

## SECTION 06100 - ROUGH CARPENTRY

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. This Section includes the following:
  - 1. Framing with dimension lumber.
  - 2. Wood blocking, cants, and nailers.
  - 3. Utility shelving.
  - 4. Wood furring and grounds.
  - 5. Subflooring and underlayment.
  - 6. Plywood backing panels.
- B. Related Sections include the following:
  - 1. Division 6 Section "Finish Carpentry" for nonstructural carpentry items exposed to view and not specified in another Section.

#### 1.3 DEFINITIONS

- A. Rough Carpentry: Carpentry work not specified in other Sections and not exposed, unless otherwise indicated.
- B. Exposed Framing: Dimension lumber not concealed by other construction.
- C. Lumber grading agencies, and the abbreviations used to reference them, include the following:
  - 1. NELMA - Northeastern Lumber Manufacturers Association.
  - 2. NLGA - National Lumber Grades Authority.
  - 3. RIS - Redwood Inspection Service.
  - 4. SPIB - Southern Pine Inspection Bureau.
  - 5. WCLIB - West Coast Lumber Inspection Bureau.
  - 6. WWPA - Western Wood Products Association.

#### 1.4 SUBMITTALS

- A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.
  - 1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Indicate type of preservative used, net amount of preservative retained, and chemical treatment manufacturer's written instructions for handling, storing, installing, and finishing treated material.
  - 2. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Include physical properties of treated materials, both before and after exposure to elevated temperatures when tested according to ASTM D 5516 and ASTM D 5664.
  - 3. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.
  - 4. Include copies of warranties from chemical treatment manufacturers for each type of treatment.

- B. Material Certificates: For dimension lumber specified to comply with minimum allowable unit stresses. Indicate species and grade selected for each use and design values approved by the American Lumber Standards Committee Board of Review.
- C. Research/Evaluation Reports: For the following, showing compliance with building code in effect for Project:
  - 1. Preservative-treated wood.
  - 2. Fire-retardant-treated wood.
  - 3. Engineered wood products.
  - 4. Foam-plastic sheathing.
  - 5. Power-driven fasteners.
  - 6. Powder-actuated fasteners.
  - 7. Expansion anchors.
  - 8. Metal framing anchors.
  - 9. Building wrap.

## 1.5 QUALITY ASSURANCE

- A. Testing Agency Qualifications: An independent testing agency, acceptable to authorities having jurisdiction, with the experience and capability to conduct the testing indicated, as documented according to ASTM E 548.
- B. Source Limitations for Engineered Wood Products: Obtain each type of engineered wood product through one source from a single manufacturer.
- C. Source Limitations for Fire-Retardant-Treated Wood: Obtain each type of fire-retardant-treated wood product through one source from a single producer.

## 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Stack lumber, plywood, and other panels; place spacers between each bundle to provide air circulation. Provide for air circulation around stacks and under coverings.

## PART 2 - PRODUCTS

### 2.1 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. Laminated-Veneer Lumber:
    - a. Boise Cascade Corporation.
    - b. Georgia-Pacific Corporation.
    - c. Louisiana-Pacific Corporation.
    - d. Pacific Woodtech Corp.
    - e. Trus Joist MacMillan.
    - f. Union Camp Corp.; Building Products Division.
    - g. Willamette Industries, Inc.
  - 2. Parallel-Strand Lumber:
    - a. Trus Joist MacMillan.
  - 3. Prefabricated Wood I-Joists:
    - a. Boise Cascade Corporation.
    - b. Georgia-Pacific Corporation.
    - c. Louisiana-Pacific Corporation.
    - d. Pacific Woodtech Corp.
    - e. Poutrelles International Inc.
    - f. Standard Structures Inc.
    - g. Stark Truss Company, Inc.

- h. Superior Wood Systems, Inc.
  - i. Trus Joist MacMillan.
  - j. Union Camp Corp.; Building Products Division.
  - k. Willamette Industries, Inc.
- 4. Gypsum Sheathing Board:
  - a. American Gypsum Co.
  - b. G-P Gypsum Corporation.
  - c. National Gypsum Company.
  - d. United States Gypsum Co.
- 5. Extruded-Polystyrene-Foam Wall Sheathing:
  - a. DiversiFoam Products.
  - b. Dow Chemical Company (The).
  - c. Owens Corning.
  - d. Tenneco Building Products.
- 6. Polyisocyanurate-Foam Wall Sheathing:
  - a. Apache Products Company.
  - b. Celotex Corporation (The); Building Products Division.
  - c. Rmax, Inc.
- 7. Building Wrap:
  - a. Celotex Corporation (The); Building Products Division.
  - b. DuPont (E. I. du Pont de Nemours and Company).
  - c. Parsec, Inc.
  - d. Raven Industries, Inc.
  - e. Reemay, Inc.
  - f. Simplex Products.
  - g. Sto-Cote Products, Inc.
  - h. Tenneco Building Products.
- 8. Metal Framing Anchors:
  - a. Alpine Engineered Products, Inc.
  - b. Cleveland Steel Specialty Co.
  - c. Harlen Metal Products, Inc.
  - d. KC Metals Products, Inc.
  - e. Silver Metal Products, Inc.
  - f. Simpson Strong-Tie Company, Inc.
  - g. Southeastern Metals Manufacturing Co., Inc.
  - h. United Steel Products Company, Inc.

## 2.2 WOOD PRODUCTS, GENERAL

- A. Lumber: DOC PS 20 and applicable rules of lumber grading agencies certified by the American Lumber Standards Committee Board of Review.
  - 1. Factory mark each piece of lumber with grade stamp of grading agency.
  - 2. For exposed lumber indicated to receive a stained or natural finish, mark grade stamp on end or back of each piece, or omit grade stamp and provide certificates of grade compliance issued by 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.
  - 5. Provide dry lumber with 19 percent maximum moisture content at time of dressing for 2-inch nominal thickness or less, unless otherwise indicated.
- B. Engineered Wood Products: Provide engineered wood products acceptable to authorities having jurisdiction and for which current model code research or evaluation reports exist that show compliance with building code in effect for Project.
  - 1. Allowable Design Stresses: Provide engineered wood products with allowable design stresses, as published by manufacturer, that meet or exceed those indicated. Manufacturer's published values shall be determined from empirical data or by rational engineering analysis

and demonstrated by comprehensive testing performed by a qualified independent testing agency.

- C. Wood Structural Panels:
  - 1. Plywood: Either DOC PS 1 or DOC PS 2, unless otherwise indicated.
  - 2. Oriented Strand Board: DOC PS 2.
  - 3. Thickness: As needed to comply with requirements specified but not less than thickness indicated.
  - 4. Comply with "Code Plus" provisions in APA Form No. E30K, "APA Design/Construction Guide: Residential & Commercial."
  - 5. Factory mark panels according to indicated standard.

## 2.3 WOOD-PRESERVATIVE-TREATED MATERIALS

- A. Preservative Treatment by Pressure Process: AWPAC2 (lumber) and AWPAC9 (plywood), except that lumber that is not in contact with the ground and is continuously protected from liquid water may be treated according to AWPAC31 with inorganic boron (SBX).
  - 1. Preservative Chemicals: Acceptable to authorities having jurisdiction and the following:
    - a. Chromated copper arsenate (CCA).
    - b. Ammoniacal copper zinc arsenate (ACZA).
    - c. Ammoniacal, or amine, copper quat (ACQ).
    - d. Copper bis (dimethyldithiocarbamate) (CDDC).
    - e. Ammoniacal copper citrate (CC).
    - f. Copper azole, Type A (CBA-A).
    - g. Oxine copper (copper-8-quinolinolate) in a light petroleum solvent.
  - 2. For exposed items indicated to receive a stained or natural finish, use chemical formulations that do not require incising, contain colorants, bleed through, or otherwise adversely affect finishes.
- B. Kiln-dry material after treatment to a maximum moisture content of 19 percent for lumber and 15 percent for plywood. Do not use material that is warped or does not comply with requirements for untreated material.
- C. Mark each treated item with the treatment quality mark of an inspection agency approved by the American Lumber Standards Committee Board of Review.
  - 1. For exposed lumber indicated to receive a stained or natural finish, mark end or back of each piece, or omit marking and provide certificates of treatment compliance issued by inspection agency.
- D. Application: Treat items indicated on Drawings, and the following:
  - 1. Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.
  - 2. Wood sills, sleepers, blocking, furring, stripping, and similar concealed members in contact with masonry or concrete.
  - 3. Wood framing members less than 18 inches above grade.
  - 4. Wood floor plates that are installed over concrete slabs directly in contact with earth.

## 2.4 FIRE-RETARDANT-TREATED MATERIALS

- A. General: Where fire-retardant-treated materials are indicated, provide materials that comply with performance requirements in AWPAC20 (lumber) and AWPAC27 (plywood). Identify fire-retardant-treated wood with appropriate classification marking of UL, U.S. Testing, Timber Products Inspection, or another testing and inspecting agency acceptable to authorities having jurisdiction.
  - 1. Use treatment for which chemical manufacturer publishes physical properties of treated wood after exposure to elevated temperatures, when tested by a qualified independent testing agency according to ASTM D 5664, for lumber and ASTM D 5516, for plywood.
  - 2. Use treatment that does not promote corrosion of metal fasteners.

3. Use Exterior type for exterior locations and where indicated.
4. Use Interior Type A High Temperature (HT), unless otherwise indicated.

- B. For exposed items indicated to receive a stained or natural finish, use chemical formulations that do not bleed through, contain colorants, or otherwise adversely affect finishes.

## 2.5 DIMENSION LUMBER

- A. General: Provide dimension lumber of grades indicated according to the American Lumber Standards Committee National Grading Rule provisions of the grading agency indicated.
- B. Non-Load-Bearing Interior Partitions: Construction, Stud, or No. 2 grade and the following species:
1. Mixed southern pine; SPIB.
  2. Hem-fir or Hem-fir (north); NLGA, WCLIB, or WWPA.
  3. Spruce-pine-fir (south) or Spruce-pine-fir; NELMA, NLGA, WCLIB, or WWPA.
  4. Eastern softwoods; NELMA.
  5. Northern species; NLGA.
  6. Western woods; WCLIB or WWPA.
- C. Framing Other Than Non-Load-Bearing Partitions: Construction, Stud, or No. 2 grade and any of the following species:
1. Douglas fir-larch; WCLIB or WWPA.
  2. Douglas fir-south; WWPA.
  3. Douglas fir-larch (north); NLGA.
  4. Hem-fir; WCLIB or WWPA.
  5. Hem-fir (north); NLGA.
  6. Southern pine; SPIB.
  7. Mixed southern pine; SPIB.
  8. Spruce-pine-fir (south); NELMA, WCLIB, or WWPA.
  9. Spruce-pine-fir; NLGA.
- D. Ceiling Joists (Non-Load-Bearing): Construction, Stud, or No. 2 grade and any of the following species:
1. Douglas fir-larch; WCLIB or WWPA.
  2. Douglas fir-south; WWPA.
  3. Douglas fir-larch (north); NLGA.
  4. Hem-fir; WCLIB or WWPA.
  5. Hem-fir (north); NLGA.
  6. Southern pine; SPIB.
  7. Mixed southern pine; SPIB.
  8. Spruce-pine-fir (south); NELMA, WCLIB, or WWPA.
  9. Spruce-pine-fir; NLGA.
- E. Joists, Rafters, and Other Framing Not Listed Above: Construction or No. 2 grade and any of the following species:
1. Douglas fir-larch; WCLIB or WWPA.
  2. Douglas fir-south; WWPA.
  3. Douglas fir-larch (north); NLGA.
  4. Hem-fir; WCLIB or WWPA.
  5. Hem-fir (north); NLGA.
  6. Southern pine; SPIB.
  7. Spruce-pine-fir (south); NELMA, WCLIB, or WWPA.
  8. Spruce-pine-fir; NLGA.
- F. Exposed Framing: Provide material hand-selected for uniformity of appearance and freedom from characteristics that would impair finish appearance.
1. Species and Grade: As indicated above for load-bearing construction of same type.

2. Species and Grade: Douglas fir-larch, Douglas fir-larch (north), or Douglas fir-south; Select Structural or No. 1 grade; NLGA, WCLIB, or WWPA.
3. Species and Grade: Eastern hemlock-balsam fir or Eastern hemlock-tamarack; Select Structural or No. 1 grade; NELMA.
4. Species and Grade: Hem-fir or Hem-fir (north), Select Structural grade; NLGA, WCLIB, or WWPA.
5. Species and Grade: Mixed maple, Select Structural grade; NELMA.
6. Species and Grade: Mixed oak, Select Structural grade; NELMA.
7. Species and Grade: Redwood, Clear Heart Structural or Clear Structural or Select Structural grade; RIS.
8. Species and Grade: Southern pine, Select Structural or No. 1 grade; SPIB.
9. Species and Grade: Spruce-pine-fir or Spruce-pine-fir (south), Select Structural or No. 1 grade; NELMA, NLGA, WCLIB, or WWPA.

## 2.6 TIMBER

- A. For timber of **5-inch nominal** size and thicker, provide material complying with the following requirements:
1. Species and Grade: Douglas fir-larch, Douglas fir-larch (north), or Douglas fir-south; **Select Structural or No. 1** grade; NLGA, WCLIB, or WWPA.
  2. Species and Grade: Eastern hemlock, Eastern hemlock-tamarack, or Eastern hemlock-tamarack (north); **Select Structural or No. 1** grade; NELMA or NLGA.
  3. Species and Grade: Hem-fir or Hem-fir (north), Select Structural or No. 1 grade; NLGA, WCLIB, or WWPA.
  4. Species and Grade: Mixed maple, Select Structural or No. 1 grade; NELMA.
  5. Species and Grade: Mixed oak, Select Structural or No. 1 grade; NELMA.
  6. Species and Grade: Southern pine, Select Structural or No. 1 grade; SPIB.
  7. Additional Restriction: Free of heart centers.

## 2.7 MISCELLANEOUS LUMBER

- A. General: Provide lumber for support or attachment of other construction, including the following:
1. Rooftop equipment bases and support curbs.
  2. Blocking.
  3. Cants.
  4. Nailers.
  5. Furring.
  6. Grounds.
- B. For items of dimension lumber size, provide Construction, Stud, or No. 2 grade lumber with 19 percent maximum moisture content and any of the following species:
1. Mixed southern pine; SPIB.
  2. Hem-fir or Hem-fir (north); NLGA, WCLIB, or WWPA.
  3. Spruce-pine-fir (south) or Spruce-pine-fir; NELMA, NLGA, WCLIB, or WWPA.
  4. Eastern softwoods; NELMA.
  5. Northern species; NLGA.
  6. Western woods; WCLIB or WWPA.
- C. For furring strips for installing plywood or hardboard paneling, select boards with no knots capable of producing bent-over nails and damage to paneling.

## 2.8 ENGINEERED WOOD PRODUCTS

- A. Laminated-Veneer Lumber: A composite of wood veneers with grain primarily parallel to member lengths, manufactured with an exterior-type adhesive complying with ASTM D 2559. Product has the following minimum allowable design values as determined according to ASTM D 5456:
1. Extreme Fiber Stress in Bending, Edgewise: 2500 psi for 12-inch nominal- depth members.

2. Modulus of Elasticity, Edgewise: 1,800,000 psi.

- B. Wood I-Joists: Prefabricated units complying with APA PRI-400; depths and performance ratings not less than those indicated.
1. Web Material: Plywood, Exterior grade.
  2. Structural Capacities: Establish and monitor structural capacities according to ASTM D 5055.
  3. Trademark: Factory mark I-joists with APA trademark indicating nominal joist depth, joist class, span ratings, mill identification, and I-joist compliance with APA standard.

## 2.9 SHEATHING

- A. Plywood Wall Sheathing: Exterior, Structural I sheathing.
1. Span Rating: Not less than 16/0.
  2. Thickness: Not less than 3/8 inch.
- B. Oriented-Strand-Board Wall Sheathing: Exposure 1, Structural I [Exposure 1] sheathing.
1. Span Rating: Not less than 16/0.
  2. Thickness: Not less than 3/8 inch.
- C. Paper-Surfaced Gypsum Wall Sheathing: ASTM C 79/C 79M, with water-resistant material incorporated into the core and with water-repellent paper bonded to core's face, back, and long edges.
1. Type and Thickness: Regular, 1/2 inch thick or as noted on plans .
- D. Plywood Roof Sheathing: Exterior, Structural I sheathing.
1. Span Rating: Not less than 16/0.
  2. Thickness: Not less than 1/2 inch.

## 2.10 SUBFLOORING AND UNDERLAYMENT

- A. Plywood Combination Subfloor-Underlayment: DOC PS 1, Exterior, Structural I, C-C Plugged single-floor panels.
1. Span Rating: Not less than 16 oc.
  2. Thickness: Not less than 7/8 inch.
  3. Edge Detail: Square.
  4. Edge Detail: Tongue and groove.
  5. Surface Finish: Fully sanded face.
- B. Plywood Subflooring: Exterior, Structural I single-floor panels or sheathing.
1. Span Rating: Not less than 16 oc or 32/16.
  2. Thickness: Not less than 7/8 inch.
- C. Underlayment, General: Provide underlayment in nominal thicknesses indicated or, if not indicated, not less than 1/4 inch over smooth subfloors and not less than 3/8 inch over board or uneven subfloors.
- D. Particleboard Underlayment: ANSI A208.1, Grade PBU.
- E. Hardboard Underlayment: AHA A135.4, Class 4 (Service), Surface S1S; with back side sanded.

## 2.11 PLYWOOD BACKING PANELS

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

## 2.12 FASTENERS

- A. General: Provide fasteners of size and type indicated that comply with requirements specified in this Article for material and manufacture.
  - 1. Where rough carpentry is exposed to weather, in ground contact, or in area of high relative humidity, provide fasteners of Type 304 stainless steel.
- B. Nails, Brads, and Staples: ASTM F 1667.
- C. Power-Driven Fasteners: CABO NER-272.
- D. Wood Screws: ASME B18.6.1.
- E. Screws for Fastening to Cold-Formed Metal Framing: ASTM C 954, except with wafer heads and reamer wings, length as recommended by screw manufacturer for material being fastened.
- F. Lag Bolts: ASME B18.2.1.
- G. Bolts: Steel bolts complying with ASTM A 307, Grade A; with ASTM A 563 hex nuts and, where indicated, flat washers.
- H. Expansion Anchors: Anchor bolt and sleeve assembly of material indicated below with capability to sustain, without failure, a load equal to 6 times the load imposed when installed in unit masonry assemblies and equal to 4 times the load imposed when installed in concrete as determined by testing per ASTM E 488 conducted by a qualified independent testing and inspecting agency.
  - 1. Material: Carbon-steel components, zinc plated to comply with ASTM B 633, Class Fe/Zn 5.
  - 2. Material: Stainless steel with bolts and nuts complying with ASTM F 593 and ASTM F 594, Alloy Group 1 or 2.

## 2.13 METAL FRAMING ANCHORS

- A. General: Provide framing anchors made from metal indicated, of structural capacity, type, and size indicated, and as follows:
  - 1. Research/Evaluation Reports: Provide products acceptable to authorities having jurisdiction and for which model code research/evaluation reports exist that show compliance of metal framing anchors, for application indicated, with building code in effect for Project.
  - 2. Allowable Design Loads: Provide products with allowable design loads, as published by manufacturer, that meet or exceed those indicated. Manufacturer's published values shall be determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency.
- B. Galvanized Steel Sheet: Hot-dip, zinc-coated steel sheet complying with ASTM A 653/A 653M, G60 coating designation.
- C. Stainless-Steel Sheet: ASTM A 666, Type 316.
  - 1. Use for exterior locations and where indicated.
- D. Joist Hangers: U-shaped joist hangers with 2-inch- long seat and 1-1/4-inch- wide nailing flanges at least 85 percent of joist depth.
  - 1. Thickness: 0.062 inch.
- E. I-Joist Hangers: U-shaped joist hangers with 2-inch- long seat and 1-1/4-inch- wide nailing flanges full depth of joist. Nailing flanges provide lateral support at joist top chord.
  - 1. Thickness: 0.062 inch.
- F. Top Flange Hangers: U-shaped joist hangers, full depth of joist, formed from metal strap with tabs bent to extend over and be fastened to supporting member.



1. Strap Width: 2 inches.
  2. Thickness: 0.062 inch.
- G. Bridging: Rigid, V-section, nailless type, 0.062 inch thick, length to suit joist size and spacing.
- H. Post Bases: Adjustable-socket type for bolting in place with standoff plate to raise post 1 inch above base and with 2-inch- minimum side cover, socket 0.062 inch thick, and standoff and adjustment plates 0.108 inch thick.
- I. Joist Ties: Flat straps, with holes for fasteners, for tying joists together over supports.
1. Width: 1-1/4 inches.
  2. Thickness: 0.062 inch.
  3. Length: 24 inches.
- J. Rafter Tie-Downs: Bent strap tie for fastening rafters or roof trusses to wall studs below, 1-1/2 inches wide by 0.050 inch thick.
- K. Rafter Tie-Downs (Hurricane or Seismic Ties): Bent strap tie for fastening rafters or roof trusses to wall studs below, 2-1/4 inches wide by 0.062 inch thick. Tie fits over top of rafter or truss and fastens to both sides of rafter or truss, face of top plates, and side of stud below.
- L. Floor-to-Floor Ties: Flat straps, with holes for fasteners, for tying upper floor wall studs to band joists and lower floor studs, 1-1/4 inches wide by 0.050 inch thick by 36 inches long.
- M. Hold-Downs: Brackets for bolting to wall studs and securing to foundation walls with anchor bolts or to other hold-downs with threaded rods and designed with first of two bolts placed seven bolt diameters from reinforced base.
1. Bolt Diameter: 3/4 inch.
  2. Width: 3-3/16 inches.
  3. Body Thickness: 0.138 inch.
  4. Base Reinforcement Thickness: 0.239 inch.
- N. Wall Bracing: T-shaped bracing made for letting into studs in saw kerf, 1-1/8 inches wide by 9/16 inch deep by 0.034 inch thick with hemmed edges.
- O. Wall Bracing: Angle bracing made for letting into studs in saw kerf, 15/16 by 15/16 by 0.040 inch thick with hemmed edges.

## 2.14 MISCELLANEOUS MATERIALS

- A. Building Paper: Asphalt-saturated organic felt complying with ASTM D 226, Type I (No. 15 asphalt felt), unperforated.
- B. Building Wrap: Air-retarder sheeting made from polyolefins; cross-laminated films, woven strands, or spun-bonded fibers; coated or uncoated; with or without perforations; and complying with ASTM E 1677, Type I.
1. Thickness: Not less than 3 mils.
  2. Permeance: Not less than 10 perms.
  3. Flame-Spread Index: 25 or less per ASTM E 84.
  4. Allowable Exposure Time: Not less than three months.
- C. Building Wrap Tape: Pressure-sensitive plastic tape recommended by building wrap manufacturer for sealing joints and penetrations in building wrap.
- D. Sheathing Tape: Pressure-sensitive plastic tape for sealing joints and penetrations in sheathing and recommended by sheathing manufacturer for use with type of sheathing required.

- E. Sill-Sealer Gaskets: Glass-fiber-resilient insulation, fabricated in strip form, for use as a sill sealer; 1-inch nominal thickness, compressible to 1/32 inch; selected from manufacturer's standard widths to suit width of sill members indicated.
- F. Sill-Sealer Gaskets: Closed-cell neoprene foam, 1/4 inch thick, selected from manufacturer's standard widths to suit width of sill members indicated.
- G. Adhesives for Field Gluing Panels to Framing: Formulation complying with ASTM D 3498 that is approved for use with type of construction panel indicated by both adhesive and panel manufacturers.
- H. Water-Repellent Preservative: NWWDA-tested and -accepted formulation containing 3-iodo-2-propynyl butyl carbamate, combined with an insecticide containing chlorpyrifos as its active ingredient.

### PART 3 - EXECUTION

#### 3.1 INSTALLATION, GENERAL

- A. 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 furring, nailers, blocking, grounds, and similar supports to comply with requirements for attaching other construction.
- B. Do not use materials with defects that impair quality of rough carpentry or pieces that are too small to use with minimum number of joints or optimum joint arrangement.
- C. Apply field treatment complying with AWPAC M4 to cut surfaces of preservative-treated lumber and plywood.
- D. Securely attach rough carpentry work to substrate by anchoring and fastening as indicated, complying with the following:
  - 1. CABO NER-272 for power-driven fasteners.
  - 2. Published requirements of metal framing anchor manufacturer.
  - 3. Table 23-II-B-1, "Nailing Schedule," and Table 23-II-B-2, "Wood Structural Panel Roof Sheathing Nailing Schedule," in the Uniform Building Code.
  - 4. Table 2305.2, "Fastening Schedule," in the BOCA National Building Code.
  - 5. Table 2306.1, "Fastening Schedule," in the Standard Building Code.
  - 6. Table 602.3(1), "Fastener Schedule for Structural Members," and Table 602.3(2), "Alternate Attachments," in the International One- and Two-Family Dwelling Code.
- E. Use common wire nails, unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting wood; predrill as required.
- F. Use finishing nails for exposed work, unless otherwise indicated. Countersink nail heads and fill holes with wood filler.

#### 3.2 WOOD GROUND, SLEEPER, BLOCKING, AND NAILER INSTALLATION

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

- B. Attach items to substrates to support applied loading. Recess bolts and nuts flush with surfaces, unless otherwise indicated. Build anchor bolts into masonry during installation of masonry work. Where possible, secure anchor bolts to formwork before concrete placement.
- C. Provide permanent grounds of dressed, pressure-preservative-treated, key-beveled lumber not less than 1-1/2 inches wide and of thickness required to bring face of ground to exact thickness of finish material. Remove temporary grounds when no longer required.

### 3.3 WOOD FURRING INSTALLATION

- A. Install level and plumb with closure strips at edges and openings. Shim with wood as required for tolerance of finish work.
  - 1. Fire block furred spaces of walls, at each floor level and at ceiling, with wood blocking or noncombustible materials accurately fitted to close furred spaces.
- B. Furring to Receive Plywood or Hardboard Paneling: Install 1-by-3-inch nominal- size furring vertically at 24 inches o.c.
- C. Furring to Receive Gypsum Board: Install 1-by-2-inch nominal- size furring vertically at 16 inches o.c.
- D. Furring to Receive Plaster Lath: Install 1-by-2-inch nominal size furring vertically at 16 inches o.c.

### 3.4 WOOD FRAMING INSTALLATION, GENERAL

- A. Framing Standard: Comply with AFPA's "Manual for Wood Frame Construction," unless otherwise indicated.
- B. Framing with Engineered Wood Products: Install engineered wood products to comply with manufacturer's written instructions.
- C. Do not splice structural members between supports.
- D. Where built-up beams or girders of 2-inch nominal dimension lumber on edge are required, fasten together with 2 rows of 20d nails spaced not less than 32 inches o.c. Locate one row near top edge and other near bottom edge.

### 3.5 WALL AND PARTITION FRAMING INSTALLATION

- A. General: Arrange studs so wide face of stud is perpendicular to direction of wall or partition and narrow face is parallel. Provide single bottom plate and double top plates using members of 2-inch nominal thickness whose widths equal that of studs, except single top plate may be used for non-load-bearing partitions. Anchor or nail plates to supporting construction, unless otherwise indicated.
  - 1. For exterior walls, provide 2-by-4-inch nominal size wood studs spaced 16 inches o.c., unless otherwise indicated.
  - 2. For interior partitions and walls, provide 2-by-4-inch nominal size wood studs spaced 16 inches o.c., unless otherwise indicated.
- B. Construct corners and intersections with three or more studs. Provide blocking and framing as indicated and as required to support facing materials, fixtures, specialty items, and trim.
  - 1. Provide continuous horizontal blocking at midheight of partitions more than 96 inches high, using members of 2-inch nominal thickness and of same width as wall or partitions.
- C. Fire block concealed spaces of wood-framed walls and partitions at each floor level and at ceiling line of top story. Where fire blocking is not inherent in framing system used, provide closely fitted wood blocks of 2-inch nominal thick lumber of same width as framing members.

