at end of the workday when rain is forecast.
- E. Apply fasteners so heads bear tightly against the face of sheathing, but do not cut into facing.
- F. Horizontal Installation: Install sheathing with V-grooved edge down and tongue edge up. Interlock tongue with groove to bring long edges in contact with edges of adjacent boards without forcing. Abut ends of boards over centers of studs, and stagger end joints of adjacent boards not less than one stud spacing. Attach boards at the perimeter and within the field of the board to each steel stud.
- G. Vertical Installation: Install board vertical edges centered over studs. Abut ends and edges of each board with those of adjacent boards. Attach boards at the perimeter and within the field of the board to each stud. Space fasteners approximately 8 inches (200 mm) o.c. and set back a minimum of 3/8 inch (9.5 mm) from edges and ends of boards.
- H. Seal sheathing joints according to the sheathing manufacturer's written instructions.

### **3.02 PROTECTION**

- A. Protect gypsum sheathing that will be exposed to the weather for more than 180 days by covering the exposed exterior surface of sheathing with a securely fastened air-infiltration barrier. Apply covering immediately after sheathing is installed. Maximum exposure of assembly is 270 days before covering with exterior wall covering.

**END OF SECTION**

**SECTION 06 61 16**  
**SOLID SURFACE FABRICATIONS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Solid surface countertops.
- B. Integral solid surface sink bowls.
- C. Solid surface transaction tops.

**1.02 RELATED REQUIREMENTS**

- A. Section 06 10 00 - Rough Carpentry
- B. Section 07 92 00 - Joint Sealants
- C. Section 09 21 16 - Gypsum Board Assemblies
- D. Section 12 32 16 - Manufactured Plastic Laminate Faced Casework

**1.03 REFERENCES**

- A. ASTM C384 - Standard Test Method for Impedance and Absorption of Acoustical Materials by Impedance Tube Method.
- B. ASTM D1037 - Standard Test Methods for Evaluating Properties of Wood-Base Fiber and Particle Panel Materials.
- C. ASTM E84

**1.04 SUBMITTALS**

- A. Product data: Indicate product description, fabrication information and compliance with specified performance requirements.
- B. Shop Drawings: Indicate dimensions component sizes, fabrication details, attachment provisions and coordination requirements with adjacent work.
- C. Samples:
  - 1. Submit product data indicating compliance with specification requirements.
  - 2. Samples: Submit 2-inch by 2-inch samples
- D. Maintenance data: Submit manufacturer's care and maintenance data, including repair and cleaning instructions. Include in project close out documents.

**1.05 QUALITY ASSURANCE**

- A. Accessible Design: Comply with [the U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA), Accessibility Guidelines for Buildings and Facilities (ADAAG)."

**1.06 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver no components to project site until areas are ready for installation. Store indoors.
- B. Handle materials to prevent damage to finished surfaces. Provide protective coverings to prevent physical damage or staining following installation for duration of project.

**1.07 WARRANTY**

- A. Manufacturer Warranty: The manufacturer shall warrant the product/s to be free of defects in material and workmanship for a period of ten (10) years from the Date of Substantial Completion.
  - 1. Submit a written warranty to the Owner, executed by the Contractor, subcontractor, and the manufacturer.
- B. Installation Warranty: The installing subcontractor shall warrant the installation to be free of defects in material and workmanship for a period of one (1) year from the Date of Substantial Completion.

1. Submit written warranty to the Owner, executed by the contractor, subcontractor, and the manufacturer.

## **PART 2 PRODUCTS**

### **2.01 MANUFACTURER**

- A. Owner Standard: The solid surfacing fabrications specified in this Section are restricted to those of Wilsonart.
  1. Product substitutions: Not permitted.

### **2.02 SOLID SURFACING FABRICATIONS**

- A. Solid Surfacing Fabrications are designated in the drawings as Finish Type SSF- #.
  1. Refer to the "Interior Finish Legend" in the Drawings for pertinent information on this Finish Type, including manufacturer, model/pattern, color, size, and other related information
- B. Type SSF-1:
  1. Product: Wilsonart
  2. Color: As scheduled
  3. Material Thickness: 1/2-inch.
  4. Edge Profile: Eased edge unless indicated otherwise.

### **2.03 MATERIALS**

- A. Solid Surfacing Material:
  1. Composition: Homogeneous-filled plastic resin complying with ISSFA-2.
  2. Material Thickness: 1/2-inch
  3. Colors and Pattern: Refer to Interior Finish Legend
  4. Physical Properties:
    - a. Flammability: Class A, when tested to ASTM E84
      - 1) Flame Spread Index: Less than 25.
      - 2) Smoke Development Index: Less than 450.
    - b. Fungi and Bacteria: Does not support microbial growth, per ASTM G21
    - c. Microbial Resistance: Highly resistant to mold growth, per UL 2824
- B. Medium Density Fiberboard (MDF):
  1. Composition: Lignocellulosic fibers and no-added formaldehyde synthetic resin.
  2. Standards Compliance:
    - a. ANSI A208.2 - Grade 100, balanced design.
    - b. Manufactured from recycled materials.
    - c. Meeting ANSI Standards for emissions.
  3. Fire-Retardant: MDF shall contain fire-retardant chemicals injected with raw materials during manufacturing to achieve a maximum flame-spread rating of 25, and a maximum smoke development rating of 200 when tested to ASTM E84.
- C. Moisture-Resistant MDF (MR-MDF):
  1. Uses: Where countertops receive sinks or are subjected to liquid spills.
  2. Product: "Medex", as manufactured by Roseburg Forest Products Company, or equivalent.
    - a. Standards Compliance:
      - 1) ANSI A208.2 - Grade 155; MR50.
      - 2) ASTM D1037: Passed.
      - 3) ASTM E84, Class C flame spread rating.
    - b. Density: 48 pcf, minimum.
- D. Adhesives and Sealant: Refer to "Installation Accessories" Article this Section.

### **2.04 COUNTERTOPS**

- A. Countertops:
  1. Countertops shall be built-up with 1/2-inch thick solid surface sheet over a 1-inch thick MDF (or MR-MDF) sub-top.

- a. Edge Thickness: 1-1/2 inches.
- 2. Edge Profile: Eased edge unless otherwise indicated.
- 3. Depth: As indicated on the Drawings.
  - a. Countertops requiring compliance with ADA shall have a maximum depth of 24-inches (600-mm) from the farthest most projection of cabinetry to the face of back wall.
- 4. Overhang: 1-inch (25-mm) beyond face of base cabinets.
- 5. Open End Radii: Countertops with open ends shall have a 1-1/2 inch radius at the open end between the front and end faces.
- 6. Splashes (Back-, Side-, and End-):
  - a. Material and Color: Match countertops.
  - b. Height: 4-inches high unless indicated otherwise.
  - c. Thickness: 1/2-inch (12-mm).
  - d. Splash Type:
    - 1) Shop-formed integrated splashes with coved assembly between horizontal and vertical surfaces.
      - (a) Coved strip assembly shall be recessed into the deck 3-mm to eliminate 'feather' at glue line.
      - (b) Provide a formed scribe strip at top of splash to permit scribing to wall surface.
      - (c) L-Shaped Returns: Shop-fabricated inside corner cove.
- B. Transition Tops: Same as countertops.
- C. Integrated Solid Surface Sinks: Refer to "Solid Surface Sinks" Article this Section.

**2.05 WINDOW SILLS**

- A. Solid Surface Material Type: SSF-1.
- B. Thickness: 1/2-inch
- C. Sill Depth: As indicated on drawings.
- D. Overhang: 1/2-inch
- E. Length: Field verify
- F. Edges: Eased Edges.

**2.06 INTEGRATED SOLID SURFACE SINKS**

- A. Solid Surface Sinks:
  - 1. Products: Solid Surface Acrylic Sinks, as manufactured by Wilsonart.
    - a. Composition: Solid Surface Sinks and Bowls are composed of a proprietary acrylic resin and minerals, are completely homogeneous, and the color has a uniform pigment throughout the thickness of each bowl.
    - b. Sizes: As scheduled below.
    - c. Color: As scheduled.
- B. Mounting of Sinks to Countertop:
  - 1. Hard Seam Undermount Installation: Where the edge of the deck and the sink bowl are flush, and the sink bowl is attached to the deck with adhesive.
    - a. Rout the cutout for the sink in the countertop.
    - b. Adhere bowl positioning blocks into position against the bowl with hot-melt adhesive.
    - c. Adhere undermount sink to countertop using manufacturer's recommended adhesive.
    - d. Use clamping devices to hold bowl until adhesive sets.
- C. Integrated Solid Surface Sinks: Finish Type IS-#, as specified below.

**D. WILSONART**

Mark	Manufacturer	Model No.	Inside Length	Inside Width	Inside Depth	Description	ADA
IS-1	Wilsonart	AV1513	17-1/2"	15-3/8"	5-1/4"	Rectangular	Yes

Mark	Manufacturer	Model No.	Inside Length	Inside Width	Inside Depth	Description	ADA
						Ramp Vanity	
IS-2	Wilsonart	AD1630	32-1/16"	16-5/8"	9-1/8"	DbL. Equal Kit. Sink	No
IS-3	Wilsonart	AV1812	19-5/8"	14-3/4"	6-7/8"	Rectangular Vanity	Yes

**2.07 INSTALLATION MATERIALS**

- A. Mounting Adhesive: Provide structural-grade silicone or epoxy adhesives as recommended by manufacturer for application and per conditions of use.
  - 1. Provide spacers, if required, of type recommended by adhesive manufacturer.
- B. Joint Adhesive: Methacrylate-based adhesive for chemically bonding solid surfacing seams. Color complementary to solid surfacing sheet material. UL 2818 GREENGUARD Gold certified and complying with SCAQMD Rule 1168.
  - 1. Adhesives shall have a VOC content of 70 g/L or less.
- C. Elastomeric Joint Sealant (Silicone): Mildew-resistant silicone sealant for filling gaps between countertops and terminating substrates in wet environment applications. Complies with ASTM C920, Type S (single component), Grade NS (nonsag).
  - 1. Color: Complementary to solid surfacing color.
- D. Siliconized Acrylic Joint Sealant: Siliconized acrylic latex sealant. For general applications to fill gaps between countertops and at terminating substrates. Complies with ASTM C384, Type OP, Grade NF, and SCAQMD Rule 1168.
  - 1. Color: Complementary to quartz surfacing color.
- E. Construction Adhesive: Countertop manufacturer's recommended silicone-based construction adhesive for backsplashes, endsplashes, and other applications according to manufacturer's published fabrication instructions.
- F. Solvent: Product recommended by adhesive manufacturer to clean surface of solid surfacing to assure adhesion of adhesives and sealants.
- G. Cleaning Agents: Non-abrasive, low pH cleansers.

**2.08 FABRICATION**

- A. Assemble work at shop following manufacturer's printed fabrication instructions and deliver to job ready for installation. Manufacture in largest practical pieces for handling and shipping without seams.
- B. Grade: AWI, Premium.
  - 1. Fabricate tops with shop-applied edges, and loose back- and endsplashes. Comply with solid surface material manufacturer's written instructions for adhesives, sealers, fabrication, and finishing.
  - 2. Joints: Form joints between components using manufacturer's standard joint adhesive; without conspicuous joints.
  - 3. Cut and finish component edges with clean sharp returns. Route radius and contours to template. Repair or reject defective and inaccurate work.
  - 4. Do not exceed manufacturer's recommended unsupported overhang distances.
  - 5. Integrated Sinks: Refer to "Solid Surface Sinks" Article this Section.
  - 6. Provide cut-outs for plumbing fixtures and trim, washroom accessories, appliances, and related items. Confirm layout with manufacturer's cut-out templates before beginning work. Round corners of cut-outs and sand edges smooth.
  - 7. Recess and conceal fasteners, connections, and reinforcing.
  - 8. Radius corners and edges.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Examine walls and other surrounding construction prior to installation of solid surface fabrications.
  - 1. Verify that construction complies with indicated requirements of construction documents regarding size, configuration and other requirements.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

#### **3.02 INSTALLATION**

- A. Install components plumb and level, scribed to adjacent finishes, in accordance with approved shop drawings and product installation details.
- B. Fabricate field joints using manufacturer's recommended adhesive, with joints being inconspicuous in finished work. Exposed joints/seams are not permitted. Keep components and hands clean when making joints. Reinforce field joints as specified herein. Cut and finish component edges with clean, sharp returns.
- C. Install countertops with no more than 1/8" sag, bow or other variation from a straight line.
- D. Adhere undermount mount sinks to countertops using manufacturer's recommended adhesive and mounting hardware.
- E. Seal between wall and components with joint sealant.

#### **3.03 REPAIRS**

- A. Repair minor imperfections and cracked seams and replace areas of severely damaged surfaces in accordance with manufacturer's "Technical Bulletins".

#### **3.04 SITE QUALITY CONTROL**

- A. Non-Conforming Work: Replace damaged work which cannot be satisfactorily repaired, restored or cleaned, to satisfaction of Architect at no cost to Owner.

#### **3.05 CLEANING**

- A. Remove excess adhesive and sealant from visible surfaces.
- B. Clean surfaces in accordance with manufacturer's "Care and Maintenance Instructions".

#### **3.06 PROTECTION**

- A. DO NOT stand on the installed countertops for any reason.
- B. Provide protective coverings to prevent physical damage or staining following installation for duration of Project.
- C. Protect surfaces from damage until Date of Substantial Completion.

**END OF SECTION**

**SECTION 07 05 53  
FIRE AND SMOKE ASSEMBLY IDENTIFICATION**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Identification markings for fire and smoke rated partitions, and fire-rated walls, including the following options:
  - 1. Adhered markings using vinyl signs
  - 2. Applied markings with paint and a code-compliant stencil

**1.02 RELATED REQUIREMENTS**

- A. Section 09 90 00 - Painting and Coating

**1.03 SUBMITTALS**

- A. Submit under the provisions of Section 01 33 00 - Submittal Procedures
- B. Product Data: Manufacturer's printed product literature for each type of marking, indicating font, foreground and background colors, wording, and overall dimensions.
- C. Schedule: Completely define the scope of proposed marking, and indicate the location of affected walls and partitions, and the number of markings.
- D. Samples: Submit two samples of each type of marking proposed for use, of a size similar to that required for the project, illustrating font, wording, and method of application.

**1.04 QUALITY ASSURANCE**

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

**1.05 FIELD CONDITIONS**

- A. Do not install adhered markings when the ambient temperature is lower than recommended by the label or sign manufacturer.
- B. Do not install painted markings when the ambient temperature is lower than recommended by the coating manufacturer.

**PART 2 PRODUCTS**

**2.01 MANUFACTURERS**

- A. Adhered Identification Labels:
  - 1. Fire Wall Signs, Inc: [www.firewallsigns.com/#sle](http://www.firewallsigns.com/#sle).
  - 2. Safety Supply Warehouse, Inc: [www.safetysupplywarehouse.com/#sle](http://www.safetysupplywarehouse.com/#sle).
  - 3. Substitutions: See Section 01 60 00 - Product Requirements.

**2.02 FIRE AND SMOKE ASSEMBLY IDENTIFICATION**

- A. Regulatory Requirements: Comply with "Marking and Identification" requirements of the "Fire-Resistance Ratings and Fire Tests" chapter of the applicable Building Code.
  - 1. Adhered Fire and Smoke Assembly Identification Signs: Printed vinyl sign with a factory applied adhesive backing.
  - 2. Applied Fire and Smoke Assembly Identification: Identification markings applied to partition with paint and a code-compliant stencil. See Section 09 90 00 for products.
- B. Language: Provide sign markings in English.

**PART 3 EXECUTION**

**3.01 EXAMINATION**

- A. Verify that substrate surfaces are ready to receive work.

**3.02 PREPARATION**

- A. See Section 09 90 00 for substrate preparation for painted markings.

**3.03 INSTALLATION**

- A. Locate markings as required by ICC (IBC).
- B. Install adhered markings in accordance with manufacturer's instructions.
- C. Install applied markings in accordance with Section
- D. Install neatly, with horizontal edges level.
- E. Protect from damage until Date of Substantial Completion; repair or replace damaged markings.

**END OF SECTION**

**SECTION 07 21 00  
THERMAL INSULATION**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Rigid board insulation
- B. Fiberglass blanket (batt) insulation.
- C. Fire safing insulation
- D. Sound attenuation batt insulation

**1.02 RELATED REQUIREMENTS**

- A. Section 03 30 00 - Cast-In-Place Concrete
- B. Section 04 20 00 - Unit Masonry
- C. Section 06 10 00 - Rough Carpentry
- D. Section 07 54 23.10 - TPO Single-Ply Roofing System (Mechanically Attached)
- E. Section 09 21 16 - Gypsum Board Assemblies
- F. Section 09 22 16 - Non-Structural Metal Framing

**1.03 REFERENCE STANDARDS**

- A. ASTM C1104/C1104M - Standard Test Method for Determining the Water Vapor Sorption of Unfaced Mineral Fiber Insulation.
- B. ASTM C138/C138M - Standard Test Method for Density (Unit Weight), Yield, and Air Content (Gravimetric) of Concrete.
- C. ASTM C1338 - Standard Test Method for Determining Fungi Resistance of Insulation Materials and Facings.
- D. ASTM C423 - Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method.
- E. ASTM C578 - Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation.
- F. ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.
- G. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials.
- H. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
- I. ASTM E96/E96M - Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials.
- J. ASTM E136 - Standard Test Method for Assessing Combustibility of Materials Using a Vertical Tube Furnace at 750 °C.
- K. NFPA 285 - Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Wall Assemblies Containing Combustible Components.

**1.04 SUBMITTALS**

- A. Submit in accordance with Section 01 33 00.
- B. Product Data: Provide data on product characteristics, performance criteria, and product limitations.
- C. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for each product.
- D. Research/Evaluation Reports: For foam-plastic insulation, from ICC-ES
- E. ABAA Field Quality Control Submittals: Submit third-party reports of testing and inspection required by ABAA QAP.

- F. ABAA Manufacturer Qualification: Submit documentation of current evaluation of proposed manufacturer and materials.
- G. ABAA Installer Qualification: Submit documentation of current contractor accreditation and current installer certification. Keep copies of contractor accreditation and installer certification on site during and after installation. Present on-site documentation upon request.

### **1.05 QUALITY ASSURANCE**

- A. Air Barrier Association of America (ABAA) Quality Assurance Program (QAP); [www.airbarrier.org/#sle](http://www.airbarrier.org/#sle):
  - 1. Installer Qualification: Use accredited contractor, certified installers, evaluated materials, and third-party field quality control audit.
  - 2. Manufacturer Qualification: Use evaluated materials from a single manufacturer regularly engaged in air barrier material manufacture. Use secondary materials approved in writing by primary material manufacturer.

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

- A. Protect insulation materials from physical damage and from deterioration due to moisture, soiling, and other sources. Store inside and in a dry location. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.

## **PART 2 PRODUCTS**

### **2.01 MANUFACTURERS**

- A. Specified Manufacturer: Owens Corning Insulating Systems, LLC
  - 1. Other acceptable manufacturers with equivalent products to the specified manufacturer shall include:
    - a. Dow Chemical Company.
    - b. DiversiFoam Products.
    - c. Certain Teed Corporation.
    - d. Knauf Insulation.
    - e. Rockwool.
  - 2. Products of other manufacturers with equivalent products to the specified manufacturer will be considered in accordance with the "or equal" provision specified in Section 01 60 00 – Product Requirements.
    - a. Product Substitutions: Comply with the requirements specified in Section 01 25 00 - Substitution Procedures.

### **2.02 APPLICATIONS**

- A. Below Grade Insulation:
  - 1. Under-Slab and Perimeter Foundation Insulation: Extruded polystyrene (XPS) rigid board.
  - 2. Continuous Insulation over Concrete Walls: Expanded polystyrene (EPS) rigid board.
- B. Metal-Framed Exterior Wall Construction:
  - 1. Stud Cavity Insulation: Fiberglass batt insulation, faced or unfaced.
  - 2. Continuous Insulation over exterior sheathing: Extruded polystyrene (XPS)
- C. Metal-Framed Interior Wall Construction:
  - 1. Stud Cavity Insulation: Sound attenuation batt insulation (SAB), unfaced.
  - 2. Wall Furring Systems (when applicable): Extruded polystyrene rigid board insulation.
- D. Insulation Over Roof Deck: Polyisocyanurate rigid board. Refer to Section 07 54 23 for requirements.

### **2.03 EXPANDED POLYSTYRENE (EPS) BOARD INSULATION**

- A. Product: Insulfoam; R-Tech IV Expanded Polystyrene (EPS) Insulation, or equivalent
  - 1. Board Size: 48-inches by 96-inches.
  - 2. Board Thickness: Thickness as required to comply with the applicable Energy Conservation Code
  - 3. Board Edges: Square

4. Warranty: 20-year Thermal Performance Warranty
- B. Performance:
  1. Flame Spread Index (FSI): Class A - 0 to 25, when tested in accordance with ASTM E84.
  2. Smoke Developed Index (SDI): 450 or less, when tested in accordance with ASTM E84.
  3. Complies with fire resistance requirements indicated on drawings as part of an exterior non-load-bearing exterior wall assembly when tested in accordance with NFPA 285.
  4. Type and Compressive Resistance: Type IV, 25 psi (173 kPa), minimum.
  5. Type and Water Absorption: Type IV, 0.3 percent by volume, maximum, by total immersion.
  6. Type and Thermal Resistance, R-value (RSI-value): Type IV, 4.4 per 1-inch thickness at 75 degrees F (24 degrees C) mean temperature.
  7. Water Vapor Transmission (ASTM E96/E96M ): Less than 1.1 perms per inch
  8. Insect and Mold Resistant

#### **2.04 EXTRUDED POLYSTYRENE (XPS) BOARD INSULATION**

- A. Comply with ASTM C578, Type IV, 25 psi (173 kPa)
- B. Product: Owens Corning; FOAMULAR 250 Extruded Polystyrene (XPS) Insulation, or equivalent
  1. Board Size: 48-inches by 96-inches
  2. Board Thickness: Thickness as required to comply with applicable Energy Conservation Code
    - a. Continuous Insulation (CI) at Exterior Walls: 1-1/2 inches
    - b. Under Slab and Perimeter Foundation: 2-inches
  3. Board Edges: Square.
  4. Performance:
    - a. Type and Compressive Resistance: Type IV, 25 psi (173 kPa), minimum.
    - b. Thermal Resistance: R-5.0 per 1-inch thickness at 75 degrees F (24 degrees C) mean temperature.
      - 1) Continuous Insulation (CI) at Exterior Walls: R-7.50
      - 2) Under Slab and Perimeter Foundation: R-10
    - c. Surface Burning Characteristics (ASTM E84): Flame Spread Index of less than 25 (Class A); Smoke Developed Index of less than 450.
    - d. Water Absorption: 0.3 percent by volume, maximum, by total immersion.

#### **2.05 POLYISOCYANURATE RIGID BOARD INSULATION**

- A. Applications:
  1. Roof Deck Insulation: Refer to Section 07 54 23 for requirements.

#### **2.06 BLANKET (BATT) INSULATION MATERIALS**

- A. Application: Stud cavity insulation at exterior walls.
- B. General:
  1. Where batt insulation is indicated, either glass fiber or mineral fiber batt insulation may be used, at the Contractor's option.
  2. Insulation Width: Provide 16-inch batts to fit stud spacing.
  3. Insulation Length: Per manufacturer.
  4. Facings:
    - a. Plenum Space: Where indicated, provide aluminum foil, one side.
    - b. Non-Plenum Spaces: Where indicated, provide asphalt treated kraft paper, one side.
  5. Formaldehyde Content: Zero.
  6. Corrosiveness (ASTM C665): Passes.
  7. Fungi Resistance (ASTM C1338): Passes.
- C. Glass Fiber Blanket (Batt) Insulation:
  1. Product: Owens Corning; EcoTouch® Unfaced Thermal Batt Insulation; ASTM C665, Type I, preformed formaldehyde-free glass fiber batt type, unfaced
    - a. Physical Properties:

- 1) Thermal Resistance: Thickness as required to comply with applicable Energy Conservation Code
    - (a) Stud Cavity Insulation at Exterior Walls: R-13, 3-1/2 inches thick
  - 2) Combustibility (ASTM E136): Classified non-combustible.
  - 3) Surface Burning Characteristics (ASTM E84): Flame Spread: Less than 25; Smoke Developed: Less than 50
  - 4) Water Vapor Sorption (ASTM C1104/C1104M): 5-percent by weight, maximum.
  - 5) Dimensional Stability: Less than 0.1-percent linear shrinkage.
  - 6) Maximum Use Temperature (ASTM C411): 450°F.
2. Product: Owens Corning; EcoTouch® Kraft-Faced Thermal Batt Insulation: ASTM C665, Type II, Class C, preformed formaldehyde-free glass fiber batt type, Kraft paper-faced one side.
- a. Physical Properties:
    - 1) Thermal Resistance: Thickness as required to comply with applicable Energy Conservation Code
      - (a) Stud Cavity Insulation at Exterior Walls: R-13, 3-1/2 inches thick
    - 2) Surface Burning Characteristics (ASTM E84): Not rated.
    - 3) Mold/mildew resistant per ASTM C138/C138M.
    - 4) Perm Rating (ASTM E96): 1 perm maximum.
    - 5) Water Vapor Sorption (ASTM C1104/C1104M): 5-percent by weight, maximum.
    - 6) Dimensional Stability: Less than 0.1-percent linear shrinkage.
  3. Product: Owens Corning; EcoTouch® Foil-Faced Thermal Batt Insulation: ASTM C665, Type III, Class C preformed formaldehyde free glass fiber batt type, foil faced one side.
    - a. Physical Properties:
      - 1) Thermal Resistance: Thickness as required to comply with applicable Energy Conservation Code
        - (a) Stud Cavity Insulation at Exterior Walls: R-13, 3-1/2 inches thick
      - 2) Surface Burning Characteristics (ASTM E84): Flame Spread: 75; Smoke Developed Index: 150.
      - 3) Perm Rating: 0.5 perm maximum per ASTM E96/E96M.
      - 4) Water Vapor Sorption (ASTM C1104/C1104M): 5-percent by weight, maximum.
      - 5) Dimensional Stability: Less than 0.1-percent linear shrinkage.

## **2.07 ACOUSTIC BLANKET INSULATION (SOUND ATTENUATION BATTS)**

- A. Application: Stud cavity insulation for interior partitions.
- B. Product: Owens Corning; PINK Next Gen™ Fiberglas™ Sound Attenuation Batts (SAB)
  1. Type: ASTM C665, Type I, preformed formaldehyde-free glass fiber batt type, unfaced
  2. Fire-Resistance (if applicable): When installed in wall systems and tested per ASTM E119, assembly fire-resistance ratings up to 2-hours can be achieved.
    - a. 1-Hour: UL Design Nos. U494, U465, and W409.
    - b. 2-Hour: UL Design No. U403.
  3. Insulation Thickness: 3-1/2 inches thick for use in 3-5/8 inch metal stud framing
  4. Insulation Width: Provide 16-inch wide batts to fit stud spacing, unless noted otherwise.
- C. Physical Properties:
  1. Thermal Resistance: Thickness as required to comply with applicable Energy Conservation Code
    - a. Stud Cavity Insulation at Interior Walls: R-13, 3-1/2 inches thick
  2. Combustibility (ASTM E136): Classified non-combustible.
  3. Mold/mildew resistant per ASTM C138/C138M.
  4. Surface Burning Characteristics (ASTM E84): Flame Spread: Less than 25; Smoke Developed: Less than 50
  5. Water Vapor Sorption (ASTM C1104/C1104M): 5-percent by weight, maximum.
  6. Dimensional Stability: Less than 0.1-percent linear shrinkage.
  7. Maximum Use Temperature (ASTM C411): 450°F.

- D. Acoustic Performance:
  - 1. Sound Transmission Class (STC) Ratings (ASTM C423):
    - a. Single Layer Wall Systems: 5/8-inch Type X gypsum board on each side of metal stud framing (spaced 16-inches on-center) with 3-1/2 inch thick cavity insulation:
      - 1) 2-1/2 inch metal studs (1-hour): STC 39
      - 2) 2-1/2 inch metal studs (3-hour): STC 54
      - 3) 3-5/8 inch metal studs (non-rated): STC 49
      - 4) 3-5/8 inch metals studs (1-hour): STC 49
      - 5) 3-5/8 inch metal studs (2-hour): STC 56
      - 6) 6-inch metal studs (1-hour): STC 51

## 2.08 MINERAL FIBER BATT INSULATION

- A. Description: Flexible or semi-rigid preformed batt or blanket, complying with ASTM C665; friction fit.
- B. Product: Thermafiber® SAFB™ (Sound Attenuation Fire Blanket) by Thermafiber, Inc. (an Owens Corning company),
  - 1. Physical Properties:
    - a. Thermal Resistance: Thickness as required to comply with applicable Energy Conservation Code
    - b. Surface Burning Characteristics (ASTM E84): Flame Spread: 0; Smoke Developed: 0
    - c. ASTM C 665: Type I, non-corrosive
    - d. Combustibility (ASTM E136): Classified non-combustible.
    - e. Water Vapor Sorption (ASTM C1104/C1104M): Less than 1-percent by volume

## 2.09 ACCESSORIES

- A. Insulation Fasteners
  - 1. Secure friction fit batts with duct tape until gypsum boards are installed.
  - 2. Install galvanized chicken wire fastened to studs at areas where insulation is to be left exposed in metal studs, to secure in place, on both sides if necessary.
- B. Tape joints of rigid insulation in accordance with manufacturers' instructions.
- C. Insulation Fasteners: Lengths of unfinished, 13 gage, 0.072 inch (1.83 mm) high carbon spring steel with chisel or mitered tips, held in place by tension, length to suit insulation thickness and substrate, capable of securely supporting insulation in place.
- D. 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.
- E. Wire Mesh: Galvanized steel, hexagonal wire mesh.
- F. Adhesive: Type recommended by insulation manufacturer for application.

## 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.
- B. Verify substrate surfaces are flat, free of honeycomb, fins, irregularities, or materials or substances that may impede adhesive bond.

### 3.02 INSTALLATION - GENERAL

- A. Comply with insulation manufacturer's written instructions applicable to products and applications indicated.
- B. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed to ice, rain, or snow at any time.
- C. Extend insulation to envelop entire area to be insulated. Cut and fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.

- D. Provide continuous coverage of sound-attenuation batts within partitions. Confirm that batts remain friction fit within framing before enclosing.
- E. Provide sizes to fit applications indicated and selected from manufacturer's standard thicknesses, widths, and lengths. Apply single layer of insulation units to produce thickness indicated unless multiple layers are otherwise shown or required to make up total thickness.

### **3.03 INSTALLATION OF BELOW-GRADE INSULATION**

- A. On vertical surfaces, set insulation units using manufacturer's recommended adhesive loosely laid, and or pinned to excavations according to manufacturer's written instructions.
  - 1. If not otherwise indicated, extend insulation a minimum of 24 inches below bottom of floor line to inside face of foundation wall.
- B. On horizontal surfaces, loosely lay insulation units according to manufacturer's written instructions. Stagger end joints and tightly abut insulation units.
  - 1. If not otherwise indicated, extend insulation a minimum of 24 inches (610 mm) in from exterior walls.

### **3.04 INSTALLATION OF CONTINUOUS INSULATION AT EXTERIOR WALLS**

- A. Install boards horizontally on walls.
  - 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.
- B. Cut and fit insulation tightly to protrusions or interruptions to the insulation plane.
- C. Tape insulation board joints.

### **3.05 INSTALLATION - INSULATION UNDER CONCRETE SLABS-ON-GRADE**

- A. When applicable, 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.

### **3.06 BATT INSTALLATION**

- A. Apply insulation units to substrates by method indicated, complying with manufacturer's written instructions. If no specific method is indicated, bond units to substrate with adhesive or use mechanical anchorage to provide permanent placement and support of units.
- B. Glass-Fiber Blanket Insulation: Install in cavities formed by framing members according to the following requirements:
  - 1. Use insulation widths and lengths that fill the cavities formed by framing members. If more than one length is required to fill the cavities, provide lengths that will produce a snug fit between ends.
  - 2. Place insulation in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.
  - 3. Maintain 3-inch (76-mm) clearance of insulation around recessed lighting fixtures not rated for or protected from contact with insulation.
  - 4. For metal-framed wall cavities where cavity heights exceed 96 inches (2438 mm), support unfaced blankets mechanically with impaling strips, per manufacturers instructions.
  - 5. Maintain 3-inch (76-mm) clearance of insulation around recessed lighting fixtures not rated for or protected from contact with insulation.
- C. Miscellaneous Voids: Install insulation in miscellaneous voids and cavity spaces where required to prevent gaps in insulation.

### **3.07 PROTECTION**

- A. Do not permit installed insulation to be damaged prior to its concealment.

**END OF SECTION**

**SECTION 07 21 60**  
**STRUCTURAL THERMAL BREAK FOR MASONRY VENEER WALLS**

**PART 1 – GENERAL**

**1.01 SECTION INCLUDES**

- A. Provide labor, materials, tools and equipment necessary to complete the Work of this Section including, but not limited to, the following:
  - 1. Extruded Polystyrene continuous insulation for cavity wall application.
  - 2. Cellular glass structural insulating block, secured in mortar to prevent thermal bridging between below grade and above grade continuous insulation.
  - 3. Fasteners and Hardware or other method as recommended by continuous insulation manufacturer.

**1.02 REFERENCES**

- A. American Society for Testing of Materials (ASTM)
  - 1. ASTM C165: Test Method for Measuring Compressive Properties of Thermal Insulations.
  - 2. ASTM C240: Test Methods for Testing Cellular Glass Insulation Block.
  - 3. ASTM C518: Standard Test Method for Steady-State Thermal Transmission Properties by Means of Heat Flow Meter Apparatus.
  - 4. ASTM C578: Standard Specification for Rigid Cellular Polystyrene Thermal Insulation.
  - 5. ASTM C1902: Standard Specification for Cellular Glass Insulation Used in Building and Roof Applications.
  - 6. ASTM D1621: Standard Test Method for Compressive Properties of Rigid Cellular Plastics.
  - 7. ASTM D2126: Standard Test Method for Response of Rigid Cellular Plastics to Thermal and Humid Aging.
  - 8. ASTM E84: Standard Test Method for Surface Burning Characteristics of Building Materials.
  - 9. ASTM E96: Standard Test Methods for Water Vapor Transmission of Materials.
  - 10. ASTM E119: Standard Test Methods for Fire Tests of Building Constructions and Materials.
  - 11. ASTM E228: Standard Test Method for Linear Thermal Expansion of Solid Materials with a Push-Rod Dilatometer.
  - 12. ASTM E331: Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors and Curtain Walls by Uniform Static Air Pressure Difference.
  - 13. ASTM E2357: Standard Test Method for Determining Air Leakage of Air Barrier Assemblies.
- B. International Code Council Evaluation Service (ICC-ES)
  - 1. AC 71: Acceptance Criteria for Foam Plastic Sheathing Panels Used as Water Resistive Barriers.
- C. National Fire Protection Association (NFPA)
  - 1. NFPA 285: Standard Fire Method for Evaluation of Fire Propagation Characteristics of Exterior Non-Load-Bearing Wall Assemblies Containing Combustible Components.

**1.03 ADMINISTRATIVE REQUIREMENTS**

- A. Coordination
  - 1. Coordinate installation of masonry veneer, masonry ties, insulation, firestopping, and accessories with air barrier membrane, roofing, fenestration, and other moisture protection work.
- B. Preinstallation Meeting: Convene a meeting of involved sub-contractors a minimum of two weeks prior to commencing Work described in this Section.

**1.04 SUBMITTALS**

- A. Product Data: Manufacturers' data on each type of product furnished including:
  - 1. Preparation instructions and recommendations.

2. Technical data and tested physical and performance properties of products.
  3. Storage, handling requirements, and recommendations.
- B. Shop Drawings:
1. Show locations and extent of cladding attachment and cladding. Include details for substrate joints and cracks, counterflashing strips, penetrations, inside and outside corners, terminations, flashing transition assemblies, and tie-ins with adjoining construction.
  2. Include details of interfaces with other materials that form part of building enclosure.
- C. Samples: Submit product minimum two samples of the following:
1. Extruded Polystyrene Insulation minimum three inches by three inches.
  2. Cellular Glass Structural Insulating Block, minimum three inches by three inches.
  3. Any fasteners, hardware, and adhesives recommended by manufacturer.
- D. Certificates: Submit documentation signed by Manufacturer that products meet Quality Assurance Certification requirements of this Section.
- E. Test And Evaluation Reports:
1. NFPA 285: Provide documentation from qualified testing agency or fire engineer that the cladding, cladding attachment, insulation, and air barrier system as components of the designed wall assembly have been tested and passed NFPA 285 or approved by third-party engineering judgement.
  2. ASTM E119: Provide documentation from qualified testing agency or fire engineer that the cladding, cladding attachment, insulation, and air barrier system as components of the designed wall assembly have been tested and passed ASTM E119 or approved by third-party engineering judgement.
  3. Engineering analysis: provide engineering analysis by cladding attachment manufacturer for cladding and building conditions using specified insulation, fasteners, cladding, and attachment accessories.
- F. Manufacturer's Instructions: Provide Manufacturer's installation instructions for each product specified in this Section.
- G. Sustainable Design Submittals: Submit material health and recycled content of each product specified as required in Quality Assurance Sustainability Standards Certification of this Section.
- H. Qualification Statements: Provide documentation of required Quality Assurance Qualifications for Manufacturers and Installers for all products in wall assembly as required in this Section.
- I. Warranty Documentation: Submit sample warranties as required by this Section.

#### **1.05 QUALITY ASSURANCE**

- A. Qualifications:
1. Manufacturers: Insulation systems shall be manufactured and marketed by a firm with a minimum of 20 years' experience in the production and sales of insulation materials. Obtain continuous insulation materials through one source from a single manufacturer. Manufacturers proposed for use, but not named in these specifications shall submit evidence of ability to meet all requirements specified and include a list of projects of similar design and complexity completed within the past 5 years.
  2. Installers: The installation work of this section shall be performed by one entity, an experienced contractor that employs installers and supervisors who are trained and authorized by manufacturer, with a minimum two years' record of successful installations on projects of similar scope.
- B. Certifications:
1. Provide Manufacturer's written certification that cladding attachment system components are compatible.
  2. Provide Manufacturer's written certification that assembly components are compatible with all adjacent materials that come into contact during construction and throughout the life of the building.

3. Provide Manufacturer's written certification that products are for the intended purpose as described in this Section.
- C. Sustainability Standards Certifications: Minimum recycled content Certified by independent third-party testing.
- D. Mock-ups:

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

- A. Deliver and store products in Manufacturer's unopened packaging until ready for installation.
- B. Store and protect products in accordance with manufacturer's instructions. Store in a dry area and protect from water, direct sunlight, flame, and ignition sources.
- C. Remove and replace materials that are damaged.
- D. In the event the extruded polystyrene insulation board becomes wet, wipe dry prior to installation.
- E. In the event the batt or blanket insulation becomes wet, remove it from the jobsite.

#### **1.07 FIELD CONDITIONS**

- A. Apply products within the range of ambient and substrate temperatures recommended by manufacturer.
- B. Protect substrates from environmental conditions that affect insulation performance.

#### **1.08 WARRANTY**

- A. Provide Manufacturer's standard limited warranty against manufacturing defects.

### **PART 2 – PRODUCTS**

#### **2.01 EXTRUDED POLYSTYRENE INSULATION**

- A. Refer to Section 07 21 00

#### **2.02 CELLULAR GLASS STRUCTURAL INSULATING BLOCK**

- A. Basis-of-Design: Owens Corning® ([www.owenscorning.com/insulation/commercial](http://www.owenscorning.com/insulation/commercial)) FOAMGLAS® PERINSUL® SIB, or equal product from Armatherm, General Plastics, or equal.
  1. Description: Provide cellular glass structural insulating block for use under first course of masonry veneer. Each insulation block must be labeled with manufacturer's name and product brand name.
- B. Performance/ Design Criteria:
  1. Type V per ASTM C1902 certified by independent third-party testing agency.
  2. Compressive Strength: 304 psi, minimum per ASTM D1621.
  3. Thermal Resistance (measured per ASTM C518 at mean temperature of 75°F): R-2.8 per inch of thickness in horizontal direction and R-2.4 per inch of thickness in vertical direction.
  4. Water Absorption (ASTM C272): Maximum.0.001 percent by volume.
  5. Surface Burning Characteristics (ASTM E84): Flame spread less than 25; smoke developed less than 450, certified by independent third-party testing agency (unfaced).
- C. Materials:
  1. Faced on top and bottom for installation into mortar bed.
  2. Contains no HCFCs or HFC 134a blowing agents.
  3. Recycled Content: Minimum 20%, certified by independent third party.
  4. Size: 2.25 inches by 3.625 inches (Standard/ Nominal) thick by 17.7 inches long; square edge.
  5. Size:.75 inches by 3.625 inches (Jumbo) thick by 17.7 inches long; square edge.
  6. Size: 3.625 inches by 3.625 inches (Economy) thick by 17.7 inches long; square edge.

### **PART 3 – EXECUTION**

#### **3.01 EXAMINATION**

- A. Verify adjacent materials are dry and ready to receive insulation.

- B. Installation of products specified in this Section constitutes acceptance of existing conditions and assumption of responsibility for satisfactory performance.

### **3.02 PREPARATION**

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

### **3.03 INSTALLATION**

- A. Cellular Glass Structural Insulating Block:
  - 1. Verify manufacturer recommended cure time for air and water barrier system and waterproofing before installing structural insulating block.
  - 2. Install a single layer of cellular glass structural insulating block with facers on top and bottom surfaces fully embedded into mortar set on brick ledge in accordance with manufacturers' written recommendations.
  - 3. Install cellular glass structural insulating block maximum sizes to minimize joints.
  - 4. Locate joints square to framing members. Do not cantilever cellular glass structural insulating block.
  - 5. Butt joints of cellular glass structural insulating block with no gaps or mortar between joints.
  - 6. Insulation board edges shall be butted together tightly and fit around openings and penetrations. Install square edges to fit square and tight.
  - 7. Extend insulation in single course to cover entire area to be insulated. Cut and fit tightly around obstructions and fill voids with insulation. Do not drill.
  - 8. Place layer of mortar on upper facer of cellular glass structural insulating block to fully and continuously cover material and receive subsequent masonry courses as specified in Section 04 20 00. First course shall be solid brick with no holes or voids.
  - 9. Install masonry veneer immediately.

### **3.04 PROTECTION**

- A. Protect insulation from damage due to weather and physical abuse until protected by permanent construction.
- B. Touch-up, repair, or replace damaged products before Substantial Completion.

**END OF SECTION**

**SECTION 07 24 00  
EXTERIOR INSULATION AND FINISH SYSTEMS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Provide air and moisture barrier, and compatible EIFS for vertical above grade exterior walls.

**1.02 RELATED REQUIREMENTS**

- Section 05 40 00 - Cold-Formed Metal Framing.
- Section 06 10 00 - Rough Carpentry.
- Section 07 62 00 - Sheet Metal Flashing and Trim.
- Section 07 92 00 - Joint Sealants.

**1.03 REFERENCES**

- A. ASTM C1177/C1177M - Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing.
- B. ASTM C150/C150M - Standard Specification for Portland Cement.
- C. ASTM C578 - Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation.
- D. ASTM C1382 -
- E. ASTM C1397 - Standard Practice for Application of Class PB Exterior Insulation and Finish Systems (EIFS) and EIFS with Drainage.
- F. ASTM E2568 -
- G. ISO 9001 - Quality Management Systems — Requirements.

**1.04 SYSTEM DESCRIPTION**

- A. General: Exterior Insulation and Finish System (EIFS), Class PB, consisting of an air/water-resistive barrier, an adhesive, grooved expanded polystyrene insulation board, flashings and trim, base coat, reinforcing mesh(es), and finish.
- B. Method of Installation
  - 1. Field Applied

**1.05 DESIGN REQUIREMENTS**

- A. Sheathing Substrate: Refer to Section 06 16 00.
- B. Wind Load
  - 1. Design for maximum allowable system deflection, normal to the plane of the wall, of L/240.
  - 2. Design for wind load in conformance with code requirements.
  - 3. Maximum wind load resistance: + 188 psf (9.00 kPa), provided structural supports and sheathing/sheathing attachment are adequate to resist these pressures.
- C. Moisture Control
  - 1. Prevent the accumulation of water behind the EIFS or into the wall assembly, either by condensation or leakage through the wall construction, in the design and detailing of the wall assembly:
    - a. Provide flashing to direct water to the exterior where it is likely to penetrate components in the wall assembly, including, above window and door heads, beneath window and door sills, at roof/wall intersections, decks, abutments of lower walls with higher walls, above projecting features, at floor lines, and at the base of the wall.
    - b. Air Leakage Prevention - provide continuity of the air barrier system at foundation, roof, windows, doors, and other penetrations through the wall with connecting and compatible air barrier components to minimize condensation and leakage caused by air movement.
    - c. Vapor Diffusion and Condensation - perform a dew point analysis and/or dynamic hygrothermal modeling of the wall assembly to determine the potential for accumulation of moisture in the wall assembly by diffusion. Adjust insulation

thickness and/or other wall assembly components accordingly to minimize risk. Avoid the use of vapor retarders on the interior side of the wall in warm, humid climates.

- D. Impact Resistance
  - 1. Provide ultra-high impact resistance of the EIFS to a minimum height of 8'-0" above finished grade at all areas accessible to pedestrian traffic and other areas exposed to abnormal stress or impact. Indicate the areas with impact resistance other than "Standard" on contract drawings.
- E. Joints
  - 1. Provide minimum 3/4 inch (19 mm) wide joints in the EIFS where they exist in the substrate or supporting construction, where the cladding adjoins dissimilar construction or materials, at changes in building height, at expansion, control, and cold joints in construction, and at floor lines in multi-level wood frame construction. Size joints to correspond with anticipated movement. Align terminating edges of EIFS with joint edges of thru-wall expansion joints and similar joints in construction.
  - 2. Provide minimum 1/2 inch (13 mm) wide perimeter sealant joints at all penetrations through the EIFS (windows, doors, mechanical, electrical, and plumbing penetrations, etc.).
  - 3. Specify compatible backer rod and sealant that has been evaluated in accordance with ASTM C 1382, and that meets minimum 50% elongation after conditioning.
  - 4. Provide joints so that air barrier continuity is maintained across the joint, and drain joints to the exterior, or provide other means to prevent or control water infiltration at joints.
- F. Terminations
  - 1. Prior to applying the system, wall openings shall be treated with a Flashing System or Flashing Tape.
  - 2. The system shall be held back from adjoining materials around openings and penetrations such as windows, doors, and mechanical equipment a minimum of 3/4-inches for sealant application.
  - 3. The system shall be terminated a minimum of 8-inches above finished grade.

#### **1.06 SUBMITTALS**

- A. Product Data: Provide data on system materials, product characteristics, performance criteria, and system limitations.
- B. Shop Drawings: Indicate wall and soffit joint patterns, joint details, and molding profiles.
- C. Shop Drawings: Include plans, elevations, sections, details of components, details, penetrations, terminations, joints, fasteners, and attachments to other work.
- D. Selection Samples: Submit manufacturer's standard range of samples illustrating available coating colors and textures.
- E. Verification Samples: Submit actual samples of selected coating on specified substrate, minimum 12 inches (300 mm) square, illustrating project colors and textures.
- F. Manufacturer's Installation Instructions: Indicate preparation required, installation techniques, and jointing requirements.

#### **1.07 QUALITY ASSURANCE**

- A. Maintain copy of specified installation standard and manufacturer's installation instructions at project site during installation.
- B. EIFS Manufacturer Qualifications: Provide 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 30 years.
  - 3. Manufacturing facilities ISO 9001 certified.
- 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 the type of work specified and with at least three years of documented experience.

#### **1.08 DELIVERY, STORAGE & 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 insulation materials from exposure to sunlight.

#### **1.09 FIELD CONDITIONS**

- A. Do not prepare materials or apply EIFS under conditions other than those described in the manufacturer's written instructions.

#### **1.10 SEQUENCING AND SCHEDULING**

- A. Installation of the EIFS shall be coordinated with other construction trades.
- B. Sufficient manpower and equipment shall be employed to ensure a continuous operation, free of cold joints, scaffold lines, texture variations, etc.

#### **1.11 WARRANTY**

- A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.
- B. Manufacturer's shall provide a written moisture drainage and limited materials warranty against defective material, for a period of 10 years from the Date of Substantial Completion.
- C. Provide separate warranty from installer covering workmanship for a period of 1 year from the Date of Substantial Completion.

### **PART 2 PRODUCTS**

#### **2.01 MANUFACTURERS**

- A. Specified Manufacturer: STO Corporation
  - 1. Other Manufacturers: The following manufacturers are approved to provide materials or products that are equivalent to the "Basis of Design":
    - a. Parex USA, Inc.
    - b. Dryvit, Inc.
    - c. Senergy (Degussa Wall Systems, Inc.)
  - 2. Products of unnamed manufacturers with equivalent products to the specified manufacturer will be considered in accordance with the "or equal" provision specified in Division 01 "Product Requirements".
    - a. Product Substitutions: Comply with the requirements specified in Division 01 "Substitution Procedures"

#### **2.02 EXTERIOR INSULATION AND FINISH SYSTEM**

- A. Exterior Insulation and Finish System: DRAINAGE type; reinforced finish coating on flat-backed insulation board adhesive-applied directly to water-resistive coating over substrate.
  - 1. Basis of Design Product: Sto Corp; StoTherm ci Essence.
- B. All components of the EIFS shall be supplied or obtained from Sto Corporation or its authorized distributors. Substitutions or additions of materials other than specified will void the warranty.

#### **2.03 AIR / MOISTURE BARRIER**

- A. Product: StoGuard®:
  - 1. Joint Treatment, Rough Opening Protection, and Detail Components:
    - a. StoGuard RapidSeal™ - one component rapid drying gun-applied rough opening protection for frame and CMU walls without mesh or fabric reinforcement. Also use as a joint treatment for sheathing when used with StoGuard Mesh. Also used to seal fish mouths, wrinkles, seams, gaps, holes, or other voids in StoGuard air barrier materials
- B. Waterproof Coating:

1. Sto Gold Coat® - ready mixed waterproof coating for concrete, concrete masonry, wood-based sheathing, and glass mat gypsum sheathing
- C. Transition Detail Components:
  1. StoGuard Transition Membrane - flexible air barrier membrane for continuity at static transitions such as sheathing to foundation, dissimilar materials (CMU to frame wall), wall to balcony floor slab or ceiling, and shingle lap transitions of flashing. Also used for dynamic joints: floor line deflection joints, masonry control joints, and through wall joints in masonry or frame construction

#### **2.04 ADHESIVE**

- A. Sto Primer Adhesive-B - factory blended one-component polymer-modified portland cement based adhesive

#### **2.05 INSULATION BOARD**

- A. Sto EPS Insulation Board: nominal 1.0 lb/ft<sup>3</sup> (16 kg/m<sup>3</sup>) Expanded Polystyrene (EPS) insulation board in compliance with ASTM E2430 and ASTM C578 Type I requirements and listed, and labeled.
- B. Board Thickness: As indicated on drawings.

#### **2.06 BASE COAT**

- A. Cementitious Base Coat
  1. Sto Primer/Adhesive-B - factory blended one component polymer modified portland cement based base coat. Also used as a leveler for concrete and masonry surfaces
    - a. Sto Primer/Adhesive - acrylic based base coat field mixed with portland cement. Also used as a leveler for concrete and masonry surfaces

#### **2.07 REINFORCING MESHES**

- A. Standard Mesh
  1. Sto Mesh - nominal 4.5 oz./yd<sup>2</sup> (153 g/m<sup>2</sup>), symmetrical, interlaced open-weave glass fiber fabric made with alkaline resistant coating for compatibility with Sto materials (achieves Standard Impact Classification).
    - a. Application: Standard-impact reinforcing mesh for all walls above the heavy-duty reinforcing mesh.
- B. High Impact Mesh
  1. Sto Intermediate Mesh - nominal 11.2 oz./yd<sup>2</sup> (380 g/m<sup>2</sup>), high impact, interwoven, open weave glass fiber fabric with alkaline resistant coating for compatibility with Sto materials (achieves High Impact Classification).
    - a. Application: Heavy-duty reinforcing mesh from ground level up to 8'-0" above finish floor elevation for all walls.
- C. Specialty Meshes
  1. Sto Detail Mesh - nominal 4.2 oz./yd<sup>2</sup> (143 g/m<sup>2</sup>), flexible, symmetrical, interlaced glass fiber fabric, with alkaline resistant coating for compatibility with Sto materials (used for standard back wrapping, aesthetic detailing, and reinforcement of sheathing joints and protection of rough openings with trowel applied air/moisture barrier)

#### **2.08 FINISH COAT**

- A. Sto Essence DPR Finish: Acrylic based textured wall finish with graded marble aggregate.
  1. Texture: To Be Determined.
  2. Color: As selected by Architect from manufacturer's standard color/s.

#### **2.09 JOB MIXED INGREDIENTS**

- A. Portland Cement: Shall be Type I or II, meeting ASTM C150/C150M, white or gray in color, fresh and free of lumps.
- B. Water: Shall be clean and free of foreign matter.

## 2.10 ACCESSORIES

- A. Starter Track with Weep Holes - Rigid PVC (polyvinyl chloride) plastic track Part No. STDE as furnished by Plastic Components, Inc., or equivalent.
- B. Sto-Mesh Corner Bead Standard - one component PVC (polyvinyl chloride) accessory with integral reinforcing mesh for outside corner reinforcement.
- C. Sto Drip Edge Profile - one component PVC (polyvinyl chloride) accessory with integral reinforcing mesh that creates a drip edge and plaster return

## 2.11 MIXING

- A. Sto Gold Fill - mix with a clean, rust-free high speed mixer to a uniform consistency
- B. Sto Gold Coat - mix with a clean, rust-free high speed mixer to a uniform consistency
- C. Sto Primer/Adhesive-B - mix ratio with water: 5-6.5 quarts (4.7-6.2 L) of water per 50 pound (23 kg) bag of Sto Primer/Adhesive-B. Pour water into a clean mixing pail. Add Sto Primer/Adhesive-B, mix to a uniform consistency and allow to set for approximately 5 minutes. Adjust mix if necessary by adding up to 12 fl. oz. (0.35L) of water per bag and re-mix to a uniform trowel consistency. Avoid re-tempering. Keep mix ratio consistent. Do not exceed maximum amount of water in mix ratio.
- D. Sto Essence DPR Finish - mix with a clean, rust-free high speed mixer to a uniform consistency. A small amount of water may be added to adjust workability. Limit addition of water to amount needed to achieve the finish texture.
- E. Mix only as much material as can readily be used
- F. Do not use anti-freeze compounds or other additives

## PART 3 EXECUTION

### 3.01 EXAMINATION

- A. Inspect sheathing application for compliance with applicable requirement and installation in conformance with specification and manufacturer requirements:
  - 1. Glass Mat Faced gypsum sheathing compliant with ASTM C1177/C1177M
  - 2. Attachment into structural supports with adjoining sheets abutted (gapped if wood-based sheathing) and fasteners at required spacing to resist design wind pressures as determined by design professional
  - 3. Fasteners seated flush with sheathing surface and not over-driven
- B. Report deviations from the requirements of project specifications or other conditions that might adversely affect the Air/Moisture Barrier and the EIFS installation to the Construction Manager. Do not start work until deviations are corrected.

### 3.02 SURFACE PREPARATION

- A. Remove surface contaminants on gypsum sheathing surfaces.
- B. Remove fasteners that are not anchored into supporting construction and seal holes with air barrier material
- C. Seal over-driven fasteners with air barrier material and install additional fasteners as needed to comply with fastener spacing requirement
- D. Fill large gaps between sheathing or voids around pipe, conduit, scupper, and similar penetrations with spray foam and shave flush with surface.
- E. Replace weather-damaged sheathing and repair or replace damaged or cracked sheathing

### 3.03 INSTALLATION - GENERAL

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

### 3.04 AIR / MOISTURE BARRIER INSTALLATION

- A. Transition Detailing: Seal substrate transitions and intersections with other materials to form continuous water-resistive barrier on exterior of sheathing, using method recommended by manufacturer.
- B. Rough Opening Protection: At door and window rough openings and other wall penetrations, seal water-resistive barrier and flexible flashings to rough opening before installation of metal flashings, sills, or frames, using method recommended by manufacturer.
  - 1. Metal Stud Framing Construction:
    - a. Sto Gold Coat with StoGuard Fabric.
- C. Sheathing Joint Treatment:
  - 1. Sto Gold Coat with StoGuard Fabric.
- D. Air/Moisture Barrier Coating Installation
  - 1. Gypsum Sheathing: Apply waterproof coating by spray or roller over sheathing surface, including the dry joint treatment, rough opening protection, and transition areas, to a uniform wet mil thickness of 10 mils (Sto Gold Coat). Use 3/4-inch nap roller for gypsum sheathing. Protect from weather until dry.
- E. Air /Moisture Barrier Connections and Shingle Laps
  - 1. Coordinate installation of connecting air barrier components with other trades to provide a continuous air tight membrane.
  - 2. Coordinate installation of flashing and other moisture protection components with other trades to achieve complete moisture protection such that water is directed to the exterior, not into the wall assembly, and drained to the exterior at sources of leaks (windows, doors and similar penetrations through the wall assembly).
  - 3. Splice-in head flashings above windows, doors, floor lines, roof/sidewall step flashing, and similar locations with StoGuard detail component to achieve shingle lap of the air/moisture barrier such that water is directed to the exterior.

### 3.05 EIFS INSTALLATION

- A. Starter Track:
  - 1. Strike a level line at the base of the wall to mark where the top of the starter track terminates.
  - 2. Attach the starter track even with the line into structural supports with the proper fastener.
  - 3. Butt sections of starter track together. Miter cut outside corners and abut. Snip front flange of one inside corner piece (to allow EPS insulation board to be seated inside of track) and abut.
  - 4. Install Starter Track at other EIFS terminations as designated on detail drawings: above roof along dormers or gable end walls, and beneath window sills with concealed flashing.
- B. Detail Splice Strips for Starter Track, Flashing at Floor Lines, Head of Windows and Doors:
  - 1. Install minimum 4 inch (100 mm) wide detail component over back flange of Starter Track, Window/Door Head Flashing, or Floor Line Flashing. Center the detail component so it spans evenly between the back leg of flashing (or accessory) and the coated sheathing. Make a smooth transition to the coated sheathing with a trowel, knife, or roller, depending on the detail component material being used. When Sto Gold Fill with StoGuard Mesh is the detail component apply another coat of the waterproof coating over the detail area. Do not leave detail components exposed for more than 30 days.
- C. Backwrapping
  - 1. Apply a strip of detail mesh to the dry air/moisture barrier at all system terminations (windows, doors, expansion joints, etc.) except where the Starter Track is installed. The mesh must be wide enough to adhere approximately 4 inches (100 mm) of mesh onto the wall, be able to wrap around the insulation board edge and cover a minimum of 2.5-inches (64 mm) on the outside surface of the insulation board. Attach mesh strips to the air/moisture barrier and allow them to dangle until the backwrap procedure is completed. Alternatively, pre-wrap terminating edges of insulation board.

- D. Adhesive Application and Installation of Insulation Board
1. Ensure the air/moisture barrier surface (Sto Gold Coat) is free of surface contamination. Install the insulation board within 30 days of the application of the air/moisture barrier coating (Sto Gold Coat), or clean the surface and recoat with Sto Gold Coat.
  2. Rasp the interior lower face of insulation boards to provide a snug friction fit into the Starter Track. (Note: rasping prevents an outward bow at the Starter Track).
  3. Use either polyurethane spray foam adhesive (Sto TurboStick) or cementitious adhesive (Sto Primer/Adhesive or Sto Primer/Adhesive-B) per manufacturer's guidelines.
    - a. Place insulation boards in a running bond pattern on the wall with the long dimension horizontal. Start by inserting the lower edge of the boards inside the starter track at the base of the wall until they contact the bottom of the track. Apply light pressure when placing the boards. After boards have been in place for 5-10 minutes use a straight edge to lightly press the boards inward and to keep board joints flush, as post expansion of the adhesive may force boards slightly outward.
  4. Bridge sheathing joints by a minimum of 6 inches (152 mm). Interlock inside and outside corners.
  5. Butt all board joints tightly together to eliminate any thermal breaks. Care must be taken to prevent any adhesive from getting between the joints of the boards.
  6. Cut insulation board in an L-shaped pattern to fit around openings. Do not align board joints with corners of openings.
  7. Check for satisfactory contact of the insulation board with the substrate. If any boards have loose areas use the spray foam adhesive dispensing pistol to create a hole through the board and inject adhesive to attach the loose area. Allow the adhesive to expand to the outer face of the board while withdrawing the pistol. Cut excess adhesive flush with the surface of the insulation. Do not use nails, screws, or any other type of non-thermal mechanical fastener.
- E. Slivering and Rasping of Insulation Board Surface
1. Fill any open joints in the insulation board layer with slivers of insulation or the spray foam adhesive.
  2. Rasp the insulation board surface to achieve a smooth, even surface and to remove any ultraviolet ray damage.
- F. Trim, Reveals and Projecting Aesthetic Features:
1. Attach features and trim where designated on drawings with adhesive to a base layer of insulation board or to the coated sheathing surface. Fill any gaps between the trim and base layer of insulation with spray foam adhesive and rasp flush with the trim surface. Slope the top surface of all trim/features minimum 1:2 (27°) and the bottom of all horizontal reveals minimum 1:2 (27°).
  2. Cut reveals/aesthetic grooves with a hot-knife, router or groove-tool in locations indicated on drawings.
  3. Offset reveals/aesthetic grooves minimum 3 inches (75 mm) from insulation board joints.
  4. Do not locate reveals/aesthetic grooves at high stress areas.
  5. Ensure minimum 3/4-inch (19 mm) thickness of insulation board at the bottom of the reveals/aesthetic grooves.
- G. Completion of Backwrapping
1. Complete the backwrapping procedure by applying base coat to exposed edges of insulation board and approximately 4 inches (100 mm) onto the face of the insulation board. Pull mesh tight around the board and embed it in the base coat with a stainless steel trowel. Use a corner trowel for clean, straight lines. Smooth any wrinkles or gaps in the mesh.
- H. Accessory Installation
1. Corner Bead: cut the corner bead accessory to proper length as needed. Use full pieces wherever possible and avoid using short filler pieces. Offset accessory butt joints from substrate joints. Apply base coat with a stainless steel trowel to an approximate thickness of 1/8 inch (3 mm) to the outside corner area that will receive the accessory. Immediately

place the accessory directly into the wet base coat material. Do not slide into place. Press the accessory into place. A corner trowel is best for this purpose. Embed and completely cover the mesh and PVC by troweling from the corner to the edge of the mesh so that no mesh or PVC color is visible. Avoid excess build-up of base coat and feather along mesh edges. Adjoin separate pieces by abutting PVC to PVC and overlapping the mesh "tail" from one piece onto the next piece. Fully embed the accessory and mesh "tail" in base coat material. When installing field mesh reinforcement overlap accessory mesh and PVC. Remove any excess base coat from the outside corner.

2. Drip Edge: install the drip edge accessory prior to application of field mesh. Install with arrow on mesh pointing UP. Cut the accessory to proper length as needed. Use full pieces wherever possible and avoid using short filler pieces. Offset accessory butt joints from substrate joints. Apply base coat with a stainless steel trowel to an approximate thickness of 1/8 inch (3 mm) to the area that will receive the accessory. Immediately place the accessory directly into the wet base coat material and press into place. Do not slide into place. Embed and completely cover the mesh and PVC by troweling from the drip edge screed rail to the edge of the mesh. Avoid excess build-up of base coat, feather along mesh edges, and remove any excess base coat from the drip edge nosing. Abut adjoining pieces and install as described above. When installing field mesh reinforcement overlap accessory mesh 4 inches (10 cm) on both vertical and horizontal faces so the PVC is overlapped, and remove any excess base coat from the drip edge nosing. On vertical and horizontal faces of the accessory install finish to the drip edge lines and remove any protruding finish from the drip edge nosing.

I. Base Coat and Reinforcing Mesh Application

1. Ensure the insulation board is firmly adhered and free of surface contamination or UV degradation, and is thoroughly rasped before commencing the base coat application.
2. Apply minimum 9x12 inch (225x300 mm) diagonal strips of detail mesh at corners of windows, doors, and all penetrations through the system. Embed the strips in wet base coat and trowel from the center to the edges of the mesh to avoid wrinkles.
3. Apply detail mesh at trim, reveals and projecting architectural features. Embed the mesh in the wet base coat. Trowel from the base of reveals to the edges of the mesh.
4. Ultra-High impact mesh application: Apply base coat over the insulation board with a stainless steel trowel to a uniform thickness of approximately 1/8 inch (3 mm). Work horizontally or vertically in strips of 40 inches (1016 mm), and immediately embed the mesh into the wet base coat by troweling from the center to the edge of the mesh. Butt ultra-high impact mesh at seams. Allow the base coat to dry.
5. Standard mesh application: Apply base coat over the insulation board, including areas with Ultra-High impact mesh, with a stainless steel trowel to a uniform thickness of approximately 3/8 inch (3 mm). Work horizontally or vertically in strips of 40 inches (1016mm), and immediately embed the mesh into the wet base coat by troweling from the center to the edge of the mesh. Overlap mesh not less than 2-1/2 inches (64 mm) at mesh seams and at overlaps of detail mesh. Feather seams and edges. Double wrap all inside and outside corners with minimum 6 inch (152 mm) overlap in each direction (optional if corner bead accessory is used). Avoid wrinkles in the mesh. The mesh must be fully embedded so that no mesh color shows through the base coat when it is dry. Re-skim with additional base coat if mesh color is visible.
6. Sloped Surfaces: for trim, reveals, aesthetic bands, cornice profiles, sills or other architectural features that project beyond the vertical wall plane more than 2-inches (51 mm) apply waterproof base coat with a stainless steel trowel to the sloped surface and minimum four inches (100 mm) above and below it. Embed standard mesh or detail mesh in the waterproof base coat and overlap mesh seams a minimum of 2.5-inches (65 mm).
7. Allow base coat to thoroughly dry before applying primer or finish.

J. Primer application (if applicable):

1. Ensure the base coat surface is free of surface contamination before commencing the primer application.
2. Apply primer evenly with brush, roller or proper spray equipment over the clean, dry base coat and allow to dry thoroughly before applying finish.

K. Finish Coat Application

1. Ensure the base coat surface or primed base coat is free of surface contamination before commencing the finish application.
2. Apply finish directly over the base coat or primed base coat when dry. Apply finish by spray or stainless steel trowel, depending on the finish specified. Follow these general rules for application of finish:
  - a. Avoid application in direct sunlight.
  - b. Apply finish in a continuous application, and work to an architectural break in the wall.
  - c. Weather conditions affect application and drying time. Hot or dry conditions limit working time and accelerate drying. Adjustments in the scheduling of work may be required to achieve desired results. Cool or damp conditions extend working time and retard drying and may require added measures of protection against wind, dust, dirt, rain and freezing. Adjust work schedule and provide protection.
  - d. Do not install separate batches of finish side-by-side.
  - e. Do not apply finish into or over sealant joints. Apply finish to outside face of wall only.
  - f. Do not apply finish over irregular or unprepared surfaces, or surfaces not in compliance with the requirements of the project specifications.

**3.06 FIELD QUALITY CONTROL**

- A. Special Inspections: Owner will engage a qualified special inspector to perform any special inspections required by local jurisdictions:
- B. Remove and replace EIFS where test results indicate that EIFS does not comply with specified requirements.
- C. Prepare test and inspection reports.

**3.07 CLEANING**

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

**3.08 PROTECTION**

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

**END OF SECTION**

**SECTION 07 27 26  
FLUID-APPLIED MEMBRANE AIR BARRIERS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Fluid-applied, vapor-permeable membrane air barriers for use over glass mat gypsum wall sheathing and other substrates indicated.

**1.02 RELATED REQUIREMENTS**

- A. Section 04 73 00 - Manufactured Stone Veneer
- B. Section 06 16 00 - Glass-Mat Gypsum Sheathing
- C. Section 07 54 23.10 - TPO Single-Ply Roofing System (Mechanically Attached)
- D. Section 07 62 00 - Sheet Metal Flashing and Trim
- E. Section 08 11 13 - Hollow Metal Doors and Frames \*\*
- F. Section 08 43 13 - Aluminum-Framed Entrances and Storefronts

**1.03 REFERENCES**

- A. American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) Standard 90.1-2010 "Energy Standard for Buildings Except Low-Rise Residential Buildings"
- B. ASTM C 920 Standard Specification for Elastomeric Joint Sealants
- C. ASTM D412 Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers—Tension
- D. ASTM E 84 Standard Test Method for Surface Burning Characteristics of Building Materials
- E. ASTM E 96 Standard Test Methods for Water Vapor Transmission of Materials.
- F. ASTM E 1105 Standard Test Method for Field Determination of Water Penetration of Installed Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform or Cyclic Static Air Pressure Difference
- G. ASTM E2178 Standard Test Method for Air Permeance of Building Materials
- H. ASTM E2357 Standard Test Method for Determining Air Leakage of Air Barrier Assemblies
- I. National Fire Protection Association (NFPA) 285 Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Non-Load-Bearing Wall Assemblies Containing Combustible Components

**1.04 DEFINITIONS**

- A. Air-Barrier Material: A primary element that provides a continuous barrier to the movement of air.
- B. Air-Barrier Accessory: A transitional component of the air barrier that provides continuity.
- C. Air-Barrier Assembly: The collection of air-barrier materials and accessory materials applied to an opaque wall, including joints and junctions to abutting construction, to control air movement through the wall.

**1.05 PREINSTALLATION MEETING**

- A. Preinstallation Conference: Conduct conference at Project site.
  - 1. Review air-barrier requirements and installation, special details, mockups, air-leakage, and bond testing, air-barrier protection, and scheduling the work that covers air barriers.

**1.06 PERFORMANCE REQUIREMENTS**

- A. Installed product and accessories constitute a continuous air barrier, as described in ASHRAE Standard 90.1-2010 Section 5.4.3.1
- B. Installed product and accessories shall perform as a liquid water drainage plane flashed to discharge to the exterior any incidental condensation or water penetration.

- C. Exterior wall assemblies incorporating the product and accessories shall be tested in accordance with and comply with the acceptance criteria of NFPA 285.
- D. The product shall be of flame-retardant, non-asphalt synthetic polymer composition.
- E. The product shall be a nominal 0.040 inch (40 mils) thickness membrane, with a dry film thickness of the installed product measuring a minimum of 0.030 inches (30 mils) with a comb gauge.
- F. Product shall meet the following requirements:
  - 1. Air Leakage Rate of Wall Assembly (ASTM E2357): 0.00242 cfm /ft<sup>2</sup> @ 1.57 psf @ 65 mils (wet)
  - 2. Air Leakage Rate of Material (ASTM E2178 ): 0.0002 cfm /ft<sup>2</sup> @ 1.57 psf @ 65 mils (wet)
  - 3. Water Vapor Permeance (ASTM E96/E96M – water method): 14.295 US Perms @ 60 mils wet (40 mils dry)
  - 4. Tensile Strength: ASTM D412: 100 lbs/sq. in., minimum.
  - 5. Tensile Elongation: ASTM D412: Minimum 200 percent.
  - 6. Water Resistance: AATCC Test Method 127: Product over gypsum sheathing with joint shall resist a 55 cm (22 inch) column of water for 5 hours, no leaking or wet through
  - 7. Surface Burning: ASTM E84: Flame Spread Index: 25 (max.), Smoke Generation Index: 450 (max.)

#### **1.07 SUBMITTALS**

- A. Product Data: For each type of product.
  - 1. Include manufacturer's written instructions for evaluating, preparing, and treating substrate; technical data; and tested physical and performance properties of products.
- B. Shop Drawings: For air-barrier assemblies.
  - 1. Show locations and extent of the air barrier. Include details for substrate joints and cracks, counterflashing strips, penetrations, inside and outside corners, terminations, and tie-ins with adjoining construction.
  - 2. Include details of interfaces with other materials that form part of the air barrier.
- C. Product Certificates: From air-barrier manufacturer, certifying compatibility of air barriers and accessory materials with Project materials that connect to or that come in contact with the barrier.
- D. Product Test Reports: For each air-barrier assembly, for tests performed by a qualified testing agency.

#### **1.08 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 work of the type specified and with at least three years of documented experience.
- C. Testing Agency Qualifications: Independent firm specializing in performing testing and inspections of type specified in this section.

#### **1.09 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver materials to Project site in original packages with seals unbroken, labeled with manufacturer's name, product, lot number, and directions for storage.
- B. Store materials in their original undamaged packages in a clean, dry, protected location and within the temperature range required by the manufacturer.
- C. During cold weather, maintain product temperature within the acceptable range for application, as required by the air barrier manufacturer. Protect freeze-sensitive materials from freezing.

#### **1.10 FIELD CONDITIONS**

- A. Environmental Limitations: Apply air barrier within the range of ambient and substrate temperatures recommended by the air-barrier manufacturer.

1. Protect substrates from environmental conditions that affect air-barrier performance.
2. Do not apply the air barrier to a damp or wet substrate or during snow, rain, fog, or mist.

### **1.11 WARRANTY**

- A. The manufacturer shall warrant the product against material defects or defects in the manufacturing for five (5) years from the date of Substantial Completion.
  1. Include coverage to repair or replace air barrier coatings and accessory products that demonstrate deterioration or failure within a 10-year period after Date of Substantial Completion due to material failure under normal use; failure includes water or air penetration through air barrier assembly.

## **PART 2 PRODUCTS**

### **2.01 MANUFACTURERS**

- A. Specified Manufacturer: Carlisle Coatings & Waterproofing, Inc.; "Barritech VP"
  1. Other acceptable manufacturers with equivalent products to the specified manufacturer shall include:
    - a. W.R. Meadows; "Air Shield LMP"
    - b. Henry Company; "Air Bloc 33"
    - c. Rubber Polymer Corporation, Inc.; "Rub-R-Wall Airtight VP"
    - d. Tremco Incorporated; "ExoAir 230"
    - e. Dow; "DOWSIL DefendAir 200C"
  2. Products of unnamed manufacturers with equivalent products to the specified manufacturer will be considered in accordance with the "or equal" provision specified in Division 01 "Product Requirements".
    - a. Product Substitutions: Comply with the requirements specified in Division 01 "Substitution Procedures".

### **2.02 MATERIALS, GENERAL**

- A. Source Limitations: Obtain primary air-barrier materials and air-barrier accessories from a single source manufacturer.
- B. VOC Content: 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24) and complying with VOC content limits of authorities having jurisdiction.

### **2.03 VAPOR-PERMEABLE MEMBRANE AIR-BARRIER**

- A. Basis of Design Product: Carlisle; "Barritech VP" Fluid-Applied, Vapor-Permeable Membrane Air Barrier
- B. General: Air barrier shall be capable of performing as a continuous vapor-permeable air barrier and as a liquid-water drainage plane flashed to discharge to the exterior incidental condensation or water penetration. Air-barrier assemblies shall be capable of accommodating substrate movement and of sealing substrate expansion and control joints, construction material changes, penetrations, and transitions at perimeter conditions without deterioration and air leakage exceeding specified limits.
- C. Performance Requirements: Refer to Heading 1.07

### **2.04 ACCESSORY MATERIALS**

- A. General: Provide from the same manufacturer as air barrier membrane.
- B. Detail Flashing: Foil-faced butyl or foil-faced rubberized asphalt flashing, minimum 0.030" (30 mils) thickness. Approved with air barrier membrane in NFPA 285 wall assemblies.
  1. AlumaGRIP-701 by Carlisle Coatings & Waterproofing, Incorporated
  2. Others as approved by air barrier membrane manufacturer
- C. Contact Adhesive:
  1. Carlisle Coatings & Waterproofing, Inc.
    - a. Over approved wall substrates: CCW-702 Solvent-Based, CCW-702 LV VOC Compliant Solvent-Based, CCW-702 WB Water-Based, CAV-GRIP™ Aerosol Spray or Travel-Tack portable aerosol spray cans

2. Others as approved by air barrier membrane manufacturer
- D. Detail Mastic:
  1. Carlisle; SURE-SEAL Lap Sealant, or equivalent
- E. Transition Membrane:
  1. Carlisle; CCW SURE-SEAL Pressure-Sensitive Elastoform, or equivalent
- F. Transition Membrane Primer:
  1. Carlisle; CURE-SEAL HP- 250 Primer, SURE-SEAL EP-95 Splicing Cement or SURE-SEAL Low VOC EPDM Primer, or equivalent
- G. Reinforcing Fabric: Woven, synthetic polymer fabric
  1. Carlisle; DCH Reinforcing Fabric, or equivalent
- H. Glass Mat: Randomly-oriented glass strands held in binder soluble in wet air barrier membrane. Offered in rolls of various widths
  1. Carlisle; LiquiFiber-W, or equivalent
- I. Fill Compound: 2-part, non-sag polyurethane sealant
  1. Carlisle; CCW-703 V or CCW-201, or equivalent
- J. Sealants: By others

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Examine substrates, areas, and conditions affecting the installation of the air & vapor barrier and accessory products for compliance with requirements. Verify that surfaces and conditions are suitable before beginning Work. Do not proceed with installation until unsatisfactory conditions have been corrected.
- B. Verify that wall assemblies are dried in, such that water intrusion will not occur from above, behind, or around the air barrier installation.
- C. Surfaces shall be sound, dry, and free of oil, grease, dirt, excess mortar, or other contaminants.
- D. Surfaces shall be supported and flush at joints without large voids or sharp protrusions.
- E. Sheathing boards shall be flush at joints, with gaps between boards according to building code and sheathing manufacturer's requirements. Sheathing boards shall also be securely fastened to the structure with proper fastener type, technique, and spacing according to building code and sheathing manufacturer's requirements. Sheathing boards shall be repaired or replaced if the inspection reveals moisture damage, mechanical damage or if sheathing boards have exceeded the exposure duration or exposure conditions as required by the sheathing manufacturer.