- D. Frame openings with multiple studs and headers. Provide nailed header members of thickness equal to width of studs. Set headers on edge and support on jamb studs.
  - 1. For non-load-bearing partitions, provide double-jamb studs with headers not less than 4-inch nominal depth for openings 48 inches and less in width, 6-inch nominal depth for openings 48 to 72 inches in width, 8-inch nominal depth for openings 72 to 120 inches in width, and not less than 10-inch nominal depth for openings 10 to 12 feet in width.
  - 2. For load-bearing walls, provide double-jamb studs for openings 72 inches and less in width, and triple-jamb studs for wider openings. Provide headers of depth indicated or, if not indicated, according to Table 602.7 in the International One- and Two-Family Dwelling Code.
- E. Provide bracing in exterior walls, at both walls of each external corner, full-story height, unless otherwise indicated. Provide one of the following:
- F. Provide bracing in walls, at locations indicated, full-story height, unless otherwise indicated. Provide one of the following:
  - 1. Diagonal bracing at 45-degree angle using let-in 1-by-4-inch nominal- size boards.
  - 2. Diagonal bracing at 45-degree angle using metal bracing.
  - 3. Plywood panels not less than 48 by 96 inches applied vertically.
  - 4. Oriented-strand-board panels not less than 48 by 96 inches applied vertically.
  - 5. Particleboard sheathing panels not less than 48 by 96 inches applied vertically.
  - 6. In lieu of bracing at corners or at locations indicated, continuous gypsum sheathing may be provided in panels not less than 48 by 96 inches applied vertically.
  - 7. In lieu of bracing at corners or at locations indicated, continuous fiberboard sheathing, intermediate type, may be provided in panels not less than 48 by 96 inches applied vertically.

### 3.6 FLOOR JOIST FRAMING INSTALLATION

- A. General: Install floor joists with crown edge up and support ends of each member with not less than 1-1/2 inches of bearing on wood or metal, or 3 inches on masonry. Attach floor joists as follows:
  - 1. Where supported on wood members, by using metal framing anchors.
  - 2. Where framed into wood supporting members, by using wood ledgers as indicated or, if not indicated, by using metal joist hangers.
- B. Fire Cuts: At joists built into masonry, bevel cut ends 3 inches and do not embed more than 4 inches.
- C. Frame openings with headers and trimmers supported by metal joist hangers; double headers and trimmers where span of header exceeds 48 inches.
- D. Do not notch in middle third of joists; limit notches to one-sixth depth of joist, one-third at ends. Do not bore holes larger than 1/3 depth of joist; do not locate closer than 2 inches from top or bottom.
- E. Provide solid blocking of 2-inch nominal thickness by depth of joist at ends of joists unless nailed to header or band.
- F. Lap members framing from opposite sides of beams, girders, or partitions not less than 4 inches or securely tie opposing members together. Provide solid blocking of 2-inch nominal thickness by depth of joist over supports.
- G. Anchor members paralleling masonry with 1/4-by-1-1/4-inch metal strap anchors spaced not more than 96 inches o.c., extending over and fastening to 3 joists. Embed anchors at least 4 inches into grouted masonry with ends bent at right angles and extending 4 inches beyond bend.
- H. Provide solid blocking between joists under jamb studs for openings.
- I. Under non-load-bearing partitions, provide double joists separated by solid blocking equal to depth of studs above.

1. Provide triple joists separated as above, under partitions receiving ceramic tile and similar heavy finishes or fixtures.
- J. Provide bridging of type indicated below, at intervals of 96 inches o.c., between joists.
  1. Diagonal wood bridging formed from bevel-cut, 1-by-3-inch nominal- size lumber, double-crossed and nailed at both ends to joists.
  2. Steel bridging installed to comply with bridging manufacturer's written instructions.
  3. Bridging may be omitted where joist depth is 12-inch nominal size or less and where indicated live load is 40 lbf/sq. ft. or less.

### 3.7 CEILING JOIST AND RAFTER FRAMING INSTALLATION

- A. Ceiling Joists: Install ceiling joists with crown edge up and complying with requirements specified above for floor joists. Face nail to ends of parallel rafters.
  1. Where ceiling joists are at right angles to rafters, provide additional short joists parallel to rafters from wall plate to first joist; nail to ends of rafters and to top plate and nail to first joist or anchor with framing anchors or metal straps. Provide 1-by-8-inch nominal- size or 2-by-4-inch nominal-size stringers spaced 48 inches o.c. crosswise over main ceiling joists.
- B. Rafters: Notch to fit exterior wall plates and toe nail or use metal framing anchors. Double rafters to form headers and trimmers at openings in roof framing, if any, and support with metal hangers. Where rafters abut at ridge, place directly opposite each other and nail to ridge member or use metal ridge hangers.
  1. At valleys, provide double-valley rafters of size indicated or, if not indicated, of same thickness as regular rafters and 2 inches deeper. Bevel ends of jack rafters for full bearing against valley rafters.
  2. At hips, provide hip rafter of size indicated or, if not indicated, of same thickness as regular rafters and 2 inches deeper. Bevel ends of jack rafters for full bearing against hip rafter.
- C. Provide collar beams (ties) as indicated or, if not indicated, provide 1-by-6-inch nominal- size boards between every third pair of rafters, but not more than 48 inches o.c. Locate below ridge member, at third point of rafter span. Cut ends to fit roof slope and nail to rafters.
- D. Provide special framing as indicated for eaves, overhangs, dormers, and similar conditions, if any.

### 3.8 TIMBER FRAMING INSTALLATION

- A. Install timber with crown edge up and provide not less than 4 inches of bearing on supports. Provide continuous members, unless otherwise indicated; tie together over supports if not continuous.
- B. Where beams or girders are framed into pockets of exterior concrete or masonry walls, provide 1/2-inch air space at sides and ends of wood members.
- C. Install wood posts using metal anchors indicated.
- D. Treat ends of timber beams and posts exposed to weather by dipping in water-repellent preservative for 15 minutes.

### 3.9 STAIR FRAMING INSTALLATION

- A. Provide stair framing members of size, space, and configuration indicated or, if not indicated, to comply with the following requirements:
  1. Stringer Size: 2-by-12-inch nominal- size, minimum.
  2. Notching: Notch stringers to receive treads, risers, and supports; leave at least 3-1/2 inches of effective depth.
  3. Stringer Spacing: At least 3 stringers for each 36-inch clear width of stair.

- B. Provide stair framing with no more than 3/16-inch variation between adjacent treads and risers and no more than 3/8-inch variation between largest and smallest treads and risers within each flight.

### 3.10 WOOD STRUCTURAL PANEL INSTALLATION

- A. General: Comply with applicable recommendations contained in APA Form No. E30K, "APA Design/Construction Guide: Residential & Commercial," for types of structural-use panels and applications indicated.
  - 1. Comply with "Code Plus" provisions in above-referenced guide.
- B. Fastening Methods: Fasten panels as indicated below:
  - 1. Combination Subfloor-Underlayment:
    - a. Nail to wood framing.
    - b. Screw to cold-formed metal framing.
    - c. Space panels 1/8 inch apart at edges and ends.
  - 2. Subflooring:
    - a. Nail or staple to wood framing.
    - b. Screw to cold-formed metal framing.
    - c. Space panels 1/8 inch apart at edges and ends.
  - 3. Sheathing:
    - a. Nail or staple to wood framing.
    - b. Screw to cold-formed metal framing.
    - c. Space panels 1/8 inch apart at edges and ends.
  - 4. Underlayment:
    - a. Nail or staple to subflooring.
    - b. Space panels 1/32 inch apart at edges and ends.
    - c. Fill and sand edge joints of underlayment receiving resilient flooring just before installing flooring.
  - 5. Plywood Backing Panels: Nail or screw to supports.

### 3.11 PARTICLEBOARD UNDERLAYMENT INSTALLATION

- A. Comply with the National Particleboard Association's recommendations for type of subfloor indicated. Fill and sand gouges, gaps, and chipped edges. Sand uneven joints flush.
  - 1. Fastening Method: Nail or staple underlayment to subflooring.

### 3.12 HARDBOARD UNDERLAYMENT

- A. Comply with AHA's "Application Instructions for Basic Hardboard Products" and hardboard manufacturer's written instructions for preparing and applying hardboard underlayment.
  - 1. Fastening Method: Nail or staple underlayment to subflooring.

### 3.13 FOAM-PLASTIC SHEATHING INSTALLATION

- A. Comply with manufacturer's written instructions for applying sheathing. Install vapor-relief strips or equivalent for permitting escape of moisture vapor that otherwise would be trapped in stud cavity behind sheathing.

### 3.14 GYPSUM SHEATHING

- A. General: Fasten gypsum sheathing to supports with galvanized roofing nails or divergent point galvanized staples; comply with GA-253 and manufacturer's recommended spacing and referenced fastening schedule. Keep perimeter fasteners 3/8 inch from edges and ends of units.
- B. Install 24-by-96-inch sheathing horizontally with long edges at right angles to studs with V-grooved edge down and tongue edge up. Interlock tongue with groove to bring long edges in contact with

edges of adjacent board without forcing. Abut ends of boards over centers of studs and stagger end joints of adjacent boards not less than one stud spacing, two where possible.

- C. Install 48-by-96-inch and longer sheathing vertically with long edges parallel to, and centered over, studs. Install solid wood blocking where end joints do not occur over framing. Fit units tightly against each other.

### 3.15 FIBERBOARD SHEATHING INSTALLATION

- A. Fasten fiberboard sheathing panels to intermediate supports and then at edges and ends. Use galvanized roofing nails or galvanized staples; comply with manufacturer's recommended spacing and referenced fastening schedule. Drive fasteners flush with surface of sheathing and locate perimeter fasteners at least 3/8 inch from edges and ends.
- B. Install sheathing vertically with long edges parallel to, and centered over, studs. Install solid wood blocking where end joints do not occur over framing. Allow 1/8-inch open space between edges and ends of adjacent units. Stagger horizontal joints, if any.
- C. Cover sheathing as soon as practical after installation to prevent deterioration from wetting.

### 3.16 BUILDING PAPER APPLICATION

- A. Apply building paper horizontally with 2-inch overlap and 6-inch end lap; fasten to sheathing with galvanized staples or roofing nails. Cover upstanding flashing with 4-inch overlap.

### 3.17 BUILDING WRAP APPLICATION

- A. Cover wall sheathing with building wrap as indicated.
  - 1. Comply with manufacturer's written instructions.
  - 2. Cover upstanding flashing with 4-inch overlap.
  - 3. Seal seams, edges, and penetrations with tape.
  - 4. Extend into jambs of openings and seal corners with tape.

### 3.18 SHEATHING TAPE APPLICATION

- A. Apply sheathing tape to joints between sheathing panels and at items penetrating sheathing. Apply at upstanding flashing to overlap both flashing and sheathing.

END OF SECTION 06100

SECTION 06105 - MISCELLANEOUS CARPENTRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following:
  - 1. Wood furring, grounds, nailers, and blocking.
- B. Related Sections: The following Sections contain requirements that relate to this Section:
  - 1. Division 6 Section "Interior Arch. Woodwork".
  - 2. Division 9Section "Gypsum Board Assemblies".

1.3 SUBMITTALS

- A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.
- B. Wood treatment data as follows, including chemical treatment manufacturer's instructions for handling, storing, installing, and finishing treated materials:
  - 1. For each type of preservative-treated wood product, include certification by treating plant stating type of preservative solution and pressure process used, net amount of preservative retained, and compliance with applicable standards.
  - 2. For waterborne-treated products, include statement that moisture content of treated materials was reduced to levels indicated before shipment to Project site.
  - 3. For fire-retardant-treated wood products, include certification by treating plant that treated materials comply with specified standard and other requirements as well as data relative to bending strength, stiffness, and fastener-holding capacities of treated materials.
- C. Material test reports from a qualified independent testing agency indicating and interpreting test results relative to compliance of fire-retardant-treated wood products with performance requirements indicated.
- D. Warranty of chemical treatment manufacturer for each type of treatment.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Keep materials under cover and dry. Protect from weather and contact with damp or wet surfaces. Stack lumber, plywood, and other panels. Provide for air circulation within and around stacks and under temporary coverings.
  - 1. For lumber and plywood pressure treated with waterborne chemicals, place spacers between each bundle to provide air circulation.

PART 2 - PRODUCTS

2.1 LUMBER, GENERAL

- A. Lumber Standards: Comply with DOC PS 20, "American Softwood Lumber Standard," and with applicable grading rules of inspection agencies certified by American Lumber Standards Committee's (ALSC) Board of Review.
- B. Inspection Agencies: Inspection agencies, and the abbreviations used to reference them, include the following:
  - 1. NELMA - Northeastern Lumber Manufacturers Association.



2. NLGA - National Lumber Grades Authority (Canadian).
3. SPIB - Southern Pine Inspection Bureau.
4. WCLIB - West Coast Lumber Inspection Bureau.
5. WWPB - Western Wood Products Association.

- C. Grade Stamps: Provide lumber with each piece factory marked with grade stamp of inspection agency evidencing compliance with grading rule requirements and identifying grading agency, grade, species, moisture content at time of surfacing, and mill.
- D. 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.
1. Provide dressed lumber, S4S, unless otherwise indicated.
  2. Provide lumber with 15 percent maximum moisture content at time of dressing for 2-inch nominal (38-mm actual) thickness or less, unless otherwise indicated.

## 2.2 WOOD-PRESERVATIVE-TREATED MATERIALS

- A. General: Where lumber or plywood is indicated as preservative treated or is specified to be treated, comply with applicable requirements of AWPB C2 (lumber) and AWPB C9 (plywood). Mark each treated item with the Quality Mark Requirements of an inspection agency approved by ALSC's Board of Review.
1. Do not use chemicals containing chromium or arsenic.
- B. Pressure treat aboveground items with waterborne preservatives to a minimum retention of 0.25 lb/cu. ft. (4.0 kg/cu. m). After treatment, kiln-dry lumber and plywood to a maximum moisture content of 19 and 15 percent, respectively. Treat indicated items and the following:
1. Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.
  2. Wood sills, sleepers, blocking, furring, stripping, and similar concealed members in contact with masonry or concrete.
  3. Wood framing members less than 18 inches (460 mm) above grade.
- C. Pressure treat wood members in contact with ground or freshwater with waterborne preservatives to a minimum retention of 0.40 lb/cu. ft. (6.4 kg/cu. m).

## 2.3 FIRE-RETARDANT-TREATED MATERIALS

- A. General: Where fire-retardant-treated wood is indicated, comply with applicable requirements of AWPB C20 (lumber) and AWPB C27 (plywood). Identify fire-retardant-treated wood with appropriate classification marking of UL; U.S. Testing; Timber Products Inspection, Inc.; or another testing and inspecting agency acceptable to authorities having jurisdiction.
1. Treatment Type: Interior Type A.
  2. Treatment Type: Exterior.
  3. Treatment Types: Interior Type A for protected wood and Exterior for wood exposed to weather.
- B. Inspect each piece of treated lumber or plywood after drying and discard damaged or defective pieces.

## 2.4 BOARDS

- A. Exposed Boards: Where boards will be exposed in the finished work, provide the following:
1. Moisture Content: 15 percent maximum.
  2. Species and Grade: Eastern white pine, D Select per NELMA or NLGA rules.
  3. Species and Grade: Southern pine, C Finish per SPIB rules.
  4. Species and Grade: Hem-fir, C & Btr per WCLIB rules or C Select per NLGA or WWPB rules.
  5. Species and Grade: Spruce-pine-fir, C & Btr per WCLIB rules or C Select per NLGA or WWPB rules.
  6. Species and Grade: Western or Idaho white pine, Choice per NLGA or WWPB rules.
  7. Species and Grade: Any species above.

- B. Concealed Boards: Where boards will be concealed by other work, provide lumber with 19 percent maximum moisture content and of following species and grade:
  - 1. Species and Grade: Eastern softwoods, No. 3 Common per NELMA rules.
  - 2. Species and Grade: Northern species, No. 3 Common or Standard per NLGA rules.
  - 3. Species and Grade: Mixed southern pine, No. 2 per SPIB rules.
  - 4. Species and Grade: Hem-fir, Standard per WCLIB rules or No. 3 Common per WWPA rules.
  - 5. Species and Grade: Spruce-pine-fir, Standard per WCLIB rules or No. 3 Common per WWPA rules.
  - 6. Species and Grade: Western woods, Standard per WCLIB rules or No. 3 Common per WWPA rules.
  - 7. Species and Grade: Any species above.

## 2.5 MISCELLANEOUS LUMBER

- A. General: Provide lumber for support or attachment of other construction, including cant strips, bucks, nailers, blocking, furring, grounds, stripping, and similar members.
- B. Fabricate miscellaneous lumber from dimension lumber of sizes indicated and into shapes shown.
- C. Moisture Content: 15 percent maximum for lumber items are not specified to receive wood preservative treatment.
- D. Grade: For dimension lumber sizes, provide No. 3 or Standard grade lumber per ALSC's NGRs of any species. For board-size lumber, provide No. 3 Common grade per NELMA, NLGA, or WWPA; No. 2 grade per SPIB; or Standard grade per NLGA, WCLIB or WWPA of any species.

## 2.6 ARTICLEBOARD

- A. General: Comply with and factory mark each panel according to ANSI A208.1. Provide thickness indicated.

## 2.8 FASTENERS

- A. General: Provide fasteners of size and type indicated that comply with requirements specified in this Article for material and manufacture.
  - 1. Where miscellaneous carpentry is exposed to weather, in ground contact, or in area of high relative humidity, provide fasteners with a hot-dip zinc coating per ASTM A 153 or of Type 304 stainless steel.
- B. Nails, Wire, Brads, and Staples: FS FF-N-105.
- C. Power-Driven Fasteners: CABO NER-272.
- D. Bolts: Steel bolts complying with ASTM A 307, Grade A (ASTM F 568, Property Class 4.6); with ASTM A 563 (ASTM A 563M) hex nuts and, where indicated, flat washers.

## 2.9 METAL FRAMING ANCHORS

- A. General: Provide galvanized steel framing anchors of structural capacity, type, and size indicated and acceptable to authorities having jurisdiction.
- B. Galvanized Steel Sheet: Hot-dip, zinc-coated steel sheet complying with ASTM A 653, G60 (ASTM A 653M, Z180) coating designation; structural, commercial, or lock-forming quality, as standard with manufacturer for type of anchor indicated.

## PART 3 - EXECUTION

### 3.1 INSTALLATION, GENERAL

- A. Discard units of material with defects that impair quality of carpentry and that are too small to use with minimum number of joints or optimum joint arrangement.
- B. Set carpentry to required levels and lines, with members plumb, true to line, cut, and fitted.
- C. Fit carpentry to other construction; scribe and cope as required for accurate fit. Correlate location of furring, nailers, blocking, grounds, and similar supports to allow attachment of other construction.
- D. Apply field treatment complying with AWPA M4 to cut surfaces of preservative-treated lumber and plywood.
- E. Securely attach carpentry work as indicated and according to applicable codes and recognized standards.
- F. Countersink nail heads on exposed carpentry work and fill holes with wood filler.
- G. Use fasteners of appropriate type and length. Predrill members when necessary to avoid splitting wood.

### 3.2 WOOD GROUNDS, NAILERS, BLOCKING, AND SLEEPERS

- A. Install where shown and where required for screeding or attaching other work. Cut and shape to required size. Coordinate locations with other work involved.
- B. Attach to substrates to support applied loading. Recess bolts and nuts flush with surfaces, unless otherwise indicated.

### 3.3 WOOD FURRING

- A. Install plumb and level with closure strips at edges and openings. Shim with wood as required for tolerance of finish work.
- B. Furring to Receive Gypsum Board: Install 1-by-2-inch nominal- (19-by-38-mm actual-) size furring at 16 inches (406 mm) o.c., vertically.

END OF SECTION 06105

## SECTION 06402 - INTERIOR ARCHITECTURAL WOODWORK

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. This Section includes the following:
  - 1. Laminate-clad cabinets (plastic-covered casework).
  - 2. Plastic-laminate countertops.
  - 3. Wood paneling.
  - 4. Interior ornamental work.
  - 5. Shop finishing of woodwork.
- B. Related Sections: The following Sections contain requirements that relate to this Section:
  - 1. Division 6 Section "Miscellaneous Carpentry".
  - 2. Division 8 Section "Flush Wood Doors" for doors specified by reference to architectural woodwork standards.
  - 3. Division 9 Section "Gypsum Board Assemblies".

#### 1.3 DEFINITIONS

- A. Interior architectural woodwork includes wood furring, blocking, shims, and hanging strips for installing woodwork items unless concealed within other construction prior to woodwork installation.
- B. Rough carriages for stairs are a part of interior architectural woodwork. Platform framing, headers, partition framing, and other rough framing associated with stairwork are specified in Division 6 Section "Rough Carpentry."

#### 1.4 SUBMITTALS

- A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.
- B. Product data for each type of product and process specified and incorporated into items of architectural woodwork during fabrication, finishing, and installation.
- C. Fire-retardant-treatment data for material treated to reduce combustibility. Include certification by treating plant that treated materials comply with requirements.
- D. Shop drawings showing location of each item, dimensioned plans and elevations, large-scale details, attachment devices, and other components.
  - 1. Show details full size.
  - 2. Show locations and sizes of furring, blocking, and hanging strips, including concealed blocking and reinforcing specified in other Sections.
  - 3. Show locations and sizes of cutouts and holes for plumbing fixtures, faucets, soap dispensers, and other items installed in architectural woodwork.
  - 4. Show veneer leaves with dimensions, grain direction, exposed face, and an identification number indicated for each leaf. Identification number shall indicate the flitch and the sequence within the flitch for each leaf.
  - 5. Apply WIC Certified Compliance Label to first page of shop drawings.
- E. Samples for initial selection of the following in the form of manufacturer's color charts consisting of actual units or sections of units showing the full range of colors, textures, and patterns available for each type of material indicated.

1. Shop-applied transparent finishes.
2. Shop-applied opaque finishes.
3. Plastic laminates.
4. Thermoset decorative overlays.
5. Solid surfacing materials.

F. Samples for verification of the following:

1. Lumber with or for transparent finish, 50 sq. in. (300 sq. cm), for each species and cut, finished on one side and one edge.
2. Veneer leaves representative of and selected from flitches to be used for transparent-finished woodwork.
3. Wood-veneer-faced panel products, with or for transparent finish, 8 by 10 inches (200 by 250 mm), for each species and cut. Include at least one face-veneer seam and finish one-half of face as specified.
  - a. Step finish materials on sample to show and clearly define each coat.
  - b. Provide separate samples of unfaced panel product used for core.
4. Lumber and panel products with shop-applied opaque finish, 8 by 10 inches (200 by 250 mm) for panels and 50 sq. in. (300 sq. cm) for lumber, for each finish system and color, with one-half of exposed surface finished.
5. Laminate-clad panel products, 8 by 10 inches (200 by 250 mm), for each type, color, pattern, and surface finish, with separate samples of unfaced panel product used for core.
6. Thermoset decorative-overlay surfaced panel products, 8 by 10 inches (200 by 250 mm), for each type, color, pattern, and surface finish, with separate samples of unfaced panel product used for core.
7. Solid surfacing materials, 6 inches (150 mm) square.
8. Corner pieces as follows:
  - a. Cabinet front frame joints between stiles and rail, as well as exposed end pieces, 18 inches (450 mm) high by 18 inches (450 mm) wide by 6 inches (150 mm) deep.
  - b. Miter joints for standing trim.
9. Exposed cabinet hardware, one unit for each type and finish.

G. Product certificates signed by woodwork fabricator certifying that products comply with specified requirements.

H. Qualification data for firms and persons specified in the "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

## 1.5 QUALITY ASSURANCE

- A. Fabricator Qualifications: Firm experienced in producing architectural woodwork similar to that indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units without delaying the Work.
- B. Installer Qualifications: Arrange for interior architectural woodwork installation by a firm that can demonstrate successful experience in installing architectural woodwork items similar in type and quality to those required for this Project.
- C. Single-Source Responsibility: Arrange for production of interior architectural woodwork with sequence-matched wood veneers by a single firm.
  1. Include the veneering of wood doors in the single-firm production where veneer matching extends across wood doors.
- D. Single-Source Responsibility for Fabrication and Installation: Engage a qualified woodworking firm to assume undivided responsibility for fabricating, finishing, and installing woodwork specified in this Section.
- E. Quality Standard: Except as otherwise indicated, comply with the following standard:

1. AWI Quality Standard: "Architectural Woodwork Quality Standards" of the Architectural Woodwork Institute for grades of interior architectural woodwork, construction, finishes, and other requirements.
    - a. Provide AWI Certification Labels or Certificates of Compliance indicating that woodwork meets requirements of grades specified.
  - F. Fire-Test-Response Characteristics: Provide materials with the following fire-test-response characteristics as determined by testing identical products per ASTM test method indicated below by UL, Warnock Hersey, or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify fire-retardant-treated material with appropriate markings of applicable testing and inspecting agency in the form of separable paper label or, where required by authorities having jurisdiction, imprint on surfaces of materials that will be concealed from view after installation.
    1. Surface-Burning Characteristics: Not exceeding values indicated below, tested per ASTM E 84 for standard time period (10 minutes).
      - a. Flame Spread: 75.
      - b. Smoke Developed: 450.
    2. Surface-Burning Characteristics: Not exceeding values indicated below, tested per ASTM E 84 for 30 minutes with no evidence of significant combustion. In addition, the flame front shall not progress more than 10-1/2 feet (3.2 m) beyond the center line of the burner at any time during the test.
      - a. Flame Spread: 25.
      - b. Smoke Developed: 450.
  - G. Preinstallation Conference: Conduct conference at Project site to comply with requirements of Division 1 Section "Project Meetings."
- 1.6 DELIVERY, STORAGE, AND HANDLING
- A. Protect woodwork during transit, delivery, storage, and handling to prevent damage, soilage, and deterioration.
  - B. Do not deliver woodwork until painting and similar operations that could damage, soil, or deteriorate woodwork have been completed in installation areas. If woodwork must be stored in other than installation areas, store only in areas whose environmental conditions meet requirements specified in "Project Conditions."
- 1.7 PROJECT CONDITIONS
- A. Environmental Limitations: Do not deliver or install woodwork until building is enclosed, wet-work is completed, and HVAC system is operating and will maintain temperature and relative humidity at occupancy levels during the remainder of the construction period.
  - B. Environmental Limitations: Obtain and comply with woodwork fabricator's and Installer's coordinated advice for optimum temperature and humidity conditions for woodwork during its storage and installation. Do not install woodwork until these conditions have been attained and stabilized so that woodwork will be within plus or minus 1.0 percent of optimum moisture content from date of installation through remainder of construction period.
  - C. Field Measurements: Where woodwork is indicated to be fitted to other construction, check actual dimensions of other construction by accurate field measurements before fabrication, and show recorded measurements on final shop drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
    1. Verify locations of concealed framing, blocking, reinforcements, and furring that support woodwork by accurate field measurements before being enclosed. Record measurements on final shop drawings.
- 1.8 COORDINATION
- A. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in other Sections to ensure that interior architectural woodwork can be supported and installed as indicated.

- B. Hardware Coordination: Distribute copies of approved schedule for cabinet hardware specified in Division 8 Section "Door Hardware" to fabricator of architectural woodwork; coordinate cabinet shop drawings and fabrication with hardware requirements.

## PART 2 – PRODUCTS

### 2.1 WOODWORK FABRICATORS

- A. Fabricators: Subject to compliance with requirements, provide interior architectural woodwork by one of the following:

### 2.2 MATERIALS

- A. General: Provide materials that comply with requirements of the AWI quality standard for each type of woodwork and quality grade indicated and, where the following products are part of interior woodwork, with requirements of the referenced product standards that apply to product characteristics indicated:
  - 1. Hardboard: AHA A135.4.
  - 2. Medium-Density Fiberboard: ANSI A208.2.
  - 3. Particleboard: ANSI A208.1, Grade M-2.
  - 4. Softwood Plywood: PS 1.
  - 5. Hardwood Plywood and Face Veneers: HPVA HP-1.
- B. Formaldehyde Emission Level for Medium-Density Fiberboard: Comply with requirements of NPA 9.
- C. Fiberboard: Medium-density fiberboard made without formaldehyde and complying with ANSI A208.2.
  - 1. Product: Subject to compliance with requirements, provide Medite II by Medite Corp.
- D. High-Pressure Decorative Laminate: NEMA LD 3, grades as indicated, or if not indicated, as required by woodwork quality standard.
  - 1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering high-pressure decorative laminates that may be incorporated in the Work include, but are not limited to, the following:
    - a. Formica Corporation.
    - b. Laminart.
    - c. Nevamar Corp.
    - d. Pioneer Plastics Corp.
    - e. Westinghouse Electric Corp.; Specialty Products Div.
    - f. Ralph Wilson Plastics Co.
- E. Chemical-Resistant, High-Pressure Decorative Laminate: NEMA LD 3, Grade PF-42, and as follows:
  - 1. Laminate has the following ratings when tested with indicated reagents according to NEMA LD 3 test procedure 3.9.5:
    - a. Nitric acid (30 percent): moderate effect.
    - b. Sulfuric acid (77 percent): moderate effect.
    - c. Hydrochloric acid (37 percent): moderate effect.
    - d. Phosphoric acid (75 percent): no effect.
    - e. Acetic acid (98 percent): no effect.
    - f. Carbon tetrachloride: no effect.
    - g. Formaldehyde: no effect.
    - h. Ethyl acetate: no effect.
    - i. Ethyl ether: no effect.
    - j. Phenol (85 percent): moderate effect.
    - k. Benzene: no effect.
    - l. Xylene: no effect.
    - m. Butyl alcohol: no effect.
    - n. Furfural: no effect.
    - o. Methyl ethyl ketone: no effect.
    - p. Sodium hydroxide (25 percent): no effect.
    - q. Sodium sulfide (15 percent): no effect.