#### **3.02 SURFACE PREPARATION**

- A. Clean, prepare, treat, and seal substrate according to the manufacturer's written instructions. Provide clean, dust-free, and dry substrate for air-barrier application.
- B. Mask off adjoining surfaces not covered by air barrier to prevent spillage and overspray affecting other construction.
- C. Cover counter-sunk fasteners and holes through exterior sheathing with fill compound or detail sealant struck flush.
- D. Fill cracks, gaps, and joints with fill compound, detail sealant, or other material approved by air barrier manufacturer.
- E. Fill rough gaps around pipe, conduit, and similar penetrations with mortar, non-shrink grout, fill compound or polyurethane foam sealant shaved flush.
- F. Primer: Apply primer to substrates as required based upon air barrier coating manufacturer's recommendations, using application methods and rate of application recommended by the manufacturer; allow the primer to fully dry before application of air barrier coating.

### **3.03 INSTALLATION**

- A. Apply air barrier system materials in accordance with the manufacturer's instructions.
- B. Transition Strips and Silicone Sealants: Install with approved sealants in accordance with the manufacturer's written instructions.
- C. Air Barrier Coating: Apply air barrier coating using application methods and rate of application recommended by the manufacturer, using nap roller or airless sprayer, in accordance with requirements of authorities having jurisdiction (AHJ).
  - 1. Provide wet application not less than 30 mils, 0.030 inch (0.76 mm) thick, or more as required by substrate conditions, with dry film thickness (DFT) not less than 15 mils, 0.015 inch (0.38 mm) thick.
  - 2. Apply additional coats as required to provide uniform, continuously cured, airtight and watertight film.

### **3.04 FIELD QUALITY CONTROL**

- A. Manufacturers Field Services and Reports:
  - 1. The manufacturer shall provide qualified staff personnel to make field visits to the Project Site to observe site conditions, condition of surfaces and installation, quality of workmanship, as applicable, and to initiate instructions when necessary.
    - a. A minimum of two (2) field visits are required.
  - 2. Individuals are to report observations and on-site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.
    - a. Submit report within (10) days of observation to Contractor and Architect.
- B. The Owner may retain a testing agency to perform the following tests:
  - 1. Verification that substrate preparation meets requirements.
  - 2. Testing and certification that coating materials comply with requirements for thickness and continuity.
  - 3. Testing of application for compliance with adhesion and film thickness requirements.
- C. If testing indicates products or current installation does not meet requirements, Owner may have materials removed from substrates that are not in compliance, and have other necessary corrections made to ensure the application meets designated requirements.

### **3.05 CLEANING AND PROTECTION**

- A. Protect air-barrier system from damage during application and remainder of the construction period, according to manufacturer's written instructions.
  - 1. Protect air barrier from exposure to UV light and harmful weather exposure as required by the manufacturer. If exposed to these conditions for more than 60 days, remove and replace the air barrier or install the additional, full-thickness, air-barrier application after repairing and preparing the overexposed membrane according to the air-barrier manufacturer's written instructions.
  - 2. Protect air barrier from contact with incompatible materials and sealants not approved by the air-barrier manufacturer.
- B. Clean spills, stains, and soiling from construction that would be exposed in the completed work using cleaning agents and procedures recommended by the manufacturer of affected construction.
- C. Remove masking materials after installation.

**END OF SECTION**

**SECTION 07 42 13.16  
MODULAR METAL CLADDING PANELS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Concealed fastener, post finished, rainscreen wall cladding panels
- B. Concealed fastener, post finished, soffit cladding panels

**1.02 RELATED REQUIREMENTS**

- A. Section 07 27 26 - Fluid-Applied Membrane Air Barriers
- B. Section 07 62 00 - Sheet Metal Flashing and Trim
- C. Section 07 92 00 - Joint Sealants

**1.03 REFERENCE STANDARDS**

- A. American Architectural Manufacturer's Association (AAMA):
  - 1. 611 - Voluntary Specification for Anodized Architectural Aluminum.
  - 2. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels.
- B. American Society of Civil Engineers (ASCE):
  - 1. ASCE 7 - Minimum Design Loads for Buildings and Other Structures.
- C. ASTM International (ASTM):
  - 1. ASTM B 209 - Specification for Aluminum and Aluminum Alloy Sheet and Plate.
  - 2. B449 - Standard Specification for Chromates on Aluminum.
  - 3. D1730 - Standard Practices for Preparation of Aluminum and Aluminum-Alloy Surfaces for Painting.
  - 4. D2244 - Standard Practice for Calculation of Color Tolerances and Color Differences from Instrumentally Measured Color Coordinates.
  - 5. D4214 - Standard Test Methods for Evaluating the Degree of Chalking of Exterior Paint Films.
  - 6. ASTM B 221 - Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
  - 7. ASTM D 3359 - Standard Test Methods for Measuring Adhesion by Tape Tests.
  - 8. ASTM E 329 - Standard Specification for Agencies Engaged in Construction Inspection and/or Testing.
  - 9. ASTM E 72 - Standard Test Methods of Conducting Strength Tests of Panels for Building Construction.

**1.04 PERFORMANCE REQUIREMENTS**

- A. General: Provide modular metal wall and soffit panel system meeting performance requirements as determined by application of specified tests by a qualified testing agency on manufacturer's standard assemblies.
- B. Structural Performance: Design modular metal wall panel system fabricated to withstand the effects of wind loads under conditions indicated below.
  - 1. Wind Loads: Determine loads based on uniform pressure, building category, exposure category, and basic wind speed indicated on drawings.
  - 2. Air/Moisture Barrier: Refer to Section 07 27 26
- C. Thermal Movements: Allow for thermal movements from variations in both ambient and internal temperatures. Accommodate movement of support structure caused by thermal expansion and contraction.
- D. Wall systems that incorporate foam plastic insulation must be tested by the foam plastic supplier in accordance with NFPA-285.

### **1.05 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Approved manufacturer listed in this Section with minimum 10-years experience in manufacture of similar products in successful use in similar applications.
- B. Installer Qualifications: Experienced Installer with minimum of 5-years' experience with successfully completed projects of a similar nature and scope.

### **1.06 ADMINISTRATIVE REQUIREMENTS**

- A. Pre-installation Meeting: Conduct pre-installation meeting at site attended by Owner, Architect, manufacturer's technical representative, and other trade contractors.
  - 1. Coordinate building framing in relation to modular metal panel system.
  - 2. Coordinate window, door and louver, and other openings and penetrations of modular metal panel system.

### **1.07 ACTION SUBMITTALS**

- A. Product Data: Manufacturer's data sheets for specified products.
- B. Shop Drawings: Provide shop drawings prepared by manufacturer or manufacturer's authorized dealer. Include full elevations showing openings and penetrations. Include details of each condition of installation and attachment. Provide details at a minimum scale 3-inch per foot of all required trim and extrusions needed for a complete installation
  - 1. Include data indicating compliance with performance requirements.
  - 2. Indicate points of supporting structure that must coordinate with modular metal panel system installation.
- C. Field Measurements: It is the panel installer's responsibility to verify locations of structural members, adjoining construction, and wall openings dimensions by field measurement before panel fabrication and indicate measurements on final shop drawings.
- D. Samples for Initial Selection: For each product specified including sealants and gaskets. 2 x 3-1/2 inch coating samples showing available colors on aluminum backing.
- E. Samples: Provide minimum 24-inch (600 mm) section of wall panel showing, horizontal joinery, vertical joint return, panel stiffener, and anchoring details. Provide 12-inch (300 mm) long pieces of each extruded aluminum trim.

### **1.08 INFORMATIONAL SUBMITTALS**

- A. Test Report: Indicating compliance of products with project requirements, based off of testing from a qualified independent testing agency.
- B. Qualification Information: For Installer and Installer's field supervisor.
- C. Manufacturer's warranty: Submit sample warranty.

### **1.09 CLOSEOUT SUBMITTALS**

- A. Maintenance data.

### **1.10 DELIVERY, STORAGE, AND HANDLING**

- A. Protect products of modular metal panel system during shipping, handling, and storage to prevent staining, denting, deterioration of components, or other damage.
  - 1. Deliver, unload, store, and erect modular metal wall panel system and accessory items without misshaping panels or exposing panels to surface damage from weather or construction operations.

### **1.11 WARRANTY**

- A. Special Manufacturer's Warranty: Manufacturer agrees to repair or replace modular metal cladding assemblies that fail in materials and workmanship for two years from the Date of Substantial Completion.
- B. Paint Finish Warranty : Manufacturer agrees to repair or replace modular metal cladding that display evidence of deterioration of finish within 20-years from the Date of Substantial Completion.

## **PART 2 PRODUCTS**

### **2.01 SYSTEM DESCRIPTION**

- A. Modular metal cladding panel system consisting of aluminum panels in a rainscreen application as part of the assembly described below.
  - 1. Modular Metal Wall Panels over Outside-Insulated Framed Wall System: Modular metal panels applied as exterior rainscreen cladding over wall framing (Section 05 40 00) with exterior sheathing (Section 06 16 00), an applied membrane that provides air, moisture, and water vapor control (Section 07 27 26), and insulation within the framing and applied outboard of the sheathing (Section 07 21 00). Metal wall panel installation specified in this Section includes [secondary metal subgirt framing and] mounting clips for panel attachment.

### **2.02 MANUFACTURERS**

- A. Specified Manufacturer: CENTRIA Architectural Systems  
(P: (800)759-7474. P: (412)299-8000. Fax: (412)299-8317. Email: info@CENTRIA.com. Web: www.CENTRIA.com)
  - 1. Other acceptable manufacturers with equivalent products to the specified manufacturer shall include:
    - a. Dri Design, Inc. (P: 616-355-2970 / Email: request info (sales@dri-design.com) / Web: www.dri-design.com)
    - b. Alcoa Architectural Products (P: 800-841-7774 / Website: www.reynobond.com)
  - 2. Products of unnamed manufacturers with equivalent products to the specified manufacturer will be considered in accordance with the "or equal" provision specified in Division 01 "Product Requirements".
    - a. Product Substitutions: Comply with the requirements specified in Division 01 "Substitution Procedures".

### **2.03 MATERIALS**

- A. Aluminum Sheet: Smooth surface coil-coated sheet, ASTM B209, 3105-H14 Alloy.
  - 1. Aluminum Material: Tension-leveled, [fluoropolymer PVDF painted finish, 3105-H14] or [anodized finish, 5005-AQ]
  - 2. Thickness: 0.060 inches nominal
  - 3. Weight: Approximately 1.5 lb. per square foot
  - 4. Finish: Two-Coat Fluoropolymer

### **2.04 MODULAR METAL PANELS**

- A. Basis of Design Product: CENTRIA; "Intercept ENTYRE Modular Metal Wall Panel System", or equivalent.
- B. Factory-formed, aluminum-faced panels fabricated from 0.060 inch thick aluminum sheet.
  - 1. Panel Depths: 1-3/8 inches (35mm).
  - 2. Panel Flatness: Maximum allowable distortion: 1/32 inch in 24 inches (0.813 mm in 610 mm) in any direction. Panel lines, breaks, and angles shall be sharp and true, and surfaces shall be free from warp or buckle.
  - 3. Attachment Clips: Manufacturer's standard extruded clips as required to meet performance requirements and ensure consistent reveals, non-extruded attachment will not be accepted.
  - 4. Fasteners: Spacing, type and quantity as determined by manufacturer's structural engineer
  - 5. Accessories: As indicated on manufacturer's standard drawings
  - 6. Panel Joints: 3/4 inch (19mm)
  - 7. Panel Sizes: As indicated on drawings.
  - 8. Provide post-finishing of panels, paint/anodize aluminum wall panels only after completion of panel fabrication.
- C. Sheet Surface: Smooth.
- D. Aluminum Face Sheet Finishes:

1. Superior Performance Organic Coating System: AAMA 2605 multiple coat, thermally cured polyvinylidene fluoride (PVDF) resin system.
  - a. Two Coat Fluoropolymer: AAMA 2605, fluoropolymer finish containing minimum 70 percent PVDF resins, two coat system, color to be selected from manufacturer's full color range.
- E. Exposed Trim, Flashings and Fastener Finish: Match panel finish unless otherwise noted.
  1. Minimum Thickness: 0.060 inch nominal shop formed
  2. Refer to section 07 62 00

## **2.05 SECONDARY METAL FRAMING**

- A. Miscellaneous Framing Components, General: Cold-formed metallic-coated steel sheet, ASTM A 653/A 653M, G90 (Z180) hot-dip galvanized zinc coating.
  1. Hat Channels: 0.048 inch/18 ga. (1.22 mm) minimum nominal thickness.
  2. Sill Channels: 0.048 inch/18 ga. (1.22 mm) minimum nominal thickness.

## **2.06 ACCESSORIES**

- A. Provide manufacturer's extruded clips, shims, flashings, sealants, and tapes for a complete installation.

## **2.07 FABRICATION**

- A. General: Fabricate modular metal panels and accessories at factory identical to tested units using manufacturer's standard procedures and processes necessary to meet performance requirements.
  1. Provide components of modular metal panel system that are products of one manufacturer, including modular metal panels, head and sill trim, bottom weep, starter flash, and metal copings.
- B. Modular Metal Panels: Fabricate modular metal panels requiring no further fabrication or modification in field.
  1. Horizontal Joints: Dry seal, drained and back ventilated.
  2. Vertical Joints: Pre-formed returns
  3. Reveals: 3/4 inches (19mm)
  4. Standard System Depth: 1-3/8 inches (35mm)

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Examine modular metal panel system substrate with Installer present. Inspect for erection tolerances and other conditions that would adversely affect installation of modular metal panel system.
  1. Inspect framing that will support modular metal panel system to determine if support components are installed as indicated on approved shop drawings and are within tolerances acceptable to modular metal wall panel system manufacturer.
    - a. Maximum deviations acceptable to modular metal panel system manufacturer:
      - 1) 1/4-inch in 20 feet (6.4 mm in 6 m) vertically or horizontally from face plane of framing.
      - 2) 1/2-inch (12.7 mm) maximum deviation from flat substrate on any building elevation.
      - 3) 1/8-inch in 5 feet (3.2 mm in 1.5 m).
  2. Confirm presence of acceptable framing members to match installation requirements of modular metal panel system.
    - a. Confirm framing minimum .048 inch (18 gauge) (1.22 mm) at maximum 24 inch (610 mm) spacing.
  3. Verify that window, door, louver, and other penetrations match layout on shop drawings.

### **3.02 INSTALLATION**

- A. General: Install modular metal panel system in accordance with approved shop drawings and manufacturer's recommendations.

- B. Installation: Attach panels to metal sub-framing using recommended clips, screws, fasteners, sealants, and adhesives indicated on approved shop drawings.
  - 1. Horizontal Joinery: Working from base of installation to top, connect upper panel to lower panel at joinery.
  - 2. Vertical Joinery: Provide reveal between vertical ends of panels as shown on shop drawings.
  - 3. Galvanic Action: Where elements of modular metal wall system will come into contact with dissimilar materials, treat faces and edges in contact with dissimilar materials as recommended by manufacturer.
- C. Rainscreen Installation: Proceed with installation of manufacturer's dry seal horizontal joinery. Keep open spaces in horizontal joinery intended to ventilate cavity behind system.

### **3.03 FIELD QUALITY CONTROL**

- A. Manufacturer's Field Service: Engage a service representative authorized by metal wall panel manufacturer to inspect completed installation. Submit written report. Correct deficiencies noted in report.

### **3.04 CLEANING AND PROTECTION**

- A. Remove temporary protective films within 2 weeks of erection. Clean finished surfaces as recommended by metal wall panel manufacturer. Clear weep holes and drainage channels of obstructions, dirt, and sealant. Maintain in a clean condition during construction.
- B. Replace damaged panels and accessories that cannot be repaired by field repair.

**END OF SECTION**

**SECTION 07 42 13  
METAL WALL PANELS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

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

**1.02 RELATED REQUIREMENTS**

- A. Section 05 40 00 - Cold-Formed Metal Framing: Wall panel substrate.
- B. Section 06 10 00 - Rough Carpentry: Wall panel substrate.
- C. Section 07 25 00 - Weather Barriers: Weather barrier under wall panels.
- D. Section 07 26 00 - Vapor Retarders: Vapor retarder under wall panels.

**1.03 REFERENCE STANDARDS**

- A. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures.

**1.04 SUBMITTALS**

- A. Product Data - Wall System: Manufacturer's data sheets on each product to be used, including:
  - 1. Physical characteristics of components shown on shop drawings.
  - 2. Storage and handling requirements and recommendations.
  - 3. Installation instructions and recommendations.
- B. Shop Drawings: Indicate dimensions, layout, joints, construction details, support clips, [\_\_\_\_], and methods of anchorage.
- C. Samples: Submit two samples of wall panel and soffit panel, 12 inches by 12 inches (305 mm by 305 mm) in size illustrating finish color, sheen, and texture.
- D. Manufacturer's qualification statement.

**1.05 DELIVERY, STORAGE, AND HANDLING**

- A. See Section 01 74 19 - Construction Waste Management and Disposal for packaging waste requirements.
- B. Protect panels from accelerated weathering by removing or venting sheet plastic shipping wrap.
- C. Store prefinished material off the ground and protected from weather; prevent twisting, bending, or abrasion; provide ventilation; slope metal sheets to ensure proper drainage.
- D. Prevent contact with materials that may cause discoloration or staining of products.

**1.06 WARRANTY**

- A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.
- B. Finish Warranty: Provide 5-year manufacturer warranty against excessive degradation of exterior finish. Include provision for replacement of units with excessive fading, chalking, or flaking. Complete forms in Owner's name and register with warrantor.

**PART 2 PRODUCTS**

**2.01 MANUFACTURERS**

- A. Metal Wall Panels - Exposed Fasteners:
  - 1. ATAS International, Inc; Belvedere PenumWall: [www.atas.com/#sle](http://www.atas.com/#sle).
  - 2. Berridge Manufacturing Company; M-Panel: [www.berridge.com/#sle](http://www.berridge.com/#sle).
  - 3. Englert, Inc; 1.25 Inch Uniline R: [www.englertinc.com/#sle](http://www.englertinc.com/#sle).
  - 4. Fabral; Hefti-Rib: [www.fabral.com/#sle](http://www.fabral.com/#sle).
  - 5. Substitutions: See Section 01 60 00 - Product Requirements.

**2.02 METAL WALL PANEL SYSTEM**

- A. Wall Panel System: Factory fabricated prefinished metal panel system, site assembled.

1. Provide exterior wall panels and subgirt framing assembly.
  2. Design and size components to support assembly dead loads, and to withstand live loads caused by positive and negative wind pressure acting normal to plane of wall.
  3. Maximum Allowable Deflection of Panel:  $L/180$  for length(L) of span.
  4. Movement: Accommodate movement within system without damage to components or deterioration of seals, movement between system and perimeter components when subject to seasonal temperature cycling; dynamic loading and release of loads; and deflection of structural support framing.
  5. Drainage: Provide positive drainage to exterior for moisture entering or condensation occurring within panel system.
  6. Fabrication: Formed true to shape, accurate in size, square, and free from distortion or defects; pieces of longest practical lengths.
  7. Corners: Factory-fabricated in one continuous piece with minimum 2-inch (51 mm) returns.
- B. Exterior Wall Panels:
1. Profile: Horizontal; style as indicated.
  2. Side Seams: Double-interlocked, tight-fitting, sealed with continuous gaskets.
  3. Panel Width: [ ] inches ([ ] mm).
  4. Color: As selected by Architect from manufacturer's standard line.
- C. Interior Liner Panels:
1. Profile: Vertical; style as indicated.
  2. Side Seams: Interlocking, sealed with continuous bead of sealant.
  3. Panel Width: [ ] inch ([ ] mm).
- D. Soffit Panels:
1. Profile: Style as indicated, with venting provided.
- E. Subgirt Framing Assembly:
- F. Internal and External Corners: Same material, thickness, and finish as exterior sheets; profile to suit system; shop cut and factory mitered to required angles.
- G. Expansion Joints: Same material, thickness and finish as exterior sheets; [ ] gauge, [ ] inch ([ ] mm) thick; manufacturer's standard brake formed type, of profile to suit system.
- H. Trim: Same material, thickness and finish as exterior sheets; brake formed to required profiles.
- I. Anchors: Galvanized steel.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Verify that building framing members are ready to receive panels.
- B. Verify weather barrier, see Section 07 25 00, has been installed over wall panel substrate; see Section 05 40 00.

#### **3.02 INSTALLATION**

- A. Install panels on walls and soffits in accordance with manufacturer's instructions.
- B. Fasten panels to structural supports; aligned, level, and plumb.
- C. Locate joints over supports.

#### **3.03 CLEANING**

- A. Remove site cuttings from finish surfaces.
- B. Remove protective material from wall panel surfaces.
- C. Clean and wash prefinished surfaces with mild soap and water; rinse with clean water.

**END OF SECTION**

**SECTION 07 46 16**  
**LINEAR METAL CLADDING PANELS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Aluminum cladding with woodgrain appearance.
- B. Trim, flashings, accessories, and fasteners.

**1.02 RELATED REQUIREMENTS**

- A. Section 07 25 00 - Weather Barriers
- B. Section 07 62 00 - Sheet Metal Flashing and Trim
- C. Section 07 92 00 - Joint Sealants

**1.03 REFERENCE STANDARDS**

- A. AAMA 609 & 610 - Cleaning and Maintenance Guide for Architecturally Finished Aluminum (Combined Document).

**1.04 SUBMITTALS**

- A. See Section 01 33 00 - Submittal Procedures, for submittal procedures.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
  - 1. Preparation instructions and recommendations.
  - 2. Cladding materials, underlayment, flashings, fasteners and accessories.
  - 3. Dimensions, physical properties, and typical details.
  - 4. Storage and handling requirements and recommendations.
  - 5. Installation instructions and recommendations.
- C. Shop Drawings: Indicate layout, methods of attachment and support clips, provisions for movement, flashing, trim, edge and field conditions, interface with adjacent materials, locations of cutouts or special shapes, and details.
- D. Samples: For each finish product specified, provide two complete sets of color chips representing manufacturer's full range of available colors and patterns.
- E. Manufacturer's qualification statement.
- F. Installer's qualification statement.
- G. Executed warranty.

**1.05 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than five years of documented experience.
- B. Installer Qualifications: Company specializing in performing work of the type specified and with at least five years of documented experience.

**1.06 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver and store products in manufacturer's unopened packaging bearing brand name and manufacturer's identification until ready for installation.
- B. Verify quantities and condition immediately upon receipt; remove damaged materials from site, and coordinate with manufacturer to replace with new materials meeting specified requirements.
- C. Store products off the ground, within manufacturer's temperature and environmental limits, away from moisture, protected from traffic and construction activities, and minimize on-site storage prior to installation.

**1.07 FIELD CONDITIONS**

- A. Do not install cladding when air temperature or relative humidity are outside manufacturer's limits.

## 1.08 WARRANTY

- A. Manufacturer's Warranty: The manufacturer shall warrant the installation to be free of defects in material and workmanship for a period of two (2) years from the Date of Substantial Completion.
- B. Finish Warranty: Provide manufacturer's limited lifetime warranty against cracking, peeling and gloss/color retention within the guidelines stated by the American Aluminum Manufacturers Association (AAMA).
  - 1. Wood Grains
    - a. Interpon / AkzoNobel D2010 STF Series – AMMA 2604 (10 year Florida) 15 year manufacturer's warranty.
- C. Installation Warranty: The installing subcontractor shall warrant the installation to be free of defects in material and workmanship for a period of one (1) year from the Date of Substantial Completion.

## PART 2 PRODUCTS

### 2.01 MANUFACTURERS

- A. Specified Manufacturer: Knotwood, a brand of OmniMax ([www.knotwood.com](http://www.knotwood.com))
- B. Substitutions: Not permitted.

### 2.02 METAL CLADDING

- A. Wall Cladding, designated in the Drawings as Exterior Finish Type MP- 2
- B. Wall Cladding: Exterior Finish Type MP- 2:
  - 1. Basis of Design: Knotwood; "Wood Grain Aluminum Wall Cladding"
    - a. Material: 6063-T6 aluminum, extruded
    - b. Model: KEC100, KEC150, KEC200
    - c. Size: As Indicated on Drawings
    - d. Finish: Alluminate bonded film finish with woodgrain appearance.
      - 1) Color: As Indicated on Drawings
- C. Aluminum Trim: Exterior Finish Type MP- 2:
  - 1. Basis of Design: Knotwood; "Wood Grain Aluminum Trim"
    - a. Material: 6063-T6 aluminum, extruded
    - b. Finish: Alluminate bonded film finish with woodgrain appearance.
      - 1) Color: As Indicated on Drawings
  - 2. Accessories: Provide coordinating accessories made of same material as required for complete and proper installation.
    - a. KEDSTRADJ - Starter Piece for Cladding and Decking 18'6"
    - b. KECFBF- Cladding Flashing Base (used with KWCFITLM)
    - c. KECFTTLM - Cladding Top Clip
    - d. KECJBF - Cladding Bottom Joiner (used with KWCTJ)
    - e. KECTJM - Cladding Top Joiner
    - f. KECIECF - Cladding Internal/External Female Corner
    - g. KECIECM - Cladding Internal/External Male Corner

### 2.03 FINISHES

- A. Pretreatment: E-CLPS Chrome Free five stager aluminum pretreatment system. Complies with, AAMA 2604, and AAMA 2605 Superior Performance Standard and meets EPA, OSHA, State and Local environmental requirements and contains no chromates, cyanides, or other heavy metals.
- B. AkzoNobel electrostatic applied Architectural Powder Coatings are approved to AAMA 2604 Performance Standard.
  - 1. Gloss Level: Standard Gloss is 30 percent, plus or minus 5 percent.
- C. Finish: Knotwood; "Premium Wood Finishes"; Uses a polyurethane powder coat with ink based wood grain patterns sublimated into the base powder effectively tattooing the powder. The

combined effect creates all the aesthetic aspects of real wood in a powder coated finish.

1. Wood Grained (AkzoNobel STF D2010 Series)
  - a. Color: As Indicated on Drawings

#### **2.04 FABRICATION**

- A. Prepare surfaces, pre-treat and coat components in accordance with AAMA 2604 and 2605 Quality Standards and applicable European standards for the coating material specified.
- B. Wrap and package coated components using methods suitable for transit and covered site storage without damage.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Examine substrate conditions before beginning installation.
- B. Verify dimensions and acceptable substrate condition.
- C. Verify water-resistive barrier (WRB) has been properly installed over substrate; see Section 07 25 00.
- D. Do not proceed with installation until unacceptable conditions have been corrected.

#### **3.02 PREPARATION**

- A. Surface Preparation: Prepare surfaces as recommended by manufacturer.
- B. Protect surrounding areas and adjacent surfaces during execution of this work.

#### **3.03 INSTALLATION**

- A. Install aluminum wall cladding, trim, and accessories in accordance with manufacturer's written instructions.
- B. Attach cladding using manufacturers recommended fasteners, sealants, and adhesives, allowing for thermal expansion.
- C. Provide concealed fasteners except where approved on shop drawings.
- D. Horizontal Cladding: Work from base of installation to top; stagger lap joints in horizontal cladding in uniform pattern as successive courses of cladding are installed.
- E. Install joint sealants to ensure watertight conditions; see Section 07 92 00.
- F. Where dissimilar materials are in contact, prevent galvanic action as recommended by manufacturer.

#### **3.04 CLEANING**

- A. Upon completion of installation, thoroughly clean prefinished aluminum surfaces in accordance with AAMA 609 & 610.

#### **3.05 PROTECTION**

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

**END OF SECTION**

**SECTION 07 54 23**  
**TPO SINGLE-PLY ROOFING SYSTEM (FULLY ADHERED)**

**PART 1 GENERAL**

**1.01 RELATED DOCUMENTS**

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

**1.02 SECTION INCLUDES**

- A. Provide all labor, material, tools, equipment, and supervision necessary to complete the installation of the reinforced TPO (Thermoplastic Polyolefin) Adhered Roofing System including flashings and insulation as specified herein and as indicated on the drawings following the manufacturer's most current specifications and details.

**1.03 RELATED REQUIREMENTS**

- Section 05 31 00 - Steel Decking
- Section 06 10 00 - Rough Carpentry
- Section 07 62 00 - Sheet Metal Flashing and Trim

**1.04 REFERENCE STANDARDS**

- A. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures.
- B. ASTM C1549 - Standard Test Method for Determination of Solar Reflectance Near Ambient Temperature Using a Portable Solar Reflectometer.
- C. ASTM C1289 - Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board.
- D. ASTM D6878/D6878M - Standard Specification for Thermoplastic Polyolefin-Based Sheet Roofing.
- E. ASTM D751 - Standard Test Methods for Coated Fabrics.
- F. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials.

**1.05 DESIGN AND PERFORMANCE REQUIREMENTS**

- A. General Performance: Installed membrane roofing and base flashings shall withstand specified uplift pressures, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other construction defects. Membrane roofing and base flashings shall remain watertight.
- B. Material Compatibility: Provide roofing materials that are compatible with one another under conditions of service and application required, as demonstrated by membrane roofing manufacturers based on testing and field experience.
- C. Delegated Design: Design the single-ply roofing system, including comprehensive engineering analysis by a qualified professional engineer, using the design criteria specified below.
  - 1. General Design Criteria: The completed roof system shall meet the following requirements:
    - a. Building Code: 2018 IBC
    - b. ASCE 7-16
    - c. Risk Category (Table 1604.5): III
    - d. External Fire Resistance Classification: Class A, when tested per UL 790.
  - 2. Wind-Resistance Design Criteria
    - a. Design and size components to withstand loads caused by pressure and suction of wind acting normal to the plane of the roof.
    - b. Refer to the Structural Drawings for the following design criteria:
      - 1) Risk Category
      - 2) Ultimate Design Wind Speed,  $V_{ULT}$
      - 3) Wind Exposure Category
      - 4) Applicable internal pressure coefficient

- 5) Surface Roughness Category
3. Design Wind Pressures: The wind loads shall be determined in accordance with ASCE 7-16, Method 1 - Simplified Method.
  - a. Refer to the Structural Drawings for the minimum design wind-resistance loads for the following:
    - 1) Roof Interior (Field of Roof): Zone 1
    - 2) Roof Edge (Perimeter of Roof): Zone 2
    - 3) Roof Corners: Zone 3
    - 4) Depth of Perimeter and Corner Zones
  - b. The Roofing Contractor shall submit fastening pattern diagrams for the field, perimeter, and corner conditions, which meet the design load requirements.
4. Seismic Design Criteria:
  - a. Refer to the Structural Drawings for the following design criteria:
    - 1) Risk Category
    - 2) Seismic Design Category
    - 3) Site Class
    - 4) Seismic Force-Resisting System
    - 5) Design Spectral Response Acceleration Parameters,  $S_{DS}$  and  $S_{D1}$
    - 6) Mapped Spectral Response Acceleration Parameters,  $S_S$  and  $S_1$
    - 7) Basic Seismic Force-Resisting System/s
    - 8) Design Base Shear/s
    - 9) Seismic Response Coefficients/s,  $CS$
    - 10) Response Modification coefficient/s,  $R$
    - 11) Component Importance Factor,  $I_e$
    - 12) Analysis Procedure Used
5. Thermal Performance:
  - a. Applicable Code: 2012 International Energy Conservation Code (IECC)
  - b. Climate Zone: 4A
  - c. Minimum R-Value (per Table C402.2):
    - 1) Insulation entirely above deck: R-25ci
  - d. The roof R-Value is calculated by the continuous roof insulation being installed completely above the roof deck.
  - e. The TPO membrane (white and tan) meets the ENERGY STAR requirement for reflectance and emittance when tested following ASTM C1549.
6. Drainage: Provide a roof system with positive drainage where all standing water dissipates within 48 hours after precipitation ends.

#### 1.06 SUBMITTALS

- A. Submit under provisions of Section 01 33 00
- B. Product Data: Provide the manufacturer's written information listed below.
  1. Product data indicating membrane materials, flashing materials, insulation, vapor retarder, surfacing, and fasteners.
  2. Preparation instructions and recommendations.
  3. Storage and handling requirements.
- C. Shop Drawings: Indicate joint or termination detail conditions, conditions of interface with other materials, setting plan for tapered insulation, and mechanical fastener layout.
- D. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- E. Manufacturer's Field Reports: Indicate procedures followed, ambient temperatures, humidity, wind velocity during application, and supplementary instructions given.
- F. Manufacturer's Installation Instructions: Indicate membrane seaming precautions and perimeter conditions requiring special attention.
- G. Warranty:

1. Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with the manufacturer.
2. Submit installer's certification that installation complies with all warranty conditions for the waterproof membrane.

#### **1.07 QUALITY ASSURANCE**

- A. Installer Qualifications: A qualified firm that is approved, authorized or licensed by membrane roofing system manufacturer to install manufacturer's product and that is eligible to receive manufacturer's special warranty.
- B. Source Limitations: Obtain components including for membrane roofing system from the same manufacturer as membrane roofing or approved by the membrane roofing manufacturer.
- C. Fire-Resistance Ratings: Where indicated, provide fire-resistance-rated roof assemblies identical to those of assemblies tested for fire resistance per ASTM E119 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
- D. This roofing system must be installed by a Manufacturer Authorized Roofing Applicator in compliance with drawings and specifications as approved by the manufacturer.
- E. After completion of the installation, upon request, an inspection shall be conducted by a Field Service Representative (FSR) of the Manufacturer to ascertain that the membrane roofing system has been installed according to the specifications and details applicable at the time of the bid. This inspection is to determine whether a warranty shall be issued. It is not intended as a final inspection for the benefit of the owner.
- F. Preconstruction Roofing Conference: Before starting roof system construction, conduct conference at Project site.
  1. Meet with Owner, Architect, testing and inspecting agency representative, roofing Installer, roofing system manufacturer's representative, deck Installer, and installers whose work interfaces with or affects roofing, including installers of roof accessories and roof-mounted equipment.
  2. Review methods and procedures related to roofing installation, including manufacturer's written instructions.
  3. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
  4. Review requirements for deck substrate conditions and finishes, including flatness and fastening.
  5. Review structural loading limitations of roof deck during and after roofing.
  6. Review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that will affect the roofing system.
  7. Review governing regulations and requirements for insurance and certificates if applicable.
  8. Review temporary protection requirements for roofing system during and after installation.
  9. Review roof observation and repair procedures after roofing installation.

#### **1.08 DELIVERY, STORAGE & 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.
- C. Protect foam insulation from direct exposure to sunlight.
- D. Keep Material Safety Data Sheets (MSDS) at the project site at all times during transportation, storage, and installation of materials.

#### **1.09 PROJECT CONDITIONS**

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit the roofing system to be installed according to the manufacturer's written instructions and warranty requirements.

- B. Provide protection, such as 3/4 inch thick plywood, for all roof areas exposed to traffic during construction. Plywood must be smooth and free of fasteners and splinters.
- C. The surface on which the insulation or roofing membrane is to be applied shall be clean, smooth, dry, and free of projections or contaminants that would prevent proper application of or be incompatible with the new installation, such as fins, sharp edges, foreign materials, oil, and grease.
- D. New roofing shall be complete and weathertight at the end of the workday.
- E. Contaminants such as grease, fats, and oils shall not be allowed to come in direct contact with the roofing membrane.

#### **1.10 WARRANTY**

- A. Manufacturer's Warranty: Manufacturer's standard NDL roof warranty, in which the manufacturer agrees to repair or replace components of membrane roofing system that fail in materials or workmanship, for twenty (20) years, commencing with the date of the acceptance of the roofing system by the manufacturer.
  - 1. The roof system warranty includes the membrane, flashings, adhesives and sealants, insulation, insulation adhesives, cover board, fasteners, fastener plates, fastening bars, edge metal, and any other products utilized in the installation.
  - 2. Wind Damage Coverage: Winds of 3-second peak gust speeds up to 90 mph, measured at 10-meters above ground, and using available meteorological data.
  - 3. Hail Damage Coverage: None
  - 4. Puncture Coverage: None
- B. Special Extended Warranty – Sheet Metal Paint Finish: The manufacturer shall warrant the sheet metal paint finishes that show evidence of deterioration of factory-applied finishes for a period of fifteen (15) years from the Date of Substantial Completion.
- C. Installation Warranty: The installing subcontractor shall warrant the roof system installation to be free of defects in material and workmanship for a period of two (2) years from the Date of Substantial Completion.

### **PART 2 PRODUCTS**

#### **2.01 MANUFACTURER**

- A. Specified Manufacturer: Carlisle SynTec
  - 1. Other acceptable manufacturers with equivalent products to the specified manufacturer shall include:
    - a. Firestone Building Products Company.
    - b. GAF Materials Corporation.
    - c. GenFlex Roofing Systems.
    - d. Johns Manville.
  - 2. Products of unnamed manufacturers with equivalent products to the specified manufacturer will be considered in accordance with the "or equal" provision specified in Division 01 "Product Requirements".
    - a. Product Substitutions: Comply with the requirements specified in Division 01 "Substitution Procedures".

#### **2.02 ROOFING APPLICATION**

- A. TPO Membrane Roofing: One-ply membrane (fully adhered) over the cover board, insulation, and vapor barrier, above the steel roof deck (by others)

#### **2.03 MEMBRANE AIR / VAPOR BARRIER**

- A. Product: Carlisle; VapAir Seal MD Air / Vapor Barrier: reinforced composite aluminum foil with self-adhesive SBS backing and removable poly release film. Used for direct application over metal roof deck.

#### **2.04 ROOF DECK INSULATION**

- A. Product: Carlisle; Insulbase Polyisocyanurate Board Insulation.

- B. Description: Rigid board with glass fiber reinforced facers (GRF) on both sides, meeting or exceeding the requirements of ASTM C1289, Type II, Class 1, fiber reinforced felt both faces; Grade 2 (20 psi).
- C. Provide multiple layer configuration of roof insulation to achieve a minimum R-value of 25 at roof drains, gutters, and scuppers (where applicable).
- D. Total Roof Insulation Thickness / LTTR R-Value: 4-1/4 inches / R-25.2
  - 1. Exception: At roof drains, the insulation can taper down 1-inch within the area of the drain sump (i.e. 4-feet away from the drain on a 1/4-inch per foot system)
- E. Panel Types:
  - 1. Flat Panels: 48-inches by 96-inches (1220 by 2440 mm), with a thickness from 1 to 4 inches.
    - a. Provide flat panel roof insulation over sloping roof framing systems.
  - 2. Tapered Panels: 48-inches by 48-inches, factory-tapered insulation boards fabricated to slope 1/4-inch per foot towards roof drains or gutters.
    - a. Provide tapered panel roof insulation over level roof framing systems (flat roofs)
    - b. Taper panels of the fewest layers possible.
- F. Provide preformed saddles, crickets, tapered edge strips, and other insulation shapes where indicated to direct water towards roof drains, gutters, or thru-wall scuppers.
- G. Installation Method: Fully Adhered.

## 2.05 COVER BOARD

- A. Product: G-P Gypsum; "Dens-Deck Prime".
  - 1. Water-resistant and silicone-treated gypsum panel with embedded fiberglass facer on both sides, and pre-primed on one side.
  - 2. Board Thickness: 5/8 inch (15mm).

## 2.06 SINGLE-PLY ROOF MEMBRANE

- A. Product: Carlisle "Sure-Weld" Adhered TPO Roofing System.
  - 1. Material: Thermoplastic Polyolefin (TPO) complying with ASTM D6878/D6878M.
  - 2. Reinforcing: Internal fabric.
  - 3. Thickness: 60 mils (0.060 inch) (1.5 mm), minimum.
  - 4. Sheet Width: Factory fabricated into largest sheets possible.
  - 5. Color: White.
- B. Attachment Method: Adhered.
- C. Performance:
  - 1. Elongation: Minimum 25 percent per ASTM D751.
  - 2. Tearing Strength: Minimum 55 lbf/in per ASTM D751.
  - 3. Breaking Strength: Minimum 250 lbf per ASTM D751.
- D. Seaming Materials: As recommended by membrane manufacturer.
- E. Membrane Fasteners: As recommended and approved by the membrane manufacturer.
- F. Vapor Retarder: Compatible with roofing and insulation materials.
- G. Flexible Flashing Material: Same material as membrane.
- H. Base Flashing: Provide waterproof, fully adhered base flashing system at all penetrations, plane transitions, and terminations.

## 2.07 FLASHING

- A. Flashing Membrane:
  - 1. Carlisle Sure-Weld TPO Flashing, 60-mils thick.
- B. Prefabricated Flashing Accessories:
  - 1. Corners and Seams: Same material as membrane, in manufacturer's standard thicknesses.
    - a. Carlisle Sure-Weld TPO Inside Corners; 60 mils (0.060 inch) (1.5 mm) thick.

- b. Carlisle Sure-Weld TPO Outside Corners; 60 mils (0.060 inch) (1.5 mm) thick.
  - c. Carlisle Sure-Weld TPO T-Joint Covers; 60 mils (0.060 inch) (1.5 mm) thick, 4-1/2 inch (114 mm) diameter.
  - d. Carlisle TPO Curb Wrap Corners; 45 mils (0.045 inch) (1.1 mm) thick, 6 inch (152 mm) wide flange, and 12 inch (305 mm) overall height.
2. Penetrations: Same material as membrane, with manufacturer's standard cut-outs, rigid inserts, clamping rings, and flanges.
    - a. Carlisle Sure-Weld TPO Molded Pipe Flashings; for pipes 1 inch to 6 inches (25 mm to 152 mm) in diameter.
    - b. Carlisle Sure-Weld TPO Split Pipe Seals; for pipes 1 inch to 6 inches (25 mm to 152 mm) in diameter.
    - c. Carlisle Sure-Weld TPO Square Tubing Wraps. 3 inches (76 mm), 4 inches (101 mm), and 6 inches (152 mm) square.
  3. Sealant Pockets: Same material as membrane, with manufacturer's standard accessories, in manufacturer's standard configuration.
    - a. Carlisle Sure-Weld TPO Molded Sealant Pockets: Two-piece, interlocking, flexible pockets with rigid polypropylene vertical wall and preformed deck flanges. 6 inches (152 mm) wide and adjustable from 7-1/2 inches (191 mm) to 12 inches (305 mm) long.
    - b. Carlisle Sure-Weld TPO Prefabricated Sealant Pockets: Two-piece, prefabricated, rigid; TPO and TPO-coated metal with weldable horizontal deck flange; 12 inch (305 mm) square.
    - c. Carlisle Sure-Weld TPO Sealant Pockets Extension Legs: 45 mils (0.045 inch) (1.1 mm) thick TPO membrane and TOP-coated metal; each unit extends the length of Molded Sealant Pocket or Prefabricated Sealant Pocket by 10 inches (254 mm). Use full length or cut to size.
  4. Walkway Rolls: Sure-Flex Heat Weldable Walkway Rolls; 80 mils (0.080 inch) (2 mm) thick; gray membrane.
  5. Miscellaneous Flashing: Non-reinforced TPO membrane; 80 mils (0.080 inch) (2 mm) thick, in manufacturer's standard lengths and widths.

## **2.08 PRIMERS, ADHESIVES, SEALANTS, AND CLEANERS**

- A. Primer:
  1. Carlisle TPO Primer.
- B. Membrane Adhesive:
  1. Carlisle Sure-Weld Bonding Adhesive: A high-strength, synthetic rubber adhesive.
- C. Sealants:
  1. Sure-Weld Cut Edge Sealant: A clear colored sealant used to seal cut edges of reinforced Sure-Weld membrane.
  2. Water Cut-Off Mastic: Used as a mastic to prevent moisture migration at drains, compression terminations and beneath conventional metal edging
  3. Universal Single-Ply Sealant: A 100% solids, solvent-free, VOC-free, one-part polyether sealant that provides a weather-tight seal to a variety of building materials. It is white in color and is used for general caulking such as above termination bars and metal counter flashings and at scuppers.
  4. Thermoplastic, One-Part Pourable Sealant: A one-part, moisture curing, elastomeric polyether sealant used to fill Molded Pourable Sealant Pockets.
- D. Cleaner: Manufacturer's standard, clear, solvent-based cleaner.
  1. Carlisle Weathered Membrane Cleaner.

## **2.09 FASTENING COMPONENTS**

- A. Insulation Fasteners: Appropriate for the purpose intended and approved by roofing manufacturer.
- B. Base Sheet Fasteners And Plates: Appropriate for the purpose intended and approved by roofing manufacturer.

## **2.10 ROOF WALKWAYS**

- A. Roof Walkways:
  - 1. Thickness: 180 mils.
  - 2. Color: White.
  - 3. Walkway material may be heat welded to Sure-Weld membrane using an automated heat welder or handheld heat welder.

## **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 the roof system.
- D. Verify deck surfaces are dry and free of snow or ice.
- E. Verify that roof openings, curbs, and penetrations through the roof are solidly set, and cant strips are in place.

### **3.02 PREPARATION**

- A. Clean substrate thoroughly before roof application.
- B. Do not begin work until other work that requires foot or equipment traffic on the roof is complete.
- C. Apply the manufacturer's recommended vapor retarder before roof insulation.

### **3.03 METAL DECK PREPARATION**

- A. Apply vapor retarder to deck surface with adhesive in accordance with manufacturer's instructions.
  - 1. Extend vapor retarder under cant strips and blocking to deck edge.
  - 2. Install flexible flashing from vapor retarder to air seal material of wall construction, lap and seal to provide continuity of the air barrier plane.
- B. Ensure vapor retarder is clean and dry, continuous, and ready for application of insulation.

### **3.04 INSULATION APPLICATION**

- A. Attachment of Insulation:
  - 1. Mechanically fasten first layer of insulation to deck in accordance with roofing manufacturer's instructions.
  - 2. Embed second layer of insulation into full bed of adhesive in accordance with roofing and insulation manufacturers' instructions.
- B. Enhance the perimeter and corner areas per the International Building Code (ASCE 7) or ANSI/SPRI WD-1.
- C. Do not install wet, damaged, or warped insulation boards.
- D. Lay subsequent layers of insulation with joints staggered minimum 6 inch (152 mm) from joints of preceding layer.
- E. Place tapered insulation to the required slope pattern in accordance with manufacturer's instructions.
- F. On metal deck, place boards parallel to flutes with insulation board edges bearing on deck flutes.
- G. Lay boards with edges in moderate contact without forcing, and gap between boards no greater than 1/4 inch (6.3 mm). Cut insulation to fit neatly to perimeter blocking and around penetrations through roof.
- H. Tape joints of insulation in accordance with roofing and insulation manufacturers' instructions.

- I. At roof drains, use factory-tapered boards to slope down to roof drains over a distance of 18 inches (450 mm).
- J. Do not apply more insulation than can be completely waterproofed in the same day.

### 3.05 COVER BOARD APPLICATION

- A. Coordinate installing membrane roofing system components so the cover board is not exposed to precipitation or left exposed at the end of the workday.
- B. Comply with membrane roofing system manufacturer's written instructions for installing roof cover board.
- C. Install cover board with long joints of the cover board in a continuous straight line with end joints staggered between rows, abutting edges, and ends between boards. Fill gaps exceeding 1/4 inch (6 mm) with a cover board.
  - 1. Cut and fit cover board within 1/4 inch (6 mm) of nailers, projections, and penetrations.
- D. Trim the surface of the cover board where necessary at roof drains so the completed surface is flush and does not restrict flow of water.
  - 1. Install tapered edge strips at perimeter edges of the roof that do not terminate at vertical surfaces.
- E. Adhered Cover Board: Adhere cover board to the substrate as follows:
  - 1. Install each layer in a two-part urethane adhesive according to the roofing system manufacturer's instruction.
  - 2. Install to resist uplift pressure at corners, perimeter, and field of the roof.

### 3.06 MEMBRANE APPLICATION

- A. Roll out membrane, free from wrinkles or tears. Place sheet into place without stretching.
- B. Shingle joints on sloped substrate in direction of drainage.
- C. Fully Adhered Application: Apply adhesive at manufacturer's recommended rate. Fully embed membrane in adhesive except in areas directly over or within 3 inches (75 mm) of expansion joints. Fully adhere one roll before proceeding to adjacent rolls.
- D. Seam Welding:
  - 1. Seam Welding: Overlap edges and ends and seal seams by heat welding, minimum 2 inches (51 mm).
- E. At intersections with vertical surfaces:
  - 1. Extend membrane over cant strips and up a minimum of 8 inches ([ ] mm) onto vertical surfaces.
  - 2. Fully adhere flexible flashing over membrane and up to nailing strips.
  - 3. Secure flashing to nailing strips at 4 inches (100 mm) on center.
  - 4. Insert flashing into reglets and secure.
- F. Install roofing expansion joints where indicated. Make joints watertight.
- G. Install prefabricated joint components in accordance with manufacturer's instructions.
- H. Coordinate installation of roof drains and sumps and related flashings. Locate all field splices away from low areas and roof drains. Lap upslope sheet over downslope sheet.
- I. Install walkway pads at areas of concentrated traffic and as shown on Drawings. Space pad joints to permit drainage.
- J. Daily Seal: Install daily seal per manufacturers instructions at the end of each work day. Prevent infiltration of water at incomplete flashings, terminations, and at unfinished membrane edges.

### 3.07 DAILY SEALS

- A. On phased roofing, when the completion of flashings and terminations is not achieved by the end of the workday, a daily seal must be performed to temporarily close the membrane to prevent water infiltration.

- B. Complete an acceptable membrane seal in accordance with the manufacturer's requirements.

### **3.08 FIELD QUALITY CONTROL**

- A. Testing Agency: The Owner may engage a qualified testing agency to perform tests and inspections and to prepare test reports.
- B. Test Cuts: Test specimens will be removed to evaluate problems observed during quality-assurance inspections of roofing membrane as follows:
  - 1. Approximate quantities of components within the roofing membrane will be determined according to ASTM D 3617.
  - 2. Repair areas where test cuts were made according to the roofing system manufacturer's written instructions.
- C. Manufacturers Field Services and Reports:
  - 1. Field Visits: The roofing manufacturer shall provide a qualified, trained auditor to perform a minimum of three (3) field visits to the Project during installation of the roofing to inspect the site conditions, condition of surfaces and installation, quality of workmanship, as applicable, and to initiate instructions when necessary.
    - a. Upon completion of the field visits, copies of the inspection reports will be provided to the Architect and Contractor. Any corrective action deemed necessary to comply with the manufacturer's specifications must be completed prior to the final inspection.
  - 2. Final Inspection: The roofing system manufacturer shall provide a qualified, trained auditor to perform a final inspection to ensure the roof system has been installed properly and according to the manufacturer's recommendations and guaranty requirements.
    - a. Upon completion of the final inspection, copies of the inspection report will be provided to the Architect and Contractor. Any corrective action deemed necessary to comply with the manufacturer's specifications must be completed prior to final close-out.
- D. The roofing system will be considered defective if it does not pass tests and inspections.
  - 1. Additional testing and inspecting, at the Contractor's expense, will be performed to determine if replaced or additional work complies with specified requirements.

### **3.09 CLEAN UP**

- A. Perform daily clean-up to collect all wrappings, empty containers, paper, and other debris from the project site. Upon completion, all debris must be disposed of in a legally acceptable manner.
- B. Prior to the manufacturer's inspection for warranty, the applicator must perform a pre-inspection to review all work and to verify all flashing has been completed as well as the application of all caulking.

### **3.10 PROTECTION**

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

**END OF SECTION**

**SECTION 07 62 00  
SHEET METAL FLASHING AND TRIM**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Fabricated sheet metal items, including flashings and counterflashings.
- B. Sealants for joints within sheet metal fabrications.
- C. Miscellaneous trim, flashing, closures and accessories.

**1.02 RELATED REQUIREMENTS**

- A. Section 06 10 00 - Rough Carpentry
- B. Section 07 41 13 - Metal Roof Panels
- C. Section 07 42 13.16 - Modular Metal Cladding Panels
- D. Section 07 46 16 - Linear Metal Cladding Panels
- E. Section 07 92 00 - Joint Sealants

**1.03 REFERENCE STANDARDS**

- A. ASTM A792/A792M - Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.
- B. CDA A4050 - Copper in Architecture - Handbook.
- C. SMACNA (ASMM) - Architectural Sheet Metal Manual.

**1.04 SUBMITTALS**

- A. Shop Drawings: Indicate material profile, jointing pattern, jointing details, fastening methods, flashings, terminations, and installation details.
- B. Samples: Submit two samples 2 by 4 inch (\_\_\_\_by\_\_\_\_ mm) in size illustrating metal finish color.

**1.05 QUALITY ASSURANCE**

- A. Perform work in accordance with SMACNA (ASMM) and CDA A4050 requirements and standard details, except as otherwise indicated.

**1.06 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 MANUFACTURERS**

- A. Specified Manufacturer: Berridge Manufacturing Company.
  - 1. Other acceptable manufacturers with equivalent products to the specified manufacturer shall include:
    - a. MBCI
    - b. AEP Span
    - c. PAC-Clad
    - d. ATAS International, Inc
    - e. Firestone Building Products LLC
    - f. Petersen Aluminum Corporation
  - 2. Products of unnamed manufacturers with equivalent products to the specified manufacturer will be considered in accordance with the "or equal" provision specified in Division 01 "Product Requirements".
    - a. Product Substitutions: Comply with the requirements specified in Division 01 "Substitution Procedures".

## 2.02 MATERIAL

- A. Pre-Finished Galvanized Steel: Prefinished metal shall be 24-gauge Aluminum-zinc alloy-coated steel sheet, ASTM A792/A792M, with AZ50/AZM150 coating. Prepainted by the coil-coating process to comply with ASTM A755/A755M.
  - 1. Nominal Thickness: 0.024 inch (24-gauge).
  - 2. Surface: Smooth, flat finish.
  - 3. Exterior Finish: Two-coat fluoropolymer.
  - 4. Color: [\_\_\_\_\_].
- B. Strippable film shall be applied to the top side of all prefinished metal to protect the finish during fabrication, shipping and field handling. This strippable film MUST be removed immediately before installation.

## 2.03 FINISH

- A. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- 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 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.
- C. Paint Finish:
  - 1. Two-Coat Fluoropolymer: AAMA 621. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat applied by panel manufacturer on a continuous coil coating line, with a top side dry film thickness of  $0.75 \pm 0.05$  mil ( $0.019 \pm 0.0013$  mm) over  $0.2 \pm 0.05$  mil ( $0.05 \pm 0.0013$  mm) primer coat, to provide a total dry film thickness of  $0.95 \pm 0.10$  mil ( $0.024 \pm 0.0025$  mm). Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

## 2.04 FABRICATION

- A. Flashing and Trim: Provide flashing and trim formed from same material as metal panels as required to seal against weather and to provide finished appearance. Locations include, but are not limited to, bases, drips, sills, jambs, corners, endwalls, framed openings, rakes, fasciae, parapet caps, soffits, reveals, and fillers. Finish flashing and trim with same finish system as adjacent metal panels.
- B. Form sections true to shape, accurate in size, square, and free from distortion or defects.
- 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.

## 2.05 ACCESSORIES

- A. Metal Components:
  - 1. Provide accessories and other items essential to a complete roof or wall panel installation including panel clips, trim, closures, fascia, soffits, caps and similar metal components.
  - 2. Metal components fabricated from same gauge and finish as metal panels, unless otherwise noted.

3. Flashing: Provide the same gauge and finish as the exterior panel, unless otherwise noted.
- B. Sealants:
1. Exposed Sealants: One component silicone based as recommended by panel manufacturer: field applied.
  2. Concealed Sealants: Non-curing, non-skinning butyl, polyisobutylene or polybutane tape as recommended by panel manufacturer; field applied.
- C. Fasteners:
1. Exposed fasteners shall be hex head self-drilling screws with bonded washers and color to match panels. Screws may be either plated steel or stainless steel as noted on the Drawings.
  2. Exposed stainless steel rivets shall match color finish of panel.

## **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.

### **3.03 INSTALLATION - GENERAL**

- A. General: Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement. Use fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.
  1. Install sheet metal flashing and trim true to line and levels indicated. Provide uniform, neat seams with minimum exposure of solder, welds, and sealant.
  2. Install sheet metal flashing and trim to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.
  3. Space cleats not more than 12 inches (300 mm) apart. Anchor each cleat with two fasteners. Bend tabs over fasteners.
  4. Install exposed sheet metal flashing and trim without excessive oil canning, buckling, and tool marks.
  5. Install sealant tape where indicated.
  6. Torch cutting of sheet metal flashing and trim is not permitted.
  7. Retain subparagraph below if required to prevent galvanic corrosion between graphite and aluminum or aluminum-zinc alloy-coated steel. See the "Metal Considerations" Article in the Evaluations.
  8. Do not use graphite pencils to mark metal surfaces.
- B. Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with bituminous coating or by other permanent separation as recommended by SMACNA.
  1. Underlayment: Where installing metal flashing directly on cementitious or wood substrates, install a course of felt underlayment and cover with a slip sheet or install a course of polyethylene sheet.
- C. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet (3 m) with no joints allowed within 24 inches (600 mm) of corner or intersection. Where lapped expansion provisions cannot be used or would not be sufficiently watertight, form expansion joints of intermeshing hooked flanges, not less than 1 inch (25 mm) deep, filled with sealant concealed within joints.
- D. Fastener Sizes: Use fasteners of sizes that will penetrate wood sheathing not less than 1-1/4 inches (32 mm) for nails and not less than 3/4 inch (19 mm) for wood screws.

- E. Seal joints as shown and as required for watertight construction.
  - 1. Where sealant-filled joints are used, embed hooked flanges of joint members not less than 1 inch (25 mm) into sealant. Form joints to completely conceal sealant. When ambient temperature at time of installation is moderate, between 40 and 70 deg F (4 and 21 deg C), set joint members for 50 percent movement each way. Adjust setting proportionately for installation at higher ambient temperatures. Do not install sealant-type joints at temperatures below 40 deg F (4 deg C).
  - 2. Prepare joints and apply sealants to comply with requirements in Section 079200 "Joint Sealants."
- F. Soldered Joints: Clean surfaces to be soldered, removing oils and foreign matter. Pre-tin edges of sheets to be soldered to a width of 1-1/2 inches (38 mm), except reduce pre-tinning where pre-tinned surface would show in completed Work.
  - 1. Retain metals in first two subparagraphs below that are specified in Part 2; revise to suit Project. Soldering requires removal of painted, coated, or lacquered finishes. Although unusual, zinc-coated (galvanized) steel, a type of metallic-coated steel, may be soldered.
  - 2. Do not solder metallic-coated steel sheet.
  - 3. Do not use torches for soldering. Heat surfaces to receive solder and flow solder into joint. Fill joint completely. Completely remove flux and spatter from exposed surfaces.

### **3.04 INSTALLATION - ROOF DRAINAGE SYSTEM**

- A. General: Install sheet metal roof drainage items to produce complete roof drainage system according to SMACNA recommendations and as indicated. Coordinate installation of roof perimeter flashing with installation of roof drainage system.

### **3.05 INSTALLATION - ROOF FLASHING**

- A. General: Install sheet metal flashing and trim to comply with performance requirements, sheet metal manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, set units true to line, and level as indicated. Install work with laps, joints, and seams that will be permanently watertight and weather resistant.
- B. Pipe or Post Counterflashing: Install counterflashing umbrella with close-fitting collar with top edge flared for elastomeric sealant, extending a minimum of 4 inches (100 mm) over base flashing. Install stainless-steel draw band and tighten.
- C. Roof-Penetration Flashing: Coordinate installation of roof-penetration flashing with installation of roofing and other items penetrating roof. Seal with butyl sealant and clamp flashing to pipes that penetrate roof.

### **3.06 INSTALLATION - MISCELLANEOUS FLASHING**

- A. Equipment Support Flashing: Coordinate installation of equipment support flashing with installation of roofing and equipment. Weld or seal flashing with elastomeric sealant to equipment support member.

### **3.07 TOLERANCES**

- A. Installation Tolerances: Shim and align sheet metal flashing and trim within installed tolerance of 1/4 inch in 20 feet (6 mm in 6 m) on slope and location lines as indicated and within 1/8-inch (3-mm) offset of adjoining faces and of alignment of matching profiles.

### **3.08 CLEANING AND PROTECTION**

- A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.
- B. Clean and neutralize flux materials. Clean off excess solder.
- C. Clean off excess sealants.
- D. Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed unless otherwise indicated in manufacturer's written installation instructions. On completion of installation, remove unused materials and clean finished surfaces. Maintain in a clean condition during construction.

- E. Replace sheet metal flashing and trim that have been damaged or that have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

**END OF SECTION**

**SECTION 07 72 00  
ROOF ACCESSORIES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Roof hatches and accessories.
- B. Non-penetrating rooftop assemblies.

**1.02 RELATED REQUIREMENTS**

- A. Section 05 12 00 - Structural Steel Framing
- B. Section 05 21 00 - Steel Joist Framing
- C. Section 05 31 00 - Steel Decking
- D. Section 06 10 00 - Rough Carpentry
- E. Section 07 54 23.10 - TPO Single-Ply Roofing System (Mechanically Attached)
- F. Section 07 62 00 - Sheet Metal Flashing and Trim

**1.03 REFERENCE STANDARDS**

- A. 29 CFR 1910.23 - Ladders.
- B. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
- C. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
- D. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
- E. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric).

**1.04 SUBMITTALS**

- A. Submit under the provisions of Section 01 33 00 - Submittal Procedures.
- B. Product Data: Manufacturer's data sheets on each product to be used.
  - 1. Preparation instructions and recommendations.
  - 2. Storage and handling requirements and recommendations.
  - 3. Installation methods.
  - 4. Maintenance requirements.
- C. Shop Drawings: Submit a detailed layout developed for this project. Show dimensioned location and number for each type of roof accessory.
  - 1. Non-penetrating Rooftop Supports: Submit design calculations for loadings and spacings.

**1.05 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: A firm experienced in producing products similar to those indicated for this Project.
  - 1. Record of successful in-service performance.
  - 2. Sufficient production capacity to produce required units.
- B. Installer Qualifications: Competent and experienced firm capable of selecting fasteners and installing roof accessories to attain designed operational performance.

**1.06 DELIVERY, STORAGE, AND HANDLING**

- A. Store products in the manufacturer's unopened packaging until ready for installation.
- B. Store products undercover and elevated above grade.

## 1.07 WARRANTY

- A. Roof Hatch, Safety Rail, and Safety Post: Manufacturer's warranty: Materials shall be free of defects in material and workmanship for a period of five (5) years from the date of Substantial Completion.
  - 1. Should a part fail to function in normal use within this period, the manufacturer shall furnish a new part at no charge.

## PART 2 PRODUCTS

### 2.01 MANUFACTURERS

- A. Roof Hatches:
  - 1. Specified Manufacturer: The Bilco Company
    - a. Other Acceptable Manufacturer: Equivalent products of the manufacturers listed below will be acceptable.
      - 1) Acudor Products Inc.
      - 2) Babcock-Davis
      - 3) Milcor, Inc.
    - b. Products of unnamed manufacturers with equivalent products to the specified manufacturer will be considered by the "or equal" provision specified in Division 01 "Product Requirements".
      - 1) Product Substitutions: Comply with the requirements specified in Division 01 "Substitution Procedures"
- B. Non-Penetrating Roof Assemblies:
  - 1. Specified Manufacturer: Portals Plus
    - a. Other Acceptable Manufacturer: Equivalent products of the manufacturers listed below will be acceptable.
      - 1) PHP Systems Design.
      - 2) Metal Roof Innovations, Ltd.
    - b. Products of unnamed manufacturers with equivalent products to the specified manufacturer will be considered by the "or equal" provision specified in Division 01 "Product Requirements".
      - 1) Product Substitutions: Comply with the requirements specified in Division 01 "Substitution Procedures"

### 2.02 ROOF HATCHES

- A. General:
  - 1. Lifting mechanisms: The manufacturer shall provide compression spring operators enclosed in telescopic tubes to provide, smooth, easy, and controlled cover operation throughout the entire arc of opening and closing.
  - 2. Hardware
    - a. Heavy pintle hinges shall be provided.
    - b. Cover shall be equipped with a spring latch with interior and exterior turn handles.
    - c. The roof hatch shall be equipped with interior padlock hasps.
    - d. The latch strike shall be a stamped component bolted to the curb assembly.
    - e. Cover shall automatically lock in the open position with a rigid hold open arm equipped with a 1" (25mm) diameter red vinyl grip handle to permit easy release for closing.
    - f. Compression spring tubes shall be an anti-corrosive composite material and all other hardware shall be zinc plated and chromate sealed.
    - g. Cover hardware shall be bolted into a heavy gauge channel reinforcing welded to the underside of the cover and concealed within the insulation space.
- B. Roof Hatch for Ships Ladder Access:
  - 1. Product: Bilco; Type NB-40; Aluminum cover and galvanized steel curb, single leaf roof hatch.
  - 2. Size: 30-inches by 54-inches (762 mm by 1372 mm).

3. Frame/Curb: One-piece curb and frame with integral cap flashing to receive roof flashings; extended bottom flange to suit mounting.
  - a. Material: 14 gauge (1.9 mm) paint bond G90 galvanized steel.
  - b. Finish: Factory prime paint.
  - c. Curb Insulation: Manufacturer's standard; 1 inch (25 mm) rigid high-density fiberboard, located on outside face of curb.
  - d. Curb Height: 12 inches (305 mm) from finished surface of roof, minimum.
  - e. Fabrication:
    - 1) The curb shall be formed with a 3-1/2" (89mm) flange with 7/16" (11.1mm) holes provided for securing the curb to the roof deck.
    - 2) The curb shall be equipped with an integral metal cap flashing of the same gauge and material as the curb, fully welded at the corners.
4. Cover:
  - a. Material: 11-gauge (2.3 mm) aluminum.
  - b. Finish: Mill finish aluminum.
  - c. Cover Insulation: Shall be fiberglass of 1" (25mm) thickness, fully covered, and protected by a metal liner of 18-gauge (1.0 mm) aluminum.
  - d. Fabrication:
    - 1) Provide with a 3-inch (76 mm) beaded flange with formed reinforcing members
    - 2) Gasket: Provide a heavy extruded EPDM rubber gasket that is bonded to the cover interior to assure a continuous seal when compressed to the top surface of the curb.
5. Performance characteristics:
  - a. Cover shall be reinforced to support a minimum live load of 40 psf (195kg/m<sup>2</sup>) with a maximum deflection of 1/150th of the span or 20 psf (97 kg/m<sup>2</sup>) wind uplift.
  - b. Operation of the cover shall be smooth and easy with controlled operation throughout the entire arc of opening and closing.
  - c. Operation of the cover shall not be affected by temperature.
  - d. The entire hatch shall be weathertight with fully welded corner joints on the cover and curb.

### 2.03 ROOF HATCH ACCESSORIES

- A. Retractable Safety Post:
  1. Product: Bilco, Model LU-2; Retractable Safety Post.
  2. Performance criteria:
    - a. The tubular post shall lock automatically when fully extended.
    - b. Safety post shall have controlled upward and downward movement.
    - c. The release lever shall disengage the post to allow it to be returned to its lowered position.
    - d. The post shall have adjustable mounting brackets to fit ladder rung spacing up to 14" (356mm) on center and clamp brackets to accommodate ladder rungs up to 1-3/4" (44mm) in diameter.
  3. Post: Shall be manufactured of high-strength square tubing. A pull-up loop shall be provided at the upper end of the post to facilitate raising the post.
  4. Material: Steel.
  5. Balancing spring: A stainless steel spring balancing mechanism shall be provided to provide smooth, easy, controlled operation when raising and lowering the safety post.
  6. Hardware: All mounting hardware shall be Type 316 stainless steel.
  7. Factory Finish: Hot-dipped galvanized.
- B. Safety Railing System:
  1. Product: Bilco Company; Bil-Guard 2.0, Model #RL2-XX.
  2. Performance Characteristics:
    - a. Comply with 29 CFR 1910.23, with a safety factor of two.
    - b. The Hatch rail system shall attach to the cap flashing of the roof hatch and shall not penetrate any roofing material.

- c. The hinged gate shall ensure a continuous barrier around the roof hatch.
- d. Self-closing gate hinge and positive latching system provided with the hatch rail system.
3. Fabrication:
  - a. Posts and Rails: Aluminum pipe, 1-1/4 inch diameter, 6061 T6, Schedule 40.
  - b. Gate: Same material as railing; automatic closing with latch.
  - c. Gate Hinges and Post Guides: ASTM B221 (ASTM B221M), 6063 alloy, T5 temper aluminum.
  - d. Curb mounting brackets: 6063 T5 aluminum extrusion.
4. Finish: High-visibility safety yellow powder coat finish.
5. Hardware: Mounting brackets shall be 3/8" (9mm) thick extruded aluminum. Pivoting post guides with compression fittings and latching mechanism shall be cast aluminum. Self-closing hinges and all fasteners shall be type 316 stainless steel.

## **2.04 NON-PENETRATING ROOFTOP ASSEMBLIES**

- A. Pipe Supports:
  1. Product: Portals Plus; Pedestal Plus.
    - a. Description: Manufacturer-engineered and factory-fabricated, with pedestal bases that rest on top of roofing membrane, not requiring any attachment to the roof structure and not penetrating the roofing assembly.
  2. Design Loadings and Configurations: As required by applicable codes.
  3. Height: Provide a minimum clearance of 8-inches under supported items to the top of roofing.
  4. Support Spacing and Base Sizes: As required to distribute load sufficiently to prevent indentation of the roofing assembly.
  5. Steel Components: Stainless steel or carbon steel hot-dip galvanized after fabrication following ASTM A123/A123M.
  6. Hardware, Bolts, Nuts, and Washers: Stainless steel, or carbon steel hot-dip galvanized after fabrication following ASTM A153/A153M.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Do not begin installation until substrates have been properly prepared.

### **3.02 PREPARATION**

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

### **3.03 INSTALLATION**

- A. Install roof accessories following the manufacturer's instructions, in a manner that maintains roofing weather integrity.

### **3.04 CLEANING**

- A. Clean installed work to like-new condition.

### **3.05 PROTECTION**

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

**END OF SECTION**

**SECTION 07 84 00  
PENETRATION FIRESTOPPING**

**PART 1 GENERAL**

**1.01 RELATED DOCUMENTS**

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

**1.02 SECTION INCLUDES**

- A. Only tested firestop systems shall be used in specific locations as follows:
  - 1. Penetrations for the passage of duct, cable, cable tray, conduit, piping, electrical busways, and raceways through fire-rated vertical barriers (walls and partitions), horizontal barriers (floor/ceiling assemblies), and vertical service shaft walls and partitions.
  - 2. Blank openings through fire-rated vertical barriers (walls and partitions), horizontal barriers (floor/ceiling assemblies), and vertical service shaft walls and partitions.
  - 3. Openings and penetrations in fire-rated partitions or walls containing fire doors.
  - 4. Openings around structural members penetrate floors or walls.

**1.03 RELATED REQUIREMENTS**

- A. Coordinate work of this section with work of other sections as required to properly execute the work and as necessary to maintain satisfactory progress of the work of other sections, including:
- B. Section 07 05 53 - Fire and Smoke Assembly Identification
- C. Section 09 21 16 - Gypsum Board Assemblies
- D. Division 21 - Fire Suppression
- E. Division 22 - Plumbing
- F. Division 23 - Heating, Ventilating, and Air Conditioning
- G. Division 26 - Electrical

**1.04 REFERENCES**

- A. ANSI/UL 263 - Fire Tests of Building Construction and Materials.
- B. ANSI/UL 723 - Surface Burning Characteristics of Building Materials.
- C. ANSI/UL 1479 - Standard for Fire Tests of Through-Penetration Firestops.
- D. ANSI/UL 1709 - Rapid Rise Fire Tests of Protection Materials for Structural Steel.
- E. ANSI/UL 2079 - Tests for Fire Resistance of Building Joint Systems.
- F. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
- G. ASTM E 119 - Standard Test Methods for Fire Tests of Building Construction and Materials.
- H. ASTM E 814 - Standard Test Method for Fire Tests of Through-Penetration Fire Stops.
- I. ASTM E 1399 - Standard Test Method for Cyclic Movement and Measuring the Minimum and Maximum Joint Widths of Architectural Joint Systems.
- J. ASTM E 1966 - Standard Test Method for Fire Resistive Joint Systems.
- K. ASTM E 1529 - Standard Test Methods for Determining Effects of Large Hydrocarbon Pool Fires on Structural Members and Assemblies.
- L. ASTM E 1725 - Standard Test Methods for Fire Tests of Fire-Resistive Barrier Systems for Electrical System Components.
- M. ASTM E 2307 - Fire Tests of Perimeter Fire Barrier Systems Using Intermediate Scale, Multi-Story Test Apparatus.
- N. FM Global (FM) - FM4991 - Standard for Approval of Firestop Contractors.
- O. International Building Code (IBC).

- P. NFPA 70 - National Electrical Code.
- Q. NFPA 101 - Life Safety Code.
- R. Standards Council of Canada (CAN/ULC):
- S. CAN/ULC S115 - Standard Method of Fire Tests of Firestop Systems.
- T. Underwriters Laboratories (UL) - UL Building Materials Directory; Through-Penetration Firestops Systems (XHEZ), Joint Systems (XHBN), Firestop Devices (XHJI), Forming Materials (XHKU), Wall Opening Protective Materials (CLIV), and Fill, Void or Cavity Materials (XHHW).
- U. Underwriters Laboratories of Canada (ULC)

#### **1.05 DEFINITIONS**

- A. Firestopping: Material or combination of materials used to retain the integrity of fire-rated construction by maintaining an effective barrier against the spread of flame, smoke, and hot gases through penetrations in the fire-rated wall and floor assemblies.

#### **1.06 SUBMITTALS**

- A. Product Data: For each type of through-penetration firestop system product indicated.
- B. System Drawings: Submit documentation from a qualified third-party testing agency that applies to each through-penetration firestop system configuration for construction and penetrating items.
- C. Product Certificates: Certificate of conformance signed by manufacturers of through-penetration firestop system products certifying that products comply with requirements.

#### **1.07 QUALITY ASSURANCE**

- A. Provide through-penetration firestop systems that comply with the following requirements and those specified in the "Performance Criteria" Article:
  - 1. Firestopping tests are performed by a qualified, testing and inspection agency. A qualified testing and inspection agency is UL, ULC, or another agency performing testing and follow-up inspection services for firestop systems acceptable to authorities having jurisdiction.
  - 2. Through-penetration firestop system products bear classification marking of qualified testing and inspection agency.
- B. Installer Qualifications: A firm that has been approved by FM Approval in accordance with FM Approval FM 4991, or been evaluated by UL or ULC and found to comply with its "Qualified Firestop Contractor Program Requirements."
- C. Obtain through-penetration firestop systems for each type of penetration and construction condition indicated by a single manufacturer.
- D. Replace / Reinstall material removed for any destructive testing performed.

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

- A. Deliver through-penetration firestop system products to Project site in original, unopened containers or packages with intact and legible manufacturer's labels identifying product and manufacturer, date of manufacture; lot number; shelf life, if applicable; qualified testing and inspection agency's classification marking, and mixing instructions for multi-component materials.
- B. Store and handle materials for through-penetration firestop systems to prevent their deterioration or damage due to moisture, temperature changes, contaminants, or other causes.

#### **1.09 PROJECT CONDITIONS**

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

- C. Do not install through-penetration firestop systems when ambient or substrate temperatures are outside limitations recommended by the manufacturer.
- D. Do not install through-penetration firestop systems when substrates are wet due to rain, frost, condensation, or other causes.
- E. Do not use materials that contain flammable solvents.