- r. Ammonium hydroxide (28 percent): no effect.
  - s. Zinc chloride: no effect.
  - t. Gentian violet: no effect.
  - u. Methyl red: no effect.
- 2. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:
  - a. Lab Grade 840 Black; Formica Corporation.
  - b. Pionite Chemguard; Pioneer Plastics Corp.
  - c. Chemsurf; Ralph Wilson Plastics Co.
- F. Thermoset Decorative Overlay: Decorative surface of thermally fused polyester or melamine-impregnated web, bonded to specified substrate and complying with ALA 1992.
  - 1. Substrate: Fire-retardant particleboard.
- G. Solid Surfacing Material: Homogeneous solid sheets of filled plastic resin complying with the material and performance requirements of ANSI Z124.3, Type 5 or Type 6, without a precoated finish.
  - 1. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:
    - a. Avonite; Avonite, Inc.
    - b. Corian; DuPont Polymers.
    - c. Surell; Formica Corp.
    - d. Fountainhead; Nevamar Corp.
    - e. Swanstone; The Swan Corporation.
    - f. Gibraltar; Ralph Wilson Plastics Co.

## 2.3 FIRE-RETARDANT-TREATED MATERIALS

- A. General: Where indicated, use materials impregnated with fire-retardant chemical formulations indicated by a pressure process or other means acceptable to authorities having jurisdiction to produce products with fire-test-response characteristics specified.
- B. Fire-Retardant Chemicals: Use chemical formulations that do not bleed through or otherwise adversely affect finishes. Do not use colorants in solution to distinguish treated material from untreated material.
- C. Fire-Retardant-Treated Lumber: Comply with the following:
  - 1. Organic-Resin-Based Formulation: Exterior type per AWWPA C20, consisting of organic-resin solution, relatively insoluble in water, thermally set in wood by kiln drying.
  - 2. Low-Hygroscopic Formulation: Interior Type A per AWWPA C20.
  - 3. Nonpressure-Treatment Formulation: Nontoxic, water-soluble product applied by dip, spray, roller, curtain coating, vacuum chamber, or soaking.
  - 4. Mill lumber before treatment and implement special procedures during treatment and drying processes that prevent lumber from warping and developing discolorations from drying sticks or other causes, marring, and other defects affecting appearance of treated woodwork.
  - 5. Kiln-dry material before and after treatment to levels required for untreated material.
  - 6. Discard treated material that does not comply with requirements of referenced woodworking standard. Do not use twisted, warped, bowed, discolored, or otherwise damaged or defective material.
  - 7. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:
    - a. Organic-Resin-Based Formulation (Exterior Type):
      - 1) Exterior Fire-X; American Wood Treaters, Inc.
      - 2) Exterior Fire-X; Hoover Treated Wood Products, Inc.
    - b. Low-Hygroscopic Formulation (Type A):
      - 1) D-Blaze; J. H. Baxter Co.
      - 2) D-Blaze; Chemical Specialties, Inc.
      - 3) Pyro-guard; Continental Wood Preservers, Inc.
      - 4) Dricon; Hickson Corp.



- 5) Pyro-guard; Hoover Treated Wood Products, Inc.
- c. Nonpressure-Treatment Formulation:
  - 1) Gaia Process; Fibretech, Inc.
- D. Fire-Retardant Particleboard: Panels complying with the following requirements, made from softwood particles and fire-retardant chemicals mixed together at time of panel manufacture to achieve products identical to those tested for flame spread of 25 or less and for smoke developed of 25 or less per ASTM E 84 by UL, Warnock Hersey, or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify products with appropriate markings of applicable testing and inspecting agency.
  - 1. For panels 3/4 inch (19 mm) thick and less and 45-lb/cu. ft (720-kg/cu. m) density, comply with ANSI A208.1 for Grade M-2 except for the following minimum properties: modulus of rupture, 1600 psi (11 MPa); modulus of elasticity, 300,000 psi (2000 MPa); internal bond, 80 psi (550 kPa); and screw-holding capacity on face and edge, 250 lbf (1100 N) and 225 lbf (1000 N) respectively.
  - 2. For panels 13/16 to 1-1/4 inches (20 to 32 mm) thick and 44-lb/cu. ft (705-kg/cu. m) density, comply with ANSI A208.1 for Grade M-1 except for the following minimum properties: modulus of rupture, 1300 psi (9 MPa); modulus of elasticity, 250,000 psi (1700 MPa); linear expansion, 0.50 percent; and screw-holding capacity on face and edge, 250 lbf (1100 N) and 175 lbf (780 N) respectively.
  - 3. Product: Subject to compliance with requirements, provide Duraflake FR by Willamette Industries, Inc.
- E. Fire-Retardant Fiberboard: Medium-density fiberboard panels complying with ANSI A208.2, made from softwood fibers, synthetic resins, and fire-retardant chemicals mixed together at time of panel manufacture to achieve products identical to those tested for flame spread of 25 or less and for smoke developed of 200 or less per ASTM E 84 by UL, Warnock Hersey, or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify products with appropriate markings of applicable testing and inspecting agency.
  - 1. Product: Subject to compliance with requirements, provide Medite FR by Medite Corp.

## 2.4 CABINET HARDWARE AND ACCESSORY MATERIALS

- A. General: Provide cabinet hardware and accessory materials associated with architectural cabinets, except for items specified in Division 8 Section "Door Hardware."
- B. Cabinet Hardware Schedule: Refer to schedule at end of this Section for cabinet hardware required for architectural cabinets.
- C. Exposed Hardware Finishes: For exposed hardware, provide finish that complies with BHMA A156.18 for BHMA code number indicated.
  - 1. Satin Chromium Plated: BHMA 626 for brass or bronze base; BHMA 652 for steel base.
- D. For concealed hardware provide manufacturer's standard finish that complies with product class requirements of BHMA A156.9.
- E. Clear Float Glass for Doors: ASTM C 1036, Type I, Class 1, Quality q3, 6 mm thick, unless otherwise indicated.
- F. Clear, Tempered Float Glass for Shelves: ASTM C 1048, Kind FT, Condition A, Type I, Class 1, Quality q3; with exposed edges seamed before tempering, 1/4" thick, unless otherwise indicated.

## 2.5 INSTALLATION MATERIALS

- A. Furring, Blocking, Shims, and Hanging Strips: Softwood or hardwood lumber, kiln dried to less than 15 percent moisture content.
- B. Rough Carriages for Stairs: Comply with requirements of Division 6 Section "Rough Carpentry" for structural framing lumber. Kiln dry to less than 15 percent moisture content.
- C. Screws: Select material, type, size, and finish required for each use. Comply with ASME B18.6.1 for applicable requirements.

1. For metal framing supports, provide screws as recommended by metal-framing manufacturer.
- D. Nails: Select material, type, size, and finish required for each use. Comply with FS FF-N-105 for applicable requirements.
- E. Anchors: Select material, type, size, and finish required for each substrate for secure anchorage. Provide nonferrous metal or hot-dip galvanized anchors and inserts on inside face of exterior walls and elsewhere as required for corrosion resistance. Provide toothed steel or lead expansion bolt devices for drilled-in-place anchors.

## 2.6 FABRICATION, GENERAL

- A. Interior Woodwork Grade: Provide interior woodwork complying with the referenced quality standard and of the following grade:
  1. Grade: Premium.
- B. Wood Moisture Content: Comply with requirements of referenced quality standard for wood moisture content in relation to relative humidity conditions existing during time of fabrication and in installation areas.
- C. Sand fire-retardant-treated wood lightly to remove raised grain on exposed surfaces before fabrication.
- D. Fabricate woodwork to dimensions, profiles, and details indicated. Ease edges to radius indicated for the following:
  1. Corners of cabinets and edges of solid-wood (lumber) members 3/4 inch (19 mm) thick or less: 1/16 inch (1.5 mm).
  2. Edges of rails and similar members more than 3/4 inch (19 mm) thick: 1/8 inch (3 mm).
- E. Complete fabrication, including assembly, finishing, and hardware application, before shipment to Project site to maximum extent possible. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.
  1. Trial fit assemblies at the fabrication shop that cannot be shipped completely assembled. Install dowels, screws, bolted connectors, and other fastening devices that can be removed after trial fitting. Verify that various parts fit as intended and check measurements of assemblies against field measurements indicated on approved shop drawings before disassembling for shipment.
- F. Shop-cut openings, to maximum extent possible, to receive hardware, appliances, plumbing fixtures, electrical work, and similar items. Locate openings accurately and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Smooth edges of cutouts and, where located in countertops and similar exposures, seal edges with a water-resistant coating.
- G. Install glass to comply with applicable requirements of Division 8 Section "Glazing" and of FGMA "Glazing Manual." For glass in wood frames, secure glass with removable stops.

## 2.7 INTERIOR STANDING AND RUNNING TRIM FOR TRANSPARENT FINISH

- A. Quality Standard: Comply with AWI Section 300.
  1. Grade: Premium.
- B. Backout or groove backs of flat trim members and kerf backs of other wide, flat members, except for members with ends exposed in finished work.
- C. Assemble casings in plant except where limitations of access to place of installation require field assembly.
- D. Wood Species: White oak, rift sawn.

## 2.8 LAMINATE-CLAD CABINETS (PLASTIC-COVERED CASEWORK)

- A. Quality Standard: Comply with AWI Section 400 requirements for laminate-clad cabinets.
  - 1. Grade: Custom.
- B. AWI Type of Cabinet Construction: As indicated.
- C. Laminate Cladding for Exposed Surfaces: High-pressure decorative laminate complying with the following requirements:
  - 1. Horizontal Surfaces Other than Tops: GP-50, 0.050-inch (1.270-mm) nominal thickness.
  - 2. Postformed Surfaces: PF-42, 0.042-inch (1.067-mm) nominal thickness.
  - 3. Vertical Surfaces: GP-50, 0.050-inch (1.270-mm) nominal thickness.
  - 4. Edges: GP-50, 0.050-inch (1.270-mm) nominal thickness.
- D. Materials for Semiexposed Surfaces: Provide surface materials indicated below:
  - 1. Surfaces Other than Drawer Bodies: High-pressure decorative laminate, Grade GP-28.
  - 2. Drawer Bottoms: Thermoset decorative overlay.
- E. Colors, Patterns, and Finishes: Provide materials and products that result in colors and textures of exposed laminate surfaces complying with the following requirements:
  - 1. Provide Architect's selections from laminate manufacturer's full range of colors and finishes in the following categories:
    - a. Solid colors.
    - b. Solid colors, with core same color as surface.
    - c. Wood grains.
    - d. Patterns.
- F. Provide dust panels of 1/4-inch (6.4-mm) plywood or tempered hardboard above compartments and drawers except where located directly under tops.

## 2.9 COUNTERTOPS

- A. Quality Standard: Comply with AWI Section 400 requirements for countertops.
- B. Type of Top: High-pressure decorative laminate complying with the following:
  - 1. Grade: GP-50, 0.050-inch (1.270-mm) nominal thickness.
  - 2. Colors, Patterns, and Finishes: Provide materials and products that result in colors and textures of exposed laminate surfaces complying with the following requirements:
    - a. Match Architect's sample.
    - b. Match color, pattern, and finish indicated by reference to manufacturer's standard designations for these characteristics.
    - c. Provide Architect's selections from manufacturer's full range of colors and finishes in the following categories:
      - 1) Solid colors.
      - 2) Solid colors, with core same color as surface.
      - 3) Patterns.
  - 3. Grain Direction: Parallel to cabinet fronts.
  - 4. Edge Treatment: Same as laminate cladding on horizontal surfaces.
  - 5. Core Material: Fire-retardant particleboard.

## 2.10 FLUSH WOOD PANELING AND WAINSCOTS FOR TRANSPARENT FINISH

- A. Quality Standard: Comply with AWI Section 500 requirements for flush wood paneling.
  - 1. Grade: Premium.
- B. Wood Species: White oak, rift cut.
- C. Wood Species: As indicated.

1. Lumber Trim and Edges: At panelwork fabricator's option, trim and edges indicated as solid wood (except moldings) may be either lumber or veneered construction compatible with grain and color of veneered panels.
- D. Panel-Matching Method: No matching between panels is required. Select panels for similarity of grain pattern and color, and arrange sequence of panels for optimum color and grain matching between adjacent panels.
- E. Fire-Test-Response Characteristics: Provide panels composed of wood veneer and fire-retardant particleboard that are identical in construction to units tested for the following surface-burning characteristics per ASTM E 84 by UL or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify panels with appropriate markings of applicable testing and inspecting agency on surfaces that will be concealed from view after installation.
  1. Flame Spread: 75 or less.
  2. Smoke Developed: 450 or less.
- F. Wood stain color and finish coat of wood paneling to match wood doors reference Division 8 "Flush Wood Panels".

#### 2.11 INTERIOR ORNAMENTAL WORK FOR TRANSPARENT FINISH

- A. Quality Standard: Comply with AWI Section 700.
  1. Grade: Premium.
- B. Wood Species: White oak, rift sawn.
- C. Wood Species: Match species and cut indicated for other types of transparent-finished architectural woodwork located in same area of building, unless otherwise indicated.

#### 2.12 SHOP FINISHING OF INTERIOR ARCHITECTURAL WOODWORK

- A. Quality Standard: Comply with AWI Section 1500, unless otherwise indicated.
  1. Grade: Provide finishes of same grades as items to be finished.
- B. General: The entire finish of interior architectural woodwork is specified in this Section, regardless of whether shop applied or applied after installation.
  1. Shop Finishing: To the greatest extent possible, finish architectural woodwork at the fabrication shop. Defer only final touch up, cleaning, and polishing until after installation.
- C. General: The priming and shop finishing (if any) of interior architectural woodwork required to be performed at the fabrication shop are specified in this Section. Refer to Division 9 Section "Painting" for final finishing of installed architectural woodwork and for material and application requirements of prime coats for woodwork not specified to receive final finish in this Section.
- D. Preparations for Finishing: Comply with referenced quality standard for sanding, filling countersunk fasteners, sealing concealed surfaces, and similar preparations for finishing architectural woodwork, as applicable to each unit of work.
  1. Backpriming: Apply one coat of sealer or primer compatible with finish coats to concealed surfaces of woodwork, including backs of trim, cabinets, paneling, and ornamental work and the underside of countertops. Apply 2 coats to back of paneling. Concealed surfaces of plastic laminate-clad woodwork do not require backpriming when surfaced with plastic laminate or thermoset decorative overlay.
- E. Washcoat for Stained Finish: Apply a vinyl washcoat to woodwork made from closed-grain wood before staining and finishing.
- F. Open Finish for Open-Grain Woods: Do not apply filler to open-grain woods.

- G. Filled Finish for Open-Grain Woods: After staining (if any), apply paste wood filler to open-grain woods and wipe off excess. Tint filler to match stained wood.
  - 1. Apply vinyl washcoat sealer after staining and before filling.
- H. Transparent Finish: Comply with requirements indicated below for grade, finish system, staining, and satin gloss sheen. Grade: Premium.

## PART 3 - EXECUTION

### 3.1 PREPARATION

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

### 3.2 INSTALLATION

- A. Quality Standard: Install woodwork to comply with AWI Section 1700 for the same grade specified in Part 2 of this Section for type of woodwork involved.
- B. Install woodwork plumb, level, true, and straight with no distortions. Shim as required with concealed shims. Install to a tolerance of 1/8 inch in 96 inches (3 mm in 2400 mm)
- C. for plumb and level (including tops).
- D. Scribe and cut woodwork to fit adjoining work and refinish cut surfaces or repair damaged finish at cuts.
- E. Fire-Retardant-Treated Wood: Handle, store, and install fire-retardant-treated wood to comply with recommendations of chemical treatment manufacturer, including those for adhesives used to install woodwork.
- F. Anchor woodwork to anchors or blocking built in or directly attached to substrates. Secure to grounds, stripping and blocking with countersunk, concealed fasteners and blind nailing as required for complete installation. Use fine finishing nails for exposed nailing, countersunk and filled flush with woodwork and matching final finish where transparent finish is indicated.
- G. Standing and Running Trim: Install with minimum number of joints possible, using full-length pieces (from maximum length of lumber available) to the greatest extent possible. Do not use pieces less than 36 inches (900 mm) long, except where necessary. Stagger joints in adjacent and related members. Fill gaps, if any, between top of base and wall with plastic wood filler, sand smooth, and finish same as wood base, if finished.
  - 1. Install standing and running trim with no more than 1/8 inch in 96-inch (3 mm in 2400-mm) variation from a straight line.
- H. Cabinets: Install without distortion so that doors and drawers fit openings properly and are accurately aligned. Adjust hardware to center doors and drawers in openings and to provide unencumbered operation. Complete the installation of hardware and accessory items as indicated.
  - 1. Install cabinets with no more than 1/8 inch in 96-inch (3 mm in 2400-mm) sag, bow, or other variation from a straight line.
  - 2. Maintain veneer sequence matching of cabinets with transparent finish.
- I. Tops: Anchor securely to base units and other support systems as indicated. Calk space between backsplash and wall with specified sealant.
  - 1. Install countertops with no more than 1/8 inch in 96-inch (3 mm in 2400-mm) sag, bow, or other variation from a straight line.
  - 2. Secure backsplashes to tops with concealed metal brackets at 16 inches (400 mm) o.c.

- J. Paneling: Anchor paneling to supporting substrate with concealed panel-hanger clips and by blind nailing on backup strips, splined-connection strips, and similar associated trim and framing. Do not face nail unless otherwise indicated.
  - 1. Install flush paneling with no more than 1/16 inch in 96-inch (1.5 mm in 2400-mm) vertical cup or bow and 1/8 inch in 96-inch (3 mm in 2400-mm) horizontal variation from a true plane.
- K. Complete the finishing work specified in this Section to the extent not completed at shop or before installation of woodwork. Fill nail holes with matching filler where exposed. Apply specified finish coats, including stains and paste fillers if any, to exposed surfaces where only sealer/prime coats were applied in the shop.

### 3.3 ADJUSTING AND CLEANING

- A. Repair damaged and defective woodwork where possible to eliminate functional and visual defects; where not possible to repair, replace woodwork. Adjust joinery for uniform appearance.
- B. Clean, lubricate, and adjust hardware.
- C. Clean woodwork on exposed and semiexposed surfaces. Touch up shop-applied finishes to restore damaged or soiled areas.

### 3.4 PROTECTION

- A. Provide final protection and maintain conditions in a manner acceptable to fabricator and Installer that ensures that woodwork is without damage or deterioration at the time of Substantial Completion.

### 3.5 CABINET HARDWARE AND ACCESSORY SCHEDULE (For cabinets and countertops)

- A. BHMA numbers are used below to designate hardware requirements, except as otherwise indicated.
- B. Concealed (European Type) Hinges: B01602.
- C. Pulls: Wire pulls, 5 inches (127 mm) long, 2-1/2 inches (62 mm) deep, and 5/16 inches (8 mm) in diameter satin chrome finish.
- D. Adjustable Shelf Standards: B04071.
  - 1. Shelf Rests for Standards: B04081.
- E. Shelf Rests: B04013.
- F. Drawer Slides: Side-mounted, full-extension, zinc-plated steel drawer slides with steel ball bearings, complying with BHMA A156.9, Grade 1 and rated for the following loads:
  - 1. Box Drawer Slides: 75 lbf (330 N).
  - 2. File Drawer Slides: 150 lbf (670 N).
  - 3. Pencil Drawer Slides: 45 lbf (200 N).
- G. Door Locks: E07121.
- H. Drawer Locks: E07041.
- I. Grommets for cable passage through countertops: 2 inch (25 mm) OD black, molded-plastic grommets with 1 3/4-inch (19-mm) hole and black plastic cap with slot for wire passage.

END OF SECTION 06402

## SECTION 06651 - SOLID SURFACE FABRICATIONS

### PART 1 — GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the contract, including general and supplementary conditions and Division 1 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. This Section includes the following horizontal and trim solid surface product types:

1. Countertops with sinks
2. Lavatory tops with undermount bowls
3. Lavatory tops with integral bowls
4. Vanity tops
5. Tabletops
6. Cove backsplashes

- B. Related Sections include the following:

1. Division 6 Section "Rough Carpentry" for Blocking.

#### 1.3 DEFINITION

- A. Solid surface is defined as nonporous, homogeneous material maintaining the same composition throughout the part with a composition of acrylic polymer, aluminum trihydrate filler and pigment.

#### 1.4 SUBMITTALS

- A. Product data:

1. For each type of product indicated.

- B. Shop drawings:

1. Show location of each item, dimensioned plans and elevations, large-scale details, attachment devices and other components.
  - a. Show full-size details, edge details, thermoforming requirements, attachments, etc.
  - b. Show locations and sizes of furring, blocking, including concealed blocking and reinforcement specified in other Sections.
  - c. Show locations and sizes of cutouts and holes for plumbing fixtures, faucets, soap dispensers, waste receptacle and other items installed in solid surface.

- C. Samples:

1. For each type of product indicated.
  - a. Submit minimum 6-inch by 6-inch sample in specified gloss.
  - b. Cut sample and seam together for representation of inconspicuous seam.
  - c. Indicate full range of color and pattern variation.
2. Approved samples will be retained as a standard for work.

- D. Product data:

1. Indicate product description, fabrication information and compliance with specified performance requirements.

- E. Product certificates:

1. For each type of product, signed by product manufacturer.

- F. Maintenance data:

1. Submit manufacturer's care and maintenance data, including repair and cleaning instructions.
  - a. Maintenance kit for finishes shall be submitted.
2. Include in project closeout documents.

#### 1.5 QUALITY ASSURANCE

##### A. Qualifications:

1. Shop that employs skilled workers who custom fabricate products similar to those required for this project and whose products have a record of successful in-service performance.

##### B. Fabricator/installer qualifications:

1. Work of this section shall be by a certified fabricator/installer, certified in writing by the manufacturer.

##### C. 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
2. Fire test response characteristics:
  - a. Provide with the following Class A (Class I) surface burning characteristics as determined by testing identical products per UL 723 (ASTM E84) or another testing and inspecting agency acceptable to authorities having jurisdiction:
    - 1) Flame Spread Index: 25 or less.
    - 2) Smoke Developed Index: 450 or less.

##### D. Coordination drawings:

1. Shall be prepared indicating:
  - a. Plumbing work.
  - b. Electrical work.
  - c. Miscellaneous steel for the general work.
  - d. Indicate location of all walls (rated and non-rated), blocking locations and recessed wall items, etc.
2. Content:
  - a. Project-specific information, drawn accurately to scale.
  - b. Do not base coordination drawings on reproductions of the contract documents or standard printed data.
  - c. Indicate dimensions shown on the contract drawings and make specific note of dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements.
  - d. Provide alternate sketches to designer for resolution of such conflicts.
    - 1) Minor dimension changes and difficult installations will not be considered changes to the contract.

##### E. Drawings shall:

1. Be produced in 1/2-inch scale for all fabricated items.

##### F. Drawings must be complete and submitted to the architect within 60 days after award of contract for record only.

1. No review or approval will be forthcoming.

##### G. Pre-installation conference:

1. Conduct conference at project site to comply with requirements in Division 1.

#### 1.6 DELIVERY, STORAGE AND HANDLING



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

#### 1.7 WARRANTY

- A. Provide manufacturer's warranty against defects in materials.
  - 1. Warranty shall provide material and labor to repair or replace defective materials.
  - 2. Damage caused by physical or chemical abuse or damage from excessive heat will not be warranted.
- B. Manufacturer's warranty period:
  - 1. Ten years from date of substantial completion.

#### 1.8 MAINTENANCE

- A. Provide maintenance requirements as specified by the manufacturer.

### PART 2 — PRODUCTS

#### 2.1 MANUFACTURERS

- A. Manufacturers:
  - 1. Subject to compliance with requirements, provide products by one of the following:
    - a. Corian® surfaces from the DuPont company (basis of design).
    - b. Architect Approved Equal

#### 2.2 MATERIALS

- A. Solid polymer components
  - 1. Cast, nonporous, filled polymer, not coated, laminated or of composite construction with through body colors meeting ANSI Z124.3 or ANSI Z124.6, having minimum physical and performance properties specified.
  - 2. Superficial damage to a depth of 0.010 inch (.25 mm) shall be repairable by sanding and/or polishing.

- B. Thickness:
  - 1. 1/2 inch

- D. Inlays:
  - 1. Fabricate using manufacturer's approved method.
  - 2. Rout 1/8" deep max. groove for inlay to pattern indicated on designer's drawings.
  - 3. Fill groove using methods approved by manufacturer, avoiding air bubbles or voids.
  - 4. Overfill inlay area.
  - 5. Allow area to fully cure.
    - a. Do not overheat inlay while sanding.
  - 6. Finish and touch up to uniform appearance.

- E. Integral sink:
  - 3. Mounting:
    - a. Seamed undermount.

- 3. Mounting:
    - a. Seamed undermount.

- G. Backsplash:
  - 1. Applied.

- H. Sidesplash:

1. Applied.

I. Performance characteristics:

Property	Typical Result	Test
Tensile Strength	6,000 psi	ASTM D 638
Tensile Modulus	$1.5 \times 10^{-6}$ psi	ASTM D 638
Tensile Elongation	0.4% min.	ASTM D 638
Flexural Strength	10,000 psi	ASTM D 790
Flexural Modulus	$1.2 \times 10^{-6}$ psi	ASTM D 790
Hardness	>85	Rockwell "M" Scale
	56	ASTM D 785 Barcol Impressor
Thermal Expansion	$3.02 \times 10^{-5}$ in./in./°C ( $1.80 \times 10^{-5}$ in./in./°F)	ASTM D 2583 ASTM D 696
Gloss (60° Gardner)	5–75 (matte—highly polished)	ANSI Z124
Light Resistance	(Xenon Arc) No effect	NEMA LD 3-2000 Method 3.3
Wear and Cleanability	Passes	ANSI Z124.3 & Z124.6
Stain Resistance: Sheets	Passes	ANSI Z124.3 & Z124.6
Fungus and Bacteria Resistance	Does not support microbial growth	ASTM G21&G22
Boiling Water Resistance	No visible change	NEMA LD 3-2000 Method 3.5
High Temperature Resistance	No change	NEMA LD 3-2000 Method 3.6
Izod Impact (Notched Specimen)	0.28 ft.-lbs./in. of notch	ASTM D 256 (Method A)
Ball Impact	No fracture—1/2 lb. ball:	NEMA LD 3-2000
Resistance: Sheets	1/4" slab—36" drop 1/2" slab—144" drop	Method 3.8
Weatherability	$\Delta E^*_{94} < 5$ in 1,000 hrs.	ASTM G 155
Specific Gravity †	1.7	
Water Absorption	Long-term 0.4% (3/4") 0.6% (1/2") 0.8% (1/4")	ASTM D 570
Toxicity	99 (solid colors) 66 (patterned colors)	Pittsburgh Protocol Test ("LC50" Test)
Flammability	All colors (Class I and Class A)	ASTM E 84, NFPA 255 & UL 723
Flame Spread Index	<25	
Smoke Developed Index	<25	

† Approximate weight per square foot: 1/4" (6 mm) 2.2 lbs., 1/2" (12.3 mm) 4.4 lbs.  
Shapes meet or exceed the ANSI Z124.3 and ANSI Z124.6 standards for plastic sinks and lavatories.  
NEMA results based on the NEMA LD 3-2000

2.3 ACCESSORIES

A. Joint adhesive:

1. Manufacturer's standard one- or two-part adhesive kit to create inconspicuous, nonporous joints.
- B. Sealant:
  1. Manufacturer's standard mildew-resistant, FDA-compliant, NSF 51-compliant (food zone — any type), UL-listed silicone sealant in colors matching components.
- C. Sink/lavatory mounting hardware:
  1. Manufacturer's standard bowl clips, panel inserts and fasteners for attachment of undermount sinks/lavatories.
- D. Conductive tape:
  1. Manufacturer's standard aluminum foil tape, with required thickness, for use with cutouts near heat sources.
- E. Insulating felt tape:
  1. Manufacturer's standard for use with conductive tape in insulating solid surface material from adjacent heat source.

## 2.4 FACTORY FABRICATION

- A. Shop assembly
  1. Fabricate components to greatest extent practical to sizes and shapes indicated, in accordance with approved shop drawings and manufacturer's printed instructions and technical bulletins.
  2. Form joints between components using manufacturer's standard joint adhesive without conspicuous joints.
    - a. Reinforce with strip of solid polymer material, 2" wide.
  3. Provide factory cutouts for plumbing fittings and bath accessories as indicated on the drawings.
  4. Rout and finish component edges with clean, sharp returns.
    - a. Rout cutouts, radii and contours to template.
    - b. Smooth edges.
    - c. Repair or reject defective and inaccurate work.

## 2.5 FINISHES

- A. Select from the manufacturer's standard color chart.

## PART 3 — EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates and conditions, with fabricator present for compliance with requirements for installation tolerances and other conditions affecting performance of work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 INSTALLATION

- A. Install components plumb, level and rigid, scribed to adjacent finishes, in accordance with approved shop drawings and product data.
  1. Provide product in the largest pieces available.
  2. Form field joints using manufacturer's recommended adhesive, with joints inconspicuous in finished work.
    - a. Exposed joints/seams shall not be allowed.
  3. Reinforce field joints with solid surface strips extending a minimum of 1 inch on either side of the seam with the strip being the same thickness as the top.
  4. Cut and finish component edges with clean, sharp returns.
  5. Rout radii and contours to template.
  6. Anchor securely to base cabinets or other supports.
  7. Align adjacent countertops and form seams to comply with manufacturer's written recommendations using adhesive in color to match countertop.

8. Carefully dress joints smooth, remove surface scratches and clean entire surface.
9. Install countertops with no more than 1/8-inch (3 mm) sag, bow or other variation from a straight line.

B. Coved backsplashes and applied sidesplashes:

1. Install applied sidesplashes using manufacturer's standard color-matched silicone sealant.
2. Adhere applied sidesplashes to countertops using manufacturer's standard color-matched silicone sealant.

C. Coved backsplashes and sidesplashes:

1. Provide coved backsplashes and sidesplashes at all walls and adjacent millwork.
2. Fabricate radius cove at intersection of counters with backsplashes to dimensions shown on the drawings.
3. Adhere to countertops using manufacturer's standard color-matched Joint Adhesive.

D. Color inlays:

1. Comply with product data from manufacturer.
2. Rout groove for inlay to straight edge or pattern indicated on drawings.
3. Fill groove using material furnished by manufacturer.
4. Cure inlay, finish and touch up to uniform appearance.

E. Integral sinks/vanities:

1. Provide solid surface materials bowls and/or lavatories sinks with overflows in locations shown on the drawings.
2. Secure sinks and lavatory bowls to tops using manufacturer's recommended sealant, adhesive and mounting hardware to maintain warranty.

### 3.3 REPAIR

- A. Repair or replace damaged work which cannot be repaired to architect's satisfaction.

### 3.4 CLEANING AND PROTECTION

- A. Keep components clean during installation.  
B. Remove adhesives, sealants and other stains.

END OF SECTION

## SECTION 07210 - BUILDING INSULATION

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. This Section includes the following:
  - 1. Concealed building insulation.
  - 2. Radiant barriers.
  - 3. Safing insulation.
- B. Related Sections: The following Sections contain requirements that relate to this Section:
  - 1. Division 9 Section indicated below for insulation installed as part of wood-framed wall and partition assemblies:
    - a. "Gypsum Board Assemblies."

#### 1.3 SUBMITTALS

- A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.
- B. Product Data for each type of insulation product specified.
- C. Samples of exposed insulation for initial selection in the form of actual units or sections of units showing the full range of colors available for each type of exposed insulation indicated.
- D. Samples for verification in full-size units of each type of exposed insulation indicated for each color specified.
- E. Product test reports from and based on tests performed by a qualified independent testing agency evidencing compliance of insulation products with specified requirements including those for thermal resistance, fire-test-response characteristics, water-vapor transmission, water absorption, and other properties, based on comprehensive testing of current products.
- F. Research or evaluation reports of the model code organization acceptable to authorities having jurisdiction that evidence compliance of foam-plastic insulations with building code in effect for Project.

#### 1.4 QUALITY ASSURANCE

- A. Single-Source Responsibility for Insulation Products: Obtain each type of building insulation from a single source with resources to provide products complying with requirements indicated without delaying the Work.
- B. Fire-Test-Response Characteristics: Provide insulation and related materials with the fire-test-response characteristics indicated on Drawings or specified elsewhere in this Section as determined by testing identical products per test method indicated below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify materials with appropriate markings of applicable testing and inspecting agency.
  - 1. Surface-Burning Characteristics: ASTM E 84.
  - 2. Fire-Resistance Ratings: ASTM E 119.
  - 3. Combustion Characteristics: ASTM E 136.

#### 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Protect insulation materials from physical damage and from deterioration by 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

### 2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering insulation products that may be incorporated in the work include, but are not limited to, the following:
  - 1. Extruded-Polystyrene Board Insulation:
    - a. Amoco Foam Products Company.
    - b. DiversiFoam Products.
    - c. Dow Chemical Co.
    - d. UC Industries, Inc.; Owens-Corning Co.
  - 2. Extruded-Polystyrene Drainage Panels:
    - a. Dow Chemical Co.
    - b. UC Industries, Inc.; Owens-Corning Co.
  - 3. Polyisocyanurate Board Insulation:
    - a. Celotex Corporation (The).
    - b. NRG Barriers, Inc.
  - 4. Glass-Fiber Insulation:
    - a. CertainTeed Corporation.
    - b. Knauf Fiber Glass GmbH.
    - c. Owens-Corning Fiberglas Corporation.
    - d. Schuller International, Inc.
  - 5. Slag-Wool/Rock-Wool-Fiber Insulation:
    - a. Fibrex Inc.
    - b. Partek Insulations, Inc.
    - c. USG Interiors, Inc.

### 2.2 INSULATING MATERIALS

- A. General: Provide insulating materials that comply with requirements and with referenced standards.
  - 1. Preformed Units: Sizes to fit applications indicated; selected from manufacturer's standard thicknesses, widths, and lengths.
- B. Extruded-Polystyrene Board Insulation: Rigid, cellular polystyrene thermal insulation formed from polystyrene base resin by an extrusion process using hydrochlorofluorocarbons as blowing agent to comply with ASTM C 578 for type and with other requirements indicated below:
  - 1. Type IV, 1.60-lb/cu. ft. minimum density, unless otherwise indicated.
  - 2. Surface-Burning Characteristics: Maximum flame-spread and smoke-developed indices of 75 and 450, respectively.
- C. Extruded-Polystyrene Drainage Panels: Fabric-faced, rigid, cellular polystyrene thermal insulation formed by expansion of polystyrene base resin in an extrusion process using hydrochlorofluorocarbons as blowing agent to comply with ASTM C 578 for type indicated below. Provide products fabricated with tongue-and-groove edges and with one side having a matrix of vertical and horizontal drainage channels and faced with insulation manufacturer's standard nonwoven filtration fabric.
  - 1. Type IV, 1.60-lb/cu. ft. minimum density.
  - 2. Flame Spread: 10.
  - 3. Smoke: 200.
- D. Polyisocyanurate Board Insulation: Rigid, cellular polyisocyanurate thermal insulation with core formed by using hydrochlorofluorocarbons as blowing agent and faced on both sides with aluminum foil to comply with referenced standards and with other requirements indicated below:
  - 1. Federal Standard: FS HH-I-1972/1, Class 1 (nonreinforced core) or 2 (reinforced core).
  - 2. ASTM Standard: ASTM C 1289, Type I, Class 1 or 2.

3. Surface-Burning Characteristics: Maximum flame-spread and smoke-developed indices of 75 and 450, respectively, based on tests performed on unfaced core on thicknesses up to 4 inches.
  4. Thermal Resistivity:  $7.2 \text{ deg F} \times \text{h} \times \text{sq. ft./Btu} \times \text{in. at } 75 \text{ deg F.}$
- E. Unfaced, Flexible Glass-Fiber Board Insulation: Thermal insulation combining glass fibers with thermosetting resin binders to comply with ASTM C 612, Type IA; or with ASTM C 553, Types I, II, and III; and with other requirements indicated below:
1. Nominal Density: Not less than 1.5 lb/cu. ft. nor more than 1.65 lb/cu. ft..
  2. Thermal Resistivity:  $4.13 \text{ deg F} \times \text{h} \times \text{sq. ft./Btu} \times \text{in. at } 75 \text{ deg F.}$
  3. Surface-Burning Characteristics: Smoke-developed indices of 25 and 50, respectively.
- F. Foil-Faced, Flexible Glass-Fiber Board Insulation: Thermal insulation combining glass fibers with thermosetting resin binders and faced on one side with foil-scrim-kraft vapor retarder to comply with ASTM C 612, Type IA; or with ASTM C 553, Types I, II, and III; and with other requirements indicated below:
1. Nominal Density: 1.5 lb/cu. ft..
  2. Thermal Resistivity:  $4.13 \text{ deg F} \times \text{h} \times \text{sq. ft./Btu} \times \text{in. at } 75 \text{ deg F.}$
  3. Surface-Burning Characteristics: Maximum flame-spread and smoke-developed indices of 25 and 50, respectively.
- G. Glass-Mat-Faced, Glass-Fiber Board Insulation: Thermal insulation combining glass fibers with thermosetting resin binders and faced on one side with black glass-fiber mat to comply with ASTM C 612, Type IA or Type IA and IB; and with other requirements indicated below:
1. Nominal density of 6 lb/cu. ft., thermal resistivity of  $4.55 \text{ deg F} \times \text{h} \times \text{sq. ft./Btu} \times \text{in. at } 75 \text{ deg F.}$
  2. Surface-Burning Characteristics: Maximum flame-spread and smoke-developed indices of 25 and 50, respectively.
- H. Foil-Faced, Slag-Wool-/Rock-Wool-Fiber Board Insulation: Thermal insulation combining slag-wool or rock-wool fibers with thermosetting resin binders and faced on one side with foil-scrim-kraft or foil-scrim-polyethylene vapor retarder to comply with ASTM C 612 for type and other requirements indicated below; passing ASTM E 136 for combustion characteristics of unfaced board.
1. Nominal density of 4 lb/cu. ft., Type IA and IB, thermal resistivity of  $4 \text{ deg F} \times \text{h} \times \text{sq. ft./Btu} \times \text{in. at } 75 \text{ deg F.}$
  2. Surface-Burning Characteristics: Maximum flame-spread and smoke-developed indices of 25 and 5, respectively.
- I. Unfaced Mineral-Fiber Blanket Insulation: Thermal insulation combining mineral fibers of type described below with thermosetting resins to comply with ASTM C 665, Type I (blankets without membrane facing).
1. Mineral-Fiber Type: Fibers manufactured from glass.
  2. Surface-Burning Characteristics: Maximum flame-spread and smoke-developed indices of 25 and 50, respectively.
- J. Faced Mineral-Fiber Blanket Insulation: Thermal insulation combining mineral fibers of type described below with thermosetting resins to comply with ASTM C 665, Type III, Class A (blankets with reflective vapor-retarder membrane facing and flame spread of 25 or less); with foil-scrim-kraft, foil-scrim, or foil-scrim-polyethylene vapor-retarder membrane on 1 face.
1. Mineral-Fiber Type: Fibers manufactured from glass.
  2. Flanged Units: Provide blankets fabricated with facing incorporating 5-inch- wide flanges along edges for attachment to framing members.

## 2.3 SAFING INSULATION AND ACCESSORIES

- A. Slag-Wool-Fiber Board Safing Insulation: Semirigid boards designed for use as fire stop at openings between edge of slab and exterior wall panels, produced by combining slag-wool fibers with thermosetting resin binders to comply with ASTM C 612, Type IA and IB; nominal density of 4 lb/cu.

ft.; passing ASTM E 136 for combustion characteristics; thermal resistivity of 4 deg F x h x sq. ft./Btu x in. at 75 deg F.

- B. Calking Compound: Material approved by manufacturer of safing insulation for sealing joint between foil backing of safing insulation and edge of concrete floor slab against penetration of smoke.
- C. Safing Clips: Galvanized steel safing clips approved by manufacturer of safing insulation for holding safing insulation in place.

#### 2.4 VAPOR RETARDERS

- A. Reinforced-Polyethylene Vapor Retarders: 2 outer layers of polyethylene film laminated to an inner reinforcing layer consisting of either nylon cord or polyester scrim and weighing not less than 25 lb/1000 sq. ft., with maximum permance rating of 0.0403 perm.
- B. Vapor-Retarder Tape: Pressure-sensitive tape of type recommended by vapor retarder manufacturer for sealing joints and penetrations in vapor retarder.
- C. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
  - 1. Reinforced-Polyethylene Vapor Retarders:
    - a. DURA-SKRIM 6WB; Raven Industries, Inc.
    - b. Griffolyn T-65; Reef Industries, Inc., Griffolyn Div.

#### 2.5 AUXILIARY INSULATING MATERIALS

- A. Adhesive for Bonding Insulation: Product with demonstrated capability to bond insulation securely to substrates indicated without damaging insulation and substrates.
- B. Asphalt Coating for Cellular Glass Block Insulation: Cutback asphalt or asphalt emulsion of type recommended by cellular glass block insulation manufacturer.
  - 1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Karnak 100; Karnak Corp.
    - b. PITTCOTE 300 Coating; Pittsburgh Corning Corporation.
- C. Protection Board: Premolded, semirigid asphalt/fiber composition board, 1/4 inch thick, formed under heat and pressure, standard sizes.

#### 2.7 INSULATION FASTENERS

- A. Adhesively Attached, Spindle-Type Anchors: Plate welded to projecting spindle; capable of holding insulation, of thickness indicated, securely in position indicated with self-locking washer in place; and complying with the following requirements:
  - 1. Plate: Perforated galvanized carbon-steel sheet, 0.030 inch thick by 2 inches square.
  - 2. Spindle: Copper-coated low carbon steel, fully annealed, 0.105 inches in diameter, length to suit depth of insulation indicated.
- B. Adhesively Attached, Angle-Shaped, Spindle-Type Anchors: Angle welded to projecting spindle, capable of holding insulation securely in position indicated with self-locking washer in place, and complying with the following requirements:
  - 1. Angle: Formed from 0.030-inch- thick, perforated, galvanized carbon-steel sheet with each leg 2 inches square.
  - 2. Spindle: Copper-coated low carbon steel, fully annealed, 0.105 inches in diameter, length to suit depth of insulation indicated.
- C. Insulation-Retaining Washers: Self-locking washers formed from 0.016-inch- thick galvanized steel sheet, with beveled edge for increased stiffness, sized as required to hold insulation securely in place, but not less than 1-1/2 inches square or in diameter.



- D. Insulation Standoff: Spacer fabricated from galvanized mild-steel sheet for fitting over spindle of insulation anchor to maintain air space of dimension indicated between face of insulation and substrate to which anchor is attached.
  - 1. Air Space: 1 inch.
- E. Anchor Adhesive: Product with demonstrated capability to bond insulation anchors securely to substrates indicated without damaging insulation, fasteners, and substrates.
- F. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
  - 1. Adhesively Attached, Spindle-Type Anchors:
    - a. TACTOO Insul-Hangers; AGM Industries, Inc.
    - b. Spindle Type Gemco Hangers; Gemco.
  - 2. Adhesively Attached, Angle-Shaped, Spindle-Type Anchor:
    - a. 90 Degree Insulation Hangers; Gemco.
  - 3. Insulation-Retaining Washers:
    - a. RC150; AGM Industries, Inc.
    - b. SC150; AGM Industries, Inc.
    - c. Dome-Cap; Gemco.
    - d. R-150; Gemco.
    - e. S-150; Gemco.
  - 4. Insulation Standoff:
    - a. Clutch Clip; Gemco.
  - 5. Anchor Adhesives:
    - a. TACTOO Adhesive; AGM Industries, Inc.
    - b. Tuff Bond Hanger Adhesive; Gemco.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements of Sections in which substrates and related work are specified and to determine if other conditions affecting performance of insulation are satisfactory. Do not proceed with installation until unsatisfactory conditions have been corrected.

#### 3.2 PREPARATION

- A. Clean substrates of substances harmful to insulations or vapor retarders, including removing projections capable of puncturing vapor retarders or that interfere with insulation attachment.

#### 3.3 INSTALLATION, GENERAL

- A. Comply with insulation manufacturer's written instructions applicable to products and application indicated.
- B. Install insulation that is undamaged, dry, unsoiled, and has not been exposed at any time to ice and snow.
- C. Extend insulation in thickness indicated 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. Apply single layer of insulation to produce thickness indicated, unless multiple layers are otherwise shown or required to make up total thickness.

#### 3.4 INSTALLATION OF PERIMETER AND UNDER-SLAB INSULATION

- A. On vertical surfaces, set units in adhesive applied according to manufacturer's written instructions. Use adhesive recommended by insulation manufacturer.
- B. Protect below-grade insulation on vertical surfaces from damage during backfilling by applying protection board. Set in adhesive according to written instructions of insulation manufacturer.
- C. Protect top surface of horizontal insulation from damage during concrete work by applying protection board.

### 3.5 INSTALLATION OF CAVITY WALL INSULATION

- A. On units of plastic insulation, install small pads of adhesive spaced approximately 24 inches o.c. both ways on inside face, as recommended by manufacturer. Fit courses of insulation between wall ties and other confining obstructions in cavity, with edges butted tightly both ways. Press units firmly against inside wythe of masonry or other construction as shown.
  - 1. Supplement adhesive attachment of insulation by securing boards with 2-piece wall ties designed for this purpose and specified in Division 4 Section "Unit Masonry."
- B. On units of cellular glass insulation, apply insulation with closely fitting joints using method indicated below:
  - 1. Gob Method: Install 4 gobs of adhesive per unit and apply firmly against inside wythe of masonry or other construction as shown. Apply gobs at each corner; spread gobs to form pads 4 inches in diameter by 1/4 inch thick.
  - 2. Serrated-Trowel Method: Apply adhesive to entire surface of each cellular-glass insulation unit with serrated trowel complying with insulation manufacturer's specifications.
  - 3. Coat edges of insulation units with full bed of adhesive to seal joints between insulation and between insulation and adjoining construction.

### 3.6 INSTALLATION OF GENERAL BUILDING INSULATION

- 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. Seal joints between closed-cell (nonbreathing) insulation units by applying adhesive, mastic, or sealant to edges of each unit to form a tight seal as units are shoved into place. Fill voids in completed installation with adhesive, mastic, or sealant as recommended by insulation manufacturer.
- C. Set vapor-retarder-faced units with vapor retarder to warm side of construction, unless otherwise indicated. Do not obstruct ventilation spaces, except for firestopping.
  - 1. Tape joints and ruptures in vapor retarder, and seal each continuous area of insulation to surrounding construction to ensure airtight installation.
- D. Set reflective, foil-faced units with not less than 0.75-inch air space in front of foil as indicated.
  - 1. Use blanket widths and lengths that fill cavities formed by framing members. Where more than one length is required to fill cavity, provide lengths that will produce a snug fit between ends.
  - 2. Place blankets in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.
- E. Install board insulation on concrete substrates by adhesively attached, spindle-type insulation anchors as follows:
  - 1. Fasten insulation anchors to concrete substrates with insulation anchor adhesive according to anchor manufacturer's written instructions. Space anchors according to insulation manufacturer's written instructions for insulation type, thickness, and application indicated.
  - 2. Apply insulation standoffs to each spindle to create cavity width indicated between concrete substrate and insulation.
  - 3. After adhesive has dried, install board insulation by pressing insulation into position over spindles and securing it tightly in place with insulation-retaining washers, taking care not to compress insulation below indicated thickness.

4. Where insulation will not be covered by other building materials, apply capped washers to tips of spindles.

- F. Install board insulation in curtain wall construction as indicated on Drawings and according to curtain wall manufacturer's written instructions.
  1. Retain insulation in place by metal clips and straps or integral pockets within window frames, spaced at intervals recommended by insulation manufacturer to hold insulation securely in place without touching spandrel glass. Maintain cavity width between insulation and glass of dimension indicated.
  2. Brace insulation where it contacts safing insulation to prevent insulation from bowing under pressure from safing insulation.

### 3.7 INSTALLATION OF SAFING INSULATION

- A. Install safing insulation to fill gap between edge of concrete floor slab and back of exterior spandrel panels on safing clips spaced as needed to support insulation, but not further apart than 24 inches o.c. Cut safing insulation wider than gap to be filled to ensure compression fit and seal joint between insulation and edge of slab with calking approved by safing insulation manufacturer for this purpose. Leave no voids in completed installation.

### 3.8 INSTALLATION OF RADIANT BARRIERS

- A. Install radiant barriers in locations indicated according to ASTM C 1158 and radiant barrier insulation manufacturer's written instructions.

### 3.9 INSTALLATION OF VAPOR RETARDERS

- A. General: Extend vapor retarder to extremities of areas to be protected from vapor transmission. Secure in place with adhesives or other anchorage system as indicated. Extend vapor retarder to cover miscellaneous voids in insulated substrates, including those filled with loose-fiber insulation.
- B. Seal vertical joints in vapor retarders over framing by lapping not less than 2 wall studs. Fasten vapor retarders to framing at top, end, and bottom edges; at perimeter of wall openings; and at lap joints. Space fasteners 16 inches o.c.
- C. Seal overlapping joints in vapor retarders with adhesives or vapor-retarder tape according to vapor retarder manufacturer's instructions. Seal butt joints and fastener penetrations with vapor-retarder tape. Locate all joints over framing members or other solid substrates.
- D. Firmly attach vapor retarders to substrates with mechanical fasteners or adhesives as recommended by vapor retarder manufacturer.
- E. Seal joints caused by pipes, conduits, electrical boxes, and similar items penetrating vapor retarders with vapor-retarder tape to create an airtight seal between penetrating objects and vapor retarder.
- F. Repair any tears or punctures in vapor retarders immediately before concealment by other work. Cover with vapor-retarder tape or another layer of vapor retarder.

### 3.10 PROTECTION

- A. General: Protect installed insulation and vapor retarders from damage due to harmful weather exposures, physical abuse, and other causes. Provide temporary coverings or enclosures where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

END OF SECTION 07210

## SECTION 07270 - FIRESTOPPING

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. This Section includes firestopping for the following:
  - 1. Penetrations through fire-resistance-rated floor and roof construction including both empty openings and openings containing cables, pipes, ducts, conduits, and other penetrating items.
  - 2. Penetrations through fire-resistance-rated walls and partitions including both empty openings and openings containing cables, pipes, ducts, conduits, and other penetrating items.
  - 3. Penetrations through smoke barriers and construction enclosing compartmentalized areas involving both empty openings and openings containing penetrating items.
  - 4. Sealant joints in fire-resistance-rated construction.
- B. Related Sections: The following Sections contain requirements that relate to this Section:
  - 1. Division 7 Section "Building Insulation" for saing insulation and accessories.
  - 2. Division 7 Section "Joint Sealants" for non-fire-resistive-rated joint sealants.
  - 3. Division 22 & 23 Sections specifying ducts and piping penetrations.
  - 4. Division 26 Sections specifying cable and conduit penetrations.

#### 1.3 SYSTEM PERFORMANCE REQUIREMENTS

- A. General: Provide firestopping systems that are produced and installed to resist the spread of fire, according to requirements indicated, and the passage of smoke and other gases.
- B. F-Rated Through-Penetration Firestop Systems: Provide through-penetration firestop systems with F-Ratings indicated, as determined per ASTM E 814, but not less than that equaling or exceeding the fire-resistance rating of the constructions penetrated.
- C. T-Rated Through-Penetration Firestop Systems: Provide through-penetration firestop systems with T-Ratings, in addition to F-Ratings, as determined per ASTM E 814, where indicated and where systems protect penetrating items exposed to contact with adjacent materials in occupiable floor areas. T-rated assemblies are required where the following conditions exist:
  - 1. Where firestop systems protect penetrations located outside fire-resistive shaft enclosures.
  - 2. Where firestop systems protect penetrations located in construction containing doors required to have a temperature-rise rating.
  - 3. Where firestop systems protect penetrating items larger than a four inch (4") (100 mm) diameter nominal pipe or 16 sq. in. (100 sq. cm) in overall cross-sectional area.
- D. Fire-Resistive Joint Sealants: Provide joint sealants with fire-resistance ratings indicated, as determined per ASTM E 119, but not less than that equaling or exceeding the fire-resistance rating of the construction in which the joint occurs.
- E. For firestopping exposed to view, traffic, moisture, and physical damage, provide products that do not deteriorate when exposed to these conditions.
  - 1. For piping penetrations for plumbing and wet-pipe sprinkler systems, provide moisture-resistant through-penetration firestop systems.
  - 2. For floor penetrations with annular spaces exceeding four inches (4") (100 mm) or more in width and exposed to possible loading and traffic, provide firestop systems capable of supporting the floor loads involved either by installing floor plates or by other means.
  - 3. For penetrations involving insulated piping, provide through-penetration firestop systems not requiring removal of insulation.

- F. For firestopping exposed to view, provide products with flame-spread values of less than 25 and smoke-developed values of less than 450, as determined per ASTM E 84.

#### 1.4 SUBMITTALS

- A. General: Submit the following according to General Conditions of Contract and Division 1 Specification Sections.
- B. Product data for each type of product specified.
  - 1. Certification by firestopping manufacturer that products supplied comply with local regulations controlling use of volatile organic compounds (VOCs) and are nontoxic to building occupants.
- C. Shop drawings detailing materials, installation methods, and relationships to adjoining construction for each through-penetration firestop system, and each kind of construction condition penetrated and kind of penetrating item. Include firestop design designation of qualified testing and inspecting agency evidencing compliance with requirements for each condition indicated.
  - 1. Submit documentation, including illustrations, from a qualified testing and inspecting agency that is applicable to each through-penetration firestop configuration for construction and penetrating items.
- D. Product certificates signed by manufacturers of firestopping products certifying that their products comply with specified requirements.
- E. Product test reports from, and based on tests performed by, a qualified testing and inspecting agency evidencing compliance of firestopping with requirements based on comprehensive testing of current products.
- F. Qualification data for firms and persons specified in "Quality Assurance" article to demonstrate their capabilities and experience. Include list of completed projects with project names, addresses, names of architects, engineers and owners, and other information specified.

#### 1.5 QUALITY ASSURANCE

- A. Fire-Test-Response Characteristics: Provide firestopping that complies with the following requirements and those specified under the "System Performance Requirements" article:
  - 1. Firestopping tests are performed by a qualified testing and inspecting agency. A qualified testing and inspecting agency is UL, Warnock Hersey, or another agency performing testing and follow-up inspection services for firestop systems that is acceptable to authorities having jurisdiction.
  - 2. Through-penetration firestop systems are identical to those tested per ASTM E 814 under conditions where positive furnace pressure differential of at least 0.01 inch of water (2.5 Pa) is maintained at a distance of 0.78 inch (20 mm) below the fill materials surrounding the penetrating items in the test assembly. Provide rated systems complying with the following requirements:
    - a. Through-penetration firestop system products bear classification marking of qualified testing and inspecting agency.
    - b. Through-penetration firestop systems correspond to those indicated by reference to through-penetration firestop system designations listed by UL in their "Fire Resistance Directory," by Warnock Hersey, or by another qualified testing and inspecting agency.
  - 3. Fire-resistive joint sealant systems are identical to those tested for fire-response characteristics per ASTM E 119 under conditions where the positive furnace pressure differential is at least 0.01 inch of water (2.5 Pa), as measured 0.78 inch (20 mm) from the face exposed to furnace fire. Provide systems complying with the following requirements:
    - a. Fire-Resistance Ratings of Joint Sealants: As indicated by reference to design designations listed by UL in their "Fire Resistance Directory" or by another qualified testing and inspecting agency.
    - b. Joint sealants, including backing materials, bear classification marking of qualified testing and inspection agency.