#### **1.10 COORDINATION**

- A. Coordinate construction of openings and penetrating items to ensure that through-penetration firestop systems are installed according to specified requirements.
  - 1. A 3-inch minimum "NO FLY-ZONE" (no penetrations allowed) as measured from the underside of the structure along the top of the wall shall be observed for all new penetration(s) in new and existing fire-rated wall construction.
  - 2. All sub-contractors shall coordinate and receive approval for proposed locations of new penetrations in fire-rated walls with the General Contractor before the commencement of work.
- B. Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate through-penetration firestop systems.
- C. Schedule installation of firestopping after completion of penetrating item installation but before covering or concealing of openings.
- D. Upon the installation of acoustic ceiling tiles in the ceiling grid, any work that shall occur above the ceiling by trades contracted directly with the Owner or the General Contractor shall follow the procedures outlined in the Owner's "Above Ceiling Permit Policy".

#### **1.11 WARRANTY**

- A. At project closeout, provide to Owner an executed copy of the manufacturer's standard limited warranty against manufacturing defect, outlining its terms, conditions, and exclusions from coverage.

### **PART 2 PRODUCTS**

#### **2.01 MANUFACTURERS**

- A. Specified Manufacturer: Hilti, Inc.
  - 1. Other Acceptable Manufacturers with equivalent products to the specified manufacturer shall include:
    - a. 3M Fire Protection Products; [www.3m.com/firestop](http://www.3m.com/firestop)
    - b. Specified Technologies Inc (STI); [www.stifirestop.com](http://www.stifirestop.com)
    - c. W. R. Grace
- B. Additional Manufacturers will be considered in accordance with the "or equal" provision specified in Section 01 60 00 – Product Requirements.
  - 1. Substitutions: Submit a "Request for Substitution" for any manufacturer not named, in conformance with Section 01 33 00.

#### **2.02 FIRESTOPPING ASSEMBLY REQUIREMENTS**

- A. Provide penetration firestopping that is produced and installed to resist the spread of fire according to requirements indicated, resist the passage of smoke and other gases, and maintain the original fire-resistance rating of construction penetrated. Penetration firestopping systems shall be compatible with one another, with the substrates forming openings, and with penetrating items if any.
- B. Penetrations in Fire-Resistance-Rated Walls: Provide penetration firestopping with ratings determined per ASTM E814 or UL 1479, based on testing at a positive pressure differential of 0.01-inch wg (2.49 Pa).
  - 1. Fire-resistance-rated walls include fire-barrier walls and smoke-barrier walls.
  - 2. F-Rating: Not less than the fire-resistance rating of constructions penetrated.
- C. Penetrations in Horizontal Assemblies: Provide penetration firestopping with ratings determined per ASTM E814 or UL 1479, based on testing at a positive pressure differential of

- 0.01-inch wg (2.49 Pa).
1. Horizontal assemblies include floors and floor/ceiling assemblies.
  2. F-Rating: At least 1 hour, but not less than the fire-resistance rating of constructions penetrated.
  3. T-Rating: At least 1 hour, but not less than the fire-resistance rating of constructions penetrated except for floor penetrations within the cavity of a wall.
- D. Penetrations in Smoke Barriers: Provide penetration firestopping with ratings determined per UL 1479.
1. L-Rating: Not exceeding 5.0 cfm/sq. ft. (0.025 cu. m/s per sq. m) of penetration opening at 0.30-inch wg (74.7 Pa) at both ambient and elevated temperatures.
- E. W-Rating: Provide penetration firestopping showing no evidence of water leakage when tested according to UL 1479.
- F. Exposed Penetration Firestopping: Provide products with flame-spread and smoke-developed indexes of less than 25 and 450, respectively, as determined per ASTM E84.
- G. VOC Content: Penetration firestopping sealants and sealant primers shall comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
1. Sealants: 250 g/L.
  2. Sealant Primers for Nonporous Substrates: 250 g/L.
  3. Sealant Primers for Porous Substrates: 775 g/L.

### 2.03 MIXING

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

### 2.04 MATERIALS

- A. Use only firestop products that have been UL 1479, ASTM E 814, or UL 2079 tested for specific fire-rated construction conditions conforming to construction assembly type, penetrating item type, annular space requirements, and fire-rating involved for each separate instance.
- B. Pre-formed firestop devices for use with non-combustible and combustible pipes (closed and open systems), conduit, and/or cable bundles penetrating concrete floors
1. Hilti Cast-In-Place Firestop Device (CP 680-P)
  2. Hilti Cast-In-Place Firestop Device (CP 680-M) for use with noncombustible penetrants.
  3. Hilti Cast-in-Place Firestop System for Metal Decks (CFS CID MD P) including all components as described by manufacturer for proper installation.
  4. Hilti Cast-in-Place Firestop System for Metal Decks (CFS CID MD M) including all components as described by manufacturer for proper installation, for use with noncombustible penetrants.
  5. Hilti Firestop Speed Sleeve (CP 653) for use with cable penetrations.
  6. Hilti Firestop Drop-In Device (CFS-DID) for use with non-combustible and combustible penetrants.
  7. Hilti Firestop Block (CFS-BL)
  8. Hilti Closet Stub (CFS-CID CS)
- C. Sealants, caulking materials, or foams for use with non-combustible items including steel pipe, copper pipe, rigid steel conduit, and electrical metallic tubing (EMT)
1. Hilti Intumescent Firestop Sealant (FS-ONE MAX)
  2. Hilti Fire Foam (CP 620)
  3. Hilti Flexible Firestop Sealant (CP 606)
  4. Hilti Firestop Silicone Sealant Gun Grade (CFS-S SIL GG)
  5. Hilti Firestop Silicone Sealant Self Leveling (CFS-S SIL SL)
- D. Sealants or caulking materials for use with sheet metal ducts

1. Hilti Silicone Sealant Gun Grade (CFS-S SIL GG)
  2. Hilti Firestop Silicone Sealant Self Leveling (CFS-S SIL SL)
  3. Hilti Flexible Firestop Sealant (CP 606)
  4. Hilti Intumescent Firestop Sealant (FS-ONE MAX)
- E. Intumescent sealants, caulking materials for use with combustible items (penetrants consumed by high heat and flame) including insulated metal pipe, PVC jacketed, flexible cable or cable bundles, and plastic pipe
1. Hilti FS-ONE MAX Intumescent Firestop Sealant
- F. Foams, intumescent sealants, or caulking materials for use with flexible cable or cable bundles
1. Hilti; CFS-S SIL GG Firestop Silicone Sealant Gun-Grade
  2. Hilti; CFS-S SIL SL Firestop Silicone Sealant Self-Leveling
  3. Hilti CP-606 Flexible Firestop Sealant
  4. Hilti CP-620 Fire Foam
  5. Hilti FS-ONE MAX Intumescent Firestop Sealant
- G. Non-curing, re-penetrable intumescent putty or foam materials for use with flexible cable or cable bundles
1. Specified Technologies, Inc.; SpecSeal Series SSP Firestop Putty
  2. Hilti CP 618 Firestop Putty Stick
  3. Hilti CFS-PL Firestop Plug
  4. or equivalent by other approved manufacturers
- H. Wall opening protective materials for use with U.L. listed metallic and specified nonmetallic outlet boxes
1. Hilti; Firestop Box Insert
  2. Hilti CFS-P PA Firestop Putty Pad
  3. Hilti CP 617 Moldable Firestop Putty Pad
- I. Firestop collar or wrap devices attached to assembly around combustible plastic pipe (closed and open piping systems)
1. Hilti CP 643N Retrofit Firestop Collar
  2. Hilti CP 644 Firestop Collar, for 8" and 10" pipes
  3. Hilti CP-648-E / CP-648-S Wrap Strips
- J. Materials used for large openings and complex penetrations made to accommodate cable trays and bundles, multiple steel and copper pipes, electrical busways in raceways
1. Hilti; CFS-BL Firestop Block
  2. Hilti CP-637 Firestop Mortar
  3. Hilti CP-620 Fire Foam, 2-part polyurethane, suited for complex applications
  4. Hilti CP-675T Firestop Board
  5. Specified Technologies, Inc. (STI) SpecSeal CS Composite Sheet
- K. Noncuring, re-penetrable materials used for large size/complex penetrations made to accommodate cable trays and bundles, multiple steel and copper pipes, electrical busways in raceways
1. Hilti; CFS-BL Firestop Block
  2. Hilti CP-675T Firestop Board
- L. Re-penetrable, round cable management devices for use with new or existing cable bundles penetrating gypsum or masonry walls
1. Hilti; CP653 Speed Sleeve
  2. Hilti CFS-CC Firestop Cable Collar
  3. Hilti CFS-SL-SK Firestop Sleeve
  4. Hilti; CFS-SL RK Retrofit Sleeve Kit for existing cables
  5. Hilti; CFS-SL SK Firestop Sleeve Kit
  6. Hilti CFS-SL GP Gangplate, for use with multiple cable management devices.
  7. Hilti CFS-SL GP-CAP Gangplate Cap, for use at blank openings in gangplate for future penetrations.

- M. For blank openings made in a fire-rated wall or floor assemblies, where future penetration of pipes, conduits, or cables is expected
  - 1. Hilti CFS-BL Firestop Block
  - 2. Hilti CFS-PL Firestop Plug
- N. For single or cable bundles up to one-inch diameter penetrating gypsum, masonry, concrete walls or wood floor assemblies
  - 1. Hilti CFS-D Firestop Cable Disc

### **PART 3 EXECUTION**

#### **3.01 PREPARATION**

- A. Examination of Conditions: Examine areas and conditions under which work is to be performed and identify conditions detrimental to proper or timely completion.
- B. Surfaces to which firestop materials will be applied shall be free of dirt, grease, oil, scale, laitance, rust, release agents, water repellents, and any other substances that may inhibit optimum adhesion.
- C. Provide masking and temporary covering to prevent soiling of adjacent surfaces by firestopping materials.
- D. Do not proceed until unsatisfactory conditions have been corrected.

#### **3.02 THROUGH PENETRATION FIRESTOP INSTALLATION**

- A. General Requirements: Install through-penetration firestop systems in accordance with the "Performance Criteria" Article and in accordance with the conditions of testing and classification as specified in the published design.
- B. Manufacturer's Instructions: Comply with manufacturer's instructions for installation of through-penetration firestop systems products.
  - 1. Seal all openings or voids made by penetrations to ensure an air and water-resistant seal.
  - 2. Consult with the mechanical engineer, project manager, and damper manufacturer before installation of through-penetration firestop systems that might hamper the performance of fire dampers as it pertains to ductwork.
  - 3. Protect materials from damage on surfaces subjected to traffic.

#### **3.03 PENETRATION ASSEMBLY IDENTIFICATION**

- A. Refer to Section 07 05 53 for requirements.

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

- A. Inspections: The Owner shall engage a qualified independent inspection agency to inspect through-penetration firestop systems.
- B. Keep areas of work accessible until inspection by authorities having jurisdiction.
- C. Where deficiencies are found, repair or replace through-penetration firestop systems so they comply with requirements.

#### **3.05 ADJUSTING AND CLEANING**

- A. Remove equipment, materials, and debris, leaving the area in undamaged, clean condition.
- B. Clean all surfaces adjacent to sealed openings to be free of excess through-penetration firestop system materials and soiling as work progresses.

#### **3.06 PENETRATION FIRESTOPPING SCHEDULE**

- A. Where UL-classified systems are indicated, they refer to system numbers in UL's "Fire Resistance Directory" under product Category XHEZ.
- B. Where Intertek ETL SEMKO-listed systems are indicated, they refer to design numbers in Intertek ETL SEMKO's "Directory of Listed Building Products" under "Firestop Systems."
- C. Where FM Global-approved systems are indicated, they refer to design numbers listed in FM Global's "Building Materials Approval Guide" under "Wall and Floor Penetration Fire Stops."

D. Refer to drawings for assemblies, with assembly ratings, etc.

**END OF SECTION**

**SECTION 07 92 00  
JOINT SEALANTS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Joint Sealants.

**1.02 RELATED REQUIREMENTS**

- A. Section 06 61 16 - Solid Surface Fabrications
- B. Section 08 11 13 - Hollow Metal Doors and Frames
- C. Section 12 32 16 - Manufactured Plastic Laminate Faced Casework
- D. Divisions 21, 22, 23, 26, 27 specifications regarding building service systems that penetrate walls, floors, and ceilings.

**1.03 REFERENCES**

- A. ASTM C510 - Standard Test Method for Staining and Color Change of Single- or Multicomponent Joint Sealant, 1990.
- B. ASTM C639 - Test Method for Rheological (Flow) Properties of Elastomeric Sealants, 1990.
- C. ASTM C719 - Test Method for Adhesion and Cohesion of Elastomeric Joint Sealants Under Cyclic Movement, 1993.
- D. ASTM C834 - Standard Specification for Latex Sealants.
- E. ASTM C919 - Standard Practice for Use of Sealants in Acoustical Applications.
- F. ASTM C920 - Standard Specification for Elastomeric Joint Sealants.
- G. ASTM C1021 - Standard Practice for Laboratories Engaged in Testing of Building Sealants.
- H. ASTM C1193 - Standard Guide for Use of Joint Sealants.
- I. ASTM C1248 - Standard Test Method for Staining of Porous Substrate by Joint Sealants.
- J. ASTM C1330 - Standard Specification for Cylindrical Sealant Backing for Use with Cold Liquid-Applied Sealants.
- K. ASTM D412. Test Method for Vulcanized Rubber and Thermo-Plastic Rubbers and Thermo-Plastic Elastomers/Tensions.
- L. ASTM D2240. Test Method for Rubber Property- Durometer Hardness.
- M. ASTM E90 -
- N. American Association of State Highway and Transportation Officials (AASHTO), Standard Specifications for Highway Bridges, Thirteenth Edition, 1992. See Table 25.2B for physical property requirements of bridge bearing quality neoprene.

**1.04 SUBMITTALS**

- A. Product Data: For each joint-sealant product indicated.
- B. Samples for Initial Selection: Manufacturer's color charts consisting of strips of cured sealants showing the full range of colors available for each product exposed to view.
- C. Joint-Sealant Schedule: Include the following information:
  - 1. Joint-sealant application, joint location, and designation.
  - 2. Joint-sealant manufacturer and product name.
  - 3. Joint-sealant formulation.
  - 4. Joint-sealant color.
- D. Qualification Data: For qualified Installer and testing agency.
- E. Product Certificates: For each kind of joint sealant and accessory, from manufacturer.
- F. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, indicating that sealants comply with requirements.

- G. Preconstruction Compatibility and Adhesion Test Reports: From sealant manufacturer, indicating the following:
  - 1. Materials forming joint substrates and joint-sealant backings have been tested for compatibility and adhesion with joint sealants.
  - 2. Interpretation of test results and written recommendations for primers and substrate preparation needed for adhesion.
- H. Preconstruction Field-Adhesion Test Reports: Indicate which sealants and joint preparation methods resulted in optimum adhesion to joint substrates based on testing specified in "Preconstruction Testing" Article.
- I. Field-Adhesion Test Reports: For each sealant application tested.
- J. Warranties: Sample of special warranties.

#### **1.05 QUALITY ASSURANCE**

- A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of units required for this Project.
- B. Source Limitations: Obtain each kind of joint sealant from single source from single manufacturer.
- C. Product Testing: Test joint sealants using a qualified testing agency.
  - 1. Testing Agency Qualifications: An independent testing agency qualified according to ASTM C1021 to conduct the testing indicated.
  - 2. Test according to SWRI's Sealant Validation Program for compliance with requirements specified by reference to ASTM C920 for adhesion and cohesion under cyclic movement, adhesion-in-peel, and indentation hardness.

#### **1.06 PROJECT CONDITIONS**

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

#### **1.07 WARRANTY**

- A. Installation Warranty: The installing subcontractor shall warrant the installation to be free of defects in material and workmanship for a period of one (1) year from the Date of Substantial Completion.
- B. Manufacturers Warranty: The manufacturer shall warrant the products specified in this Section against material defects, or defects in manufacturing, for a period of five (5) years from the Date of Substantial Completion.

### **PART 2 PRODUCTS**

#### **2.01 MANUFACTURER**

- A. Specified Manufacturer: Tremco Incorporated, unless indicated otherwise.
  - 1. Acceptable Manufacturer's: Equivalent products of the manufacturers listed below will be acceptable.
    - a. Sherwin Williams
    - b. Koroseal

#### **2.02 MATERIALS, GENERAL**

- A. Joint Sealants, designated in this Section as Joint Sealant Type JS- #
- B. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as

demonstrated by joint-sealant manufacturer, based on testing and field experience.

- C. VOC Content of Interior Sealants: Sealants and sealant primers used inside the weatherproofing system shall comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
  - 1. Architectural Sealants: 250 g/L.
  - 2. Sealant Primers for Nonporous Substrates: 250 g/L.
  - 3. Sealant Primers for Porous Substrates: 775 g/L.
- D. Liquid-Applied Joint Sealants: Comply with ASTM C920 and other requirements indicated for each liquid-applied joint sealant specified, including those referencing ASTM C920 classifications for type, grade, class, and uses related to exposure and joint substrates.
- E. Stain-Test-Response Characteristics: Where sealants are specified to be nonstaining to porous substrates, provide products that have undergone testing according to ASTM C1248 and have not stained porous joint substrates indicated for Project.
- F. Suitability for Contact with Food: Where sealants are indicated for joints that will come in repeated contact with food, provide products that comply with 21 CFR 177.2600.
- G. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range.

### **2.03 SILICONE JOINT SEALANTS**

- A. Type JS-1: Mildew-Resistant, Single-Component, Acid-Curing Silicone Joint Sealant: ASTM C920, Type S, Grade NS, Class 25, for Use NT.
  - 1. Products:
    - a. Tremco; "Tremsil 200 Sanitary", or equivalent by Koroseal or Sherwin Williams.
- B. Type JS-2: Single-Component, Nonsag, Neutral-Curing Silicone Joint Sealant: ASTM C920, Type S, Grade NS, Class 50, for Use NT.
  - 1. Products:
    - a. Tremco Incorporated; Spectrem 2, or equivalent by Koroseal or Sherwin Williams.

### **2.04 URETHANE JOINT SEALANTS**

- A. Type JS-3: Single-Component, Pourable, Traffic-Grade, Urethane Joint Sealant: ASTM C 920, Type S, Grade P, Class 25, for Use T.
  - 1. Products:
    - a. Tremco Incorporated; Vulkem 45, or equivalent by Koroseal or Sherwin Williams.
- B. Type JS-4: Multi-Component, Pourable, Traffic-Grade, Urethane Joint Sealant: ASTM C920, Type M, Grade P, Class 25, for Use T.
  - 1. Acceptable Products:
    - a. Tremco Incorporated; Vulkem 245, or equivalent by Koroseal.
    - b. Sherwin Williams; Loxon 2K SL
- C. Type JS-5: Multicomponent, Nonsag, Urethane Joint Sealant: ASTM C920, Type M, Grade NS, Class 50, for Use NT.
  - 1. Products:
    - a. Tremco Incorporated; Dymeric 240 FC, or equivalent by Koroseal or Sherwin Williams.

### **2.05 POLYUREA SEALANTS**

- A. Type JS-6: Semi-Rigid, Multi-Component Polyurea Sealant: Self-leveling, 100% solids, rapid curing, polyurea control joint and crack filler with a Shore D 85 or higher hardness when tested in accordance with ASTM D2240. Tensile strength of 1160 pounds per square inch when tested in accordance with ASTM D412.
  - 1. Products:
    - a. VersaFlex; S/L 85.
    - b. L & M Construction Chemicals, Inc.; Joint Tite 750.
    - c. Curecrete Distribution Company, Inc.; Ashford Crete-Fill.
    - d. Adhesives Technologies Corp.; Crackbond JF311.

## 2.06 LATEX JOINT SEALANTS

- A. Type JS-7: Acrylic latex or siliconized acrylic latex, ASTM C834, Type OP, Grade NF.
  - 1. Products:
    - a. Tremco Incorporated; Tremflex 834, or equivalent by Koroseal or Sherwin Williams.

## 2.07 ACOUSTICAL JOINT SEALANTS

- A. Type JS-8: Acoustical Joint Sealant, Latex: Manufacturer's standard non-sag, paintable, non-staining latex sealant complying with ASTM C834. Product effectively reduces airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E90.
- B. Properties: Acoustical sealants shall have the following properties:
  - 1. Hardness of no more than 50 durometer Shore A as rated in ASTM D2240.
  - 2. Minimum elongation of 500% as rated in ASTM D412.
  - 3. Minimum joint width movement of 25% as rated in ASTM C719.
  - 4. Self Leveling type (S/L) if applied on floors in accordance with ASTM C639.
  - 5. Non-Sag type (N/S) if applied on walls in accordance with ASTM C639.
  - 6. Acoustical sealants must meet the following additional requirements where applied in exposed locations:
    - a. Acoustical sealants shall be paintable.
    - b. Acoustical sealants shall be skinning type.
    - c. Acoustical sealants shall be non-staining type as rated in ASTM C510.
- C. Acceptable Products:
  - 1. Exposed Locations:
    - a. Grabber; Acoustical Sound and Smoke Sealant #GSCSF
    - b. DAP; Sound Block E90 Acoustical Sound & Draft Sealant
    - c. Pecora Corporation; AIS-919 Acoustical Latex Sealant
    - d. USG Corporation; SHEETROCK Acoustical Sealant
    - e. GE; RCS20 Siliconized Acrylic Sealant

## 2.08 PUTTY PADS

- A. Putty pads shall be made from polybutene-butyl with inert fillers or other approved permanently resilient self-adhering material.
- B. Putty pads shall have a minimum thickness of 1/8-inch.
- C. Acceptable Products:
  - 1. Harry A. Lowry & Associates Outlet Box Pads
  - 2. Hevi-Duty Nelson FSP Putty Pads
  - 3. STI; Spec Seal SSP Putty Pads
  - 4. 3M; Fire Barrier Putty Pads

## 2.09 PACKING MATERIAL

- A. Packing material shall be of the following types:
  - 1. Mineral Fiber
  - 2. Glass Fiber
  - 3. Preformed Pipe Insulation

## 2.10 JOINT SEALANT BACKING

- A. Provide sealant backings of material that are non-staining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.
- B. Cylindrical Sealant Backings: ASTM C1330, Type B (bicellular material with a surface skin), and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.
- C. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint

surfaces at back of joint. Provide self-adhesive tape where applicable.

- D. Expansion Joint Material: Preformed sealant shall be preformed, pre-compressed, self-expanding. Expanding foam to be cellular foam impregnated with a water-based, non-drying, polymer-modified 100% acrylic dispersion. Install as a secondary sealant to urethane sealant w/ backer rod provide BACKERSEAL as manufactured by EMSEAL Joint Systems, Ltd as indicated on the drawings for vertical expansion joint locations.
  - 1. Install BACKERSEAL at depth sufficient to allow installation of properly sized backer rod and sealant in front of material.
  - 2. Size: As indicated on the Drawings

## 2.11 MISCELLANEOUS MATERIALS

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

## PART 3 EXECUTION

### 3.01 EXAMINATION

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

### 3.02 PREPARATION

- A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:
  - 1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
  - 2. Clean porous joint substrate surfaces by brushing, grinding, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air. Porous joint substrates include the following:
    - a. Unglazed surfaces of ceramic tile.
  - 3. Remove laitance and form-release agents from concrete.
  - 4. Clean nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants. Nonporous joint substrates include the following:
    - a. Metal
    - b. Glass
    - c. Porcelain enamel
    - d. Glazed surfaces of glass tile
- B. Joint Priming: Prime joint substrates where recommended by joint-sealant manufacturer or as indicated by preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.
- C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after

tooling without disturbing joint seal.

### 3.03 INSTALLATION OF JOINT SEALANTS, GENERAL

- A. Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.
- B. Sealant Installation Standard: Comply with recommendations in ASTM C1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.
- C. Install sealant backings of kind indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
  - 1. Do not leave gaps between ends of sealant backings.
  - 2. Do not stretch, twist, puncture, or tear sealant backings.
  - 3. Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.
- D. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.
- E. Install sealants using proven techniques that comply with the following and at the same time backings are installed:
  - 1. Place sealants so they directly contact and fully wet joint substrates.
  - 2. Completely fill recesses in each joint configuration.
  - 3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.
- F. Tooling of Non-sag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified in subparagraphs below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.
  - 1. Remove excess sealant from surfaces adjacent to joints.
  - 2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
  - 3. Provide concave joint profile per Figure 8A in ASTM C1193, unless otherwise indicated.
  - 4. Provide flush joint profile where indicated per Figure 8B in ASTM C1193.
  - 5. Provide recessed joint configuration of recess depth and at locations indicated per Figure 8C in ASTM C1193.
    - a. Use masking tape to protect surfaces adjacent to recessed tooled joints.
- G. Acoustical Sealant Installation: At sound-rated assemblies and elsewhere as indicated, seal construction at perimeters, behind control joints, and at openings and penetrations with a continuous bead of acoustical sealant. Install acoustical sealant at both faces of partitions at perimeters and through penetrations. Comply with ASTM C919 and with manufacturer's written recommendations.

### 3.04 PUTTY PADS

- A. Brush or wipe construction dust and dirt from recessed box.
  - 1. If surface is contaminated with oil, wipe with xylene or toluene to remove oily residue.
- B. Before mounting recessed box or attaching conduit, adhere putty pad to box back and mounting side(s). Leave 1/2-inch minimum overlap along the front surface to enable wrapping of plaster ring.
- C. Mount recessed box and install plaster ring. Tighten all loose fasteners.
- D. Continue wrapping recessed box, all conduit attachments and plaster ring with putty pad. Press putty pad firmly into surfaces.
  - 1. If necessary, cut and apply additional pieces of putty pad to achieve an airtight seal around the recessed box, conduit attachments, and plaster ring.
- E. After gypsum board installation, press putty pad firmly against gypsum board to create an airtight seal.

1. If airtight seal is not continuous around the plaster ring perimeter, seal any gaps or voids with a liberal bead of acoustical sealant to create an airtight seal.

### **3.05 PUTTY**

- A. Brush or wipe construction dust and dirt from cables and conduit.
  1. If surfaces are contaminated with oil, wipe with xylene or toluene to remove oily residue.
- B. Properly space cables away from each other inside the conduit.
- C. Tightly pack mineral fiber between all cables.
  1. Pack mineral fiber tight around cables the full depth of the sleeve, holding back the mineral fiber 1/4" from both ends of the conduit sleeve.
- D. Fill all spaces between the cables and conduit with putty to a 1/4" depth to create an airtight seal. The putty shall be flush with both ends of the conduit sleeve or conduit stub.

### **3.06 CLEANING**

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

### **3.07 PROTECTION**

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

## **PART 4 - SCHEDULES**

### **4.01 INTERIOR JOINT SEALANT SCHEDULE**

- A. When applicable, provide joint sealants for the following applications
- B. Application: Joints in exposed concrete slabs that do not receive floorcoverings, tile, or dyed and polished finish.
  1. Joint Locations: Joints in concrete slabs
  2. Sealant Type JS-4, Urethane.
  3. Color: As selected by Architect from manufacturer's full range of colors.
- C. Application: Joints in horizontal traffic surfaces at tile flooring
  1. Sealant Type JS-4, Urethane; Multi component, pourable, traffic grade, class 25.
  2. Color: As selected by Architect from manufacturer's full range of colors.
- D. Application: Control and/or contraction joints in concrete slabs with dyed and polished finish.
  1. Sealant Type JS-6, Polyurea.
  2. Color: As selected by Architect from manufacturer's full range of colors.
- E. Application: Joints in vertical surfaces and horizontal non-traffic surfaces.
  1. Joint Locations:
    - a. Control and expansion joints on exposed interior surfaces of exterior walls.
    - b. Perimeter joints of exterior openings where indicated.
    - c. Vertical joints on exposed surfaces of interior unit masonry and concrete.
  2. Sealant Type JS-5, Urethane.
  3. Color: As selected by Architect from manufacturer's full range of colors.
- F. Application: Interior non-moving joints in vertical surfaces.
  1. Joint Locations:
    - a. Vertical joints in exposed surfaces of gypsum drywall partitions.
    - b. Perimeter joints between interior wall surfaces and frames of interior doors and windows.
    - c. Other joints as indicated.
  2. Joint-Sealant Type JS-7, Acrylic Latex.

3. Color: As selected by Architect from manufacturer's full range of colors.
- G. Application: Mildew-resistant interior joints in vertical surfaces and horizontal non-traffic surfaces.
  1. Joint Locations:
    - a. Joints between plumbing fixtures and adjoining walls, floors, countertops.
    - b. Joints between backsplashes and adjacent wall surfaces at wet locations.
    - c. Tile control and expansion joints where indicated.
    - d. Other joints at wet locations where or not specifically detailed or called out to seal joints from leakage of water.
  2. Type JS-1, Silicone.
  3. Color: As selected by Architect from manufacturer's full range of colors.
- H. Application: Acoustical joints in vertical surfaces and horizontal non-traffic surfaces.
  1. Joint Locations:
    - a. All wall locations where sound attenuation batts are shown in the wall types.
    - b. Apply putty pads to all recessed boxes sharing a stud space where separate recessed boxes are open to both sides of wall.
    - c. Other joints as indicated.
  2. Sealant Type JS-8, Acoustical.
  3. Color: As selected by Architect from manufacturer's full range of colors.
- I. Application: Joints in vertical surfaces and horizontal non-traffic surfaces where tamper-resistant (non-pickable) joint sealants are required.
  1. Joint Locations:
    - a. Perimeter of light fixtures, mirrors, toilet accessories, etc.
    - b. Perimeter of door and window frames.
    - c. Protrusions and penetrations
    - d. Resilient Base: Perimeter joints to the wall and floor, and vertical joints between base pieces.
    - e. Other joints as indicated.
  2. Sealant Type JS-9, Polyurethane.
  3. Color: As selected by Architect from manufacturer's full range of colors.

**END OF SECTION**

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

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Interior metal doors and frames
- B. Interior metal frames for wood doors
- C. Interior borrowed lite glazing frames
- D. Exterior metal doors and frames

**1.02 RELATED REQUIREMENTS**

- A. Section 05 40 00 - Cold-Formed Metal Framing
- B. Section 07 92 00 - Joint Sealants
- C. Section 08 14 16 - Flush Wood Veneer Doors
- D. Section 08 71 00 - Door Hardware
- E. Section 08 80 00 - Glazing
- F. Section 08 81 17 - Fire-Rated Glass
- G. Section 09 21 16 - Gypsum Board Assemblies
- H. Section 09 22 16 - Non-Structural Metal Framing
- I. Section 09 90 00 - Painting and Coating

**1.03 ABBREVIATIONS AND ACRONYMS**

- A. ANSI - American National Standards Institute.
- B. ASCE - American Society of Civil Engineers.
- C. HMMA - Hollow Metal Manufacturers Association.
- D. NAAMM - National Association of Architectural Metal Manufacturers.
- E. NFPA - National Fire Protection Association.
- F. NOA - Notice of Acceptance
- G. SDI - Steel Door Institute.
- H. UL - Underwriters Laboratories.

**1.04 REFERENCE STANDARDS**

- A. ANSI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames..
- B. ANSI A250.8 - SDI-100 Recommended Specifications for Standard Steel Doors and Frames..
- C. ANSI A250.6 - Hardware on Standard Steel Doors (Reinforcement--Application)..
- D. ANSI/SDI A250.4 - Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames and Frame Anchors.
- E. ANSI/SDI A250.8 - Specifications for Standard Steel Doors and Frames (SDI-100).
- F. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
- G. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- H. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Required Hardness, Solution Hardened, and Bake Hardenable.
- I. ASTM A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and

Ultra-High Strength.

- J. ASTM C143/C143M - Standard Test Method for Slump of Hydraulic-Cement Concrete.
- K. ASTM C476 - Standard Specification for Grout for Masonry.
- L. ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.
- M. ASTM E136 - Standard Test Method for Assessing Combustibility of Materials Using a Vertical Tube Furnace at 750 °C.
- N. ICC (IBC)-2012 - International Building Code.
- O. ICC (IBC)-2018 - International Building Code.
- P. NFPA 257 - Standard on Fire Test for Window and Glass Block Assemblies.
- Q. NFPA 80 - Standard for Fire Doors and Other Opening Protectives.
- R. NFPA 105 - Standard for Smoke Door Assemblies and Other Opening Protectives.
- S. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies.
- T. UL (DIR) - Online Certifications Directory.
- U. UL 10C - Standard for Positive Pressure Fire Tests of Door Assemblies.
- V. UL 1784 - Standard for Air Leakage Tests of Door Assemblies.
- W. UL 9 - Standard for Fire Tests of Window Assemblies.

#### **1.05 DESIGN AND PERFORMANCE REQUIREMENTS**

- A. Delegated Design: Design exterior metal doors and door frames, including comprehensive engineering analysis by a qualified professional engineer, using the design criteria specified below.
  - 1. General Design Criteria:
    - a. Building Code: 2018 IBC
    - b. Risk Category: II
  - 2. Seismic Design Criteria (when applicable):
    - a. Refer to the Structural Drawings for the following design criteria:
      - 1) Seismic Design Category
      - 2) Site Classification
      - 3) Seismic Force-Resisting System
      - 4) Seismic Loads: Spectral Response Acceleration Value ( $S_a$ )
      - 5) Component Importance Factor ( $I_e$ )
    - b. Refer to the Mechanical and Electrical Documents for additional seismic design/detailing requirements.
  - 3. Wind-Resistance Design Criteria (exterior doors):
    - a. Refer to the Structural Drawings for the following design criteria:
      - 1) Ultimate Design Wind Speed,  $V_{ULT}$
      - 2) Exposure Category
      - 3) Surface Roughness Category

#### **1.06 ACTION SUBMITTALS**

- A. Product Data: For each type of product indicated. Include construction details, material descriptions, core descriptions, fire-resistance rating, temperature-rise ratings, and finishes.
- B. Shop Drawings: Include the following:
  - 1. Elevations of each door design.
  - 2. Details of doors, including vertical and horizontal edge details and metal thicknesses.
  - 3. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
  - 4. Locations of reinforcement and preparations for hardware.
- C. Samples for Verification:

1. For each type of exposed finish required, prepared on Samples of not less than 3 by 5 inches (75 by 125 mm).
  2. For the following items, prepared on Samples about 12 by 12 inches (305 by 305 mm) to demonstrate compliance with requirements for quality of materials and construction:
    - a. Doors: Show vertical-edge, top, and bottom construction; core construction; and hinge and other applied hardware reinforcement. Include a separate section showing glazing if applicable.
    - b. Frames: Show profile, corner joint, floor and wall anchors, and silencers. Include a separate section showing fixed metal panels and glazing if applicable.
- D. Other Action Submittals:
1. Schedule: Provide a schedule of metalwork prepared by or under the supervision of the supplier, using the same reference numbers for details and openings as those on Drawings. Coordinate with door hardware schedule.

#### **1.07 INFORMATIONAL SUBMITTALS**

- A. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for each type of metal door and frame assembly.

#### **1.08 QUALITY ASSURANCE**

- A. Source Limitations: Obtain metalwork from a single source from a single manufacturer.
- B. Fire-Rated Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to NFPA 252.
1. Temperature-Rise Limit: At vertical exit enclosures and exit passageways, provide doors that have a maximum transmitted temperature end point of not more than 450 deg F (250 deg C) above ambient after 30 minutes of standard fire-test exposure.
- C. Fire-Rated, Borrowed Lite Frame Assemblies: Assemblies complying with NFPA 80 that are listed and labeled, by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on testing according to NFPA 257 or UL 9. Label each glazed lite.
- D. Smoke-Control Door Assemblies: Comply with NFPA 105 or UL 1784.
- E. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
- F. Copies of Documents at Project Site: Maintain at the project site a copy of each referenced document that prescribes installation requirements.

#### **1.09 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver metal work palletized, wrapped, or crated to protect transit and Project-site storage. Do not use non-vented plastic.
1. Provide additional protection to prevent damage to the finish of factory-finished units.
- B. Deliver welded frames with two removable spreader bars across the bottom of frames, tack welded to jambs and mullions.
- C. Store metalwork undercover at Project site. Place in stacks of five units maximum in a vertical position with heads up, spaced by blocking, on minimum 4-inch- (102-mm-) high wood blocking. Do not store in a manner that traps excess humidity.

#### **1.10 PROJECT CONDITIONS**

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

#### **1.11 COORDINATION**

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

## **PART 2 PRODUCTS**

### **2.01 MANUFACTURERS**

- A. Specified Manufacturer: Steelcraft
  - 1. Other Acceptable Manufacturer's: Equivalent products of the manufacturers listed below will be acceptable.
    - a. Republic
  - 2. Substitutions: Limited to the manufacturer's listed above.

### **2.02 MATERIALS**

- A. Cold-Rolled Steel Sheet: ASTM A1008/A1008M, Commercial Steel (CS), Type B; suitable for exposed applications.
- B. Hot-Rolled Steel Sheet: ASTM A1011/A1011M, Commercial Steel (CS), Type B; free of scale, pitting, or surface defects; pickled and oiled.
- C. Frame Anchors: ASTM A591/A591M, Commercial Steel (CS), 40Z (12G) coating designation; mill phosphatized.
- D. Inserts, Bolts, and Fasteners: Hot-dip galvanized according to ASTM A153/A153M
- E. Powder-Actuated Fasteners in Concrete: Fastener system of a type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching metal frames of the type indicated.
- F. Glazing: Comply with requirements in Division 08 Section "Glazing."
- G. Bituminous Coating: Cold-applied asphalt mastic, SSPC-Paint 12, compounded for 15-mil (0.4-mm) dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.

### **2.03 HOLLOW METAL DOOR TYPES**

- A. Products: Steelcraft; as follows:
  - 1. Full flush door construction:
    - a. L and SL Series: Laminated
    - b. B Series: Steel stiffened
    - c. T Series: Temperature rise rated
    - d. PW Paladin Series: Tornado resistant, compliant with FEMA 361/320 guidelines.
    - e. Fire-Rated Doors

### **2.04 EXTERIOR METAL DOORS**

- A. Product: Steelcraft; Full Flush Hollow Metal Doors, unless otherwise indicated.
- B. Standard: ANSI/SDI A250.8
  - 1. Level 3 - Extra Heavy-duty.
  - 2. Physical Performance Level A, 1,000,000 cycles; in accordance with ANSI/SDI A250.4.
  - 3. Edge Construction: Model 2 - Seamless.
- C. Model: L / SL Series (Laminated) and B Series (Steel stiffened).
- D. Physical Properties:
  - 1. Door Face Metal Thickness: Coated, 16 gage, 0.053 inch (1.3 mm), minimum.
  - 2. Door Face Sheets: Flush.
  - 3. Door Finish: Factory primed and field finished.
  - 4. Door Thickness: 1-3/4 inch (44.5 mm), nominal.
  - 5. Door Core Material:
    - a. Non-rated doors: Polyurethane, or polyisocyanurate.
    - b. Fire-Rated Doors: Mineral Board.
  - 6. Vertical Edges for Single-Acting Doors: Beveled edge.
    - a. Beveled Edge: 1/8-inch in 2-inches (3 mm in 50 mm).
  - 7. Top and Bottom Edges: Closed with flush or inverted 0.042-inch- (1.0-mm-) thick, end closures or channels of the same material as face sheets.

8. Zinc Coating: A60/ZF180 galvanized coating; ASTM A653/A653M.
9. Door Thermal Resistance: R-Value of 6.0, minimum.
10. Top Closures for Outswinging Doors: Flush with top of faces and edges.
11. Hardware Reinforcement: Fabricate according to ANSI/SDI A250.6 with reinforcing plates from the same material as door face sheets.
  - a. Fabricate concealed stiffeners and hardware reinforcement from either cold- or hot-rolled steel sheets.

E. Door Hardware: Refer to Section 08 72 00.

## **2.05 INTERIOR METAL DOORS**

- A. Product: Steelcraft; Full Flush Hollow Metal Doors, unless otherwise indicated.
1. Standard: ANSI/SDI A250.8 for level and model; ANSI/SDI A250.4 for the physical performance level.
    - a. Level: 2 - Heavy-duty
    - b. Physical Performance Level B
    - c. Edge Construction: Model 1 - Full Flush
  2. Model: L Series
  3. Physical Properties:
    - a. Door Face Metal Thickness: Uncoated, 18 gage, 0.042 inch (1.0 mm), minimum.
    - b. Door Face Sheets: Flush.
    - c. Door Finish: Factory primed and field finished.
    - d. Door Thickness: 1-3/4 inch (44.5 mm), nominal.
    - e. Door Core: Manufacturers standard core material/construction and in compliance with requirements.
    - f. Vertical Beveled Edge: 1/8-inch in 2 inches for single acting doors.
    - g. Zinc Coating: A60/ZF180 galvanized coating.
  4. Hardware Reinforcement: Fabricate according to ANSI/SDI A250.6 with reinforcing plates from the same material as door face sheets.
    - a. Fabricate concealed stiffeners and hardware reinforcement from either cold- or hot-rolled steel sheets.
  5. Door Hardware: Refer to Section 08 72 00
  6. Fire-Rated Doors:
    - a. Fire Rating: As indicated on Door Schedule, tested in accordance with UL 10C and NFPA 252 ("positive pressure fire tests").
    - b. Temperature-Rise Rating (TRR) Across Door Thickness: In accordance with local building code and authorities having jurisdiction.
    - c. Provide units listed and labeled by UL (DIR).
      - 1) Attach fire rating label to each fire-rated unit.
    - d. Fire Door Core: As required to provide fire-protection and temperature-rise ratings indicated.
      - 1) Locations: interior doors where indicated.
  7. Smoke and Draft Control Doors: Self-closing or automatic closing doors in accordance with NFPA 80 and NFPA 105, with fire-resistance-rated wall construction, rated the same or greater than the fire-rated doors, and the following;
    - a. Maximum Air Leakage: 3.0 cfm/sq ft (0.02 cu m/sec/sq m) of door opening at 0.10 inch w.g. (24.9 Pa) pressure, when tested in accordance with UL 1784 at both ambient and elevated temperatures.
    - b. Gasketing: Provide gasketing or edge sealing as necessary to achieve leakage limit.
    - c. Label: Include the "S" label on the fire-rating label of the door.

## **2.06 STORM DOORS AND FRAMES**

A. Refer to Section 08 11 69, for requirements

## **2.07 METAL FRAMES, GENERAL**

A. Products: Steelcraft; as follows:

1. F Series: Double rabbet, single rabbet, and cased opening frame construction, Full profile/continuously welded type
  2. FE and DE Series: Double egress frame construction, Full profile/continuously welded type
  3. Fire-Rated Frames
- B. Comply with ANSI/SDI A250.8 and with details indicated for type and profile.
- C. Comply with standards and/or custom guidelines as indicated for the corresponding door in accordance with applicable door frame requirements.

## **2.08 EXTERIOR METAL FRAMES**

- A. Exterior Door Frames: Full profile/continuously welded type
1. Fabricate frames with mitered or coped corners.
  2. Galvanizing: Components hot-dipped zinc-iron alloy-coated (galvannealed) in accordance with ASTM A653/A653M, with A40/ZF120 coating
  3. Frame Metal Thickness: 16 gage, 0.053 inch (1.3 mm), minimum.
  4. Frame Finish: Factory primed and field finished.
  5. Reinforcement: Provide high-frequency hinge reinforcement at the top hinge location.
  6. Weatherstripping: Separate, see Section 08 72 00.

## **2.09 INTERIOR METAL FRAMES**

- A. Fire-Rated and Non-Fire Rated Frames: Full profile/continuously welded type.
1. Fabricate frames with mitered or coped corners.
  2. Frame Metal Thickness:
    - a. Steel or wood doors under 48-inches wide: 16 gage, 0.053 inch (1.3 mm), uncoated.
    - b. Borrowed Lite Glazed Frames: 16 gage, 0.053 inch (1.3 mm), uncoated.
  3. Fire Rating: Same as the door, labeled.
  4. Hardware Reinforcement: Fabricate according to ANSI/SDI A250.6 with reinforcement plates from the same material as frames.
  5. Frame Finish: Factory primed and field finished.

## **2.10 FRAME ANCHORS**

- A. Stud-Wall Type: Designed to engage stud, welded to the back of frames; not less than 0.042 inches (1.0 mm) thick. Provide the number and spacing of anchors as follows:
1. Locate anchors not more than 18 inches (457 mm) from the top and bottom of the frame. Space anchors not more than 32 inches (813 mm) o.c. and as follows:
    - a. Three anchors per jamb up to 60 inches (1524 mm) high.
    - b. Four anchors per jamb from 60 to 90 inches (1524 to 2286 mm) high.
    - c. Two anchors per head for frames above 42 inches (1066 mm) wide
- B. Masonry Wall Type: Adjustable strap-and-stirrup or T-shaped anchors to suit frame size, not less than 0.042 inches (1.0 mm) thick, with corrugated or perforated straps not less than 2 inches (51 mm) wide by 10 inches (254 mm) long; or wire anchors not less than 0.177 inches (4.5 mm) thick.
1. For doors and frames up to 7-feet high, provide 3 anchors per jamb. In excess of 7-feet, provide an additional anchor for each 30-inches of additional height, or fraction thereof.
- C. Post-installed Expansion Type for In-Place Concrete and Masonry Walls: Minimum 3/8-inch- (9.5-mm) diameter bolts with expansion shields or inserts. Provide pipe spacer from frame to wall, with throat reinforcement plate, welded to frame at each anchor location.
- D. Floor Anchors: Formed from the same material as frames, not less than 0.042 inches (1.0 mm) thick, and as follows:
1. Monolithic Concrete Slabs: Clip-type anchors, with two holes to receive fasteners.
- E. All anchors in exterior walls shall be hot-dip galvanized with non-corrosive anchors.

## **2.11 FRAME STOPS AND MOLDINGS**

- A. Moldings for Glazed Lites in Metal Doors: Minimum 0.032 inch (0.8 mm) thick, fabricated from the same material as door face sheet in which they are installed.

- B. Fixed Frame Moldings: Formed integrally with metal frames, a minimum of 5/8 inch (16 mm) high unless otherwise indicated.
  - 1. Coordinate rabbet width between fixed and removable stops with the type of glazing and type of installation indicated.
  - 2. Orient fixed frame moldings to the secure side of interior frames.
- C. Removable Stops: Formed sheet steel, shape as indicated on drawings, mitered or butted corners; prepared for countersunk style tamper-proof screws.

## 2.12 ACCESSORIES

- A. Mechanical Fasteners for Concealed Metal-to-Metal Connections: Self-drilling, self-tapping, steel with an electroplated zinc finish.

## 2.13 FABRICATION

- A. Fabricate metalwork to be rigid and free of defects, warp, or buckle. Accurately form metal to required sizes and profiles, with a minimum radius for the thickness of metal. Where practical, fit and assemble units in manufacturer's plant. To ensure proper assembly at the Project site, clearly identify work that cannot be permanently factory assembled before shipment.
- B. Tolerances: Fabricate metalwork to tolerances indicated in SDI 117
- C. Metal Frames:
  - 1. Factory-welded three-sided frames: Weld miter joints between head and jamb faces completely along their length either internally or externally. The remaining elements of the frame profile (soffit, stop, and rabbets) are not welded. Grind and finish face joints smooth.
  - 2. Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of same thickness metal as frames.
  - 3. Profile: 2-inch (51 mm) face dimension with 5/8 inch (16 mm) high stop, and types and throat dimensions indicated on the Door Schedule.
  - 4. Silencers. Prepare frames to receive inserted type door silencers, 3 per strike jamb on single doors, and 2 per head for pair of doors. Stick-on silencers are not permitted.
  - 5. Temporary Frame Spreaders: Provide for factory- or shop-assembled frames.
  - 6. Mullions and Transom Bars: Join adjacent members by welding or rigid mechanical anchors.
  - 7. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.
  - 8. Floor Anchors: Weld anchors to the bottom of jambs and mullions with at least four spot welds per anchor.
- D. Metal Doors:
  - 1. Glazed Lites: Factory cut openings in the doors.
  - 2. Astragals: Provide overlapping astragal on one leaf of pairs of doors where required by NFPA 80 for a fire-performance rating or where indicated. Extend a minimum of 3/4 inches (19 mm) beyond the edge of the door on which the astragal is mounted.
  - 3. Exterior Doors: Provide weep-hole openings in the bottom of exterior doors to permit moisture to escape. Seal joints in top edges of doors against water penetration.
- E. Fabricate concealed stiffeners, edge channels, and hardware reinforcement from either cold- or hot-rolled steel sheet.
- F. Hardware Preparation: Factory prepare metalwork to receive templated mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping according to the Door Hardware Schedule and templates furnished as specified in Division 08 Section "Door Hardware."
  - 1. Locate hardware as indicated, matching Steelcraft standards for doors and frames, or if not indicated, according to ANSI A250.8.
  - 2. Reinforce doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.
  - 3. Comply with applicable requirements in ANSI A250.6 and ANSI/DHI A115 Series specifications for preparation of metalwork for hardware.

4. Coordinate locations of conduit and wiring boxes for electrical connections with Division 26 and 28 Sections.

## **2.14 FINISHES**

- A. Factory Prime Finish: All frames and door components shall be cleaned, phosphatized and finished standard with one coat of factory baked-on, a rust-inhibited primer in accordance with ANSI A250.10 (Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames)
- B. Frame Undercoating (Bituminous Coating): Cold-applied asphalt mastic, SSPC-Paint 12, compounded for 15-mil dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.
  1. Locations: Exterior door frames

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting the performance of the Work.
- B. Examine roughing-in for embedded and built-in anchors to verify actual locations before frame installation.

### **3.02 PREPARATION**

- A. Remove welded-in shipping spreaders installed at the factory. Restore exposed finish by grinding, filling, and dressing, as required to make the repaired area smooth, flush, and invisible on exposed faces.
- B. Before installation, adjust and securely brace welded metal frames for squareness, alignment, twist, and plumbness to the following tolerances:
  1. Squareness: Plus or minus 1/16 inch (1.6 mm), measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
  2. Alignment: Plus or minus 1/16 inch (1.6 mm), measured at jambs on a horizontal line parallel to the plane of the wall.
  3. Twist: Plus or minus 1/16 inch (1.6 mm), measured at opposite face corners of jambs on parallel lines, and perpendicular to the plane of the wall.
  4. Plumbness: Plus or minus 1/16 inch (1.6 mm), measured at jambs on a perpendicular line from head to the floor.
- C. Drill and tap doors and frames to receive non-templated, mortised, and surface-mounted door hardware.

### **3.03 METAL DOORS, AND FRAMES INSTALLATION**

- A. General: Install metal work plumb, rigid, properly aligned, and securely fastened in place; comply with Drawings and manufacturer's written instructions.
- B. Interior Metal Frames: Install metal frames of size and profile indicated. Comply with ANSI/SDI A250.11.
  1. Set frames accurately in position, plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces, leaving surfaces smooth and undamaged.
    - a. At fire-protection-rated openings, install frames according to NFPA 80.
    - b. Where frames are fabricated in sections because of shipping or handling limitations, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces.
    - c. Install frames with removable glazing stops located on the secure side of the opening.
    - d. Remove temporary braces necessary for installation only after frames have been properly set and secured.

- e. Check plumbness, squareness, and twist of frames as walls are constructed. Shim as necessary to comply with installation tolerances.
  2. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to the floor, and secure with post-installed expansion anchors.
    - a. Floor anchors may be set with powder-actuated fasteners instead of post-installed expansion anchors if so indicated and approved on Shop Drawings.
  3. Ceiling Struts: Extend struts vertically from the top of the frame at each jamb to overhead structural supports or substrates above the frame unless the frame is anchored to masonry or to other structural support at each jamb. Bend top of struts to provide flush contact for securing to supporting construction. Provide adjustable wedged or bolted anchorage to frame jamb members.
- C. Interior Metal Doors: Fit metal doors accurately in frames, within clearances specified below. Shim as necessary.
1. Non-Fire-Rated Standard Steel Doors:
    - a. Jambs and Head: 1/8 inch (3 mm) plus or minus 1/16 inch (1.6 mm).
    - b. Between Edges of Pairs of Doors: 1/8 inch (3 mm) plus or minus 1/16 inch (1.6 mm).
    - c. Between Bottom of Door and Top of Threshold: Maximum 3/8 inch (9.5 mm).
    - d. Between Bottom of Door and Top of Finish Floor (No Threshold): Maximum 3/4 inch (19 mm).
  2. Fire-Rated Doors: Install doors with clearances according to NFPA 80.
  3. Smoke-Control Doors: Install doors according to NFPA 105.
- D. Glazing: Comply with installation requirements in Section 08 80 00, and with the metal manufacturer's written instructions.
1. Secure stops with countersunk flat- or oval-head machine screws spaced uniformly not more than 9 inches (230 mm) o.c. and not more than 2 inches (50 mm) o.c. from each corner.

### **3.04 ADJUSTING AND CLEANING**

- A. Final Adjustments: Check and readjust operating hardware items immediately before final inspection. Leave work complete and properly operating condition. Remove and replace defective work, including metalwork that is warped, bowed, or otherwise unacceptable.
  1. Adjust for smooth and balanced door movement.
- B. Touch-up:
  1. Prime-Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying, rust-inhibitive primer.

**END OF SECTION**

**SECTION 08 14 23  
PLASTIC LAMINATE CLAD WOOD DOORS**

**PART 1 GENERAL**

**1.01 RELATED DOCUMENTS**

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

**1.02 SECTION INCLUDES**

- A. Interior High-Pressure Decorative Laminate Faced Doors:
  - 1. Flush solid-core high-pressure decorative laminate doors, non-rated and fire-rated.

**1.03 RELATED SECTIONS**

- A. Section 08 12 13 - Hollow Metal Frames.
- B. Section 08 71 00 - Door Hardware.
- C. Section 08 80 00 - Glazing.

**1.04 REFERENCE STANDARDS**

- A. 16 CFR 1201 - Safety Standard for Architectural Glazing Materials.
- B. ANSI A208.1 - American National Standard for Particleboard.
- C. NEMA LD 3 - High-Pressure Decorative Laminates.
- D. NFPA 80 - Standard for Fire Doors and Other Opening Protectives.
- E. NFPA 105 - Standard for Smoke Door Assemblies and Other Opening Protectives.
- F. UL 10C - Standard for Positive Pressure Fire Tests of Door Assemblies.
- G. WDMA I.S. 1A - Interior Architectural Wood Flush Doors.

**1.05 SUBMITTALS**

- A. See Section {id\#1000134} - {t\#1000134}.
- B. Product Data: Submit manufacturer's product data, including door construction description and WDMA I.S.1-A and AWS classifications.
- C. Schedules: Submit manufacturer's schedules, including door dimensions, cutouts, species, finish, and hardware. Reference individual door numbers as indicated on the Drawings.
- D. Shop Drawings: Show doors and frames, elevations, sizes, types, swings, undercuts, beveling, blocking for hardware, factory machining, factory finishing, cutouts for glazing and other details.
- E. Samples for Initial Selection: Submit two samples of door veneer, 6 by 6 inch (\_\_\_\_ by \_\_\_\_ mm) in size illustrating plastic laminate color.
- F. Samples for Verification:
  - 1. Samples: Submit two samples of plastic laminate for each pattern as selected.
  - 2. Corner sections of doors, approximately 8 by 10 inches (200 by 250 mm), with door faces and edges representing actual materials to be used.
- G. Test Reports: Submit manufacturer's test results of STC ratings from testing performed by independent testing agency for sound-retardant doors.

**1.06 QUALITY ASSURANCE**

- A. Identifying Label: Each door shall bear identifying label indicating:
  - 1. Door manufacturer.
  - 2. Order number.
  - 3. Door number.
  - 4. Fire rating, if applicable.
- B. Fire-Rated Doors: Labeled by Intertek/Warnock Hersey.
  - 1. Construction Details and Hardware Application: Approved by labeling agency.

- C. Positive Pressure Opening Assemblies: UL 10C.
- D. Environmental Responsibility: Provide doors manufactured with the following environmentally responsible components:
  - 1. Core:
    - a. Particleboard Core:
      - 1) Forest Stewardship Council (FSC) certified.
      - 2) Pre-consumer recycled material.
      - 3) No added urea formaldehyde.
  - 2. Composite Crossband:
    - a. High-Density Fiberboard (HDF):
      - 1) Forest Stewardship Council (FSC) certified.
      - 2) Pre-consumer recycled material.
      - 3) No added urea formaldehyde.
  - 3. Stiles and Rails:
    - a. Structural Composite Lumber (SCL):
      - 1) Forest Stewardship Council (FSC) certified.
      - 2) No added urea formaldehyde.

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

- A. Package, deliver and store doors in accordance with specified quality standard.
- B. Accept doors on site in manufacturer's packaging. Inspect for damage.
- C. Protect doors with resilient packaging sealed with heat shrunk plastic. Do not store in damp or wet areas; or in areas where sunlight might bleach veneer. Seal top and bottom edges with tinted sealer if stored more than one week. Break seal on site to permit ventilation.

### **1.08 WARRANTY**

- A. Manufacturers' Warranty: Warrant clad wood doors for life of installation against warpage, delamination, and defects in materials and workmanship.
  - 1. Defects noted during warranty period shall be corrected at no cost to Owner. Corrective work shall include labor and material for repair, replacement, refinishing, and rehang as required.

## **PART 2 PRODUCTS**

### **2.01 MANUFACTURERS**

- A. Basis-of-Design Manufacturer / Products: Subject to compliance with the Contract Documents, provide products from the manufacturer's specified, no exceptions.
  - 1. Substitutions: Not permitted.
- B. High-Pressure Decorative Laminate (HPDL) Faced Doors:
  - 1. Ampco Products, Inc: [www.ampco.com/#sle](http://www.ampco.com/#sle).
  - 2. Oregon Door: [www.oregondoor.com/#sle](http://www.oregondoor.com/#sle).
  - 3. Poncraft Door Co: [www.poncraft.com/#sle](http://www.poncraft.com/#sle).
  - 4. VT Industries, Inc: [www.vtindustries.com/#sle](http://www.vtindustries.com/#sle).
    - a. Products from V.T. Industries are specified to establish a standard of quality for design, function, materials, and appearance.
- C. Source Limitations: Obtain clad wood doors from single manufacturer.

### **2.02 PLASTIC LAMINATE CLAD WOOD DOORS**

- A. General:
  - 1. High-Pressure Decorative Laminates: NEMA LD3.
    - a. Face laminate doors with high-pressure decorative laminates.
    - b. Nominal Minimum Thickness for Faces and Vertical Edges: 0.048 inch.
    - c. Laminate Selection: As scheduled.
    - d. Finish: As scheduled
    - e. Grade: General purpose, horizontal grade.

2. Vision Panels in Doors:
  - a. VT Industries; Steel Vision Frame.
  - b. Style: No. 110.
  - c. Finish: Beige finish.
3. Glazing: As specified in Section 08 80 00.

### **2.03 PLASTIC LAMINATE CLAD WOOD DOORS**

- A. Basis of Design: V.T. Industries; "Heritage" Collection, Flush Solid-Core High-Pressure Decorative Laminate Doors.
  1. Type: High Pressure Decorative Laminate (HPDL):
    - a. Non-Fire-Rated.
    - b. Fire-Rated:
    - c. Smoke and Draft Control.

### **2.04 NON-RATED AND 20-MINUTE DOORS**

- A. Compliance: WDMA I.S. 1A.
  1. Aesthetic Grade: Premium Grade.
  2. Duty Level: Extra Heavy Duty.
  3. Type: PC-HPDL-5.
- B. Models:
  1. Non-Rated Doors: Model No. 404H, PC-HPDL-5, five ply particleboard core, non-rated.
  2. 20-Minute Doors: Model No. 404H, PC-20-HPDL-5, five-ply particleboard core, 20-minute rated.
  3. 20-Minute Doors, Positive Pressure: Model No. 404H, PC-20PP-HPDL-5, five-ply particleboard core, 20-minute rated, positive pressure.
- C. Seven-Ply and Non-Bonded Core Construction: Not acceptable.
- D. Door Thickness: 1-3/4 inches (44 mm).
- E. Stiles:
  1. 1-3/8 inches wide, before prefitting.
  2. Structural composite lumber (SCL).
  3. Edged with high-pressure decorative laminate before face laminates.
- F. Rails:
  1. Structural composite lumber (SCL).
  2. Width before pre-fitting: 1-3/8 inches, minimum.
- G. Cores:
  1. Non-Rated and 20-Minute Rated Doors: Particleboard core (PC), 5-ply.
    - a. Material: Particleboard.
    - b. Particleboard Compliance: ANSI A208.1, Grade 1-LD-2.
    - c. Stave Lumber Core Compliance: Blocks and strips not more than 2-1/2 inches wide, one species of wood.
- H. Door Assembly:
  1. Stiles and rails bonded to core.
  2. Monolithically sand core assembly to ensure minimum telegraphing of core components.
- I. Laminates:
  1. Apply to core in hot press using Type I, exterior, water-resistant adhesive.
  2. 5-ply construction.
- J. Positive Pressure:
  1. Where UL 10C standards for positive pressure apply, doors shall be constructed in accordance with Category A guidelines as published by Intertek/Warnock Hersey.
  2. Smoke Gasketing: Apply smoke gasketing around frame perimeter and between door and pairs to meet Smoke (S) rating.

3. Intertek/Warnock Hersey Category A Guidelines: Edge sealing systems not allowed on frames.

## 2.05 FIRE-RATED DOORS

- A. Basis of Design Product: VTI; "Heritage Collection", 5-Ply Flush Fire-Rated HPDL Doors.
  1. Fire Ratings: 45-Minutes, 60-Minutes, and 90-Minutes as scheduled on the "Door Schedule".
- B. Compliance: WDMA I.S. 1A.
  1. Aesthetic Grade: Custom Grade.
  2. Duty Level: Extra Heavy Duty.
  3. Type: FD-HPDL-5.
- C. Models:
  1. 1345H, mineral core, FD-45-HPDL-5, 45-minute rated.
  2. 1P45H, mineral core, FD-45PP-HPDL-5, 45-minute rated, positive pressure.
  3. 1111H, mineral core, FD-60-HPDL-5, 60-minute rated.
  4. 1111H, mineral core, FD-90-HPDL-5, 90-minute rated.
  5. 1P11H, mineral core, FD-60PP-HPDL-5, 60-minute rated, positive pressure.
  6. 1P11H, mineral core, FD-90PP-HPDL-5, 90-minute rated, positive pressure.
- D. Door Thickness: 1-3/4 inches (44 mm).
- E. Stiles: Structural composite lumber (SCL) with high-pressure decorative laminate edges, 45-minute rated, or Non-combustible material, 60- and 90-minute rated.
- F. Rails:
  1. Structural composite lumber (SCL) with high-pressure decorative laminate edges, 45-minute rated, or Noncombustible material, 60- and 90-minute rated.
  2. Width: Manufacturer's standard width.
- G. Core:
  1. Fire-retardant mineral core (FD) that does not contain asbestos or added urea formaldehyde.
  2. Agrifiber Core Door: ANSI A208.1, Grade 1-LD-2.
- H. Composite Crossbands:
  1. Apply to core in hot press using Type I, exterior, water-resistant adhesive before application of hardwood edges.
  2. Exposed Crossbanding: Not allowed along stile edges.
- I. Positive Pressure:
  1. Where UL 10C standards for positive pressure apply, doors shall be constructed in accordance with Category A guidelines as published by Intertek/Warnock Hersey.
  2. Smoke Gasketing: Apply smoke gasketing around frame perimeter and between door and pairs to meet Smoke (S) rating.
  3. Intertek/Warnock Hersey Category B Guidelines: Edge sealing systems not allowed on frames.

## 2.06 DOOR FACINGS

- A. High Pressure Decorative Laminate (HPDL) Facing for Fire Doors: NEMA LD 3, HGF; color(s) as indicated; finish as selected.
- B. High Pressure Decorative Laminate (HPDL) Facing for Non-Fire-Rated Doors: NEMA LD 3, HGS; color(s) as indicated; finish as selected.

## 2.07 ACCESSORIES

- A. Hollow Metal Frames: As specified in Section 08 12 13.
- B. Glazing: As scheduled in the Drawings.
- C. Glass Lite Mouldings:
  1. Non-rated Doors: VT Industries; Style VT1 (1/4" Glass), Flush wood lite mouldings:

- a. Flush wood lite mouldings have one side fixed into place with brads at the factory. The other side is temporarily tacked into place so glass and glazing can be installed at the jobsite. Field fitting of glass and glazing is the responsibility of the installer. Use of a glazing compound or caulking is recommended to reduce glass rattle. All profiles have a tolerance of  $\pm 0.005$  inches.
  - b. Wood Stop Materials:
    - 1) Doors with laminate faces will use poplar stops.
  2. 20-Minute Fire Rated Doors:
    - a. Flush Wood Lite Mouldings:
      - 1) Basis of Design Product: VT Industries; Style VT1 (1/4" Glass) with metal glazing clips.
        - (a) Wood Stop Materials:
          - 1) Doors with laminate faces will use poplar stops.
      - b. Metal Vision Frame:
        - 1) Basis of Design Product: VT Industries; Style #110 Metal Vision Frame.
          - (a) Material: Frame formed of 0.048-inch- (1.2-mm-) thick, cold-rolled steel sheet.
          - (b) Finish: Factory primed for field-applied paint finish.
          - (c) Glass Thickness: As scheduled.
    - a. Metal Vision Frame:
      - 1) Basis of Design Product: VT Industries; Style #110 Metal Vision Frame.
        - (a) Material: Frame formed of 0.048-inch- (1.2-mm-) thick, cold-rolled steel sheet.
        - (b) Finish: Factory primed for field-applied paint finish.
        - (c) Glass Thickness: As scheduled.
  3. 45-, 60- and 90-Minute Fire-Rated Doors:
    - a. Metal Vision Frame:
      - 1) Basis of Design Product: VT Industries; Style #110 Metal Vision Frame.
        - (a) Material: Frame formed of 0.048-inch- (1.2-mm-) thick, cold-rolled steel sheet.
        - (b) Finish: Factory primed for field-applied paint finish.
        - (c) Glass Thickness: As scheduled.
- D. Astragals:
1. Astragals for Non-Rated Double Doors: Steel, T shaped, overlapping and recessed at face edge.
  2. Astragals for Fire-Rated Double Doors: Steel, T shaped, overlapping and recessed at face edge, specifically for double doors.
- E. Door Hardware: As specified in Section 08 71 00.

## 2.08 FABRICATION

- A. Stile Edges: Apply laminate edges before application of face laminates.
- B. Prefit Doors:
  1. Prefit and bevel doors at factory to fit openings.
  2. Prefit Tolerances: WDMA I.S. 1A and AWS Section 9.
- C. Factory-machine doors for mortised hardware, including pilot holes for hinge screws and lock fronts required.
- D. Top and Bottom Rails: Factory sealed.
- E. Glazed Openings: Non-removable stops on non-secure side; sizes and configurations as indicated on drawings.
- F. Factory machine doors for hardware other than surface-mounted hardware, in accordance with hardware requirements and dimensions.
- G. Factory fit doors for frame opening dimensions identified on shop drawings, with edge clearances in accordance with specified quality standard.
- H. Provide edge clearances in accordance with the quality standard specified.
- I. Undercut:
  1. Bottom of Door: 5/8 inch.
  2. Top and Sides: 1/8 inch.

**PART 3 EXECUTION**

**3.01 EXAMINATION**

- A. Examine locations to receive doors. Notify Architect of conditions that would adversely affect installation or subsequent use. Do not begin installation until unacceptable conditions are corrected.
- B. Ensure frames are solidly anchored, allowing no deflection when doors are installed.
- C. Ensure frames are plumb, level, square, and within tolerance.

**3.02 PREPARATION**

- A. Allow doors to become acclimated to building temperature and relative humidity for a minimum of 24 hours before installation.

**3.03 INSTALLATION**

- A. Install doors in accordance with manufacturer's instructions and specified quality standard.
  - 1. Install fire-rated doors in accordance with NFPA 80 requirements.
  - 2. Install smoke and draft control doors in accordance with NFPA 105 requirements.
- B. Install doors at locations indicated on the Drawings.
- C. Install doors plumb, level, and square.
- D. Install door hardware as specified in Section 08 71 00.
- E. Coordinate installation of doors with installation of frames, hardware, and glazing.

**3.04 TOLERANCES**

- A. Conform to specified quality standard for fit and clearance tolerances.
- B. Conform to specified quality standard for telegraphing, warp, and squareness.

**3.05 ADJUSTING**

- A. Adjust doors to swing freely, without binding in frame.
- B. Adjust hardware to operate properly.
- C. Repair minor damages to finish in accordance with manufacturer's instructions and as approved by Architect.
- D. Remove and replace damaged doors that cannot be successfully repaired, as determined by Architect.

**3.06 CLEANING**

- A. Clean doors promptly after installation in accordance with manufacturer's instructions.
- B. Do not use harsh cleaning materials or methods that could damage finish.

**3.07 PROTECTION**

- A. Protect installed doors from damage during construction.

**END OF SECTION**

**SECTION 08 31 00  
ACCESS DOORS AND FRAMES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Wall and ceiling access door and frame units.

**1.02 RELATED REQUIREMENTS**

- A. Section 09 21 16 - Gypsum Board Assemblies
- B. Section 09 51 00 - Acoustical Ceilings

**1.03 REFERENCE STANDARDS**

**1.04 SUBMITTALS**

- A. Product Data: For each type of product.
  - 1. Include construction details, fire ratings, materials, individual components and profiles, and finishes.
- B. Shop Drawings:
  - 1. Include plans, elevations, sections, details, and attachments to other work.
  - 2. Detail fabrication and installation of access doors and frames for each type of substrate.
- C. Samples: For each door face material, at least 3 by 5 inches (75 by 125 mm) in size, in specified finish.
- D. Product Schedule: Provide complete access door and frame schedule, including types, locations, sizes, latching or locking provisions, and other data pertinent to installation.

**1.05 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
- B. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years documented experience.

**1.06 WARRANTY**

- A. Special Manufacturers Warranty: The manufacturer shall warrant the products specified in this Section against defects in material or workmanship for a period of one (1) year from the Date of Substantial Completion.

**PART 2 PRODUCTS**

**2.01 PERFORMANCE REQUIREMENTS**

- A. Fire-Rated Access Doors and Frames: Units complying with NFPA 80 that are identical to access door and frame assemblies tested for fire-test-response characteristics according to the following test method and that are listed and labeled by UL or another testing and inspecting agency acceptable to authorities having jurisdiction:
  - 1. NFPA 252 or UL 10C for fire-rated access door assemblies installed vertically.
  - 2. Provide smoke gasketing for doors in 0 or 1 hour rated smoke partitions.

**2.02 MANUFACTURERS**

- A. Specified Manufacturer: Karp Associates, Inc..
  - 1. Other acceptable manufacturers with equivalent products to the specified manufacturer shall include:
    - a. Acudor Products, Inc.
    - b. J. L. Industries, Inc.
    - c. Milcor Inc.
- B. Product Substitutions: Comply with the requirements specified in Division 01 "Substitution Procedures".

- C. Source Limitations: Obtain each type of access door and frame from single source from single manufacturer.

### 2.03 MATERIALS

- A. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
- B. Steel Sheet: Uncoated or electrolytic zinc coated, ASTM A 879/A 879M, with cold-rolled steel sheet substrate complying with ASTM A 1008/A 1008M, Commercial Steel (CS), exposed.
- C. Stainless-Steel Sheet, Strip, Plate, and Flat Bars: ASTM A 666, [Type 304] [Type 316]. Remove tool and die marks and stretch lines or blend into finish.
- D. Aluminum Extrusions: ASTM B 221 (ASTM B 221M), Alloy 6063-T6.
- E. Aluminum-Alloy Rolled Tread Plate: ASTM B 632/B 632M, Alloy 6061-T6.
- F. Frame Anchors: Same type as door face.
- G. Inserts, Bolts, and Anchor Fasteners: Hot-dip galvanized steel according to ASTM A 153/A 153M or ASTM F 2329.

### 2.04 ACCESS DOORS AND FRAMES

- A. Flush Access Doors with Concealed Flanges:
  - 1. Product: Karp, Model KDW. (Model DSC-214M for above ceiling or concealed areas with exposed flange type).
  - 2. Assembly Description: Fabricate door to fit flush to frame. Provide frame with gypsum board beads for concealed flange installation.
  - 3. Locations: Wall and ceiling.
  - 4. Door Size: as required by location.
  - 5. Uncoated Steel Sheet for Door: Nominal 0.060 inch (1.52 mm), 16 gage.
    - a. Finish: Factory prime.
  - 6. Frame Material: Same material and thickness as door.
  - 7. Hinges: Manufacturer's standard.
  - 8. Hardware: Lock.
- B. Fire-Rated, Flush Access Doors with Exposed Flanges:
  - 1. Product: Karp, Model KRP-150-FR.
    - a. Description: Fabricate door to fit flush to frame, with a core of mineral-fiber insulation enclosed in sheet metal. Provide self-latching door with automatic closer and interior latch release. Provide manufacturer's standard-width exposed flange, proportional to door size.
    - b. Locations: Wall or ceiling.
    - c. Fire-Resistance Rating: Not less than that of adjacent construction.
    - d. Temperature-Rise Rating (if applicable): 250 deg F (139 deg C) at the end of 30 minutes.
    - e. Uncoated Steel Sheet for Door: Nominal 0.036 inch (0.91 mm), 20 gage.
      - 1) Finish: Factory prime.
    - f. Frame Material: Same material, thickness, and finish as door.
    - g. Hinges: Manufacturer's standard.
    - h. Hardware: Latch.
- C. Fire-Rated, Flush Access Doors with Concealed Flanges:
  - 1. Product: Karp Model KRP-350 FR.
    - a. Assembly Description: Fabricate door to fit flush to frame, with a core of mineral-fiber insulation enclosed in sheet metal. Provide self-latching door with automatic closer and interior latch release. Provide frame with gypsum board beads for concealed flange installation.
    - b. Locations: Wall.
    - c. Fire-Resistance Rating: Not less than that of adjacent construction.
      - 1) Temperature-Rise Rating: 250 deg F (139 deg C) at the end of 30 minutes.
    - d. Uncoated Steel Sheet for Door: Nominal 0.036 inch (0.91 mm), 20 gage.

- 1) Finish: Factory prime.
- e. Frame Material: Same material, thickness, and finish as door.
- f. Hinges: Manufacturer's standard.
- g. Hardware: Lock.

- D. Hardware:
  - 1. Lock: Cam lock operated by key.

## **2.05 FABRICATION**

- A. General: Provide access door and frame assemblies manufactured as integral units ready for installation.
- B. Metal Surfaces: For metal surfaces exposed to view in the completed Work, provide materials with smooth, flat surfaces without blemishes. Do not use materials with exposed pitting, seam marks, roller marks, rolled trade names, or roughness.
- C. Doors and Frames: Grind exposed welds smooth and flush with adjacent surfaces. Furnish attachment devices and fasteners of type required to secure access doors to types of supports indicated.
  - 1. For concealed flanges with drywall bead, provide edge trim for gypsum board securely attached to perimeter of frames.
  - 2. Provide mounting holes in frames for attachment of units to metal framing.
- D. Latching Mechanisms: Furnish number required to hold doors in flush, smooth plane when closed.

## **2.06 FINISHES**

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

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that rough openings are correctly sized and located.
- B. Examine substrates for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

### **3.02 INSTALLATION**

- A. Install units in accordance with manufacturer's instructions.
- B. Install frames plumb and level in openings, and secure units rigidly in place.
- C. Position units to provide convenient access to concealed equipment when necessary.

### **3.03 ADJUSTING**

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

**END OF SECTION**

**SECTION 08 42 43  
MANUAL SLIDING BREAK-AWAY ICU/CCU DOORS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Interior, 3-panel telescoping manual sliding ICU/CCU entrances; trackless.

**1.02 RELATED REQUIREMENTS**

- A. Section 03 30 00 - Cast-in-Place Concrete
- B. Section 07 92 00 - Joint Sealants
- C. Section 08 71 00 - Door Hardware
- D. Section 08 80 00 - Glazing
- E. Section 09 21 16 - Gypsum Board Assemblies

**1.03 DEFINITIONS**

- A. Packaged Sliding Entrance Door System (from here on referred to as "Entrance System") shall refer to packaged sliding entrance system including doors, sidelights, framing, headers, carrier assemblies, roller tracks, pivots, and accessories required for a complete installation.
- B. SX Panel: Sliding panel that swings open upon pushing.
- C. SO Panel: Sidelight panel, normally stationary, that will swing open upon pushing.
- D. X Panel: Sliding panel unable to swing.
- E. O Panel: Sidelight panel unable to swing.

**1.04 REFERENCE STANDARDS**

- A. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
- B. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
- C. NFPA 105 - Standard for Smoke Door Assemblies and Other Opening Protectives.
- D. UL 1784 - Standard for Air Leakage Tests of Door Assemblies.