- B. Information on drawings referring to specific design designations of through-penetration firestop systems is intended to establish requirements for performance based on conditions that are expected to exist during installation. Any changes in conditions and designated systems require the Architect's prior approval. Submit documentation showing that the performance of proposed substitutions equals or exceeds that of the systems they would replace and are acceptable to authorities having jurisdiction.
- C. Installer Qualifications: Engage an experienced Installer who is certified, licensed, or otherwise qualified by the firestopping manufacturer as having the necessary experience, staff, and training to install manufacturer's products per specified requirements. A manufacturer's willingness to sell its firestopping products to the Contractor or to an Installer engaged by the Contractor does not in itself confer qualification on the buyer.
- D. Single-Source Responsibility: Obtain through-penetration firestop systems for each kind of penetration and construction condition indicated from a single manufacturer.
- E. Field-Constructed Mockup: Prior to installing firestopping, erect mockups for each different through-penetration firestop system indicated to verify selections made and to demonstrate qualities of materials and execution. Build mockups to comply with the following requirements, using materials indicated for final installations.
  - 1. Locate mockups on site as directed by the Architect.
  - 2. Notify Architect two (2) weeks in advance of the dates and times when mockups will be erected.
  - 3. Obtain Architect's acceptance of mockups before start of final unit of Work.
  - 4. Retain and maintain mockups during construction in an undisturbed condition as a standard for judging completed unit of Work.
    - a. Accepted mockups in an undisturbed condition at time of Substantial Completion may become part of completed unit of Work.
- F. Provide firestopping products containing no detectable asbestos as determined by the method specified in 40 CFR Part 763, Subpart F, Appendix A, Section 1, "Polarized Light Microscopy."
- G. Coordinating Work: Coordinate construction of openings and penetrating items to ensure that designated through-penetration firestop systems are installed per specified requirements.
- H. Preinstallation Conference: Conduct conference at Project site to comply with requirements of Division 1 Section "Project Meetings."
- I. Owner will employ and pay a qualified inspection agency to check installed firestopping systems for compliance with requirements.

#### 1.6 DELIVERY, STORAGE, AND HANDLING

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

#### 1.7 PROJECT CONDITIONS

- A. Environmental Conditions: Do not install firestopping when ambient or substrate temperatures are outside limits permitted by firestopping manufacturers or when substrates are wet due to rain, frost, condensation, or other causes.
- B. Ventilation: Ventilate firestopping per firestopping manufacturers' instructions by natural means or, where this is inadequate, forced air circulation.

#### 1.8 SEQUENCING AND SCHEDULING

- A. Notify Owner's inspection agency at least one (1) week in advance of firestopping installations; confirm dates and times on days preceding each series of installations.
- B. Do not cover up those firestopping installations that will become concealed behind other construction until Owner's inspection agency and authorities having jurisdiction, if required, have examined each installation.

## PART 2 - PRODUCTS

### 2.1 FIRESTOPPING, GENERAL

- A. Compatibility: Provide firestopping composed of components that are compatible with each other, the substrates forming openings, and the items, if any, penetrating the firestopping under conditions of service and application, as demonstrated by firestopping manufacturer based on testing and field experience.
- B. Accessories: Provide components for each firestopping system that are needed to install fill materials and to comply with "System Performance Requirements" article in Part 1. Use only components specified by the firestopping manufacturer and approved by the qualified testing and inspecting agency for the designated fire-resistance-rated systems. Accessories include but are not limited to the following items:
  - 1. Permanent forming/damming/backing materials including the following:
    - a. Semirefractory fiber (mineral wool) insulation.
    - b. Ceramic fiber.
    - c. Sealants used in combination with other forming/damming materials to prevent leakage of fill materials in liquid state.
    - d. Fire-rated formboard.
    - e. Joint fillers for joint sealants.
  - 2. Temporary forming materials.
  - 3. Substrate primers.
  - 4. Collars.
  - 5. Steel sleeves.
- C. Applications: Provide firestopping systems composed of materials specified in this Section that comply with system performance and other requirements.

### 2.2 FILL MATERIALS FOR THROUGH-PENETRATION FIRESTOP SYSTEMS

- A. Ceramic-Fiber and Mastic Coating: Ceramic fibers in bulk form formulated for use with mastic coating, and ceramic fiber manufacturer's mastic coating.
  - 1. Grade for Horizontal Surfaces: Pourable (self-leveling) grade for openings in floors and other horizontal surfaces.
  - 2. Grade for Vertical Surfaces: Nonsag grade for openings in vertical and other surfaces.
- B. Mortar: Prepackaged dry mix composed of a blend of inorganic binders, fillers, and lightweight aggregate formulated for mixing with water at Project site to form a nonshrinking, homogenous mortar.
- C. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:
  - 1. Mortar:
    - a. K-2 Firestop Mortar, Bio Fireshield, Inc.
    - b. Novasit K-10 Firestop Mortar, Bio Fireshield, Inc.
    - c. KBS-Mortar Seal, International Protective Coatings Corp.
    - d. Or approved equal.

### 2.3 FIRE-RESISTIVE ELASTOMERIC JOINT SEALANTS

- A. Elastomeric Sealant Standard: Provide manufacturer's standard chemically curing, elastomeric sealants of base polymer indicated that complies with ASTM C 920 requirements, including those

referenced for Type, Grade, Class, and Uses, and requirements specified in this Section applicable to fire-resistive joint sealants.

- B. Sealant Colors: Provide color of exposed joint sealants to comply with the following:
  - 1. Provide selections made by Architect from manufacturer's full range of standard colors for products of type indicated.
- C. Multicomponent, Nonsag, Urethane Sealant: Type M; Grade NS; Class 25; exposure-related Use NT, and joint-substrate-related Uses M, A, and (as applicable to joint substrates indicated) O.
  - 1. Additional Movement Capability: Provide sealant with the capability to withstand the following percentage change in joint width existing at time of installation, when tested for adhesion and cohesion under maximum cyclic movement per ASTM C 719, and remain in compliance with other requirements of ASTM C 920 for uses indicated:
    - a. 50 percent movement in both extension and compression for a total of 100 percent movement.
- D. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:
  - 1. Multicomponent, Nonsag, Urethane Sealant:
    - a. Vulkem 922, Mameco International Inc.
    - b. Dynflex, Pecora Corp.
    - c. Dynatred, Pecora Corp.
    - d. Dynatrol II, Pecora Corp.
    - e. Sikaflex 2cn NS, Sika Corp.
    - f. Sonolastic NP 2, Sonneborn Building Products Div., ChemRex Inc.
    - g. Dymeric, Tremco Inc.
    - h. Or approved equal.

## 2.4 MIXING

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

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for opening configurations, penetrating items, substrates, and other conditions affecting performance of firestopping. Do not proceed with installation until unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

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



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

### 3.3 INSTALLING THROUGH-PENETRATION FIRESTOPS

- A. General: Comply with the "System Performance Requirements" article in Part 1 and the through-penetration firestop manufacturer's installation instructions and drawings pertaining to products and applications indicated.
- B. Install forming/damming materials and other accessories of types required to support fill materials during their application and in the position needed to produce the cross-sectional shapes and depths required to achieve fire ratings of designated through-penetration firestop systems. After installing fill materials, remove combustible forming materials and other accessories not indicated as permanent components of firestop systems.
- C. Install fill materials for through-penetration firestop systems by proven techniques to produce the following results:
  - 1. Completely fill voids and cavities formed by openings, forming materials, accessories, and penetrating items.
  - 2. Apply materials so they contact and adhere to substrates formed by openings and penetrating items.
  - 3. For fill materials that will remain exposed after completing Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

### 3.4 INSTALLING FIRE-RESISTIVE JOINT SEALANTS

- A. General: Comply with the "System Performance Requirements" article in Part 1, with ASTM C 1193, and with the sealant manufacturer's installation instructions and drawings pertaining to products and applications indicated.
- B. Install joint fillers to provide support of sealants during application and at position required to produce the cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability and develop fire-resistance rating required.
- C. Install sealants by proven techniques that result in sealants directly contacting and fully wetting joint substrates, completely filling recesses provided for each joint configuration, and providing uniform, cross-sectional shapes and depths relative to joint width that optimum sealant movement capability. Install sealants at the same time joint fillers are installed.
- D. Tool nonsag sealants immediately after sealant application and prior to the time skinning or curing begins. Form smooth, uniform beads of configuration indicated or required to produce fire-resistance rating, as well as to eliminate air pockets, and to ensure contact and adhesion of sealants with sides of joint. Remove excess sealant from surfaces adjacent to joint. Do not use tooling agents that discolor sealants or adjacent surfaces or are not approved by sealant manufacturer.

### 3.5 FIELD QUALITY CONTROL

- A. Inspecting agency employed and paid by Owner will examine completed firestopping to determine, in general, if it is being installed in compliance with requirements.
- B. Inspecting agency will report observations promptly and in writing to Contractor and Architect.
- C. Do not proceed to enclose firestopping with other construction until reports of examinations are issued.

- D. Where deficiencies are found, repair or replace firestopping so that it complies with requirements.

### 3.6 CLEANING

- A. Clean off excess fill materials and sealants adjacent to openings and joints as work progresses by methods and with cleaning materials approved by manufacturers of firestopping products and of products in which opening and joints occur.
- B. Protect firestopping during and after curing period from contact with contaminating substances or from damage resulting from construction operations or other causes so that they 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 firestopping immediately and install new materials to produce firestopping complying with specified requirements.

END OF SECTION 07270

## SECTION 07901 - JOINT SEALANTS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. This Section includes joint sealants for the following locations:
  - 1. Interior joints in vertical surfaces and horizontal nontraffic surfaces as indicated below:
    - a. Control joints on exposed interior surfaces of exterior walls.
    - b. Perimeter joints of exterior openings where indicated.
    - c. Tile control and expansion joints.
    - d. Vertical control joints on exposed surfaces of partitions.
    - e. Perimeter joints between interior wall surfaces and frames of interior doors and windows
    - f. Perimeter joints of toilet fixtures.
    - g. Other joints as indicated.
- B. Related Sections: The following Sections contain requirements that relate to this Section:
  - 1. Division 7 Section "Firestopping" for through-penetration firestopping systems.
  - 2. Division 9 Section "Tile" for sealing tile joints.

#### 1.3 SYSTEM PERFORMANCE REQUIREMENTS

- A. Provide elastomeric joint sealants that have been produced and installed to establish and to maintain watertight and airtight continuous seals without causing staining or deterioration of joint substrates.
- B. Provide joint sealants for interior applications that have been produced and installed to establish and maintain airtight continuous seals that are water resistant and cause no staining or deterioration of joint substrates.

#### 1.4 SUBMITTALS

- A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.
- B. Product data from manufacturers for each joint sealant product required.
  - 1. Certification by joint sealant manufacturer that sealants plus the primers and cleaners required for sealant installation comply with local regulations controlling use of volatile organic compounds.
- C. Samples for initial selection purposes in form of manufacturer's standard bead samples, consisting of strips of actual products showing full range of colors available, for each product exposed to view.
- D. Samples for verification purposes of each type and color of joint sealant required. Install joint sealant samples in 1/2-inch (13-mm) wide joints formed between two (2) 6-inch (6") (150-mm) long strips of material matching the appearance of exposed surfaces adjacent to joint sealants.

- E. Certificates from manufacturers of joint sealants attesting that their products comply with specification requirements and are suitable for the use indicated.
- F. Qualification data complying with requirements specified in "Quality Assurance" article. Include list of completed projects with project names addresses, names of architects and owners, plus other information specified.
- G. Compatibility and adhesion test reports from elastomeric sealant manufacturer indicating that materials forming joint substrates and joint sealant backings have been tested for compatibility and adhesion with joint sealants. Include sealant manufacturer's interpretation of test results relative to sealant performance and recommendations for primers and substrate preparation needed to obtain adhesion.
- H. Product test reports for each type of joint sealants indicated, evidencing compliance with requirements specified.
- I. Preconstruction field test reports indicating which products and joint preparation methods demonstrate acceptable adhesion to joint substrates.

#### 1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Engage an experienced Installer who has completed joint sealant applications similar in material, design, and extent to that indicated for Project that have resulted in construction with a record of successful in-service performance.
- B. Testing Laboratory Qualifications: To qualify for acceptance, an independent testing laboratory must demonstrate to Architect's satisfaction, based on evaluation of laboratory-submitted criteria conforming to ASTM-E699, that it has the experience and capability to conduct satisfactorily the testing indicated without delaying progress of the Work.
- C. Single Source Responsibility for Joint Sealant Materials: Obtain joint sealant materials from a single manufacturer for each different product required.
- D. Preconstruction Compatibility and Adhesion Testing: Submit to joint sealant manufacturers samples of materials that will contact or affect joint sealants for compatibility and adhesion testing as indicated below:
  - 1. Use test methods standard with manufacturer to determine if priming and other specific joint preparation techniques are required to obtain rapid, optimum adhesion of joint sealants to joint substrates.
    - a. Perform tests under normal environmental conditions that will exist during actual installation.
  - 2. Submit not less than nine (9) pieces of each type of material, including joint substrates, shims, joint sealant backings, secondary seals, and miscellaneous materials.
  - 3. Schedule sufficient time for testing and analysis of results to prevent delay in the progress of the Work.
  - 4. Investigate materials failing compatibility or adhesion tests and obtain joint sealant manufacturer's written recommendations for corrective measures, including use of specially formulated primers.
  - 5. Testing will not be required when joint sealant manufacturer is able to submit joint preparation data required above that are acceptable to Architect and are based on previous testing of current sealant products for adhesion to, and compatibility with, joint substrates and other materials matching those submitted.
- E. Product Testing: Provide comprehensive test data for each type of joint sealant based on tests conducted by a qualified independent testing laboratory on current product formulations within a 24-month period preceding date of Contractor's submittal of test results to Architect.

1. Test elastomeric sealants for compliance with requirements specified by reference to ASTM C 920. Include test results for hardness; stain resistance, adhesion and cohesion under cyclic movement (per ASTM C 719), low-temperature flexibility, and modulus of elasticity at 100-percent strain, effects of heat aging, and effects of accelerated weathering.
  2. Include test results performed on joint sealants after they have cured for one (1) year.
- F. Preconstruction Field Testing: Prior to installation of joint sealants, field-test their adhesion to joint substrates as follows:
1. Locate test joints where indicated or, if not indicated, as directed by Architect.
  2. Conduct field tests for each application indicated below:
    - a. Each type of elastomeric sealant and joint substrate indicated.
    - b. Each type of non-elastomeric sealant and joint substrate indicated.
  3. Notify Architect one (1) week in advance of the dates and times when mock-ups will be erected.
  4. Arrange for tests to take place with joint sealant manufacturer's technical representative present.
  5. Test Method: Test joint sealants by hand pull method described below:
    - a. Install joint sealants in 60-inches (1500 mm) joint lengths using same materials and methods for joint preparation and joint sealant installation required for completed Work. Allow sealants to cure fully before testing.
    - b. Make knife cuts horizontally from one side of joint to the other followed by two (2) vertical cuts approximately two inches (2") (50 mm) long at side of joint and meeting horizontal cut at top of two inch (2") (50-mm) cuts. Place a mark one inch (1) (25 mm) from top of two inch (2") (50-mm) piece.
    - c. Use fingers to grasp two inch (2") (50-mm) piece of sealant just above one inch (1) (25-mm) mark; pull firmly down at a 90-degree angle or more while holding a ruler along side of sealant. Pull sealant out of joint to the distance recommended by sealant manufacturer for testing adhesive capability, but not less than that equaling specified maximum movement capability in extension; hold this position for 10 seconds.
  6. Report whether or not sealant in joint connected to pulled-out portion failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each type of product and joint substrate.
  7. Evaluation of Field Test Results: Sealants not evidencing adhesive failure from testing, in absence of other indications of noncompliance with requirements, will be considered satisfactory. Do not use sealants that fail to adhere to joint substrates during testing.
- G. Field-Constructed Mock-Ups: Prior to installation of joint sealants, apply elastomeric sealants as follows to verify selections made under sample submittals and to demonstrate aesthetic effects as well as qualities of materials and execution:
1. Joints in field-constructed mock-ups of assemblies specified in other Sections that are indicated to receive elastomeric joint sealants specified in this Section.

## 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to Project site in original unopened containers or bundles with labels indicating manufacturer, product name and designation, color, expiration period for use, pot life, curing time, and mixing instructions for multicomponent materials.
- B. Store and handle materials in compliance with manufacturer's recommendations to prevent their deterioration or damage due to moisture, high or low temperatures, contaminants, or other causes.

## 1.7 PROJECT CONDITIONS

- A. Environmental Conditions: Do not proceed with installation of joint sealants under the following conditions:
  - 1. When ambient and substrate temperature conditions are outside the limits permitted by joint sealant manufacturer.
  - 2. When ambient and substrate temperature conditions are outside the limits permitted by joint sealant manufacturer or below 40 degrees F (4 deg C).
  - 3. When joint substrates are wet.
- B. Joint Width Conditions: Do not proceed with installation of joint sealants where joint widths are less than allowed by joint sealant manufacturer for application indicated.
- C. Joint Substrate Conditions: Do not proceed with installation of joint sealants until contaminants capable of interfering with their adhesion are removed from joint substrates.

## 1.8 SEQUENCING AND SCHEDULING

- A. Sequence installation of joint sealants to occur not less than 21 or more than 30 days after completion of waterproofing, unless otherwise indicated.

## PART 2 - PRODUCTS

### 2.1 MATERIALS, GENERAL

- A. Compatibility: Provide joint sealants, joint fillers, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.
- B. Colors: Provide color of exposed joint sealants to comply with the following:
  - 1. Provide selections made by Architect from manufacturer's full range of standard colors for products of type indicated.

### 2.2 ELASTOMERIC JOINT SEALANTS

- A. Elastomeric Sealant Standard: Provide manufacturer's standard chemically curing elastomeric sealants that comply with ASTM C 920 and other requirements indicated on each Elastomeric Joint Sealant Data Sheet at end of this Section, including those requirements referencing ASTM C 920 classifications for Type, Grade, Class, and Uses.
- B. Available Products: Subject to compliance with requirements, elastomeric sealants that may be incorporated in the Work include, but are not limited to, the products specified in each Elastomeric Sealant Data Sheet.

### 2.3 JOINT SEALANT BACKING

- A. General: Provide sealant backings of material and type 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. Plastic Foam Joint Fillers: Preformed, compressible, resilient, non-staining, non-waxing, non-extruding strips of flexible plastic foam of material indicated below and of size, shape, and density to control sealant depth and otherwise contribute to producing optimum sealant performance:
  - 1. Closed-cell polyethylene foam, nonabsorbent to liquid water and gas, non-outgassing in unruptured state.
- C. Bond-Breaker Tape: Polyethylene tape or other plastic tape as recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint filler materials or joint

surfaces at back of joint where such adhesion would result in sealant failure. Provide self-adhesive tape where applicable.

## 2.4 MISCELLANEOUS MATERIALS

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

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint sealant performance. Do not proceed with installation of joint sealants until unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with recommendations of joint sealant manufacturer 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 concrete, masonry, unglazed surfaces of ceramic tile, and similar porous joint substrate surfaces by brushing, grinding, blast cleaning, 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 from above cleaning operations by vacuuming or blowing out joints with oil-free compressed air.
  - 3. Remove laitance and form release agents from concrete.
  - 4. Clean metal, glass, porcelain enamel, glazed surfaces of ceramic tile, and other nonporous surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants.
- B. Joint Priming: Prime joint substrates where indicated or where recommended by joint sealant manufacturer based on preconstruction joint sealant-substrate tests or prior experience. Apply primer to comply with joint sealant manufacturer's recommendations. 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 with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

### 3.3 INSTALLATION OF JOINT SEALANTS

- A. General: Comply with joint sealant manufacturer's printed installation instructions applicable to products and applications indicated, except where more stringent requirements apply.
- B. Sealant Installation Standard: Comply with recommendations of ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.
- C. Acoustical Sealant Application Standard: Comply with recommendations of ASTM C 919 for use of joint sealants in acoustical applications as applicable to materials, applications, and conditions indicated.
- D. Installation of Sealant Backings: Install sealant backings to comply with the following requirements:
  - 1. Install joint fillers of type indicated to provide support of sealants during application and at position required to produce the cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
    - a. Do not leave gaps between ends of joint fillers.
    - b. Do not stretch, twist, puncture, or tear joint fillers.
    - c. Remove absorbent joint fillers that have become wet prior to sealant application and replace with dry material.
  - 2. Install bond breaker tape between sealants where backer rods are not used between sealants and joint fillers or back of joints.
- E. Installation of Sealants: Install sealants by proven techniques that result in sealants directly contacting and fully wetting joint substrates, completely filling recesses provided for each joint configuration, and providing uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability. Install sealants at the same time sealant backings are installed.
- F. Tooling of Nonsag Sealants: Immediately after sealant application and prior to time skinning or curing begins, tool sealants to form smooth, uniform beads of configuration indicated, to eliminate air pockets, and to ensure contact and adhesion of sealant with sides of joint. Remove excess sealants from surfaces adjacent to joint. Do not use tooling agents that discolor sealants or adjacent surfaces or are not approved by sealant manufacturer.
  - 1. Provide flush joint configuration, per Figure 5B in ASTM C 1193, where indicated.
    - a. Use masking tape to protect adjacent surfaces of recessed tooled joints.

### 3.4 CLEANING

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

### 3.5 PROTECTION

- A. Protect joint sealants during and after curing period from contact with contaminating substances or from damage resulting from construction operations or other causes so that they 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 that and installations with repaired areas are indistinguishable from original work.

END OF SECTION 07901



SECTION 08111 - HOLLOW METAL DOORS AND FRAMES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Standard and custom hollow metal doors and frames.
2. Steel sidelight, borrowed lite and transom frames.
3. Louvers installed in hollow metal doors.
4. Light frames and glazing installed in hollow metal doors.

B. Related Sections:

1. Division 04 Section "Unit Masonry" for embedding anchors for hollow metal work into masonry construction.
2. Division 08 Section "Glazing" for glass view panels in hollow metal doors.
3. Division 08 Section "Door Hardware".
4. Division 08 Section "Access Control Hardware".
5. Division 09 Sections "Exterior Painting" and "Interior Painting" for field painting hollow metal doors and frames.

C. Codes and References: Comply with the version year adopted by the Authority Having Jurisdiction.

1. ANSI/SDI A250.8 - Recommended Specifications for Standard Steel Doors and Frames.
2. ANSI/SDI A250.4 - Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames, Frames Anchors and Hardware Reinforcing.
3. ANSI/SDI A250.6 - Recommended Practice for Hardware Reinforcing on Standard Steel Doors and Frames.
4. ANSI/SDI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames.
5. ANSI/SDI A250.11 - Recommended Erection Instructions for Steel Frames.
6. ASTM A1008 - Standard Specification for Steel Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.
7. ASTM A653 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
8. ASTM A924 - Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.
9. ASTM C 1363 - Standard Test Method for Thermal Performance of Building Assemblies by Means of a Hot Box Apparatus.
10. ANSI/BHMA A156.115 - Hardware Preparation in Steel Doors and Frames.
11. ANSI/SDI 122 - Installation and Troubleshooting Guide for Standard Steel Doors and Frames.
12. ANSI/NFPA 80 - Standard for Fire Doors and Fire Windows; National Fire Protection Association.

13. ANSI/NFPA 105: Standard for the Installation of Smoke Door Assemblies.
14. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies; National Fire Protection Association.
15. UL 10C - Positive Pressure Fire Tests of Door Assemblies.
16. UL 1784 - Standard for Air Leakage Tests of Door Assemblies.

### 1.3 SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction details, material descriptions, core descriptions, hardware reinforcements, profiles, anchors, fire-resistance rating, and finishes.
- B. Door hardware supplier is to furnish templates, template reference number and/or physical hardware to the steel door and frame supplier in order to prepare the doors and frames to receive the finish hardware items.
- C. 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.
  5. Details of anchorages, joints, field splices, and connections.
  6. Details of accessories.
  7. Details of moldings, removable stops, and glazing.
  8. Details of conduit and preparations for power, signal, and control systems.
- D. Samples for Verification:
  1. Samples are only required by request of the architect and for manufacturers that are not current members of the Steel Door Institute.

### 1.4 QUALITY ASSURANCE

- A. Source Limitations: Obtain hollow metal doors and frames through one source from a single manufacturer wherever possible.
- B. Quality Standard: In addition to requirements specified, comply with ANSI/SDI A250.8, latest edition, "Recommended Specifications for Standard Steel Doors and Frames".
- C. 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 (neutral pressure at 40" above sill) or UL 10C.
  1. Oversize Fire-Rated Door Assemblies Construction: For units exceeding sizes of tested assemblies, attach construction label certifying doors are built to standard construction requirements for tested and labeled fire rated door assemblies except for size.
  2. Temperature-Rise Limit: Where indicated and at vertical exit enclosures (stairwell openings) and exit passageways, provide doors that have a maximum transmitted temperature end point of not more than 450 deg F (250 deg C) above ambient after 30 minutes of standard fire-test exposure.
  3. Smoke Control Door Assemblies: Comply with NFPA 105.

- a. Smoke "S" Label: Doors to bear "S" label, and include smoke and draft control gasketing applied to frame and on meeting stiles of pair doors.
- D. Fire-Rated, Borrowed-Light 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. Provide labeled glazing material.
- E. Pre-Submittal Conference: Conduct conference in compliance with requirements in Division 01 Section "Project Meetings" with attendance by representatives of Supplier, Installer, and Contractor to review proper methods and procedures for installing hollow metal doors and frames and to verify installation of electrical knockout boxes and conduit at frames with electrified or access control hardware.

#### 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver hollow metal work palletized, wrapped, or crated to provide protection during transit and Project site storage. Do not use non-vented plastic.
- B. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.
- C. Store hollow metal work under cover at Project site. Place in stacks of five units maximum in a vertical position with heads up, spaced by blocking, on minimum 4-inch high wood blocking. Do not store in a manner that traps excess humidity.
  - 1. Provide minimum 1/4-inch space between each stacked door to permit air circulation. Door and frames to be stacked in a vertical upright position.

#### 1.6 PROJECT CONDITIONS

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

#### 1.7 COORDINATION

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

#### 1.8 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace doors that fail in materials or workmanship within specified warranty period.
- B. Warranty includes installation and finishing that may be required due to repair or replacement of defective doors.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. CECO Door Products.
  2. Curries Company.

### 2.2 MATERIALS

- A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B; suitable for exposed applications.
- B. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B; with minimum G60 (Z180) or A60 (ZF180) metallic coating.
- C. Frame Anchors: ASTM A 653/A 653M, Commercial Steel (CS), Commercial Steel (CS), Type B; with minimum G60 (Z180) or A60 (ZF180) metallic coating.

### 2.3 STANDARD HOLLOW METAL DOORS

- A. General: Provide 1-3/4 inch doors of design indicated, not less than thickness indicated; fabricated with smooth surfaces, without visible joints or seams on exposed faces unless otherwise indicated. Comply with ANSI/SDI A250.8.
- B. Exterior Doors: Face sheets fabricated of commercial quality hot-dipped zinc coated steel that complies with ASTM A 653/A 653M, Coating Designation A60. Provide doors complying with requirements indicated below by referencing ANSI/SDI A250.8 for level and model and ANSI/SDI A250.4 for physical performance level:
1. Design: Flush panel.
  2. Core Construction: Manufacturer's standard polystyrene. Where indicated, provide doors fabricated as thermal-rated assemblies with a minimum R-value of 2.8 or better.
  3. Core Construction: Manufacturer's standard vertical steel-stiffener core. Minimum 22 gauge steel-stiffeners at 6 inches on-center construction attached by spot welds spaced not more than 5" on centers. Spaces between stiffeners filled with fiberglass insulation (minimum density 0.8#/cubic ft.).
  4. Top and Bottom Edges: Reinforce tops and bottoms of doors with a continuous steel channel not less than 16 gauge, extending the full width of the door and welded to the face sheet. Doors with an inverted top channel to include a steel closure channel, screw attached, with the web of the channel flush with the face sheets of the door. Plastic or composite channel fillers are not acceptable.
  5. Hinge Reinforcement: Minimum 7 gauge (3/16") plate 1-1/4" x 9" or minimum 14 gauge continuous channel with pierced holes, drilled and tapped.
  6. Hardware Reinforcements: Fabricate according to ANSI/SDI A250.6 with reinforcing plates from same material as door face sheets.
- C. Interior Doors: Face sheets fabricated of commercial quality cold rolled steel that complies with ASTM A 1008/A 1008M. Provide doors complying with requirements indicated below by referencing ANSI/SDI A250.8 for level and model and ANSI/SDI A250.4 for physical performance level:

1. Design: Flush panel.
2. Core Construction: Manufacturer's standard kraft-paper honeycomb, or one-piece polystyrene core, securely bonded to both faces.
3. Core Construction: Manufacturer's standard vertical steel-stiffener core. Minimum 22 gauge steel-stiffeners at 6 inches on-center construction attached by spot welds spaced not more than 5" on centers. Spaces between stiffeners filled with fiberglass insulation (minimum density 0.8#/cubic ft.).
  - a. Fire Door Core: As required to provide fire-protection and temperature-rise ratings indicated.
4. Top and Bottom Edges: Reinforce tops and bottoms of doors with a continuous steel channel not less than 16 gauge, extending the full width of the door and welded to the face sheet.
5. Hinge Reinforcement: Minimum 7 gauge (3/16") plate 1-1/4" x 9" or minimum 14 gauge continuous channel with pierced holes, drilled and tapped.
6. Hardware Reinforcements: Fabricate according to ANSI/SDI A250.6 with reinforcing plates from same material as door face sheets.

D. Manufacturers Basis of Design:

1. CECO Door Products Imperial Series.
2. CECO Door Products Steel-Stiffened: Medallion Series.
3. Curries Company Steel-Stiffened: 747 Series.

2.4 ENERGY-EFFICIENT HOLLOW METAL DOORS

- A. General: Provide 1-3/4 inch doors of design specified, not less than thickness indicated; fabricated with smooth surfaces, without visible joints or seams on exposed faces unless otherwise indicated. Comply with ANSI/SDI A250.8 and ANSI/NAAMM HMMA 867.
- B. Energy Efficient Exterior Doors: Face sheets fabricated of commercial quality hot-dipped zinc coated steel that complies with ASTM A924 A60. Provide doors complying with requirements indicated below by referencing ANSI/SDI A250.8 for level and model, ANSI/SDI A250.4 for physical performance level, and HMMA 867 for door construction.
  1. Design: Flush panel.
  2. Core Construction: Foamed in place polyurethane and steel stiffened laminated core with no stiffener face welds, in compliance with HMMA 867 "Laminated Core".
    - a. Provide 22 gauge steel stiffeners at 6 inches on-center internally welded at 5" on-center to integral core assembly, foamed in place polyurethane core chemically bonded to all interior surfaces. No stiffener face welding is permitted.
    - b. Thermal properties to rate at a fully operable minimum U-Factor 0.29 and R-Value 3.4, including insulated door, thermal-break frame and threshold.
      - 1) Kerf Type Frames: Thermal properties to rate at a fully operable minimum U-Factor 0.36 and R-Value 2.7, including insulated door, kerf type frame, and threshold.
  3. Level/Model: Level 2 and Physical Performance Level A (Heavy Duty), Minimum 18 gauge (0.042 inch - 1.1-mm) thick steel, Model 2.
  4. Vertical Edges: Vertical edges to be mechanically interlocked with hairline seam. Beveled Lock Edge, 1/8 inch in 2 inches (3 mm in 50 mm).

5. Top and Bottom Edges: Reinforce tops and bottoms of doors with a continuous steel channel not less than 16 gauge, extending the full width of the door and welded to the face sheet. Doors with an inverted top channel to include a steel closure channel, screw attached, with the web of the channel flush with the face sheets of the door. Plastic or composite channel fillers are not acceptable.
6. Hinge Reinforcement: Minimum 7 gauge (3/16") plate 1-1/4" x 9".
7. Hardware Reinforcements: Fabricate according to ANSI/SDI A250.6 with reinforcing plates from same material as door face sheets.

C. Manufacturers Basis of Design:

1. CECO Door Products Trio-E/Trio Series.
2. Curries Company 777 Trio-E/Trio Series.

2.5 STANDARD HOLLOW METAL FRAMES

A. General: Comply with ANSI/SDI A250.8 and with details indicated for type and profile.

B. Exterior Frames: Fabricated of hot-dipped zinc coated steel that complies with ASTM A 653/A 653M, Coating Designation A60.

1. Fabricate frames with mitered or coped corners.
2. Fabricate frames, with the exception of knock down types, with "closed and tight" miter seams continuously welded on face, finished smooth with no visible seam unless otherwise indicated.
3. Frames for Level 3 Steel Doors (up to 48 inches in width): Minimum 14 gauge (0.067-inch -1.7-mm) thick steel sheet.
4. Frames for Level 3 Steel Doors (48 inches and up in width): Minimum 12 gauge (0.081-inch -2.7-mm) thick steel sheet.
5. Frames for Level 2 Steel Doors: Minimum 16 gauge (0.053-inch -1.3-mm) thick steel sheet.
6. Manufacturers Basis of Design:
  - a. CECO Door Products SQ/SU/SR Series.
  - b. Curries Company M/G Series.

C. Interior Frames: Fabricated from cold-rolled steel sheet that complies with ASTM A 1008/A 1008M.

1. Fabricate frames with mitered or coped corners.
2. Fabricate frames, with the exception of slip-on drywall types, with "closed and tight" miter seams continuously welded on face, finished smooth with no visible seam unless otherwise indicated.
3. Frames for Steel Doors: Minimum 16 gauge (0.053-inch -1.3-mm) thick steel sheet.
4. Frames for openings up to 48 inches in width: Minimum 16 gauge (0.053-inch -1.3-mm) thick steel sheet.]
5. Frames for openings 48 inches and wider in width: Minimum 14 gauge (0.067-inch -1.7-mm) thick steel sheet.]
6. Frames for Wood Doors: Minimum 16 gauge (0.053-inch-1.3-mm-) thick steel sheet.
7. Frames for Borrowed Lights: Minimum 16 gauge (0.053-inch-1.3-mm-) thick steel sheet.
8. Manufacturers Basis of Design:
  - a. CECO Door Products BQ/BU/DQ/DU/BR/DR Series (Drywall Profile).
  - b. CECO Door Products SQ/SU/SR Series (Masonry Profile).

- c. Curries Company C/CM/CG Series (Drywall Profile).
- d. Curries Company M/G Series (Masonry Profile).

- D. Fire rated frames: Fabricate frames in accordance with NFPA 80, listed and labeled by a qualified testing agency, for fire-protection ratings indicated.
- E. Hardware Reinforcement: Fabricate according to ANSI/SDI A250.6 Table 4 with reinforcement plates from same material as frames.

## 2.6 ENERGY-EFFICIENT HOLLOW METAL FRAMES

- A. Thermal Break Frames: Subject to the same compliance standards and requirements as standard hollow metal frames, provide where indicated thermally broken frame profiles available for use in both masonry and drywall construction. Fabricate from minimum 16 gauge galvanized steel, with positive 3/8" vinyl thermal break and integral vinyl weatherstripping.
  - 1. Manufacturers Basis of Design:
    - a. CECO Door Products - Thermal Break SQT and SRT Series.
    - b. Curries Company - Thermal Break M and C Series.

## 2.7 FRAME ANCHORS

- A. Jamb Anchors:
  - 1. Masonry Type: Adjustable strap-and-stirrup or T-shaped anchors to suit frame size, formed from A60 metallic coated material, not less than 0.042 inch thick, with corrugated or perforated straps not less than 2 inches wide by 10 inches long; or wire anchors not less than 0.177 inch thick.
  - 2. Stud Wall Type: Designed to engage stud and not less than 0.042 inch thick.
  - 3. Compression Type for Drywall Slip-on (Knock-Down) Frames: Adjustable compression anchors.
  - 4. Windstorm Opening Anchors: Types as tested and required for indicated wall types to meet specified wind load design criteria.
  - 5. FEMA 361 Storm Shelter Anchors: Masonry T-shaped, wire masonry type, or existing opening type anchors.
- B. Floor Anchors: Floor anchors to be provided at each jamb, formed from A60 metallic coated material, not less than 0.042 inches thick.
- C. Mortar Guards: Formed from same material as frames, not less than 0.016 inches thick.

## 2.8 HOLLOW METAL PANELS

- A. Provide hollow metal panels of same materials, construction, and finish as specified for adjoining hollow metal work.

## 2.9 LOUVERS

- A. Metal Louvers: Door manufacturer's standard metal louvers unless otherwise indicated.
  - 1. Blade Type: Vision proof inverted V or inverted Y.

2. Metal and Finish: Galvanized steel, 0.040 inch thick, factory primed for paint finish with baked enamel or powder coated finish. Match pre-finished door paint color where applicable.
- B. Louvers for Fire Rated Doors: Metal louvers with fusible link and closing device, listed and labeled for use in doors with fire protection rating of 1-1/2 hours and less.
1. Manufacturers: Subject to compliance with requirements, provide door manufacturers standard louver to meet rating indicated.
  2. Metal and Finish: Galvanized steel, 0.040 inch thick, factory primed for paint finish with baked enamel or powder coated finish. Match pre-finished door paint color where applicable.

## 2.10 LIGHT OPENINGS AND GLAZING

- A. Stops and Moldings: Provide stops and moldings around glazed lites where indicated. Form corners of stops and moldings with butted or mitered hairline joints at fabricator's shop. Fixed and removable stops to allow multiple glazed lites each to be removed independently. Coordinate frame rabbet widths between fixed and removable stops with the type of glazing and installation indicated.
- B. Moldings for Glazed Lites in Doors and Loose Stops for Glazed Lites in Frames: Minimum 20 gauge thick, fabricated from same material as door face sheet in which they are installed.
- C. Fixed Frame Moldings: Formed integral with hollow metal frames, a minimum of 5/8 inch (16 mm) high unless otherwise indicated. Provide fixed frame moldings and stops on outside of exterior and on secure side of interior doors and frames
- D. Preformed Metal Frames for Light Openings: Manufacturer's standard frame formed of 0.048-inch-thick, cold rolled steel sheet; with baked enamel or powder coated finish; and approved for use in doors of fire protection rating indicated. Match pre-finished door paint color where applicable.
- E. Glazing: Comply with requirements in Division 08 Section "Glazing" and with the hollow metal door manufacturer's written instructions.
1. Factory Glazing: Factory install glazing in doors as indicated. Doors with factory installed glass to include all of the required glazing material.

## 2.11 ACCESSORIES

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

## 2.12 FABRICATION

- A. Fabricate hollow metal work to be rigid and free of defects, warp, or buckle. Accurately form metal to required sizes and profiles, with minimum radius for thickness of metal. Where practical, fit and assemble units in manufacturer's plant. When shipping limitations so dictate, frames for large openings are to be fabricated in sections for splicing or splining in the field by others.



B. Tolerances: Fabricate hollow metal work to tolerances indicated in ANSI/SDI A250.8.

C. Hollow Metal Doors:

1. Exterior Doors: Provide optional weep-hole openings in bottom of exterior doors to permit moisture to escape where specified.
2. Glazed Lites: Factory cut openings in doors with applied trim or kits to fit. Factory install glazing where indicated.
3. Astragals: Provide overlapping astragals as noted in door hardware sets in Division 08 Section "Door Hardware" on one leaf of pairs of doors where required by NFPA 80 for fire-performance rating or where indicated. Extend minimum 3/4 inch beyond edge of door on which astragal is mounted.
4. Continuous Hinge Reinforcement: Provide welded continuous 12 gauge strap for continuous hinges specified in hardware sets in Division 08 Section "Door Hardware".

D. Hollow Metal Frames:

1. Shipping Limitations: 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.
2. Welded Frames: Weld flush face joints continuously; grind, fill, dress, and make smooth, flush, and invisible.
  - a. Welded frames are to be provided with two steel spreaders temporarily attached to the bottom of both jambs to serve as a brace during shipping and handling. Spreader bars are for bracing only and are not to be used to size the frame opening.
3. Sidelight and Transom Bar Frames: Provide closed tubular members with no visible face seams or joints, fabricated from same material as door frame. Fasten members at crossings and to jambs by butt welding.
4. High Frequency Hinge Reinforcement: Provide high frequency hinge reinforcements at door openings 48-inches and wider with mortise butt type hinges at top hinge locations.
5. Continuous Hinge Reinforcement: Provide welded continuous 12 gauge straps for continuous hinges specified in hardware sets in Division 08 Section "Door Hardware".
6. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated for removable stops, provide security screws at exterior locations.
7. Mortar Guards: Provide guard boxes at back of hardware mortises in frames at all hinges and strike preps regardless of grouting requirements.
8. Floor Anchors: Weld anchors to bottom of jambs and mullions with at least four spot welds per anchor.
9. Jamb Anchors: Provide number and spacing of anchors as follows:
  - a. Masonry Type: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches o.c. and as follows:
    - 1) Two anchors per jamb up to 60 inches high.
    - 2) Three anchors per jamb from 60 to 90 inches high.
    - 3) Four anchors per jamb from 90 to 120 inches high.
    - 4) Four anchors per jamb plus 1 additional anchor per jamb for each 24 inches or fraction thereof above 120 inches high.
  - b. Stud Wall Type: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches o.c. and as follows:

- 1) Three anchors per jamb up to 60 inches high.
  - 2) Four anchors per jamb from 60 to 90 inches high.
  - 3) Five anchors per jamb from 90 to 96 inches high.
  - 4) Five anchors per jamb plus 1 additional anchor per jamb for each 24 inches or fraction thereof above 96 inches high.
  - 5) Two anchors per head for frames above 42 inches wide and mounted in metal stud partitions.
10. Door Silencers: Except on weatherstripped or gasketed doors, drill stops to receive door silencers. Silencers to be supplied by frame manufacturer regardless if specified in Division 08 Section "Door Hardware".

E. Hardware Preparation: Factory prepare hollow metal work to receive template 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, or if not indicated, according to ANSI/SDI A250.8.
2. Reinforce doors and frames to receive non-template, mortised and surface mounted door hardware.
3. Comply with applicable requirements in ANSI/SDI A250.6 and ANSI/DHI A115 Series specifications for preparation of hollow metal work for hardware.
4. Coordinate locations of conduit and wiring boxes for electrical connections with Division 26 Sections.

## 2.13 STEEL FINISHES

- A. Prime Finishes: Doors and frames to be cleaned, and chemically treated to insure maximum finish paint adhesion. Surfaces of the door and frame exposed to view to receive a factory applied coat of rust inhibiting shop primer.
1. Shop Primer: Manufacturer's standard, fast-curing, lead and chromate free primer complying with ANSI/SDI A250.10 acceptance criteria; recommended by primer manufacturer for substrate; and compatible with substrate and field-applied coatings.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. General Contractor to verify the accuracy of dimensions given to the steel door and frame manufacturer for existing openings or existing frames (strike height, hinge spacing, hinge back set, etc.).
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Remove welded in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces.

- B. Prior to installation, adjust and securely brace welded hollow metal frames for squareness, alignment, twist, and plumbness.
- C. Tolerances shall comply with SDI-117 "Manufacturing Tolerances Standard Steel Doors and Frames."
- D. Drill and tap doors and frames to receive non-template, mortised, and surface-mounted door hardware.

### 3.3 INSTALLATION

- A. General: Install hollow metal work plumb, rigid, properly aligned, and securely fastened in place; comply with Drawings and manufacturer's written instructions.
- B. Hollow Metal Frames: Install hollow metal frames of size and profile indicated. Comply with ANSI/SDI A250.11 and NFPA 80 at fire rated openings.
  - 1. Set frames accurately in position, plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete and frames properly set and secured, remove temporary braces, leaving surfaces smooth and undamaged. Shim as necessary to comply with installation tolerances.
  - 2. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, and secure with post-installed expansion anchors.
  - 3. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with mortar.
  - 4. Grout Requirements: Do not grout head of frames unless reinforcing has been installed in head of frame. Do not grout vertical or horizontal closed mullion members.
- C. Hollow Metal Doors: Fit hollow 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 plus or minus 1/16 inch.
    - b. Between Edges of Pairs of Doors: 1/8 inch plus or minus 1/16 inch.
    - c. Between Bottom of Door and Top of Threshold: Maximum 3/8 inch.
    - d. Between Bottom of Door and Top of Finish Floor (No Threshold): Maximum 3/4 inch.
  - 2. Fire-Rated Doors: Install doors with clearances according to NFPA 80.
- D. Field Glazing: Comply with installation requirements in Division 08 Section "Glazing" and with hollow metal manufacturer's written instructions.

### 3.4 ADJUSTING AND CLEANING

- A. Final Adjustments: Check and readjust operating hardware items immediately before final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including hollow metal work that is warped, bowed, or otherwise unacceptable.
- B. Remove grout and other bonding material from hollow metal work immediately after installation.

- C. Prime-Coat and Painted Finish Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat, or painted finishes, and apply touchup of compatible air drying, rust-inhibitive primer, zinc rich primer (exterior and galvanized openings) or finish paint.

END OF SECTION 081113

SECTION 08161 - NARROW STILE FRP DOORS.

PART 1 GENERAL

1.01 DESCRIPTION

- A. WORK INCLUDED - The fiberglass doors and aluminum frames required for this work are indicated on the drawings and include, but is not necessarily limited to:
1. Openings as shown in the schedule, bound into these specifications.
  2. The removal of existing doors, frames, glass, etc as noted
  3. The installation of new opening systems that include aluminum frames, fiberglass doors, fiberglass panels, door hardware and glass.
  4. NARROW STILE.

1.02 QUALITY ASSURANCE

A. MANUFACTURER'S CERTIFICATION

Manufacturer is to have a minimum of 5 years experience in the production of pre-hardwared and pre-assembled door systems, using the type of materials specified for this project.

B. INSTALLER'S QUALIFICATIONS

For the installation of the entrance systems, use only mechanics who are thoroughly trained and experienced in the skills required and who are completely familiar with the manufacturer's recommended methods of installation plus the requirements of this work.

C. WARRANTIES

1. Wide Stile FRP doors will carry a 25 year limited warranty on doors structural integrity, main frame, and the lamination between face sheets and core.
2. THE ENTIRE SYSTEM will be guaranteed for 10 years.
3. System Manufacturer will guarantee THE INSTALLATION of its products. Proper installation of frames, doors and hardware will be supervised and guaranteed by the System Manufacturer to be installed per manufacturer's standards. Acceptance of this warrant condition must be provided by System Manufacturer to the owner/architect before materials can be accepted.
4. Warrantees are to be in WRITING from the System - Door manufacturer, and MUST be submitted before invoices for payment will be reviewed.

D. TEST REPORTS AND PERFORMANCE REQUIREMENTS FOR (NARROW STILE DOORS)

Entrance systems must comply with requirements for system performance characteristics as determined by the testing methods that follow:

Two copies of current test reports covering the test procedures as listed are to be included with the submittals.

1. COMPLETE SYSTEM REQUIREMENT TESTS - Complete system units that include door, frame and hardware are to meet the following criteria:
  - a. THERMAL TRANSMITTANCE TESTS:
    1. U-factors expressed  
in Btu/ hr-ft (2)-F - AAMA 1503-98 - 0.58
    2. R-value expressed  
in hr-ft (2)-F/Btu - ASTM 1503-98 - 1.73
  - b. STRUCTURAL PERFORMANCE TESTS:
    1. Air Infiltration -  
ASTM E283 @ 1.56 psf (25 mph) - 0.41 cfm/ft (2)  
ASTM E283 @ 6.24 psf (50 mph) – 1.06 cfm/ft (2)
    2. Water Penetration -  
ASTM E331 - 15 Min Cycle - NO ENTRY
    3. Uniform Load - ASTM E330 - (+) - 75.0 psf
  - c. STRUCTURAL INTEGRITY TESTS:
    1. Exit Bar Pull Off Test - 1300 lbs. minimum load resistance before exit bar disengages from door.
    2. Closer Pull Off - 1638 lbs. minimum load resistance before closer disengages from door.
  - d. WINDBORNE DEBRIS RESISTANCE TESTS:
    1. Missile Impact Test - PA 201 - 94 - PASSED
    2. Cyclic Wind Pressure Test - PA 203 - 94 - 60PSF
    3. Forced Entry Test - SFBC 3603.2 - 300 lbs. - PASSED
2. DOOR LEAF REQUIREMENT TESTS - Door leaf without frame or hardware and with a minimum lite cut out of 12" x 24" is to meet the following criteria:
  - a. CONCENTRATED LOAD BOW TEST - 3400 lbs. minimum load before door leaf fails.
  - b. TORISON TWIST TEST - @300 lbs. minimum load with a permanent set no greater than 0.188".
3. FACE SHEET REQUIREMENT TESTS - FRP material and FRP face sheets with core material are to meet the following criteria:
  - a. CENTER DOOR SECTION (face sheet/core/face sheet)  
Gardner Impact Test - ASTM D5420 – 411.84 in-lb.
  - b. FRP MATERIAL (MR85)
    1. Flexural Strength Test -

ASTM D790 - 22,600 psi (inward)  
24,400 psi (outward)

2. Izod Impact Strength Test -  
ASTM D256 - 15.36 ft-lb./in thickness
3. Barcol Hardness -  
ASTM D2583 – 50

E. TEST REPORTS AND PERFORMANCE REQUIREMENTS FOR (HEAVY DUTY WIDE STILE DOORS)

Entrance systems must comply with requirements for system performance characteristics as determined by the testing methods that follow:

Two copies of current test reports covering the test procedures as listed are to be included with the submittals.

1. COMPLETE SYSTEM REQUIREMENT TESTS - Complete system units that include door, frame and hardware are to meet the following criteria:

a. THERMAL TRANSMITTANCE TESTS:

1. U-factors expressed  
in Btu/ hr-ft (2)-F - AAMA 1503-98 - 0.70
2. R-value expressed  
in hr-ft (2)-F/Btu - ASTM 1503-98 - 1.43

b. STRUCTURAL PERFORMANCE TESTS:

1. Air Infiltration -  
ASTM E283 @ 1.56 psf (25 mph) - 0.31 cfm/ft (2)  
ASTM E283 @ 6.24 psf (50 mph) - 0.97 cfm/ft (2)
2. Water Penetration -  
ASTM E331 - 15 Min Cycle - NO ENTRY
3. Uniform Load - ASTM E330 - (+) - 82.5 psf

c. STRUCTURAL INTEGRITY TESTS:

1. Exit Bar Pull Off Test - 2400 lbs. minimum load resistance before exit bar disengages from door.
2. Closer Pull Off - 7300 lbs. minimum load resistance before closer disengages from door.

d. WINDBORNE DEBRIS RESISTANCE TESTS:

1. Missile Impact Test - PA 201 - 94 - PASSED
2. Forced Entry Test - SFBC 3603.2 - 300 lbs. - PASSED

2. DOOR LEAF REQUIREMENT TESTS - Door leaf without frame or hardware and with a minimum lite cut out of 12" x 24" is to meet the following criteria:

- a. CONCENTRATED LOAD BOW TEST - 4200 lbs. minimum load with no permanent deflection to door leaf.
- b. TORSION TWIST TEST - @300 lbs. minimum load with *no permanent* set to door leaf.
3. FACE SHEET REQUIREMENT TESTS - FRP material and FRP face sheets with core material are to meet the following criteria:
  - a. CENTER DOOR SECTION (face sheet/core/face sheet)
    1. Gardner Impact Test - ASTM D5420 – 411.84 in-lb.
  - b. FRP MATERIAL (MR85)
    1. Flexural Strength Test -  
ASTM D790 - 22,680 psi (inward)  
24,400 psi (outward)
    2. Izod Impact Strength Test -  
ASTM D256 - 15.36 ft-lb./in thickness
    3. Barcol Hardness - ASTM D2583 - 50

#### 1.03 PRODUCTS AND APPROVAL METHOD

##### A. ACCEPTABLE MANUFACTURERS

The products outlined in this specification are not the exclusive property of any one manufacture. This is a PERFORMANCE SPECIFICATION. There are no Patents, Contractual Agreements, or any other type of restrictions that limit competition with the products described in this Performance Specification. However, it should be noted that the manufacturers, listed in this specification, would have to make some modifications to their standard products, and new dies and designs may be required to adhere to the demands of this specification.

##### B. APPROVED EQUAL PRODUCTS

Equal products by manufacturers not listed in this specification will be considered only if those products are in strict compliance with the demands of this performance specification. Any modifications needed to a standard product must be included in the samples that are submitted with the approval request.

##### C. APPROVAL PROCEDURE

1. Submit manufacturer's technical data for each type (STILE CLASSIFICATION) of door. Include all frame & door sections, elevations and details.
2. Two copies of current test reports are to be included with the submittals.
3. Submit two samples of each door STILE CLASSIFICATION that shows rails, stiles, core, joint construction, and edge trim.

##### D. SHOP DRAWINGS

1. Submit SIX sets of shop drawings for the fabrication and installation of the Doors and Frames, and associated components of the work. Include wall elevations and detail sections of every typical



composite member. Show frame anchoring, frame repairs to existing frames, glazing details, interior and exterior wall repairs and any other component or accessory required to complete each door opening.

2. Include details of main frame corner joint construction on doors, Stile and Rail size, Core material, Vision lite moldings, Louvers and Factory Finishing Specifications.
3. Details of HARDWARE REINFORCING Material, Size & Thickness, Locations on both door(s) and frame, and Method of attachment.

#### 1.04 *PRODUCT DELIVERY, STORAGE AND HANDLING*

##### A. IDENTIFICATION

Each door and frame will be tagged with a mark or number, which correlates with designation system used for shop drawings.

##### B. PROTECTION

All materials will be protected during transit and storage from soiling and deterioration.

### PART 2 DOORS, FRAMES AND PANELS

#### 2.01 *DOOR SYSTEMS CLASSIFICATIONS:*

Door systems for this project are based on one or more of the following STILE classifications. All manufacturers listed below currently offer products that can be modified to meet the demands of this performance specification for the DOOR CLASS they are listed in. Manufacturers listed below, or any other manufacturer not listed are free to produce a product that meets any or all of the DOOR STILE CLASSIFICATIONS given and detailed in this performance specification.

- |                               |  |
|-------------------------------|--|
| 1. NARROW STILE DOOR SYSTEMS: | CDS-F200<br>SPECIAL LITE-SL17<br>EXTRUDART "V"<br>VISTA WALL - "VISION*LITE" |
|-------------------------------|--|

#### 2.02 *MATERIALS*

##### A. ALUMINUM MEMBERS

1. Doors, frames, miscellaneous components and entrance systems accessories are to be from the same manufacturer. Splitting the source for these items will not be permitted.
2. Provide alloy and temper as recommended for resistance to corrosion and color control. Aluminum member references are ASTM B 221 for extrusions and ASTM B 209 for sheets.

#### 2.03 *ALUMINUM FRAMES:*

- A. STANDARD CLOSED BACK FRAMES shall be of extruded aluminum 6063-T5 alloy and a wall thickness of .125".

1. VERTICAL MEMBERS - All vertical frame jambs and mullions will be full height of opening.

2. SECTIONS - Tube sections will be 2" x 6" with joints connected by use of reinforcing clips and machine screws.
3. CLOSED BACK FRAMES are: CDS Model 2600 (or equal)

B. INSERT CAP FRAMES shall be of extruded aluminum 6063-T6 alloy and a wall thickness of .250". Insert Cap Frames will cover the entire exterior face of sub or existing frame and the new door rabbit area.

1. SECTIONS - Insert Cap Frame sections will be "Z" shaped.  
Dimensions are 15/16" x 2 1/8" x 2 1/4". Joints are mitered.

TWO PIECE DETAILS THAT REQUIRE A CAULK BEAD WILL NOT BE ACCEPTED.

2. INSERT CAP FRAMES are: CDS Model 225 (or equal)

## 2.04 FIBERGLASS (FRP) PANELS

### A. ALUMINUM EDGED FIBERGLASS (FRP) PANELS

1. CONSTRUCTION - Panels will be constructed of two sheets of .120 fiberglass sheets bonded to 3/4" core material. Panel thickness will be 1". An aluminum frame surrounds the perimeter of the panel, and measures 1" x 1" x 1" with 1/8" wall thickness.

WOOD EDGED PANELS WILL NOT BE ACCEPTED.

2. CORE material will be 25psi density polystyrene with a *FLAME SPREAD* rating of no more than 25.

CORE MATERIAL MUST HAVE A PROVEN RECORD FOR USE IN PANEL FABRICATION - *WITHOUT DELAMINATING*.

\*\*\*\*\*URETHANE CORES that have a *FLAME SPREAD* rating greater than 25 will require an ALUMINUM liner between the FRP face sheet and the urethane core material.

\*\*\*\*\*URETHANE CORE PANELS will require a letter from the manufacturer offering special guarantee that the FRP face sheets will not delaminate (bubble) for a period of 10 years, AND that the manufacturer will cover ALL replacement costs if delamination does occur.

3. FRP face sheets will be .120 minimum thickness with a pebble like surface.
4. Color will be selected from manufacturers full range of colors
5. PANELS are by one of the following: (or equal)

COMMERCIAL DOOR SYSTEMS, Model AP75, modified as follows -  
Polystyrene core.

SPECIAL LITE, Model SL-37, modified as follows -

1. Aluminum liner between FRP material and urethane core.
2. Aluminum channel perimeter frame. (wood frame not acceptable).

## 2.05 FIBERGLASS NARROW STILE (FRP) DOORS

- A. STRUCTURAL MAIN FRAME - Doors have an aluminum main frame constructed from extruded aluminum 6063 - T5 alloy. Doors are 1 3/4" thick. Main-frame tube is to be a single extruded unit measuring 1 1/2" x 2 1/2" (O.D.) on Sides and Bottom rail with a 6" (O.D.) tube on Top rail.

NARROW STILE FRP DOORS.