**1.05 PERFORMANCE REQUIREMENTS**

- A. Provide Entrance System capable of withstanding structural loads and thermal movements based on testing manufacturer's standard units in assemblies similar to those indicated for this Project.
- B. Operating Range: Minus 30 deg F (Minus 34 deg C) to 130 deg F (54 deg C).
- C. Opening-Force Requirements for Egress Doors: Force shall be adjustable; but, not more than 50 lbf (222 N) required to manually set swinging egress door panel(s) in motion.
- D. Smoke and Draft Control: Provide smoke and draft control system on specified doors. Smoke and draft control system shall provide an effective barrier for limiting the passage of smoke through the entrance system, and shall comply with the following:
  - 1. The maximum air leakage rate shall be 3.0 ft<sup>3</sup>/min/ft<sup>2</sup> (0.9 m<sup>3</sup>/min/m<sup>2</sup>) of door opening at 0.30 in water column (75 Pa) for both the ambient and elevated temperature tests.
  - 2. Entrance System shall be tested in accordance UL 1784.
  - 3. Installation shall be in accordance with NFPA 105.

**1.06 SUBMITTALS**

- A. Product Data: Manufacturer's catalog data, detail sheets, and specifications.
- B. Shop Drawings: Prepared specifically for this project; show dimensions of doors, sidelights, details of construction, and interface with other products.
- C. Selection Samples: For each finish product specified, color chips representing manufacturer's full range of available colors and patterns.

- D. Verification Samples: For each finish product specified, minimum size 6 inches (150 mm) square, representing actual product, color, and patterns.
- E. Closeout Submittals:
  - 1. Operating and Maintenance Data: Operating and maintenance instructions, and parts lists.
  - 2. Warranties.

#### **1.07 QUALITY ASSURANCE**

- A. Installer Qualifications: Manufacturer's authorized representative, with certificate issued by AAADM, who is trained for installation and maintenance of units required for this Project.
- B. Manufacturer Qualifications: A qualified manufacturer with a manufacturing facility certified under ISO 9001.
- C. Manufacturer shall have in place a national service dispatch center providing 24 hours a day, 7 days a week, emergency call back service.
- D. Certifications: Entrance System provided as an effective barrier against the passage of smoke shall be UL 1784 listed.
- E. Source Limitations: Obtain Entrance System through one source from a single manufacturer.
- F. Product Options: Drawings indicate sizes, profiles, and dimensional requirements of Entrance System and are based on the specific system indicated.

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

- A. Deliver products to project site in factory packaging, protected from damage.
- B. Store products in manufacturer's unopened packaging until ready for installation.
- C. Store products under cover and elevated above grade.

#### **1.09 PROJECT CONDITIONS**

- A. Field Measurements: Contractor shall verify openings to receive entrance systems by field measurements before fabrication and indicate measurements on Shop Drawings.
- B. Mounting Surfaces: Contractor shall verify all surfaces to be plumb, straight and secure; substrates to be of proper dimension and material.
- C. Other trades: Contractor shall advise of any inadequate conditions or equipment.

#### **1.10 COORDINATION**

- A. Templates: Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing entrance system to comply with indicated requirements.

#### **1.11 WARRANTY**

- A. Entrance System shall be warranted to be free of defects in material and workmanship for a period of one (1) year from the Date of Substantial Completion.
  - 1. During the warranty period the Owner shall engage a factory-trained technician to perform service and affect repairs. A safety inspection shall be performed after each adjustment or repair and a completed inspection form shall be submitted to the Owner.
  - 2. During the warranty period all warranty work, including but not limited to emergency service, shall be performed during normal working hours.

### **PART 2 PRODUCTS**

#### **2.01 MANUFACTURERS**

- A. Specified Manufacturer: Stanley Access Technologies
  - 1. Other acceptable manufacturers with equivalent products to the specified manufacturer shall include:
    - a. Besam
  - 2. Substitutions: Limited to the manufacturer's listed above.

## 2.02 MATERIALS

- A. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.
  - 1. Headers, stiles, rails, and frames 6063-T6.
  - 2. Extruded Bars, Rods, Profiles, and Tubes: ASTM B221.
    - a. Sheet and Plate: ASTM B209.
- B. Sealants and Joint Fillers: As specified in Section 07 92 00.

## 2.03 TELESCOPING ENTRANCE SYSTEM (3-PANEL)

- A. Product: Stanley; Dura-Care™ 7500TL-FBO Series, manual sliding entrance system.
  - 1. Description: Manufacturer's standard entrance system including doors, sidelights, framing, headers, carrier assemblies, roller tracks, pivots, and accessories required for a complete installation.
  - 2. Configuration: Two sliding panels and one full sidelight; telescoping.
  - 3. Traffic Pattern: Two-way.
  - 4. Breakaway Capability: Sliding panels and sidelight, from fully open position.
  - 5. Mounting: Between jambs.
  - 6. Floor Track Configuration: Trackless.
  - 7. Dimensions:
    - a. Package Width: 96-inches
    - b. Package Height: 88-inches
    - c. Clear Opening Width (nom): 84-inches, when swinging panels are fully open.
    - d. Normal Operation Opening Width: 52.6 inches
    - e. Nominal Panel Width: 32.5 inches

## 2.04 COMPONENTS

- A. Framing Members: Provide manufacturer's standard extruded aluminum framing, reinforced as required to support imposed loads.
  - 1. Nominal Sizes: 1-3/4 inch (44.5 mm) wide by 6 inch (152 mm) deep.
  - 2. Concealed Fastening: Provide concealed fastening pocket in framing, with continuous flush insert cover extending full length of each framing member.
- B. Stile and Rail Doors and Sidelights: Manufacturer's standard 1-3/4 inch (44.5 mm) thick glazed doors with extruded-aluminum tubular stile and rail members. Incorporate concealed tie-rods that span full length of top and bottom rails.
  - 1. Glazing Stops and Gaskets: Snap-on, extruded-security aluminum stops and preformed gaskets.
  - 2. Stile Design: Narrow stile, 2 inch (51 mm), nominal width.
  - 3. Bottom Rail Height: 6 inch (152 mm), nominal.
  - 4. Muntin Bars (if applicable): 2 inch (51 mm), nominal.
  - 5. Top Rail Height: 4 inch (102 mm), nominal.
- C. Glazing: Furnished under Division 8 Section "Glazing". All Glazing furnished under separate section shall be:
  - 1. 1/4 inch (6 mm) tempered (Type GL-2)
- D. Headers: Fabricated from extruded aluminum and extending full width of entrance units to conceal carrier assemblies, and roller tracks. Provide hinged or removable access panels for service and adjustment of door carrier assemblies. Secure panels to prevent unauthorized access. Mounting shall be concealed, flush with framing.
- E. Carrier Assemblies and Overhead Roller Tracks: Manufacturer's standard carrier assembly that allows vertical adjustment of at least 1/8 inch (3 mm); consisting of urethane with precision steel lubricated ball-bearing wheels, operating on a continuous roller track.
- F. Fasteners and Accessories: Manufacturer's standard corrosion-resistant, non-staining, non-bleeding fasteners and accessories compatible with adjacent materials.

## 2.05 ACCESSORIES

- A. Integrated Blinds:
  - 1. Manually controlled via a knob from inside the room or outside of the room.

## 2.06 HARDWARE

- A. General: Provide units in sizes and types recommended by entrance system and hardware manufacturers for entrances and uses indicated.
- B. Breakaway Feature: Provide release hardware that allows panel(s) to swing out in direction of egress to full 90 degrees. Maximum force to open panel shall be 50 lbf (222 N) with panel retaining bolts released. Limit arms shall be provided to control swing of non-sliding panels on break-out; swing shall not exceed 90 degrees.
- C. Positive Latch: Manufacturer's standard non-keyed, spring loaded, latch and strike that can secure sliding door panels to adjacent panels or jambs. Strike shall mount flush to surface of framing. Latch shall engage by closing action of door.
- D. Smoke Seal Components (if applicable): Provide manufacturer's standard smoke and draft control components as required to meet performance specifications. Components included but are not limited to: Rubber stile, top rail, and hanger seals.
- E. Pulls: Provide manufacturer's standard flush cup pulls.

## 2.07 FABRICATION

- A. General: Factory fabricate entrance system components to designs, sizes, and thickness indicated and to comply with indicated standards.
  - 1. Form aluminum shapes before finishing.
  - 2. Use concealed fasteners to greatest extent possible.
    - a. Where fasteners are subject to loosening or turning out from thermal and structural movements, wind loads, or vibration, use self-locking devices.
    - b. Reinforce members as required to receive fastener threads.
- B. Framing: Provide entrance system as prefabricated assemblies.
  - 1. Fabricate tubular and channel frame assemblies with manufacturer's standard mechanical or welded joints. Provide sub-frames and reinforcement as required for a complete system to support required loads.
  - 2. Perform fabrication operations in manner that prevents damage to exposed finish surfaces.
  - 3. Form profiles that are sharp, straight, and free of defects or deformations.
  - 4. Prepare components to receive concealed fasteners and anchor and connection devices.
  - 5. Fabricate components with accurately fitted joints with ends coped or mitered to produce hairline joints free of burrs and distortion.
- C. Doors: Factory fabricated and assembled in profiles indicated. Reinforce as required to support imposed loads and for installing hardware.
- D. Glazing: Fabricate framing with minimum glazing edge clearances for thickness and type of glazing indicated.
- E. Hardware: Factory install hardware to the greatest extent possible; remove only as required for final finishing operation and for delivery to and installation at Project site.

## 2.08 ALUMINUM FINISH

- A. General: Comply with NAAMM Metal Finishes Manual for Architectural and Metal Products for recommendations for applying and designing finishes. Finish designations prefixed by AA comply with system established by Aluminum Association for designing finishes.
- B. Class II, Clear Anodic Finish: AA-M12C22A31 Clear Finish.
  - 1. AAMA 607.1
  - 2. Applicator must be fully compliant with all applicable environmental regulations and permits, including wastewater and heavy metal discharge.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Examine conditions for compliance with requirements for installation tolerances, header support, and other conditions affecting performance of ICU/CCU entrances. Proceed with installation only after unsatisfactory conditions have been corrected.

#### **3.02 INSTALLATION**

- A. General: Do not install damaged components. Fit frame joints to produce joints free of burrs and distortion. Rigidly secure non-movement joints.
- B. Entrances: Install entrance system plumb and true in alignment with established lines and grades without warp or rack of framing members and doors. Anchor securely in place.
  - 1. Install surface-mounted hardware using concealed fasteners to greatest extent possible.
  - 2. Set headers, carrier assemblies, tracks, operating brackets, and guides level and true to location with anchorage for permanent support.
- C. Grounding: Connect ICU/CCU entrances to building grounding system as specified in Division 26 Sections.
- D. Glazing: Performed under Division 8 Section "Glazing" in accordance with ICU/CCU entrance manufacturer's instructions.
- E. Sealants: Comply with requirements specified in Section 07 92 00.

#### **3.03 FIELD QUALITY CONTROL**

- A. Testing Services: Factory Trained Installer shall test and inspect each entrance system to determine compliance of installed systems with applicable standards.

#### **3.04 ADJUSTING**

- A. Adjust entrance system, and hardware for smooth and safe operation.

#### **3.05 CLEANING**

- A. Clean glass and aluminum surfaces promptly after installation. Remove excess glazing and sealant compounds, dirt, and other substances. Repair damaged finish to match original finish.

#### **3.06 PROTECTION**

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

**END OF SECTION**

**SECTION 08 43 13  
ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Exterior aluminum storefront framing for window walls and/or punched openings.
- B. Interior aluminum storefront framing.
- C. Entrance doors and frames.

**1.02 RELATED REQUIREMENTS**

- A. Section 03 30 00 - Cast-In-Place Concrete
- B. Section 05 40 00 - Cold-Formed Metal Framing
- C. Section 06 10 00 - Rough Carpentry
- D. Section 07 92 00 - Joint Sealants
- E. Section 08 71 00 - Door Hardware
- F. Section 08 80 00 - Glazing
- G. Section 08 81 17 - Fire-Rated Glass
- H. Section 09 21 16 - Gypsum Board Assemblies

**1.03 DESIGN AND PERFORMANCE CRITERIA**

- A. Delegated Design: Design storefront framing and entrance door systems, including comprehensive engineering analysis by a qualified professional engineer, using the design criteria specified below.
  - 1. General Design Criteria:
    - a. Building Code: 2018 IBC
    - b. Occupancy Category: II
  - 2. Seismic Design Criteria:
    - a. Refer to Structural Drawings for the following design criteria:
      - 1) Seismic Design Category
      - 2) Site Class
      - 3) Seismic Force-Resisting System
      - 4) Seismic Loads: Spectral Response Acceleration Value ( $S_a$ )
      - 5) Component Importance Factor ( $I_e$ )
  - 3. Wind-Resistance Design Criter:
    - a. Wind Loads: Design and size components to withstand loads caused by pressure and suction of wind acting normal to the plane of the wall.
    - b. Refer to Structural Drawings for the following design criteria:
      - 1) Basic Design Wind Speed,  $V_{ult}$
      - 2) Exposure Category
      - 3) Surface Roughness Category
- B. Structural: Aluminum-framed systems shall withstand the effects of the following performance requirements without exceeding performance criteria or failure due to defective manufacture, fabrication, installation, or other construction defects:
  - 1. Movements of supporting structure indicated on Drawings including, but are not limited to, story drift and deflection from uniformly distributed and concentrated live loads.
  - 2. Dimensional tolerances of building frame and other adjacent construction.
  - 3. Failure includes the following:
    - a. Deflection exceeding specified limits.
    - b. Thermal stresses transferring to the building structure.
    - c. Framing members transferring stresses, including those caused by thermal and structural movements to glazing.
    - d. Glazing-to-glazing contact.

- e. Noise or vibration created by wind and by thermal and structural movements.
- f. Loosening or weakening of fasteners, attachments, and other components.
- g. Sealant failure.
- h. Failure of operating units.

#### **1.04 SUBMITTALS**

- A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for aluminum-framed systems.
- B. Shop Drawings: For aluminum-framed systems.
  - 1. Storefront Framing Systems: Include plans, elevations, sections, details, and attachments to other work. Include details of provisions for system expansion and contraction and drainage of moisture in the system to the exterior.
  - 2. 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.
- C. Delegated-Design Submittal: For aluminum-framed systems indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
  - 1. Detail fabrication and assembly of aluminum-framed systems.
  - 2. Include design calculations.
- D. Finish Samples:
  - 1. For Initial Selection: For units with factory-applied color finishes.
  - 2. For Verification: For each type of exposed finish required, in manufacturer's standard sizes.
- E. Fabrication Sample: Of each vertical-to-horizontal intersection of aluminum-framed systems, made from 12-inch (300-mm) lengths of full-size components and showing details of the a) Joinery (including concealed welds); b) anchorage; c) expansion provisions; d) glazing; e) flashing and drainage.

#### **1.05 INFORMATIONAL SUBMITTALS**

- A. Qualification Data: For qualified Installer and testing agency.
- B. Welding certificates
- C. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for aluminum-framed systems, indicating compliance with performance requirements.
- D. Source quality-control reports.
- E. Field quality-control reports.
- F. Warranty samples

#### **1.06 CLOSEOUT SUBMITTALS**

- A. Maintenance Data: For aluminum-framed systems and entrance doors to include in maintenance manuals.

#### **1.07 QUALITY ASSURANCE**

- A. Test reports shall be accompanied by the storefront manufacturer's letter of certification stating that the tested storefront meets or exceeds the requirements of the
- B. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of units required for this Project.
- C. Testing Agency Qualifications: Qualified according to ASTM E699 for testing indicated.

- D. Engineering Responsibility: Prepare data for aluminum-framed systems, including Shop Drawings, based on testing and engineering analysis of manufacturer's standard units in systems similar to those indicated for this Project.
- E. Product Options: Information on Drawings and Specifications establishes requirements for systems' aesthetic effects and performance characteristics. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and adjoining construction. Performance characteristics are indicated by criteria subject to verification by one or more methods including preconstruction testing, field testing, and in-service performance.
  - 1. Do not revise intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If revisions are proposed, submit comprehensive explanatory data to Architect for review.
- F. Accessible Entrances: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines and ICC A117.1.
- G. Source Limitations for Aluminum-Framed Systems: Obtain from a single source from a single manufacturer.
- H. Welding Qualifications: Qualify procedures and personnel according to AWS D1.2/D1.2M, "Structural Welding Code - Aluminum."

#### **1.08 PROJECT CONDITIONS**

- A. Field Measurements: Verify actual locations of structural supports for aluminum-framed systems by field measurements before fabrication and indicate measurements on Shop Drawings.

#### **1.09 WARRANTY**

- A. Installation Warranty: The installation contractor shall warrant the installation to be free of defects in material and workmanship for a period of one (1) year from the Date of Substantial Completion.
- B. Special Manufacturer Extended Warranty: The manufacturer shall warrant the products, including aluminum finish, to be free of defects in material and workmanship for a period of three (3) years from the Date of Substantial Completion.

### **PART 2 PRODUCTS**

#### **2.01 MANUFACTURER**

- A. Specified Manufacturer: Kawneer Corporation
  - 1. Other acceptable manufacturers with equivalent products to the specified manufacturer shall include:
    - a. Tubelite
    - b. EFCO Corporation
    - c. Manko Window Systems, Inc
    - d. Special-Lite
  - 2. Products of unnamed manufacturers with equivalent products to the specified manufacturer will be considered in accordance with the "or equal" provision specified in Division 01 "Product Requirements".
    - a. Product Substitutions: Comply with the requirements specified in Division 01 "Substitution Procedures".

#### **2.02 MATERIALS**

- A. Aluminum Extrusions (ASTM B221): Alloy and temper recommended by aluminum storefront manufacturer for strength, corrosion resistance, and application of required finish, and not less than 0.070-inch (min.) wall thickness
- B. Thermal Barrier: Kawneer DUAL Isolock™ Thermal Break with two (2) 1/4" (6.4 mm) separations 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.
- C. Thermal Barrier: All exterior aluminum shall be separated from interior aluminum by a rigid, structural thermal barrier. The barrier material shall be poured-in-place, two-part polyurethane. A nonstructural thermal barrier is unacceptable.
- D. Glazing: Refer to Section 08 80 00
- E. Glazing Gaskets: Manufacturer's standard compression types; replaceable, extruded EPDM rubber.
- F. Spacers and Setting Blocks: Manufacturer's standard elastomeric type.
- G. Bond-Breaker Tape: Manufacturer's standard TFE-fluorocarbon or polyethylene material to which sealants will not develop adhesion.
- H. Glazing Sealants: For structural-sealant-glazed systems, as recommended by the manufacturer for joint type, and as follows:
  1. Structural Sealant: ASTM C1184, 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 a structural sealant and approved by a structural-sealant manufacturer for use in aluminum-framed systems indicated.
    - a. Color: Black
  2. Weatherseal Sealant: ASTM C920 for Type S, Grade NS, Class 25, Uses NT, G, A, and O; A 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, weather seal-sealant, and aluminum-framed-system manufacturers for this use.
    - a. Color: Matching structural sealant.
- I. Fasteners: Aluminum, non-magnetic stainless steel, or other materials to be non-corrosive and compatible with aluminum framing members, trim hardware, anchors, and other components.
- J. Anchors, Clips, and Accessories: Aluminum, non-magnetic stainless steel, or zinc-coated steel or iron complying with ASTM B633 for SC 3 severe service conditions or other suitable zinc coatings; provide sufficient strength to withstand design pressure indicated.
- K. Reinforcing Members: Aluminum, non-magnetic stainless steel, or nickel/chrome-plated steel complying with ASTM B456 for Type SC 3 severe service conditions, or zinc-coated steel or iron complying with ASTM B633 for SC 3 severe service conditions or other suitable zinc coatings; provide sufficient strength to withstand design pressure indicated.
- L. Concealed Flashing: Dead-soft, 0.018-inch- (0.457-mm-) thick stainless steel, ASTM A240/A240M of type recommended by manufacturer.
- M. 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.

### **2.03 STOREFRONT FRAMING SYSTEM - EXTERIOR APPLICATIONS**

- A. Storefront Framing at Entrance Doors:
  1. Product: Kawneer; Tri-Fab VG 451T, Thermally broken storefront system.
    - a. Framing Member: Manufacturer's standard extruded-aluminum framing members of thickness required, and reinforced as required to support imposed loads
      - 1) The depth of the frame shall not be less than 4-1/2 inches (114 mm).
      - 2) Face dimension shall not be less than 2-inches (50 mm).
      - 3) Frame components shall be screw spline construction.
  2. Glazing Plane: Exterior plane
  3. Glazing System: Retained mechanically with gaskets on four sides
- B. Storefront Framing for Exterior Windows:
  1. Product: Kawneer; Tri-Fab VG 451T, Thermally broken storefront system.
    - a. Framing Member: Manufacturer's standard extruded-aluminum framing members of thickness required, and reinforced as required to support imposed loads

- 1) The depth of the frame shall not be less than 4-1/2 inches (114 mm).
- 2) Face dimension shall not be less than 2-inches (50 mm).
- 3) Frame components shall be shear block construction.

#### **2.04 STOREFRONT FRAMING SYSTEM - INTERIOR APPLICATIONS**

- A. Product: Kawneer; Tri-Fab VG 450, Non-Thermal storefront system.
  1. Framing Members: Manufacturer's standard extruded-aluminum framing members of thickness required and reinforced as required to support imposed loads
    - a. The depth of the frame shall not be less than 4-1/2 inches (114 mm).
    - b. Face dimension shall not be less than 1-3/4 inches (45 mm).
    - c. Frame components shall be shear block construction.
- B. Glazing System: Retained mechanically with gaskets on four sides.
- C. Glazing Plane: Interior

#### **2.05 ENTRANCE DOORS**

- A. Exterior Entrance Doors: Manufacturer's glazed full-lite entrance doors, manual-swing operation.
  1. Product: Kawneer; Series 350T Insulpour Thermal Entrances, medium stiles.
- B. Interior Vestibule Entrance Doors: Manufacturer's glazed full-lite entrance doors, manual-swing operation.
  1. Product: Kawneer; Series 350 Medium Stile
- C. Physical Properties:
  1. Overall Door Thickness: 1-3/4 inches
  2. Material Thickness: 0.125-inches minimum extruded aluminum
  3. Medium Stile Doors:
    - a. Vertical Stiles: 3-1/2 inches wide.
    - b. Top Rail: 5-inches high
    - c. Bottom Rail: 6-1/2 inches high
    - d. Intermediate Rail for mounting of panic hardware: 8-1/4 inches high.
  4. Glazing Stops and Gaskets: Square, extruded aluminum stops shaped to accommodate 1/4-inch or 1-inch glazing with the manufacturer's standard glazing gaskets.
    - a. Provide non-removable glazing stops at the exterior side of doors and storefronts.
- D. Door Hardware: Refer to Section 08 71 00.
- E. Performance:
  1. Opening-Force Requirements:
    - a. Egress Doors: Not more than 15 lbf (67 N) to release the latch and not more than 30 lbf (133 N) to set the door in motion and not more than 15 lbf (67 N) to open the door to its minimum required width.
    - b. Accessible Interior Doors: Not more than 5 lbf (22.2 N) to fully open the door.

#### **2.06 FINISHES**

- A. Kawneer Permanodic™ AA-M10C21A44 / AA-M45C22A44, AAMA 611, Architectural Class I Color Anodic Coating.
  1. Color: Dark Bronze

#### **2.07 FABRICATION**

- A. General
  1. All exposed work shall be carefully matched to produce continuity of line and design with all joints. System design shall be such that raw edges will not be visible at joints.
- B. Storefront Framing:
  1. Fabricate components that, when assembled, have the following characteristics:
    - a. Profiles that are sharp, straight, and free of defects or deformations.
    - b. Accurately fitted joints with ends coped or mitered.

- c. The means to drain water passing joints, condensation within framing members, and moisture migrating within the system to exterior.
  - d. Physical and thermal isolation of glazing from framing members.
  - e. Accommodations for thermal and mechanical movements of glazing and framing to maintain required glazing edge clearances.
  - f. Provisions for field replacement of glazing from the interior for vision glass, and from the exterior for spandrel glazing (or metal panels)
  - g. Fasteners, anchors, and connection devices that are concealed from view to the greatest extent possible.
2. Structural-Sealant-Glazed Framing Members: Include accommodations for using a temporary support device to retain glazing in place while structural sealant cures.
- C. Entrance Doors:
1. Door Frames: Reinforce as required to support loads imposed by door operation and for installing entrance door hardware.
    - a. Exterior Doors: Provide compression weather stripping at fixed stops.
    - b. Interior Doors: Provide silencers at stops to prevent metal-to-metal contact. Install three silencers on strike jamb of single-door frames and two silencers on the head of frames for pairs of doors.
  2. Doors: Reinforce doors as required for installing entrance door hardware.
    - a. At pairs of exterior doors, provide sliding-type weather stripping retained in adjustable strip and mortised into the door edge.
    - b. At exterior doors, provide weather sweeps applied to door bottoms.
  3. Entrance Door Hardware Installation: Factory install entrance door hardware to the greatest extent possible. Cut, drill, and tap for factory-installed entrance door hardware before applying finishes.
- D. After fabrication, clearly mark components to identify their locations in Project according to Shop Drawings.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

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

### **3.02 INSTALLATION**

- A. General:
  1. Comply with manufacturer's written instructions.
  2. Do not install damaged components.
  3. Fit joints to produce hairline joints free of burrs and distortion.
  4. Rigidly secure nonmovement joints.
  5. Install anchors with separators and isolators to prevent metal corrosion and electrolytic deterioration.
  6. Seal joints watertight unless otherwise indicated.
- B. Metal Protection:
  1. Where aluminum will contact dissimilar metals, protect against galvanic action by painting contact surfaces with primer or applying sealant or tape, or by installing nonconductive spacers as recommended by the manufacturer for this purpose.
  2. Where aluminum will contact concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.
- C. Install components to drain water passing joints, condensation occurring within framing members, and moisture migrating within the system to the exterior.
- D. Set continuous sill members and flashing in full sealant bed as specified in Section 079200 - Submittal Procedures to produce weathertight installation.

- E. Install components plumb and true in alignment with established lines and grades, and without warp or rack.
- F. Install glazing as specified in Section 08 80 00.
- G. Entrance Doors: Install doors to produce smooth operation and tight fit at contact points.
  - 1. Exterior Doors: Install to produce weathertight enclosure and tight fit at weather stripping.
  - 2. Field-Installed Entrance Door Hardware: Install surface-mounted entrance door hardware according to entrance door hardware manufacturers' written instructions using concealed fasteners to the greatest extent possible.
- H. Install perimeter joint sealants as specified in Section 07 92 00 to produce weathertight installation.

### **3.03 ERECTION TOLERANCES**

- A. Install aluminum-framed systems to comply with the following maximum erection tolerances:
  - 1. Location and Plane: Limit variation from true location and plane to 1/8 inch in 12 feet (3 mm in 3.7 m); 1/4 inch (6 mm) over total length.
  - 2. Alignment:
    - a. Where surfaces abut in line, limit offset from true alignment to 1/16 inch (1.5 mm).
    - b. Where surfaces meet at corners, limit offset from true alignment to 1/32 inch (0.8 mm).
- B. Diagonal Measurements: Limit difference between diagonal measurements to 1/8 inch (3 mm).

### **3.04 FIELD QUALITY CONTROL**

- A. Manufacturer's Field Services: Provide periodic site visits by the manufacturer's field service representative.
- B. Repair or remove work if test results and inspections indicate that it does not comply with specified requirements.
- C. Additional testing and inspecting, at the Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
- D. Aluminum-framed assemblies will be considered defective if they do not pass tests and inspections.

### **3.05 ADJUSTING, CLEANING, AND PROTECTION**

- A. Adjust operating entrance door hardware to function smoothly as recommended by the manufacturer.
- B. Clean aluminum surfaces immediately after installing aluminum-framed entrance doors. Avoid damaging protective coatings and finishes. Remove excess sealants, glazing materials, dirt, and other substances.
- C. Clean glass immediately after installation. Comply with glass manufacturer's written recommendations for final cleaning and maintenance. Remove nonpermanent labels and clean surfaces.
- D. Remove and replace glass that has been broken, chipped, cracked, abraded, or damaged during the construction period.
- E. Protect installed systems from damage.

**END OF SECTION**

**SECTION 08 71 00  
DOOR HARDWARE**

**PART 1 GENERAL**

**1.01 RELATED DOCUMENTS**

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

**1.02 SUMMARY**

- A. This Section includes items known commercially as finish or door hardware that are required for swing, sliding, and folding doors, except special types of unique hardware specified in the same sections as the doors and door frames on which they are installed.
- B. This Section includes the following:
  - 1. Hinges
  - 2. Continuous hinges
  - 3. Pivots
  - 4. Key control system
  - 5. Lock cylinders and keys
  - 6. Lock and latch sets
  - 7. Bolts
  - 8. Exit devices
  - 9. Closers
  - 10. Overhead stops and holders
  - 11. Miscellaneous door control devices
  - 12. Door trim units
  - 13. Protection plates
  - 14. Weatherstripping for exterior doors
  - 15. Sound and smoke seals for interior doors
  - 16. Automatic drop seals (door bottoms)
  - 17. Astragals or meeting seals on pairs of doors
  - 18. Thresholds
- C. Related Sections: The following Sections contain requirements that relate to this Section:
  - 1. Section 0: Section "Access Control" for key pad and card readers not specified in this section.
  - 2. Division 8: Sections for Hollow Metal Doors and Frames.
  - 3. Division 8: Sections for Laminated Plastic Faced Wood Doors.
  - 4. Division 8: Sections for Overhead Coiling Doors.
  - 5. Division 8: Sections for Automatic Door Operators.
  - 6. Division 26: Sections for electrical connections provided separately including conduit and wiring for power to, and control of, swinging automatic entrances.
  - 7. Division 28: Section "Access Control" for key pad and card readers not specified in this section.
- D. Products furnished but not installed under this Section to include:
  - 1. Cylinders for locks on entrance doors.

**1.03 REFERENCES**

- A. Standards of the following as referenced:
  - 1. American National Standards Institute (ANSI)
  - 2. Door and Hardware Institute (DHI)
  - 3. Factory Mutual (FM)
  - 4. National Fire Protection Association (NFPA)
  - 5. Underwriters' Laboratories, Inc. (UL)
    - a. UL 10C - Fire Tests Door Assemblies
  - 6. Warnock Hersey

- B. Regulatory standards of the following as referenced:
  - 1. Department of Justice, Office of the Attorney General, Americans with Disabilities Act, Public Law 101-336 (ADA).
  - 2. CABO/ANSI A117.1: Providing Accessibility and Usability for Physically Handicapped People, 2010 edition.

#### 1.04 SYSTEM DESCRIPTION

- A. Refer to applicable "HW SETS" for system description for electric and electro-pneumatic hardware products.

#### 1.05 SUBMITTALS

- A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification sections.
- B. Product data including manufacturers' technical product data for each item of door hardware, installation instructions, maintenance of operating parts and finish, and other information necessary to show compliance with requirements. For items other than those scheduled in the "Headings" of Section 3, provide catalog information for the specified items and for those submitted.
- C. Final hardware schedule coordinated with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.
  - 1. Final Hardware Schedule Content: Based on hardware indicated, organize schedule into vertical format "hardware sets" indicating complete designations of every item required for each door or opening. Use specification HW SET numbers with any variations suffixed a, b, etc. Include the following information:
    - a. Type, style, function, size, and finish of each hardware item.
    - b. Name and manufacturer of each item.
    - c. Fastenings and other pertinent information.
    - d. Location of each hardware set cross-referenced to indications on Drawings both on floor plans and in door and frame schedule.
    - e. Explanation of all abbreviations, symbols, and codes contained in schedule.
    - f. Mounting locations for hardware.
    - g. Door and frame sizes and materials.
    - h. Keying information.
    - i. Cross-reference numbers used within schedule deviating from those specified.
      - 1) Column 1: State specified item and manufacturer.
      - 2) Column 2: State prior approved substituted item and its manufacturer.
  - 2. Furnish complete wiring diagrams, riser diagrams, elevation drawings, and operational descriptions of electrical components and systems, listed by opening in the hardware submittals. Elevation drawings to identify locations of the system components with respect to their placement in the door opening. Operational descriptions to fully detail how each electrical component will function within the opening, including all conditions of ingress and egress. Provide a copy with each hardware schedule submitted for approval. Supply a copy with delivery of hardware to the jobsite and another copy to the Owner at the time of project completion.
  - 3. Submittal Sequence: Submit final schedule at earliest possible date particularly where acceptance of hardware schedule must precede fabrication of other work that is critical in the Project construction schedule. Include with schedule the product data, samples, shop drawings of other work affected by door hardware, and other information essential to the coordinated review of schedule.
  - 4. Keying Schedule: Submit separate detailed schedule indicating clearly how the Owner's final instructions on keying of locks has been fulfilled.
- D. Provide samples, if requested, of each type of exposed hardware unit in finish indicated and tagged with full description for coordination with schedule. Submit samples prior to submission of final hardware schedule.

1. Samples will be returned to the supplier. Units that are acceptable and remain undamaged through submittal, review, and field comparison process may, after final check of operation, be incorporated in the Work, within limitations of keying coordination requirements.
- E. Templates for doors, frames, and other work specified to be factory prepared for the installation of door hardware. Check shop drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.
- F. Contract closeout submittals:
  1. Operation and maintenance data: Complete information for installed door hardware.
  2. Warranty: Completed and executed warranty forms.

#### **1.06 QUALITY ASSURANCE**

- A. Single Source Responsibility: Obtain each type of hardware (latch and locksets, hinges, closers, etc.) from a single manufacturer.
- B. Supplier Qualifications: A recognized architectural door hardware distributor, with warehousing facilities in the Project's vicinity, that has a record of successful in-service performance for supplying door hardware similar in quantity, type, and quality to that indicated for this Project and that employs an experienced Architectural Hardware Consultant (AHC) who is available for consultation to Owner, Architect, and Contractor, at reasonable times during the course of the Work.
- C. Coordination Meetings:
  1. Organize and attend the following:
    - a. Lock distributor to meet with the Owner to finalize lock functions and keying requirements and to obtain final instructions in writing.
    - b. Lock distributor and lock, closer and exit device manufacturers' representative(s) to meet with the installer prior to commencing installation of door hardware. Instruct installer on proper installation of scheduled products.
  2. Organize and attend the following:
    - a. Meet with the Owner, hardware supplier, frame and door supplier, electrical sub-contractor and security sub-contractor to coordinate all electrical hardware items. Hardware supplier to provide riser diagrams, elevation drawings, wiring diagrams, and operational descriptions as required by the General and sub-contractors.
- D. Fire-Rated Openings: Provide door hardware for fire-rated openings that complies with NFPA Standard No. 80 requirements of authorities having jurisdiction. Provide only items of door hardware that are listed and tested by UL or Warnock Hersey for given type/size opening and degree of label. Provide proper latching hardware, door closers, approved-bearing hinges, and seals whether listed in the Hardware Schedule or not. All hardware to comply with State and local codes and UL 10C.
  1. Where emergency exit devices are required on fire-rated doors, (with supplementary marking on doors' UL labels indicating "Fire Door to be equipped with Fire Exit Hardware") provide UL label on exit devices indicating "Fire Exit Hardware".
- E. All hardware is to comply with Federal and State Handicap laws. Provide tactile warning at the back of all outside levers to electrical, mechanical, machine rooms, and doors that lead to hazardous areas.

#### **1.07 PRODUCT HANDLING**

- A. Tag each item or package separately with identification related to final hardware schedule, and include basic installation instructions with each item or package.
- B. Inventory door hardware jointly with representatives of hardware supplier and hardware installer until each is satisfied that count is correct.
- C. Deliver individually packaged door hardware items promptly to place of installation.
- D. Provide secure lock-up for door hardware delivered to the Project, but not yet installed. Control handling and installation of hardware items that are not immediately replaceable so that completion of the Work will not be delayed by hardware losses both before and after

installation.

### 1.08 WARRANTY

- A. Special warranties:
  - 1. Surface Door Closers: Twenty five (25) year period
  - 2. Exit Devices: Three (3) year period
  - 3. Automatic Door Operators: Two (2) year period
  - 4. Mortise Locks and Cylinders: Three (3) year period

### 1.09 MAINTENANCE

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

## PART 2 PRODUCTS

### 2.01 MANUFACTURED UNITS

(\*DENOTES MANUFACTURER REFERENCED IN THE HARDWARE HEADINGS)

- A. Hinges:
  - 1. Acceptable manufacturers:
    - a. Ives\*
  - 2. Characteristics:
    - a. Templates: Provide only template-produced units.
    - b. Screws: Provide Phillips flat-head screws complying with the following requirements:
      - 1) For metal doors and frames install machine screws into drilled and tapped holes.
      - 2) For wood doors and frames install threaded-to-the-head wood screws.
      - 3) For fire-rated wood doors install #12 x 1-1/4", threaded-to-the-head steel wood screws.
      - 4) Finish screw heads to match surface of hinges or pivots.
    - c. Hinge pins: Except as otherwise indicated, provide hinge pins as follows:
      - 1) Out-Swing Exterior Doors: Non-removable pins.
      - 2) Interior Doors: Non-rising pins.
      - 3) Tips: Flat button and matching plug. Finished to match leafs.
    - d. Size: Size hinges in accordance with specified manufacturer's published recommendations.
    - e. Quantity: Furnish one pair of hinges for all doors up to 5'-0" high. Furnish one hinge for each additional 2-1/2 feet or fraction thereof.
- B. Continuous Hinges:
  - 1. Acceptable manufacturers:
    - a. Ives\*
  - 2. Characteristics:
    - a. Continuous gear hinges to be manufactured of extruded 6063-T6 aluminum alloy with anodized finish, or factory painted finish as scheduled.
    - b. All hinges are to be manufactured to template. Uncut hinges to be non-handed and to be a pinless assembly of three interlocking extrusions applied to the full height of the door and frame without mortising.
    - c. Vertical door loads to be carried on chemically lubricated polyacetal thrust bearings. The door and frame leaves to be continually geared together for the entire hinge length and secured with a full cover channel. Hinge to operate to a full 180o.
    - d. Hinges to be milled, anodized, and assembled in matching pairs. Fasteners supplied to be steel self-drilling, self-tapping 12-24 x 3/4".
    - e. Provide UL listed continuous hinges at fire doors. Continuous hinges at fire doors to meet the required ratings without the use of auxiliary fused pins or studs.
- C. Pivot Sets:
  - 1. Acceptable manufacturers:
    - a. Ives\*

2. Characteristics:
  - a. Pivots to be high strength forged bronze with top pivot housing with spring activated bronze retracting pin. Pivots to have tilt-on bearing and bearing pin.
  - b. Offset and intermediate pivots to be handed at the factory. Pivot set to support doors to 1000 pounds. Each intermediate pivot to support 100 additional pounds. Centerline of pivots to be 3/4" from face of door, 3/4" from edge of door.

D. Cylinders:

1. Acceptable manufacturers:

**SCHLAGE SFIC KEYING, KEYED TO EXISTING SYSTEM IS LISTED IN THE HARDWARE SETS TO INDICATE LEVEL OF QUALITY AND LOCATIONS. LARGE FORMAT INTERCHANGEABLE CORES FOR THE RENOVATION ARE REQUIRED. FINAL CONFIRMATION WITH FACILITY ON STANDARDS IS REQUIRED PRIOR TO SUBMITTAL.**

1. Characteristics:

- a. Except as otherwise indicated, provide keys and cylinders for the master key system for Project. Final keying to meet the requirements of the facility and parent of the facility, if applicable. During keying meeting, verify exact keying requirements with owner or owner's representative prior to ordering final cylinders.
- b. Metals: Construct lock cylinder parts from brass or bronze, stainless steel, or nickel silver.
- c. Comply with Owner's instructions for master keying and, except as otherwise indicated, provide individual change key for each lock that is not designated to be keyed alike with a group of related locks.
  - 1) Permanently inscribe each key with number of lock that identifies cylinder manufacturer's key symbol, and notation, "DO NOT DUPLICATE".
- d. Key Material: Provide keys of nickel silver only.
- e. Key Quantity: Furnish 3 change keys for each lock, 5 master keys for each master system, 5 grandmaster keys for each grandmaster system, 5 construction master keys, and 5 control keys for interchangeable core series.
  - 1) Furnish one extra blank for each lock.
  - 2) Furnish construction master keys to General Contractor.
  - 3) Deliver keys to Owner.
- f. Provide construction keying for the project. Have the permanent keys and cores shipped directly to the owner. Install the permanent keying at completion of the project, as required by the owner. Return temporary cores and keys to the hardware supplier.

B. Locksets, Latchsets, Deadbolts:

1. Acceptable manufacturers:
  - a. Schlage\*
2. Mortise Locksets and Latchsets: as scheduled.
  - a. Chassis: Cold-rolled steel, handing field-changeable without disassembly.
  - b. Latchbolts: 3/4" throw stainless steel anti-friction type.
  - c. Lever Trim: Through-bolted, accessible design, cast or solid rod lever as scheduled. Spindles: Independent break-away.
  - d. Thumbturns: Accessible design not requiring pinching or twisting motions to operate.
  - e. Deadbolts: Stainless steel 1" throw.
  - f. Electric operation: Manufacturer-installed continuous duty solenoid.
  - g. Strikes: 16 gage curved stainless steel, bronze, or brass with 1" deep box construction, lips of sufficient length to clear trim and protect clothing.
  - h. Scheduled Lock Series and Design: Schlage L series.
  - i. Certifications:
    - 1) ANSI A156.13, 1994, Grade 1 Operational, Grade 1 Security.
    - 2) ANSI/ASTM F476-84 Grade 30 UL Listed.
3. Extra Heavy Duty Cylindrical Locks and Latches: as scheduled, fastened with through-bolts.

- a. Chassis: Cylindrical design, corrosion-resistant plated cold-rolled steel.
  - b. Locking Spindle: Stainless steel, interlocking design.
  - c. Latch Retractors: Forged steel. Balance of inner parts: Corrosion-resistant plated steel, or stainless steel.
  - d. Lever Trim: Accessible design, independent operation, spring-cage supported, minimum 2" clearance from lever mid-point to door face.
  - e. Rosettes: Minimum 3-7/16" diameter for coverage of ANSI/DHI A115.18, 1994 door preparation, through-bolt lugs on both spring cages to fully engage this pattern.
  - f. Springs: Full compression type.
  - g. Electric operation: Manufacturer-installed continuous duty solenoid.
  - h. Strikes: 16 gage curved steel, bronze, or brass with 1" deep box construction, lips of sufficient length to clear trim and protect clothing.
  - i. Lock Series and Design: Schlage ND series.
  - j. Certifications:
    - 1) ANSI A156.2, 1994, Series 4000, Grade 1. Tested to exceed 3,000,000 cycles.
    - 2) UL listed for A label single doors up to 4 ft x 8 ft.
4. Deadbolts: as scheduled. Rotating cylinder trim rings of attack-resistant design. Mounting plates and actuator shields of plated cold-rolled steel. Mounting screws of 1/4" dia. steel and protected by drill-resistant ball bearings. Steel alloy deadbolt with hardened steel roller. Strike with 1/8" thick strike reinforcer and two 3" long screws. ANSI A156.5, 1992 Grade 1 certified.
- C. Exit Devices:
1. Acceptable manufacturers:
    - a. Von Duprin\*
  2. Characteristics:
    - a. Exit devices to be "UL" listed for life safety. All exit devices for fire rated openings to have "UL" labels for "Fire Exit Hardware".
    - b. All exit devices mounted on labeled wood doors to be mounted on the door in accordance with the door manufacturer's requirements.
    - c. All trim to be thru-bolted to the lock stile case. Lever design to match locksets.
    - d. All exit devices to be made of brass, bronze, stainless steel, or aluminum material, powder coated, anodized, or plated to the standard architectural finishes to match the balance of the door hardware.
    - e. Provide glass bead conversion kits to shim exit devices on doors with raised glass beads.
    - f. All exit devices to be one manufacturer. No deviation will be considered.
    - g. All series exit devices to incorporate a fluid damper, which decelerates the touchpad on its return stroke and eliminates noise associated with exit device operation.
    - h. All exit devices to be non-handed. Touchpad to extend a minimum of 1/2 of the door width and extend to the height of the cross-rail housing for a "no pinch" operation. Plastic touchpads are not acceptable.
    - i. All latchbolts to be the deadlocking type. Latchbolts to have a self-lubricating coating to reduce wear. Plated or plastic coated latchbolts are not acceptable. Plastic linkage and "dogging" components are not acceptable.
    - j. Lever trim to be solid case material with a break-away feature to limit damage to the unit from vandalism. The break-away feature to utilize a clutch mechanism allowing the lever to drop to the six o'clock position and reset manually.
    - k. Surface vertical rod devices to be UL labeled for fire door applications without the use of bottom rod assemblies. Where bottom rods are required for security applications, the devices to be UL labeled for fire doors applications with rod and latch guards by the device manufacturer.
    - l. Exit devices to include impact resistant, flush mounted end cap design to avoid damage due to carts and other heavy objects passing through an opening. End cap to be of heavy-duty metal alloy construction and provide horizontal adjustment to provide alignment with device cover plate. When exit device end cap is installed, no

raised edges will protrude.

- D. Electric Strikes:
  - 1. Acceptable manufacturers:
    - a. Von Duprin\*
  - 2. Characteristics:
    - a. Heavy duty, stainless steel construction.
    - b. Adjustable strike box to compensate for any misalignment of door or frame.
    - c. Two-piece plug connectors for ease of installation and for removal during strike servicing.
- E. Closers and Door Control Devices:
  - 1. Acceptable manufacturers:
    - a. LCN Closers\*
  - 2. Characteristics:
    - a. Door closers to have fully hydraulic, full rack and pinion action with a high strength cast iron cylinder.
    - b. All closers to utilize a stable fluid withstanding temperature range of 120oF to -30oF without seasonal adjustment of closer speed to properly close the door. Closers for fire-rated doors to be provided with temperature stabilizing fluid that complies with standards UBC 7-2 (1997) and UL 10C.
    - c. Spring power to be continuously adjustable over the full range of closer sizes, and allow for reduced opening force for the physically handicapped. Hydraulic regulation to be by tamper-proof, non-critical valves. Closers to have separate adjustment for latch speed, general speed and back check.
    - d. All closers to have solid forged steel main arms and, where specified, to have a stop on the closer shoe ("SCUSH"). Where door travel on out-swing doors must be limited, "SCUSH" type closers. Auxiliary stops are not required when "SCUSH" type closers are used. Provide drop plates where top rail of door is not sufficient for closer mounting. Provide "cush shoe supports" and "blade stop spacers" where dictated by frame details.
    - e. All closers (overhead, surface, and concealed) to be of one manufacturer and carry manufacturer's ten (10) year warranty. Electric closers to have two-year warranty.
    - f. Access-Free Manual Closers: Where manual closers are indicated for doors required to be accessible to the physically handicapped provide adjustable units complying with ADA and ANSI A-117.1 provisions for door opening force.
    - g. Closers to be installed to allow door swing to the maximum degree of opening before striking an obstruction. Doors swinging into exit corridors to provide for corridor clear width as required by code. Where possible, mount closers inside rooms.
    - h. Powder coating finish to be certified to exceed 100 hours salt spray testing by ETL, an independent testing laboratory used by BHMA for ANSI certification.
    - i. Combination Door Closers and Holders: Provide units designed to hold door in open position under normal usage and to release and automatically close door under fire conditions. Incorporate an integral electromagnetic holder mechanism designed for use with UL listed fire detectors, provided with normally closed switching contacts.
    - j. Magnetic Door Holders to be heavy duty wall mounted with metal housing and complete mounting hardware. Provide 24V holding coils unless otherwise scheduled.
- F. Overhead Door Stops and Holders:
  - 1. Acceptable manufacturers:
    - a. Glynn Johnson\*
  - 2. Characteristics:
    - a. Provide door stops and holders of brass, bronze or stainless steel.
    - b. Concealed stops and holders to be installed with the jamb bracket mortised flush with the bottom of the jamb. The arm and channel to be mortised into the door.
    - c. Surface-mounted stops and holders to be installed with the jamb bracket mounted on the stop.

- G. Floor Stops and Wall Bumpers:
  - 1. Acceptable manufacturers:
    - a. Ives\*
  - 2. Characteristics: Refer to Part 3, Hardware Schedule.
- H. Door Bolts/Coordinators:
  - 1. Acceptable manufacturers:
    - a. Ives\*
  - 2. Characteristics:
    - a. Flush bolts to be forged brass 6-3/4" x 1", with 1/2" diameter bolts. Plunger to be supplied with milled surface one side that fits into a matching guide.
    - b. Automatic flush bolts to be UL listed as top and bottom bolts on a pair of classified fire doors. Bolt construction to be of rugged steel and brass components.
    - c. Self-latching flush bolts to be UL listed as top and bottom bolts on a pair of classified fire doors. Bolt construction to be of rugged steel and brass components.
    - d. Automatic flush bolts and self-latching flush bolts are to be UL listed for fire door application without bottom bolts.
    - e. Furnish dust proof bottom strikes.
    - f. Coordinator to be soffit mounted non-handed fully automatic UL listed coordinating device for sequential closing of paired doors with or without astragals.
    - g. Provide filler pieced to close the header. Provide brackets as required for mounting of soffit applied hardware.
- I. Push Plates:
  - 1. Acceptable manufacturers:
    - a. Ives\*
  - 2. Characteristics:
    - a. Exposed Fasteners: Provide manufacturers standard exposed fasteners.
    - b. Material to be stainless steel.
    - c. Provide plates sized as shown in Part 3, Hardware Schedule.
- J. Door Pulls & Pull Plates:
  - 1. Acceptable manufacturers:
    - a. Ives\*
  - 2. Characteristics:
    - a. Provide concealed thru-bolted trim on back to back mounted pulls, but not for single units.
    - b. Material to be stainless steel.
    - c. Provide units of types and sizes shown in Part 3, Hardware Schedule.
- K. Protective Plates:
  - 1. Acceptable manufacturers:
    - a. Ives\*
  - 2. Characteristics:
    - a. Provide manufacturers standard exposed fasteners for door trim units consisting of either machine screws or self-tapping screws.
    - b. Materials:
      - 1) Metal Plates: Stainless Steel, .050 inch (U.S. 18 gage).
    - c. Fabricate protection plates not more than 2" less than door width on push side and not more than 1" less than door width on pull side.
- L. Thresholds:
  - 1. Acceptable manufacturers:
    - a. Zero Weatherstripping\*
  - 2. Types: Indicated in Part 3, Hardware Schedule.
- M. Door Seals/Gasketing:
  - 1. Acceptable manufacturers:

- a. Zero Weatherstripping\*
  2. Types: Indicated in Part 3, Hardware Schedule.
- N. Silencers:
1. Acceptable manufacturers:
  2. Ives\*
  3. Three (3) for each single door; two (2) for each pair of doors.
  4. Omit silencers at openings scheduled to receive perimeter gasketing.
- O. Key Cabinet and System:
1. Acceptable manufacturers:
    - a. Lund
  2. Provide a key control system including envelopes, labels, tags with self-locking key clips, receipt forms, 3-way visible card index, temporary markers, permanent markers, and standard metal cabinet, all as recommended by system manufacturer, with capacity for 150 percent of the number of locks required for the project.
    - a. Provide complete cross index system set up by key control distributor, and place keys on markers and hooks in the cabinet as determined by the final key schedule.
    - b. Provide hinged-panel type cabinet for wall mounting.
    - c. Provide multiple-drawer type cabinet.
- P. Security Equipment:
1. Acceptable manufacturers:
  2. Characteristics:
    - a. Provide items as found in Part 3, Hardware Schedule.
  3. Coordinate security equipment with electrical systems.

#### **4.02 MATERIALS AND FABRICATION**

- A. Base Metals: Produce hardware units of basic metal and forming method indicated, using manufacturer's standard metal alloy, composition, temper, and hardness, but in no case of lesser (commercially recognized) quality than specified for applicable hardware units by applicable ANSI/BHMA A156 series standards for each type of hardware item and with ANSI/BHMA A156.18 for finish designations indicated. Do not furnish "optional" materials or forming methods for those indicated, except as otherwise specified.
- B. Fasteners: Provide hardware manufactured to conform to published templates, generally prepared for machine screw installation.
1. Do not provide hardware that has been prepared for self-tapping sheet metal screws, except as specifically indicated.
  2. Furnish screws for installation with each hardware item. Provide Phillips flat-head screws except as otherwise indicated. Finish exposed (exposed under any condition) screws to match hardware finish or, if exposed in surfaces of other work, to match finish of this other work as closely as possible including "prepared for paint" surfaces to receive painted finish.
  3. Unless indicated otherwise provide concealed fasteners for hardware units that are exposed when door is closed except to the extent no standard units of type specified are available with concealed fasteners.
  4. Use thru-bolts for installation of all exit devices, closers, and overhead stops. Coordinate with wood doors and metal doors and frames. Where thru-bolts are used, provide sleeves for each thru-bolt as a means of reinforcing the work, or use sex nut and bolt fasteners.

#### **4.03 HARDWARE FINISHES**

- A. Match items to the manufacturer's standard color and texture finish for the latch and lock sets (or push-pull units if no latch or lock sets).
- B. Provide finishes that match those established by ANSI or, if none established, match the Architect's sample.
- C. Provide quality of finish, including thickness of plating or coating (if any), composition, hardness, and other qualities complying with manufacturer's standards, but in no case less

than specified by referenced standards for the applicable units of hardware.

**PART 3 EXECUTION**

**5.01 INSTALLATION**

- A. Mount hardware units at heights indicated in following applicable publications, except as specifically indicated or required to comply with governing regulations and except as otherwise directed by Architect.
- B. "Recommended Locations for Builders Hardware for Standard Steel Doors and Frames" by the Door and Hardware Institute.
- C. Install each hardware item in compliance with the manufacturer's instructions and recommendations. Where cutting and fitting is required to install hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation or application of surface protection with finishing work specified in the Division 9 Sections. Do not install surface-mounted items until finishes have been completed on the substrates involved.
- D. Set units level, plumb, and true to line and location. Adjust and reinforce the attachment substrate as necessary for proper installation and operation.
- E. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors in accordance with industry standards.
- F. Set thresholds for exterior doors in full bed of butyl-rubber or polyisobutylene mastic sealant complying with requirements specified in Division 7 Section "Joint Sealers".
- G. Weatherstripping and Seals: Comply with manufacturer's instructions and recommendations to the extent installation requirements are not otherwise indicated.

**5.02 ADJUSTING, CLEANING, AND DEMONSTRATING**

- A. Adjust and check each operating item of hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate freely and smoothly or as intended for the application made.
  - 1. Where door hardware is installed more than one month prior to acceptance or occupancy of a space or area, return to the installation during the week prior to acceptance or occupancy and make final check and adjustment of all hardware items in such space or area. Clean operating items as necessary to restore proper function and finish of hardware and doors. Adjust door control devices to function properly with final operation of heating and ventilating equipment.
- B. Clean adjacent surfaces soiled by hardware installation.
- C. Door Hardware Supplier's Field Service:
  - 1. Inspect door hardware items for correct installation and adjustment after complete installation of door hardware.
  - 2. Instruct Owner's personnel in the proper adjustment and maintenance of door hardware and hardware finishes.
  - 3. File written report of this inspection to Architect.

**5.03 HARDWARE SCHEDULE**

**HARDWARE SET: 01**

**FOR USE ON DOOR #(S):**

<b>111</b>	<b>129</b>	<b>161</b>	<b>163</b>	<b>165</b>	<b>176</b>
<b>178</b>					

**PROVIDE EACH SGL DOOR(S) WITH THE FOLLOWING:**

<b>QTY</b>		<b>DESCRIPTION</b>	<b>CATALOG NUMBER</b>	<b>FINISH</b>	<b>MFR</b>
<b>3</b>	<b>EA</b>	<b>HINGE</b>	<b>5BB1 (HW HINGES @</b>	<b>652</b>	<b>IVE</b>

			DOORS OVER 41" WIDE)		
1	EA	ENTRANCE LOCK	ND53TD SPA	626	SCH
1	EA	FSIC CORE	23-030	626	SCH
1	EA	WALL STOP	WS406CCV	630	IVE
1	EA	GASKETING	188SBR PSA	BR	ZER

**HARDWARE SET: 02**

**FOR USE ON DOOR #(S):**

135	153	154.1	155	166.1	167
171.1	182	184			

**PROVIDE EACH SGL DOOR(S) WITH THE FOLLOWING:**

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 (HW HINGES @ DOORS OVER 41" WIDE)	652	IVE
1	EA	CLASSROOM LOCK	ND70TD SPA	626	SCH
1	EA	FSIC CORE	23-030	626	SCH
1	EA	SURFACE CLOSER	4050A RW/PA	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406CCV	630	IVE
1	EA	GASKETING	188SBR PSA	BR	ZER

**HARDWARE SET: 03**

**FOR USE ON DOOR #(S):**

191	192				
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**PROVIDE EACH SGL DOOR(S) WITH THE FOLLOWING:**

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 (HW HINGES @ DOORS OVER 41" WIDE)	652	IVE
1	EA	CLASSROOM LOCK	ND70TD SPA	626	SCH
1	EA	FSIC CORE	23-030	626	SCH
1	EA	SURFACE CLOSER	4050A DEL RW/PA	689	LCN
1	EA	ARMOR PLATE	8402 34" X 2" LDW B-CS	630	IVE
1	EA	EDGE GUARD	7310SB	630	IVE
1	EA	WALL STOP	WS406CCV	630	IVE
1	EA	GASKETING	188SBR PSA	BR	ZER

**NOTE: SUPPLIER TO SIZE ARMOR PLATE APPROPRIATELY TO COORDINATE WITH OVERLAPPING EDGE GUARD.**

**HARDWARE SET: 04**

**FOR USE ON DOOR #(S):**

114	123	139	148		
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**PROVIDE EACH SGL DOOR(S) WITH THE FOLLOWING:**

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 (HW HINGES @ DOORS OVER 41" WIDE)	652	IVE
1	EA	PRIVACY LOCK	ND40S SPA	626	SCH
1	EA	SURFACE CLOSER	4050A RW/PA	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406CCV	630	IVE
1	EA	GASKETING	188SBR PSA	BR	ZER

**HARDWARE SET: 05**

**FOR USE ON DOOR #(S):**

112	113				
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**PROVIDE EACH SGL DOOR(S) WITH THE FOLLOWING:**

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 (HW HINGES @ DOORS OVER 41" WIDE)	652	IVE
1	EA	PRIVACY LOCK	ND40S SPA	626	SCH
1	EA	OH STOP	90S	652	GLY
1	EA	SURFACE CLOSER	4050A RW/PA	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	GASKETING	188SBR PSA	BR	ZER

**HARDWARE SET: 06**

**FOR USE ON DOOR #(S):**

175.1	175.2	177.1	177.2		
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**PROVIDE EACH SGL DOOR(S) WITH THE FOLLOWING:**

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 (HW HINGES @ DOORS OVER 41" WIDE)	652	IVE

1	EA	PUSH PLATE	8200 6" X 16"	630	IVE
1	EA	PULL PLATE	8303 8" 4" X 16"	630	IVE
1	EA	SURFACE CLOSER	4050A RW/PA	689	LCN
1	EA	WALL STOP	WS406CCV	630	IVE
3	EA	SILENCER	SR64	GRY	IVE

**HARDWARE SET: 07**

**FOR USE ON DOOR #(S):**

137	154	157	164	169	171.2
172	173	174	186		

**PROVIDE EACH SGL DOOR(S) WITH THE FOLLOWING:**

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 (HW HINGES @ DOORS OVER 41" WIDE)	652	IVE
1	EA	STOREROOM LOCK	ND80TD SPA	626	SCH
1	EA	FSIC CORE	23-030	626	SCH
1	EA	SURFACE CLOSER	4050A RW/PA	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406CCV	630	IVE
1	EA	GASKETING	188SBR PSA (AT RATED DOORS)	BR	ZER
3	EA	SILENCER	SR64 (AT NON- RATED DOORS)	GRY	IVE

**HARDWARE SET: 08**

**FOR USE ON DOOR #(S):**

187					
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**PROVIDE EACH SGL DOOR(S) WITH THE FOLLOWING:**

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 (HW HINGES @ DOORS OVER 41" WIDE)	652	IVE
1	EA	STOREROOM LOCK	ND80TD SPA	626	SCH
1	EA	FSIC CORE	23-030	626	SCH
1	EA	SURFACE CLOSER	4050A DEL RW/PA	689	LCN

1	EA	ARMOR PLATE	8402 34" X 2" LDW B-CS	630	IVE
1	EA	EDGE GUARD	7310SB	630	IVE
1	EA	WALL STOP	WS406CCV	630	IVE
1	EA	GASKETING	188SBR PSA	BR	ZER

**NOTE: SUPPLIER TO SIZE ARMOR PLATE APPROPRIATELY TO COORDINATE WITH OVERLAPPING EDGE GUARD.**

**HARDWARE SET: 09**

**FOR USE ON DOOR #(S):**

109					
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**PROVIDE EACH SGL DOOR(S) WITH THE FOLLOWING:**

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 (HW HINGES @ DOORS OVER 41" WIDE)	652	IVE
1	EA	PASSAGE SET	ND10S SPA	626	SCH
1	EA	SURFACE CLOSER	4050A RW/PA	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406CCV	630	IVE
1	EA	GASKETING	188SBR PSA	BR	ZER

**HARDWARE SET: 10**

**FOR USE ON DOOR #(S):**

102	105	108	109.1	111.1	122
168					

**PROVIDE EACH SGL DOOR(S) WITH THE FOLLOWING:**

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 (HW HINGES @ DOORS OVER 41" WIDE)	652	IVE
1	EA	STOREROOM LOCK	ND80TD SPA	626	SCH
1	EA	FSIC CORE	23-030	626	SCH
1	EA	ELECTRIC STRIKE	6211 FSE 12/16/24/28 VAC/VDC	630	VON
1	EA	SURFACE CLOSER	4050A RW/PA	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406CCV	630	IVE
1	EA	GASKETING	188SBR PSA	BR	ZER

			(AT RATED DOORS)		
3	EA	SILENCER	SR64 (AT NON-RATED DOORS)	GRY	IVE
1	EA	MULTITECH READER	BY SECURITY CONTRACTOR		
1	EA	DOOR CONTACT	679-05 HM/WD AS REQ'D (BID ALTERNATE)	WHT	SCE
1	EA	MOTION SENSOR	SCANII 12/24 VDC	WHT	SCE
1	EA	POWER SUPPLY	BY SECURITY CONTRACTOR		

**OPERATIONAL DESCRIPTION**

PRESENTATION OF VALID CREDENTIAL UNLOCKS ELECTRIC STRIKE. ELECTRIC STRIKE RE-LOCKS AFTER PRESET INTERVAL. FREE EGRESS AT ALL TIMES. COORDINATE WITH ELECTRICAL, SECURITY AND FIRE LIFE SAFETY SYSTEMS

HARDWARE SET: 11

FOR USE ON DOOR #(S):

180					
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PROVIDE EACH PR DOOR(S) WITH THE FOLLOWING:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
2	EA	CONT. HINGE	224XY	628	IVE
2	EA	POWER TRANSFER	EPT10	689	VON
2	EA	ELEC FIRE EXIT HARDWARE	QEL-9827-L-BE-F-LBR-17-499F 24 VDC	626	VON
1	EA	SURF. AUTO OPERATOR	9553 REG/STD AS REQ (120/240 VAC)	ANCLR	LCN
1	EA	ROCKER SWITCH	8310-806R	689	LCN
2	EA	ACTUATOR, WALL MOUNT	8310-813	630	LCN
2	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
2	EA	WALL STOP	WS406CCV	630	IVE
1	EA	GASKETING	188SBR PSA	BR	ZER
2	EA	MEETING STILE	8194AA	AA	ZER
1	EA	POWER SUPPLY	PS902 900-4RL-FA 120/240 VAC	LGR	SCE

**OPERATIONAL DESCRIPTION:**

**PRESSING EITHER ACTUATOR RETRACTS LATCH BOLTS AND ENGAGES AUTOMATIC OPERATOR. DOORS CLOSE AND LATCH BOLTS RE-LATCH AFTER PRESET INTERVAL.**

**HARDWARE SET: 12**

**FOR USE ON DOOR #(S):**

140					
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**PROVIDE EACH PR DOOR(S) WITH THE FOLLOWING:**

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
2	EA	CONT. HINGE	224XY	628	IVE
2	EA	DUMMY PUSH BAR	350	626	VON
2	EA	PULL PLATE	8303 8" 4" X 16"	630	IVE
1	EA	SURF. AUTO OPERATOR	9553 REG/STD AS REQ (120/240 VAC)	ANCLR	LCN
1	EA	ROCKER SWITCH	8310-806R	689	LCN
2	EA	ACTUATOR, WALL MOUNT	8310-813	630	LCN
2	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
2	EA	WALL STOP	WS406CCV	630	IVE
1	EA	GASKETING	188SBR PSA	BR	ZER
2	EA	MEETING STILE	8194AA	AA	ZER

**OPERATIONAL DESCRIPTION:**

**PRESSING EITHER ACTUATOR ENGAGES AUTOMATIC OPERATOR. DOORS CLOSE AFTER PRESET INTERVAL.**

**HARDWARE SET: 13**

**FOR USE ON DOOR #(S):**

179					
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**PROVIDE EACH PR DOOR(S) WITH THE FOLLOWING:**

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HINGE	5BB1 (HW HINGES @ DOORS OVER 41" WIDE)	652	IVE
1	EA	AUTO FLUSH BOLT	FB41T	630	IVE
1	EA	STOREROOM LOCK	ND80TD SPA	626	SCH
1	EA	FSIC CORE	23-030	626	SCH
1	EA	COORDINATOR	COR X FL	628	IVE
2	EA	MOUNTING BRACKET	MB1/MB2	689	IVE
2	EA	SURFACE	4050A CUSH	689	LCN

		<b>CLOSER</b>			
2	EA	KICK PLATE	8400 10" X 1" LDW B-CS	630	IVE
2	EA	GASKETING	188SBR PSA	BR	ZER
2	EA	MEETING STILE	8194AA	AA	ZER

**HARDWARE SET: 14**

**FOR USE ON DOOR #(S):**

195.2	198	199			
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**PROVIDE EACH SGL DOOR(S) WITH THE FOLLOWING:**

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1HW NRP	B643E/716	IVE
1	EA	STOREROOM W/DEADBOLT	L9480T 17A L583-363	643E	SCH
1	EA	FSIC CORE	23-030	613	SCH
1	EA	SURFACE CLOSER	4050A SCUSH	695	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	613	IVE
1	EA	RAIN DRIP	142D	D	ZER
1	SET	GASKETING	312D-S	D	ZER
1	EA	DOOR SWEEP	39D	D	ZER
1	EA	THRESHOLD	65D-223	D	ZER

**NOTE: REVISE FUNCTION AS NEED FOR DOOR LOCATION.**

**HARDWARE SET: 15**

**FOR USE ON DOOR #(S):**

196	197				
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**PROVIDE EACH SGL DOOR(S) WITH THE FOLLOWING:**

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1HW NRP	B643E/716	IVE
1	EA	PANIC HARDWARE	99-L-NL-06	313	VON
1	EA	RIM CYLINDER	20-057 ICX	643E	SCH
1	EA	FSIC CORE	23-030	613	SCH
1	EA	SURFACE CLOSER	4050A SCUSH	695	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	613	IVE
1	EA	RAIN DRIP	142D	D	ZER
1	SET	GASKETING	312D-S	D	ZER
1	EA	DOOR SWEEP	39D	D	ZER
1	EA	THRESHOLD	65D-223	D	ZER

**HARDWARE SET: 16**

**FOR USE ON DOOR #(S):**

190					
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**PROVIDE EACH SGL DOOR(S) WITH THE FOLLOWING:**

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1HW NRP	B643E/716	IVE
1	EA	POWER TRANSFER	EPT10	695	VON
1	EA	ELEC PANIC HARDWARE	RX-QEL-99-L-NL-06 24 VDC	313	VON
1	EA	RIM CYLINDER	20-057 ICX	643E	SCH
1	EA	FSIC CORE	23-030	613	SCH
1	EA	SURFACE CLOSER	4050A SCUSH	695	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	613	IVE
1	EA	RAIN DRIP	142D	D	ZER
1	SET	GASKETING	312D-S	D	ZER
1	EA	DOOR SWEEP	39D	D	ZER
1	EA	THRESHOLD	65D-223	D	ZER
1	EA	MULTITECH READER	BY SECURITY CONTRACTOR		
1	EA	DOOR CONTACT	679-05 HM/WD AS REQ'D (BID ALTERNATE)	WHT	SCE
1	EA	POWER SUPPLY	PS902 900-2RS 120/240 VAC	LGR	SCE

**OPERATIONAL DESCRIPTION**  
**PRESENTATION OF VALID CREDENTIAL RETRACTS DEVICE LATCH. ALWAYS FREE EGRESS.**

**HARDWARE SET: 17**

**FOR USE ON DOOR #(S):**

106					
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**PROVIDE EACH SGL DOOR(S) WITH THE FOLLOWING:**

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1HW	652	IVE
1	EA	PANIC HARDWARE	98-L-BE-17	626	VON
1	EA	SURFACE CLOSER	4050A EDA	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406CCV	630	IVE
1	EA	GASKETING	188SBR PSA	BR	ZER

**HARDWARE SET: 18**

**FOR USE ON DOOR #(S):**

117					
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**PROVIDE EACH SGL DOOR(S) WITH THE FOLLOWING:**

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1HW	652	IVE
1	EA	POWER TRANSFER	EPT10	689	VON
1	EA	ELEC PANIC HARDWARE	RX-QEL-98-L-NL-17 24 VDC	626	VON
1	EA	RIM CYLINDER	20-057 ICX	626	SCH
1	EA	FSIC CORE	23-030	626	SCH
1	EA	SURFACE CLOSER	4050A EDA	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406CCV	630	IVE
1	EA	GASKETING	188SBR PSA	BR	ZER
1	EA	MULTITECH READER	BY SECURITY CONTRACTOR		
1	EA	DOOR CONTACT	679-05 HM/WD AS REQ'D (BID ALTERNATE)	WHT	SCE
1	EA	POWER SUPPLY	PS902 900-2RS 120/240 VAC	LGR	SCE

**OPERATIONAL DESCRIPTION**

PRESENTATION OF VALID CREDENTIAL RETRACTS LATCH BOLT. LATCH BOLT RE-LATCHES AFTER PRESET INTERVAL. RX SWITCH IN PANIC BAR SHUNTS DPS. FREE EGRESS AT ALL TIMES

**HARDWARE SET: 19**

**FOR USE ON DOOR #(S):**

107.1					
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**PROVIDE EACH SGL DOOR(S) WITH THE FOLLOWING:**

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1HW	652	IVE
1	EA	POWER TRANSFER	EPT10	689	VON
1	EA	ELEC PANIC HARDWARE	RX-QEL-98-L-NL-17 24 VDC	626	VON
1	EA	RIM CYLINDER	20-057 ICX	626	SCH
1	EA	FSIC CORE	23-030	626	SCH
1	EA	SURF. AUTO OPERATOR	4642 WMS 120 VAC	689	LCN
1	EA	ACTUATOR, WALL MOUNT	8310-813	630	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406CCV	630	IVE

1	EA	GASKETING	188SBR PSA	BR	ZER
1	EA	MULTITECH READER	BY SECURITY CONTRACTOR		
1	EA	DOOR CONTACT	679-05 HM/WD AS REQ'D (BID ALTERNATE)	WHT	SCE
1	EA	POWER SUPPLY	PS902 900-4RL- FA 120/240 VAC	LGR	SCE

**OPERATIONAL DESCRIPTION**

PRESENTATION OF VALID CREDENTIAL RETRACTS LATCH BOLT. LATCH BOLT RE-LATCHES AFTER PRESET INTERVAL. RX SWITCH IN PANIC BAR SHUNTS DPS. FREE EGRESS AT ALL TIMES

ADA ENTRY BY PULL SIDE ACTUATOR AFTER VALID CARD READ. ADA EGRESS AT ALL TIMES BY PUSH SIDE ACTUATOR. PUSH SIDE ACTUATOR FIRST RETRACTS DEVICE LATCH, THEN INITIATES AUTO OPERATOR CYCLE.