B. MAIN FRAME STILE WALL THICKNESS':

- |                |         |       |                        |
|----------------|---------|-------|------------------------|
| 1. Side Stiles | Minimum | 1/8"  | thick hinge edge wall. |
| 2. Side Stiles | Minimum | 1/16" | thick face walls.      |
| 3. Bottom Rail | Minimum | 1/16" | thick face walls.      |
| 4. Top Rail    | Minimum | 1/8"  | thick all walls.       |

C. MAIN FRAME JOINERY - Assembly for the meeting joints of the Rails and Stiles on the main-frame are to be one of the following types:

1. Tie rods inserted into top and bottom rails.
2. MORTISE & TENON with four-point connect fasteners (per joint).

**\*\*WELDED JOINTS WILL NOT BE ACCEPTED\*\***

D. FACE SHEETS - Face sheets will be fiberglass reinforced polyester, .120" thick, and have a pebble-like embossed finish. Face sheet color will be selected from CDS color chart.

FRP face sheets are MR85 HIGH IMPACT FRP MATERIAL that has been tested by ASTM S5420 Gardner Impact Test with "Mean Failure Energy" rating no lower than 411.84 in-lb. (or equal).

E. CORE MATERIAL - Core material will be 3-lb. density polystyrene with a flame spread rating of no more than 25.

**\*\*\*URETHANE CORES** that have a *FLAME SPREAD* rating greater than 25 will require an ALUMINUM liner between the FRP face sheet and the urethane core material.

**\*\*\*URETHANE CORE DOORS** will require a letter from the manufacturer offering a special guarantee that the FRP face sheets will not delaminate (bubble) for a period of 25 years, AND that the manufacturer will cover ALL replacement costs if delamination does occur.

F. EDGE TRIM - Stile Edge Trim is an INTEGRAL part of the main frame and interlocks with the panel. Top and bottom edge trim is removable.

**SNAP-ON EDGE TRIM WILL NOT BE ACCEPTED.**

G. WEATHERSTRIPPING - Center stiles of pairs will have pile weather-stripping .500 backing width, .5" pile height.

H. HARDWARE REINFORCING - CLOSER reinforcing to be 1/8" minimum aluminum plate or channel. Surface Applied Exit Device reinforcing to be 1/8" aluminum channel.

**SEX OR THRU BOLTS WILL NOT BE ACCEPTED.**

I. NARROW STILE (FRP) DOORS are by one of the following: (or equal)

COMMERCIAL DOOR SYSTEMS, Model CDS-F200, modified as follows -

1. Polystyrene core that carries a 25 year warranty.
2. UPDATED TEST RESULTS.

SPECIAL LITE, Model SL-17, modified as follows -

1. Aluminum or Steel Urethane CORE LINER for urethane core material that has a FLAME SPREAD higher than 25.
2. Extended 25 year warranty for this project.
3. 1/8" Aluminum channel closer & exit bar reinforcing.
4. UPDATED TEST RESULTS.

EXTRUDART, Model "V", modified as follows -

1. Aluminum or Steel Urethane CORE LINER for urethane core material that has a

- FLAME SPREAD higher than 25.
2. Extended 25 year warranty for this project.
  3. UPDATED TEST RESULTS.

VISTA WALL, Model "VISION\*LITE", modified as follows -

1. Aluminum or Steel Urethane CORE LINER for urethane core material that has a FLAME SPREAD higher than 25.
2. Extended 25-year warranty for this project.
3. 1/8" Aluminum channel closer & exit bar reinforcing.
4. UPDATED TEST RESULTS.

#### 2.07 VISION LITES

- A. FABRICATION - Vision lite trim moldings will be aluminum extrusion - 6063 - T5 alloy and removable from the inside only.
- B. Door Vision Lites will be FACTORY glazed for 1/4" or 1" thick glass as listed on the door schedule.
- C. DOOR VISION LITE KITS are by THE DOOR MANUFACTURER ONLY.

#### 2.08 RECESSED FLUSH PULLS

- A. FABRICATION - Recessed pull handle, 6" x 8 1/2" x 1-9/16", manufactured from all extruded aluminum 6063-T6 alloy. Unit is welded together. Pull will be finished to match door edge trim or as specified.
- B. SAFETY FEATURE - Pull is to be secured to main frame of door WITHOUT any of the fastening devices EXPOSED to the FINGERS when hand is inserted into pull to open door.
- C. Pull is to be supplied and installed at factory by door manufacturer. All necessary reinforcements and modifications to door for receiving the recessed flush pull is to be done at the factory. Pull is also guaranteed for 10 years.
- D. RECESSED FLUSH PULLS are by THE DOOR MANUFACTURER ONLY.

#### 2.09 RECESSED HANDICAP (ADA) PULLS

- A. FABRICATION - Recessed pull handle, 6" x 8 1/2" x 1-9/16", manufactured from all extruded aluminum 6063-T6 alloy. Unit is welded together. Pull will be finished to match door edge trim or as specified.
- B. ADA COMPLIANCE - Pull has a FULL 2 3/4" hand clearance. The pull must meet all current standards for public access and ADA guidelines.
- C. SAFETY FEATURE - Pull is to be secured to main frame of door WITHOUT any of the fastening devices EXPOSED to the FINGERS when hand is inserted into pull to open door.
- D. Pull is to be supplied and installed at factory by door manufacturer. All necessary reinforcements and modifications to door for receiving the recessed flush pull are to be done at the factory. Pull is also guaranteed for 10 years.
- E. RECESSED HANDICAP (ADA) PULLS are by THE DOOR MANUFACTURER ONLY.

## SECTION 08211 - FLUSH WOOD DOORS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. This Section includes the following:
  - 1. Solid-core doors with wood-veneer faces.
  - 2. Factory finishing flush wood doors.
- B. Related Sections include the following:
  - 1. Division 6 Section "Interior Architectural Woodwork" for requirements for veneers from the same flitches for both flush wood doors and architectural woodwork.
  - 2. Division 8 Section "Steel Doors and Frames" for hollow metal door frames.
  - 3. Division 8 Section "Glazing" for glass view panels in flush wood doors.

#### 1.3 SUBMITTALS

- A. Product Data: For each type of door. Include details of core and edge construction, trim for openings, and louvers.
  - 1. Include factory-finishing specifications.
- B. Shop Drawings: Indicate location, size, and hand of each door; elevation of each kind of door; construction details not covered in Product Data; location and extent of hardware blocking; and other pertinent data.
  - 1. Indicate dimensions and locations of mortises and holes for hardware.
  - 2. Indicate dimensions and locations of cutouts.
  - 3. Indicate requirements for veneer matching.
  - 4. Indicate doors to be factory finished and finish requirements.
- C. Samples for Initial Selection: Color charts consisting of actual materials in small sections for the following:
  - 1. Faces of factory-finished doors with transparent finish. Show the full range of colors available for stained finishes.
- D. Samples for Verification: As follows:
  - 1. Corner sections of doors approximately 8 by 10 inches (200 by 250 mm) with door faces and edgings representing the typical range of color and grain for each species of veneer and solid lumber required. Finish sample with same materials proposed for factory-finished doors.
  - 2. Louver blade and frame sections, 6 inches (150 mm) long, for each material and finish specified.
  - 3. Frames for light openings, 6 inches (150 mm) long, for each material, type, and finish required.

#### 1.4 QUALITY ASSURANCE

- A. Source Limitations: Obtain flush wood doors through one source from a single manufacturer.
- B. Quality Standard: Comply with the following standard:
  - 1. AWI Quality Standard: AWI's "Architectural Woodwork Quality Standards" for grade of door, core, construction, finish, and other requirements.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Protect doors during transit, storage, and handling to prevent damage, soiling, and deterioration. Comply with requirements of referenced standard and manufacturer's written instructions.
  - 1. Individually package doors in cardboard cartons and wrap bundles of doors in plastic sheeting.
- B. Mark each door with individual opening numbers used on Shop Drawings. Use removable tags or concealed markings.

1.6 PROJECT CONDITIONS

- A. Environmental Limitations: Do not deliver or install doors until conditions for temperature and relative humidity have been stabilized and will be maintained in storage and installation areas during the remainder of the construction period to comply with requirements of the referenced quality standard for Project's geographical location.

1.7 WARRANTY

- A. General Warranty: Door manufacturer's warranty specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by the Contractor under requirements of the Contract Documents.
- B. Door Manufacturer's Warranty: Submit written agreement on door manufacturer's standard form, signed by manufacturer, Installer, and Contractor, agreeing to repair or replace defective doors that have warped (bow, cup, or twist) more than 1/4 inch (6.35 mm) in a 42-by-84-inch (1067-by-2134-mm) section or that show telegraphing of core construction in face veneers exceeding 0.01 inch in a 3-inch (0.25 mm in a 75-mm) span, or do not comply with tolerances in referenced quality standard.
  - 1. Warranty shall also include installation and finishing that may be required due to repair or replacement of defective doors.
  - 2. Warranty shall be in effect during the following period of time after the date of Substantial Completion:
    - a. Solid-Core Interior Doors: Life of installation.

PART 2 - PRODUCTS

2.1 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. Flush Wood Doors:
    - a. Algoma Hardwoods Inc.
    - b. Ampco Products, Inc.
    - c. Eggers Industries; Architectural Door Division.
    - d. The Maiman Company
    - e. Mohawk Flush Doors, Inc.
    - f. V-T Industries Inc.
    - g. Weyerhaeuser Co.

2.2 DOOR CONSTRUCTION, GENERAL

- A. Doors for Transparent stained Finish: Comply with the following requirements:
  - 1. Grade: Premium, with Grade AA faces.
  - 2. Faces: **Stained Clear Maple Veneer**, Grade #1, plain sliced.
  - 3. Match between Veneer Leaves: Pleasing match.
  - 4. Match within Door Faces: Running match.
  - 5. Stiles: Same species as face.

Note: No pith marks or veneer discoloration will be accepted.

## 2.3 SOLID-CORE DOORS

- A. Interior Veneer-Faced Doors: Comply with the following requirements:
  - 1. Core: Mineral Core - Shall be asbestos free, noncombustible mineral composite with a minimum of 28 pounds per cubic foot density when testing in accordance with ASTM C303-82, with 10% maximum absorption by weight with core in equilibrium at 90% relative humidity and 70 degrees Fahrenheit. Stiles and rails shall be manufacturers standard for specified label. Stile shall be reinforced to receive full mortise hinges. No salt treated components shall be used.
  - 2. Construction: Seven plies with stiles and rails bonded to core, then entire unit abrasive planed before veneering.
  - 3. Rating: UL 10(B).

## 2.4 LIGHT FRAMES

- A. Wood Frames for Light Openings: As follows:
  - 1. Wood Species: Same species as door faces.
  - 2. Profile: Manufacturer's standard shape.

## 2.5 FABRICATION

- A. Factory fit doors to suit frame-opening sizes indicated, with the following uniform clearances and bevels, unless otherwise indicated:
  - 1. Comply with clearance requirements of referenced quality standard for fitting. Comply with requirements of NFPA 80 for fire-rated doors.
- B. Factory machine doors for hardware that is not surface applied. Locate hardware to comply with DHI-WDHS-3. Comply with final hardware schedules, door frame Shop Drawings, DHI A115-W series standards, and hardware templates.
- C. Openings: Cut and trim openings through doors to comply with applicable requirements of referenced standards for kind(s) of door(s) required.
  - 1. Light Openings: Trim openings with moldings of material and profile indicated.
  - 2. Louvers: Factory install louvers in prepared openings.

## 2.6 FACTORY FINISHING

- A. General: Comply with referenced quality standard's requirements for factory finishing.
- B. Finish wood doors at factory that are indicated to receive transparent finish. Field finish wood doors indicated to receive opaque finish.
- C. Transparent Finish: Comply with requirements indicated for grade, finish system, staining effect, and sheen.
  - 1. Grade: Premium.
  - 2. Finish: AWI System TR-4 conversion varnish.
  - 3. Finish: AWI System TR-6 catalyzed polyurethane.
  - 4. Finish: Manufacturer's standard finish with performance requirements comparable to AWI System TR-4 conversion varnish.
  - 5. Finish: Manufacturer's standard finish with performance requirements comparable to AWI System TR-6 catalyzed polyurethane.
  - 6. Staining: As selected by Architect from manufacturer's full range of colors.
  - 7. Effect: Filled finish.
  - 8. Sheen: Satin.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

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

### 3.2 INSTALLATION

- A. Hardware: For installation, see Division 8 Section "Door Hardware."
- B. Manufacturer's Written Instructions: Install wood doors to comply with manufacturer's written instructions, referenced quality standard, and as indicated.
- C. Factory-Fitted Doors: Align in frames for uniform clearance at each edge.
- D. Factory-Finished Doors: Restore finish before installation, if fitting or machining is required at Project site.

### 3.3 ADJUSTING AND PROTECTING

- A. Operation: Rehang or replace doors that do not swing or operate freely.
- B. Finished Doors: Refinish or replace doors damaged during installation.
- C. Protect doors as recommended by door manufacturer to ensure that wood doors are without damage or deterioration at the time of Substantial Completion.

END OF SECTION 08211



SECTION 08700 - FINISH HARDWARE

PART 1.00 - GENERAL

1.01 GENERAL REQUIREMENTS

- A. Work of this Section, as shown or specified, shall be in accordance with the Contract Documents.

1.02 WORK INCLUDED

- A. Work of this Section includes all labor, materials, equipment and services necessary to furnish all the finish hardware as shown on the drawings and specified herein.

1.03 RELATED WORK

- A. Installation of finish hardware - Section 06200
- B. Steel doors and frames - Section 08100
- C. Wood doors - Section 08200
- D. Entrance assemblies - Section 08410
- E. Seals and saddles - Section 08730
- F. Painting - Section 09900
- G. Electrical – Division 16.

1.04 QUALITY ASSURANCE

- A. Hardware shall be suitable and adapted for its required use and shall fit its designated location. Should any hardware as shown, specified or required fail to meet the intended requirements or require modification to suit or fit the designated location, determine the correction or modification necessary and notify the Architect in ample time to avoid delay in the manufacture and delivery of hardware.
- B. For fire rated openings provide hardware complying with NFPA Standard No. 80 requirements of authorities having jurisdiction.
- C. Barrier Free Requirements: Comply with all standards of CABO/ANSI 117.1, latest addition.
- D. Hardware Supplier Qualifications: The Hardware Supplier shall have been regularly engaged in the sale and distribution of Finish Hardware for projects of comparable scope and size for a minimum of five (5) years. The Hardware Supplier shall have an AHC of the Door and Hardware Institute on staff who will be responsible for overseeing the scheduling, detailing, ordering, and coordinating of Finish Hardware, and shall be available for consultation with the Architect, at no additional cost to the Owner, during progress of construction.

1.05 SUBMITTALS

- A. Before any finish hardware is ordered or purchased, submit catalog cuts and a complete Hardware Schedule of Finish Hardware. Each item listed in the Hardware Schedule shall be identifiable with respect to manufacture, brand, catalog number, material, and finish.

- B. Where submission differs from Schedule given herein, use different color or other means of identification to bring change to the attention of the Architect.
- C. Hardware Supplier shall provide all product information, wiring diagrams, and electrical data to the Electrical Contractor.
- D. Samples: Submit samples only if requested by the Architect. Do not proceed with installation until samples have been approved. Approved samples shall be installed in the work.

1.06 PRODUCT HANDLING

- A. Pack finish hardware in approved manufacturer's containers, complete with trimmings, bolts, screws, washers, etc., as required for application and securement. Each container shall bear a suitable label which shall state the quantity and kind of contents of said container, as well as identifying marks relating to the approved Hardware Schedule and its location in the project.
- B. Lever handles, pulls and other items of finish hardware with easily damaged finishes shall be individually wrapped before placing in containers and with sufficient sheet cloth or cotton-backed paper which shall be adequately tied with heavy strings; all as necessary to protect the finishes.
- C. Finish hardware shall be delivered, as directed, to the building site or the factories of the various fabricators of metal work to which such hardware is to be applied. Deliver hardware in the order required and in ample time to permit application at the building, or fabricators' shops, within the time required for the completion of the building.

1.07 JOB CONDITIONS

- A. Field Service: The hardware supplier shall assign a competent representative, acceptable to the Architect, to be at the jobsite each time a major shipment of finish hardware is received. Such representative shall assist in "checking in" these shipments and shall secure a receipt covering the contents of each shipment. In addition, such representative shall be available for immediate call to the jobsite when, in the opinion of the Architect, his presence is necessary.
- B. Templates: Promptly following approval of the Hardware Schedule by the Architect, furnish and deliver template information, to the fabricators, of items to which finish hardware is to be applied.
  - 1. Such deliveries shall be made in ample time to avoid delays in such work of said fabricators. Provide drawings, schedules and detailed information to other trades as necessary for them to accommodate and prepare their work to receive the finish hardware.
- C. Cooperation and Coordination
  - 1. Cooperate and coordinate work with that of other trades supplying materials or performing work in contact with, connecting to, underlying, or overlaying the work of this Section.
  - 2. Provide complete data of requirements for work of this Section to those other trades whose work is affected by or dependent upon the work of this Section.
  - 3. Furnish all items to be built into other work in ample time to avoid delaying the progress of such work.

4. Examine all drawings covering the work of this Section and refer to all other drawings, including mechanical and electrical drawings, which may affect the work of this Section or require coordination by this trade.
- D. Existing Conditions: Hardware Supplier shall verify all existing conditions in the field to ensure compatibility with hardware specified in the Hardware Sets herein. Any discrepancies between the existing field conditions and hardware specified shall be brought to the attention of the Architect immediately. Hardware Supplier shall not order any hardware until all discrepancies are rectified and written approval is granted by the Architect.

## PART 2.00 - PRODUCTS

### 2.01 GENERAL

- A. Requirements for design, grade, function, finish, size and other distinctive qualities of each type of finish hardware are indicated herein. Products are identified by using appropriate hardware designation numbers.
- B. Manufacturers are listed for each hardware type required. Provide either the product designated, or approved equal.
- C. Barrier Free Requirements: Comply with all standards of CABO/ANSI 117.1, latest addition.
- D. Notwithstanding anything to the contrary in this specification or the drawings, the finish hardware shall conform to the requirements of governmental authorities having jurisdiction and such requirements shall be followed as if specifically set forth in this specification.
- E. Finish hardware shall conform to the applicable requirements of the American Insurance Association, and the National Board of Fire Underwriters' Laboratories, Inc., and other local authorities having jurisdiction, and each such item shall bear a label or mark of the Underwriters' Laboratories, Inc., indicating its conformity with such requirements for use in connection with its specified location.
- F. Finish hardware shall be uniform in color and finish and free from imperfections affecting its appearance, function, operation and serviceability. Such hardware shall be suited and adapted to its required use and shall fit its respective location.
- G. Where the finished shape or size of members receiving finish hardware are such as to prevent or render unsuitable the use of the specific types or sizes of such hardware, suitable types or sizes shall be furnished, having as nearly as practicable the same function, operation and quality as the specified hardware.
- H. Bolts, screws and other fastenings required for the application of the finished hardware shall be of size and type to fit requirements and shall be of the same material and finish as the exposed parts of such hardware which they adjoin. Exposed screws and bolts shall have countersunk oval heads and bolts shall be provided with cap nuts. Countersunk part of screw and bolt holes shall be finished smoothly without sharp edges and form a firm seal for such screw and bolt heads. Full threaded wood screws shall be furnished for all wood applications. No thru bolts will be allowed. Sex-nuts and bolts shall be provided on push/pulls, exit devices, closers, etc. when being attached to mineral core or particle core wood fire doors.

### 2.02 PRODUCTS AND MANUFACTURERS

- A. The following are acceptable manufacturers, unless specifically indicated in the Hardware Sets. Underlined manufacturers are those whose products are indicated in the hardware sets.

HINGES & SPRING HINGES: Bommer, McKinney, Stanley.

CONTINUOUS HINGES: Select Products, Markar, Bommer

FLOOR CLOSERS, PIVOT SETS, INTERMEDIATE PIVOTS: Rixson, Dorma

FLUSH BOLTS & DUSTPROOF STRIKES: Burns, BBW, Quality.

PUSH/PULLS: Burns, BBW, Quality.

LOCKSETS, PASSAGE SETS, PRIVACY SETS & DEADLOCKS: PDQ, Kaba (no substitution)

EXIT DEVICES: Detex, Precision, Von Duprin

DOOR CLOSERS: PDQ, LCN, Norton

PROTECTION PLATES: Burns, BBW, Quality.

STOPS: Burns, BBW, Quality.

OVERHEAD STOPS: Rixson, Glynn Johnson, Burns

SILENCERS: Burns, BBW, Quality.

SADDLES & GASKETING: National Guard, Reese, Zero.

ELECTRIC HINGE AND LOCK MODIFICATIONS, POWER SUPPLIES, WIRING  
DIAGRAMS: Archtectural Control Systems, Inc.

ELECTRIC STRIKES: Camden, Folger Adam, HES

## 2.03 SPECIFIC ITEMS

### A. Hinges

1. Minimum of three (3) hinges per door leaf up to 7'-6" high. Provide one additional hinge per 2'-6" or fraction thereof.
2. Hinges shall be of types, sizes and materials as required to suit door weights thickness and fire ratings.
3. Unless otherwise specified hinges shall be standard weight. Doors 3'-4" in width shall receive 5 x 4½ .146 gauge hinges. Doors over 3'-4" in width shall receive 5 x 4½ .190 gauge hinges.
4. Hinge sizes shall be detailed so that the least amount of projection shall be visible from the frame.
5. Unless otherwise specified hinges shall have concealed ball bearings (combination anti-friction or oil impregnated) and five (5) knuckles.

- a. Standard doors shall have non-rising pins.
- b. Doors exposed to the public, and other secure areas, as determined by the Owner, shall have non-removable pins.
6. Electric Hinges: Coordinate voltage and other electrical requirements with applicable portions of Division 16 "Electrical".
7. Continuous Hinges: Unless otherwise specified in the Hardware Sets, continuous hinges shall be of the geared aluminum type using self-lubricating polyester thrust bearings.

B. Pivots

1. Provide quantities and types of pivots (offset, intermediate, or center) as required to suit door sizes and weights.
2. Pivot sets (offset and center) shall consist of top and bottom pivots, unless otherwise indicated.
3. Provide a top pivot for each floor closer unless otherwise indicated.
4. Provide fire rated pivots on all rated doors in a labeled opening.

C. Door Closers

1. Unless otherwise indicated, closers shall not be visible on the public side of doors. Closers opening into public spaces shall be provided with parallel arms and brackets to suit.
2. Closers shall be sized in accordance with the accepted manufacturer's standards to suit height, width, weight of door and draft conditions.
3. Provide a top pivot for each floor closer.
4. Provide weather sealing compound for each exterior floor closer.
5. Unless specified otherwise in the Hardware Sets, all floor closers shall have a built in dead stop.

D. Locking and Latching Devices

1. Mechanical: Provide types, functions, as specified. Coordinate with Owners keying requirements.
  - a. Unless otherwise specified in the Hardware Sets, tubular style locksets or latchsets will not be accepted in lieu of cylindrical style sets specified.
  - b. Unless otherwise specified in the Hardware Sets, ANSI Grade 3 deadlocks will not be accepted.
  - c. Mortise locksets shall conform to ANSI A156.13, Series 1000, Grade 1 – latest edition.
  - d. Heavy Duty Cylindrical Lever Locksets shall conform to ANSI A156.2, Series 4000, Grade 1 – latest edition.

- e. Lock trim shall be throughbolted through the lock case to assure correct alignment and proper operation.
    - f. All locksets with  $\frac{1}{2}$ " throw latchbolt shall be listed by Underwriters Laboratories for "A" label and lesser class single doors, 4' x 10'. All locksets with  $\frac{3}{4}$ " throw latchbolt shall be UL listed for "A" label and lesser class pairs of doors, 8' x 10'.
  - 2. Electric Lock: Electric locks shall be fail safe and shall be deactivated by fire suppression system and devices (local and/or remote) as determined by the Owner.
    - a. Coordinate voltage and other electrical requirements with applicable portions of Division 16 "Electrical".
  - 3. Electric Strike: Electric locks shall be fail safe and shall be deactivated by fire suppression system and devices (local and/or remote) as determined by the Owner, unless otherwise indicated.
    - a. Coordinate voltage and other electrical requirements with applicable portions of Division 16 "Electrical".
- E. Keys and Keying
- 1. During construction, all locksets shall be provided with temporary construction cores. Upon installation of permanent cores, the temporary cores shall be turned over to the Hardware Supplier. The General Contractor shall receive ten (10) construction masterkeys. Under no circumstance shall the General Contractor receive any permanent building masterkeys or change keys unless authorized by the Architect or Owner. All permanent keys shall be sent via Registered Mail to the Architect or Owner, as directed.
  - 2. All permanent cores and keys supplied by College
- F. Stops: Provide stops to limit the degree of opening, helping to prevent damage to adjacent walls, columns, equipment, the door or its hardware.
- 1. Overhead Stops
    - a. Size overhead stops to suit door width, height, weight and draft condition.
    - b. Overhead stops shall have extruded architectural bronze tracks with a built-in shock absorber. The arm shall be hard-drawn brass.
  - 2. Floor Stops: All stops to be fastened to concrete shall use expansion shields and machine screws.
- G. Pushes and Pulls: Provide concealed fasteners where practical. Where exposed fasteners are required provide flush type finished to match push or pull.
- H. Flush Bolts: Provide top and bottom extension type flush bolts, mounted twelve (12) inches and seventy-two (72) inches respectively from the bottom of each door, where scheduled. Provide each bottom flush bolt with a dustproof strike.

- I. Silencers: Provide silencers for all non-gasketed and non-weatherstripped frames. Provide three (3) for each single swing door and two (2) for each pair of doors.
- J. Automatic Door Bottoms: Unless otherwise specified in the Hardware Sets, automatic door bottoms shall be dual actuated with an operating force not to exceed one and one-half (1½) pounds.
- K. Kick and Mop Plates: Provide type and gauge as scheduled. Size shall be as indicated in the hardware schedule.
- L. Remainder of Hardware: Provide type, style and function as indicated in the Hardware Sets, Section 3.02. Should substitutions be acceptable per Section 2.02, acceptable material shall meet or exceed product standards as detailed in the Hardware Sets.

## 2.04 FINISHES

- A. Provide finish hardware with the following finishes unless otherwise shown:

- 1. Hinges:

- a. Interior doors:

- 1. Hollow Metal Doors x Hollow Metal Frames: 652 (Satin Chrome).
    - 2. Wood Doors x Hollow Metal Frames: 652 (Satin Chrome).
    - 3. Wood Doors x Wood Frames: 652 (Satin Chrome).

- b. Exterior doors: 630 (Satin Stainless Steel).

- 2. Pivots: 626 (Satin Chrome).

- 3. Surface Closers: 689

- 4. Floor Closers: 626

- 5. Locksets and Exit Devices: 626/630

- 6. Stops: 630

- 7. Push Plates, Pulls, Kick and Mop Plates: 630

- 8. Flush Bolts, Dust Proof Strikes: 626

- 9. Remainder of Hardware: 626

## PART 3.00 - EXECUTION

### 3.01 GENERAL

- A. Make periodic checks during construction in order to ascertain that the finish hardware furnished has been installed correctly. After completion of all construction work, adjust finish hardware to work properly; test all keys and adjust as required for smooth, free operation.