HARDWARE SET: 20

FOR USE ON DOOR #(S):

195.1					
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**PROVIDE EACH PR DOOR(S) WITH THE FOLLOWING:**

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HINGE	5BB1HW NRP	B643E/716	IVE
2	EA	MANUAL FLUSH BOLT	FB458	643E/716	IVE
1	EA	STOREROOM W/DEADBOLT	L9480T 17A L583-363	643E	SCH
1	EA	FSIC CORE	23-030	613	SCH
1	EA	SURFACE CLOSER	4050A SHCUSH	695	LCN
2	EA	KICK PLATE	8400 10" X 1" LDW B-CS	613	IVE
1	EA	RAIN DRIP	142D	D	ZER
1	SET	GASKETING	312D-S	D	ZER
1	EA	ASTRAGAL	OUTSIDE ACTIVE LEAF BY DOOR MFG		
2	EA	DOOR SWEEP	39D	D	ZER
1	EA	THRESHOLD	65D-223	D	ZER

HARDWARE SET: 21

FOR USE ON DOOR #(S):

166.2					
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**PROVIDE EACH SGL DOOR(S) WITH THE FOLLOWING:**

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
1	EA	CONT. HINGE	112XY EPT	313AN	IVE
1	EA	POWER	EPT10	695	VON

		<b>TRANSFER</b>			
1	EA	ELEC PANIC HARDWARE	RX-QEL-35A- NL-OP-388 24 VDC	313	VON
1	EA	RIM CYLINDER	20-057 ICX	643E	SCH
1	EA	FSIC CORE	23-030	613	SCH
1	EA	90 DEG OFFSET PULL	8190HD 10" O	643E/716	IVE
1	EA	SURFACE CLOSER	4050A EDA	695	LCN
1	EA	PA MOUNTING PLATE	4050A-18PA SRT	695	LCN
1	EA	BLADE STOP SPACER	4050A-61 SRT	695	LCN
1	EA	FLOOR STOP	FS444	643E/716	IVE
1	EA	SEAL	BY ALUM DR MFG		
1	EA	DOOR SWEEP	BY ALUM DR MFG		
1	EA	THRESHOLD	8655D	D	ZER
1	EA	MULTITECH READER	BY SECURITY CONTRACTOR		
1	EA	DOOR CONTACT	679-05 HM/WD AS REQ'D (BID ALTERNATE)	WHT	SCE
1	EA	POWER SUPPLY	PS902 900-2RS 120/240 VAC	LGR	SCE

**OPERATIONAL DESCRIPTION**  
 PRESENTATION OF VALID CREDENTIAL RETRACTS DEVICE LATCH. ALWAYS FREE EGRESS.  
 HARDWARE SET: 22  
 FOR USE ON DOOR #(S):

107					
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**PROVIDE EACH SGL DOOR(S) WITH THE FOLLOWING:**

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
1	EA	CONT. HINGE	112XY EPT	313AN	IVE
1	EA	POWER TRANSFER	EPT10	695	VON
1	EA	ELEC PANIC HARDWARE	RX-QEL-35A- NL-OP-388 24 VDC	313	VON
1	EA	RIM CYLINDER	20-057 ICX	643E	SCH
1	EA	FSIC CORE	23-030	613	SCH
1	EA	90 DEG OFFSET PULL	8190HD 10" O	643E/716	IVE
1	EA	SURF. AUTO OPERATOR	4642 WMS 120 VAC	695	LCN

2	EA	ACTUATOR, WALL MOUNT	8310-813	630	LCN
1	EA	FLOOR STOP	FS444	643E/716	IVE
1	EA	SEAL	BY ALUM DR MFG		
1	EA	DOOR SWEEP	BY ALUM DR MFG		
1	EA	THRESHOLD	8655D	D	ZER
1	EA	MULTITECH READER	BY SECURITY CONTRACTOR		
1	EA	DOOR CONTACT	679-05 HM/WD AS REQ'D (BID ALTERNATE)	WHT	SCE
1	EA	POWER SUPPLY	PS902 900-4RL 120/240 VAC	LGR	SCE
1	EA	AIPHONE SYSTEM	BY SECURITY CONTRACTOR		B/O

**OPERATIONAL DESCRIPTION**

**PRESENTATION OF VALID CREDENTIAL RETRACTS DEVICE LATCH. ALWAYS FREE EGRESS.**

**ADA ENTRY BY EXTERIOR ACTUATOR WHEN DOOR IS DOGGED, OR AFTER VALID CARD READ. ADA EGRESS AT ALL TIMES BY INTERIOR ACTUATOR. INTERIOR ACTUATOR FIRST RETRACTS DEVICE LATCH, THEN INITIATES AUTO OPERATOR CYCLE.**

**HARDWARE SET: 23**

**FOR USE ON DOOR #(S):**

180.1					
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**PROVIDE EACH SGL DOOR(S) WITH THE FOLLOWING:**

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
1	EA	CONT. HINGE	112XY	313AN	IVE
1	EA	PANIC HARDWARE	35A-NL-OP-388	313	VON
1	EA	RIM CYLINDER	20-057 ICX	643E	SCH
1	EA	FSIC CORE	23-030	613	SCH
1	EA	90 DEG OFFSET PULL	8190HD 10" O	643E/716	IVE
1	EA	SURFACE CLOSER	4050A SCUSH	695	LCN
1	EA	PA MOUNTING PLATE	4050A-18PA SRT	695	LCN
1	EA	CUSH SHOE SUPPORT	4050A-30 SRT	695	LCN
1	EA	BLADE STOP SPACER	4050A-61 SRT	695	LCN
1	EA	SEAL	BY ALUM DR MFG		
1	EA	DOOR SWEEP	BY ALUM DR		

1	EA	THRESHOLD	MFG 8655D	D	ZER
1	EA	DOOR CONTACT	679-05 HM/WD AS REQ'D (BID ALTERNATE)	WHT	SCE

**HARDWARE SET: 24**

**FOR USE ON DOOR #(S):**

152	156	181	183	185	
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**PROVIDE EACH SGL DOOR(S) WITH THE FOLLOWING:**

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1HW	652	IVE
1	EA	PUSH/PULL LATCH	HL6 5" A	626	SCH
1	EA	OH STOP	90S	630	GLY
1	EA	SURFACE CLOSER	4050A HW/PA	689	LCN
1	EA	ARMOR PLATE	8402 34" X 2" LDW B-CS	630	IVE
1	EA	EDGE GUARD	7310SB (STRIKE EDGE)	630	IVE
1	EA	GASKETING	188SBR PSA	BR	ZER

**NOTE: SUPPLIER TO SIZE ARMOR PLATE APPROPRIATELY TO COORDINATE WITH OVERLAPPING EDGE GUARD.**

**HARDWARE SET: 25**

**FOR USE ON DOOR #(S):**

101.1					
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**PROVIDE EACH PR DOOR(S) WITH THE FOLLOWING:**

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
2	EA	CONT. HINGE	112XY	628	IVE
2	EA	PUSH/PULL BAR	9190HD-10"-NO	630	IVE
1	EA	OH STOP	100S (AT LEAF W/ OPERATOR)	695	GLY
1	EA	SURFACE CLOSER	4050A SCUSH	689	LCN
1	EA	SURF. AUTO OPERATOR	4642 WMS 120 VAC	695	LCN
1	EA	PA MOUNTING PLATE	4050A-18PA SRT	689	LCN
1	EA	CUSH SHOE SUPPORT	4050A-30 SRT	689	LCN
1	EA	BLADE STOP SPACER	4050A-61 SRT	689	LCN

2	EA	ACTUATOR, WALL MOUNT	8310-813	630	LCN
1	EA	SEAL	BY ALUM DR MFG		

**HARDWARE SET: 26**

**FOR USE ON DOOR #(S):**

101					
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**PROVIDE EACH PR DOOR(S) WITH THE FOLLOWING:**

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
2	EA	CONT. HINGE	112XY	313AN	IVE
1	EA	PANIC HARDWARE	3549A-EO	313	VON
1	EA	PANIC HARDWARE	3549A-NL- OP-388	313	VON
1	EA	RIM CYLINDER	20-057 ICX	643E	SCH
1	EA	FSIC CORE	23-030	613	SCH
2	EA	90 DEG OFFSET PULL	8190HD 10" O	643E/716	IVE
1	EA	OH STOP	100S (AT LEAF W/ OPERATOR)	695	GLY
1	EA	SURFACE CLOSER	4050A SCUSH	695	LCN
1	EA	SURF. AUTO OPERATOR	4642 WMS 120 VAC	695	LCN
1	EA	PA MOUNTING PLATE	4050A-18PA SRT	695	LCN
1	EA	CUSH SHOE SUPPORT	4050A-30 SRT	695	LCN
1	EA	BLADE STOP SPACER	4050A-61 SRT	695	LCN
2	EA	ACTUATOR, WALL MOUNT	8310-813	630	LCN
1	EA	SEAL	BY ALUM DR MFG		
2	EA	DOOR SWEEP	BY ALUM DR MFG		
1	EA	THRESHOLD	8655D	D	ZER

**HARDWARE SET: 27**

**FOR USE ON DOOR #(S):**

121	125				
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**PROVIDE EACH SL DOOR(S) WITH THE FOLLOWING:**

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
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**ALL HARDWARE BY DOOR SUPPLIER.**

**HARDWARE SET: 28**

**FOR USE ON DOOR #(S):**

300					
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**PROVIDE EACH SGL DOOR(S) WITH THE FOLLOWING:**

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	TRUCLOSE GATE HINGE	TCHD1AS3BT	BLK	UNK
1	EA	STOREROOM LOCK	ND80TD SPA	626	SCH
1	EA	FSIC CORE	23-030	626	SCH
1	EA	ELECTRIC STRIKE	EN400	630	TRN
1	EA	MULTITECH READER	BY SECURITY CONTRACTOR		
1	EA	POWER SUPPLY	BY SECURITY CONTRACTOR		

**OPERATIONAL DESCRIPTION**

**GATE NORMALLY CLOSED AND LOCKED. PRESENTATION OF VALID CREDENTIAL RELEASES ELECTRIC STRIKE. ALWAYS FREE EGRESS.**

**NOTE: METAL SHROUD FOR ELECTRIC STRIKE AND CYLINDRICAL LOCKSET BY FENCING/GATE SUPPLIER.**

**END OF SECTION**

**SECTION 08 80 00  
GLAZING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Vision lite glazing materials installed in interior doors, sidelights, transoms, and borrowed lites
- B. Vision lite glazing materials installed in exterior doors, windows, storefront, and curtainwall
- C. Spandrel glazing

**1.02 RELATED REQUIREMENTS**

- A. Section 08 11 13 - Hollow Metal Doors and Frames
- B. Section 08 14 16 - Flush Wood Veneer Doors
- C. Section 08 34 00.13 - Aluminum-Framed Top-Hung Sliding (Barn) Doors
- D. Section 08 42 43 - Manual Sliding Break-Away ICU/CCU Doors
- E. Section 08 43 13 - Aluminum-Framed Entrances and Storefronts

**1.03 REFERENCES**

- A. ASTM E 119: Fire Tests of Building Construction and Materials.
- B. ANSI Z97.1: Standard for Safety Glazing Materials Used in Buildings
- C. CPSC 16 CFR 1201: Safety Standard for Architectural Glazing Materials
- D. GANA - Glazing Manual.
- E. FGMA - Sealant Manual.

**1.04 SUBMITTALS**

- A. Shop Drawings - submit shop drawings showing all areas to receive glass, identifying the type of glass for each area, type of sealant, manufacturer literature, glazing method, etc.
- B. Samples - submit samples of each glass type to be used on the project, 12-inch square, other than monolithic clear float glass.
- C. Preconstruction Adhesion and Compatibility Test Report: From glazing sealant manufacturer.

**1.05 QUALITY ASSURANCE**

- A. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below, unless more stringent requirements are indicated. Refer to those publications for glazing terms not otherwise defined in this section, or in referenced standards.
  - 1. IGMA Publication for Insulating Glass: SIGMA TM-3000, "Glazing Guidelines for Sealed Insulating Glass Units".
  - 2. GANA Publications: GANA Laminated Division's "Laminated Glass Design Guide" and GANA's "Glazing Manual".
- B. Insulating-Glass Certification Program: Permanently marked either on spacers, or on at least one component lite of units with appropriate certification label of the Insulating Glass Certification Council or Associated Laboratories, Inc.

**1.06 PRE-INSTALLATION CONFERENCE**

- A. Convene a conference approximately two weeks before the scheduled commencement of the Work. Attendees shall include Architect, Contractor, and trades involved. The agenda shall include schedule, responsibilities, critical path items, and approvals.

**1.07 DELIVERY, STORAGE, AND HANDLING**

- A. Store and handle in per manufacturer's written instructions and recommendations.
- B. Protect from damage due to weather, excessive temperature, and construction operations.

## 1.08 PROJECT CONDITIONS

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

## 1.09 WARRANTY

- A. Manufacturer's Special 10-Year Warranty on Coated Glass:
  - 1. Manufacturer's standard form in which coated-glass manufacturer agrees to replace coated glass units that deteriorate within the specified warranty period.
  - 2. Deterioration of coated glass is defined as failure of coating, including discoloration or delamination, under normal use that is not attributed to glass breakage or to maintaining and cleaning insulating glass contrary to the manufacturer's written instructions.
  - 3. Warranty Period: 10-years from the date of Substantial Completion.
- B. Manufacturer's Warranty on Insulating Glass Units:
  - 1. Manufacturer's standard form in which insulating glass manufacturer agrees to replace insulating glass units that deteriorate within the specified warranty period.
  - 2. Deterioration of insulating glass is defined as failure of the hermetic seal under normal use that is not attributed to glass breakage or to maintaining and cleaning insulating glass contrary to the manufacturer's written instructions.
  - 3. Evidence of failure is the obstruction of vision by dust, moisture, or film on interior surfaces of glass.
  - 4. Warranty Period: 10-years from the date of Substantial Completion.
- C. Manufacturer's Warranty on Laminated Glass:
  - 1. Manufacturer's standard form in which laminated glass manufacturer agrees to replace laminated glass units that deteriorate within the specified warranty period.
  - 2. Deterioration of laminated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning laminated glass contrary to the manufacturer's written instructions.
  - 3. Defects include edge separation, de-lamination materially obstructing vision through glass, and blemishes exceeding those allowed by referenced laminated glass standard.
  - 4. Warranty Period: 10-years from the date of Substantial Completion.
- D. Coated Glass, Laminated Glass, and Insulating Glass (where applicable): 10-year warranty from the date of Substantial Completion. The warranty covers deterioration due to normal conditions of use and not to handling, installing, and cleaning practices contrary to the glass manufacturer's published instructions.

## PART 2 PRODUCTS

### 2.01 MANUFACTURER

- A. Specified Manufacturer: Guardian Glass, LLC
  - 1. Other Acceptable Manufacturers: Equivalent products of the manufacturers listed below will be acceptable:
    - a. Viracon
    - b. Insulite Glass Company
    - c. AGC Glass North America, Inc
    - d. Cardinal Glass Industries
    - e. Oldcastle
    - f. Vitro Architectural Glass
  - 2. Products of unnamed manufacturers with equivalent products to the manufacturers listed will be considered per the "or equal" provision specified in Division 01 "Product Requirements".
    - a. Product Substitutions: Comply with the requirements specified in Division 01 "Substitution Procedures".

## 2.02 DESIGN AND PERFORMANCE CRITERIA

- A. Performance: Provide glazing systems capable of withstanding normal thermal movements, wind loads, and impact loads, without failure, including loss due to defective manufacture, fabrication, and installation; deterioration of glazing materials; and other defects in construction.
- B. Delegated Design: Design glazing systems, including comprehensive engineering analysis by a qualified professional engineer (when applicable), using the design criteria specified below.
  - 1. Basic Design Criteria:
    - a. Building Code: 2018 IBC
    - b. Occupancy Risk Category: II
- C. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes acting on glass framing members and glazing components.
  - 1. Temperature Change: 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.
- D. Glass Design: Glass thickness designations indicated are minimums and are for detailing only. Confirm glass thicknesses by analyzing project loads and in-service conditions. Provide glass lites in the thickness designations indicated for various size openings, but not less than thicknesses and in strengths (annealed or heat-treated) required to meet or exceed ASTM E1300.
- E. Safety Glazing: Where safety glazing is indicated, comply with testing requirements in 16 CFR 1201 for Category II materials.
- F. Glass Strength:
  - 1. Where float glass is indicated, provide annealed float glass, Kind HS heat-strengthened float glass, or Kind FT fully tempered treated float glass as needed to comply with requirements indicated.
  - 2. Where heat-treated glass is indicated, provide Kind HS heat-strengthened float glass or Kind FT fully tempered float glass as needed to comply with the requirements indicated.
  - 3. Where fully tempered glass is indicated, provide Kind FT fully tempered float glass.
- G. Thermal and Optical Performance: Provide glass products with performance properties specified in the Product Schedule. Performance properties to be manufacturer's published data as determined according to the following procedures:
  - 1. Center of glass U-Value: NFRC 100 methodology using LBNL WINDOW 7 computer program.
  - 2. Center of glass solar heat gain coefficient: NFRC 200 methodology using LBNL-35298 WINDOW 7 computer program.
  - 3. Solar optical properties: NFRC 300.

## 2.03 GLASS SYSTEMS, GENERAL

- A. Provide glazing systems capable of withstanding normal thermal movements, wind loads, and impact loads, without failure, including loss due to defective manufacture, fabrication, and installation; deterioration of glazing materials; and other construction defects.
- B. Glass shall be annealed, heat-strengthened, or tempered as required by codes, or as required to meet thermal stress and wind loads.
- C. Safety Glazing Labeling: Where safety glazing is indicated, permanently mark glazing with the certification label of the SGCC or another certification agency acceptable to authorities having jurisdiction. The label indicates the manufacturer's name, type of glass, thickness, and safety glazing standard with which glass complies.

## 2.04 GLASS PRODUCTS

- A. FLOAT GLASS:
  - 1. Non-Heat-Treated Float Glass:
    - a. Kind AN - Annealed: ASTM C1036, Type I, Class 1 (clear) or Class 2 (tinted), and Quality Q3.
  - 2. Heat-Treated Float Glass:

- a. Kind HS - Heat Strengthened Float Glass: ASTM C1048; Type 1; Class 1 (clear) or Class 2 (tinted); Quality Q3; Condition A, B, or C.
    - 1) Condition A: Uncoated glass.
    - 2) Condition B: Spandrel glass, one surface coated.
    - 3) Condition C: Other coated glass.
  - b. Kind FT - Fully Tempered Float Glass: ASTM C1048; Type 1; Class 1 (clear) or Class 2 (tinted); Quality Q3; Condition A or C.
  3. Uncoated tempered glass, comply with requirements for Condition A.
  4. Coated tempered glass, comply with requirements for Condition C.
- B. TEMPERED (SAFETY) GLASS**
1. All tempered architectural safety glass shall conform with ANSI Z97.1 and 16 CFR 1201.
  2. Types: Clear, Tinted, or Coated where indicated.
  3. Fabrication: Laminated or Insulated where indicated.
  4. Thickness: 1/4-inch (6-mm) unless indicated otherwise.
  5. Insulating Glass Units:
    - a. Description: Factory-assembled units consisting of sealed lites of glass separated by a dehydrated interspace, following ASTM E2190, and other requirements specified.
      - 1) Sealing System: Dual seal, with manufacturer's standard primary and secondary.
      - 2) Metal Edge Spacers: Aluminum, bent and soldered corners.
        - (a) Spacer Color: Anodized Aluminum.
      - 3) Desiccant: Molecular sieve or silica gel, or a blend of both.
- C. LAMINATED (SECURITY) GLASS: Comply with ASTM C1172, and with testing requirements in 16 CFR 1201 and ANSI Z97.1.**
1. Non-Impact-Resistant Laminated Glass:
    - a. Construction: Laminate 2 plies of glass with polyvinyl butyral (PVB) interlayer to comply with the interlayer manufacturer's written recommendations.
      - 1) Glass Thickness per Plie: 1/8-inch (3-mm) or 1/4-inch (6-mm). Refer to 'Glazing Schedule'.
    - b. Polyvinyl Butyral (PVB) Interlayer:
      - 1) Manufacturers/ Products:
        - (a) Viracon; Vanceva® Color Interlay System
        - (b) Dupont; "Sentry Glass".
        - (c) Eastman Corporation; "Saflex"
      - 2) Interlayer Thickness: 0.030-inch or 0.060-inch per 'Glazing Schedule'.
        - (a) Provide thickness not less than that indicated and as needed to comply with requirements.
      - 3) Interlayer Color:
        - (a) Clear, unless otherwise indicated.
  2. Impact-Resistant Laminated Glass (if applicable):
    - a. Construction: Laminate 2 plies of glass with polyvinyl butyral (PVB) interlayer to comply with the interlayer manufacturer's written recommendations.
    - b. Glass Thickness per Ply: 1/4-inch (6-mm), unless otherwise indicated.
    - c. Polyvinyl Butyral (PVB) Interlayer:
    - d. Manufacturers/ Products:
      - 1) Viracon; Vanceva® Color Interlay System
      - 2) Dupont; "Sentry Glass".
      - 3) Eastman Corporation; "Saflex"
      - 4) Silent Glass Technologies.
    - e. Interlayer Thickness: 0.090 inch (2.286 mm), unless otherwise indicated.
      - 1) Provide thickness not less than that indicated and as needed to comply with requirements.
    - f. Interlayer Color:
      - 1) Clear, unless otherwise indicated.

3. Fabrication: Provide laminated glass units in glass types and sizes required to fit openings as scheduled and indicated in the Drawings.

## 2.05 LOW-E COATED GLASS

- A. Comply with ASTM C1376 for Vacuum Deposition (soft-coat) type coatings on float glass.
  1. Coated Glass Types:
    - a. Vision Glass: Kind CV
    - b. Overhead Glass: Kind CO
    - c. Spandrel Glass: Kind CS
- B. Coating Products:
  1. Glass Makeup: Double-glazed
  2. Outer Lite: Guardian; SunGuard SNX 62/27 Coated Glass
    - a. Substrate: 1/4-inch (6-mm) glass.
    - b. Coating Position: Surface No. 2, unless indicated otherwise.
    - c. Glass Color: Clear.
- C. Performance Characteristics: Based on a 1-inch (25-mm) thick insulating glazing unit with coatings on the #2 surface:
  1. Transmittance (%):
    - a. Visible Light Transmittance (VLT): 62%
    - b. Solar Energy Transmittance: 32%
    - c. UV Transmittance: 6%
  2. Visible Light Reflectance (%):
    - a. Outside: 11%
    - b. Inside: 12%
    - c. Solar: 23%
  3. Winter U-value Nighttime - Air: 1.624
  4. Summer U-value Daytime - Air: 1.508
  5. Shading Coefficient (SC): 0.31
  6. Solar Heat Gain Coefficient (SHGC): 0.27
  7. Light to Solar Gain (LSG): 2.32

## 2.06 PATTERNED GLASS

- A. Patterned Glass, designated in the Drawings as Finish Type AG- #
  1. Refer to the "Interior Finish Legend" for pertinent information on this Finish Type, including manufacturer, model/pattern, color, size, and other related information.
- B. Basis of Design: "Decorative Series Cast Patterned Glass" as manufactured by McGrory Glass, Inc.
  1. Product Code: TBD
- C. Standard: ASTM C 1036, Type II - Patterned Flat Glass, Class 1 (clear), Form 3, Quality-Q%, and complying with other requirements specified.
- D. Glass Material: Float Glass - Kind FT (Fully Tempered); Complies with ANSI Z97.1 and 16 CFR 1201 criteria.
- E. Glazing Units, Type AG-1:
  1. Description: Cast patterned glass; translucent, showing shadow but not form.
  2. Applications: Locations as indicated on drawings.
  3. Tint: Clear.
  4. Glass Pattern: Cast. A rolled pattern with a free-flowing, organic pattern.
    - a. Surface Pattern, as designated by product code, is permanent and shall be clear, sharp, defined, and free of obvious disfiguration that affects the appearance of the pattern.
    - b. Surface area shall be free of large areas of blemishes. Scattered areas of non-uniform surface and scattered surface blemishes are permissible
  5. Thickness: 3/8 inch (10 mm)

6. Edge fabrication shall be flat ground, flat polished, seamed, or clean cut as noted on drawings

## **2.07 INSULATING GLAZING UNITS (IGU)**

- A. General: Comply with ASTM E2190, and other requirements specified.
  1. Sealing System: Dual seal, with manufacturer's standard primary and secondary.
  2. Metal Edge Spacers: Aluminum, bent and soldered corners, ASTM E2188
    - a. Spacer Finish: Anodized Aluminum.
  3. Desiccant: Molecular sieve or silica gel, or a blend of both.
  4. Safety Glazing Labeling: Where safety glazing is indicated, permanently mark glazing with the certification label of the SGCC or another certification agency acceptable to authorities having jurisdiction. The label indicates the manufacturer's name, type of glass, thickness, and safety glazing standard with which glass complies.

## **2.08 FIRE-RATED GLASS**

- A. Refer to Section 08 81 17 - Fire-Rated Glass for requirements

## **2.09 GLAZING GASKETS**

- A. Soft Compression Gaskets: Extruded or molded, closed-cell, integral-skinned neoprene EPDM silicone or thermoplastic polyolefin rubber gaskets complying with ASTM C 509, Type II, black; of profile and hardness required to maintain watertight seal.
- B. Lock-Strip Gaskets (if applicable): Neoprene extrusions in size and shape indicated, fabricated into frames with molded corner units and zipper lock-strips, complying with ASTM C 542, black.

## **2.10 GLAZING SEALANTS**

- A. Compatibility: Provide glazing sealants that are compatible with one another and with other materials they will contact, including glass products, seals of insulating glass units, and glazing channel substrates, under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.
- B. Suitability: Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated and for conditions existing at time of installation.
- C. Sealant Types:
  1. Neutral-curing silicone glazing sealant complying with ASTM C920, Type S, Grade NS, Class 100/ 50, Use NT.
  2. Neutral-curing silicone glazing sealant complying with ASTM C920, Type S, Grade NS, Class 50, Use NT.
  3. Neutral-curing silicone glazing sealant complying with ASTM C920, Type S, Grade NS, Class 25, Use NT.
  4. Acid-curing silicone glazing sealant complying with ASTM C920, Type S, Grade NS, Class 25, Use NT.

## **2.11 GLAZING TAPES**

- A. Back-Bedding Mastic Glazing Tapes: Preformed, butyl-based, 100 percent solids elastomeric tape complying with ASTM C 1281 and AAMA 800 for products indicated below:
  1. AAMA 804.3 tape, where indicated.
  2. AAMA 806.3 tape, for glazing applications in which tape is subject to continuous pressure.
  3. AAMA 807.3 tape, for glazing applications in which tape is not subject to continuous pressure.
- B. Expanded Cellular Glazing Tapes: Closed-cell, PVC foam tapes; factory coated with adhesive on both surfaces; and complying with AAMA 800 for the following types:
  1. AAMA 810.1, Type 1, for glazing applications in which tape acts as the primary sealant.
  2. AAMA 810.1, Type 2, for glazing applications in which tape is used in combination with a full bead of liquid sealant.

## 2.12 MISCELLANEOUS GLAZING MATERIALS

- A. General: Provide products of material, size, and shape complying with referenced glazing standards, requirements of manufacturers of glass and other glazing materials for application indicated, and with a proven record of compatibility with surfaces contacted in installation.
- B. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.
- C. Setting Blocks: Elastomeric material with a Shore, Type A durometer hardness of 85, plus or minus 5.
- D. Spacers: Elastomeric blocks or continuous extrusions of hardness required by glass manufacturer to maintain glass lites in place for installation indicated.
- E. Edge Blocks: Elastomeric material of hardness needed to limit glass lateral movement (side walking).
- F. Cylindrical Glazing Sealant Backing: ASTM C 1330, Type O (open-cell material), of size and density to control glazing sealant depth and otherwise produce optimum glazing sealant performance.

## 2.13 FABRICATION OF GLAZING UNITS

- A. Fabricate glazing units in sizes required to fit openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing publications, to comply with system performance requirements.
- B. Grind smooth and polish exposed glass edges and corners.

## 2.14 GLAZING SCHEDULE

- A. Single (Monolithic) Glazing, designated in the Drawings as Glazing Type GL-#. Refer to the Article below.
- B. Insulating Glazing Units: Designated in the Drawings as Glazing Type IGU-#. Refer to the Article below.
- C. Abbreviations:
  - 1. AN - Annealed.
  - 2. HS - Heat Strengthened.
  - 3. FT - Fully Tempered.
  - 4. LAM - Laminated.
  - 5. STC - Sound Transmission Coefficient.
  - 6. PVB - Polyvinyl Butyral.

## 2.15 SINGLE (MONOLITHIC) GLAZING TYPES

- A. TYPE GL-1: TEMPERED (SAFETY) GLASS
  - 1. Tempered (Safety) Glass:
    - a. Glass Type: 1/4-inch clear Herculite, FT Safety Glass.
    - b. Provide safety glazing labeling where required
    - c. Applications include, but not limited to, the following:
      - 1) Glazed lites in non-rated and 20-minute interior doors
      - 2) Glazed sidelight panels located next to doors
      - 3) Glazed lites in partitions, except in fire-rated walls and partitions.
      - 4) Other locations required by applicable federal, state, and local codes and regulations.
- B. TYPE GL-2: LAMINATED (SECURITY) GLASS
  - 1. Glass Type: 5/16-inch, Clear LAM Security Glass
    - a. Makeup: Two (2) layers of 1/8-inch clear, AN float glass with a 0.060-inch clear PVB interlayer between glass.
    - b. Provide safety glazing labeling where required.
- C. TYPE GL-3: FLOAT GLASS - NOT USED

D. TYPE GL-4: FIRE PROTECTION RATED GLASS

1. Refer to Section 08 81 17 for requirements.

E. TYPE GL-5: FIRE RESISTANT RATED GLASS

1. Refer to Section 08 81 17 for requirements.

**2.16 INSULATING GLAZING UNIT (IGU) TYPES**

A. TYPE IGU-1: LOW-E COATED INSULATING GLAZING

1. Glazing Type: Double-Glazed Insulating Glazing Unit; 1-inch total unit thickness

a. Makeup:

- 1) Outdoor Lite: 1/4-inch, clear HS glass, coated
  - (a) Low-E Coating: Guardian SunGuard SNX62-27 on Surface #2
- 2) Air Space: 1/2-inch, clear anodized spacer
- 3) Indoor Lite: 1/4-inch, clear HS float glass, uncoated

b. Applications:

- 1) Exterior windows, except where required to be tempered glass by Code. Refer to Glazing TYPE IGU-2.

B. TYPE IGU-2: LOW-E COATED INSULATING GLAZING WITH TEMPERED (SAFETY) GLASS

1. Glazing Type: Double-Glazed Insulating Glazing Unit; 1-inch total unit thickness

a. Makeup:

- 1) Outdoor Lite: 1/4-inch, clear FT glass, coated
  - (a) Low-E Coating: Guardian SunGuard SNX62-27 on Surface #2
- 2) Air Space: 1/2-inch, clear anodized spacer
- 3) Indoor Lite: 1/4-inch, clear FT glass, uncoated

b. Provide safety glazing labeling as required.

c. Applications:

- 1) Exterior windows where required by Code.

C. TYPE IGU-3: LOW-E COATED INSULATING GLAZING WITH LAMINATED GLASS INBOARD

1. Glazing Type: Double-Glazed Insulating Glazing Unit; 1-inch total unit thickness, coated (3).

a. Makeup:

- 1) Outdoor Lite: 1/4-inch, clear FT glass, uncoated
- 2) Air Space: 1/2-inch, clear anodized spacer
- 3) Indoor Lite: 5/16-inch, clear LAM glass, coated
  - (a) Makeup: 1/8-inch, clear HS glass (coated) + 0.030-inch clear PVB + 1/8-inch, clear HS glass
    - (1) Low-E Coating: Guardian SunGuard SNX62-27 on Surface #3

b. Applications:

- 1) Glazed lites in exterior doors.
- 2) Glazed sidelights and panels next to doors

D. TYPE IGU-4: LOW-E COATED INSULATING SPANDREL GLAZING

1. Glazing Type: Double-Glazed Insulating Glazing Unit; 1-inch total unit thickness

a. Makeup:

- 1) Outdoor Lite: 1/4-inch, clear HS or FT glass, coated (2)
  - (a) Low-E Coating: Guardian SunGuard SNX62-27
- 2) Interspace: 1/2-inch clear air space with clear anodized spacer
- 3) Indoor Lite: 1/4-inch, clear HS or FT glass, with opacifier (4)
  - (a) Opacifier: Ceramic frit, on #4 surface
  - (b) Opacifier Color: To be determined

b. Provide safety glazing labeling as required.

c. Application: Exterior spandrel glazing.

E. TYPE IGU-5: LOW-E COATED INSULATING GLAZING WITH SILK-SCREENING

1. Glazing Type: Double-Glazed Insulating Glazing Unit; 1-inch total unit thickness

a. Makeup:

- 1) Outdoor Lite: 1/4-inch tinted, AN glass with Low-E coating on Surface 2.
  - (a) Low-E Coating: Guardian SunGuard SNX62-27, triple silver coated.
  - (b) Acid Etch: SatinDeco, on Surface 3.
- 2) Interspace: 1/2-inch clear air space with clear anodized spacer.
- b. Applications:
  - 1) Exterior panels at Prep/Recovery Bays

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Verification of Conditions:
  1. Verify prepared openings for glazing are correctly sized and within tolerance. Verify that the minimum required face and edge clearances are being followed.
  2. Verify that a functioning weep system is present.
  3. Do not proceed with glazing until unsatisfactory conditions have been corrected.

#### **3.02 PREPARATION**

- A. Surface Preparation: Immediately before glazing, clean glazing channels and other framing members receive glass. Remove coatings not firmly bonded to substrates.
- B. Demolition / Removal: Remove and replace glass that is broken, chipped, cracked, or damaged in any way.

#### **3.03 GLAZING, GENERAL**

- A. Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.

#### **3.04 INSTALLATION**

- A. Install products using the recommendations of manufacturers of glass, sealants, gaskets, and other glazing materials including those in the GANA Glazing Manual except where more stringent requirements are indicated.
- B. Prevent glass from contact with contaminating substances that result from construction operations such as weld splatter, fire-safing, or plastering.

#### **3.05 CLEANING**

- A. Clean excess sealant or compound from glass and framing members immediately after application using solvents or cleaners recommended by manufacturers.

#### **3.06 PROTECTION**

- A. Protect glass from damage immediately after installation by attaching crossed streamers to framing held away from the glass. Do not apply markers to the glass surface. Remove nonpermanent labels and clean surfaces.
- B. Protect glass from contact with contaminating substances resulting from construction operations. If, despite such protection, contaminating substances do come into contact with glass, remove substances immediately as recommended in writing by the glass manufacturer.
- C. Remove and replace glass that is broken, chipped, cracked, or abraded or that is damaged from natural causes, accidents, and vandalism, during the construction period.
- D. Wash glass on both exposed surfaces in each area of the Project not more than four days before the date scheduled for inspections that establish Date of Substantial Completion. Wash glass as recommended in writing by a glass manufacturer.

**END OF SECTION**

**SECTION 08 81 17  
FIRE-RATED GLASS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Fire-protection-rated glazing.
- B. Fire-resistance-rated glazing.

**1.02 RELATED REQUIREMENTS**

- A. Section 08 11 13 - Hollow Metal Doors and Frames
- B. Section 08 14 16 - Flush Wood Veneer Doors
- C. Section 08 43 13 - Aluminum-Framed Entrances and Storefronts
- D. Section 08 80 00 - Glazing

**1.03 REFERENCES**

- A. ASTM E 119: Fire Tests of Building Construction and Materials.
- B. ANSI Z97.1: Standard for Safety Glazing Materials Used in Buildings
- C. CPSC 16 CFR 1201: Safety Standard for Architectural Glazing Materials
- D. GANA - Glazing Manual.
- E. FGMA - Sealant Manual.
- F. NFPA 80: Fire Doors and Windows.
- G. UL 263: Fire tests of Building Construction and Materials

**1.04 DEFINITIONS**

- A. Fire Resistance Rated Glazing: Type, thickness, and configuration of glazing that contains flame, smoke, and blocks radiant heat, as required to achieve indicated fire-rating period exceeding 45-minutes.
- B. Fire Protection-Rated Glazing: Type, thickness, and configuration of glazing that contains flame, smoke, and does not block radiant heat, as required to achieve fire-doors indicated fire-rating period as indicated on drawings.

**1.05 PERFORMANCE REQUIREMENTS**

- A. Fire-rated, clear and wireless glazing material for use in locations such as doors, sidelites, transoms, borrowed lites, and wall applications with fire rating requirements ranging from 45-minutes to 3-hours with required hose stream test; for use in interior or exterior applications.
- B. Provides protection by reducing the radiant and conductive heat transfer.

**1.06 SUBMITTALS**

- A. Product data: Submit manufacturer's technical data for each glazing material required, including installation and maintenance instructions.
- B. Certificates of compliance from glass and glazing materials manufacturers attesting that glass and glazing materials furnished for project comply with requirements. Separate certification will not be required for glazing materials bearing manufacturer's permanent label designating type and thickness of glass, provided labels represent a quality control program involving a recognized certification agency or independent testing laboratory acceptable to authority having jurisdiction.
- C. Product Test Listings: From UL indicating fire-rated glass complies with requirements, based on comprehensive testing of current product.
- D. Samples: Submit, for verification purposes, approx. 8-inch by 10-inch sample for each type of glass indicated.

**1.07 QUALITY ASSURANCE**

- A. Glazing Standards: FGMA Glazing Manual and Sealant Manual.

- B. Fire Resistance Rated Glass: Each lite shall bear permanent, nonremovable label of UL certifying it for use in tested and rated fire resistive assemblies.

#### **1.08 DELIVERY, STORAGE & HANDLING**

- A. Deliver materials to specified destination in manufacturer or distributor's packaging, undamaged, complete with installation instructions.
- B. Store off ground, under cover, protected from weather and construction activities.
- C. Do not expose the non-PVB side of glass to UV light.
- D. Store sheets of glass vertically. DO NOT lean.

#### **1.09 WARRANTY**

- A. The manufacturer shall warrant the products in this Section against material defects, or defects in manufacturing, for ten (10) years from Date of Substantial Completion.

### **PART 2 PRODUCTS**

#### **2.01 MANUFACTURERS**

- A. Specified Manufacturer: Technical Glass Products (TGP)
  - 1. Products of unnamed manufacturers with equivalent products to the specified manufacturer will be considered in accordance with the "or equal" provision specified in Division 01 "Product Requirements".
    - a. Product Substitutions: Comply with the requirements specified in Division 01 "Substitution Procedures".

#### **2.02 GLASS PRODUCTS, GENERAL**

- A. Safety Glazing Labeling: Permanently mark glazing with certification label of 16 CFR 1201 Category I and Category II, ANSI Z97.1 and CAN/CGSB-12.1-M. Label shall indicate manufacturer's name, type of glass, and safety glazing standard with which glass complies.
- B. Float Glass, Tempered (Safety) Glass, Laminated (Security) Glass: Refer to Section 08 80 00 for requirements.

#### **2.03 FIRE PROTECTION RATED GLAZING**

- A. Fire Protection Rated Glazing, designated on the Drawings as Glazing Type GL-4
- B. Basis of Design: TGP; FireLite Plus®
  - 1. Glass Type: Safety ceramic glass
  - 2. Description: Protects against flames and smoke. The designation indicates the duration of the fire test exposure to which a fire door assembly or fire window assembly was exposed and for which it successfully met all acceptance criteria as determined in accordance with NFPA 252, NFPA 257, UL 9, UL 10C, ASTM E163, and ASTM E152.
    - a. Fire-Rating:
      - 1) 20-, 45-, 60-, and 90-minutes, and 3-hours, as scheduled on the Drawings.
  - 3. Performance:
    - a. Fire-rated glass-ceramic clear and wireless glazing material listed for use in non-impact safety-rated locations such as transoms and borrowed lites with fire rating requirements ranging from 20 to 90 minutes with required hose stream test.
    - b. Passes positive pressure test standards UL 10C
  - 4. Applications:
    - a. Glazing in fire-rated door assemblies
    - b. Glazing in fire-rated window assemblies
    - c. Other locations as indicated on drawings
  - 5. Properties:
    - a. Thickness: 5/16 inch [8 mm] overall.
    - b. Weight: 4 lbs./sq. ft.
    - c. Approximate Visible Transmission: 85 percent.
    - d. Approximate Visible Reflection: 9 percent.
    - e. Impact Safety Resistance: ANSI Z97.1 and CPSC 16CFR1201 (Cat. I and II).

- f. STC Rating: Approximately 38 dB.
  - g. Positive Pressure Test: UL 10C; passes.
  - h. Surface Finish:
    - 1) Standard Grade is polished for a surface quality that is comparable to alternative fire-rated ceramics marketed as having a premium finish.
- C. Labeling: Permanently label each piece of fire-rated glass with the manufacturer's logo, UL logo, and fire rating in sizes up to 3,325 sq. in., and with the product label only for sizes that exceed the listing (as approved by the local authority having jurisdiction).

**2.04 FIRE-RESISTANCE RATED GLAZING MATERIALS**

- A. Fire Resistance Rated Glazing, designated on the Drawings as Glazing Type GL-5
- B. Product: TGP; Pilkington Pyrostop®, Fire Resistance Rated Glazing
  - 1. Glass Type: Tempered Glass with Intumescent Interlayers:
    - a. Construction: Composed of multiple plies of Pilkington Optiwhite™ tempered, high visible light transmission glass laminated with intumescent interlayers, and complying with 16 CFR 1201 Category II and ANSI Z97.1
  - 2. Description: Protects against flames, smoke, and heat transfer. The time, in minutes or hours, that materials or assemblies have withstood a fire exposure as established in accordance with the test procedures of NFPA 215, ASTM E-119, and UL 263. (Wall Assemblies)
  - 3. Fire-Resistive Rating: 45-, 60-, 90-, or 120-minutes, as scheduled on the Drawings.
    - a. Listed and labeled by a testing agency acceptable to authorities having jurisdiction, for fire resistance ratings indicated, based on testing according to ASTM E 119 or UL 263.
  - 4. Applications:
    - a. Fire-Rated Doors:
      - 1) Fire-Rating Duration: 45-minutes.
  - 5. Impact Safety Resistance: ANSI Z97.1 and CPSC 16CFR1201(Cat. I and II).
  - 6. STC Rating: Up to 46 dB.
  - 7. Interior Glazing - Properties:

Fire-Rating	45 minute	60 minute**	60 minute	120 minute
Manu. Designation	45-200	60-101	60-201	120-106
Glazing Type	single	single	single	IGU
Nom. Thickness	3/4-inch	7/8-inch	1-1/16 inches	2-1/4 inches
Weight (lbs/sf)	9.2	10.85	12.5	22.9
Daylight Transmission	86%	87%	86%	75%
Sound Transmission Coefficient	40dB	41dB	44dB	46dB

- 8. Labeling: Permanently mark fire resistance-rated glazing with certification label of a testing agency acceptable to authorities having jurisdiction. Label shall indicate manufacturer's name, test standard, that the glazing is approved for use in walls, and the fire resistance rating in minutes.
- 9. Glazing Accessories: Manufacturer's standard compression gaskets, standoff, spacers, setting blocks and other accessories necessary for a complete installation.

**2.05 GLAZING ACCESSORIES**

- A. Provide glazing gaskets, glazing sealants, glazing tapes, setting blocks, spacers, edge blocks, and other glazing accessories that are compatible with glazing products and each other and are approved by testing agencies that listed and labeled fire-resistant glazing products with which

products are used for applications and fire protection ratings indicated.

- B. Glazing Sealants for Fire-Rated Glazing Products: Neutral-curing silicone glazing sealant complying with ASTM C 920, Type S, Grade NS, Class 50, Use NT. Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated.
- C. Back-Bedding Mastic Glazing Tapes: Preformed, butyl-based, 100 percent solids elastomeric tape; nonstaining and nonmigrating in contact with nonporous surfaces; with or without spacer rod as recommended in writing by tape and glass manufacturers for application indicated; and complying with ASTM C 1281 and AAMA 800 for products indicated below:
  - 1. AAMA 804.3 tape, where indicated.
  - 2. AAMA 806.3 tape, for glazing applications in which tape is subject to continuous pressure.
  - 3. AAMA 807.3 tape, for glazing applications in which tape is not subject to continuous pressure.
- D. Expanded Cellular Glazing Tapes: Closed-cell, PVC foam tapes; factory coated with adhesive on both surfaces; and complying with AAMA 800 for the following types:
  - 1. AAMA 810.1, Type 1, for glazing applications in which tape acts as the primary sealant.
  - 2. AAMA 810.1, Type 2, for glazing applications in which tape is used in combination with a full bead of liquid sealant.

## **2.06 MISCELLANEOUS GLAZING MATERIALS**

- A. General: Provide products of material, size, and shape complying with referenced glazing standard, requirements of manufacturers of glass and other glazing materials for application indicated, and with a proven record of compatibility with surfaces contacted in installation.
- B. Cylindrical Glazing Sealant Backing: ASTM C 1330, Type O (open-cell material), of size and density to control glazing sealant depth and otherwise produce optimum glazing sealant performance.
- C. Perimeter Insulation for Fire-Resistive Glazing: Product that is approved by testing agency that listed and labeled fire-resistant glazing product with which it is used for application and fire protection rating indicated.

## **2.07 FABRICATION**

- A. Fabricate glass and other glazing products in sizes required to glaze openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with recommendations of product manufacturer and referenced glazing standard as required to comply with system performance requirements.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Examine glass framing, with glazier present, for compliance with the following:
  - 1. Manufacturing and installation tolerances, including those for size, squareness, offsets at corners.
  - 2. Minimum required face or edge clearances.
  - 3. Observable edge damage or face imperfections.
- B. Do not proceed with glazing until unsatisfactory conditions have been corrected.
- C. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings that are not firmly bonded to substrates.

### **3.02 INSTALLATION**

- A. Comply with referenced GANA standards and instructions of manufacturers of glass, glazing sealants, and glazing compounds.
- B. Protect glass from edge damage during handling and installation. Inspect glass during installation and discard pieces with edge damage that could affect glass performance.
- C. Set units of glass in each series with uniformity of pattern, draw, bow, and similar characteristics.

- D. Cut glazing tape to length and set against permanent stops, flush with sight lines to fit openings exactly, with stretch allowance during installation.
- E. Place setting blocks located at quarter points of glass with edge block no more than 6-inches from corners.
- F. Glaze vertically into labeled fire-rated metal frames or partition walls with the same fire rating as glass and push against tape for full contact at perimeter of pane or unit.
- G. Place glazing tape on free perimeter of glazing in same manner described above.
- H. Install removable stop and secure without displacement of tape.
- I. Do not remove protective edge tape.
- J. Install removable stop and secure without displacement of tape.
- K. Do not pressure glaze.
- L. Glaze exterior openings with PVB layer toward the exterior of the building.
- M. Knife trim protruding tape.
- N. Apply cap bead of silicone sealant along void between the stop and the glazing, to uniform line, with bevel to form watershed away from glass. Tool or wipe sealant surface smooth.
- O. Provide minimum 3/16-inch edge clearance.
- P. Install in vision panels in fire-rated doors to requirements of NFPA 80.
- Q. Install so that appropriate UL and Pilkington Pyrostop® markings remain permanently visible.
- R. Install so that appropriate [UL] [FireLite Plus®] markings remain permanently visible.

### **3.03 PROTECTION AND CLEANING**

- A. Protect glass from contact with contaminating substances resulting from construction operations. Remove any such substances by method approved by glass manufacturer.
- B. Wash glass on both faces not more than four days prior to date scheduled for inspections intended to establish date of substantial completion. Wash glass by method recommended by glass manufacturer.

**END OF SECTION**

**SECTION 08 81 30  
INTEGRATED GLASS AND BLIND ASSEMBLIES**

**PART 1 - GENERAL**

**1.01 SECTION INCLUDES**

- A. Integrated glass and blind assemblies with horizontal louver blinds

**1.02 RELATED REQUIREMENTS**

- A. Section 08 11 13 - Hollow Metal Doors and Frames
- B. Section 08 43 13 - Aluminum-Framed Entrances and Storefronts

**1.03 SUBMITTALS**

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: Include elevations, edge details, hardware, and attachments to other work.
- C. Certificates of Compliance: Manufacturer's certification that products furnished comply with specified requirements
- D. Samples: Manufacturer's sample box showing available colors.
- E. Warranties: Sample of special warranties.

**1.04 QUALITY ASSURANCE**

- A. Insulated Glass Manufacturer Qualifications: Qualified insulating glass manufacturer, approved and certified by the integrated glass and blind assembly manufacturer
- B. Installer Qualifications: Minimum 3-years experience in work of this Section, and who are certified under AGA Certified Installer Program.
- C. Obtain integrated glass and blind assemblies from a single manufacturer.
- D. Safety Glazing Products: For integrated glass and blind assemblies requiring tempered safety glazing, comply with testing requirements in 16 CFR 1201 for Category II materials.
- E. Safety Glazing Labeling: Where safety glazing labeling is indicated, permanently mark glazing with the certification label of the SGCC or another certification agency acceptable to authorities having jurisdiction or the manufacturer. The label shall indicate the manufacturer's name, type of glass, thickness, and safety glazing standard with which glass complies.

**1.05 DELIVERY, STORAGE & HANDLING**

- A. Deliver glass with a temporary label on each light identifying manufacturer, glass type, quality, and nominal thickness.
- B. Store product in areas least subject to traffic and falling objects. Keep storage area dry.
- C. Stack individual units on edge leaned slightly against upright supports with separators between panels.

**1.06 PROJECT CONDITIONS**

- A. Environmental Limitations: Integrated glass and blind assemblies are intended for interior usage only.

**1.07 WARRANTY**

- A. Furnish manufacturer's warranty providing for replacement of defective products due to improper workmanship and materials, under normal installation, use, service, and maintenance.
  - 1. Warranty Period: 5-years from the Date of Substantial Completion.

**PART 2 - PRODUCTS**

**2.01 MANUFACTURER**

- A. Specified Manufacturer: Kyler Industries (Holland, MI; P: (616) 392-1042; Web: www.Kyler-Industries.com)
  - 1. Other acceptable manufacturers with equivalent products to the specified manufacturer shall include:

- a. BetweenGlassBlinds, LLC (Coral Springs, FL; P: 866-466-9525,  
Email:sales@betweenglassblinds.com; Web: www.betweenglassblinds.com)
2. Products of unnamed manufacturers with equivalent products to the specified manufacturer will be considered in accordance with the "or equal" provision specified in Division 01 "Product Requirements".
  - a. Product Substitutions: Comply with the requirements specified in Division 01 "Substitution Procedures".

## 2.02 INTEGRATED GLASS AND BLIND ASSEMBLIES

- A. Basis of Design Product: "Sani-Pane", as manufactured by Kyler Industries
  1. Description: Mechanically gear-driven micro-blind installed between two lites of glass, with internally-mounted control assembly coupled to an external operator(s) which in turn control the tilt function of the internal blind slats.
    - a. System Pocket Width in Frame: 1-inch, minimum.
- B. Type of Blinds: Horizontal louver blinds
  1. Slats: 6010-T8 aluminum alloy, 5/8-inch wide by 0.008-inch thick, crowned profile
  2. Spacing: Manufacturer's standard.
  3. Finish: Baked polyester paint ultra-violet-resistant finish.
    - a. Color: 102 - White
  4. Head and Bottom Rails: 6063-T5 aluminum alloy, painted in coordinated color with slats.
  5. Ladder Tapes and Plisse Cords: Thermally fixed polyester, UV resistant, and evenly spaced to prevent long-term slat sag.
- C. Tilt Operating Mechanism:
  1. Type: Thumb wheel
  2. Description: Injected molded glass-filled nylon mounted to a solid brass core. Internal mechanism is comprised of solid brass and aluminum. Color to be black
  3. Control:
    - a. Dual control: Allows tilt operation from both sides of the unit
  4. Location:
    - a. Frame Side: Right side of frame.
    - b. Side of Opening: Offset Side of Sub-frame (side of hollow metal frame that has fixed glass stop).
    - c. Operator Height on the Vertical Frame: 4-5/8 inches above the bottom of the frame on the flat side of the sub-frame.
- D. Glazing:
  1. Glazing: Fully-tempered float glass (ASTM C1048), 3/16-inch minimum thickness, unless otherwise indicated.
  2. Air Spacer: 3/4-inch, manufacturer's standard clear anodized spacer material and construction
- E. Perimeter Sub-Frame:
  1. Material: 0.062-inch thick extruded aluminum.
  2. All sub-frame corners are cut at 45-degrees and mechanically fastened with concealed fasteners.
  3. Sub-Frame Depth: 1-7/16 inches
  4. Exposed Face Width (installed): 1-1/4 inches, nominal
  5. Finish: Factory custom color paint; Color: To be determined

## 2.03 FABRICATION

- A. Tolerances:
  1. Space of approximately 1/8 inch on each side between slats and spacer, for free movement of the system, and allowing thermal transmission of aluminum slats.
  2. Blind Width Tolerance: Plus zero; minus 1/16 inch.
  3. Blind Height Tolerance: Plus 3/8 inch; minus zero. The bottom rail engages pins in vertical air spacer with some slack and is slightly above bottom air spacer.

**PART 3 - EXECUTION**

**3.01 EXAMINATION**

- A. Verify that openings conform to details; dimensions, and tolerances indicated on approved Shop Drawings.

**3.02 PREPARATION**

- A. Clean surfaces to receive the integrated glass and blind assemblies before installation.

**3.03 INSTALLATION**

- A. Install in accordance with manufacturer's instructions and approved Shop Drawings.
- B. Set glazing without bending, twisting, or forcing of units.
- C. Do not allow glass to rest on or contact framing members.

**3.04 CLEANING**

- A. Clean glass surfaces; remove temporary labels and foreign matter.

**3.05 ADJUSTING**

- A. Replace cracked, broken, and imperfect glass, and glass that has been improperly installed.

**3.06 PROTECTION**

- A. Protect installed products until completion of the project.

**END OF SECTION**

**SECTION 09 05 61  
COMMON WORK RESULTS FOR FLOORING PREPARATION**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Preparation of existing interior concrete floor slabs regardless of age or elevation to receive the following types of adhered floor coverings:
  - 1. Carpet tile
  - 2. Resilient tile and sheet
- B. Removal of existing floor coverings
- C. Testing of existing concrete floor slabs for moisture and alkalinity (pH).
- D. Smoothing compound, leveling compound, and patching compound.
- E. Remedial moisture vapor emission control for concrete floor slabs.

**1.02 RELATED REQUIREMENTS**

- A. Section 01 22 00 - Unit Prices
- B. Section 03 30 00 - Cast-in-Place Concrete
- C. Section 03 81 00 - Concrete Sawcutting and Core-Drilling
- D. Section 09 65 00 - Resilient Flooring
- E. Section 09 21 16 - Gypsum Board Assemblies

**1.03 PRICE AND PAYMENT PROCEDURES**

- A. Alternates : See Section 01 23 00 - Alternates.
- B. Alternate for Alternate Flooring Adhesive: Do not include the cost of the alternate adhesive in the base bid; state on the bid form the total additional cost for the alternate adhesive, installed, in the event such remediation is required.
- C. Unit Prices: See Section 01 22 00 - Unit Prices.
- D. Unit Price for Alternate Flooring Adhesive: Do not include the cost of the alternate adhesive in the base bid; state on the bid form the unit price per square foot (square meter) for using the alternate adhesive, in the event such remediation is required.
- E. Unit Price for Remedial Floor Coating: Do not include the cost of the floor coating in the base bid; state on the bid form the unit price per square foot (square meter) for the floor coating or underlayment, installed, in the event such remediation is required.
  - 1. Base the unit price on the assumption that the floor area to be treated is primarily open, not divided into rooms and corridors.
  - 2. Base the unit price on a total quantity of 10,000 square feet (1000 square meters).

**1.04 REFERENCE STANDARDS**

- A. ASTM C109/C109M - Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or [50 mm] Cube Specimens).
- B. ASTM C472 - Standard Test Methods for Physical Testing of Gypsum, Gypsum Plasters, and Gypsum Concrete.
- C. ASTM F710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring.
- D. ASTM F1869 - Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride.
- E. ASTM F2170 - Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes.
- F. RFCI (RWP) - Recommended Work Practices for Removal of Resilient Floor Coverings.

### **1.05 ADMINISTRATIVE REQUIREMENTS**

- A. Coordinate scheduling of cleaning and testing, so that preliminary cleaning has been completed for at least 24 hours before testing.

### **1.06 SUBMITTALS**

- A. Submit under provisions of Section 01 33 00.
- B. Smoothing Compound, Leveling Compound, Patching Compound, Adhesive, and Floor Covering Manufacturers' Product Literature: For each specific combination of substrate, floor covering, and adhesive to be used; showing:
  - 1. Manufacturer's required moisture limits and test methods.
    - a. No such moisture testing shall be required where moisture vapor reduction admixture was required as part of the concrete mix design.
  - 2. Manufacturer's required alkalinity limits and test methods.
  - 3. Manufacturer's required substrate surface absorption/porosity test methods.
  - 4. Manufacturer's required concrete surface profile.
  - 5. Manufacturer's required bond/compatibility test procedure.
- C. Testing Organization's Report (when applicable):
  - 1. Description of areas tested; including floor plans and photographs if helpful.
  - 2. Summary of conditions encountered.
  - 3. Copies of moisture and alkalinity test reports.
  - 4. Copies of concrete substrate water absorption test report.
  - 5. Summary of concrete surface profiles encountered.
  - 6. Copies of specified test methods.
  - 7. Recommendations for remediation of unsatisfactory surfaces.
  - 8. Submit report to Contractor.
  - 9. Submit a report not more than two business days after the conclusion of testing.
- D. Adhesive Bond and Compatibility Test Report.
- E. Remedial Moisture Vapor Emission Control Materials Product Data: Manufacturers published data on each product to be used for remediation.
  - 1. Manufacturer's qualification statement.
  - 2. Manufacturer's installation instructions.

### **1.07 QUALITY ASSURANCE**

- A. Moisture and alkalinity (pH) testing shall be performed by an independent testing agency employed and paid for by the Contractor.
  - 1. At the Contractor's option, tests may be performed by the Contractor.
- B. Testing Agency Qualifications: Testing agency experienced in the types of testing specified.
- C. Remedial Coating Installer Qualifications: Company specializing in performing work of the type specified in this section, trained by or employed by the coating manufacturer.

### **1.08 DELIVERY, STORAGE & HANDLING**

- A. Deliver, store, handle, and protect products in accordance with the manufacturer's instructions and recommendations.
- B. Deliver materials in manufacturer's packaging; including installation instructions.

### **1.09 COORDINATION**

- A. Contractor shall coordinate testing required by this Section before installation of floor coverings.
- B. Testing includes concrete placed on-grade
- C. Testing shall take place after allowing concrete to dry for a minimum of 28 days.
- D. Testing is to be scheduled no less than 1 and no more than 6 weeks before scheduled flooring installation.

### 1.10 FIELD CONDITIONS

- A. Maintain the ambient temperature in spaces where concrete testing is being performed, and for at least 48 hours before testing, at not less than 65 degrees F (18 degrees C) or more than 85 degrees F (30 degrees C).
- B. Maintain concrete substrate surface temperature in spaces where concrete testing is being performed, and for at least 48 hours before testing and through the duration of testing, at not less than 65 degrees F (18 degrees C) or more than 85 degrees F (29 degrees C).
- C. Maintain the ambient relative humidity in spaces where concrete testing is being performed, and for at least 48 hours prior to testing, at not less than 40 percent and not more than 60 percent.

### 1.11 WARRANTY

- A. Manufacturer's Warranty: Provide manufacturer's standard limited warranty.

## PART 2 PRODUCTS

### 2.01 MANUFACTURER

- A. Subject to compliance with the Contract Documents, provide products of the manufacturers named for each product type specified in this Section.
  - 1. Products of other manufacturers with equivalent products to the manufacturers listed will be considered in accordance with the "or equal" provision specified in Division 01 "Product Requirements".
    - a. Product Substitutions: Comply with the requirements specified in Division 01 "Substitution Procedures".

### 2.02 MATERIALS

- A. Patching Compound: Floor covering manufacturer's recommended product, suitable for conditions, and compatible with adhesive and floor covering. In the absence of any recommendation from the flooring manufacturer, provide a product with the following characteristics:
  - 1. Cementitious moisture-, mildew-, and alkali-resistant.
  - 2. Latex or polyvinyl acetate additions are permitted; gypsum content is prohibited.
  - 3. Compressive Strength: 3000 psi, minimum, after 28 days, when tested in accordance with ASTM C109/C109M or ASTM C472, whichever is appropriate.
  - 4. Basis of Design: TEC (H.B. Fuller); TEC Feather Edge Skim Coat, or equivalent.
- B. Alternate Flooring Adhesive: Low-VOC adhesive suitable for the moisture and pH conditions present and compatible with floor covering.
  - 1. Basis of Design: MVBA 500; as manufactured by ISE Logik Industries, or equivalent.
  - 2. Thickness: As required for application and in accordance with manufacturer's installation instructions.
  - 3. Provide resistance to up to 100 percent relative humidity per ASTM F2170, and 25 pounds moisture vapor transmission per ASTM F1869
  - 4. Provide resistance to alkalinity level of pH 14.
- C. Moisture Vapor Emission Control: Single- or multi-layer coating intended by its manufacturer to resist water vapor transmission to a degree sufficient to meet flooring manufacturer's emission limits, resistant to the level of alkalinity found, and suitable for adhesion of flooring without further treatment.
  - 1. Basis of Design: MVEC 710 with MVBP 600; as manufactured by ISE Logik Industries, or equivalent.
  - 2. Thickness: As required for application and in accordance with manufacturer's installation instructions.
  - 3. Provide resistance to up to 100 percent relative humidity per ASTM F2170 and 25 pounds moisture vapor transmission per ASTM F1869
  - 4. Provide resistance to alkalinity level of pH 14.

### **PART 3 EXECUTION**

#### **3.01 PREPARATION**

- A. Clean substrate surface in accordance with ASTM F710
  - 1. Substrate surface shall be free of dust, solvents, paint, wax, oil, grease, asphalt, residual adhesive, adhesive removers, film-forming curing compounds, parting compounds, sealing compounds, alkaline salts, excessive laitance, mold, mildew, and other materials that might prevent adhesive bond.
  - 2. Do not use solvents or other chemicals for cleaning.

#### **3.02 REMOVAL OF EXISTING FLOOR COVERINGS**

- A. Comply with local, state, and federal regulations and recommendations of RFCI "Recommended Work Practices for Removal of Resilient Floor Coverings", as applicable to floor covering being removed.
- B. Dispose of removed materials in accordance with local, state, and federal regulations and as specified.

#### **3.03 MOISTURE VAPOR EMISSION TESTING**

- A. Test in accordance with ASTM F1869
  - 1. Plastic sheet test and mat bond test may not be substituted for the specified ASTM test method.
- B. The test site should be maintained at the same temperature and humidity conditions as those anticipated during normal occupancy. These temperature and humidity levels should be maintained for 48 hours before and during the test period. If meeting these criteria is not possible, then minimum conditions should be  $75 \pm 10^{\circ}\text{F}$  and  $50 \pm 10\%$  relative humidity. When a building is not under HVAC control, a recording hygrometer or data logger shall be in place recording conditions during the test period. A transcript of this information must be included with the test report.
- C. The number of vapor emission test sites is determined by the square footage of the facility. The minimum number of tests to be placed is equal to 3 in the first 1,000 square feet, and 1 per each additional 1,000 square feet after that.
- D. Tests sites are to be cleaned of all adhesive residue, curing compounds, paints, sealers, floor coverings, etc. 24 hours before the placement of test kits.
- E. Test Method:
  - 1. Weigh the test dish on-site before the start of the test. The scale must report weight to 0.1 grams. Record weight and start time.
  - 2. Expose Calcium Chloride and set the dish on the concrete surface.
  - 3. Install test containment dome and allow the test to proceed for 60 - 72 hours.
  - 4. Retrieve test dish by carefully cutting through containment dome. Close and reseal test dish.
  - 5. Weigh test dish on-site recording weight and stop time.
  - 6. Calculate and report results as "pounds of emission per 1,000 SF per 24 hours"
  - 7. Report the information required by the test method.
- F. If test values exceed floor covering manufacturer's limits, perform remediation as indicated in the test report.
  - 1. In the absence of manufacturer limits, perform remediation if test values exceed 3 pounds per 1000 square feet (1.4 kg per 93 square meters) per 24 hours.

#### **3.04 INTERNAL RELATIVE HUMIDITY TESTING**

- A. Where the floor covering manufacturer's requirements conflict with either the referenced test method or this specification, comply with the manufacturer's requirements.
- B. Where this specification conflicts with the referenced test method, comply with the requirements of this section.
- C. Test in accordance with ASTM F2170 Procedure A.

1. Testing with electrical impedance or resistance apparatus may not be substituted for the specified ASTM test method.
- D. If test values exceed floor covering manufacturer's limits, perform remediation as indicated.
  1. In the absence of manufacturer limits, perform remediation if any test value exceeds 75 percent relative humidity.
- E. Report: Report the information required by the test method.

### **3.05 ALKALINITY TESTING**

- A. Where the floor covering manufacturer's requirements conflict with either the referenced test method or this specification, comply with the manufacturer's requirements.
- B. Test in accordance with ASTM F710
  1. Use of a digital pH meter with a probe is acceptable; follow meter manufacturer's instructions.
- C. If test values exceed floor covering manufacturer's limits, perform remediation as indicated.
  1. In the absence of manufacturer limits, perform remediation if the alkalinity (pH) test value is over 10.

### **3.06 ADHESIVE BOND AND COMPATIBILITY TEST**

- A. Comply with requirements and recommendations of floor covering manufacturer.
- B. In the absence of adhesive and flooring manufacturer's written instructions, test in accordance with ASTM F3311.
- C. Report the results of the adhesive bond and compatibility tests and note any concerns over adhesion.

### **3.07 CONCRETE PREPARATION**

- A. Prepare concrete substrate surfaces in accordance with ASTM F710.
  1. See individual floor covering sections for additional requirements.
- B. Comply with requirements and recommendations of adhesive, floor covering, smoothing, leveling, patching, thin set, and mortar manufacturers.
  1. Concrete slabs containing moisture vapor reduction admixtures do not require moisture testing.
- C. Verify appropriate concrete surface profile is present for material to be installed.
- D. Unless otherwise indicated by the product manufacturer, do not install any material unless the following conditions are present:
  1. Substrate surface is clean.
  2. Substrate surface is dry.
  3. Substrate temperature is not less than 65 degrees F (18 degrees C) and no greater than 85 degrees F (29 degrees C) during and after installation.
  4. Substrate surface is at least 5 degrees F (2.8 degrees C) above the dew point.
  5. Issues with moisture and alkalinity have been addressed.
- E. Fill and smooth surface cracks, grooves, depressions, control joints, and other non-moving joints, and other irregularities with smoothing, leveling, or patching compound.
- F. Do not fill expansion joints, isolation joints, or other moving joints.
  1. Unless otherwise indicated, honor all moving joints up through flooring material.

### **3.08 REMEDIATION**

- A. Active Water Leaks or Continuing Moisture Migration to Surface of Slab:
  1. Correct this condition before doing any other remediation.
  2. Re-test after correction.
- B. Excessive Moisture Emission or Relative Humidity:
  1. If an adhesive that is resistant to the level of moisture present is available and is compatible with the flooring material, use that adhesive for the installation of the flooring.
  2. If not, apply moisture vapor emission control over the entire suspect floor area.

3. Slabs containing moisture vapor reduction admixture require no further moisture vapor emission control remediation.
- C. Excessive Alkalinity, pH:
1. If remedial floor coating is necessary to address excessive moisture, no additional remediation is required.
  2. If not, if an adhesive that is resistant to the level present is available and is compatible with the flooring material, use that adhesive for installation of the flooring.
  3. Otherwise, apply a skim coat of specified patching compound over the entire suspect floor area.

### **3.09 CLEANING AND PROTECTION**

- A. Cover prepared floors with building paper or other durable covering.

**END OF SECTION**

**SECTION 09 21 16  
GYPSUM BOARD ASSEMBLIES**

**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 SECTION INCLUDES**

- A. Requirements for gypsum board assemblies.

**1.03 RELATED REQUIREMENTS**

- A. Section 04 73 00 - Manufactured Stone Veneer
- B. Section 06 10 00 - Rough Carpentry
- C. Section 07 21 00 - Thermal Insulation
- D. Section 07 84 00 - Penetration Firestopping
- E. Section 07 92 00 - Joint Sealants
- F. Section 09 30 00 - Tiling
- G. Section 09 90 00 - Painting and Coating
- H. Section 13 49 13 - Integrated X-Ray Shielding Assemblies

**1.04 ACTION SUBMITTALS**

- A. 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.
- B. Verification Samples: For each finish product specified, two samples, representing actual product and finish.

**1.05 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Minimum 5 year experience manufacturing similar products.
- B. Installer Qualifications: Minimum 2 year experience installing similar products.
- C. Performance: Fire, structural, and seismic performance meeting requirements of building code and local authorities.
- D. Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship.
  - 1. Finish areas designated by Architect.
  - 2. Do not proceed with remaining work until workmanship is approved by Architect.
  - 3. Refinish mock-up area as required to produce acceptable work.

**1.06 DELIVERY, STORAGE, AND HANDLING**

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

**1.07 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.

**PART 2 PRODUCTS**

**2.01 MANUFACTURERS**

- A. Gypsum Board:

1. Specified Manufacturer: USG Corporation
    - a. Other Acceptable Manufacturers with equivalent products to the specified manufacturer shall include:
      - 1) Georgia-Pacific Gypsum LLC.
  2. Substitutions: Limited to the manufacturer's listed above.
- B. Trim and Accessories:
1. Manufacturer: Subject to compliance with the Contract Documents, provide products of the manufacturers named for each product type specified in this Section.
  2. Products of other manufacturers with equivalent products to the manufacturers listed will be considered in accordance with the "or equal" provision specified in Division 01 "Product Requirements".
    - a. Product Substitutions: Comply with the requirements specified in Division 01 "Substitution Procedures".

## 2.02 PERFORMANCE REQUIREMENTS

- A. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E119 by an independent testing agency.

## 2.03 GYPSUM PANELS, GENERAL

- A. Size: Provide maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.
- B. Material Standards:
1. All interior gypsum panels shall be moisture and mold resistant, unless otherwise indicated.
  2. All interior gypsum panels on vertical surfaces, including non-fire-rated and fire-resistive-rated assemblies, shall be Type X material.

## 2.04 INTERIOR GYPSUM PANELS

- A. Interior Gypsum Panels are designated in this Section as Panel Type GB- #:
- B. Type GB-1: GYPSUM PANELS: TYPE X (REGULAR)
1. Product: USG; "Sheetrock® Brand EcoSmart Panels Firecode® X"
    - a. Compliance: ASTM C1396/C1396M, for Type X gypsum wallboard
    - b. UL Type Designation: ULIX
    - c. Panel Size: Manufacturer standard
    - d. Thickness: 5/8 inch.
    - e. Edges: Tapered.
  2. Physical Properties:
    - a. Non-Combustibility (ASTM E136): Meets or exceeds criteria
    - b. Surface-Burning Characteristics (ASTM E84):
      - 1) Flame Spread: 5
      - 2) Smoke Developed: 5
      - 3) Class A
  3. Uses:
    - a. Occurs at **all** walls throughout the Project
    - b. Fire-rated ceiling and soffit construction where required.
- C. Type GB-2: GYPSUM PANELS: TYPE X, MOISTURE & MOLD-RESISTANT
1. Product: USG; Sheetrock® Brand EcoSmart Panels Mold Tough® Firecode® X Panels
    - a. Compliance: ASTM C1396/C1396M, for Type X, water-resistant gypsum wallboard and exterior gypsum soffit board
    - b. UL Type Designation: ULIX
    - c. Panel Size: Manufacturer standard
    - d. Thickness: 5/8 inch.
    - e. Edges: Tapered.
  2. Physical Properties:

- a. Non-Combustibility (ASTM E136): Meets or exceeds criteria.
  - b. Surface-Burning Characteristics (ASTM E84):
    - 1) Flame Spread: 5.
    - 2) Smoke Developed: 5.
    - 3) Class A
  - c. Mold Resistance (ASTM D3273): Meets or exceeds criteria
3. Uses:
- a. As a substrate for tiling (refer to Section 09 30 00).
  - b. Fire-resistive-rated ceiling and soffit construction, where applicable.
- D. Type GB-3: GYP SUM CEILING PANELS
- 1. Product: USG; "Sheetrock® Brand UltraLight Gypsum Panels"
    - a. Compliance: ASTM C1396/C1396M, for gypsum wallboard
    - b. UL Type Designation: Not Applicable
    - c. Panel Size: Manufacturer standard
    - d. Thickness: 1/2-inch
    - e. Edges: Tapered
  - 2. Physical Properties:
    - a. Non-Combustibility (ASTM E136): Meets or exceeds criteria
    - b. Surface-Burning Characteristics (ASTM E84):
      - 1) Flame Spread: 15
      - 2) Smoke Developed: 0
      - 3) Class A
  - 3. Uses:
    - a. Occurs at non-fire-rated single-layer ceiling and soffit construction.
- E. Type GB-4: GYP SUM CEILING PANELS, MOISTURE- AND MOLD-RESISTANT
- 1. Product: USG; "Sheetrock® Brand UltraLight Gypsum Panels Mold Tough"
    - a. Compliance: ASTM C1396/C1396M, for water-resistant gypsum wallboard and exterior gypsum soffit board
    - b. UL Type Designation: Not Applicable
    - c. Panel Size: Manufacturer standard
    - d. Thickness: 1/2-inch
    - e. Edges: Tapered
  - 2. Physical Properties:
    - a. Non-Combustibility (ASTM E136): Meets or exceeds criteria
    - b. Surface-Burning Characteristics (ASTM E84):
      - 1) Flame Spread: 15
      - 2) Smoke Developed: 0
      - 3) Class A
    - c. Mold Resistance (ASTM D3273): Meets or exceeds criteria
  - 3. Uses:
    - a. Occurs at non-rated single-layer ceiling and soffit construction where applicable.

## **2.05 GLASS-MAT BACKERBOARD**

- A. Product: USG; "Durock™ Brand Glass-Mat Tile Backerboard"
  - 1. Compliance: ASTM C1178/C1178M
  - 2. Panel Size: Manufacturer standard
  - 3. Thickness: 5/8 inch
- B. Physical Properties:
  - 1. Mold Resistance: ASTM D3273: Score of 10
  - 2. ASTM E84 Surface-Burning Characteristics:
    - a. Flame Spread: 15
    - b. Smoke Developed: 5
  - 3. Permeability: ASTM E96/E96M: <1 perm

- C. Uses:
  - 1. Used behind porcelain and ceramic tile where indicated
- D. Fastener Requirements:
  - 1. Screws for Fastening Backerboard to Metal Stud Framing: DUROCK Tile Backer Screws, 1-5/8 inches long.

#### **2.06 LEAD-BACKED GYPSUM BOARD:**

- A. Refer to Section 13 49 13 for requirements, when applicable

#### **2.07 TRIM ACCESSORIES**

- A. Interior Trim: Conform to ASTM C1047.
  - 1. Manufacturer / Products: USG Sheetrock® and Beadex® Brand Paper-Faced Metal Corner Bead and Trim, or equivalent.
  - 2. Material: Paper-plastic-paper copolymer mud-applied corner trim.
  - 3. Shapes:
    - a. Cornerbead
    - b. Outside 90-degree corner
    - c. Inside 90-degree corner
    - d. L-trim corner profile
    - e. J-trim
    - f. Reveal trim
    - g. Flexible corner trim for off-angles

#### **2.08 JOINT TREATMENT MATERIALS**

- A. General: Comply with ASTM C475/C475M.
- B. Joint Tape:
  - 1. Interior Gypsum Board: Paper.
- C. Joint Compound for Interior Gypsum Board: For each coat use formulation that is compatible with other compounds applied on previous or for successive coats.
  - 1. Prefilling: At open joints, rounded or beveled panel edges, and damaged surface areas, use setting-type taping compound.
  - 2. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use setting-type taping compound.
    - a. Use setting-type compound for installing paper-faced metal trim accessories.
  - 3. Fill Coat: For second coat, use setting-type, sandable topping compound.
  - 4. Finish Coat: For third coat, use drying-type, all-purpose compound.

#### **2.09 AUXILIARY MATERIALS**

- A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written recommendations.
- B. Resilient Sound Isolation Clips (RSIC):
  - 1. Product: Model #RSIC-1, as manufactured by TM Soundproofing.
  - 2. RSIC-1 assembly decouples and isolates the gypsum board or plywood from the structure increasing the acoustical performance of the system.
  - 3. Application: Install at the Type H partition type where metal furring strips are being attached to the CMU wall at the east wall of Room Nos. 115, 116, 117, 118, and 119.
- C. Laminating Adhesive: Adhesive or joint compound recommended for directly adhering gypsum panels to continuous substrate.
  - 1. Laminating adhesive shall have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- D. Steel Drill Screws: ASTM C1002, unless otherwise indicated.
  - 1. Use screws complying with ASTM C954 for fastening panels to steel members from 0.033 to 0.112 inch (0.84 to 2.84 mm) thick.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

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

#### **3.02 APPLYING AND FINISHING PANELS, GENERAL**

- A. Comply with ASTM C840.
- B. Install ceiling panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.
- C. Install panels with face side out. Butt panels together for a light contact at edges and ends with not more than 1/16 inch (1.5 mm) of open space between panels. Do not force into place.
- D. Locate edge and end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Do not make joints other than control joints at corners of framed openings.
- E. Form control and expansion joints with space between edges of adjoining gypsum panels.
- F. Cover both faces of support framing with gypsum panels in concealed spaces (above ceilings, etc.), except in chases braced internally.
  - 1. Unless concealed application is indicated or required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than 8 sq. ft. (0.7 sq. m) in area.
  - 2. Fit gypsum panels around ducts, pipes, and conduits.
  - 3. Where partitions intersect structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by structural members; allow 1/4- to 3/8-inch- (6.4- to 9.5-mm-) wide joints to install sealant.
- G. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments, except floors. Provide 1/4- to 1/2-inch- (6.4- to 12.7-mm-) wide spaces at these locations and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.
- H. Attachment to Steel Framing: Attach panels so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.
- I. Install sound attenuation blankets before installing gypsum panels unless blankets are readily installed after panels have been installed on one side.

#### **3.03 INSTALLATION - GYPSUM BOARD**

- A. Single-Layer Application:
  - 1. On ceilings, apply gypsum panels before wall/partition board application to greatest extent possible and at right angles to framing unless otherwise indicated.
  - 2. On partitions/walls, apply gypsum panels vertically (parallel to framing) unless otherwise indicated or required by fire-resistance-rated assembly, and minimize end joints.
    - a. Stagger abutting end joints not less than one framing member in alternate courses of panels.
  - 3. On Z-furring members, apply gypsum panels vertically (parallel to framing) with no end joints. Locate edge joints over furring members.
  - 4. Fastening Methods: Apply gypsum panels to supports with steel drill screws.
- B. Multilayer Application:
  - 1. On partitions/walls, apply gypsum board indicated for base layers and face layers vertically (parallel to framing) with joints of base layers located over stud or furring member and face-layer joints offset at least one stud or furring member with base-layer

joints, unless otherwise indicated or required by fire-resistance-rated assembly. Stagger joints on opposite sides of partitions.

2. Fastening Methods: Fasten base layers and face layers separately to supports with screws.
- C. Laminating to Substrate: Where gypsum panels are indicated as directly adhered to a substrate (other than studs, joists, furring members, or base layer of gypsum board), comply with gypsum board manufacturer's written recommendations and temporarily brace or fasten gypsum panels until fastening adhesive has set.

### 3.04 INSTALLATION - TRIM ACCESSORIES

- A. General: For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.
- B. Control Joints: Install control joints according to ASTM C840, as shown on the drawings or coordinated with the Architect prior to the start of work. Control joints shall be installed in face layer of the gypsum board at the following locations:
1. Ceilings: Install control joints in ceilings at 50-foot intervals in either direction to limit areas to 2,500 SF. Control joints shall also be installed where ceiling framing changes direction.
  2. Walls: In long partition runs without full height breaks, control joints should be installed at 30'-0" intervals, from floor to ceiling.
  3. Doorways and other wall openings: Full height door frames or other full height breaks in the wall surface may be considered as control joints. Less than ceiling height frames should have control joints extending to the ceiling from both corners. Borrowed lite frames should have control joints extending to the floor and ceiling from both corners.
  4. Control joints should be installed at weak points in framing where any movement might be expected.
  5. Align ceiling and soffit gypsum joints with wall gypsum joints where possible.
- C. Interior Trim: Install with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions. All exposed edges of gypsum shall have trim.

### 3.05 FINISHING GYPSUM BOARD

- A. General: Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.
- B. Prefill open joints, rounded or beveled edges, and damaged surface areas.
- C. Apply joint tape over gypsum board joints, except for trim products specifically indicated as not intended to receive tape.
- D. Gypsum Board Finish Levels: Finish panels to levels indicated below according to ASTM C840
1. LEVEL 0: UNFINISHED
    - a. Uses: Temporary construction, dust walls.
    - b. This level has the designation of zero because there is no finish. There is no taping, no joint cement, and no painting. The drywall is erected and is then complete.
  2. LEVEL 1: TAPE (FIRE TAPING)
    - a. Uses: Plenum areas above ceiling, and other areas where gypsum board may be concealed.
    - b. Level 1 Finish Requirements:
      - 1) Taping: All joints and angles shall have tape set in joint compound, but not embedded in it.
        - (a) Tape does not need to be covered with joint compound.
      - 2) Coverage of fastener heads, beads, and accessories: Not required.
      - 3) Surface: Tool marks and ridges are acceptable.
  3. LEVEL 2: EMBED COAT

- a. Uses: Substrates for tile (ASTM C630), and other areas where an unfinished appearance is desired.
  - b. Level 2 Finish requirements:
    - 1) Taping: All joints and angles shall have tape embedded in joint compound. Joints and angles shall be wiped with a joint knife, leaving a thin coating of joint compound.
      - (a) Fire-Taping: Where a fire resistance rating is required for the gypsum board assembly, details of construction should be in accordance with reports of fire tests of assemblies that have met the requirements of the fire rating imposed.
    - 2) Fastener heads, beads, and accessories shall be covered with one coat of joint compound. Remove excess compound.
    - 3) Surface: Tool marks and ridges are acceptable.
4. LEVEL 3: FILL COAT
- a. Uses: For surfaces that may receive a medium-to-heavy (knockdown) texture or heavyweight wall covering.
  - b. Level 3 Finish Requirements:
    - 1) Taping: Level 2 with an additional coat of joint compound over the taped joints and angles (2 coats total).
    - 2) Coverage of fastener heads, beads, and accessories: Level 2 with one additional coat of joint compound (2 coats total).
    - 3) Surface shall be smooth and free of tool marks and ridges.
    - 4) Primer: The prepared surface shall be covered with drywall primer prior to the application of the final topcoats.
5. LEVEL 4 : FINISH COAT
- a. Applications:
    - 1) Typical finish level for all exposed gypsum board surfaces scheduled to receive paint finishes.
      - (a) Refer to the Interior Finish Legend for paint sheen callouts.
    - 2) For surfaces covered with lightweight wallcovering, if applicable.
  - b. Finish Requirements:
    - 1) Taping: Level 3 with two additional coats of joint compound added over the taped joints (4 coats total), and one additional coat added over all angles (3 coats total)
    - 2) Coverage of fastener heads, beads, and accessories: Level 3 with one additional coat of joint compound (3 coats total).
    - 3) Surface shall be smooth and free of tool marks and ridges.
    - 4) Primer: The prepared surface shall be covered with drywall primer prior to the application of the final topcoats.

### **3.06 PROTECTION**

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

### **END OF SECTION**

**SECTION 09 22 16**  
**NON-STRUCTURAL METAL FRAMING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Non-structural steel framing systems for interior partitions.

**1.02 RELATED REQUIREMENTS**

- A. Section 05 40 00 - Cold-Formed Steel Framing

**1.03 SUBMITTALS**

- A. Product Data: For each type of product.
- B. Manufacturers' height limiting tables indicating products provided.
- C. Evaluation Reports: Submit evaluation reports certified under an independent third-party inspection program administered by an agency accredited by IAS to ICC-ES AC98, IAS Accreditation Criteria for Inspection Agencies.
- D. Manufacturer's Certification: Submit manufacturer's certification of product compliance with applicable codes and standards, including:

**1.04 QUALITY ASSURANCE**

- A. Provide certification of code compliance of studs and track that framing members are certified in accordance with the "Code Compliance Certification Program" implemented by the Steel Framing Industry Association (SFIA), or similar organization providing a verifiable code-compliance program.
- B. Contractor to provide effective, full-time quality control over fabrication and erection complying with pertinent codes and regulations of government agencies having jurisdiction. Conduct preinstallation meeting to verify Project requirements, substrate conditions, and manufacturer's written installation instructions.

**1.05 DELIVERY, STORAGE, AND HANDLING**

- A. Notify manufacturer of damaged materials received prior to installation.
- B. Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.
- C. Protect cold-formed metal framing from corrosion, deformation, and other damage during delivery, storage, and handling as required by AISI S202.

**PART 2 PRODUCTS**

**2.01 MANUFACTURER**

- A. Specified Manufacturer: ClarkDietrich
  - 1. Other acceptable manufacturers with equivalent products to the specified manufacturer shall include:
    - a. CEMCO
    - b. Jaimes Industries
    - c. Marino Ware
    - d. SCAFCO Corp.
    - e. Steel Construction Systems
    - f. United Products, Inc.
  - 2. Products of unnamed manufacturers with equivalent products to the specified manufacturer will be considered in accordance with the "or equal" provision specified in Division 01 "Product Requirements".
    - a. Product Substitutions: Comply with the requirements specified in Division 01 "Substitution Procedures".

## 2.02 PERFORMANCE REQUIREMENTS

- A. Fire-Test-Response Characteristics: For fire-resistance-rated assemblies that incorporate non-structural steel framing, provide materials and construction identical to those tested in assembly indicated, according to ASTM E 119 by and displaying a classification label from an independent testing agency acceptable to the authority having jurisdiction.
1. Construct fire-resistance-rated partitions in compliance with tested assembly requirements [indicated on drawings].
  2. Rated assemblies to be substantiated from applicable testing using proposed products, by Contractor.
- B. Design framing systems in accordance with American Iron and Steel Institute Publication S220 "North American Specification for the Design of Cold-Formed Steel Framing – Non-Structural Members", except as otherwise shown or specified.

BUILDING CODE	APPLICABLE STANDARDS
2009 IBC	ASTM C 645
2012 IBC	ASTM C 645
2015 IBC	AISI S220 and ASTM C645, Section 10
2018 IBC	AISI S220

- C. Design loads: As indicated on the Architectural Drawings or 5 PSF minimum as required by the International Building Code. Design framing systems to accommodate deflection of primary building structure and construction tolerances and to withstand design loads with a maximum deflection of inches.

## 2.03 FRAMING SYSTEMS

- A. Framing Members, General: Comply with applicable codes and standards, per Article 2.02(B), for conditions indicated.
- B. Steel Sheet Components: Comply with Article 2.02(B), for metal unless otherwise indicated.
1. Protective Coating: Comply with Article 2.02(B); ASTM A653/ A653M, G40, or coating with equivalent corrosion resistance. Galvannealed products are unacceptable.
    - a. Coating to demonstrate equivalent corrosion resistance with an evaluation report acceptable to the authority having jurisdiction.
  2. Basis-of-Design Product: ClarkDietrich; DiamondPlus Coating, or equivalent.
- C. Studs and Track: Comply with Article 2.02(B)
1. Basis-of-Design Product: ClarkDietrich; ProSTUD Drywall Framing System with Smart Edge technology, or equivalent.
  2. Comply with Article 2.02(B).
  3. Provide manufacturers' steel studs and runners or steel studs and runners of equivalent gauge.
    - a. Minimum Base Steel Thickness: Indicated in the physical properties table of the submitted manufacturer's literature, and cross-referenced with the appropriate height determination table to meet required performance.
    - b. Web Depth: As indicated on the drawings and cross-referenced with the appropriate height determination table to meet required performance.
- D. Partition Head to Structure Connections (Slip-Type): Provide mechanical anchorage devices that accommodate deflection using slotted holes, screws, and anti-friction bushings, preventing rotation of studs while maintaining the structural performance of partition.
1. Basis of Design Product: ClarkDietrich; MaxTrak® (SLT) Head-of-Wall Deflection Track, or equivalent.
    - a. Material: ASTM A653/A653M steel sheet, SS Grade 50, with G60/Z180 hot-dipped galvanized coating.
    - b. Thickness: 33 mils: 20-gauge, 0.0346-inch design thickness
    - c. Dimensions: 2-1/2 inch legs with an inside depth equal to the depth of stud.
    - d. Attach studs with #8 wafer head screws through the slot located 1-1/4 inches from the track web. Provide a guideline at the center of vertical slots to align top of studs.

- E. Firestop Tracks: Top runner manufactured to allow partition heads to expand and contract with movement of the structure while maintaining continuity of fire-resistance-rated assembly indicated; in thickness not less than indicated for studs and in width to accommodate depth of studs.
  - 1. Basis of Design Product: ClarkDietrich; BlazeFrame, or equivalent.
- F. Flat Strap and Backing Plate: Steel sheet for blocking and bracing in length and width indicated.
  - 1. Basis of Design Product: ClarkDietrich; BlazeFrame, or equivalent.
  - 2. Minimum Base-Steel Thickness: 0.0179 inch (0.45 mm) or 0.0296 inch (0.752 mm)
- G. U-Channel Bridging:
  - 1. Basis of Design Product: ClarkDietrichU-Channel and Bridging Clip, or equivalent.
  - 2. Minimum Base-Steel Thickness: 0.054-inch, with minimum 1-1/2 inch wide flanges.
  - 3. Depth: As indicated on Drawings.
  - 4. Clip Angle: Not less than 1-1/2 by 1-1/2 inches, 0.0538-inch thick, galvanized steel.
- H. Hat-Shaped, Rigid Furring Channels: AISI S220.
  - 1. Basis of Design Product: ClarkDietrich; U-Channel and Bridging Clip, or equivalent.
  - 2. Minimum Base-Steel Thickness: 0.018 inch
  - 3. Depth: 7/8 inch or 1-1/2 inches, as indicated on drawings.
- I. Resilient Furring Channels: 1/2-inch deep, steel sheet members designed to reduce sound transmission.
  - 1. Basis of Design Product: ClarkDietrich; RC Deluxe (RCSD) Resilient Channel, or equivalent.
- J. Carrying Channels: 0.054-inch uncoated-steel thickness, with minimum 1/2-inch wide flanges.
  - 1. Furring Brackets: Adjustable, corrugated-edge type of steel sheet with minimum uncoated-steel thickness of 0.0296 inch.
  - 2. Tie Wire: ASTM A641/A641M, Class 1 zinc coating, soft temper, 0.062-inch diameter wire, or double strand of 0.048-inch diameter wire.
- K. Z-Shaped Furring: With slotted or non-slotted web, face flange of 1-1/4 inches, wall attachment flange of 3/4 inch, minimum base-steel thickness of 0.018 inches, and depth required to fit insulation thickness indicated.
  - 1. Basis of Design Product: ClarkDietrich; Z-Furring Channels, or equivalent.
- L. Headers and Jambs: Manufacturer's proprietary shape used to form header beams and jambs, columns or posts, of web depths indicated, unpunched, with stiffened flanges and as follows:
  - 1. Basis of Design Product: ClarkDietrich; Heavy-Duty Studs (HDS) and Type HDSC Header Bracket or equivalent.
- M. Shaftwall System: Non-load-bearing fire-rated wall assemblies that provide critical, life-safety, fire-resistant protection for elevator shafts, stairwells, vertical chases, and mechanical enclosures.
  - 1. Stud: Manufacturer's standard profile for repetitive members, corner and end members, and fire-resistance-rated assembly indicated below:
    - a. Basis of Design Product: ClarkDietrich; CT Stud, or equivalent.
  - 2. Runner Tracks: Manufacturer's standard J-profile track with 2-1/4-inch (57.1-mm) leg and matching studs in depth.
    - a. Basis of Design Product: ClarkDietrich; J-Tabbed Track, or equivalent.

## 2.04 SUSPENSION SYSTEMS

- A. Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.062-inch- (1.59-mm-) diameter wire, or double strand of 0.048-inch- (1.21-mm-) diameter wire.
- B. Hanger Attachments to Concrete:
  - 1. Anchors: Fabricated from corrosion-resistant materials with holes or loops for attaching wire hangers and capable of sustaining, without failure, a load equal to 5 times that imposed by construction as determined by testing according to ASTM E 488 by an independent testing agency.

- a. Type: Post-installed, expansion anchor.
  - b. Powder-Actuated Fasteners: Suitable for application indicated, fabricated from corrosion-resistant materials with clips or other devices for attaching hangers of type indicated, and capable of sustaining, without failure, a load equal to 10 times that imposed by construction as determined by testing according to ASTM E 1190 by an independent testing agency.
- C. Wire Hangers: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.16 inch (4.12 mm) in diameter.
- D. Flat Hangers: Steel sheet, 1 by 3/16 inch (25 by 5 mm) by length indicated.
1. Carrying Channels: Cold-rolled, commercial-steel sheet with a base-metal thickness of 0.053 inch (1.34 mm) and minimum 1/2-inch- (13-mm-) wide flanges.
    - a. Depth: 1-1/2 inches (38 mm).
  2. Furring Channels (Furring Members):
    - a. Cold-Rolled Channels: 0.053-inch (1.34-mm) uncoated-steel thickness, with minimum 1/2-inch- (13-mm-) wide flanges, 3/4 inch (19 mm) deep.
    - b. Steel Studs and Runners: ASTM C 645.
      - 1) Minimum Base-Metal Thickness: As indicated on Drawings or determined by span and loading requirements.
      - 2) Depth: As indicated on Drawings, 3-5/8 inches (92 mm) typical and others as needed by spans and loadings.
      - 3) Hat-Shaped, Rigid Furring Channels: ASTM C 645, 7/8 inch (22 mm) deep.
        - (a) Minimum Base-Metal Thickness: 0.018 inch (0.45 mm).
  3. Grid Suspension System for Gypsum Board Ceilings: ASTM C 645, direct-hung system composed of main beams and cross-furring members that interlock.
    - a. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
      - 1) Armstrong World Industries, Inc.; Drywall Grid Systems.
      - 2) Chicago Metallic Corporation; Drywall Grid System.
      - 3) USG Corporation; Drywall Suspension System.

## 2.05 AUXILIARY MATERIALS

- A. General: Provide auxiliary materials that comply with referenced installation standards.
1. Fasteners for Metal Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members to substrates.
- B. Isolation Strip at Exterior Walls: Provide the following:
1. Foam Gasket: Adhesive-backed, closed-cell vinyl foam strips that allow fastener penetration without foam displacement, 1/8-inch thick, in width to suit steel stud size.

## PART 3 EXECUTION

### 3.01 EXAMINATION

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

### 3.02 INSTALLATION, GENERAL

- A. Installation Standard: ASTM C754.
- B. Install supplementary framing, and blocking to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction.
- C. Install bracing at terminations in assemblies.
- D. Do not bridge building control and expansion joints with non-structural steel framing members. Frame both sides of joints independently.

### 3.03 INSTALLATION, FRAMED ASSEMBLIES

- A. Install framing system components to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.
  - 1. Single-Layer Application: 16 inches o.c. unless otherwise indicated.
  - 2. Multilayer Application: 16 inches o.c. unless otherwise indicated.
  - 3. Tile Backing Panels: 16 inches o.c. unless otherwise indicated.
- B. Install studs so flanges within framing system point in same direction.
- C. Install tracks (runners) at floors and overhead supports. Extend framing full height to structural supports or substrates above suspended ceilings except where partitions are indicated to terminate at or above suspended ceilings. Continue framing around ducts penetrating partitions above ceiling.
  - 1. Slip-Type Head Joints: Where framing extends to overhead structural supports, install to produce joints at tops of framing systems that prevent axial loading of finished assemblies.
  - 2. Door Openings: Securely fasten vertical studs at jambs to jamb anchor clips on door frames; install runner track section (for cripple studs) at head and secure to jamb studs. Fasteners shall not exceed height from face of framing members more than specified in ASTM C840 Section 6.5.
    - a. Install two studs at each jamb unless a framing member has been specifically engineered for the jamb.
    - b. Extend jamb studs through suspended ceilings and attach to underside of overhead structure if suspended ceiling system cannot withstand forces imposed by door swings.
    - c. If jamb studs cannot be attached to the overhead structure, the Design Professional should be consulted for bracing design.
  - 3. Other Framed Openings: Frame openings other than door openings the same as required for door openings unless otherwise indicated. Install framing below sills of openings to match framing required above door heads.
  - 4. Fire-Resistance-Rated Partitions: Install framing to comply with fire-resistance-rated assembly indicated and support closures and to make partitions continuous from floor to underside of solid structure.
    - a. Firestop Track: Where indicated, install to maintain continuity of fire-resistance-rated assembly indicated.
- D. Installation Tolerance: Install framing members plumb within 1/4 inch in 10 feet
- E. Installation Tolerance: Install each framing member so fastening surfaces vary not more than 1/8 inch from the plane formed by faces of adjacent framing.

**END OF SECTION**

**SECTION 09 30 00  
TILING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Tile for floor applications.
- B. Tile for wall applications.

**1.02 RELATED REQUIREMENTS**

- A. Section 09 05 61 - Common Work Results for Flooring Preparation
- B. Section 03 30 00 - Cast-in-Place Concrete
- C. Section 07 92 00 - Joint Sealants
- D. Section 09 21 16 - Gypsum Board Assemblies
- E. Section 09 30 50 - Metal Edge Protection and Transition Profiles

**1.03 ACTION SUBMITTALS**

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: Show locations of each type of tile and tile pattern. Show widths, details, and locations of expansion, contraction, control, and isolation joints in tile substrates and finished tile surfaces.
- C. Samples for Verification:
  - 1. Full-size units of each type and composition of tile and for each color and finish required.
  - 2. Assembled samples mounted on a rigid panel, with grouted joints, for each type and composition of tile and for each color and finish required. Make samples at least 12 inches (300 mm) square, but not fewer than 4 tiles. Use grout of type and in color or colors approved for completed Work.
  - 3. Full-size units of each type of trim and accessory for each color and finish required.
  - 4. Metal edge strips in 6-inch (150-mm) lengths.

**1.04 INFORMATIONAL SUBMITTALS**

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

**1.05 MAINTENANCE MATERIAL SUBMITTALS**

- A. Furnish extra materials that match and are from same production runs as products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  - 1. Tile and Trim Units: Furnish quantity of full-size units in unopened cartons, equal to not less than 3 percent of amount installed for each type, composition, color, pattern, and size indicated.

**1.06 QUALITY ASSURANCE**

- A. Source Limitations for Tile: Obtain tile of each type and color or finish from one source or producer.
  - 1. Obtain tile of each type and color or finish from same production run and of consistent quality in appearance and physical properties for each contiguous area.
- B. Source Limitations for Setting and Grouting Materials: Obtain ingredients of a uniform quality for each mortar, adhesive, and grout component from one manufacturer and each aggregate from one source or producer.

- C. Source Limitations for Other Products: Obtain each of the following products specified in this Section from a single manufacturer for each product:
  - 1. Joint sealants.
  - 2. Metal edge strips.
- D. Mockups: Lay out tile materials for Owner's approval to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
  - 1. Build mockup of each type of wall tile installation.
  - 2. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.
- E. Preinstallation Conference: Conduct conference at Project site.
  - 1. Review requirements in ANSI A108.01 for substrates and for preparation by other trades.

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

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

#### **1.08 PROJECT CONDITIONS**

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

#### **1.09 WARRANTY**

- A. Manufacturer Warranty: Manufacturer shall warrant the products specified in this Section against material defects or defects in manufacturing, for a period of one (1) year from the Date of Substantial Completion.
- B. Installation Warranty: The installing subcontractor shall warrant the installation to be free of defects in material and workmanship for a period of one (1) year from the Date of Substantial Completion.

### **PART 2 PRODUCTS**

#### **2.01 MANUFACTURER**

- A. Owner Standard: The products specified in this Section are restricted to those of the manufacturers named for each finish type specified.
  - 1. Product substitutions: Not permitted.

#### **2.02 PRODUCTS, GENERAL**

- A. ANSI Ceramic Tile Standard: Provide tile that complies with ANSI A137.1 for types, compositions, and other characteristics indicated.
  - 1. Provide tile complying with Standard grade requirements unless otherwise indicated.
- B. ANSI Standards for Tile Installation Materials: Provide materials complying with ANSI A108.02, ANSI standards referenced in other Part 2 articles, ANSI standards referenced by TCA installation methods specified in tile installation schedules, and other requirements specified.
- C. Factory Blending: For tile exhibiting color variations within ranges, blend tile in factory and package so tile units taken from one package show same range in colors as those taken from other packages and match approved Samples.

- D. Mounting: For factory-mounted tile, provide back- or edge-mounted tile assemblies as standard with manufacturer unless otherwise indicated.
- E. Factory-Applied Temporary Protective Coating: Where indicated under tile type, protect exposed surfaces of tile against adherence of mortar and grout by precoating with continuous film of petroleum paraffin wax, applied hot. Do not coat unexposed tile surfaces.
  - 1. Products: Refer to Interior Finish Schedule and Materials/Color Group Schedule.

### 2.03 TILE PRODUCTS - FLOORING APPLICATION

- A. Porcelain Floor Tile, designated in the Drawings as Finish Type PFT- #.
  - 1. Refer to the "Interior Finish Legend" for pertinent information on this Finish Type, including manufacturer, model/pattern, color, size, and other related information.
  - 2. Type PFT-1:
    - a. Application: Floor Tiling.
    - b. Manufacturer: Refer to Drawings.
    - c. Model/ Pattern/ Style: Refer to Drawings.
    - d. Color: Refer to Drawings.
    - e. Size: Refer to Drawings.
    - f. Grout: Type GT-1.
    - g. Installation Method: Refer to Drawings.

### 2.04 TILE PRODUCTS - WALL APPLICATIONS

- A. Ceramic Wall Tile, designated in the Drawings as FinishType CWT- #
  - 1. Refer to the "Interior Finish Legend" for pertinent information on this Finish Type, including manufacturer, model/pattern, color, size, and other related information.
  - 2. Type CWT-1:
    - a. Application: Wall Tiling.
    - b. Manufacturer: Virginia Tile.
    - c. Model/ Pattern/ Style: Refer to Drawings.
    - d. Color: Refer to Drawings.
    - e. Size: 3-inch by 12-inch.
    - f. Grout: Type GT-1
    - g. Installation Method: Refer to Drawings.
  - 3. Type CWT-2:
    - a. Application: Wall Tiling.
    - b. Manufacturer: Virginia Tile.
    - c. Model/ Pattern/ Style: Refer to Drawings.
    - d. Color: Refer to Drawings.
    - e. Size: 2-inch by 6.3-inch.
    - f. Grout: Type GT-1.
    - g. Installation Method: Refer to Drawings.

### 2.05 SETTING MATERIAL

- A. Latex-Portland Cement Mortar (Thin Set): ANSI A118.4.
  - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Bostik, Inc.
    - b. Laticrete International, Inc.
    - c. MAPEI Corporation.
    - d. Summitville Tiles, Inc.
    - e. TEC; a subsidiary of H. B. Fuller Company.
  - 2. Provide prepackaged, dry-mortar mix containing dry, redispersible, vinyl acetate or acrylic additive to which only water must be added at Project site.
  - 3. Provide prepackaged, dry-mortar mix combined with acrylic resin liquid-latex additive at Project site.

4. For wall applications, provide mortar that complies with requirements for nonsagging mortar in addition to the other requirements in ANSI A118.4.
5. For all glass tile provide white materials.

## 2.06 GROUT

- A. Grout, designated in the Drawings as FinishType GT- #.
  1. Refer to the "Interior Finish Legend" for pertinent information on this Finish Type, including manufacturer, model/pattern, color, size, and other related information.
- B. Type GT-1:
  1. Manufacturer: Mapei.
  2. Product: Kerapoxy.
    - a. Water-Cleanable Epoxy Grout
  3. Color: Refer to Drawings.
  4. Width of Grout Lines: 1/8-inch

## 2.07 ELASTOMERIC SEALANTS

- A. General: Provide sealants, primers, backer rods, and other sealant accessories that comply with the following requirements and with the applicable requirements in Section 07 92 00 - Joint Sealants.
- B. Mildew-Resistant, Single-Component, Acid-Curing Silicone Joint Sealant: ASTM C920 , Type S, Grade NS, Class 25, for Use NT.
  1. Products:
    - a. BASF Building Systems; Omnipus.
    - b. Dow Corning Corporation; 786 Mildew Resistant.
    - c. GE Advanced Materials - Silicones; Sanitary SCS1700.
    - d. Tremco Incorporated; Tremsil 200 Sanitary.
- C. Colors: Provide colors of exposed sealants to match colors of grout in tile adjoining sealed joints unless otherwise indicated.

## 2.08 MISCELLANEOUS MATERIALS

- A. Trowelable Underlayments and Patching Compounds: Latex-modified, portland cement-based formulation provided or approved by manufacturer of tile-setting materials for installations indicated.
- B. Metal Edge Protection: Refer to Section 09 30 50.
- C. Temporary Protective Coating: Product indicated below that is formulated to protect exposed surfaces of tile against adherence of mortar and grout; compatible with tile, mortar, and grout products; and easily removable after grouting is completed without damaging grout or tile.
  1. Grout release in form of manufacturer's standard proprietary liquid coating that is specially formulated and recommended for use as temporary protective coating for tile.
- D. Tile Cleaner: A neutral cleaner capable of removing soil and residue without harming tile and grout surfaces, specifically approved for materials and installations indicated by tile and grout manufacturers.
- E. Grout Sealer: Manufacturer's standard silicone product for sealing grout joints and that does not change color or appearance of grout.
  1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Bostik, Inc.; Siloxane 220.
    - b. MAPEI Corporation; KER 003, Silicone Spray Sealer for Cementitious Tile Grout.
    - c. Summitville Tiles, Inc.; SL-15, Invisible Seal Penetrating Grout and Tile Sealer.
    - d. TEC; a subsidiary of H. B. Fuller Company; TA-256 Penetrating Silicone Grout Sealer.

## **2.09 MIXING MORTARS AND GROUT**

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

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Examine substrates, areas, and conditions where tile will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of installed tile.
  - 1. Verify that substrates for setting tile are firm, dry, clean, free of coatings that are incompatible with tile-setting materials including curing compounds and other substances that contain soap, wax, oil, or silicone; and comply with flatness tolerances required by ANSI A108.01 for installations indicated.
  - 2. Verify that installation of grounds, anchors, recessed frames, electrical and mechanical units of work, and similar items located in or behind tile has been completed.
  - 3. Verify that joints and cracks in tile substrates are coordinated with tile joint locations; if not coordinated, adjust joint locations in consultation with Architect.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### **3.02 PREPARATION**

- A. Blending: For tile exhibiting color variations, verify that tile has been factory blended and packaged so tile units taken from one package show same range of colors as those taken from other packages and match approved Samples. If not factory blended, either return to manufacturer or blend tiles at Project site before installing.
- B. Field-Applied Temporary Protective Coating: If indicated under tile type or needed to prevent grout from staining or adhering to exposed tile surfaces, precoat them with continuous film of temporary protective coating, taking care not to coat unexposed tile surfaces.

### **3.03 TILE INSTALLATION**

- A. Comply with TCA's "Handbook for Ceramic Tile Installation" for TCA installation methods specified in tile installation schedules. Comply with parts of the ANSI A108 Series "Specifications for Installation of Ceramic Tile" that are referenced in TCA installation methods, specified in tile installation schedules, and apply to types of setting and grouting materials used.
  - 1. For the following installations, follow procedures in the ANSI A108 Series of tile installation standards for providing 95 percent mortar coverage:
    - a. Tile floors composed of tiles 8 by 8 inches (200 by 200 mm) or larger.
    - b. Tile floors composed of rib-backed tiles.
- B. Extend tile work into recesses and under or behind equipment and fixtures to form complete covering without interruptions unless otherwise indicated. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.
- C. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap tile.
- D. Provide manufacturer's standard trim shapes where necessary to eliminate exposed tile edges.
- E. Jointing Pattern: Lay tile in grid pattern unless otherwise indicated. Lay out tile work and center tile fields in both directions in each space or on each wall area. Lay out tile work to minimize the use of pieces that are less than half of a tile. Provide uniform joint widths unless otherwise indicated.

1. For tile mounted in sheets, make joints between tile sheets same width as joints within tile sheets so joints between sheets are not apparent in finished work.
  2. Where adjoining tiles on floor, base, walls, or trim are specified or indicated to be same size, align joints.
  3. Where tiles are specified or indicated to be whole integer multiples of adjoining tiles on floor, base, walls, or trim, align joints unless otherwise indicated.
- F. Lay out tile wainscots to dimensions indicated or to next full tile beyond dimensions indicated.
- G. Expansion Joints: Provide expansion joints and other sealant-filled joints, including control, contraction, and isolation joints, where indicated. Form joints during installation of setting materials, mortar beds, and tile. Do not saw-cut joints after installing tiles.
1. Where joints occur in concrete substrates, locate joints in tile surfaces directly above them.
  2. Prepare joints and apply sealants to comply with requirements in Division 07 Section "Joint Sealants."
- H. Metal Edge Strips: Install at locations indicated.
- I. Grout Sealer: Apply grout sealer to cementitious grout joints according to grout-sealer manufacturer's written instructions. As soon as grout sealer has penetrated grout joints, remove excess sealer and sealer from tile faces by wiping with soft cloth.

### **3.04 CLEANING AND PROTECTING**

- A. Cleaning: On completion of placement and grouting, clean all ceramic tile surfaces so they are free of foreign matter.
1. Remove epoxy and latex-portland cement grout residue from tile as soon as possible.
  2. Clean grout smears and haze from tile according to tile and grout manufacturer's written instructions but no sooner than 10 days after installation. Use only cleaners recommended by tile and grout manufacturers and only after determining that cleaners are safe to use by testing on samples of tile and other surfaces to be cleaned. Protect metal surfaces and plumbing fixtures from effects of cleaning. Flush surfaces with clean water before and after cleaning.
  3. Remove temporary protective coating by method recommended by coating manufacturer and that is acceptable to tile and grout manufacturer. Trap and remove coating to prevent drain clogging.
- B. Protect installed tile work with kraft paper or other heavy covering during construction period to prevent staining, damage, and wear. If recommended by tile manufacturer, apply coat of neutral protective cleaner to completed tile walls.
- C. Before final inspection, remove protective coverings and rinse neutral protective cleaner from tile surfaces.

**END OF SECTION**

**SECTION 09 30 50  
METAL EDGE PROTECTION AND TRANSITION PROFILES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Edge-protection and transition profiles for floors and walls.

**1.02 RELATED REQUIREMENTS**

- A. Section 03 30 00 - Cast-In-Place Concrete
- B. Section 09 30 00 - Tiling

**1.03 REFERENCE STANDARDS**

- A. Tile Council of North America (TCNA) Handbook for Ceramic Tile Installation.
- B. American National Standard Specifications for the installation of ceramic tile A108 / A118 / A136.1.

**1.04 DEFINITIONS**

- A. Metal Edge Protection and Transition Profiles from here on shall be referred to as "Edge Protection".

**1.05 SUBMITTALS**

- A. 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.
- B. Verification Samples: For each finish product specified, two samples, minimum size 6 inches (150 mm) long, representing actual product, color, and finish.
- C. Manufacturer's Certificates: Certify products meet or exceed specified requirements.

**1.06 QUALITY ASSURANCE**

- A. Installer Qualifications: Company specializing in performing the work of this section with minimum five-years experience.
- B. Source Limitations for Setting Materials and Accessories: Obtain product of a uniform quality for each application condition from a single manufacturer.

**1.07 DELIVERY, STORAGE, AND HANDLING**

- A. Store products in manufacturer's unopened packaging until ready for installation.

**1.08 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 absolute limits.

**1.09 COORDINATION**

- A. Coordinate Work with other operations and installation of floor finish materials to avoid damage to installed materials.

**1.10 WARRANTY**

- A. Floor and Wall Profiles - Limited Warranty: The manufacturer shall warrant the product against material defects, or defects in manufacturing, for five (5) years from Date of Substantial Completion.
- B. Cove-Shaped Profiles - Limited Warranty: The manufacturer shall warrant the product against material defects, or defects in manufacturing, for five (5) years from Date of Substantial Completion.

## **PART 2 PRODUCTS**

### **2.01 MANUFACTURER**

- A. Specified Manufacturer: Schluter Systems.
  - 1. Other Acceptable Manufacturer: None identified. No substitutions will be considered or accepted.

### **2.02 APPLICATIONS**

- A. Applications for Metal Edge Protection:
  - 1. Open edges of wall tile.
  - 2. Open edges of floor tile.
  - 3. Transition from flooring surfaces to wall surfaces.

### **2.03 EDGE PROTECTION - GENERAL**

- A. Refer to the "Interior Finish Legend" for pertinent information on the Finish Types, including manufacturer, model/pattern, color, size, and other related information.

### **2.04 FLOORING EDGE PROTECTION PRODUCTS**

- A. Flooring Edge Protection, designated in the Drawings as Finish Type TRS- #
- B. Type TRS-3: Schluter; SCHIENE
  - 1. Description: L-shaped profile with 1/8 inch (3.2 mm) wide visible surface integrated trapezoid-perforated anchoring leg, and integrated grout joint spacer.
  - 2. Anchoring Leg:
    - a. Provide with straight anchoring leg.
  - 3. Material and Finish:
    - a. AE - Satin Anodized Aluminum.
      - 1) Height as required to coordinate with tile selection and setting system selected.
- C. Type TRS-2: Schluter-RENO-U
  - 1. Description: profile with sloped exposed surface, 5/32 inch (4 mm) tall leading edge, integrated trapezoid-perforated anchoring leg, and integrated grout joint spacer.
  - 2. Material and Finish:
    - a. AE - Satin Anodized Aluminum.
      - 1) Height as required to coordinate with tile selection and setting system selected.

### **2.05 WALL EDGE PROTECTION**

- A. Wall Edge Protection, designated in the Drawings as Finish Type MT- #
- B. Type MT-2: Schluter-JOLLY
  - 1. Description: L-shaped profile with 1/8 inch (3.2 mm) wide top section vertical wall section that together form the visible surface, integrated trapezoid-perforated anchoring leg, and integrated grout joint spacer.
  - 2. Anchoring Leg:
    - a. Provide with straight anchoring leg.
    - b. Provide with special radius anchoring leg for radius applications.
  - 3. Material and Finish:
    - a. AT - Satin Nickel Anodized Aluminum.
      - 1) Height as required to coordinate with tile selection and setting system selected.

### **2.06 COVE-SHAPED PROFILES**

- A. Coved-Shaped Profiles, designated in the Drawings as Finish Type MT- #
- B. Type MT-1: Schluter-DILEX-AHK
  - 1. Description: Profile with integrated trapezoid-perforated anchoring legs, connected at a 90-degree angle by a cove shaped section with 3/8 inch (10 mm) radius that forms the visible surface.
  - 2. Corners:
    - a. Provide with matching inside corners.

- b. Provide with matching outside corners.
- c. Provide with matching end caps.
- d. Provide with matching connectors.
- 3. Material and Finish:
  - a. AE - Satin Anodized Aluminum.
    - 1) Height as required to coordinate with tile selection and setting system selected.

**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 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.

**3.03 INSTALLATION**

- A. Install in accordance with manufacturer's instructions.

**3.04 PROTECTION**

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

**END OF SECTION**

**SECTION 09 51 00  
ACOUSTICAL CEILINGS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Suspended exposed tee metal grid ceiling system
- B. Acoustical panels

**1.02 RELATED REQUIREMENTS**

- A. Section 09 21 16 - Gypsum Board Assemblies
- B. 09 51 16 - Specialty Ceiling System
- C. Division 21 - Fire Protection
- D. Division 23 - HVAC
- E. Division 26 - Electrical
- F. Division 28 - Electronic Safety and Security

**1.03 REFERENCE STANDARDS**

- A. ASTM A641/A641M - Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire.
- B. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- C. ASTM C635/C635M - Standard Specification for Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings.
- D. ASTM C636/C636M - Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels.
- E. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials.
- F. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
- G. ASTM E580/E580M - Standard Practice for Installation of Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels in Areas Subject to Earthquake Ground Motions.
- H. ASTM E1264 - Standard Classification for Acoustical Ceiling Products.
- I. ICC (IBC)-2018 - International Building Code.

**1.04 DESIGN AND PERFORMANCE REQUIREMENTS**

- A. Acoustical ceiling assemblies shall comply with the performance requirements without failure due to defective manufacture, fabrication, installation, or other construction defects.
- B. Design acoustical ceiling systems using the design criteria specified below.
  - 1. Building Code: 2018 IBC
  - 2. Occupancy Category: II
  - 3. Seismic Design Category: B - No Seismic Requirements
- C. Surface-Burning Characteristics: Comply with ASTM E84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
  - 1. Flame-Spread Index: Comply with ASTM E1264 for Class A materials, 25 or less.
  - 2. Smoke-Developed Index: 50 or less.

**1.05 SUBMITTALS**

- A. Product Data: For each type of product.
- B. Samples: For each exposed product and each color and texture specified, 6-inches- (150-mm-) in size.
- C. Samples for Initial Selection: For components with factory-applied color finishes.
- D. Samples for Verification: For each component indicated and for each exposed finish required, prepared on Samples of the size indicated below.

1. Acoustical Tile: Set of full-size Samples of each type, color, pattern, and texture.
  2. Concealed Suspension-System Members: 6-inch- (150-mm-) long Sample of each type.
  3. Exposed Moldings and Trim: Set of 6-inch- (150-mm-) long Samples of each type and color.
- E. Coordination Drawings: Reflected ceiling plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:
1. Ceiling suspension system members.
  2. Method of attaching hangers to the building structure.
  3. Size and location of initial access modules for acoustical tile.
  4. Ceiling-mounted items include lighting fixtures, diffusers, grilles, speakers, sprinklers, access panels, and special moldings.
  5. Minimum Drawing Scale: 1/8 inch = 1 foot (1:96).
- F. Qualification Data: For testing agency.
- G. Product Test Reports: For each acoustical tile ceiling, for tests performed by a qualified testing agency.
- H. Evaluation Reports: For each acoustical tile ceiling suspension system and anchor and fastener type, from ICC-ES.
- I. Field quality-control reports.
- J. Maintenance Data: For finishes to include in maintenance manuals.

#### **1.06 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
- B. Manufacturer member in good standing of Cisca (Ceiling and Interior Systems Construction Association)
- C. Installer Qualifications: Company specializing in performing Work of this section with a minimum of three years of experience.
- D. Where applicable, provide seismic design of suspended ceiling under the direct supervision of Professional Engineer experienced in the design of this Work and licensed in the State of Missouri.

#### **1.07 DELIVERY, STORAGE & HANDLING**

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

#### **1.08 SEQUENCING**

- A. Sequence Work to ensure acoustic ceilings are not installed until dust-generating activities are complete, wet work is complete, and overhead work is complete, tested, and approved.
- B. Ensure that products of this section are supplied to affected trades in time to prevent interruption of construction progress.

#### **1.09 FIELD CONDITIONS**

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

### 1.10 EXTRA MATERIALS

- A. Deliver extra acoustical units for the Owner's use in maintenance. Label and store where directed by the Owner including codes used on the Drawings. Do not deliver to the Project site until the Owner is prepared to receive and store maintenance materials.
  - 1. Ceiling Panels: For each type specified, provide full-size panels in unopened boxes equal to no less than 5 percent of the quantity installed.

### 1.11 WARRANTY

- A. Acoustical Panels:
  - 1. Manufacturer Warranty: The manufacturer shall warrant the products specified in this Section against material defects or defects in manufacturing, for thirty (30) years from the Date of Substantial Completion.
- B. Suspension System:
  - 1. Manufacturer Warranty: The manufacturer shall warrant the products specified in this Section against material defects or defects in manufacturing, for ten (10) years from the Date of Substantial Completion.
- C. Installation Warranty: The installing subcontractor shall warrant the installation to be free of defects in material and workmanship for one (1) year from the Date of Substantial Completion.

## PART 2 PRODUCTS

### 2.01 MANUFACTURER

- A. Acoustical Panels and Suspension Systems:
  - 1. Owner Standard: The products specified in this Section are restricted to those of Armstrong World Industries, Inc.
    - a. Product substitutions: Not permitted.
- B. Suspension Systems:
  - 1. Owner Standard: The products specified in this Section are restricted to those of Armstrong World Industries, Inc.
    - a. Product substitutions: Not permitted.

### 2.02 ACOUSTICAL PANELS

- A. Acoustical Panels, designated in the Drawings as FinishType ACT- #.
  - 1. Refer to the "Interior Finish Legend" for pertinent information on this Finish Type, including manufacturer, model/pattern, color, size, and other related information
- B. Type ACT-1, ACT-2, & ACT-3:
  - 1. Product: As scheduled
  - 2. Compliance: ASTM E1264
  - 3. Size: As scheduled
  - 4. Edges: Per ceiling type
  - 5. Recycled Content: Per ceiling type
  - 6. Sag / Humidity Resistant: HumiGuard Plus
  - 7. Mold and Mildew Resistant.
  - 8. Color: White
  - 9. Suspension System: Prelude XL 15/16" Exposed Tee; Color: White
  - 10. Acoustic Performance: Per ceiling type

### 2.03 SUSPENSION SYSTEMS

- A. Metal Suspension Systems, General: Comply with ASTM C635/C635M; die-cut and interlocking components, with stabilizer bars, clips, splices, perimeter moldings, and hold down clips as required.
  - 1. Structural Classification: Heavy-duty system.
  - 2. Access: Upward
  - 3. Seismic Design Criteria:
    - a. Seismic Design Category: B - No Seismic Requirements

- B. Suspension System for Type ACT-1 Acoustical Ceilings:
1. Product: Armstrong; Prelude XL 15/16" Exposed Tee
  2. Profile: Tee; 15/16 inch (24 mm) wide face.
  3. Construction: Double web.
  4. Description: Main beams and cross tees, base metal, and end detail, fabricated from commercial quality hot-dipped galvanized steel complying with ASTM A653/A653M. Main beams and cross tees are double-web steel construction with type exposed flange design. Exposed surfaces chemically cleansed, capping prefinished galvanized steel in baked polyester paint. Main beams and cross tees shall have rotary stitching.
  5. Color: White
  6. Attachment Devices: Size for five times design load indicated in ASTM C635/C635M, Table 1, Direct Hung unless otherwise indicated.
  7. Wire for Hangers and Ties: ASTM A641/A641M, Class 1 zinc coating, soft annealed, with a yield stress load of at least time three design load, but not less than 12 gauge.
  8. Finish: White painted.
  9. Grid Module: Varies by panel size
  10. Fire Performance Characteristics: Identify acoustical ceiling components with appropriate markings of applicable testing and inspecting organization.
    - a. Surface Burning Characteristics: Tested per ASTM E84 and complying with ASTM E1264 Classification.
    - b. Fire Resistance: As follows tested per ASTM E119 and listed in the appropriate floor or roof design in the Underwriters Laboratories Fire Resistance Directory
- C. Suspension System for Type ACT-2 Acoustical Ceiling:
1. Product: Armstrong; 15/16" CoExtruded Clean Room
  2. Profile: Tee; 15/16 inch (24 mm) wide face.
  3. Construction: Double web.
  4. Description: Main beams and cross tees, base metal, and end detail, fabricated from commercial quality hot-dipped galvanized steel complying with ASTM A653/A653M. Main beams and cross tees are double-web steel construction with type exposed flange design. Exposed surfaces chemically cleansed, capping prefinished galvanized steel in baked polyester paint. Main beams and cross tees shall have rotary stitching.
  5. Structural Classification: ASTM C635/C635M, Intermediate Duty duty
  6. Color: White
  7. Attachment Devices: Size for five times design load indicated in ASTM C635/C635M , Table 1, Direct Hung unless otherwise indicated.
  8. Wire for Hangers and Ties: ASTM A641/A641M, Class 1 zinc coating, soft annealed, with a yield stress load of at least time three design load, but not less than 12 gauge.
  9. Edge Mouldings and Trim:
  10. Grid Module: Varies by panel size
  11. Fire Performance Characteristics: Identify acoustical ceiling components with appropriate markings of applicable testing and inspecting organization.
    - a. Surface Burning Characteristics: Tested per ASTM E84 and complying with ASTM E1264 Classification.
    - b. Fire Resistance: As follows tested per ASTM E119 and listed in the appropriate floor or roof design in the Underwriters Laboratories Fire Resistance Directory

#### **2.04 ACCESSORIES**

- A. Perimeter Moldings: Same material and finish as the grid.
1. At Exposed Grid: Provide L-shaped molding for mounting at the same elevation as the face of the grid.
- B. Touch-up Paint: Type and color to match acoustical and grid units.

#### **2.05 OTHER SUSPENDED CEILING SYSTEMS**

- A. Specialty Ceiling Systems: Refer to Section 09 51 16.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Examine substrates, areas, and conditions, including structural framing and substrates to which acoustical tile ceilings attach or abut, with Installer present, for compliance with requirements specified in this and other Sections that affect ceiling installation and anchorage and for compliance with requirements for installation tolerances and other conditions affecting the performance of the Work.
- B. Examine acoustical tiles before installation. Reject acoustical tiles that are wet, moisture-damaged, or mold-damaged.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.
- D. Verify that layout of hangers will not interfere with other work.

### **3.02 PREPARATION**

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

### **3.03 SUSPENSION SYSTEM INSTALLATION**

- 1. Install suspension system in accordance with ASTM C636/C636M, ASTM E580/E580M, and manufacturer's instructions and as supplemented in this section.
- 2. Rigidly secure system, including integral mechanical and electrical components, for maximum deflection of 1:360.
- B. The layout of the suspended ceiling system shall be a balanced grid design with edge units no less than 50-percent of acoustical unit size.
- C. Locate the ceiling system on the room axis according to the reflected ceiling plan.
- D. Install after major above-ceiling work is complete. Coordinate the location of hangers with other work.
- E. Space hangers not more than 48-inches (1200 mm) on-center along each member supported directly from hangers unless otherwise indicated; provide hangers not more than 8 inches (200 mm) from ends of each member.
- F. 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.
- G. 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.
- H. Do not support components on main runners or cross runners if weight causes total dead load to exceed deflection capability.
- I. Support fixture loads using supplementary hangers located within 6 inches (150 mm) of each corner, or support components independently.
- J. Do not eccentrically load system or induce rotation of runners.
- K. Perimeter Molding: Install at the intersection of ceiling and vertical surfaces and junctions with other interruptions.
- L. Install light fixture boxes constructed of gypsum board above light fixtures in accordance with fire-rated assembly requirements and light fixture ventilation requirements.

### **3.04 INSTALLATION, ACOUSTICAL PANELS**

- A. Install acoustical units in accordance with the manufacturer's instructions.
- B. Fit acoustical units in place, free from damaged edges or other defects detrimental to appearance and function.
- C. Lay directional patterned units with pattern parallel to longest room axis.
- D. Fit border trim neatly against abutting surfaces.

- E. Install units after completing the above-ceiling work.
- F. Install acoustical units level, in a uniform plane, and free from twist, warp, and dents.
- G. Cutting Acoustical Units:
  - 1. Cut to fit irregular grid and perimeter edge trim.
  - 2. Make field cut edges of the same profile as factory edges.
  - 3. Double cut and field paint exposed reveal edges.
- H. Install hold-down clips on panels within 20 ft (6 m) of an exterior door.

**3.05 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.

**END OF SECTION**

**SECTION 09 51 16  
SPECIALTY CEILING SYSTEMS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Linear metal ceiling panels with a woodgrain appearance.
- B. Suspended metal support system, trim, etc.

**1.02 RELATED REQUIREMENTS**

- A. Section 07 46 16 - Linear Metal Cladding Panels
- B. Section 09 21 16 - Gypsum Board Assemblies
- C. Section 09 51 00 - Acoustical Ceilings

**1.03 REFERENCES**

- A.

**1.04 DESIGN AND PERFORMANCE REQUIREMENTS**

- A. Linear ceiling panel assemblies shall comply with the performance requirements without failure due to defective manufacture, fabrication, installation, or other construction defects.
- B. Design linear ceiling systems using the design criteria specified below.
  - 1. General Design Criteria:
    - a. Building Code: 2018 IBC
    - b. Occupancy Category: II
    - c. Seismic Design Category: B - No requirements
- C. Design components to ensure components will not induce eccentric loads. Where components may induce rotation of ceiling system components, provide stabilizing reinforcement.
- D. Suspension System: Rigidly secure ceiling suspension system, including integral mechanical and electrical components, with a maximum deflection of 1:360.

**1.05 ADMINISTRATIVE REQUIREMENTS**

- A. Coordination: Coordinate work of this section with the installation of mechanical and electrical components and with other construction activities affected by the work of this section.
- B. Preinstallation Meeting: Convene two (2) weeks before starting work of this section.

**1.06 SUBMITTALS**

- A. Submit under the provisions of Section 01 33 00 - Submittal Procedures.
- B. Product Data: Manufacturer's data sheets on each product to be used.
- C. Shop Drawings: Reflected ceiling plan indicating ceiling layouts, dimensions and perimeter conditions, and ceiling schedule including panel and grid types to match codes used on the Drawings.
- D. Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.
- E. Closeout Submittals
  - 1. Maintenance Data: For finishes to include in maintenance manuals.

**1.07 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum of three years of documented experience.
  - 1. Manufacturer member in good standing of CISCA (Ceiling and Interior Systems Construction Association)
- B. Installer Qualifications: Company specializing in performing Work of this section with minimum of three years documented experience.

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

- A. Deliver specialty ceiling systems to the project site in original, unopened packages and store them in a fully enclosed, conditioned space where they will be protected against damage from moisture, humidity, temperature extremes, direct sunlight, surface contamination, and other causes.
- B. Before installing specialty ceiling systems, permit them to reach room temperature and a stabilized moisture content.

### **1.09 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.

### **1.10 EXTRA MATERIALS**

- A. Deliver extra acoustical units for Owner's use in maintenance. Label and store where directed by the Owner including codes used on the Drawings. Do not deliver to the Project site until the Owner is prepared to receive and store maintenance materials.
  - 1. Ceiling Panels: For each type specified, provide full-size panels in unopened boxes equal to no less than 5 percent of quantity installed.

### **1.11 WARRANTY**

- A. Manufacturer's Warranty: The manufacturer shall warrant the installation to be free of defects in material and workmanship for a period of two (2) years from the Date of Substantial Completion.
- B. Finish Warranty: Provide manufacturer's limited lifetime warranty against cracking, peeling and gloss/color retention within the guidelines stated by the American Aluminum Manufacturers Association (AAMA).
  - 1. Wood Grains
    - a. Interpon / AkzoNobel D2010 STF Series – AMMA 2604 (10 year Florida) 15 year manufacturer's warranty.
- C. Installation Warranty: The installing subcontractor shall warrant the installation to be free of defects in material and workmanship for a period of one (1) year from the Date of Substantial Completion.

## **PART 2 PRODUCTS**

### **2.01 SPECIALTY CEILING SYSTEMS**

- A. Specialty Ceiling Systems, designated on the Drawings as Finish Type SPC-1
  - 1. Refer to the "Interior Finish Legend" for the manufacturer's name, the product model number and pattern, color, size, and other pertinent information on this Finish Type.

## **PART 1 EXECUTION**

### **3.01 EXAMINATION**

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, metal cladding supports, and other conditions affecting performance of the Work.

### **3.02 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.

### **3.03 INSTALLATION**

- A. Install metal cladding in accordance with manufacturer's written instructions in orientation, sizes, and locations indicated. Install cladding perpendicular to supports unless otherwise indicated. Anchor metal cladding and other components of the Work securely in place, with provisions for thermal and structural movement.

- B. Fasteners: Use aluminum or galvanized steel fasteners for surfaces exposed to the interior.
- C. Accessory Installation: Install components required for a complete metal cladding system including trim, corners, and similar items. Provide types indicated by metal cladding manufacturer; or, if not indicated, provide types recommended by metal cladding manufacturer.

**3.04 PROTECTION AND CLEANING**

- A. Remove temporary protective coverings and strippable films, if any, as metal cladding is installed unless otherwise indicated in manufacturer's written installation instructions. On completion of metal cladding installation, clean finished surfaces as recommended by metal cladding manufacturer. Maintain in a clean condition during construction.
- B. Replace metal cladding that has been damaged or has deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

**END OF SECTION**

**SECTION 09 54 26  
SUSPENDED WOOD CEILINGS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Wood veneer panels.
- B. Linear wood planks.
- C. Metal suspension system.

**1.02 RELATED REQUIREMENTS**

- A. Section 09 51 00 - Acoustical Ceilings: Metal suspension systems.

**1.03 REFERENCE STANDARDS**

- A. CISCA (WC) - Wood Ceilings Technical Guidelines.

**1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Shop Drawings: Indicate grid layout and related dimensioning, attachment of wood ceiling components to grid, accessory attachments, junctions with other ceiling finishes, and mechanical and electrical items installed in the ceiling.
- C. Product Data: Provide data on wood ceiling components and suspension system components.

**PART 2 PRODUCTS**

**2.01 MANUFACTURERS**

- A. Suspended Wood Ceilings:
  - 1. Armstrong World Industries, Inc; Woodworks: [www.armstrongceilings.com/#sle](http://www.armstrongceilings.com/#sle).

**2.02 SUSPENDED WOOD CEILING SYSTEM**

- A. Performance Requirements:
  - 1. Design for maximum deflection of 1/360 of span.
- B. Linear Wood Planks: Composite wood core with wood veneer finish.

**PART 3 EXECUTION**

**3.01 EXAMINATION**

- A. Verify existing conditions before starting work.
- B. Do not install ceiling until after interior wet work is dry.

**3.02 PREPARATION**

- A. Layout wood ceiling components in pattern according to reflected ceiling plan and as shown on shop drawings.
- B. Acclimate wood ceiling materials by removing from packaging in installation area a minimum of 48 hours prior to installation.

**3.03 INSTALLATION**

- A. General: Install suspended wood ceiling system in accordance with CISCA (WC).
- B. Wood Ceiling:
  - 1. Install wood ceilings in accordance with manufacturer's instructions.
  - 2. Fit wood components in place, free from damaged edges or other defects detrimental to appearance and function.
  - 3. Install components in uniform plane, and free from twist, warp, and dents.
  - 4. Cut to fit irregular grid and perimeter edge trim.
  - 5. Make field cut edges of same profile as factory edges, seal and finish according to manufacturer.

**END OF SECTION**

**SECTION 09 65 00  
RESILIENT FLOORING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Resilient sheet flooring
- B. Resilient tile flooring
- C. Installation accessories

**1.02 RELATED REQUIREMENTS**

- A. Section 03 30 00 - Cast-in-Place Concrete
- B. Section 09 30 50 - Metal Edge Protection and Transition Profiles
- C. Section 09 65 13 - Resilient Base and Accessories

**1.03 REFERENCES**

- A. ASTM D2047 - Standard Test Method for Static Coefficient of Friction of Polish-Coated Flooring Surfaces as Measured by the James Machine.
- B. ASTM E662 - Standard Test Method for Specific Optical Density of Smoke Generated by Solid Materials.
- C. ASTM E648 - Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source.
- D. ASTM F970 - Standard Test Method for Measuring Recovery Properties of Floor Coverings after Static Loading.

**1.04 SUBMITTALS**

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: For each type of floor covering. Include floor covering layouts, locations of seams, edges, columns, doorways, enclosing partitions, built-in furniture, cabinets, and cutouts.
  - 1. Show details of special patterns.
- C. Samples for Verification: In manufacturer's standard size, but not less than 6-by-9-inch (150-by-230-mm) sections of each different color and pattern of floor covering required.
  - 1. For heat-welding beads, standard-size samples, but not less than 9 inches (230 mm) long, of each color required.
- D. Seam Samples: For seamless-installation technique indicated and for each floor covering product, color, and pattern required; with seam running lengthwise and in center of 6-by-9-inch (150-by-230-mm) Sample applied to rigid backing and prepared by Installer for this Project.
- E. Qualification Data
- F. Maintenance Data: For each type of floor covering to include in maintenance manuals.

**1.05 EXTRA MATERIAL**

- A. Deliver extra resilient flooring material for the Owner's use in maintenance. Label and store where directed by the Owner including codes used on the Drawings. Do not deliver to the Project site until the Owner is prepared to receive and store maintenance materials.
  - 1. Resilient Sheet Floor Covering: Furnish quantity not less than 10 linear feet (3 linear m) for every 500 linear feet (150 linear m) or fraction thereof, in roll form and full roll width for each color, pattern, and type of floor covering installed.
  - 2. Resilient Tile Floor Covering: For each type specified, provide full-size tiles in unopened cartons equal to no less than 3 percent of each type and color installed.

**1.06 QUALITY ASSURANCE**

- A. Installer Qualifications: A qualified installer who employs workers for this Project who are competent in techniques required by the manufacturer for floor covering installation and seaming method indicated.

1. Engage an installer who employs workers for this Project who are trained or certified by the floor covering manufacturer for installation techniques required.
- B. Fire-Test-Response Characteristics: As determined by testing identical products according to ASTM E 648 or NFPA 253 by a qualified testing agency.
  1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.

#### **1.07 DELIVERY, STORAGE & HANDLING**

- A. Store floor coverings and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within the range recommended by the manufacturer, but not less than 65 deg F or more than 90 deg F. Store rolls upright.

#### **1.08 FIELD CONDITIONS**

- A. Maintain ambient temperatures within the range recommended by the manufacturer, but not less than 65 deg F (21 deg C) or more than 85 deg F (29 deg C), in spaces to receive floor coverings for 48 hours before installation, during installation, and 48 hours after installation
- B. Close spaces to traffic during floor covering installation.
- C. Close spaces to traffic for 48 hours after floor covering installation.

#### **1.09 WARRANTY**

- A. Manufacturer Warranty: The manufacturer shall warrant the products specified in this Section against material defects or defects in manufacturing for 5-years from the Date of Substantial Completion.
- B. Installation Warranty: The installing subcontractor shall warrant the installation to be free of defects in material and workmanship for one (1) year from the Date of Substantial Completion.

### **PART 2 PRODUCTS**

#### **2.01 MANUFACTURER**

- A. Owner Standard: The products specified in this Section are restricted to those of manufacturers named for each product type.
  1. Product substitutions: Not permitted.

#### **2.02 RESILIENT SHEET FLOORING**

- A. Resilient Sheet Flooring, designated in the Drawings as FinishType RSF- #.
  1. Refer to the "Interior Finish Legend" for pertinent information on this Finish Type, including manufacturer, model/pattern, color, size, and other related information
- B. Type RSF-1:
  1. Refer to the "Interior Finish Legend" for pertinent information on this Finish Type, including manufacturer, model/pattern, color, size, and other related information
- C. Type RSF-2:
  1. Refer to the "Interior Finish Legend" for pertinent information on this Finish Type, including manufacturer, model/pattern, color, size, and other related information
- D. Type RSF-3:
  1. Refer to the "Interior Finish Legend" for pertinent information on this Finish Type, including manufacturer, model/pattern, color, size, and other related information
- E. Seams:
  1. Heat Welded Seams:
    - a. Provide vinyl weld rod. Color of weld rod shall be compatible with field color of flooring or as selected by Architect to contrast with field color of flooring.
      - 1) Weld rods shall be sealed after installation. Provide weld rod coating pen from the manufacturer.
- F. Integral Flash Cove Base:
  1. Where indicated, provide integral flash cove wall base by extending sheet flooring up the wall using adhesive, welding rod, and accessories recommended and approved by the flooring manufacturer.

2. Integral Flash Cove Base, designated in the Drawings as FinishType IB- #.
  - a. Refer to the "Interior Finish Legend" for pertinent information on this Finish Type, including manufacturer, model/pattern, color, size, and other related information
3. Type IB-1:
  - a. Material: Match Type RSF-1
  - b. Height: 6-inches
4. Type IB-2:
  - a. Material: Match Type RSF-2
  - b. Height: 6-inches
5. Accessories:
  - a. Cove Strip: 1-inch (25-mm) radius provided or approved by the manufacturer; plastic.
  - b. Cap Strip: Square metal cap provided or approved by the manufacturer.
  - c. Corners: Metal inside and outside corners and end stops provided or approved by the manufacturer.

### **2.03 LUXURY VINYL TILE (LVT)**

- A. Luxury Vinyl Tile, designated in the Drawings as Finish Type LVT- #
  1. Refer to the "Interior Finish Legend" for pertinent information on this Finish Type, including manufacturer, model/pattern, color, size, and other related information
- B. Type LVT-1:
  1. Manufacturer: Mannington
  2. Model/ Pattern: Refer to Drawings
  3. Color: Refer to Drawings
  4. Format: Plank
    - a. Size: 7-1/4-inches by 48-inches.
  5. Material Thickness: 0.1575 inch (4.0 mm).
  6. Installation Method: Refer to Drawings.
  7. Adhesive:
    - a. Amtico PSA Full Spread, Transitional Pressure Sensitive, High Moisture
    - b. Amtico RP-18 Full Spread, One Component
    - c. XpressStep Full Coverage Spray
  8. Compliance: ASTM F1700, Class III, Type B embossed surface
  9. Performance Criteria:
    - a. Fire Test Data:
      - 1) Flooring Radiant Panel (ASTM E648): Class I;
      - 2) Smoke Density (ASTM E662):  $\leq 450$
    - b. Slip Resistance (ASTM C1028):  $\geq 0.55$  Leather; 0.6 Rubber, ADA Compliant.
    - c. Static Load Limit (ASTM F970): 2000 psi; Residual Indent  $\leq 0.005$  inch
  10. Warranty: Limited 15 Year Commercial Warranty

### **2.04 INSTALLATION MATERIALS**

- A. Trowelable Leveling and Patching Compounds: Latex-modified, portland cement-based, or blended hydraulic-cement-based formulation provided or approved by the manufacturer for applications indicated.
- B. Adhesives: Water-resistant type recommended by the manufacturer to suit floor covering and substrate conditions indicated.
  1. Adhesives shall have a VOC content of not more than 50 g/L when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- C. Subfloor Filler: White premix latex; type recommended by the adhesive material manufacturer.
- D. Primers, Adhesives, and Seam Sealer: Waterproof; types recommended by the flooring manufacturer.
- E. Edge Protection: Refer to Section 09 65 13.
- F. Sealer and Wax: Types recommended by the flooring manufacturer.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Verify substrate conditions are acceptable for product installation in accordance with manufacturer's instructions (i.e. moisture tests, bond test, pH test, etc.).
- B. Verify that surfaces are flat to tolerances acceptable to the flooring manufacturer, free of cracks that might telegraph through the flooring, clean, dry, and free of curing compounds, surface hardeners, and other chemicals that might interfere with the bonding of flooring to the substrate.

#### **3.02 PREPARATION**

- A. Subfloor Cleaning: The surface shall be free of dust, solvents, varnish, paint, wax, oil, grease, sealers, release agents, curing compounds, residual adhesive, adhesive removers, and other foreign materials that might affect the adhesion of resilient flooring to the concrete or cause a discoloration of the flooring from below.
- B. Subfloor Moisture, Relative Humidity, and pH Testing: Refer to Section 09 05 61
- C. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound and remove bumps and ridges to produce a uniform and smooth substrate.
- D. Do not install floor coverings until they are the same temperature as the space where they are to be installed.
- E. Sweep and vacuum clean substrates to be covered by floor coverings immediately before installation.

#### **3.03 INSTALLATION, GENERAL**

- A. Install flooring wall to wall before the installation of floor-set cabinets, casework, furniture, equipment, movable partitions, etc. Extend flooring into toe spaces, door recesses, closets, and similar openings as shown on the drawings.
- B. Scribe, cut, and fit to permanent fixtures, columns, walls, partitions, pipes, outlets, and built-in furniture and cabinets.
- C. Install flooring with adhesives, tools, and procedures in strict accordance with the manufacturer's written instructions. Observe the recommended adhesive trowel notching, open times, and working times.
- D. Adhere floor coverings to substrates using a full spread of adhesive applied to the substrate to produce a completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.
  - 1. Fit joints and butt seams tightly.
  - 2. Set flooring in place, press with a heavy roller to attain full adhesion.
- E. Where the type of floor finish, pattern, or color is different on opposite sides of the door, terminate flooring under the centerline of the door.
- F. Install flooring on recessed floor access covers, maintaining floor pattern.
- G. At movable partitions, install flooring under partitions without interrupting floor patterns.

#### **3.04 INSTALLATION OF RESILIENT SHEET FLOORING**

- A. Lay flooring with joints and seams parallel to longer room dimensions, to produce minimum number of seams. Layout seams to avoid widths less than 1/3 of roll width; match patterns at seams.
- B. Seams are prohibited in bathrooms, kitchens, toilet rooms, and custodial closets.
- C. Seams:
  - 1. Heat-Welded Seams: Comply with ASTM F 1516. Rout joints and use a welding bead to permanently fuse sections into a seamless floor covering. Prepare, weld, and finish seams to produce surfaces flush with adjoining floor covering surfaces.

### **3.05 INSTALLATION OF RESILIENT TILE FLOORING**

- A. Set resilient tile flooring in place in accordance with the manufacturer's instructions.
  - 1. Installation Pattern: As indicated on the Drawings.
- B. Layout floor tiles from center mark established with principal walls, discounting minor offsets, so tiles at opposite edges of the room are of equal width. Adjust as necessary to avoid using cut widths that equal less than one-half tile at the perimeter.

### **3.06 CLEANING**

- A. Comply with manufacturer's written instructions for cleaning of installed floor coverings.
  - 1. Remove adhesive and other blemishes from floor covering surfaces.
  - 2. Sweep and vacuum floor coverings thoroughly.
  - 3. Damp-mop floor coverings to remove marks and soil.
- B. Sealers and Finish Coats: Remove soil, visible adhesive, and surface blemishes from resilient terrazzo floor tile surfaces before applying liquid cleaners, sealers, and finish products.
  - 1. Sealer: Apply two base coats of liquid sealer.

### **3.07 PROTECTION**

- A. Comply with manufacturer's written instructions for the protection of installed floor coverings.
- B. Prohibit traffic on resilient flooring for 48 hours after installation.
- C. Protect floor coverings from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during the remainder of the construction period.
- D. Joint Sealant: Apply sealant around columns, at door frames, and other joints and penetrations.
- E. Cover floor coverings until Substantial Completion.

**END OF SECTION**

**SECTION 09 65 13  
RESILIENT BASE AND ACCESSORIES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Resilient wall base
- B. Resilient finishing accessories

**1.02 RELATED REQUIREMENTS**

- A. Section 03 30 00 - Cast-in-Place Concrete
- B. Section 09 21 16 - Gypsum Board Assemblies

**1.03 ACTION SUBMITTALS**

- A. Product Data: For each type of product indicated.
- B. Samples for Initial Selection: For each type of product indicated.
- C. Samples for Verification: For each type of product indicated, in manufacturer's standard-size Samples but not less than 12-inches (300 mm) long, of each resilient product color, texture, and pattern required.
- D. Product Schedule: For resilient products. Use the same designations indicated on Drawings.

**1.04 QUALITY ASSURANCE**

- A. Fire-Test-Response Characteristics: As determined by testing identical products according to ASTM E648 or NFPA 253 by a qualified testing agency.
  - 1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.

**1.05 DELIVERY, STORAGE, AND HANDLING**

- A. Store resilient products and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within the range recommended by the manufacturer, but not less than 50 deg F (10 deg C) or more than 90 deg F (32 deg C).

**1.06 PROJECT CONDITIONS**

- A. Maintain ambient temperatures within the range recommended by the manufacturer, but not less than 65 deg F or more than 95 deg F, in spaces to receive resilient products for 48 hours before installation, uring installation, and 48 hours after installation.
- B. Install resilient products after other finishing operations, including painting, have been completed.

**1.07 EXTRA MATERIALS**

- A. Deliver extra resilient base units for the Owner's use in maintenance. Label and store as directed by the Owner including codes used on the Drawings. Do not deliver to the Project site until the Owner is prepared to receive and store maintenance materials.
  - 1. Furnish not less than 10 linear feet for every 500 linear feet, or fraction thereof, of each type, color, pattern, and size of the resilient product installed.

**1.08 WARRANTY**

- A. Manufacturer Warranty: The manufacturer shall warrant the products specified in this Section against material defects or defects in the manufacturing for 2-years from the Date of Substantial Completion.
- B. Installation Warranty: The installing subcontractor shall warrant the installation to be free of defects in material and workmanship for one (1) year from the date of Substantial Completion.

**PART 2 PRODUCTS**

**2.01 MANUFACTURER**

- A. Specified Manufacturer: Mannington.
  - 1. Substitutions No substitutions will be considered or accepted.

## 2.02 MATERIAL

- A. Rubber Wall Base and Accessories: Meet or exceed the requirements of ASTM F1861, Type TS (Thermoset) rubber formulations, Group 1 (solid, homogeneous).
  - 1. Construction: 100% vulcanized homogenous rubber compound comprised of a premium blend and SBR rubber materials.
  - 2. Performance Criteria:
    - a. Flame Spread / Smoke Density (ASTM E84): Class B, Smoke <450
    - b. Flammability / Critical Radiant Flux (ASTM E648): Class I
    - c. Flexibility (ASTM F137): Passes

## 2.03 RESILIENT BASE

- A. Resilient Base, designated in the Drawings as FinishType RB- #
  - 1. Refer to the "Interior Finish Legend" for pertinent information on this Finish Type, including manufacturer, model/pattern, color, size, and other information
- B. Type RB-1:
  - 1. Manufacturer: Mannington
  - 2. Product: Burkebase, Type TP
  - 3. Thickness: 1/8 inch
  - 4. Height: 4 inches
  - 5. Profile: Toe
  - 6. Length: 100-foot coils or 25-foot/4-inch pieces
  - 7. Outside Corners: Factory pre-formed corners
  - 8. Inside Corners: Mitered or coped
  - 9. Adhesive: MR-101
  - 10. Testing:
    - a. Flooring Radiant Panel (ASTM E648): Passes - Class I;  $\geq 0.45$  watts/cm<sup>2</sup>
    - b. Smoke Density (ASTM E662): Passes - < 450
  - 11. Warranty: 5-year Limited Warranty
- C. Type RB-2:
  - 1. Manufacturer: Mannington
  - 2. Product: Edge Effects Sculptured Wall Base
    - a. Model: Etched
    - b. Color:
  - 3. Classification: ASTM F1861 Type TP, Group 1
  - 4. Finish: Matte
  - 5. Thickness: 1/4 inch
  - 6. Height: 6 inches
  - 7. Profile: Toeless
  - 8. Length: Per Manufacturer
  - 9. Outside Corners: Factory pre-formed corners
  - 10. Inside Corners: Mitered or coped
  - 11. Adhesive: MR101 Acrylic
  - 12. Testing:
    - a. Flooring Radiant Panel (ASTM E648): Passes - Class I;  $\geq 0.45$  watts/cm<sup>2</sup>
    - b. Smoke Density (ASTM E662): Passes - < 450
    - c. Chemical Resistance (ASTM F925): Passes
  - 13. Warranty: 5-year Limited Warranty

## 2.04 FINISHING ACCESSORIES, VINYL

- A. Vinyl Finishing Accessories, designated on the Drawings as Finish Type TRS- #.
  - 1. Refer to the "Interior Finish Legend" for pertinent information on this Finish Type, including manufacturer, model/pattern, color, size, and other information
- B. Accessory Types: Trims, transitions, reducers, adaptors, t-moldings, cove caps, thresholds, nosings, and other accessories as indicated on the Drawings.

- C. Composition: Vinyl; Homogeneous composition of polyvinyl chloride (PVC), high-quality additives, and colorants.
- D. Performance Requirements:
  - 1. Flame Spread / Smoke Density (ASTM E84): Class B; Smoke Index: <450.
  - 2. Critical Radiant Flux (ASTM E648): Class I.
  - 3. Hardness: ASTM D 2240: Not less than 85 Shore A
  - 4. Abrasion Resistance (ASTM D 3389): 0.22 mg/cycle
  - 5. Slip Resistance (ASTM D 2047): Exceeds Federal Standards and ADA recommendations for flat surfaces.
  - 6. Warranty: 2-year limited.
- E. TYPES
- F. Type TRS-#: Transition Strip:
- G. Refer to the "Interior Finish Legend" for pertinent information on this Finish Type, including manufacturer, model/pattern, color, size, and other information

## **2.05 INSTALLATION MATERIALS**

- A. Trowelable Leveling and Patching Compounds: Latex-modified, portland cement-based, or blended hydraulic-cement-based formulation provided or approved by the manufacturer for applications indicated.
- B. Adhesives: Water-resistant type recommended by the manufacturer to suit resilient products and substrate conditions indicated.
  - 1. Adhesives shall have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

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

### **3.02 PREPARATION**

- A. Prepare substrates according to the manufacturer's written instructions to ensure the adhesion of resilient products.
- B. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound and remove bumps and ridges to produce a uniform and smooth substrate.
- C. Do not install resilient products until they are the same temperature as the space they are to be installed.
  - 1. Move resilient products and installation materials into spaces where they will be installed at least 48 hours in advance of installation.
- D. Sweep and vacuum clean substrates to be covered by resilient products immediately before installation.

### **3.03 RESILIENT BASE INSTALLATION**

- A. Comply with manufacturer's written instructions for installing resilient base.
- B. Apply resilient base to walls, columns, pilasters, casework, and cabinets in toe spaces, and other permanent fixtures in rooms and areas where the base is required.
- C. Install resilient base in lengths as long as practicable without gaps at seams and with tops of adjacent pieces aligned.
- D. Tightly adhere resilient base to substrate throughout the length of each piece, with base in continuous contact with horizontal and vertical substrates.

- E. Do not stretch the resilient base during installation.
- F. Preformed Corners: Install preformed corners before installing straight pieces.
- G. Job-Formed Corners:
  - 1. Outside Corners: Use straight pieces of maximum lengths possible. Form without producing discoloration (whitening) at bends.
  - 2. Inside Corners: Use straight pieces of maximum lengths possible.

#### **3.04 RESILIENT ACCESSORY INSTALLATION**

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

#### **3.05 CLEANING AND PROTECTION**

- A. Comply with manufacturer's written instructions for cleaning and protection of resilient products.
- B. Perform the following operations immediately after completing resilient product installation:
  - 1. Remove adhesive and other blemishes from exposed surfaces.
  - 2. Sweep and vacuum surfaces thoroughly.
- C. Protect resilient products from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during the remainder of the construction period.

**END OF SECTION**

**SECTION 09 68 13  
TILE CARPETING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Modular Walk-Off Carpet Tile
- B. Modular Carpet Tile
- C. Accessories.

**1.02 RELATED REQUIREMENTS**

- A. Section 03 30 00 - Cast-in-Place Concrete
- B. Section 09 05 61 - Common Work Results for Flooring Preparation
- C. Section 09 65 13 - Resilient Base and Accessories

**1.03 REFERENCE STANDARDS**

- A. ASTM D2859 - Standard Test Method for Ignition Characteristics of Finished Textile Floor Covering Materials.
- B. ASTM E648 - Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source.
- C. ASTM E662 - Standard Test Method for Specific Optical Density of Smoke Generated by Solid Materials.
- D. CRI (GL) - Green Label Testing Program - Certified Products.

**1.04 SUBMITTALS**

- A. Submit under the provisions of Section 01 33 00.
- B. Product Data: Provide data on specified products, describing physical and performance characteristics; sizes, patterns, colors available, and method of installation.
- C. Manufacturer's Installation Instructions: Indicate special procedures.
- D. Maintenance Data: Include maintenance procedures, recommended maintenance materials, and a suggested schedule for cleaning.

**1.05 MAINTENANCE MATERIALS**

- A. Furnish the following for the Owner's use in the maintenance of the project:
  - 1. Carpet Tile: For each type specified, provide full-size tiles in unopened boxes equal to but not less than 5-percent of the quantity installed.

**1.06 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing specified carpet with a minimum of three years of documented experience.
- B. Installer Qualifications: Company specializing in installing carpet with a minimum of three years documented experience.
- C. Fire-Test-Response Ratings: Where indicated, provide carpet tile identical to those of assemblies tested for fire response according to NFPA 253 by a qualified testing agency.

**1.07 FIELD CONDITIONS**

- A. Maintain minimum 70 degrees F (21 degrees C) ambient temperature 24 hours before, during, and 24 hours after installation.
- B. Ventilate installation area during installation and for 72 hours after installation.
- C. Comply with CRI 104 for temperature, humidity, and ventilation limitations.
- D. Do not install carpet tiles over concrete slabs until slabs have cured and are sufficiently dry to bond with adhesive and concrete slabs have pH range recommended by the carpet tile manufacturer.

## 1.08 WARRANTY

- A. Special Manufacturer Warranty: The manufacturer agrees to repair or replace components of carpet tile installation that fail in materials or workmanship within ten (10) years from the Date of Substantial Completion.
  - 1. Warranty does not include deterioration or failure of carpet tile due to unusual traffic, failure of substrate, vandalism, or abuse.
  - 2. Failures include, but are not limited to, more than 10 percent edge raveling, snags, runs, dimensional stability, excess static discharge, loss of tuft bind strength, loss of face fiber, and delamination.

## PART 2 PRODUCTS

### 2.01 MANUFACTURER

- A. Owner Standard: The products specified in this Section are restricted to those of manufacturers named for each product type.
  - 1. Product substitutions: Not permitted.

### 2.02 WALK-OFF CARPET TILE

- A. Walk-Off Modular Carpet, designated in the Drawings as Finish Type WOC- #.
  - 1. Refer to the "Interior Finish Legend" for pertinent information on this Finish Type, including manufacturer, model/pattern, color, size, and other information.
- B. Type WOC-1:
  - 1. Manufacturer: Refer to Drawings
  - 2. Collection/ Style: Refer to Drawings
    - a. Size: 24" X 24"
    - b. Primary Backing: Standard
    - c. Dye Method: Solution dyed.
    - d. Color: As scheduled
    - e. Format: Square
  - 3. Installation Method: Monolithic
  - 4. Warranty: Limited Lifetime Commercial Warranty
  - 5. Performance Criteria:
    - a. Radiant Panel (ASTM E648): Class I.
    - b. Smoke Generation (ASTM E662): Less than 450.
    - c. Electrostatic Propensity: less than 3.5 kV.
    - d. Surface Flammability Ignition: Pass ASTM D2859 (the "pill test").

### 2.03 MODULAR CARPET TILE

- A. Modular Carpet Tile, designated in the Drawings as Finish Type CPT- #.
  - 1. Refer to the "Interior Finish Legend" for pertinent information on this Finish Type, including manufacturer, model/pattern, color, size, and other related information.
- B. Type CPT-1:
  - 1. Manufacturer: Refer to Drawings.
  - 2. Collection/ Style: Refer to Drawings.
    - a. Size: 24 inches by 24 inches
    - b. Primary Backing: Manufacturer standard.
    - c. Color: Refer to Drawings.
    - d. Format: Plank
- C. Installation Method: Refer to Drawings
- D. Warranty: Limited Lifetime Commercial Warranty
- E. Performance Criteria:
  - 1. Radiant Panel (ASTM E648): Class I.
  - 2. Smoke Generation (ASTM E662): Less than 450.
  - 3. Electrostatic Propensity: less than 3.5 kv.

4. Surface Flammability Ignition: Pass ASTM D2859 (the "pill test").

#### **2.04 ACCESSORIES**

- A. Sub-Floor Filler: Type recommended by the carpet manufacturer.
- B. Adhesives:
  1. Compatible with materials being adhered to; maximum VOC content of 50 g/L; CRI (GL) certified; in lieu of labeled product, independent test report showing compliance is acceptable.
- C. Metal Edge Protection: Refer to Section 09 30 50.
  1. Provide transition/reducing strips tapered to meet abutting materials as indicated in the drawings.
- D. Carpet Adhesive: Recommended by carpet manufacturer; releasable type.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Verify that substrate surfaces are smooth and flat within the tolerances specified for that type of work and are ready to receive carpet.
- B. Verify that sub-floor surfaces are dust-free and free of substances that could impair the bonding of adhesives to substrate surfaces.
- C. Verify the substrates are dry enough and ready for flooring installation by testing for moisture and alkalinity (pH).
  1. Test in accordance with Section 09 05 61 - Common Work Results for Flooring Preparation.

#### **3.02 PREPARATION**

- A. Prepare floor substrates for installation of flooring in accordance with Section 09 05 61 - Common Work Results for Flooring Preparation.
- B. Remove sub-floor ridges and bumps. Fill minor or local low spots, cracks, joints, holes, and other defects with sub-floor filler.
- C. Apply, trowel, and float filler to achieve a smooth, flat, hard surface. Prohibit traffic until the filler is cured.
- D. Clean substrate.

#### **3.03 CARPET TILE INSTALLATION**

- A. Apply contact adhesive to the floor uniformly at a rate recommended by the manufacturer. After sufficient open time, press carpet into adhesive.
- B. Roll with appropriate roller for complete contact of adhesive to carpet backing.
- C. Trim carpet neatly at walls and around interruptions.

#### **3.04 CLEANING**

- A. Remove excess adhesive from floor and wall surfaces without damage.
- B. Clean and vacuum carpet surfaces.

**END OF SECTION**

**SECTION 09 90 00  
PAINTING AND COATING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Surface preparation.
- B. Interior painting and coating systems.
- C. Exterior painting and coating systems.

**1.02 RELATED REQUIREMENTS**

- A. Section 05 50 00 - Metal Fabrications
- B. Section 07 92 00 - Joint Sealants
- C. Section 09 21 16 - Gypsum Board Assemblies
- D. Division 21 - Fire Protection
- E. Division 22 - Plumbing
- F. Division 26 - Electrical

**1.03 REFERENCE STANDARDS**

- A. SSPC-SP 6 - Commercial Blast Cleaning.

**1.04 SUBMITTALS**

- A. See Section 01 33 00 - Submittal Procedures
- B. Product Data: Provide complete list of products to be used, with the following information for each:
  - 1. Product characteristics.
  - 2. Surface preparation instructions and recommendations.
  - 3. Primer requirements and finish specification.
  - 4. Storage and handling requirements and recommendations.
  - 5. Application methods.
  - 6. Clean-up information.
- C. Samples: Submit two (2) paper 'drawdown samples', 8-1/2 by 11 inches (216 by 279 mm) in size, illustrating the range of colors available for each finishing product specified.
  - 1. Where sheen is specified, submit samples in only that sheen.
  - 2. Where sheen is not specified, submit each color in each sheen available.
  - 3. Allow 30 days for the approval process, after receipt of complete samples by the Architect.
    - a. Paint color submittals will not be considered until color submittals for major materials not to be painted, such as factory-finished metals, have been approved.
- D. Certification: By manufacturer that paints and finishes comply with VOC limits specified.
- E. Applicator's qualification statement.
- F. Maintenance Data: Submit coating maintenance manual including finish schedule showing where each product/color/finish was used, product technical datasheets, safety data sheets (SDS), care and cleaning instructions, touch-up procedures, repair of painted and finished surfaces, and color samples of each color and finish used.

**1.05 CLOSEOUT SUBMITTALS**

- A. Coating Maintenance Manual: Provide coating maintenance manual including area summary with finish schedule, area detail designating the location where each product/color/finish was used, product data pages, material safety data sheets, care and cleaning instructions, touch-up procedures, and color samples of each color and finish used.

**1.06 EXTRA MATERIALS**

- A. Deliver extra paint material/s for the Owner's use in maintenance. Label and store as directed by the Owner, including codes used on the Drawings. Do not deliver to the Project site until the

Owner is prepared to receive and store maintenance materials

- B. Extra Paint and Finish Materials: 1 gallon (4 L) of each color; from the same product run, store at a location where directed by the Owner.
  - 1. Label each container with color in addition to the manufacturer's label.
  - 2. Include one copy of the Interior Finish Schedule with the paint material.
  - 3. Include MSDS information for all materials delivered.

#### **1.07 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified, with a minimum ten years documented experience.
- B. Applicator Qualifications: Company specializing in performing the type of work specified with a minimum of 5-years experience and approved by the manufacturer.
- C. Do not paint prefinished items, concealed surfaces, finished metal surfaces, operating parts, and labels unless indicated.
- D. Coordination:
  - 1. Provide finish coats that are compatible with the prime coats actually used.
  - 2. Review other Sections of these Specifications as required, verifying the primer coats to be used and assuring compatibility of the total coating system for the various substrate.
  - 3. Furnish information on the characteristics of the specific finish materials to assure that compatible primer coats are used.
  - 4. Provide barrier coats over non-compatible primers, or remove the primer and re-prime as required.

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

- A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.
- B. Container Label: Include manufacturer's name, type of paint, product name, product code, color designation, VOC content, batch date, environmental handling, surface preparation, application, and use instructions.
- C. Paint Materials: Store at a minimum of 45 degrees F (7 degrees C) and a maximum of 90 degrees F (32 degrees C), in ventilated area, and as required by manufacturer's instructions.
- D. Handling: Maintain a clean, dry storage area to prevent contamination or damage to materials.

#### **1.09 MATERIAL DISPOSAL**

- A. Never pour leftover coating down any sink or drain. Use up material on the job or seal can and store it safely for future use.
- B. Do not incinerate closed containers.
- C. For specific disposal or recycle guidelines, contact the local waste management agency or district. Recycle whenever possible.

#### **1.10 FIELD CONDITIONS**

- A. Do not apply materials when environmental conditions (temperature, humidity, and ventilation) are outside the ranges required by the manufacturer.
- B. Follow manufacturer's recommended procedures for producing the best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.
- C. Provide a lighting level of 80 ft candles (860 lx) measured mid-height at the substrate surface.

#### **1.11 WARRANTY**

- A. Manufacturer Warranty: The manufacturer shall warrant the products specified in this Section against material defects or defects in manufacturing, for a period of one (1) year from the Date of Substantial Completion.
- B. The painting contractor shall furnish a guarantee to repair or replace any or all work which is found to be defective in workmanship or materials, together with any adjacent work disturbed by rectifying the defective work, for two (2) years from the Date of Substantial Completion.

## **PART 2 - PRODUCTS**

### **2.01 MANUFACTURERS**

- A. Basis-of-Design: Products from the Sherwin-Williams Paint Company are specified to establish the significant qualities related to type, function, in-service performance, physical properties, and appearance.
  - 1. Other acceptable manufacturers with equivalent products to the specified manufacturer shall include:
    - a. Benjamin Moore
    - b. PPG Paints
  - 2. Products of other manufacturers with equivalent products to the specified manufacturer will be considered following the "or equal" provision specified in Section 01 60 00 – Product Requirements.
    - a. Product Substitutions: Comply with the requirements specified in Section 01 25 00 - Substitution Procedures.

### **2.02 PAINTINGS AND COATINGS, GENERAL**

- A. When required, mix coatings to correct consistency in accordance with manufacturer's instructions before application.
- B. Volatile Organic Compound (VOC) Content:
  - 1. Provide paints and finishes that comply with the most stringent requirements specified in the following:
    - a. 40 CFR 59, Subpart D--National Volatile Organic Compound Emission Standards for Architectural Coatings.
- C. Accessory Materials: Provide primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials as required for final completion of painted surfaces.

### **2.03 MIXING AND TINTING**

- A. Paints and Finishes: Ready-mixed, unless intended to be a field-catalyzed paint.
- B. Provide paints and finishes of a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating, with good flow and brushing properties, and capable of drying or curing free of streaks or sags.
- C. Unless noted otherwise, a typical paint system consists of:
  - 1. One (1) Coat of Primer/ Filler
  - 2. One (1) Intermediate Coat
  - 3. One (1) Top Coat
- D. Tinting of Paint Finishes: Tint each coat as follows:
  - 1. Primer Coat: Do NOT tint primer coat.
  - 2. Intermediate Coat/s: Tint intermediate coat/s as the base color, applied to match the topcoat sheen.
  - 3. Top Coat: Final finish coat shall be applied as the base color with the specified sheen.
- E. Do not reduce, thin, or dilute paint or finishes or add materials unless such procedure is specifically described in the manufacturer's product instructions.

### **2.04 PAINT FINISHES**

- A. Paint Finishes are designated in the Drawings as Finish Type PT-1
  - 1. Refer to the "Interior Finish Legend" for paint color designations, names, reference numbers, and sheen callouts.

### **2.05 EXTERIOR PAINT SYSTEMS**

- A. Masonry: Concrete masonry units (CMU) as indicated in the drawings:
  - 1. Latex Systems:
    - a. Semi-Gloss Finish:
      - 1) 1st Coat: Sherwin-Williams PrepRite Block Filler, B25W25: [www.sherwin-williams.com/#sle](http://www.sherwin-williams.com/#sle).

- 2) 2nd and 3rd Coat: Sherwin-Williams Pro Industrial Acrylic Semi-Gloss, B66-650 series: [www.sherwin-williams.com/#sle](http://www.sherwin-williams.com/#sle).
- B. Exterior Ferrous and Non-Ferrous (Galvanized) Metal: Provide the following finish systems over exterior metal substrates, if indicated in the drawings:
1. Pre-Catalyzed Waterbased Epoxy System:
    - a. Uses: Metal doors, metal door frames, and miscellaneous metals, as indicated in the drawings:
    - b. Semi-Gloss Finish:
      - 1) 1st Coat: Sherwin-Williams Pro Industrial™ Pro-Cryl® Universal Primer, B66-1310 Series
        - (a) Galvanized Metal Surfaces: Chemically treat with a compound designed for this purpose, in accordance with the manufacturer's directions before applying the first coat of primer.
        - (b) Shop Primed Surfaces: Except for "touch-up", the prime coat may be omitted.
      - 2) 2nd and 3rd Coat: Sherwin-Williams Pro Industrial™ Pre-Catalyzed Waterbased Epoxy Semi-Gloss, K46-1150 Series

## 2.06 INTERIOR PAINT SYSTEMS

- A. Ferrous Metal Substrates: Includes, but is not limited to, interior metal doors, door frames, and miscellaneous metals, as indicated in the drawings:
1. Pre-Catalyzed Water-Based Epoxy Systems:
    - a. Uses: Interior metal doors, door frames, and miscellaneous metals
    - b. Semi-Gloss Finish:
      - 1) Primer: Pro Industrial™ Pro-Cryl® Universal Primer, B66-310 Series
        - (a) Shop Primed Surfaces: Except for "touch-up," prime coat may be omitted. Verify compatibility and application of finish coat over shop primer with the paint manufacturer.
      - 2) Intermediate Coat: Pro Industrial™ Pre-Catalyzed Water-Based Epoxy Semi-Gloss, K46 Series
      - 3) Top Coat: Pro Industrial™ Pre-Catalyzed Water-Based Epoxy Semi-Gloss, K46 Series
- B. Non-Ferrous (Galvanized) Metal Substrates:
1. Epoxy Systems, Water Based:
    - a. Semi-Gloss Finish:
      - 1) 1st Coat: Sherwin-Williams Pro Industrial Pro-Cryl Universal Primer, B66-1310 Series
        - (a) 5 mils wet, 2 mils dry per coat.
      - 2) 2nd and 3rd Coat: Sherwin-Williams Pro Industrial Pre-Catalyzed Waterbased Epoxy, K46 Series
        - (a) 4 mils wet, 1.5 mils dry per coat.
- C. Gypsum Board (Drywall): Walls and ceilings as indicated on the drawings
1. Latex Systems:
    - a. Eg-Shel Finish (walls on):
      - 1) 1st Coat: Sherwin-Williams ProMar 200 Zero VOC Interior Latex Primer, B28W2600
      - 2) 2nd and 3rd Coat: Sherwin-Williams ProMar 200 Zero VOC Eg-Shel, B20-2600 Series
    - b. Flat Finish (ceilings and soffits only):
      - 1) 1st Coat: Sherwin-Williams ProMar 200 Zero VOC Interior Latex Primer, B28W2600
      - 2) 2nd and 3rd Coat: Sherwin-Williams ProMar 200 Zero VOC Latex Flat, B30-2600 Series
  2. Epoxy Systems, Water Based:
    - a. Eg-Shel/Low Luster Finish (walls):

- 1) 1st Coat: Sherwin-Williams ProMar 200 Zero VOC Interior Latex Primer, B28W2600
    - (a) 4 mils wet, 1.5 mils dry per coat.
  - 2) 2nd and 3rd Coat: Sherwin-Williams Pro Industrial Pre-Catalyzed Waterbased Epoxy, K45 Series
    - (a) 4 mils wet, 1.5 mils dry per coat.
- D. Concrete Floors: Light-Duty Industrial Floors, non-vehicular.
1. Acrylic Systems:
    - a. Semi-Gloss Finish:
      - 1) 1st Coat: ArmorSeal® Tread-Plex™ Water-Based Acrylic Primer, B90 Series
      - 2) 2nd Coat: ArmorSeal® Tread-Plex™, B90 Series
      - 3) 3rd Coat: ArmorSeal® Tread-Plex™, B90 Series

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially effect proper application.

#### **3.02 PREPARATION**

- A. Clean surfaces thoroughly and correct defects prior to application.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- C. Remove mildew from impervious surfaces by scrubbing with a solution of tetra-sodium phosphate and bleach. Rinse with clean water and allow the surface to dry.
- D. Remove or mask surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, before preparing surfaces or finishing.
- E. Seal surfaces that might cause bleed through or staining of topcoat.
- F. Ferrous Metal:
  1. Solvent clean according to SSPC-SP 1.
  2. Remove rust, loose mill scale, and other foreign substances using methods recommended by paint manufacturer and blast cleaning according to SSPC-SP 6. Protect from corrosion until coated.

#### **3.03 APPLICATION**

- A. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.
- B. Apply products in accordance with manufacturer's written instructions.
- C. Apply coatings at spread rate required to achieve manufacturer's recommended dry film thickness.
- D. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Paint surfaces behind permanently fixed equipment or furniture with prime coat only.
- E. Paint front and backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.
- F. Do not paint over labels of independent testing agencies, or equipment name, identification, performance rating, or nomenclature plates.
- G. Primers specified in painting schedules may be omitted on items that are factory-primed or factory finished if acceptable to topcoat manufacturers.
- H. Where adjacent sealant is to be painted, do not apply finish coats until the sealant is applied.
- I. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before the next coat is applied.
- J. Apply each coat to a uniform appearance in thicknesses specified by the manufacturer.

- K. Dark Colors and Deep Clear Colors: Regardless of the number of coats specified, apply as many coats as necessary for complete hide.
- L. Prime surfaces to receive wall coverings.

### **3.04 FIELD QUALITY CONTROL**

- A. Dry Film Thickness Testing: The Owner may engage the services of a qualified testing and inspecting agency to inspect and test paint for dry film thickness.
  - 1. The contractor shall touch up and restore painted surfaces damaged by testing.
  - 2. If test results show that the dry film thickness of applied paint does not comply with the paint manufacturer's written recommendations, the Contractor shall pay for testing and apply additional coats as needed to provide dry film thickness that complies with the paint manufacturer's written recommendations.

### **3.05 DEFECTIVE WORK**

- A. Painted interior surfaces shall be considered to lack uniformity and soundness if any of the following defects are apparent upon inspection:
  - 1. Brush/roller marks, streaks, laps, runs, sags, drips, heavy stippling, hiding or shadowing by inefficient application methods, skipped or missed areas, and foreign materials in paint coatings.
  - 2. evidence of poor coverage at rivet heads, plate edges, lap joints, crevices, pockets, corners, and re-entrant angles.
  - 3. Damage due to touching before paint is sufficiently dry or any other contributory cause.
  - 4. Damage due to application on moist surfaces or caused by inadequate protection from the weather.
  - 5. Damage and/or contamination of paint due to blown contaminants (dust, spray paint, etc.).
- B. Painted surfaces shall be considered unacceptable if any of the following are evident under daylight conditions for exterior surfaces:
  - 1. Visible defects are evident on vertical surfaces when viewed at normal viewing angles from a distance of not less than 1000 mm (39").
  - 2. Visible defects are evident on horizontal surfaces when viewed at normal viewing angles from a distance of not less than 1000 mm (39").
  - 3. Visible defects are evident on the ceiling, soffit, and other overhead surfaces when viewed at normal viewing angles.
  - 4. When the final coat on any surface exhibits a lack of uniformity of color, sheen, texture, and hiding across the full surface area.

### **3.06 REPAIR**

- A. After construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

### **3.07 CLEANING**

- A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.
- B. Clean surfaces immediately of overspray, splatter, and excess material.
- C. After coating has cured, clean and replace finish hardware, fixtures, and fittings previously removed.

### **3.08 PROTECTION**

- A. Provide "Wet Paint" signs to protect newly painted finishes.
- B. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from the Project site.
- C. Protect work of other trades against damage from the painting work by providing surface-applied protection before preparation and painting. After completing painting operations, remove temporary protective wrappings.
- D. Protect finished coatings from damage until completion of project.

E. Touch-up damaged finishes after Substantial Completion.

**END OF SECTION**

**SECTION 10 21 13.16**  
**PLASTIC-LAMINATE-CLAD TOILET COMPARTMENTS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Plastic laminate toilet compartments.
- B. Urinal screens.

**1.02 RELATED REQUIREMENTS**

- A. Section 06 10 00 - Rough Carpentry: Blocking and supports.

**1.03 REFERENCE STANDARDS**

- A. ANSI A208.1 - American National Standard for Particleboard.
- B. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar.
- C. NEMA LD 3 - High-Pressure Decorative Laminates.
- D. PS 1 - Structural Plywood.

**1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate partition plan, elevation views, dimensions, details of wall supports, door swings.
- C. Product Data: Provide data on panel construction, hardware, and accessories.

**PART 2 PRODUCTS**

**2.01 MANUFACTURERS**

- A. Plastic Laminate Toilet Compartments:
  - 1. ASI Accurate Partitions; [ ]: [www.asi-accuratepartitions.com/#sle](http://www.asi-accuratepartitions.com/#sle).
  - 2. ASI Global Partitions; [ ]: [www.asi-globalpartitions.com/#sle](http://www.asi-globalpartitions.com/#sle).
  - 3. General Partitions Mfg. Corp; [ ]: [www.generalpartitions.com/#sle](http://www.generalpartitions.com/#sle).
  - 4. Substitutions: Section 01 60 00 - Product Requirements.

**2.02 MATERIALS**

- A. Particleboard for Core: ANSI A208.1 composed of wood chips, sawdust or flakes, made with waterproof resin binder; of grade to suit application; sanded faces.
- B. Plastic Laminate: NEMA LD 3, HGS.

**2.03 COMPONENTS**

- A. Toilet Compartments: Plastic laminate finished, floor-mounted unbraced.
- B. Doors, Panels, and Pilasters: Plastic laminate adhesive and pressure bonded to faces and edges of particleboard core, with beveled corners and edges; edges of cut-outs sealed.
- C. Door and Panel Dimensions:
  - 1. Thickness: 1 inch (25 mm).
  - 2. Door Width: 24 inch (610 mm).
  - 3. Door Width for Handicapped Use: 36 inch (915 mm) , out-swinging.
  - 4. Height: 58 inch (1 473 mm).

**2.04 ACCESSORIES**

- A. Pilaster Shoes: Formed chromed steel with polished finish, 3 inches (75 mm) high, concealing floor fastenings.
- B. Pilaster Brackets: Polished stainless steel.
- C. Wall Brackets: Continuous type, polished stainless steel.
- D. Hardware: Polished stainless steel:

1. Pivot hinges, gravity type, adjustable for door close positioning; two per door.
2. Thumb turn door latch with exterior emergency access feature.
3. Door strike and keeper with rubber bumper; mounted on pilaster in alignment with door latch.
4. Coat hook with rubber bumper; one per compartment, mounted on door.
5. Provide door pull for outswinging doors.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

#### **3.02 INSTALLATION**

- A. Install partitions secure, rigid, plumb, and level in accordance with manufacturer's instructions.
- B. Maintain 3/8 to 1/2 inch (9 to 13 mm) space between wall and panels and between wall and end pilasters.
- C. Attach panel brackets securely to walls using anchor devices.
- D. Attach panels and pilasters to brackets. Locate head rail joints at pilaster center lines.

**END OF SECTION**

**SECTION 10 21 23  
CUBICLES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Cubicle curtains with a surface-mounted overhead tracking system.
- B. Shower curtains, rods, and rings.

**1.02 RELATED REQUIREMENTS**

- Section 06 10 00 - Rough Carpentry
- Section 09 51 00 - Acoustical Ceilings

**1.03 REFERENCES**

- A. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
- B. NFPA 701 - Standard Methods of Fire Tests for Flame Propagation of Textiles and Films.

**1.04 SUBMITTALS**

- A. Submit in conformance with the provisions of Section 01 33 00.
- B. Product Data: Provide data for curtain fabric, track and hardware.
- C. Shop Drawings: Indicate a reflected ceiling plan view of curtain track, hangers, and suspension points, attachment details, schedule of the curtain sizes.
- D. Samples: Submit two cubicle curtain fabric samples, 12 by 12 inch (300 by 300 mm) in size .
- E. Maintenance Data: Include recommended cleaning methods and materials and stain removal methods.

**1.05 DELIVERY, STORAGE, AND HANDLING**

- A. Environmental Limitations: Do not install cubicles until spaces are enclosed and weatherproof, wet work in spaces is complete and dry, work above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.
- B. Field Measurements: Where cubicles are indicated to fit other construction, verify dimensions of other construction by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the work.

**1.06 WARRANTY**

- A. Provide a copy of the manufacturer's standard warranty for each product specified.

**PART 2 PRODUCTS**

**2.01 MANUFACTURER**

- A. Owner Standard: The products specified in this Section are restricted to the specified manufacturers. Product substitutions are not permitted.
  - 1. Cubicle Curtain:
    - a. Specified Manufacturer: By Others.
    - b. Owner Furnished / Owner Installed (OFOI)
  - 2. Cubicle Curtain Track and Components:
    - a. Specified Manufacturer: InPro Corporation.
    - b. Contractor Furnished / Contractor Installed
  - 3. Shower Curtain:
    - a. Specified Manufacturer: InPro Corporation.
    - b. Contractor Furnished / Contractor Installed
  - 4. Shower Curtain Rod and Rings:
    - a. Specified Manufacturer: InPro Corporation.
    - b. Contractor Furnished / Contractor Installed

## 2.02 CUBICLE CURTAIN TRACKING SYSTEM

- A. Cubicle Curtain Track, designated in the Drawings as Finish Type CCT- #
  - 1. Refer to the "Interior Finish Legend" in the Drawings for pertinent information on this Finish Type, including manufacturer, model/pattern, color, size, and other related information
- B. Product: InPro Corporation; Whisper Cube, heavy-duty extruded rigid vinyl cubicle track
  - 1. Scope: Contractor Furnished / Contractor Installed (CFCI)
  - 2. Color: White
  - 3. Dimensions: 1.14 inches (29mm) height by 1.20 inches (30mm) width
  - 4. Bent sections: Provide factory bent track sections with one-foot radii to mate with straight track sections.
  - 5. Track Components:
    - a. Track Attachment: Provide appropriate attachment accessories as required for ceiling grid members.
      - 1) Flush Gridclip: Flush panel T-bar gridclip
    - b. Track Splice: Provide extruded aluminum splice, with white powder coat finish, to join track sections.
    - c. End Caps: Provide molded thermoplastic end caps for end of track section.
    - d. Wands: Provide wand to move curtain along the track.
    - e. Curtain Carriers: Provide carriers with non-binding nylon rollers to accurately fit track. Carriers to be fitted to curtain to prevent accidental curtain removal. 2.2 carriers per lineal foot of track length, plus one extra carrier.
    - f. Tie Backs: Provide curtain tie back to hold curtain back.

## 2.03 CUBICLE CURTAINS [ADDM-1]

- A. ~~Cubicle Curtains, designated in the Drawings as Finish Type CC- #~~
  - 1. ~~Refer to the "Interior Finish Legend" in the Drawings for pertinent information on this Finish Type, including manufacturer, model/pattern, color, size, and other related information~~
- B. ~~Scope: Contractor Furnished / Contractor Installed (CFCI)~~
- C. ~~Type CC-1:~~
  - 1. ~~Manufacturer: Maharam~~
  - 2. ~~Product: As scheduled.~~
    - a. ~~Color: As scheduled.~~
- D. ~~Physical Properties:~~
  - 1. ~~Content: 100% FR Polyester.~~
  - 2. ~~Backing: None~~
  - 3. ~~Open Mesh Cloth: Open weave to permit air circulation; flameproof material, manufacturer's standard color.~~
    - a. ~~Attachment of Curtain Fabric to Open Mesh Cloth: Manufacturer's standard sewn seam.~~
  - 4. ~~Fire Performance:~~
    - a. ~~Surface Burning Characteristics (ASTM E84): Flame spread index of 25, maximum; smoke developed index of 450, maximum; when tested in accordance with ASTM-E84.~~
- E. ~~Fabrication:~~
  - 1. ~~Curtain Width: Equal to track length from which curtain is hung plus 10 percent, but not less than 12 inches (300 mm).~~
  - 2. ~~Curtain Length: Equal to floor to ceiling height minus 2" from the finished ceiling at the top and 15 inches above the finished floor at the bottom.~~
  - 3. ~~Mesh Top: Include open mesh cloth at top 20 inches (508 mm) of the curtain for room air circulation, attached to curtain as specified above.~~

4. ~~Curtain Heading: Fabric band matching curtain panel with metal grommet holes for carriers spaced 6 inches (150 mm) on center.~~
5. ~~Seams and Hems:~~
  - a. ~~Top Hem: Not less than 1 inch (25.4 mm) and not more than 1-1/2 inches (38 mm) wide, triple thickness, reinforced with integral web, and double lockstitched.~~
  - b. ~~Bottom Hem: Not less than 1 inch (25.4 mm) and not more than 1-1/2 inches (38 mm) wide, double thickness, and double lock stitched. Lead weights included.~~
  - c. ~~Side Hems: Not less than 1/2 inch (13 mm) and not more than 1-1/4 inches (32 mm) wide, with triple turned edges, and single lock stitched.~~
  - d. ~~Vertical Seams: Not less than 1/2 inch (13 mm) wide, double turned, and double stitched.~~

#### 2.04 SHOWER CURTAINS

- A. Shower Curtain, designated in the Drawings as Finish Type SC- #
  1. Refer to the "Interior Finish Legend" in the Drawings for pertinent information on this Finish Type, including manufacturer, model/pattern, color, size, and other information
- B. Type SC-1
  1. Scope: Contractor Furnished / Contractor Installed (CFCI)
  2. Product: Inpro; Clickeze ® Shower Curtain
    - a. Curtain Material: Shield by Panaz antimicrobial fabric
      - 1) Non-woven: 100% flame retardant polyester modified with nano-molecular, anti-bacterial, and water repellent technologies
    - b. Pattern and Color: As scheduled
    - c. Curtain Fabrication:
      - 1) Curtain Width: Manufacture curtains of one piece, sized to 10% wider than the track length but no less than 1' (304.8mm) extra fullness. Width tolerance  $\pm 3$ ".
      - 2) Curtain Height: 80 inches. Shower curtains hang 1/2" (12.7mm) above the floor. Height tolerance  $\pm 1/2$ ".
      - 3) Curtain Heading: Include 4-ounce (113.4g) nickel-plated grommets, 6" (152.4mm) on center for carriers. Top hem to be triple-turned hem over nylon tape for rugged wear.
      - 4) Seams: Curtains are to be seamless when possible with sanitary "no scum" side and bottom edges. Sewing thread to be triple-ply twisted nylon.

#### 2.05 SHOWER CURTAIN RODS AND RINGS

- A. Shower Curtain Rod and Rings, designated in the Drawings as Finish Type SCR- #
  1. Refer to the "Interior Finish Legend" in the Drawings for pertinent information on this Finish Type, including manufacturer, model/pattern, color, size, and other information
- B. Type SCR-1:
  1. Scope: Contractor Furnished / Contractor Installed (CFCI)
  2. Product: InPro; Model #CE10075X Shower Curtain Rod
    - a. Length: As shown on drawings.
    - b. Rod Construction: Type 304 Stainless Steel Tube, 1 inch (25.4mm) diameter x .035 inch (.89mm) wall thickness (20 gauge). Finish – BS, Bright Stainless.
    - c. Flange Construction: .031 inch (.89mm) thick, type 304 stainless steel. Includes two 3/16 inch (4.8mm) diameter mounting holes with formed countersink for #10 Oval Head Screws(by others).
  3. Accessories:
    - a. Rings: InPro; Model #CE100800 Stainless Steel Slide Beads
      - 1) Height: 2-1/2 inches.
      - 2) Inside Diameter: 1-5/16 inches.
      - 3) Quantity: Coordinate with Owner provided shower curtains

**PART 3 EXECUTION**

**3.01 EXAMINATION**

- A. Verify that surfaces and supports above the ceiling are ready to receive work of this Section.

**3.02 INSTALLATION**

- A. Cubicle Curtains: By Owner. Coordinate installation with the Owner. **[ADDM-1]**
- B. Cubicle Curtain Track:
  - 1. Install curtain track to be secure, rigid, and true to ceiling line.
  - 2. Install end cap and stop device.
- C. Shower Curtains and Accessories:
  - 1. Install shower curtains, rods, and hooks per manufacturer recommendations.

**END OF SECTION**

**SECTION 10 26 13  
INTERIOR WALL PROTECTION**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Interior surface protection, including corner guards and wall protection sheets.

**1.02 RELATED REQUIREMENTS**

- Section 06 10 00 - Rough Carpentry
- Section 09 21 16 - Gypsum Board Assemblies

**1.03 REFERENCE STANDARDS**

- A. ASTM D256 - Standard Test Methods for Determining the Izod Pendulum Impact Resistance of Plastics.
- B. ASTM D635 - Standard Test Method for Rate of Burning and/or Extent and Time of Burning of Plastics in a Horizontal Position.
- C. ASTM D543 - Standard Practices for Evaluating the Resistance of Plastics to Chemical Reagents.
- D. ASTM G21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi.
- E. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials.

**1.04 ACTION SUBMITTALS**

- A. Product data and detailed specifications for each system component and installation accessory required, including installation methods for each type of substrate.
- B. Shop drawings showing locations, extent, and installation details of crash rails. Show methods of attachment to adjoining construction.
- C. Samples for verification purposes: Submit the following samples, as proposed for this work, for verification of color, texture, pattern, and end cap attachment and alignment:
  - 1. 12-inch (304.8-mm) long sample of each model specified including end cap.
- D. Product test reports from a qualified independent testing laboratory showing compliance of each component with requirements indicated.
- E. Maintenance data for wall protection system components for inclusion in the operating and maintenance manuals specified in Division 1.

**1.05 INFORMATIONAL SUBMITTALS**

- A. Qualification Data: For qualified Installer.
- B. Material Certificates: For each impact-resistant plastic material, from the manufacturer.
- C. Material Test Reports: For each impact-resistant plastic material.
- D. Warranty: Sample of special warranty.

**1.06 CLOSEOUT SUBMITTALS**

- A. Maintenance Data: For each impact-resistant wall protection unit to include in maintenance manuals.

**1.07 QUALITY ASSURANCE**

- A. Installer Qualifications: Engage an installer who has no less than 3 years of experience in the installation of systems similar in complexity to those required for this project.
- B. Manufacturer's Qualifications: Not less than 5 years experience in the production of specified products and a record of successful in-service performance.
- C. Product Options: Drawings indicate size, profiles, and dimensional requirements of impact-resistant wall protection units and are based on the specific system indicated.

- D. Code compliance: Assemblies should conform to all applicable codes.
- E. Single source responsibility: Provide all components of the wall protection system manufactured by the same company to ensure compatibility of color, texture, and physical properties.

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

- A. Deliver materials to the project site in unopened original factory packaging clearly labeled to show manufacturer.
- B. Store materials in original, undamaged packaging in a cool, dry place out of direct sunlight and exposure to the elements.

#### **1.09 PROJECT CONDITIONS**

- A. Environmental Limitations: Comply with manufacturer's written instructions for substrate temperature, ambient temperature, moisture, ventilation, and other conditions affecting the installation of products.

#### **1.10 WARRANTY**

- A. Special Manufacturers Warranty: The manufacturer shall warrant the products specified in this Section against material defects, or defects in manufacturing, for five (5) years from the Date of Substantial Completion.

### **PART 2 PRODUCTS**

#### **2.01 MANUFACTURER**

- A. Owner Standard: The products specified in this Section are restricted to those of manufacturers named for each product type.
  - 1. Product substitutions: Not permitted.

#### **2.02 WALL PROTECTION PANELS**

- A. Wall Protection Panels, designated in the Drawings as Finish Type WP- #.
  - 1. Refer to the "Interior Finish Legend" in the Drawings for pertinent information on this Finish Type, including manufacturer, model/pattern, color, size, and other information.
- B. Type WP-1:
  - 1. Product: InPro; Palladium® Rigid Vinyl Sheet Wall Protection.
    - a. Material: Rigid Vinyl Sheet: Manufactured from chemical and stain resistant polyvinyl chloride with the addition of impact modifiers. No plasticizers shall be added.
    - b. Thickness: 0.060 inches.
    - c. Panel Width: Per Manufacturer
    - d. Panel Length: Per Manufacturer
    - e. Adhesive: As recommended by the manufacturer.
  - 2. Accessories:
    - a. Top caps, vertical divider bars, inside corners, and outside corners shall be made of extruded PVC.
  - 3. Finishes:
    - a. Surface Texture: Velvet Texture.
    - b. Color: As scheduled in the Interior Finish Legend
  - 4. Vinyl Accessories: Top caps, inside corners, divider bars, and outside corners shall be of a color matching the wall panels.
  - 5. Performance Requirements:
    - a. Fire Performance Characteristics: Provide UL Classified wall protection panels conforming with the NFPA Class A fire rating.
      - 1) Surface Burning Characteristics (ASTM E84): Provide assemblies with a maximum flame spread index of 20 and a maximum smoke-developed index of 350
      - 2) Fire Resistance: Where fire rating is specified for the wall in which the product is mounted, provide assemblies that have been tested in accordance with ASTM E119 for the same rating as the wall.

- 3) Self-Extinguishing: Provide CC1 classification, as tested in accordance with the procedures specified in ASTM D635.
- b. Impact Strength (ASTM D256): 30.4 ft-lbs/ inch of thickness
- c. Resist lateral impact force of 100 lbs (445 N) at any point without damage or permanent set.
- d. Support vertical live load of 100 lb/lineal ft (1,400 N/m) with deflection not to exceed 1/50 of the span between supports.
- e. Impact Strength: 30.40 ft-lbs/inch of thickness as tested in accordance with the procedures specified in ASTM D256
- f. Chemical and Stain Resistance (ASTM D543): Passes
- g. Fungal and Bacterial Resistance (ASTM G21): Passes

### 2.03 BUMPER RAIL

- A. Bumper Rail, designated in the Drawings as Finish Type BR- #
  1. Refer to the "Interior Finish Legend" in the Drawings for pertinent information on this Finish Type, including manufacturer, model/pattern, color, size, and other information.
- B. Type BR-1:
  1. Product: InPro; "1300 Wall Guard"
    - a. Description: Surface-mounted wall guard assembly consisting of aluminum retainer clip with snap-on cover.
  2. Materials:
    - a. Vinyl: Snap-on Cover: 0.080 inches (2mm) thickness, extruded from chemical and stain resistant PVC, including end caps and corners.
      - 1) Color: As scheduled.
      - 2) Surface shall have a pebblette texture.
    - b. Aluminum: Continuous aluminum retainer of 0.080 inches (2mm) thickness, fabricated from 6063-T5 aluminum, with a mill finish.
  3. Dimensions:
    - a. Height: 4-1/16 inches (103 mm)
    - b. Length: As indicated on drawings.
    - c. Depth: 1-7/8 inches (48 mm)
  4. Components:
    - a. End caps, inside corners, outside corners and brackets shall be made of injection-molded thermoplastics.
    - b. Hardware: Attachment hardware shall be appropriate for wall conditions.

### 2.04 CRASH RAILS

- A. Crash Rails, designated in the Drawings as Finish Type CR- #
  1. Refer to the "Interior Finish Legend" in the Drawings for pertinent information on this Finish Type, including manufacturer, model/pattern, color, size, and other information.
- B. Type CR-1:
  1. Product: InPro; "1600 Wall Guard"
    - a. Description: Surface-mounted crash rail assembly consisting of aluminum retainer clip with snap-on cover.
  2. Materials:
    - a. Vinyl: Snap-on Cover: 0.080 inches (2mm) thickness, extruded from chemical and stain resistant PVC, including end caps and corners.
      - 1) Color: As scheduled.
      - 2) Surface shall have a pebblette texture.
    - b. Aluminum: Continuous aluminum retainer of 0.080 inches (2mm) thickness, fabricated from 6063-T5 aluminum, with a mill finish.
  3. Dimensions:
    - a. Height: 6-inches (152 mm)
    - b. Length: As indicated on drawings.
    - c. Depth: 1 inch (25 mm)

4. Components:
  - a. End caps, inside corners, outside corners and brackets shall be made of injection-molded thermoplastics.
  - b. Impact Bumper: Continuous impact bumper shall be extruded from recycled polyvinyl chloride.
  - c. Hardware: Attachment hardware shall be appropriate for wall conditions.

## 2.05 CORNER GUARDS

- A. Corner Guards, designated in the Drawings as Finish Type CG- #.
  1. Refer to the "Interior Finish Legend" in the Drawings for pertinent information on this Finish Type, including manufacturer, model/pattern, color, size, and other information.
- B. Type CG-1:
  1. Product: InPro; Model No. 160 BluNose® High Impact Surface Mount Corner Guard System
    - a. Construction: High impact vinyl with full height extruded aluminum retainer.
    - b. Profile: 2-inch by 2-inch (51mm by 5mm), 90-degree.
    - c. Corner: Square.
    - d. Color: As scheduled.
    - e. Length: Full height of wall less wall base.
  2. Material:
    - a. Vinyl: Snap-on cover of .080-inch (2-mm) thickness shall be extruded from chemical and stain resistant polyvinyl chloride with the addition of impact modifiers. No plasticizers shall be added.
    - b. Aluminum: Continuous aluminum retainer of .070-inch (1.8-mm) thickness shall be fabricated from 6063-T5 aluminum, with a mill finish.
  3. Components:
    - a. Top Caps shall be made of injection-molded thermoplastics.
      - 1) Top Caps shall be of a color matching the corner guards. Surface shall have a pebblette texture.
    - b. Fasteners: All mounting system accessories appropriate for substrates indicated on the drawing shall be provided.
  4. Warranty: Limited Life Time Warranty
- C. Type CG-2:
  1. Product: InPro; Model No. 160DBN "BluNose End Wall Protector System"
    - a. Construction: High impact vinyl with full height extruded aluminum retainer.
    - b. Profile: 2-inch by 2-inch (51mm by 51mm), 90-degree.
    - c. Corner: Square.
    - d. Color: As scheduled.
    - e. Length: Full height of wall less wall base.
  2. Material:
    - a. Vinyl Cover: Snap-on cover of .080-inch (2-mm) thickness shall be extruded from chemical and stain resistant PVC.
    - b. Vinyl Retainers: Continuous vinyl retainers of .070" (1.8mm) thickness with a co-extruded Biopolymer Flex PVC apex shall be fabricate from polyvinyl chloride with the addition of impact modifiers.
  3. Components:
    - a. Top Caps shall be made of injection-molded thermoplastics.
    - b. Fasteners: All mounting system accessories appropriate for substrates indicated on the drawing shall be provided.
  4. Warranty: Limited Life Time Warranty

## 2.06 FABRICATION

- A. Fabricate components with tight joints, corners, and seams.
- B. Form end trim closure by capping and finishing smooth.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Verify that rough openings, concealed blocking, and anchors are correctly sized and located.
- B. Verify that field measurements are as indicated on Drawings.

#### **3.02 PREPARATION**

- A. General: Before installation, clean substrate to remove dust, debris, and loose particles.

#### **3.03 INSTALLATION - WALL PROTECTION**

- A. Install fabrications in accordance with shop drawings and manufacturer's instructions.
- B. Install level and plumb at the height indicated on the drawings.
- C. Install wall protection with bottom edge located to clear the top of the wall base.
- D. Apply adhesive uniformly using adhesive manufacturers recommended trowel to the entire back of sheet completely to the edge (100% coverage).
- E. Follow adhesive manufacturer's recommendations for set and application times.
- F. Apply pressure to the entire panel face with laminate type roller, removing trapped air and ensure proper adhesion between surfaces.

#### **3.04 INSTALLATION - CORNER GUARDS**

- A. Install components in accordance with manufacturer's instructions, level, and plumb, secured rigidly in position to wall framing members only.
- B. Position corner guard at the top of the wall base. Terminate at finished ceiling height.
- C. Sealant: After installation seal the perimeter of the corner guard with pick-free sealant.

#### **3.05 CLEANING**

- A. After the installation, clean surfaces in accordance with the manufacturer's instructions.

**END OF SECTION**

**SECTION 10 28 00  
WASHROOM ACCESSORIES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Public- and Private-use washroom accessories.
- B. Diaper changing stations.

**1.02 RELATED REQUIREMENTS**

- A. Section 06 10 00 - Rough Carpentry
- B. Section 09 21 16 - Gypsum Board Assemblies
- C. Section 09 30 00 - Tiling

**1.03 REFERENCE STANDARDS**

- A. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
- B. ASTM A269/A269M - Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service.
- C. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- D. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar.
- E. ASTM B86 - Standard Specification for Zinc and Zinc-Aluminum (ZA) Alloy Foundry and Die Castings.
- F. ASTM B456 - Standard Specification for Electrodeposited Coatings of Copper Plus Nickel Plus Chromium and Nickel Plus Chromium.

**1.04 SUBMITTALS**

- A. See Section 01 33 00 - Submittal Procedures, for additional requirements.
- B. Product Data: Submit data on accessories describing size, finish, details of the function, and attachment methods.
- C. Product Schedule: Indicating types, quantities, sizes, and installation locations by room of each accessory required. Use room and product designations indicated on Drawings.
- D. Manufacturer's Installation Instructions: Indicate special procedures and conditions requiring special attention.

**1.05 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Minimum five years of documented experience producing products specified.
- B. Source Limitations: To the greatest extent possible products shall be provided by a single manufacturer.

**1.06 DELIVERY, STORAGE, AND HANDLING**

- A. Ship products in the manufacturer's standard protective packaging with vinyl coating on exposed surfaces.
- B. Storage and Protection: Store products in the manufacturer's protective packaging until installation.

**1.07 SEQUENCING**

- A. Supply locations, dimensions, and other pertinent details to installing Contractor for coordination of blocking, support, and recess size and locations required for accessory installation.

## 1.08 WARRANTY

- A. Toilet Accessories: Manufacturer's standard 3-year warranty against defects in product workmanship and materials, beginning at the date of Substantial Completion.
- B. Mirrors: Manufacturer's 15-year warranty against silver spoilage of mirrors, beginning at the date of Substantial Completion.
- C. Baby Changing Station: Manufacturer's standard 5-year warranty on materials and workmanship, to include a provision for replacement caused by vandalism.

## PART 2 PRODUCTS

### 2.01 MANUFACTURERS

- A. Washroom Accessories:
  - 1. Specified Manufacturer: Bobrick Washroom Equipment.
    - a. Other acceptable manufacturers with equivalent products to the specified manufacturer shall include:
      - 1) A&J Washroom Accessories (P: 845-562-3332 / [www.ajwashroom.com](http://www.ajwashroom.com))
      - 2) American Specialties, Inc. (P: 914-476-9000 / [www.americanspecialties.com](http://www.americanspecialties.com))
      - 3) Bradley Corporation (P: 800-272-3539 / [www.bradleycorp.com](http://www.bradleycorp.com))
    - b. Products of unnamed manufacturers with equivalent products to the manufacturers listed will be considered in accordance with the "or equal" provision specified in Section 01 60 00 – Product Requirements.
      - 1) Product Substitutions: Comply with the requirements specified in Section 01 25 00 - Substitution Procedures.
- B. Baby Changing Station (when applicable):
  - 1. Specified Manufacturer: Koala Kare Products
    - a. Other acceptable manufacturers with equivalent products to the specified manufacturer shall include:
      - 1) American Specialties, Inc.
      - 2) Bradley Corporation.
      - 3) Diaper Deck & Company.
      - 4) Safe-Strap Company, Inc.
    - b. Products of unnamed manufacturers with equivalent products to the manufacturers listed will be considered in accordance with the "or equal" provision specified in Section 01 60 00 - Product Requirements.
      - 1) Product Substitutions: Comply with the requirements specified in Section 01 25 00 - Substitution Procedures.

### 2.02 MATERIALS

- A. Accessories - General: Shop assembled, free of dents and scratches, and packaged complete with anchors and fittings, steel anchor plates, adapters, and anchor components for installation.
  - 1. Grind welded joints smooth.
  - 2. Fabricate units made of metal sheets of seamless sheets, with flat surfaces.
- B. Keys: Provide 3 keys for each accessory to Owner; master key lockable accessories.
- C. Stainless Steel Sheet: ASTM A666, Type 304.
- D. Stainless Steel Tubing: ASTM A269/A269M, Grade TP304 or TP316.
- E. Galvanized Sheet Steel: Hot-dipped galvanized steel sheet, ASTM A653/A653M, with G90/Z275 coating.
- F. Zinc Alloy: Diecast, ASTM B86.
- G. Adhesive: Two component epoxy type, waterproof.
- H. Fasteners, Screws, and Bolts: Hot-dip galvanized; tamper-proof; security type.

### 2.03 FINISHES

- A. Stainless Steel: Satin finish, unless otherwise noted.

- B. Chrome/Nickel Plating: ASTM B456, SC 2, polished finish, unless otherwise noted.
- C. Baked Enamel: Pretreat to clean condition, apply one coat primer and a minimum of two coats epoxy baked enamel.
- D. Galvanizing for Items Other than Sheet: Comply with ASTM A123/A123M; galvanize ferrous metal and fastening devices.
- E. Shop Primed Ferrous Metals: Pretreat and clean, spray apply one coat primer, and bake.
- F. Back paint components where contact is made with building finishes to prevent electrolysis.

#### **2.04 ACCESSORY SCHEDULE**

- A. Washroom Accessories, callouts on the "FFE Schedule" in the Drawings.

#### **2.05 FRAMED MIRRORS**

- A. Scope: Contractor Furnished/ Contractor Installed (CFCI)
- B. Accessory Type A1066a & A1066b: Mirrors
  - 1. Product: Bobrick; Model B-165 Mirror with stainless steel channel frame
    - a. Description: Mirror shall have a one-piece type-430 stainless steel channel frame, with 90° mitered corners; all exposed surfaces shall have a bright polished finish. Select float glass mirror shall be guaranteed for 15 years against silver spoilage. The back shall be protected by full-size, shock-absorbing, water-resistant, nonabrasive, polyethylene padding. Galvanized steel back shall have integral horizontal hanging brackets located at top and bottom for mounting on concealed wall hanger to prevent the mirror from pulling away from the wall. Locking devices secure mirror to the concealed wall hanger. The mirror shall be removable from the wall.
  - 2. Mirror Size:
    - a. Type A1066a:
      - 1) Mirrors in Patient Room Toilets: 16-inches wide by 36-inches tall
      - 2) All other Mirrors: 18-inches wide by 30-inches tall.
    - b. Type A1066b: Large format mirrors: 36-inches wide by 60-inches tall.
  - 3. Installation:
    - a. Mounting Height:
      - 1) Mirrors above lavatories: 40-inches (maximum) above the finished floor to the bottom edge of the reflecting surface.
      - 2) Large Format Mirrors: Where indicated in the drawings.
    - b. Mirror Locations: Where indicated in the drawings.

#### **2.06 BABY CHANGING STATION**

Scope: Contractor Furnished/ Contractor Installed (CFCI)

- A. Accessory Type A4995: CHANGING STATION, SURFACE-MOUNTED
  - 1. Product: Koala Kare Products; Model KB310-SSWM, Surface-Mounted Horizontal Design Stainless Steel Changing Station
    - a. Front Panel: Deep drawn, one-piece seamless, 18-8, Type 304, 20 gauge (0.91mm) stainless steel with satin finish
    - b. Bed Surface: Grey color injection molded polypropylene with Microban antimicrobial additive, and ISO 22196 tested for efficacy. Surface is contoured, concave and smooth.
    - c. Dual Cavity Liner Dispenser: Grey color injection molded polypropylene with integral spring tab dispenses one liner at a time.
    - d. Skirt: 18-8, Type 304, 20 gauge (0.91mm) stainless steel with satin finish.
    - e. Operation: Concealed pneumatic cylinder providing controlled, slow opening and closing of the changing station bed.
    - f. Mounting: Surface-mounted with manufacturer-provided mounting hardware and concealed 11 gauge plated steel chassis with 16-inch centers and 6 mounting points.
- B. Changing station shall comply with ADA and ICC A117.1 Accessibility Standards, and ASTM Standard F 2285, Standard Consumer Safety Performance Specification for Diaper Changing

Stations for Commercial Use.

- C. Installation:
  - 1. Mounting Height: 34-inches above the finished floor to top of the table, in an open position.
  - 2. Location: Where indicated in the drawings.

## **2.07 FOLDING SHOWER SEAT**

- A. Accessory Type A5030: FOLDING SHOWER SEAT
  - 1. Scope: Contractor Furnished/ Contractor Installed (CFCI)
- B. Installation:
  - 1. Mounting Height: 19-inches a.f.f. to top of the seat.
  - 2. Location: Where indicated in the drawings.
- C. Product: Bobrick Series B-5191, Folding Shower Seat:
  - 1. Unit shall support static loads of up to 500 lbs when properly installed and used.
  - 2. General Contractor to provide fire treated wood blocking and anchoring of seat as necessary to meet manufacturer's requirements for weight capacity.
  - 3. The shower seat shall comply with accessible design guidelines, including ADAAG.

## **2.08 SOAP DISPENSER**

- A. Accessory Type A5075: SOAP DISPENSER
  - 1. Scope: Owner Furnished/ Owner Installed (OFOI)
  - 2. Product: Owner to provide product data to Contractor
  - 3. Installation:
    - a. Mounting Height:
      - 1) Above base cabinets: 42-inches a.f.f. to bottom of the unit.
      - 2) Lavatory locations: 50-inches a.f.f., top of the unit.
    - b. Location: Where indicated in the drawings.

## **2.09 HAND SANITIZER DISPENSER**

- A. Accessory Type A5077: HAND SANITIZER DISPENSER
  - 1. Scope: Owner Furnished/ Owner Installed (OFOI)
- B. Installation:
  - 1. Mounting Height:
    - a. Above base cabinets: 42-inches a.f.f. to the bottom of the unit.
    - b. Lavatory locations: 50-inches a.f.f. to the top of the unit.
  - 2. Location: Where indicated in the drawings.

## **2.10 PAPER TOWEL DISPENSER**

- A. Accessory Type A5080: PAPER TOWEL DISPENSER, RECESSED
  - 1. Scope: Contractor Furnished/ Contractor Installed (CFCI)
  - 2. Product: Georgia Pacific; enMotion® Recessed Automated Towel Dispenser, Model 59466A.
    - a. Description: The Recessed Automated Towel Dispenser holds and dispenses proprietary hard-wound roll towels. The cover is 24 gauge, #304 stainless steel, #4 AISI satin brush finish, with the grain in the vertical direction.
    - b. Mounting: Towel dispenser has mounting holes on both sides of the backplate and directly in the rear of the unit. The unit must be mounted flush to the wall, 4" recessed to comply with ADA guidelines.
    - c. Operation: Towel dispenser runs on 4 D Cell alkaline batteries.
    - d. The dispenser features 3 LEDs, from left to right, a low paper indicator, a motor/sensor activation light, and a low battery light.
    - e. The dispenser has 2 dispensing modes: an on-demand mode, where a new sheet is presented when a hand is waved in front of the sensor, and a hanging- towel mode, where a new towel is dispensed as soon as a towel is removed from the dispenser.
    - f. The dispenser also has adjustable settings for paper length and sheet delay.

3. Mounting Height: 54-inches above the finished floor to top of the unit.

#### **2.11 SANITARY NAPKIN DISPOSAL UNIT**

- A. Accessory Type A5090: SANITARY NAPKIN DISPOSAL UNIT
  1. Scope: Contractor Furnished/ Contractor Installed (CFCI)
  2. Product: Bobrick; Model B-270, Surface-Mounted Sanitary Napkin Disposal Unit, or equivalent.
    - a. Description: Surface-mounted sanitary napkin disposal shall be type-304 stainless steel with all-welded construction; exposed surfaces shall have a satin finish. Cover shall be drawn, one-piece, seamless construction, and secured to the container with a full-length stainless steel piano hinge. The container shall have integral finger depression for opening cover.
  3. Installation:
    - a. Mounting Height: 30-inches a.f.f. to the top of the unit.
    - b. Location: Align the side of the unit with the front edge of the toilet or water closet.

#### **2.12 SHARPS CONTAINER**

- A. Type A5108: DISPOSAL UNIT, SHARPS WITH GLOVES
  1. Owner Furnished/ Contractor Installed (OFCI)
  2. Product: Owner to provide product data to Contractor

#### **2.13 GLOVES**

- A. Type A5107: GLOVE DISPENSER
  1. Owner Furnished/ Contractor Installed (OFCI)
  2. Product: Owner to provide product data to Contractor

#### **2.14 GRAB BARS**

- A. Scope: Contractor Furnished/ Contractor Installed (CFCI), typical.
- B. General:
  1. Grab Bar Requirements (unless otherwise indicated):
    - a. Type-304 stainless steel with satin-finish.
    - b. 1-1/2 inches O.D.
    - c. Concealed mounting flanges with flange covers.
      - 1) Ends of grab bar shall pass through concealed mounting flanges and be heliarc welded to form one structural unit.
    - d. Grab Bars shall comply with accessible design for structural strength.
    - e. Configuration and Length: As indicated, this section.
    - f. Mounting Height: As indicated, this section.
- C. Accessory Type A5109a: GRAB BAR - REAR WALL
  1. Product: Bobrick; Model B-6806 Series Grab Bar
  2. Configuration and Length: Horizontal, 36-inches.
  3. Installation:
    - a. Mounting Height: 36-inches a.f.f. to top of the grab bar.
    - b. Location: 12-inches from the center of the water closet on one side and 24-inches on the other side.
- D. Accessory Type A5109b: GRAB BAR - SIDEWALL
  1. Product: Bobrick; Model B-6806 Series Grab Bar.
  2. Configuration and Length: Horizontal, 42-inches.
  3. Installation:
    - a. Mounting Height: 36-inches a.f.f. to top of the grab bar.
    - b. Location: 12-inches from the rear wall to the flange centerline.
- E. Type A5109c: GRAB BAR - VERTICAL
  1. Product: Bobrick; Model B-6806 Series Grab Bar:
  2. Configuration and Length: Vertical, 18-inches.
  3. Installation:

- a. Mounting Height: 40-inches a.f.f. to the centerline of the bottom flange.
- b. Location: 40-inches from the rear wall to the centerline of the unit.
4. Scope: Contractor Furnished/ Contractor Installed (CFCI)
5. Product: Bobrick Model B-6806 Series Grab Bar

## 2.15 UTILITY SHELF WITH MOP/ BROOM HOLDERS

- A. Type A5135: UTILITY SHELF WITH MOP/ BROOM HOLDERS
  1. Contractor Furnished/ Contractor Installed (CFCI)
  2. Product: Bobick; Model B-239
    - a. Description: Utility shelf with mop/broom holders and rag hooks shall be type-304 stainless steel with all-welded construction; exposed surfaces shall have satin finish. The shelf shall be 18 gauge (1.2mm), 8-inches (205mm) deep with 3/4-inch (19mm) return edges, and shall have front edge hemmed for safety.
      - 1) Mop/Broom Holders: Spring-loaded rubber cams with anti-slip coating. Plated steel retainers. Three (3) required.
      - 2) Hooks: 18-8, type-304, 12-gauge (2.8mm) stainless steel with a satin finish. Each hook is attached to a mounting strip with two rivets. Four (4) required.
    - b. Length: 34-inches (865 mm) .
  3. Installation:
    - a. Mounting Height: 72-inches a.f.f. to top of the shelf.
    - b. Location: Where indicated in the drawings.

## 2.16 CLOTHES / ROBE HOOK

- A. Type A5145: CLOTHES/ ROBE HOOK
  1. Contractor Furnished/ Contractor Installed (CFCI)
  2. Product: Bobrick; Model B-233 Series Clothes Hook:
    - a. Description: Clothes hook shall be type-304, 11-gauge (3.2mm) stainless steel with satin finish and all-welded construction.
  3. Installation:
    - a. Mounting Heights:
      - 1) ADA: 38-inches minimum, 48-inches a.f.f. to top of the unit.
      - 2) Non-ADA: 69-inches a.f.f. to top of the unit.

## 2.17 SHOWER CURTAINS & ACCESSORIES

- A. Type A5170: SHOWER CURTAIN & ACCESSORIES - Refer to Section 10 21 23 - Cubicles for requirements.

## 2.18 CUBICLE CURTAIN AND TRACK

- A. Type A5180: CUBICLE CURTAIN AND TRACK - Refer to Section 10 21 23 - Cubicles for requirements.

## 2.19 TOILET TISSUE DISPENSER

- A. Type A5200: TOILET TISSUE DISPENSER
  1. Scope: Contractor Furnished/ Contractor Installed (CFCI)
  2. Product: Bobrick; Model No.B-2840, Double Roll, Surface-Mounted Toilet Tissue Dispenser and Utility Shelf:
    - a. Description: Surface-mounted toilet tissue dispenser and utility shelf shall be type-304 stainless steel with a satin finish. The shelf shall have 1/2" (13mm) return edges with front edge hemmed for safe handling. Provide theft-resistant spindles (Part No. 283-604) to hold standard-core toilet tissue rolls up to 5-1/2 inch (140mm) diameter (1800 sheets).
    - b. Utility Shelf Size: 16-inches long X 5-inches deep.
  3. Installation:
    - a. Mounting Height: 22-inches above the finished floor to top of the shelf.
    - b. Location: Located 7- to 9-inches from the front face of the water closet to the center of the first roll of toilet paper for the dual roll unit.

**PART 3 EXECUTION**

**3.01 EXAMINATION**

- A. Verify existing conditions before starting work.
- B. Verify the exact location of accessories for installation. Coordinate with Owner.

**3.02 PREPARATION**

- A. Deliver inserts and rough-in frames to the site for a timely installation.
- B. Provide templates and rough-in measurements as required.

**3.03 INSTALLATION**

- A. Install accessories in accordance with manufacturers' instructions in locations indicated on the drawings.
- B. Install plumb and level, securely and rigidly anchored to the substrate.
- C. Mounting Heights: As required by accessibility regulations, unless otherwise indicated.

**3.04 PROTECTION**

- A. Protect installed accessories from damage due to subsequent construction operations.

**END OF SECTION**

**SECTION 10 44 00  
FIRE PROTECTION SPECIALTIES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Portable fire extinguishers
- B. Fire extinguisher cabinets
- C. Key lockbox for Fire Department access.

**1.02 RELATED REQUIREMENTS**

- A. Section 06 10 00 - Rough Carpentry
- B. Section 09 21 16 - Gypsum Board Assemblies

**1.03 REFERENCE STANDARDS**

- A. UL 1037 - Antitheft Alarms and Devices.
- B. UL 1610 - Central-Station Burglar-Alarm Units.
- C. UL 437 - Standard for Key Locks.
- D. ASTM E814 - Standard Test Method for Fire Tests of Penetration Firestop Systems.
- E. NFPA 10 - Standard for Portable Fire Extinguishers.

**1.04 SUBMITTALS**

- A. Submit under the provisions of Section 01 33 00 - Submittal Procedures.
- B. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for fire protection cabinets.
  - 1. Fire Protection Cabinets: Include roughing-in dimensions, details showing mounting methods, relationships of the box and trim to surrounding construction, door hardware, cabinet type, trim style, and panel style.
- C. Shop Drawings: For fire protection cabinets. Include plans, elevations, sections, details, and attachments to other work.
- D. Product Schedule: For fire protection cabinets. Coordinate final fire protection cabinet schedule with fire extinguisher schedule to ensure proper fit and function. Use the same designations indicated on Drawings.
- E. Maintenance Data: For fire protection cabinets to include in maintenance manuals.

**1.05 QUALITY ASSURANCE**

- A. Fire-Rated, Fire Protection Cabinets (when applicable): Listed and labeled to comply with requirements in ASTM E 814 for the fire-resistance rating of walls where they are installed.
- B. Provide fire protection specialties produced by a single manufacturer.
- C. Provide fire extinguishers of a type approved by UL, State Fire Marshal's Office, and local regulatory agencies, if any.

**1.06 COORDINATION**

- A. Coordinate the type of fire extinguisher cabinet with the "Code Footprint Plan" in the drawings.
  - 1. Provide non-rated cabinets in non-fire-rated walls.
  - 2. Provide 1-hour fire-rated cabinets at locations where the walls are identified as "1-HR Smoke Barriers", or "1-HR Fire Barriers".
  - 3. Provide 2-hour fire-rated cabinets at locations where the walls are identified as "2-HR Smoke Barriers", or "2-HR Fire Barriers".
- B. Coordinate the size of fire protection cabinets to ensure that type and capacity of fire extinguishers indicated are accommodated.
- C. Coordinate sizes and locations of fire protection cabinets with wall depths.

### 1.07 FIELD CONDITIONS

- A. Do not install extinguishers when the ambient temperature may cause freezing of extinguisher ingredients.

### 1.08 WARRANTY

- A. Fire Extinguishers: The manufacturer shall warrant the product/s to be free of defects in material and workmanship under conditions of normal use for a period of six (6) years from the date of Substantial Completion.
- B. All Fire Protection Products (except fire extinguishers) carry a one-year warranty from the date of Substantial Completion against defects in materials or workmanship.

## PART 2 PRODUCTS

### 2.01 MANUFACTURERS

- A. Specified Manufacturers:
  - 1. Fire Extinguishers: Specified Manufacturer: J.L. Industries ([www.activarcpg.com](http://www.activarcpg.com))
  - 2. Fire Extinguisher Cabinets: Specified Manufacturer: Larsen's Manufacturing Company ([www.larsensmfg.com](http://www.larsensmfg.com)).
  - 3. Key Lock Box: Knox Box, Inc. (The)
- B. Products of unnamed manufacturers with equivalent products to the specified manufacturer will be considered in accordance with the "or equal" provision specified in Division 01 "Product Requirements".
  - 1. Product Substitutions: Comply with the requirements specified in Division 01 "Substitution Procedures".

### 2.02 PORTABLE FIRE EXTINGUISHERS

- A. General: Comply with product requirements of NFPA 10 and applicable codes, whichever is more stringent.
- B. Fire Extinguisher, Type A:
  - 1. Basis-of-Design Product (typical): J.L. Industries; Cosmic Series, Model 10E
    - a. Class A, B, & C Multi-Purpose Chemical Type: Extinguisher unit containing a fluidized and siliconized mono ammonium phosphate powder; nonconductive and nontoxic.
      - 1) Nominal Capacity: 10 pound (4.54 kg)
    - b. UL Rating: 4A-80B:C.
    - c. Size: 5-inch diameter by 21-inches high.
    - d. Mounting: Inside fire extinguisher cabinet
- C. Fire Extinguisher, Type K:
  - 1. Application: Located in the Kitchen area.
  - 2. Basis-of-Design Product: J.L. Industries; Saturn Series, Model 15.
    - a. Class K, Dry Chemical Type: Extinguisher unit containing a low "pH" potassium acetate solution.
      - 1) Size: 1.8 gallons (6.8 L).
    - b. Effectiveness (Rating): Class A, K fires.
    - c. UL Rating: (C)1-A: K.
    - d. Size: 7-inch diameter / 19-1/4 inches overall height.
    - e. Mounting: Inside fire extinguisher cabinet

### 2.03 FIRE EXTINGUISHER CABINETS, GENERAL

- A. Fire Extinguisher Cabinets are designated on the Code Footprint Plan as "FEC".
- B. Cabinet Configuration: Semi-recessed type.
  - 1. Sized to accommodate accessories.
  - 2. Fabricate cabinet trim in one piece with corners mitered, welded, and ground smooth.
  - 3. Provide cabinet enclosure with right angle inside corners and seams, and with formed perimeter trim and door stiles.
- C. Cabinet Box:

1. Non-Fire-Rated Cabinets:
  - a. Formed 0.036 inch (0.9 mm) thick steel sheet with white baked enamel finish.
2. Fire-Rated Cabinets:
  - a. Construction: Shall have a double wall of formed 0.036 inch (0.9 mm) thick steel sheet with white baked enamel finish. The space between the double walls shall be lined with 5/8 inch (15.9 mm) thick fire barrier material.
  - b. Fire Rating: Listed and labeled per ASTM E814 requirements for the fire-resistance rating of walls where being installed.
- D. Cabinet Exterior Trim and Door:
  1. Material: Baked enamel, White color.
  2. Door Style: Horizontal Duo.
  3. Door Glazing:
    - a. Tempered glass, clear, 1/8 inch (3 mm) thick, and set in resilient channel glazing gasket.
  4. Fabricate doors according to manufacturer's standards, from materials indicated and coordinated with cabinet types and trim styles selected.
    - a. Fabricate door frames with tubular stiles and rails and hollow-metal design, minimum 1/2 inch (13 mm) thick.
    - b. Fabricate door frames of one-piece construction with edges flanged.
    - c. Miter and weld perimeter door frames.
- E. Door Hardware:
  1. Hinge: Continuous piano hinge capable of opening 180-degrees.
  2. Door Pull: Satin finish pull handle.
  3. Door Lock: Larson-Loc.
    - a. Provide access to a locked cabinet, without requiring the breaking of glass.
    - b. Provide 2 keys per door lock. All cabinets are keyed alike.
- F. Cabinet Mounting Hardware: Appropriate to the cabinet, with pre-drilled holes for placement of anchors.

#### **2.04 NON-RATED FIRE EXTINGUISHER CABINETS**

- A. Cabinet/s for a Type 'A' Fire Extinguisher:
  1. Basis-of-Design Product: Larsen's; "Architectural Series", Model No. 2409-6R
    - a. For installation in non-rated wall construction.
  2. Fire Extinguisher: Type A, one per cabinet.
  3. Cabinet Trim Projection from Wall: 2-1/2 inches, rolled edge.
  4. Interior Dimensions of Cabinet: 9-1/2 inches wide by 24-inches high by 6-inches deep.
  5. Rough Opening Depth: 4-inches, minimum. Coordinate with wall construction for proper clearance.
- B. Cabinet/s for a Type 'K' Fire Extinguisher:
  1. Basis-of-Design Product: Larsen's; "Architectural Series", Model No. 2712-RL
    - a. For installation in non-rated wall construction.
  2. Fire Extinguisher: Type K, one per cabinet.
  3. Cabinet Trim Projection from Wall: 2-1/2 inches, rolled edge.
  4. Interior Dimensions of Cabinet: 12-inches wide by 27-inches high by 8-inches deep.
  5. Rough Opening Depth: 6-inches deep (min). Coordinate with wall construction for proper clearance.

#### **2.05 1-HOUR FIRE-RATED FIRE EXTINGUISHER CABINET**

- A. Basis-of-Design Product: Larsen's; "Architectural Series", Model No. FS-2409-R4, semi-recessed cabinet
  1. For installation in 1-hour fire-rated wall construction.
  2. Fire Extinguisher: Type A, one per cabinet.
  3. Cabinet trim projection from wall: 3-1/2 inches, square edge.
  4. Interior Dimensions of Cabinet: 9-1/2 inches wide by 24-inches high by 6-inches deep.

5. Rough Opening Depth: 4-inches, minimum. Coordinate with wall construction for proper clearance.

## **2.06 2-HOUR FIRE-RATED FIRE EXTINGUISHER CABINET**

- A. Basis-of-Design Product: Larsen's; "Architectural Series", Model No. FS-2409-6R, semi-recessed cabinet
  1. For installation in 2-hour fire-rated wall construction.
  2. Fire Extinguisher: Type A, one per cabinet.
  3. Cabinet Trim Projection from Wall: 2-1/2 inches, square edge.
  4. Interior Dimensions of Cabinet: 9-1/2 inches wide by 24-inches high by 6-inches deep.
  5. Rough Opening Depth: 4-7/8 inches, minimum. Coordinate with wall construction for proper clearance.

## **2.07 KEY LOCKBOX**

- A. Manufacturer:
  - The Knox Company
  - P: 800-552-5669
  - Email: info@knoxbox.com
  - Web: www.knoxbox.com
- B. Basis-of-Design Product: Knox Box Model 3262, surface-mount key lock box with hinged door, without UL Listed Knox Tamper Alert.
  1. 1/4-inch plate steel housing.
  2. 1/2-inch thick steel door with interior gasket seal and stainless steel door hinge.
  3. Box and lock UL Listed (UL 1037, UL 1610, UL 437, UL 1332)
  4. Lock has a 1/8-inch thick stainless steel dust cover with tamper seal mounting capability.
  5. Lock: UL Listed. Double-action rotating tumblers and hardened steel pins accessed by a biased cut key.
  6. Color: Black.
  7. Capacity: Holds up to 10 keys, access cards, or entry items.
  8. Compliant to National Fire Code (NFPA, IFC, IBC)
  9. Quantity: 1

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Examine walls and partitions for suitable framing depth and blocking where semi-recessed cabinets will be installed.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### **3.02 INSTALLATION**

- A. General: Install fire protection cabinets in locations and at mounting heights indicated.
- B. Fire Protection Cabinets: Fasten cabinets to structure, square, and plumb.
  1. Unless otherwise indicated, provide recessed fire protection cabinets. If the wall thickness is not adequate for recessed cabinets, provide semi-recessed fire protection cabinets.
  2. Provide inside latch and lock for break-glass panels.
  3. Fasten mounting brackets to the inside surface of fire protection cabinets, square and plumb.
- C. Install key lock box per manufacturer. Mount at 6-feet above the finished floor.
- D. Place extinguishers in cabinets.

### **3.03 FIELD QUALITY CONTROL**

- A. Ensure that each extinguisher is fully charged and that inspection of each extinguisher has been performed, as evidenced by the National Association of Fire Equipment Distributors certification tag, just prior to turnover.

## **END OF SECTION**

**SECTION 10 51 13  
PLASTIC LAMINATE LOCKERS**

**PART 1 - GENERAL**

**1.01 SECTION INCLUDES**

- A. Plastic laminate lockers and accessories.

**1.02 RELATED SECTIONS**

- A. Section 06 10 00 - Rough Carpentry
- B. Section 09 21 16 - Gypsum Board Assemblies

**1.03 REFERENCES**

- A. Minimum standard for wood lockers shall conform to AWI (Architectural Woodwork Institute) Architectural Woodwork Quality Standards Illustrated.

**1.04 QUALITY ASSURANCE**

- A. All parts and hardware shall be AWI compliant, structurally sound and free from defects, in material and workmanship under normal use and service for the full warranty period.

**1.05 SUBMITTALS**

- A. Product Data: Available upon request, including:
  - 1. Preparation instructions and recommendations.
  - 2. Storage and handling requirements and recommendations.
    - a. Installation methods.
      - 1) Product data specific to materials used in construction of locker.
      - 2) Shop Drawings: Indicate locker plan layout, component profiles and elevations, schedule of finishes, and accessories.

**1.06 PRODUCT DELIVERY, STORAGE, AND HANDLING**

- A. Store products in a dry, ventilated area until ready for installation.
- B. Protect finishes from moisture, soiling and damage during handling.

**1.07 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 absolute limits.
- B. During and after installation, maintain same temperature and humidity conditions in building spaces as will occur after occupancy.
- C. Protect locker finish and adjacent surfaces from damage.

**1.08 WARRANTY**

- A. Manufacturer's Warranty: Manufacturer agrees to repair or replace components of the plastic laminate lockers that fail in materials or workmanship within specified warranty period.
  - 1. Failures include, but are not limited to, the following:
    - a. Delamination of components or other failures of glue bond.
    - b. Warping of components.
    - c. Failure of operating hardware.
  - 2. Warranty Period: Three (3) years from Date of Substantial Completion.

**PART 2 - PRODUCTS**

**2.01 MANUFACTURERS**

- A. Basis-of-Design Manufacturer: Products from Ideal Products, Inc are specified to establish a standard of quality for design, function, materials, and appearance.
  - 1. Equivalent products by other manufacturers may be acceptable if approved in accordance with Section 01 25 00.
  - 2. Architect will be the sole judge of the basis of what is equivalent.

## 2.02 LOCKERS WITH INTEGRAL BENCH

- A. Basis of Design Product: Ideal Products; "Ideal 3000-1 Series, Model M" Plastic Laminate Lockers with integral bench.
  - 1. Size: 12-inches wide by 72-inches high by 18-inches deep, double tier, z-shaped lockers.
- B. Materials:
  - 1. Particle Board: ANSI A208.1, Mat-Formed Particle Board, Grade M-2.
    - a. Type: Particleboard with ultra-low emitting formaldehyde resins (ULEF).
    - b. Density: 48-pound, minimum.
    - c. Internal Bond: 60 psi.
    - d. Screw Holding Capacity: 225 lb. on faces and 200 lb. on edges, minimum.
    - e. Thickness: 5/8-inch, minimum.
  - 2. High Pressure Decorative Laminate (HPDL):
    - a. Standards Compliance: NEMA LD 3, and ANSI A161.2 .
    - b. Grades:
      - 1) VGS: Vertical Grade, 0.028-inches thick.
      - 2) CLS: Cabinet Liner, 0.020-inches thick.
      - 3) BKH: Backer, 0.020-inches thick.:
      - 4) TFM: Thermally Fused Melamine Laminate Panels: Particleboard or MDF finished with 100-gram (minimum) thermally fused, melamine-impregnated decorative paper, and complying with requirements of NEMA LD 3, Grade VGL . Finish shall be resistant to water and mild cleaners.
- C. Surfaces:
  - 1. Exposed Surfaces (Closed Interiors): Any closed storage unit behind solid door fronts. Surfaces visible when doors are closed, include:
    - a. Door Fronts; Exterior Faces: HPDL, Grade VGS.
      - 1) Provide balanced backing sheet (BKH) on all door fronts.
    - b. Exposed Ends: Any storage unit exterior side surface that is visible after installation: HPDL, Grade VGS.
    - c. Edges: Refer to "Edgebanding" Article this Section.
    - d. Colors and Patterns: As scheduled on Drawings.
  - 2. Open Interiors: Any open storage unit without solid door:
    - a. Open Cabinet Interior (Top, bottom, back sides, horizontal and vertical members): HPDL, Grade VGS.
    - b. Edges: Refer to "Edgebanding" Article this Section.
  - 3. Semi-Exposed Surfaces: Surfaces behind opaque doors that are exposed, including:
    - a. Cabinet Interior (Top, bottom, back sides, horizontal and vertical members): HPDL, Grade TFM; Color shall be White.
    - b. Edges: Refer to "Edgebanding" Article this Section.
  - 4. Concealed Surfaces: Surfaces that are not visible after installation, including sleepers, web frames, ends and backs that are placed directly against walls or other cabinets; HPDL, Grade TFM, CLS, or BKH at Manufacturer's Option.
  - 5. Sloped Tops: HPDL, Grade VGS.
  - 6. Toekicks: Resilient base (by others).
- D. Edgebanding:
  - 1. Material: Rigid PVC extrusion; through color with satin finish.
  - 2. Thickness:
    - a. Cabinet Edges: 1-mm PVC.
    - b. Door Fronts: 3-mm PVC.
    - c. Shelves: 1-mm PVC, Front edge only.
  - 3. Color/Pattern: As scheduled on the Drawings as Finish Type 'EB- #'.
- E. Construction:
  - 1. Locker Frame:
    - a. Top, Bottom and Sides: 3/4-inch thick particle board.

- b. Back: 1/4-inch thick particle board.
    - c. Finish: HPDL; Grades per "Surfaces" Article.
    - d. Color: As scheduled.
    - e. Edges: Refer to "Edgebanding" Article this Section.
  2. Locker Doors, End Panels, Cubbies, Sloped Tops, and Fillers:
    - a. 3/4-inch thick particle board.
    - b. Finish: HPDL; Grades per "Surfaces" Article.
    - c. Color: As scheduled.
    - d. Edge Banding: 1-mm PVC edge banding to closely match laminate.
  3. Sloped Top:
    - a. 25-degree pitch, attached with concealed fasteners.
    - b. Slope top to be in addition to standard locker flat top.
  4. Bench Top: 1-1/4 inches thick.
  5. Closed Base:
    - a. Provide 4-inch high base enclosed on all four sides securely attached to bottom of locker unit.
    - b. Base shall be 3/4-inch, 45 pound density particle board. Base to be continuous with cross members on 16-inch centers.
  6. Venting: 12 millimeter openings between door and top and bottom of locker and dividers on multiple opening frames provide continuous natural air flow.
- F. Hardware:
  1. Number Plate: 1-1/4 inch diameter, recess-mounted disc with 3/8-inch numerals, satin chrome.
    - a. Locate number plate near center of each door.
    - b. Owner to furnish numbering sequence.
  2. Clothes Hook(s), side-mounted double-prong aluminum hooks.
  3. Hinges: Nickel finished, concealed, heavy duty European steel allowing 125-degree door opening, with a lifetime warranty. Quantity: 4 per door.
  4. Locks:
    - a. Dial combination locks with five changeable codes and master key bypass, nickel finish.
- G. Finish and Color: Plastic laminate manufacturer, color and pattern selections shall be as scheduled on the Drawings as Finish Type "PL- #".

### **2.03 FABRICATION**

- A. Locker shall be fabricated using blunt joint, nail and screw joinery.
- B. Fabricate lockers square, rigid and without warp, with the finished faces flat and free of scratches and chips.
- C. Machine all parts and attachment holes accurately and without chips.

## **PART 3 - EXECUTION**

### **3.01 EXAMINATION**

- A. Do not begin installation until adjacent substrates and finishes have been properly prepared.
- B. Verify prepared bases are in correct position and configuration.
- C. If preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

### **3.02 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.
- C. Verify adequacy of backing and support framing.

**3.03 INSTALLATION**

- A. Install in accordance with manufacturer's instructions.

**3.04 ADJUSTING**

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

**3.05 CLEANING**

- A. Clean locker interiors and exterior surfaces.

**3.06 PROTECTION**

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

**END OF SECTION**

**SECTION 11 72 00  
OWNER FURNISHED MEDICAL EQUIPMENT**

**PART 1 - GENERAL**

**1.01 SECTION INCLUDES**

- A. Medical equipment furnished by the Owner for the project.

**1.02 RELATED REQUIREMENTS**

- A. Section 01 10 00 - Summary

**1.03 WORK BY OWNER**

- A. The Owner will procure separate contracts with vendors to furnish and install furniture, fixtures, and equipment shown in this Section.
  - 1. The Construction Manager shall cooperate fully with the Owner so work may be carried out smoothly, without interfering with or delaying work under this Contract or work by the Owner.
- B. Products and items indicated in the Contract Documents as "OFOI" will be furnished and installed by the Owner.
- C. Products and items indicated in the Contract Documents as "OFCl" will be furnished by the Owner, for final connection or installation by the Contractor.
  - 1. Owner's Responsibilities for OFCl Work:
    - a. Arrange for and deliver shop drawings, product data, and samples to the Contractor/s.
    - b. Arrange and pay for product delivery to the site. After delivery, inspect products jointly with Contractor/s.
    - c. Submit claims for transportation damage and replace damaged, defective, or deficient items.
    - d. Arrange for manufacturer's warranties, inspections, and service.
  - 2. Contractor's Responsibilities for "OFCl" Work:
    - a. The Contractor shall coordinate and schedule with the Owner the requirements and timing required for prompt and proper incorporation into the work.
    - b. Review Owner furnished shop drawings, product data, and samples to determine if the information is adequate as needed for installation.
    - c. Receive and unload products at the site; inspect for completeness or damage, to the extent the Contractor is responsible for the installation of Owner provided Work.
    - d. Handle, store and install Owner furnished Work.
    - e. Repair or replace items damaged by construction operations.

**PART 2 - PRODUCTS**

**2.01 OWNER FURNISHED MEDICAL EQUIPMENT**

- A. A copy of the "Owner Furnished Medical Equipment Brochure", dated January 4, 2022, is attached at the end of this Section.

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

**END OF DOCUMENT**

**SECTION 12 24 00**  
**WINDOW TREATMENT - ROLLER SHADES**

**PART 1 - GENERAL**

**1.01 SECTION INCLUDES**

- A. Manual sunscreen roller shades

**1.02 RELATED REQUIREMENTS**

- A. Section 06 10 00 - Rough Carpentry
- B. Section 09 21 16 - Gypsum Board Assemblies
- C. Section 09 51 00 - Acoustical Ceilings

**1.03 REFERENCES**

- A. ASTM G 21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi.
- B. NFPA 701 - Fire Tests for Flame-Resistant Textiles and Films.

**1.04 SUBMITTALS**

- A. Submit under provisions of Section 01 33 00 - Submittal Procedures
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
  - 1. Preparation instructions and recommendations.
  - 2. Styles, material descriptions, dimensions of individual components, profiles, features, finishes, and operating instructions.
  - 3. Storage and handling requirements and recommendations.
  - 4. Mounting details and installation methods.
- C. Shop Drawings: Plans, elevations, sections, product details, installation details, operational clearances, and relationship to adjacent work.
- D. Window Treatment Schedule: For all roller shades. Use same room designations as indicated on the Drawings and include opening sizes key to the typical mounting details.
- E. Selection Samples: For each product specified, one set of shade cloth options and aluminum finish color samples representing the manufacturer's full range of available colors and patterns.
- F. Verification Samples: For each product specified, one complete set of shade components, unassembled, demonstrating compliance with specified requirements. Shadecloth sample and aluminum finish sample as selected. Mark face of material to indicate interior faces.
- G. Maintenance Data: Methods for maintaining roller shades, precautions regarding cleaning materials and methods, instructions for operating hardware and controls.

**1.05 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Obtain roller shades through one source from a single manufacturer with a minimum of twenty years experience in manufacturing products comparable to those specified in this section.
- B. Installer Qualifications: Installer trained and certified by the manufacturer with a minimum of ten years experience in installing products comparable to those specified in this section.
- C. Fire-Test-Response Characteristics: Passes NFPA 701 small and large-scale vertical burn. Materials tested shall be identical to products proposed for use.
- D. Anti-Microbial Characteristics: 'No Growth' per ASTM G21 results for fungi ATCC9642, ATCC 9644, ATCC9645.

**1.06 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver shades in factory-labeled packages, marked with manufacturer and product name, fire-test-response characteristics, and location of installation using same room designations indicated on Drawings and in the Window Treatment Schedule.

### 1.07 PROJECT CONDITIONS

- A. Environmental Limitations: Install roller shades after finish work including painting is complete and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

### 1.08 WARRANTY

- A. Manual Roller Shade Hardware and Chain Warranty: Manufacturer's standard non-depreciating twenty-five (25) year limited warranty from the date of Substantial Completion.
- B. Standard Shadecloth: Manufacturer's standard twenty-five (25) year warranty from the date of Substantial Completion.
- C. Roller Shade Installation: One year from the date of Substantial Completion, not including scaffolding, lifts, or other means to reach inaccessible areas.
- D. Motorized Roller Shades, Motors, and Motor Control Systems: Manufacturer's standard non-depreciating five (5) year warranty from the date of Substantial Completion.

## PART 2 PRODUCTS

### 2.01 MANUFACTURERS

- A. Manufacturer: Subject to compliance with requirements, provide products from:  
MechoShade Systems, Inc.  
42-03 35th St.; Long Island City, NY 11101  
P: 718-729-2020  
email: customerservice@mechosystems.com  
website: www.mechoshade.com
- B. Substitutions: Equivalent products complying with specified requirements will be considered, provided a manufacturer submit a request for consideration to the Architect before the date established for receiving bids.

### 2.02 ROLLER SHADES, GENERAL

- A. Manually- and Motor-Operated Roller Shades are designated in the Drawings as Finish Type WT- #
  - 1. Refer to the "Interior Finish Legend" in the Drawings for pertinent information on this Finish Type, including manufacturer, model/pattern, color, size, and other related information

### 2.03 ROLLER SHADES - MANUAL OPERATION

- A. Manually Operated Roller Shades, designated in the Drawings as Finish Type WT-1
  - 1. Refer to the "Interior Finish Legend" in the Drawings for pertinent information on this Finish Type, including manufacturer, model/pattern, color, size, and other related information
- B. Manual Roller Shade, Type WT-1:
  - 1. General:
    - a. Components capable of being removed or adjusted without removing mounted shade brackets, or cassette support channel.
    - b. Smoothly operation raising or lowering shades.
  - 2. Product: MechoShade; Mecho/5x System
    - a. Shade Type: Single roller
    - b. Universal drive capability to offset drive chain for reverse or regular roll shades.
    - c. Drop Position: Regular roll
    - d. Mounting: Refer to Drawings
    - e. Size: As indicated in drawings.
    - f. Fabric: As indicated under the "Shade Fabric" article in this Section
  - 3. Brackets and Mounting Hardware: As recommended by the manufacturer for the mounting indicated and to accommodate shade fabric roll-up size and weight.
    - a. Material: Steel, 1/8 inch (3 mm) thick.

4. Roller Tubes:
  - a. Material: Extruded aluminum.
  - b. Size: As recommended by the manufacturer; selected for suitability for installation conditions, span, and weight of shades.
  - c. Fabric Attachment: Utilize extruded channel in the tube to accept vinyl spline welded to the fabric edge. Shade band to be removable and replaceable without removing roller tube from brackets or inserting spline from the side of the roller tube.
  - d. Roller tubes to be capable of being removed and reinstalled without affecting roller shade limit adjustments.
5. Hembars: Designed to maintain the bottom of shade straight and flat.
  - a. Style: Full wrap fabric covered bottom bar, flat profile with heat-sealed closed ends.
6. Clutch Operator: Manufacturer's standard material and design integrated with bracket/brake assembly.
  - a. Permanently lubricated brake assembly mounted on an oil-impregnated hub with wrapped spring clutch.
  - b. Brake must withstand a minimum pull force of 50 pounds (22.7 kg) in the stopped position.
  - c. Mount clutch/brake assembly on the support brackets, fully independent of the roller tube components.
7. Drive Chain: Continuous loop stainless steel beaded ball chain, 95-pound (43 kg) minimum breaking strength. Provide upper and lower limit stops.
  - a. Chain Retainer: Chain tensioning device complying with WCMA A100.1.
8. Mecho/5x, Managed Lift Force, Hardware: Lifts single-band or multi-band shade assemblies:
  - a. Lifting Force: 3.5 to 8.5 pounds (1.6 to 3.9 kg) for shade assemblies with a shade band hanging weight, not including mounting hardware, of 35 pounds (16 kg).
  - b. Backward compatible to Mecho-5 components including fascia, regular and reverse roll, pockets, and wall-mounting accessories.
  - c. Includes offset drive capability, left/right, front, or back to allow for utilization of blackout or ShadeLoc Zipper channels.
  - d. Allows for ease of operation when obstructions do not allow for direct drive chain access.
  - e. Offset chain drive shall not cause an increase of friction or pull force when operated up to a 26-degree angle from vertical.
9. Accessories:
  - a. Fascia: Removable extruded aluminum fascia, size as required to conceal shade mounting, attachable to brackets without exposed fasteners.
    - 1) Finish: Baked enamel
      - (a) Color: As scheduled
    - 2) Single Fascia: Accommodate regular roll shades.
    - 3) Profile: Square
    - 4) Configuration: Captured, fascia stops at captured bracket end

#### **2.04 SHADE FABRIC**

- A. Products: Shade fabric as manufactured by MechoShade Systems LLC.
  1. Solar Shadecloths:
    - a. Fabric: Selected from manufacturer's standard colors
    - b. Color: As scheduled on the Drawings
  2. Fabric Properties: Non-flammable, color-fast, impervious to heat and moisture, and able to retain its shape under normal operation.
    - a. Shade Type: Light filtering shades
    - b. Material Composition: PVC coated polyester yarns.
  3. Performance Requirements:
    - a. Flammability per NFPA 701: Pass. Large or small-scale test.
    - b. Fungal Resistance: No growth when tested per ASTM G21.

4. Openness Factor: Openness factor approximately equal to 1 percent (privacy shades): Softens light. Reveals some details to outside. Moderate privacy

## 2.05 FABRICATION

- A. Field measure finished openings before ordering or fabrication.
- B. Dimensional Tolerances: Fabricate shades to fit openings within specified tolerances.
  1. Vertical Dimensions: Fill openings from head to sill with 1/2 inch (13 mm) space between bottom bar and window stool (or finished floor).
  2. Horizontal Dimensions: Inside Mounting.
    - a. Fill openings from jamb to jamb.
    - b. Symmetrical Light Gaps on Both Sides of Shade: 3/4 inch (19.05 mm) total.
- C. Openings Requiring Continuous Multiple Shade Units with Separate Rollers: Locate roller joints at window mullion centers; butt rollers end-to-end.
- D. Fabricate shade cloth to hang flat without buckling or distortion. Fabricate with heat-sealed trimmed edges to hang straight without curling or raveling. Fabricate unguided shade cloth to roll true and straight without shifting sideways more than 1/8 inch (3.18 mm) in either direction per 8 feet (2438 mm) of shade height due to warp distortion or weave design. Fabricate hem as follows:
  1. Hembar: Exposed hembar with a light seal for blackout shades.
- E. Provide battens in standard shades as required to assure proper tracking and uniform rolling of the shade bands. The contractor shall be responsible for assuring the width-to-height (W:H) ratios shall not exceed manufacturer's standards or, in absence of such standards, shall be responsible for establishing appropriate standards to assure proper tracking and rolling of the shade cloth within specified standards. Battens shall be roll-formed stainless steel or tempered steel, as required.
- F. For railroaded shade bands, provide seams in railroaded multi-width shade bands as required to meet size requirements and in accordance with seam alignment as acceptable to Architect. Seams shall be properly located. Furnish battens in place of plain seams when the width, height, or weight of the shade exceeds the manufacturer's standards. In absence of such standards, assure proper use of seams or battens as required to, and assure the proper tracking of the railroaded multi-width shade bands.
- G. Provide battens for railroaded shades when width-to-height (W:H) ratios meet or exceed the manufacturer's standards. In absence of manufacturer's standards, be responsible for the proper use and placement of battens to assure proper tracking and roll of shade bands.

## 2.06 ACCESSORIES

- A. Fascia:
  1. Continuous removable extruded aluminum fascia that attaches to shade mounting brackets without the use of adhesives, magnetic strips, or exposed fasteners.
  2. Fascia shall be able to be installed across two or more shade bands in one piece.
  3. Fascia shall fully conceal brackets, shade roller, and fabric on the tube.
  4. Provide bracket/fascia end caps where mounting conditions expose outside of roller shade brackets.
  5. Notching of Fascia for manual chain shall not be acceptable.
- B. Roller Shade Pocket: 'ElectroPocket' and 'Non-ElectroPocket' from Mecho. For recessed mounting in acoustical tile, or drywall ceilings as indicated on the Drawings. For manual and motorized shades.
  1. Provide either extruded aluminum and or formed steel shade pocket, sized to accommodate roller shades, with exposed extruded aluminum closure mount, tile support, and removable closure panel to provide access to shades.
    - a. Provide "Vented Pocket" such that there will be a minimum of four 1 inch (25.4-mm) diameter holes per foot allowing the solar gain to flow above the ceiling line.

### **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 the Architect of unsatisfactory preparation before proceeding.

#### **3.02 PREPARATION**

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

#### **3.03 INSTALLATION**

- A. Install roller shades level, plumb, square, and true according to manufacturer's written instructions, and located so shade band is not closer than 2 inches (50 mm) to the interior face of the glass. Allow proper clearances for window operation hardware.
- B. Adjust and balance roller shades to operate smoothly, easily, safely, and free from binding or malfunction throughout the entire operational range.
- C. Clean roller shade surfaces after installation, according to manufacturer's written instructions.
- D. Engage Installer to train Owner's maintenance personnel to adjust, operate and maintain roller shade systems.

#### **3.04 PROTECTION**

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

**END OF SECTION**

**SECTION 12 31 00  
MANUFACTURED METAL CASEWORK**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Manufactured custom casework, with cabinet hardware.
- B. Special purpose units.
- C. Casework Hardware.

**1.02 RELATED REQUIREMENTS**

- A. Section 06 10 00 - Rough Carpentry: Blocking and nailers for anchoring casework.
- B. Section 07 92 00 - Joint Sealants: Sealing joints between casework and countertops and adjacent walls, floors, and ceilings.
- C. Section 12 36 00 - Countertops.

**1.03 REFERENCE STANDARDS**

- A. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar.
- B. BHMA A156.9 - Cabinet Hardware.

**1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Large Components: Ensure that large components can be moved into final position without damage to other construction.
- B. Service Fixtures: Coordinate location and characteristics of service connections.

**1.05 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate casework types, sizes, locations, using large scale plans, elevations, cross sections. Include rough-in and anchors, placement dimensions and tolerances, clearances required, and keying information.
- C. Manufacturer's Qualification Statement.
- D. Installer's Qualification Statement.
- E. Maintenance Data: Manufacturer's recommendations for care and cleaning.
- F. Maintenance Materials: Furnish the following for Owner's use in maintenance of project:
  - 1. See Section 01 60 00 - Product Requirements, for additional provisions.

**1.06 QUALITY ASSURANCE**

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

**1.07 DELIVERY, STORAGE, AND HANDLING**

- A. Protect items provided by this section during handling and installation, including finished surfaces and hardware items. For metal surfaces, use polyethylene film or other protective material standard with the manufacturer.
- B. Accept casework on site. Inspect on arrival for damage.

**1.08 WARRANTY**

- A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.
- B. Correct defective Work within a five year period after Date of Substantial Completion, at no additional cost to Owner. Defects include, but are not limited to:

1. Ruptured, cracked, or stained finish coating.
2. Discoloration or lack of finish integrity.
3. Cracking or peeling of finish.
4. Failure of hardware.

## **PART 2 PRODUCTS**

### **2.01 MANUFACTURERS**

- A. Stainless Steel Casework:
1. Jamestown Metal Products; [ ]: [www.jamestown.com/#sle](http://www.jamestown.com/#sle).
  2. Kewaunee Scientific Corp; [ ]: [www.kewaunee.com/#sle](http://www.kewaunee.com/#sle).
  3. Stainless Steel Fabricators, Ltd.; Tyler, TX: [www.ssftexas.com](http://www.ssftexas.com).
  4. Substitutions: See Section 01 60 00 - Product Requirements.

### **2.02 FABRICATION**

- A. Assembly: Shop assemble casework items for delivery to site in units easily handled and to permit passage through building openings.
- B. Casework: Die-formed metal sheet; each unit self-contained and not dependent on adjacent units or building structure for rigidity; factory-fabricated, factory-assembled, and factory-finished.
1. Style: Flush overlay - square edge.
  2. Primary Cabinet Material: Stainless steel.
  3. Cabinet Nominal Dimensions: Unless otherwise indicated, provide cabinets of widths and heights indicated on drawings, and with the following front-to-back dimensions:
    - a. Base Cabinets: 24 inches (610 mm).
  4. Stainless Steel Sheet Metal:
    - a. Gables, Front and Back Panels, Gusset Plates, Aprons, and Rails: 18 gauge, 0.0478 inch (1.21 mm) minimum thickness.
    - b. Drawers, Cabinet Floors, Shelves, Filler Panels and Drawer Dividers: 20 gauge, 0.0359 inch (0.91 mm) minimum thickness.
    - c. Backing Sheet to Door and Door Fronts: 22 gauge, 0.0299 inch (0.76 mm) minimum thickness.
  5. Structural Performance: Provide components that safely support the following minimum loads, without deformation or damage:
    - a. Base Units: 500 pounds per linear foot (744 kg/linear m) across the cabinet ends.
  6. Corners and Joints: Without gaps or inaccessible spaces or areas where dirt or moisture could accumulate.
  7. Edges and Seams: Smooth. Form counter tops, shelves, and drain boards from continuous sheets.
  8. Shelf Edges: Turned down 3/4 inch (19 mm) on each side and returned 3/4 inch (19 mm) front and back.
  9. Ends: Close open ends with matching construction.
  10. Welding: Electric spot welded; joints ground smooth and flush.
  11. Drawers and Doors: Fabricate drawer and door fronts of sandwiched sheets of sheet steel welded together and reinforced for hardware.
    - a. Fill with sound-deadening core.
  12. Fittings and Fixture Locations: Cut and drill countertops, backs, and other casework components for service outlets and fixtures.
  13. Access Panels: Where indicated, for maintenance of utility service fixtures and fittings and mechanical and electrical components.
  14. Separation: Use bituminous paint or non-conductive tape to coat metal surfaces in contact with cementitious materials, and to separate dissimilar metals.

### **2.03 SPECIAL PURPOSE UNITS**

- A. Medical/Healthcare Special Units.
1. Style: Flush overlay - square edge.

2. Primary Construction: Manufacturer's standard, with stainless steel countertops.
3. Provide formed recess in vertical face panel at sink locations to received drain operator handle. Refer to Section 12 36 00 COUNTERTOPS for drain operator information.

#### **2.04 CABINET HARDWARE**

- A. Manufacturer's standard types, styles and finishes.
- B. Comply with BHMA A156.9 requirements.
  1. Acceptable base materials for plated finishes include brass, bronze, and steel.

#### **2.05 MATERIALS**

- A. Stainless Steel Sheet: ASTM A666 Type 304.
- B. Countertops: As specified in Section 12 36 00.

#### **2.06 FABRICATION - GENERAL**

- A. Fabricate casework, assembled and welded.
- B. Fabricate corners and joints without gaps or inaccessible spaces or areas where dirt or moisture could accumulate.

#### **2.07 FINISHES**

- A. Stainless Steel: No. 4 finish.
- B. Shop finish all components.
- C. Coat metal surfaces in contact with cementitious materials with bituminous paint.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Verify adequacy of support framing and anchors.
- B. Verify that service connections are correctly located and of proper characteristics.

#### **3.02 INSTALLATION**

- A. Install casework, components and accessories in accordance with manufacturer's instructions.
- B. Large Components: Ensure that large components can be moved into final position without damage to other construction.
- C. Use anchoring devices to suit conditions and substrate materials encountered.
- D. Set casework items plumb and square, securely anchored to building structure, with no distortion.
  1. Base Cabinets: Examine floor levelness and flatness of installation space. Do not proceed with installation if encountered floor conditions require more than 3/4 inch (19 mm) leveling adjustment. When installation conditions are acceptable, for each space, establish the high point of the floor. Set and make level and plumb first cabinet in relation to this high point.
- E. Align cabinets to adjoining components.
- F. Fasten together cabinets in continuous runs, with joints flush, uniform and tight. Misalignment of adjacent units not to exceed 1/16 inch (1.6 mm). In addition, do not exceed the following tolerances:
  1. Variation of tops of Base Cabinets from Level: 1/16 inch (1.6 mm) in 10 feet (3 m).
  2. Variation of Faces of Cabinets from a True Plane: 1/8 inch (3 mm) in 10 feet (3 m).
  3. Variation of Adjacent Surfaces from a True Plane (Lippage): 1/32 inch (0.8 mm).
  4. Variation in Alignment of Adjacent Door and Drawer Edges: 1/16 inch (1.6 mm).
- G. Secure upper and floor cabinets to concealed reinforcement at gypsum board assemblies.
- H. Separate dissimilar metals to prevent galvanic action.
- I. Set casework items plumb and square, securely anchored to building structure.
- J. Insulate to prevent electrolysis between dissimilar metals.

- K. Scribe to abutting surfaces and align adjoining components. Apply matching filler pieces where casework abuts dissimilar construction.

**3.03 ADJUSTING**

- A. Adjust operating parts, including doors, drawers, hardware, fixtures to function smoothly.

**3.04 CLEANING**

- A. See Section 01 74 19 - Construction Waste Management and Disposal, for additional requirements.
- B. Clean casework, counters, shelves, glass, legs, hardware, fittings and fixtures.

**3.05 PROTECTION**

- A. Do not permit finished casework to be exposed to continued construction activity.
- B. Protect casework and countertops from ongoing construction activities. Prevent installers from standing on or storing tools and materials on casework or countertops.
- C. Repair damage that occurs prior to Date of Substantial Completion, including finishes, using methods prescribed by manufacturer; replace units that cannot be repaired to like-new condition.

**END OF SECTION**

**SECTION 12 32 16**  
**MANUFACTURED PLASTIC LAMINATE FACED CASEWORK**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Fixed modular plastic laminate clad casework and components.
- B. Plastic laminate countertops .

**1.02 RELATED REQUIREMENTS**

- A. Section 06 10 00 - Rough Carpentry
- B. Section 07 92 00 - Joint Sealants
- C. Section 09 21 16 - Gypsum Board Assemblies
- D. Section 09 65 13 - Resilient Base and Accessories
- E. Section 10 56 17 - Wall Mounted Standards and Shelving
- F. Division 15 - Plumbing
- G. Division 16 - Electrical

**1.03 REFERENCES**

- A. AWI Section 400 (Architectural Cabinets)

**1.04 DEFINITIONS**

- A. Definitions in the AWI/AWMAC/WI's "Architectural Woodwork Standards" apply to the Work of this Section.
- B. Manufactured Plastic Laminate Faced Casework (from here on referred to as "Casework") shall refer to laminated plastic casework, cabinets, shelving, counter, counters, related hardware, and items indicated on the Drawings and specified.
- C. NEMA LD3 - High-Pressure Decorative Laminates (HPDL) Grades:
  - 1. Grade HGS (GP 50): Horizontal grade
  - 2. Grade VGS (GP-28): Vertical Grade
  - 3. Grade CLS (CL 20): Cabinet liner
  - 4. Grade BKL (BK 20): Backing sheet
  - 5. Grade HGF (FR 50): Horizontal application, fire-retardant material
  - 6. Grade VGF (FR 32): Vertical application, fire-retardant material
- D. TFM: Thermally Fused Melamine-Clad Particleboard.
- E. LPDL: Low-Pressure Decorative Laminate.
- F. MDF: Medium Density Fiberboard.
- G. MR MDF: Moisture-Resistant MDF.

**1.05 COORDINATION**

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

**1.06 QUALITY ASSURANCE**

- A. Manufacturer Qualification:
  - 1. Woodwork Institute accredited Millwork Company in good standing.
  - 2. A firm with no less than five years of production experience similar to a specific project, whose qualifications indicate the ability to comply with the requirements of this Section.
  - 3. Single Source Manufacturer: Casework, countertops, and architectural millwork products must all be engineered and built by a single source manufacturer to ensure consistency and quality for these related products. Splitting casework, countertops, and/or architectural millwork between multiple manufacturers will not be permitted.

- B. Installer Qualifications: An authorized representative who is trained and approved by the manufacturer.
- C. Quality Standard:
  - 1. ANSI/AWI 0641-2019 "Architectural Wood Casework Standard", shall be used to establish the minimum standard for casework construction to be provided on the project.
    - a. Aesthetic Grade: Premium
    - b. Performance Level: 1

#### **1.07 SUBMITTALS**

- A. Submit under the provisions of Section 01 33 00
- B. Product Data: For each type of product.
- C. Shop drawings: Include plans, elevations, sections, details, and attachments to other work. Approved shop drawings and field verifications shall be obtained before fabrication.
- D. Keying Schedule: Include a keying chart that indicates whether cabinets by room are keyed alike, keyed differently, and the number of master keys required.
- E. Samples for Verification: For the following:
  - 1. Laminate for each pattern selected.
  - 2. PVC edging for each pattern selected.
  - 3. Thermally fused melamine for each pattern selected.
  - 4. Hardware for each finish selected.

#### **1.08 DELIVERY, STORAGE & HANDLING**

- A. Deliver casework only after painting, utility roughing-in, and similar operations that could damage, soil, or deteriorate casework have been completed in installation areas. If casework must be stored other than installation areas, store only in areas where environmental conditions meet minimum requirements for building conditioning for installation of finishes.
- B. Keep finished surfaces covered with polyethylene film or other protective covering during handling and installation.

#### **1.09 FIELD CONDITIONS**

- A. Maintain indoor temperature and humidity within the range recommended by the manufacturer.
- B. Established Dimensions: Where casework is indicated to fit other construction, establish dimensions for areas where woodwork is to fit. Provide allowance for trimming at the site, and coordinate construction to ensure that actual dimensions correspond to established dimensions.
- C. Locate concealed framing, blocking, and reinforcements that support casework by field measurements before being enclosed, and indicate measurements on Shop Drawings.

#### **1.10 WARRANTY**

- A. Special Manufacturers Warranty: The manufacturer shall warrant the products specified in this Section against material defects, or defects in manufacturing, for two (2) years from the date of Substantial Completion.

### **PART 2 PRODUCTS**

#### **2.01 MANUFACTURERS**

- A. Specified Manufacturer: Advanced Cabinet Systems (ACS)
  - 1. Other Acceptable Manufacturers with equivalent products to the specified manufacturer shall include:
    - a. Advanced Cabinet Systems (Marion, Indiana)
    - b. Stevens Industries (Teutopolis, IL)
    - c. Case Systems (Midland, MI)
    - d. TMI Systems Corporation (Dickinson, ND)
    - e. FADCO (Tulsa, OK)
    - f. C.S. Humphrey & Company, LLC (Kansas City, MO)

- B. Products of unnamed manufacturers with equivalent products to the specified manufacturer will be considered in accordance with the "or equal" provision specified in Division 01 "Product Requirements".
  - 1. Product Substitutions: Comply with the requirements specified in Division 01 "Substitution Procedures".

## 2.02 CASEWORK, GENERAL

- A. Quality Standard: Architectural Woodwork Standards (AWS), Premium Grade.
- B. Cabinet Construction: Flush overlay (concealed hinges).
- C. Cabinet Grain Direction for Wood Grain Plastic Laminate (when applicable):
  - 1. Vertical on door and drawer fronts with continuous vertical matching.
  - 2. Vertical on end panels.
  - 3. Side-to-side on bottoms and tops of units.
  - 4. Vertical on knee-space panels.
  - 5. Horizontal on aprons.

## 2.03 MATERIALS

- A. General: Provide materials that comply with requirements of AWI's quality standard specified, unless otherwise indicated.
- B. Lumber shall be in accordance with the AWS Grade specified for the product being fabricated. Moisture content shall be 6% to 12% for boards up to 2-inches thick and shall not exceed 19% for thicker pieces.
- C. Particle Board: ANSI A208.1, Mat-Formed Particle Board, Grade M-2, made with a binder containing no urea-formaldehyde.
  - 1. Density: 45-pound, minimum.
  - 2. Thickness: 3/4-inch, minimum.
- D. Hardboard: ANSI A135.4, Class 1, Tempered.
- E. Decorative Laminates: Shall be High-Pressure Decorative Laminate (HPDL):
  - 1. Compliance: NEMA LD 3, and ANSI A161.2.
    - a. Grades as required by the woodwork quality standards.
  - 2. Grades and Thickness:
    - a. VGS: Vertical Grade, 0.028-inches thick.
    - b. HGS: Horizontal Grade, 0.048-inches thick.
    - c. HGP: Horizontal Grade, Post-formed, 0.039-inches thick.
    - d. VGP: Vertical Grade, Post-Formed, 0.028-inches thick.
    - e. HGF (when applicable): Horizontal application, fire retardant material.
    - f. VGF (when applicable): Vertical application, fire retardant material.
    - g. CLS: Cabinet Liner, 0.020-inches thick.
    - h. BKH: Backer, 0.020-inches thick.
    - i. TFM: Thermally Fused Melamine Laminate Panels: NEMA LD 3, Grade VGL, 100 grams. Finish shall be resistant to water and mild cleaners.
- F. Medium Density Fiberboard (MDF):
  - 1. Compliance: ANSI A208.2, Grade 130.
- G. Moisture-Resistant MDF (MR-MDF): Where countertops receive sinks, lavatories, or are subjected to liquids:
  - 1. Product: "Medex", as manufactured by Roseburg Forest Products Company.
    - a. Compliance: ANSI A208.2 - Grade 155; MR50.
    - b. Density: 45-pcf, minimum.
- H. Edgebanding: Refer to the "Edgebanding" Article in this Section.
- I. Glass for Glazed Doors (when applicable):
  - 1. Standard Glazing: Clear tempered glass complying with ASTM C1048, Kind FT; not less than 1/4-inch thickness.

- J. Adhesives: Chemical-resistant waterproof adhesive as recommended by the manufacturer of materials being joined. Do not use adhesives that contain urea-formaldehyde.
- K. Joint Sealant: Mildew-resistant silicone sealant.

## 2.04 CABINET SURFACES

- A. Exterior Surfaces of Cabinets:
  - 1. Door and Drawer Fronts: HPDL, Grade VGS. Provide a balanced backing sheet (BKH) on all door and drawer fronts.
  - 2. Cabinet Sides: HPDL, Grade VGS.
  - 3. Wall Cabinets - Bottoms:
    - a. 48-inches or more above finished floor: HPDL, Grade VGS.
    - b. Less than 48-inches above finished floor: HPDL, Grade HGS.
  - 4. Wall Cabinets, Tall Cabinets, and Hutches - Tops:
    - a. 80-inches or taller, and not visible from above: HPDL, Grade VGS.
    - b. Less than 80-inches tall, or visible from above: HPDL, Grade HGS.
  - 5. Sloped Tops on Tops of Wall Cabinets, and Tall Cabinets: HPDL, Grade HGS
  - 6. Soffit Panels on Tops of Wall Cabinets, and Tall Cabinets: HPDL, Grade HGS
  - 7. Edges: Refer to the "Edgebanding" Article in this Section.
- B. Interior Surfaces of Cabinets - Exposed (open interiors):
  - 1. Application: Any open storage unit without solid door or drawer fronts, units with glass or acrylic inserts in the doors, and units with sliding doors.
  - 2. Open Cabinet Interior (Top, bottom, back, sides, horizontal and vertical members): HPDL, Grade VGS.
  - 3. Open Cabinet Shelving: HPDL, Grade VGS.
  - 4. Edges: Refer to the "Edgebanding" Article in this Section.
- C. Interior Surfaces of Cabinets - Semi-Exposed (closed interiors):
  - 1. Application: Surfaces behind opaque doors and drawers.
  - 2. Door and Drawer Fronts: HPDL, Grade VGS.
  - 3. Cabinet Interior: Top, bottom, back, sides, horizontal and vertical members: HPDL, Grade TFM; Color shall be White.
  - 4. Closed Cabinet Shelving: HPDL, Grade VGS.
  - 5. Edges: Refer to the "Edgebanding" Article in this Section.
- D. Concealed Surfaces of Cabinets:
  - 1. Surfaces that are not visible after installation, including sleepers, web frames, dust panels, and ends and backs that are placed directly against walls or other cabinets; HPDL, Grade TFM, CLS, or BKH at Manufacturer's Option.
- E. Toe Kicks: Resilient base (by others).
- F. Drawer Boxes: Clear Finish, or Metabox (Contractor Option).

## 2.05 EDGEBANDING

- A. Edgebanding, designated in the Drawings as FinishType EB- #
  - 1. Refer to the "Interior Finish Legend" in the Drawings for pertinent information on this Finish Type, including manufacturer, model/pattern, color, size, and other related information
- B. Manufacturer: Rehau, or equivalent
- C. Material: Rigid PVC extrusion; through color with a satin finish.
  - 1. Color: To be determined
- D. Edgebanding Thickness:
  - 1. Cabinet Box Edges: 1-mm PVC
  - 2. Door and Drawer Fronts: 3-mm PVC
  - 3. Adjustable Shelves - Closed Cabinets Interiors: 3-mm PVC, front edge only
  - 4. Adjustable Shelves - Open Cabinet Interiors: 3-mm PVC, front edge only

5. Tops of Wall Cabinets, Tall Cabinets, and Hutches: 1-mm PVC
6. Countertops: 3-mm PVC
7. Splashes: 3-mm PVC

## 2.06 CASEWORK FABRICATION

- A. Cabinet Body Construction:
  1. Balanced construction of all laminated panels is mandatory.
    - a. Unfinished core stock surfaces, even on concealed surfaces (excluding edges), are not permitted.
  2. Tops, Bottoms, and Side Panels:
    - a. Core Material (Typical): 3/4-inch thick particleboard core with HPDL or TFM finish depending on the exposure.
      - 1) Exception: Sink Cabinets: Core shall be 3/4-inch thick Moisture-Resistant MDF (MR-MDF) with HPDL or TFM finish depending on the exposure.
    - b. Side panels and vertical dividers shall receive adjustable shelf hardware at 32mm line boring centers. Mount door hinges, drawer slides, and pull-out shelves in the line boring for consistent alignment.
    - c. Edgebanding: Refer to the "Edgebanding" Article in this Section.
  3. Back Panels:
    - a. Closed Cabinets: 1/2-inch thick particleboard core with HPDL or TFM finish depending on the exposure.
      - 1) Core Material (Typical): 1/2-inch thick particleboard core with TFM finish.
        - (a) Exception: Sink Cabinet shall be 1/2-inch thick Moisture-Resistant MDF (MR-MDF) with TFM finish depending on the exposure.
      - 2) The back shall be dadoed into sides, bottoms, and tops of closed cabinets.
    - b. Open Cabinets: 3/4-inch thick particleboard core with HPDL finish.
      - 1) The back shall be dowelled into sides, bottoms, and tops of open cabinets.
  4. Cabinet Bases:
    - a. Material: 3/4-inch, 45-pound density particle board.
    - b. Height: 4-inches, unless noted otherwise.
    - c. Base Options:
      - 1) Individual factory-applied base.
      - 2) Separate Cabinet Bases (Contractor Option): Bases to be continuous per elevation with cross members on 16-inch centers.
  5. Base Units: Provide with an open top and a stretcher at the front, attached to the sides.
    - a. Sink Base Units: Provide with an open top and a stretcher at the front, attached to the sides. Back to be split removable access panel.
- B. Adjustable Shelves in Cabinets:
  1. All shelving shall be a 1-inch thick particleboard core with HPDL finish.
  2. All shelving shall be fully adjustable on 2-inch centers, with 5mm diameter holes.
  3. Edgebanding: Refer to the "Edgebanding" Article in this Section.
- C. Door and Drawer Fronts:
  1. 3/4-inch particleboard core with HPDL finish.
    - a. Sink Cabinets: Core shall be Moisture-Resistant MDF (MR-MDF) with HPDL finish.
  2. Edgebanding: Refer to the "Edgebanding" Article in this Section.
- D. Drawer Bodies (Standard drawer):
  1. Drawer sides and back shall be 1/2-inch thick hardwood with fully dovetailed front, back, and sides, and 1/4-inch thick hardwood plywood or tempered masonite bottoms.
  2. All exposed top, sides, bottoms, and backs of wood (and masonite) to have factory finish of two (2) coats lacquer.
  3. Drawer Configuration: Standard drawer.
  4. Drawer Slides:
    - a. Drawer Slide Operation: Full extension.
    - b. File Drawer Slides: Full extension.

- c. Refer to the "Drawer Slides" Article in this Section.
5. Drawer Box Length: 21-5/8 inches unless otherwise indicated.
6. Testing Standards: Meet or exceed ANSI/BHMA A156.9, Grade 1.
  - a. Static load capacity: 100 lbs.
  - b. Dynamic load capacity: 75 lbs.
  - c. Test to perform 100,000 open/close cycles without failure.
- E. Steel Drawer Pans (Contractor Option):
  1. Basis of Design Product: "Metabox", as manufactured by Blum, Inc.
    - a. Material / Finish: 0.0359-inch (0.9-mm-) thick metal, metallic phosphate treated, and finished with manufacturer's standard two-coat, baked-enamel finish consisting of prime coat and thermosetting topcoat with a minimum dry film thickness of 1 mil (0.025 mm) for topcoat and 2 mils (0.05 mm) for the system.
    - b. Drawer Configuration: Standard drawer.
    - c. Drawer Heights:
      - 1) Type N: 2-1/8 inches (54 mm)
      - 2) Type M: 3-3/8 inches (86 mm)
      - 3) Type K: 4-5/8" inches (118 mm) - Standard drawer height.
      - 4) Type H: 5-7/8 inches (150 mm)
    - d. Drawer Slide Operation: Self-Closing Action Drawer Slides (BLUMATIC) with full Extension Drawer Slides (330 Series).
    - e. Drawer Box Length: 21-5/8 inches.
    - f. Testing Standards: Meet or exceed ANSI/BHMA A156.9, Grade 1.
      - 1) Static load capacity: 100 lbs.
      - 2) Dynamic load capacity: 75 lbs.
      - 3) Test to perform 100,000 open/close cycles without failure.
  - F. Sloped Tops at Clinical Areas: Separate unit from the cabinet, set at 30-degree angle, where indicated in the Drawings.
  - G. Soffit Panels at Clinical Areas: Provided from the top of the cabinets up to the finished ceiling. Separate unit from the cabinet, set at 90-degree angle, where indicated in the Drawings.
  - H. Filler Strips: Provide as needed to close spaces between cabinets and walls, ceilings, and indicated equipment. Fabricate from the same material and with the same finish as cabinets.

## 2.07 JOINERY OF CASE BODY MEMBERS

- A. Acceptable Joinery Methods:
  1. Tops, exposed ends, and bottoms:
    - a. Stop dado, glued with pressure, and either nailed, stapled, or screwed (fasteners will not be visible on exposed parts), or
    - b. Doweled, glued with pressure; approx. 4 per foot, or
    - c. European assembly screws:
      - 1) Fasteners are to be used no more than 37mm from each end, with subsequent screws no more than 128-mm on-center.
      - 2) Screw heads and/or plastic trim caps shall not be visible on exposed parts.
      - 3) Glue is not required with this system.
  2. Cabinet Backs - Wall-Mounted Cabinets:
    - a. Captured in grooves on cabinets sides and bottom; securely fastened.
- B. Cabinet backs - Floor-Standing Cabinets:
  1. Side bound, captured in grooves; securely fastened to top and bottom.

## 2.08 HARDWARE

- A. Provide cabinet hardware and accessory materials associated with architectural cabinets, except for items specified in Section 08 72 00 - Door Hardware (when applicable).
- B. Exposed Hardware Finishes: For exposed hardware, provide a finish that complies with BHMA A156.18 for the BHMA finish number indicated.
  1. Satin Chromium Plated: BHMA 626 for brass or bronze base; BHMA 652 for steel base.

2. Satin Stainless Steel: BHMA 630.
- C. Concealed Hardware Finishes: Provide manufacturer's standard finish that complies with product class requirements in BHMA A156.9.

## 2.09 HINGES

- A. Frameless Concealed Hinges (European Type): BHMA A156.9, Type B01602, 170-degrees of opening, self-closing.
  1. Product:
    - a. Hinge: Blum; Inserta Clip Top No. 71T6540B, or equivalent
    - b. Hinge Plates: Blum; Inserta No. 174H7100i, or equivalent
  2. Hinge Quantity:
    - a. Provide two hinges for doors up to and including 36-inches high.
    - b. Provide three hinges for doors over 36-inches, up to and including 54-inches high.
    - c. Provide four hinges for doors over 54-inches up to and including 72-inches high.
    - d. Provide five hinges for doors over 72-inches high.

## 2.10 DRAWER AND DOOR PULLS

- A. Wire Pulls, Surface-mounted, BHMA A156.9:
  1. Application: Typical door and drawer pulls throughout Project. Refer to the interior elevations in the Drawings for clarification.
  2. Basis of Design: Berensen; Model #6130-2SC-P Back Mounted Wire Pulls or equivalent.
    - a. Material: Steel
    - b. Finish: Satin Chrome
    - c. Center-to-Center: 4-inches
    - d. Diameter: 5/16-inches
    - e. Projection: 1-1/4 inches
  3. Provide two pulls for drawers more than 27-inches wide.
  4. Provide 1-inch long mounting screws.
  5. Other Acceptable Manufacturers:
    - a. Doug Mockett
    - b. Amerock
    - c. Rok Hardware
    - d. Jako Hardware
    - e. or equivalent

## 2.11 MISCELLANEOUS

- A. Door Catches:
  1. Base and Wall Cabinets: Self-aligning, permanent magnetic catches.
  2. Tall Cabinets: Nylon-roller spring catch.
    - a. Provide two catches on doors more than 48-inches high.
- B. Door and Drawer Bumpers: Self-adhering, clear silicone rubber.
  1. Doors: Provide one bumper at the top and bottom of the closing edge of each swinging door.
  2. Drawers: Provide one bumper on the backside of the drawer fronts at each corner.
- C. Adjustable Shelf Supports:
  1. Product: Hafele; Item # 282.47.402, Shelf Support - Heavy-Duty, Transparent
    - a. Two-pin (5-mm) for a 32-mm system, locks 1-inch shelves, complies with BHMA A156.9

## 2.12 DRAWER SLIDES

- A. Test Standards: ANSI / BHMA A156.9
  1. Product Grade/ Load Rating:
    - a. Grade 1: 50-lb (22.2-kg) load rating
    - b. Grade 2: 30-lb (13.3-kg) load rating
    - c. Grade 3: 20-lb (8.9-kg) load rating

- d. Grade 1HD-100: 100-lb (44.5-kg) load rating
- e. Grade 2HD-200: 200-lb (90-kg) load rating
- B. Specified Manufacturer: Accuride
  - 1. Other Manufacturers: Products of Knappe & Vogt (K&V), Hafele, or approved equivalent.
- C. Standard Box Drawer Slides:
  - 1. Product: Accuride 3832, or equivalent.
    - a. Applications: Regular, knee space, and pencil drawers not more than 6 inches (150 mm) high and 24 inches (600 mm) wide
    - b. Grade: 1HD-100
    - c. Design: Epoxy coated steel, bottom corner mounted with smooth and quiet nylon rollers. Positive stop in both directions with a self-closing feature.
- D. Heavy-Duty Box Drawer Slides:
  - 1. Product: Accuride 4032, or equivalent.
    - a. Applications: Paper storage drawers more than 6 inches (150 mm) high or 24 inches (600 mm) wide.
    - b. Grade: 2HD-200
    - c. Design: Full extension, epoxy-coated steel, bottom corner mounted with smooth and quiet nylon rollers. Positive stop in both directions with a self-closing feature.
- E. File Drawer Slides:
  - 1. Product: Accuride 4032
    - a. Applications: Letter/ legal file drawers
    - b. Grade: 1HD-100
    - c. Design: Full extension, 150-pound load rated epoxy coated steel, bottom corner mounted with smooth and quiet nylon rollers. Positive stop in both directions with a self-closing feature.
- F. Lateral File Drawer Slides:
  - 1. Product: Accuride 4032
    - a. Applications: Lateral file drawers, 30-inches and wider
    - b. Grade: 2HD-200
    - c. Design: Full extension, epoxy-coated steel, bottom corner mounted with smooth and quiet nylon rollers. Positive stop in both directions with a self-closing feature.
- G. Soiled Linen Slides (when applicable): Grade 1HD-200; for trash bins, not more than 20 inches (500 mm) high and 16 inches (400 mm) wide.
  - 1. Applications: For trash bins not more than 20 inches (500 mm) high and 16 inches (400 mm) wide.
  - 2. Grade: Grade: 2HD-200
  - 3. Design: Full extension, epoxy-coated steel, bottom corner mounted with smooth and quiet nylon rollers. Positive stop in both directions with a self-closing feature.
  - 4. Product: Accuride 4032 or equivalent.

### **2.13 DOOR AND DRAWER LOCKS**

- A. Door and Drawer Locks (Standard):
  - 1. Cam Locks:
    - a. Product: Olympus; DCN Series:
      - 1) Keyways: Re-keyable via cylinder retainer clip.
        - (a) Master-keyed: N Series, National D4292, 5-pin system.
  - 2. Compliance: ANSI/BHMA Grade 1
  - 3. Standard Function: Key removable in a locked or unlocked position. Standard function locks are non-handed.
  - 4. Cams: Provide one reversible straight cam and one reversible offset cam.
  - 5. Cam locks will have a 1-inch face diameter and include an anti-rotation plate to trap the hex nut and prevent the lock from twisting in the hole.

6. All locks will provide functionality such that the keyway will remain in the vertical position regardless of installation as a door or drawer.
  7. Barrel Length: 15/16-inch, 1-3/8 inch, and 1-5/8-inch as needed.
  8. Angle Strike: Olympus #12-3.
  9. Finish: US26D.
- B. Lock Locations:
1. Provide locks on tall storage cabinets as shown on drawings.
  2. Provide locks on file drawers as shown on drawings
  3. Provide locks on base cabinet doors and drawers as shown on drawings.
  4. Provide locks on wall cabinet doors as shown on drawings.

## 2.14 UTILITY SHELVING

- A. Refer to Section 10 56 17 - Wall Mounted Standards and Shelving, for requirements

## 2.15 PLASTIC LAMINATE COUNTERTOPS

- A. Materials:
1. High-Pressure Decorative Laminate Grade: HGS
    - a. Grain Direction: Parallel to cabinet fronts.
  2. Core Material (Standard): Particleboard or MDF
    - a. Thickness: 1-1/8 inches
  3. Core Material at Wet Locations: Moisture-Resistant MDF (MR-MDF) at sink and lavatory locations, or locations subjected to liquids.
    - a. Thickness: 1-1/8 inches
  4. Backer Sheet: Provide plastic laminate backer sheet, Grade BKH, on the underside of countertop substrate
  5. Cleats: 3/4-inch (19-mm), Grade TFM.
- B. Exposed Edge Treatment:
1. Square, Self-Edge: Substrate built up to 1 1/4-inches thick; exposed faces covered with edgebanding. Refer to the "Edgebanding" Article in this Section.
    - a. Application of self-edge: Edge laminated before the top.
- C. Splashes (Back and End):
1. Loose Back and End Splashes shall be 3/4-inches thick and field-attached using screws from the underside of the deck through a continuous bead of silicone sealant.
    - a. Exposed edges and ends of the splashes shall be covered with edgebanding. Refer to the "Edgebanding" Article in this Section.
  2. Splashes in wet areas shall be moisture-resistant MDF (Medex) with high-pressure laminate bonded to all faces, including BKL on the back.
- D. Countertop Configuration and Sizes:
1. Overall Thickness: 1-1/4 inches.
  2. Depth:
    - a. As indicated on drawings.
    - b. Countertops requiring compliance with ADA shall have a maximum depth of 24-inches (600-mm) from the face of the wall to the front edge of the countertop.
  3. Length and Layout: As indicated on drawings.
  4. Overhang: 1-inch (25-mm) beyond the face of base cabinets.
  5. Open End Radii: Countertops with open ends shall have a 1-1/2 inch radius at the open end between the front and end faces.
- E. Grade: Premium
- F. Performance:
1. Surface Burning Characteristics: Flame spread index of 25, maximum; smoke-developed index of 450, maximum; when tested in accordance with ASTM E84.
  2. NSF approved for food contact.
  3. Wear Resistance: In addition to specified grade, comply with NEMA LD 3 High Wear Grade requirements for wear resistance.

G. Countertop Accessories:

1. Wall-Mounted Countertop Support Brackets: Provide metal wall bracket, 1/8-inch thick, with black powder coat finish for support of countertops as shown on the Drawings.
  - a. Product: A&M Hardware (Web: www.AandMHardware.com).
    - 1) Size: Sized to correspond to countertop depth.
  - b. Provide fire-treated solid wood blocking to support and secure brackets when installed at metal stud walls.
  - c. Load capacity shall be 1000 lbs per bracket, minimum.
2. Grommets for Cable Passage through Work Counters: 2-1/2 inch OD, color as selected by Architect, molded-plastic grommets with matching plastic caps with a slot for wire passage. Provide one (1) grommet centered between the countertop support brackets at each knee space module.
  - a. Product: "EDP series" by Doug Mockett, or equivalent. Color: Black.

**2.16 PLASTIC LAMINATE MATERIAL**

- A. Plastic Laminate Material, designated in the Drawings as Finish Type PLAM- #
  1. Refer to the "Interior Finish Legend" in the Drawings for pertinent information on this Finish Type, including manufacturer, model/pattern, color, size, and other related information
- B. Products:
  1. Manufacturer: As scheduled on the Interior Finish Legend
  2. Product Code: As scheduled on the Interior Finish Legend
  3. Color: As scheduled on the Interior Finish Legend
- C. Laminate Properties:
  1. Laminate Composition: Decorative surface papers impregnated with melamine resins and pressed over kraft paper core sheets impregnated with phenolic resin. Sheets then bonded together under high pressure and high temperatures. Finished sheets trimmed and backs sanded to facilitate bonding to the substrate.
  2. Surface Burning Characteristics:
    - a. Test Standards: ASTM E 84, ASTM E 162, ASTM E 662, IMO FTP Code Part 2 and Part 5, and UL 723.
    - b. Interior Finish Classification, Fire-Rated Laminate: Class A according to NFPA 101.
    - c. Flame Spread Index: Less than 25; Smoke Developed Index: Less than 450.
  3. Surfaces Subject to Food Contact: Comply with NSF Standard 35.
  4. Grades: Refer to the "Materials" Article in this Section.

**PART 3 - EXECUTION**

**3.01 EXAMINATION**

- A. Examine areas, with Installer present, for compliance with requirements for installation tolerances, location of framing and reinforcements, and other conditions affecting the performance of the Work.

**3.02 PREPARATION:**

- A. Condition casework to average prevailing humidity conditions in installation areas before installing.

**3.03 INSTALLATION**

- A. Erect casework level, plumb, and true; shim as required, using concealed shims. Where casework abuts other finished work, apply filler strips and scribe for accurate fit, with fasteners concealed where practical.
- B. Separate Cabinet Bases: At the contractor's option, install separate cabinet bases before remaining casework as required to coordinate with the installation of flooring and base.
- C. Provide and install scribe strips to adjoining walls, accurately fitted, installed with fastenings.
- D. Base Cabinets: Set cabinets straight, level, and plumb. Adjust subtops within 1/16 inch of a single plane. Align similar adjoining doors and drawers to a tolerance of 1/16 inch. Bolt

adjacent cabinets together with joints flush, tight, and uniform.

- E. Wall Cabinets: Hang wall cabinets straight, level, and plumb. Adjust fronts and bottoms to align in a single plane or straight line. Fasten to hanging strips, masonry, framing, wood blocking, or reinforcements in walls and partitions to provide positive anchorage. Align similar adjoining doors to align in a straight line.
- F. Fasten cabinets to adjacent cabinets and to masonry, framing, wood blocking, or reinforcements in walls and partitions to comply with the AWI's, AWMAC's, and WI's "Architectural Woodwork Standards."
- G. Install hardware uniformly and precisely. Set hinges snug and flat in mortises unless otherwise indicated. Adjust and align hardware so moving parts operate freely and contact points meet accurately. Allow for final adjustment after installation.
- H. Repair or remove and replace defective work as directed on completion of installation.
- I. Adjust casework and hardware so doors and drawers operate smoothly without warp or bind. Lubricate operating hardware as recommended by the manufacturer.

#### **3.04 CLEANING**

- A. Remove and dispose of all packing materials and related construction debris.
- B. Clean cabinets inside and out. Wipe off fingerprints, pencil marks, and surface soil, etc., in preparation for final cleaning by the building owner.

#### **3.05 PROTECTION**

- A. Protect completed work from damage during remainder of the construction period.
- B. DO NOT stand on the installed countertops for any reason.

**END OF SECTION**

**SECTION 12 36 00  
COUNTERTOPS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Countertops for architectural cabinet work.
- B. Wall-hung counters and vanity tops.
- C. Sinks molded into countertops.

**REFERENCE STANDARDS**

- D. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar.
- E. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
- F. AWI (QCP) - Quality Certification Program.
- G. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards, 2nd Edition.
- H. AWMAC/WI (NAAWS) - North American Architectural Woodwork Standards.
- I. PS 1 - Structural Plywood.

**1.02 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- 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. Specimen warranty.
- C. Shop Drawings: Complete details of materials and installation ; combine with shop drawings of cabinets and casework specified in other sections.
- D. Verification Samples: For each finish product specified, minimum size 6 inches (150 mm) square, representing actual product, color, and patterns.
- E. Test Reports: Chemical resistance testing, showing compliance with specified requirements.
- F. Certificate: Submit labels and certificates required by quality assurance and quality control programs.
- G. Maintenance Data: Manufacturer's instructions and recommendations for maintenance and repair of countertop surfaces.

**1.03 QUALITY ASSURANCE**

- A. Installer Qualifications: Company specializing in performing work of the type specified in this section, with not less than three years of documented experience.
- B. Fabricator Qualifications: Same fabricator as for cabinets on which tops are to be installed.
- C. Quality Certification:
  - 1. Comply with AWI (QCP) woodwork association quality certification service/program in accordance with requirements for work specified in this section: [www.awiqcp.org/#sle](http://www.awiqcp.org/#sle).
  - 2. Provide labels or certificates indicating that the installed work complies with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS) requirements for grade or grades specified.
  - 3. Provide designated labels on shop drawings as required by certification program.
  - 4. Provide designated labels on installed products as required by certification program.
  - 5. Submit certifications upon completion of installation that verifies this work is in compliance with specified requirements.

**1.04 DELIVERY, STORAGE, AND HANDLING**

- A. Store products in manufacturer's unopened packaging until ready for installation.

- B. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

### 1.05 FIELD 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 absolute limits.

## PART 2 PRODUCTS

### 2.01 COUNTERTOPS

- A. Quality Standard: Premium Grade, in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), unless noted otherwise.
- B. Stainless Steel Countertops: , Type 304, stainless steel sheet; 14 gauge, [0.075] inch ([ ] mm) nominal sheet thickness.
1. Finish: 4B satin brushed finish.
  2. Exposed Edge Shape in Sink Areas: Marine edge with return; edge raised 3/16 inch (5 mm) above counter with 45 degree transition, minimum [1/2] inch ([ ] mm) flat rim; 1-1/2 inch (38 mm) high turndown, 1/2 inch (12 mm) return to face of case; reinforced with hardwood or steel.
  3. Back and End Splashes: Same material; welded 1/4 inch (6 mm) radius coved joint to countertop; square top edge with 1 inch (25 mm) wide top surface and minimum 1/2 inch (12 mm) turndown.
  4. Splash Dimensions: 4 inch (100 mm) high by 1 inch (25 mm) thick, unless otherwise indicated.
  5. Integral Stainless Steel Sinks: Same material, same thickness; flush welded to counter; bottom sloped to outlet; radiused interior corners; drain outlet located in center of sink basin
    - a. Locations
      - 1) Scope Decontamination
        - (a) Size: 22"L x 16"W x 9"D
        - (b) Spacing between sinks: 6"
      - 2) Scope Reprocessing
        - (a) Size: 16"L x 16"W x 5.5"D
      - 3) Central Sterile, Decontamination
        - (a) Size: 28"L x 16"W x 12"D
    - b. Accessories
      - 1) Sink Bottom Grids: Provide removeable sink bottom grids as described below:
        - (a) Style: Perforated Metal Round Hole
        - (b) Material: 304 Stainless Steel
        - (c) Gauge: 18
        - (d) Hole spacing: 3/16" (min.)
        - (e) Grid Offset from Botton of Sink:
          - (1) 1 inch
          - (2) 2 inches
        - (f) Size: To match sink compartment size minus 1/2 inch to allow for snug fit and easy removal.
        - (g) Quantity: Provide one sink bottom grid of each grid offset option per sink size in:
          - (1) Scope Decontamination
          - (2) Central Sterile, Decontamination
      - 2) Lever Sink Drain Operator equal to:
        - (a) Manufacturer: Advance Tabco
        - (b) Material: Brass
        - (c) Pipe Diameter: 3-1/2" (or as required)
        - (d) Connection: IPS x NPT

- (e) Length: As Required
- (f) Location: All integral sinks in:
  - (1) Scope Decontamination
  - (2) Central Sterile, Decontamination

## 2.02 MATERIALS

- A. Plywood for Supporting Substrate: PS 1 Exterior Grade, A-C veneer grade, minimum 5-ply; minimum 3/4 inch (19 mm) thick; join lengths using metal splines.
- B. Adhesives: Chemical resistant waterproof adhesive as recommended by manufacturer of materials being joined.
- C. Joint Sealant: Mildew-resistant silicone sealant, white.

## 2.03 FABRICATION

- A. Fabricate tops and splashes in the largest sections practicable, with top surface of joints flush.
  - 1. Join lengths of tops using best method recommended by manufacturer.
  - 2. Fabricate to overhang fronts and ends of cabinets 1 inch (25 mm) except where top butts against cabinet or wall.
  - 3. Prepare all cutouts accurately to size; replace tops having improperly dimensioned or unnecessary cutouts or fixture holes.
- B. Provide back/end splash wherever counter edge abuts vertical surface unless otherwise indicated.
  - 1. Secure to countertop with concealed fasteners and with contact surfaces set in waterproof glue.
  - 2. Height: 4 inches (102 mm), unless otherwise indicated.
- C. Stainless Steel: Fabricate tops up to 144 inches (3,657 mm) long in one piece including nosings and back and end splashes; accurately fitted mechanical field joints in lengths over that dimension are permitted.
  - 1. Weld joints; grind smooth and polish to match.
  - 2. Provide stainless steel hat channel stiffeners, welded or soldered to underside, where indicated on drawings.
  - 3. Provide wall clips for support of back/end splash turndowns.
  - 4. Sound Deadening: Apply water resistant, fire resistant sound deadening mastic to entire bottom surface.
- D. Wall-Mounted Counters: Provide skirts, aprons, brackets, and braces as indicated on drawings, finished to match.

## 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.
- C. Verify that wall surfaces have been finished and mechanical and electrical services and outlets are installed in proper locations.

### 3.02 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.

### 3.03 INSTALLATION

- A. Securely attach countertops to cabinets using concealed fasteners. Make flat surfaces level; shim where required.
- B. Attach stainless steel countertops using stainless steel fasteners and clips.
- C. Seal joint between back/end splashes and vertical surfaces.

**3.04 CLEANING**

- A. Clean countertops surfaces thoroughly.

**3.05 PROTECTION**

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

**END OF SECTION**

**SECTION 12 36 61  
QUARTZ SURFACING FABRICATIONS**

**PART 1 - GENERAL**

**1.01 SECTION INCLUDES**

- A. Quartz surfacing countertops for manufactured casework, including back- and end-splashes.
- B. Installation materials.

**1.02 RELATED REQUIREMENTS**

- A. Section 06 10 00 - Rough Carpentry
- B. Section 07 92 00 - Joint Sealants
- C. Section 12 32 16 - Manufactured Plastic Laminate Faced Casework
- D. Division 21 - Plumbing
- E. Division 26 - Electrical

**1.03 REFERENCE STANDARDS**

- A. ASTM C 97: Standard Test Methods for Absorption and Bulk Specific Gravity of Dimension Stone.
- B. ASTM C 170: Standard Test Method for Compressive Strength of Dimension Stone.
- C. ASTM C 501: Standard Test Method for Relative Resistance to Wear of Unglazed Ceramic Tile by Taber Abraser.
- D. ASTM C 834: Standard Specification for Latex Sealants.
- E. ASTM C 920: Standard Specification for Elastomeric Joint Sealants.
- F. ASTM D 790: Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.
- G. ASTM E 84: Standard Test Method for Surface Burning Characteristics of Building Materials.
- H. ISO: International Organization of Standardization.
- I. ISO 9001: Quality Management Systems.
- J. NSF/ANSI Standard 51: Food Equipment Materials.
- K. SCAQMD Rule 1168: Adhesive and Sealant Applications.
- L. UL 2818: GREENGUARD Certification Program for Chemical Emissions for Building Materials, Finishes, and Furnishings.

**1.04 SUBMITTALS**

- A. Product Data: For countertop materials.
  - 1. Submit data for each specified product. Include manufacturer's technical data sheets and published installation instructions.
  - 2. Submit Safety Data Sheets (SDS) for adhesives and sealants.
- B. Shop Drawings: For countertops. Submit dimensioned shop drawings showing countertop layouts, backsplashes, vanities, joinery, edge conditions, terminations, substrate construction, cutouts, and holes.
  - 1. Show locations and details of joints.
  - 2. Show direction of directional pattern, if any.
  - 3. Show plumbing installation provisions.
- C. Samples: Submit selection and verification samples for each color and pattern required.
- D. Qualification Data: For fabricator.
- E. Test Reports: Submit certified test reports showing compliance with specified performance characteristics and physical properties.
- F. Warranty: Submit specimen copy of specified warranty.

- G. Maintenance Data: Submit manufacturer's published maintenance and care manual. Include Product Data for care products used or recommended by Installer and names, addresses, and telephone numbers of local sources for products.

### 1.05 QUALITY ASSURANCE

- A. Applicable Standards
  - 1. Standards of the following, as referenced herein:
    - a. American National Standards Institute (ANSI)
    - b. American Society for Testing and Materials (ASTM)
    - c. National Electrical Manufacturers Association (NEMA)
    - d. NSF International
- B. Fire Test response characteristics
  - 1. Provide with the following Class A (Class 1) surface burning characteristics as evidenced by testing identical products against ASTM E84 (UL 723) or another testing and inspecting agency acceptable to authorities having jurisdiction.
  - 2. Flame Spread Index: 25 or less
  - 3. Smoke Developed Index: 450 or less
- C. Allowable Tolerances
  - 1. Variation in component size  $\pm 1/8"$  (3mm) over a ten (10) foot length
  - 2. Location of openings:  $\pm 1/8"$  (3mm) from indicated location
  - 3. Maximum  $1/8"$  (3mm) clearance between quartz surfaces and each wall
- D. Regulatory Requirements
  - 1. Accessibility Requirements: Comply with the U.S. Architectural & Transportation Barriers Compliance Board ADA-ABA Accessibility Guidelines for Buildings and Facilities.
- E. Manufacturing Facility Qualifications: Quartz surfacing materials produced in an ISO 9001 certified facility.
- F. Fabricator Qualifications: Minimum of five years documented experience in fabricating quartz surfacing countertops similar in scope and complexity to this Project, using water-cooled cutting tools. Currently certified by the manufacturer as an acceptable fabricator.
- G. Installer Qualifications: Minimum of five years documented installation experience for projects similar in scope and complexity to this Project, and currently certified by the manufacturer as an acceptable installer.
- H. Mockups: Construct mockup (if requested by Architect) to demonstrate aesthetic effects and to set quality standards for fabrication and execution.
  - 1. Build mockup of typical countertop, 18-inches wide, full depth with backsplash, and partial cutout for an undermount sink.

### 1.06 DELIVERY, STORAGE, AND HANDLING

- A. Comply with manufacturer's recommendations for shipping and handling quartz surfacing materials to preclude breakage and damage. Brace quartz surfacing units as necessary during shipment, transporting in near-vertical position with finished face towards finished face. Do not allow finished surfaces to rub during shipping and handling.
- B. Store materials protected from exposure to harmful weather conditions, at temperature and humidity conditions recommended by the manufacturer. Store quartz surfacing sheet materials on racks in near-vertical position to preclude damage. Store with finished face turned towards finished face. Prevent warpage and breakage.

### 1.07 PROJECT CONDITIONS

- A. Field Measurements: Verify dimensions of countertops and openings by field measurements[ after base cabinets are installed but] before countertop fabrication is complete. Show recorded measurements on shop drawings.
- B. Adhesives: Acclimate adhesives to occupancy room temperatures with maximum temperature not to exceed 75 deg F (24 deg C).

### 1.08 COORDINATION

- A. Coordinate field measurements and fabrication schedule with construction progress.
- B. Coordinate locations of utilities that will penetrate countertops.

### 1.09 WARRANTY

- A. Manufacturer Warranty: The manufacturer shall warrant the product/s to be free of defects in material and workmanship for a period of ten (10) years from Date of Substantial Completion.
- B. Installation Warranty: The installing subcontractor shall warrant the installation to be free of defects in material and workmanship for a period of one (1) year from Date of Substantial Completion.

## PART 2 PRODUCTS

### 2.01 MANUFACTURERS

- A. Quartz Surfacing Fabrications:
  - 1. Specified Manufacturer: Wilsonart.
    - a. Other Acceptable Manufacturer: No substitutions will be considered or accepted.

### 2.02 QUARTZ SURFACING

- A. Quartz Surfacing Fabrications, designated in the Drawings as Finish Type QTZ- #
  - 1. Refer to the "Interior Finish Legend" for pertinent information on this Finish Type, including manufacturer, model/pattern, color, size, and other related information.
- B. Type QTZ-1:
  - 1. Product: Wilsonart
    - a. Application: Quartz Surfacing
    - b. Model/ Pattern: As Scheduled
    - c. Color: As Scheduled
    - d. Size: As Scheduled
    - e. Material Thickness: 1.18-inches (3 cm)
    - f. Countertop Profile: Eased Edge.
    - g. Back- and Endsplash Profile: Eased Edge.
    - h. Finish: Matte.
  - 2. Performance Criteria: Product shall meet or exceed the following performance requirements:
    - a. Surface Burning Characteristics: ASTM E84: 17, Class A
    - b. Smoke Density: Flaming 196, Non-flaming 69; ASTM E662
    - c. Compressive Strength: ASTM C170
    - d. Bond Strength: ASTM C482
    - e. Breaking Strength: ASTM C648
    - f. Stain resistance: ANSI Z124.6
    - g. Chemical Resistance: ANSI Z124.6
    - h. Fungal/Bacteria Resistance: ASTM G21
    - i. ASTM C501
    - j. Impact Resistance: ASTM D256
  - 3. Conformance Standards:
    - a. NSF 51.

### 2.03 FABRICATION

- A. General: Fabricate components in shop, to greatest extent practicable, in sizes and shapes indicated according to approved shop drawings and in accordance with industry practice.
  - 1. Tools: Quartz fabrication shall include a CNC machine.
- B. Joints: Fabricate countertops in sections for joining in field.
  - 1. Joint Locations: Not within 18 inches (450 mm) of a sink or cooktop and not where a countertop section less than 36 inches (900 mm) long would result, unless unavoidable.

- C. Joint Seams: Form joint seams between quartz surfacing components with specified seam adhesive. Completed joints inconspicuous in appearance and without voids. Provide joint reinforced if required by manufacturer for particular installation conditions.
- D. Cutouts and Holes: Provide holes and cutouts for lavatories, sinks, fittings, service fixtures and similar countertop-mounted items as indicated.
  - 1. Form cutouts to required template or pattern, with smooth, even curves, eased edges, and radiused inside corners. Inside corners shall be reinforced in an acceptable manner to prevent cracking.
  - 2. All internal cutout corners must have a minimum 1/4-inch (6.35mm) radius.
  - 3. Top and bottom of edge profiles and cutouts are recommended to have a minimum 1/16-inch (1.58mm) radius or chamfer.
- E. Countertops:
  - 1. Countertops shall be constructed of 2 cm (0.79 inch) thick quartz material over a 3/4-inch substrate, for a total thickness of 1-1/2 inches
  - 2. Fabricate tops with shop-applied edges and backsplashes unless otherwise indicated. Comply with manufacturer's written instructions for adhesives, sealers, fabrication, and finishing.
  - 3. Laminations: Laminate layers of quartz surfacing as required to create built-up edges, trim, and other areas requiring additional thickness.
  - 4. Supporting Countertop Overhangs:
    - a. Overhangs equal to or less than 12 inches: No support required.
    - b. Overhangs greater than 12-inches, but less than 18-inches: Support brackets required.
    - c. Overhangs greater than 18-inches, and up to 24-inches: Support brackets, supporting substrate, and support legs required.
  - 5. Support Brackets:
    - a. Spacing of brackets: 24-inches on-center (maximum).
    - b. Place brackets 12-inches (304.8mm) from open ends, and against wall ends.
    - c. Brackets must be mounted to studs or high strength frame support.
  - 6. Supporting Substrate: 3/4-inch (19.05mm) underlayment is required, support for underlayment can be affixed to cabinet
  - 7. Support Legs: Shall be evenly installed at 36-inches (914.4mm) on-center, maximum.
- F. Backsplashes:
  - 1. Thickness: 2 cm (0.79 inch).
  - 2. Fabrication:
    - a. Shop-formed integral backsplashes with 90-degree transition between horizontal and vertical surfaces.
      - 1) Provide a formed scribe strip at top of backsplash to permit scribing to wall surface.
      - 2) L-Shaped Returns on Countertops: Shop fabricated mitered corners.
- G. End Splash: Match backsplash.
- H. Transaction Tops: Same as countertops.
- I. Identification: Material shall be labeled with slab information and imprinted with a manufacturer's identifying mark on the back.

## 2.04 INSTALLATION MATERIALS

- A. Mounting Adhesive: Provide structural-grade silicone or epoxy adhesives as recommended by manufacturer for application and per conditions of use.
  - 1. Provide spacers, if required, of type recommended by adhesive manufacturer.
- B. Joint Adhesive: Methacrylate-based adhesive for chemically bonding quartz surfacing seams. Color complementary to quartz surfacing sheet material. UL 2818 GREENGUARD Gold certified and complying with SCAQMD Rule 1168.
  - 1. Adhesives shall have a VOC content of 70 g/L or less.

- C. Elastomeric Joint Sealant (Silicone): Mildew-resistant silicone sealant for filling gaps between countertops and terminating substrates in wet environment applications. Complies with ASTM C920, Type S (single component), Grade NS (nonsag).
  - 1. Color: Complementary to quartz surfacing color.
- D. Siliconized Acrylic Joint Sealant: Siliconized acrylic latex sealant. For general applications to fill gaps between countertops and at terminating substrates. Complies with ASTM C 384, Type OP, Grade NF, and SCAQMD Rule 1168.
  - 1. Color: Complementary to quartz surfacing color.
- E. Construction Adhesive: Countertop manufacturer's recommended silicone-based construction adhesive for backsplashes, endsplashes, and other applications according to manufacturer's published fabrication instructions.
- F. Solvent: Product recommended by adhesive manufacturer to clean surface of quartz surfacing to assure adhesion of adhesives and sealants.
- G. Cleaning Agents: Non-abrasive, low pH cleansers.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Examine substrates to receive quartz countertops and conditions under which countertops will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of countertops. Substrates must be sound, flat, smooth, and free from dust or other surface contaminants.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

#### **3.02 INSTALLATION**

- A. Install quartz surfacing components plumb, level, and true according to approved shop drawings and manufacturer's published installation instructions. Use woodworking and specialized fabrication tools acceptable to the manufacturer.
  - 1. Fasten quartz surfacing components to base cabinets or other supporting substrates with suitable adhesives acceptable to manufacturer.
- B. Form joint seams with specified seam adhesive. Seams to be inconspicuous in completed work. Seams in locations shown on approved shop drawings and acceptable to manufacturer. Promptly remove excess adhesive.
  - 1. Clamp or brace quartz surfaces in position until adhesive sets.
- C. Fill gaps between countertop and terminating substrates with specified sealant.
- D. Install backsplashes and endsplashes where indicated on Drawings. Adhere to countertops with specified construction adhesive.

#### **3.03 REPAIRS**

- A. Minor surface marring for quartz surfacing components may be repaired according to manufacturer's published installation instructions.
- B. Remove and replace quartz surfacing components that are damaged and cannot be satisfactorily repaired.

#### **3.04 CLEANING**

- A. Clean quartz surfacing components according to manufacturer's published maintenance instructions.
- B. Completely remove excess adhesives and sealants from finished surfaces.

#### **3.05 PROTECTION**

- A. DO NOT stand on the countertops for any reason.
- B. Protect completed work from damage during remainder of construction period.
- C. DO NOT stand on the installed countertops for any reason.

### **END OF SECTION**