END OF SECTION

Hardware Sets

Abbreviations

BO	Bommer
BU	Burns
DX	Detex
KA	Kaba Access
NG	National Guard Products
PQ	PDQ Manufacturing
RX	Rixson
SP	Select Products



Hardware Set #1

Single Corridor Doors #104A, 104B, 104C, 104D, 204E, 204F, 204G, 204H  
Doors 3' x 6'8" Flush HMF x WD

3 ea.	Hinges	BB5006-450N	630		BO
1 ea.	Card lock	Kaba Solitaire by school	626	KA	
1 ea.	Permanent Core	Provided by school	626		KA
1 ea.	Closer	7101 BC PA	689		PQ
1 ea.	Door viewer	852	626		BU
1 st	Per WS	107NA	689	NG	
1 ea.	Sweep	C627A	689		NG
1 ea.	Kickplate	.050 x 8" x 2"LDW	630		BU
1 ea.	Signage	Room letter (size TBD)	626	BU	
1 ea.	Wall Stop	565	630		BU
3 ea.	Silencers	500			BU

Hardware Set #2

Single Bedroom Doors #101A, 102A, 101B, 102B, 101C, 102C, 101D, 102D, 201E, 202E, 201F, 202F, 201G, 202G, 201H, 202H  
Doors 30" x 6'8" Flush HMF x WD

3 ea.	Hinges	BB5002-450N	630		BO
1 ea.	Keypad lock	Kaba Oracode 660 by school	626		KA
1 ea.	Permanent Core	Provided by school	626		KA
1 ea.	Overhead Holder	1-336	626		RX
1 ea.	Wall Stop	565	630		BU
3 ea.	Silencers	500			BU

Hardware Set #3

Single Bathroom Doors #105A, 105B, 105C, 105D, 205E, 205F, 205G, 205H  
Doors 30" x 6'8" Flush HMF x WD

3 ea.	Hinges	BB5002-450N	630		BO
1 ea.	Privacy Lock	MR126 PJSJ	630		PQ
1 ea.	Overhead Holder	1-336	626		RX
1 ea.	Wall Stop	565	630		BU
3 ea.	Silencers	500			BU

Hardware Set #4

Single Water Heater Closet Doors #107A, 107B, 107C, 107D  
Doors 30" x 6'8" Flush HMF x WD

3 ea.	Hinges	BB5002-450N	630		BO
1 ea.	Storeroom Lock MR115 PJSJ	IC	630	PQ	
1 ea.	Permanent Core	by college	626		KA
1 ea.	Wall Stop	565	630		BU
3 ea.	Silencers	500			BU

Hardware Set #4A

IT Closet Door #110

Doors 30" x 6'8" Flush HMF x WD

3 ea.	Hinges	BB5002-450N	630		BO
1 ea.	Storeroom Lock MR115 PJSJ	IC	630		PQ
1 ea.	Overhead stop	9-336	626		RX
1 ea.	Permanent Core	by college	626		KA
3 ea.	Silencers	500			BU
2 ea.	Door Louvers	18 1/4" W x 10 1/8" H Clear Anodized Extruded Aluminum Dayton or equal, see 3/A003			

Hardware Set #4B

Janitor Closet Door #111

Door 30" x 6'8" Flush HMF x WD

3 ea.	Hinges	BB5002-450N	630	BO
1 ea.	Storeroom Lock MR115	PJSJ IC	630	PQ
1 ea.	Overhead stop	9-336	626	RX
1 ea.	Permanent Core	by college	626	KA
3 ea.	Silencers	500		BU

Hardware Set #5

Single Quad Entry Doors #108, 109

Doors 3' x 6'8" ALF x FRP Dr

1 ea.	Cont Hinges	SL11HD	689	SP
1 ea.	Passage lock	MR126 PJSJ	630	PQ
1 ea.	Closer	7101 BC PA	689	PQ
1 st	Per WS	107NA	689	NG
1 ea.	Sweep	C627A	689	NG
1 ea.	Wall Stop	565	630	BU
1 ea.	Card lock	Millennium, new, consult School for details		

SECTION 09260 - GYPSUM BOARD ASSEMBLIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following:
  - 1. Interior gypsum wallboard.
  - 2. Tile backing panels.
- B. Related Sections include the following:
  - 1. Division 6 Section "Rough Carpentry" for wood framing and furring, and gypsum sheathing applied over wood framing.
  - 2. Division 7 Section "Building Insulation" for insulation and vapor retarders installed in gypsum board assemblies.
  - 3. Division 9 Section "Ceramic Tile" for cementitious backer units installed as substrates for ceramic tile.

1.3 DEFINITIONS

- A. Gypsum Board Terminology: Refer to ASTM C 11 and GA-505 for definitions of terms for gypsum board assemblies not defined in this Section or in other referenced standards.

1.4 SUBMITTALS

- A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.
- B. Product Data: For each type of product indicated.
- C. Shop Drawings: Show locations, fabrication, and installation of control and expansion joints including plans, elevations, sections, details of components, and attachments to other units of Work.
- D. Product certificates signed by manufacturers of gypsum board assembly components certifying that their products comply with specified requirements.

1.5 QUALITY ASSURANCE

- A. Single-Source Responsibility:
  - 1. Panel Products: Obtain each type of gypsum board and other panel products from a single manufacturer
  - 2. Finishing Materials: Obtain finishing materials from either the same manufacturer that supplies gypsum board and other panel products or from a manufacturer acceptable to gypsum board manufacturer.
- B. Fire-Test-Response Characteristics: For gypsum board assemblies with fire-resistance ratings, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing and inspecting agency acceptable to authorities having jurisdiction.
  - 1. Fire-Resistance-Rated Assemblies: Indicated by design designations from UL's "Fire Resistance Directory."
- C. Sound Transmission Characteristics: For gypsum board assemblies with STC ratings, provide materials and construction identical to those tested in assembly indicated according to ASTM E 90 and classified according to ASTM E 413 by a qualified independent testing agency.

- D. Gypsum Board Finish Mockups: Before finishing gypsum board assemblies, install mockups of at least 100 sq. ft. in surface area to demonstrate aesthetic effects and qualities of materials and execution.
  - 1. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

#### 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in original packages, containers, or bundles bearing brand name and identification of manufacturer or supplier.
- B. Store materials inside under cover and keep them dry and protected against damage from weather, direct sunlight, surface contamination, corrosion, construction traffic, and other causes. Stack gypsum panels flat to prevent sagging.

#### 1.7 PROJECT CONDITIONS

- A. Environmental Limitations: Comply with ASTM C 840 requirements or gypsum board manufacturers written recommendations, whichever are more stringent.

### PART 2 - PRODUCTS

#### 2.1 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. Gypsum Board and Related Products:
    - a. American Gypsum Co.
    - b. G-P Gypsum Corp.
    - c. National Gypsum Company.
    - d. United States Gypsum Co.
    - e. Approved equal

#### 2.2 INTERIOR GYPSUM WALLBOARD

- A. Panel Size: Provide in maximum lengths and widths available that will minimize joints in each area and correspond with support system indicated.
  - 1. Provide gypsum board in widths of 48 inches (1219 mm).
- B. Gypsum Wallboard: ASTM C 36.
  - 1. Regular Type:
    - a. Thickness: 5/8 inch, unless otherwise indicated.
    - b. Long Edges: Tapered.
    - c. Location: As indicated.
    - d.

#### 2.3 TILE BACKING PANELS

- A. Panel Size: Provide in maximum lengths and widths available that will minimize joints in each area and correspond with support system indicated.
  - 1. Widths: Provide gypsum board in widths of 48 inches (1219 mm ).
- B. Cementitious Backer Units: ANSI A118.9.
  - 1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
  - 2. Products: Subject to compliance with requirements, provide **[one of]** the following:
    - a. Custom Building Products; Wonderboard.
    - b. FinPan, Inc.; Util-A-Crete Concrete Backer Board.
    - c. United States Gypsum Co.; DUROCK Cement Board.

- d. Approved Equal.
- 3. Thickness: As indicated.

## 2.4 TRIM ACCESSORIES

- A. Interior Trim: ASTM C 1047.
  - 1. Material: Plastic formed or galvanized or aluminum-coated steel sheet or rolled zinc.
  - 2. Shapes:
    - a. Cornerbead: Use at outside corners, unless otherwise indicated.
    - b. Bullnose Bead: Use where indicated.
    - c. LC-Bead: for edge trim unless otherwise indicated.
    - d. L-Bead: L-shaped; exposed long leg receives joint compound; use where indicated.
    - e. U-Bead: J-shaped; exposed short flange does not receive joint compound; use where indicated.
    - f. Expansion (Control) Joint: Use where indicated.
    - g. Curved-Edge Cornerbead: With notched or flexible flanges; use at curved openings.

## 2.5 JOINT TREATMENT MATERIALS

- A. General: Comply with ASTM C 475.
- B. Joint Tape:
  - 1. Interior Gypsum Wallboard: Paper.
  - 2. Tile Backing Panels: As recommended by panel manufacturer.
- C. Joint Compound for Interior Gypsum Wallboard: 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 setting-type, sandable topping compound.
  - 5. Skim Coat: For final coat of Level 5 finish, use setting-type, sandable topping compound.
- D. Joint Compound for Exterior Applications:
  - 1. Exterior Gypsum Soffit Board: Use setting-type taping and setting-type, sandable topping compounds.
- E. Joint Compound for Tile Backing Panels:
  - 1. Cementitious Backer Units: As recommended by manufacturer.

## 2.6 AUXILIARY MATERIALS

- A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written recommendations.
- B. Laminating Adhesive: Adhesive or joint compound recommended for directly adhering gypsum panels to continuous substrate.
- C. Steel Drill Screws: ASTM C 1002, unless otherwise indicated.
  - 1. Use screws complying with ASTM C 954 for fastening panels to steel members from 0.033 to 0.112 inch thick.
  - 2. For fastening cementitious backer units, use screws of type and size recommended by panel manufacturer.
- D. Sound Attenuation Blankets: ASTM C 665, Type I (blankets without membrane facing) produced by combining thermosetting resins with mineral fibers manufactured from glass, slag wool, or rock wool.
  - 1. Fire-Resistance-Rated Assemblies: Comply with mineral-fiber requirements of assembly.

- E. Thermal Insulation: As specified in Division 7 Section "Building Insulation."

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

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

#### 3.2 APPLYING AND FINISHING PANELS, GENERAL

- A. Gypsum Board Application and Finishing Standards: ASTM C 840 and GA-216.
- B. Install sound attenuation blankets before installing gypsum panels, unless blankets are readily installed after panels have been installed on one side.
- C. Install ceiling board panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in the central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.
- D. Install gypsum panels with face side out. Butt panels together for a light contact at edges and ends with not more than 1/16 inch of open space between panels. Do not force into place.
- E. 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.
- F. Attach gypsum panels to steel studs so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.
- G. Attach gypsum panels to framing provided at openings and cutouts.
- H. Form control and expansion joints with space between edges of adjoining gypsum panels.
- I. Cover both faces of steel stud partition framing with gypsum panels in concealed spaces (above ceilings, etc.), except in chases braced internally.
  1. Unless concealed application is indicated or required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than 8 sq. ft. in area.
  2. Fit gypsum panels around ducts, pipes, and conduits.
  3. Where partitions intersect open concrete coffer, concrete joists, and other structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by coffers, joists, and other structural members; allow 1/4- to 3/8-inch- wide joints to install sealant.
- J. Isolate perimeter of non-load-bearing gypsum board partitions at structural abutments, except floors. Provide 1/4- to 1/2-inch- wide spaces at these locations, and trim edges with U-bead edge trim where edges of gypsum panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.
- K. Floating Construction: Where feasible, including where recommended in writing by manufacturer, install gypsum panels over wood framing, with floating internal corner construction.
- L. STC-Rated Assemblies: Seal construction at perimeters, behind control and expansion 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 C 919 and manufacturer's written recommendations for locating edge trim and closing off sound-flanking paths around or through gypsum board assemblies, including sealing partitions above acoustical ceilings.

- M. Space fasteners in gypsum panels according to referenced gypsum board application and finishing standard and manufacturer's written recommendations.
  - 1. Space screws a maximum of 12 inches o.c. for vertical applications.
- N. Space fasteners in panels that are tile substrates a maximum of 8 inches o.c.

### 3.3 PANEL APPLICATION METHODS

- A. Single-Layer Application:
  - 1. On ceilings, apply gypsum panels before wall/partition board application to the 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 board.
    - b. At stairwells and other high walls, install panels horizontally, unless otherwise indicated or required by fire-resistance-rated assembly.
  - 3. On Z-furring members, apply gypsum panels vertically (parallel to framing) with no end joints. Locate edge joints over furring members.
- B. Multilayer Application on Ceilings: Apply gypsum board indicated for base layers before applying base layers on walls/partitions; apply face layers in same sequence. Apply base layers at right angles to framing members and offset face-layer joints 1 framing member, 16 inches minimum, from parallel base-layer joints, unless otherwise indicated or required by fire-resistance-rated assembly.
- C. Multilayer Application 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.
  - 1. Z-Furring Members: Apply base layer vertically (parallel to framing) and face layer either vertically (parallel to framing) or horizontally (perpendicular to framing) with vertical joints offset at least one furring member. Locate edge joints of base layer over furring members.
- D. Single-Layer Fastening Methods: Apply gypsum panels to supports with steel drill screws.
- E. Multilayer Fastening Methods: [Fasten base layers and face layers separately to supports with screws] [Fasten base layers with screws; fasten face layers with adhesive and supplementary fasteners].
- F. 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.
- G. Curved Partitions:
  - 1. Install panels horizontally and unbroken, to the extent possible, across curved surface plus 12-inch- long straight sections at ends of curves and tangent to them.
  - 2. Wet gypsum panels on surfaces that will become compressed where curve radius prevents using dry panels. Comply with gypsum board manufacturers written recommendations for curve radii, wetting methods, stacking panels after wetting, and other preparations that precede installing wetted gypsum panels.
  - 3. On convex sides of partitions, begin installation at one end of curved surface and fasten gypsum panels to studs as they are wrapped around curve. On concave side, start fastening panels to stud at center of curve and work outward to panel ends. Fasten panels to framing with screws spaced 12 inches o.c.
  - 4. For double-layer construction, fasten base layer to studs with screws 16 inches o.c. Center gypsum board face layer over joints in base layer, and fasten to studs with screws spaced 12 inches o.c.

5. Allow wetted gypsum panels to dry before applying joint treatment.

H. Exterior Soffits and Ceilings: Apply exterior gypsum soffit board panels perpendicular to supports, with end joints staggered and located over supports.

1. Install with 1/4-inch open space where panels abut other construction or structural penetrations.
2. Fasten with corrosion-resistant screws.

I. Tile Backing Panels:

1. Cementitious Backer Units: ANSI A108.11, at locations indicated to receive tile.
2. Areas Not Subject to Wetting: Install standard gypsum wallboard panels to produce a flat surface except at showers, tubs, and other locations indicated to receive water-resistant panels.
3. Where tile backing panels abut other types of panels in the same plane, shim surfaces to produce a uniform plane across panel surfaces.

### 3.4 INSTALLING TRIM ACCESSORIES

A. General: For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturers written instructions.

B. Control Joints: Install control joints at locations indicated on Drawings.

### 3.5 FINISHING GYPSUM BOARD ASSEMBLIES

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 those with trim having flanges not intended for tape.

D. Gypsum Board Finish Levels: Finish panels to levels indicated below, according to ASTM C 840, for locations indicated:

1. Level 1: Embed tape at joints in ceiling plenum areas, concealed areas, and where indicated, unless a higher level of finish is required for fire-resistance-rated assemblies and sound-rated assemblies.
2. Level 4: Embed tape and apply separate first, fill, and finish coats of joint compound to tape, fasteners, and trim flanges at panel surfaces that will be exposed to view, unless otherwise indicated.

E. Cementitious Backer Units: Finish according to manufacturer's written instructions.

### 3.6 CLEANING AND PROTECTION

A. Promptly remove any residual joint compound from adjacent surfaces.

B. Provide final protection and maintain conditions, in a manner acceptable to installer, that ensure gypsum board assemblies are without damage or deterioration at the time of substantial completion.

END OF SECTION 09260



## SECTION 09310 - CERAMIC TILE

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. This Section includes the following:
  - 1. Ceramic mosaic tile.
  - 2. Glazed wall tile.
  - 3. Waterproof membrane for thin-set and thick-set tile installations.
  - 4. Stone thresholds installed as part of tile installations.
- B. Related Sections include the following:
  - 1. Division 3 Section "Cast-in-Place Concrete" for monolithic slab finishes specified for tile substrates.

#### 1.3 DEFINITIONS

- A. Module Size: Actual tile size (minor facial dimension as measured per ASTM C 499) plus joint width indicated.
- B. Facial Dimension: Nominal tile size as defined in ANSI A137.1.

#### 1.4 PERFORMANCE REQUIREMENTS

- A. Static Coefficient of Friction: For tile installed on walkway surfaces, provide products with the following values as determined by testing identical products per ASTM C 1028:
  - 1. Level Surfaces: Minimum 0.6.
- B. Load-Bearing Performance: For ceramic tile installed on walkway surfaces, provide installations rated for the following load-bearing performance level based on testing assemblies according to ASTM C 627 that are representative of those indicated for this Project:
  - 1. Heavy: Passes cycles 1 through 12.
  - 2. Moderate: Passes cycles 1 through 10.

#### 1.5 SUBMITTALS

- A. Product Data: For each type of tile, mortar, grout, and other products specified.
- B. Shop Drawings: For the following:
  - 1. Tile patterns and locations.
  - 2. Widths, details, and locations of expansion, contraction, control, and isolation joints in tile substrates and finished tile surfaces.
- C. Tile Samples for Initial Selection: Manufacturer's color charts consisting of actual tiles or sections of tiles showing the full range of colors, textures, and patterns available for each type and composition of tile indicated. Include Samples of accessories involving color selection.
- D. Grout Samples for Initial Selection: Manufacturer's color charts consisting of actual sections of grout showing the full range of colors available for each type of grout indicated.
- E. Samples for Verification: Of each item listed below, prepared on Samples of size and construction indicated. Where products involve normal color and texture variations, include Sample sets showing the full range of variations expected.

1. Each type and composition of tile and for each color and texture required, at least 12 inches (300 mm) square, mounted on braced cementitious backer units, and with grouted joints using product complying with specified requirements and approved for completed work in color or colors selected by Architect.
2. Full-size units of each type of trim and accessory for each color required.
3. Stone thresholds in 6-inch (150-mm) lengths.

- F. Master Grade Certificates: For each shipment, type, and composition of tile, signed by tile manufacturer and Installer.
- G. Product Certificates: Signed by manufacturers certifying that the products furnished comply with requirements.
- H. Qualification Data: For firms and persons specified in the "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names of architects and owners, and other information specified.
- I. Setting Material Test Reports: Indicate and interpret test results for compliance of tile-setting and -grouting products with specified requirements.

#### 1.6 QUALITY ASSURANCE

- A. Installer Qualifications: Engage an experienced installer who has completed tile installations similar in material, design, and extent to that indicated for this Project and with a record of successful in-service performance.
- B. Source Limitations for Tile: Obtain each color, grade, finish, type, composition, and variety of tile from one source with resources to provide products from the same production run for each contiguous area of consistent quality in appearance and physical properties without delaying the Work.
- C. Source Limitations for Setting and Grouting Materials: Obtain ingredients of a uniform quality for each mortar, adhesive, and grout component from a single manufacturer and each aggregate from one source or producer.
- D. Source Limitations for Other Products: Obtain each of the following products specified in this Section from one source and by a single manufacturer for each product:
1. Stone thresholds.
  2. Joint sealants.
  3. Waterproofing.
- E. Mockups: Before installing tile, construct mockups for each form of construction and finish required to verify selections made under Sample submittals and to demonstrate aesthetic effects and qualities of materials and execution. Build mockups to comply with the following requirements, using materials indicated for completed Work.
1. Locate mockups in the location and of the size indicated or, if not indicated, as directed by Architect.
  2. Notify Architect 7 days in advance of the dates and times when mockups will be constructed.
  3. Demonstrate the proposed range of aesthetic effects and workmanship.
  4. Obtain Architect's approval of mockups before proceeding with final unit of Work.
  5. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
    - a. Approved mockups in an undisturbed condition at the time of Substantial Completion may become part of the completed Work.
- F. Preinstallation Conference: Conduct conference at Project site to comply with requirements of Division 1 Section "Project Meetings."

1.7 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 requirement of ANSI A137.1 for labeling sealed tile packages.
- B. Prevent damage or contamination to materials by water, freezing, foreign matter, and other causes.

1.8 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install tile until construction in spaces is completed and ambient temperature and humidity conditions are being maintained to comply with referenced standards and manufacturer's written instructions.

1.9 EXTRA MATERIALS

- A. Deliver extra materials to Owner. Furnish extra materials described below that match products installed, are packaged with protective covering for storage, and are identified with labels describing contents.
  - 1. Tile and Trim Units: Furnish quantity of full-size units equal to 3 percent of amount installed, for each type, composition, color, pattern, and size indicated.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, those indicated in the ceramic tile installation schedules at the end of this Section.
  - 1. Tile Products:
    - a. Dal-Tile Corporation.
    - b. GranitiFiandre.
    - c. United States Ceramic Tile Company.
    - d. Or approved equal.
  - 2. Tile-Setting and -Grouting Materials:
    - a. Dal-Tile Corporation.
    - b. Laticrete International, Inc.
    - c. Mapei Corporation.
    - d. Or approved equal.

2.2 PRODUCTS, GENERAL

- A. ANSI Ceramic Tile Standard: Provide tile that complies with ANSI A137.1, "Specifications for Ceramic Tile," for types, compositions, and other characteristics indicated.
  - 1. Provide tile complying with Standard Grade requirements, unless otherwise indicated.
  - 2. For facial dimensions of tile, comply with requirements relating to tile sizes specified in Part 1 "Definitions" Article.
- B. ANSI Standards for Tile Installation Materials: Provide materials complying with ANSI standards referenced in "Setting Materials" and "Grouting Materials" articles.
- C. Colors, Textures, and Patterns: Where manufacturer's standard and custom products are indicated for tile, grout, and other products requiring selection of colors, surface textures, patterns, and other appearance characteristics, provide specific products or materials complying with the following requirements:
  - 1. Match Architect's samples, to be selected from manufacturer's standard and premium colors and textures.
  - 2. Provide tile trim and accessories that match color and finish of adjoining flat tile.
  - 3. Allow for up to 20% of tile to be accent colors.

- D. Factory Blending: For tile exhibiting color variations within the ranges selected during Sample submittals, blend tile in the factory and package so tile units taken from one package show the same range in colors as those taken from other packages and match approved Samples.
- E. Mounting: Where factory-mounted tile is required, provide back- or edge-mounted tile assemblies as standard with manufacturer, unless another mounting method is indicated.

## 2.3 TILE PRODUCTS

- A. Unglazed Ceramic Mosaic Floor Tile: Provide factory-mounted flat tile complying with the following requirements:
  - 1. Composition: Porcelain with abrasive admixture.
  - 2. Module Size: 12 by 12 inches (50.8 by 50.8 mm).
  - 3. Nominal Thickness: 1/4 inch (6.35 mm).
  - 4. Face: Pattern of design indicated, with eased edges.
- B. Glazed Wall Tile: Provide flat tile complying with the following requirements:
  - 1. Module Size: 6 by 6 inches (152 by 152 mm).
  - 2. Thickness: 5/16 inch (8 mm).
  - 3. Face: Pattern of design indicated, with manufacturer's standard edges.
  - 4. Mounting: Factory back-mounted.
- C. Trim Units: Provide tile trim units to match characteristics of adjoining flat tile and to comply with the following requirements:
  - 1. Size: As indicated, coordinated with sizes and coursing of adjoining flat tile where applicable.
  - 2. Shapes: As follows, selected from manufacturer's standard shapes:
    - a. Base for Portland Cement Mortar Installations: Coved.
    - b. Base for Thin-Set Mortar Installations: Straight.
    - c. Wainscot Cap for Portland Cement Mortar Installations: Bullnose cap.
    - d. Wainscot Cap for Thin-Set Mortar Installations: Surface bullnose.
    - e. Wainscot Cap for Flush Conditions: Regular flat tile for conditions where tile wainscot is shown flush with wall surface above.
    - f. External Corners for Portland Cement Mortar Installations: Bullnose shape with a radius of at least 3/4 inch (19 mm), unless otherwise indicated.
    - g. External Corners for Thin-Set Mortar Installations: Surface bullnose.
    - h. Internal Corners: Field-buttet square corners, except with coved base and cap angle pieces designed to member with stretcher shapes.

## 2.4 STONE THRESHOLDS

- A. General: Provide stone thresholds that are uniform in color and finish, fabricated to sizes and profiles indicated to provide transition between tile surfaces and adjoining finished floor surfaces.
  - 1. Fabricate thresholds to heights indicated, but not more than 1/2 inch (12.7 mm) above adjoining finished floor surfaces, with transition edges beveled on a slope of no greater than 1:2.
- B. Marble Thresholds: Provide marble thresholds complying with ASTM C 503 requirements for exterior use and with a minimum abrasive-hardness value of 10 per ASTM C 241.
  - 1. Provide white, honed marble complying with the Marble Institute of America's Group A requirements for soundness.

## 2.5 WATERPROOFING FOR THIN-SET TILE INSTALLATIONS

- A. General: Provide products that comply with ANSI A118.10 and the descriptions in this Article.

NOTE: Water proofing required for all ceramic tile floor conditions.

- B. Sheet Membrane Waterproofing: Manufacturer's standard factory-packaged, 3-layer composite sheet membrane waterproofing and crack isolation. Comprised of Chlorinated Polyethylene with a

high-strength, non-woven fabric laminated to both sides. Designed to provide waterproofing and crack isolation in tile installations. Also allows tile to bridge control joints. Nominal thickness: 0.8 mm.

- C. Available Products: Subject to compliance with requirements, products which may be incorporated into the Work include, but are not limited to, the following:
  - 1. Sheet Membrane Waterproofing:
    - a. Dal-Seal TS; DalTile, Inc.
    - b. Or approved equal.

## 2.6 GROUTING MATERIALS

- A. Sanded Grout and joint filler, Laticrete Floor Grout & Joint Filler, 500 Series for joints greater than 1/8" thickness. Color to be selected by Architect from manufacturer's standard range of colors.

## 2.7 MIXING MORTARS AND GROUT

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

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions where tile will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of installed tile.
  - 1. Verify that substrates for setting tile are firm; dry; clean; free from oil, waxy films, and curing compounds; and within flatness tolerances required by referenced ANSI A108 series of tile installation standards 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 before installing tile.
  - 3. Verify that joints and cracks in tile substrates are coordinated with tile joint locations; if not coordinated, adjust latter in consultation with Architect.
- B. Do not proceed with installation until unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Remove coatings, including curing compounds, and other substances that contain soap, wax, oil, or silicone and are incompatible with tile-setting materials by using a terrazzo or concrete grinder, a drum sander, or a polishing machine equipped with a heavy-duty wire brush.
- B. Provide concrete substrates for tile floors installed with dry-set or latex-portland cement mortars that comply with flatness tolerances specified in referenced ANSI A108 series of tile installation standards for installations indicated.
  - 1. Use trowelable leveling and patching compounds per tile-setting material manufacturer's written instructions to fill cracks, holes, and depressions.
  - 2. Remove protrusions, bumps, and ridges by sanding or grinding.
- C. Blending: For tile exhibiting color variations within the ranges selected during Sample submittals, verify that tile has been blended in the factory and packaged so tile units taken from one package show the same range in 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.

### 3.3 INSTALLATION, GENERAL

- A. ANSI Tile Installation Standards: Comply with parts of ANSI A108 series of tile installation standards in "Specifications for Installation of Ceramic Tile" that apply to types of setting and grouting materials and to methods indicated in ceramic tile installation schedules.
- B. TCA Installation Guidelines: TCA's "Handbook for Ceramic Tile Installation." Comply with TCA installation methods indicated in ceramic tile installation schedules.
- C. Extend tile work into recesses and under or behind equipment and fixtures to form a complete covering without interruptions, unless otherwise indicated. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.
- D. 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.
- E. Jointing Pattern: Lay tile in grid pattern, unless otherwise indicated. Align joints when adjoining tiles on floor, base, walls, and trim are the same size. Lay out tile work and center tile fields in both directions in each space or on each wall area. Adjust to minimize tile cutting. Provide uniform joint widths, unless otherwise indicated.
  - 1. For tile mounted in sheets, make joints between tile sheets the same width as joints within tile sheets so joints between sheets are not apparent in finished work.
- F. Lay out tile wainscots to next full tile beyond dimensions indicated.
- G. Expansion Joints: Locate expansion joints and other sealant-filled joints, including control, contraction, and isolation joints, where indicated during installation of setting materials, mortar beds, and tile. Do not saw-cut joints after installing tiles.
  - 1. Locate joints in tile surfaces directly above joints in concrete substrates.
  - 2. Prepare joints and apply sealants to comply with requirements of Division 7 Section "Joint Sealants."
- H. Grout tile to comply with the requirements of the following tile installation standards:
  - 1. For ceramic tile grouts (sand-portland cement, dry-set, commercial portland cement, and latex-portland cement grouts), comply with ANSI A108.10.

### 3.4 WATERPROOFING INSTALLATION

- A. Install waterproofing membrane to comply with waterproofing manufacturer's written instructions. Membrane to be installed at all ceramic tile floors with floor drains in wet areas, including all toilet rooms, showers and all other tiled areas as required.
- B. Do not install tile over waterproofing until waterproofing has cured and been tested to determine that it is watertight.

### 3.5 FLOOR TILE INSTALLATION

- A. General: Install tile to comply with requirements in the Ceramic Tile Floor Installation Schedule, including those referencing TCA installation methods and ANSI A108 series of tile installation standards.
- B. Joint Widths: Install tile on floors with the following joint widths:
  - 1. Ceramic Mosaic Tile: 1/16 inch (1.6 mm).
- C. Back Buttering: For installations indicated, obtain 100 percent mortar coverage by complying with applicable special requirements for back buttering of tile in referenced ANSI A108 series of tile installation standards:
  - 1. Tile floors in wet areas, including showers, tub enclosures, laundries.
  - 2. Tile floors composed of tiles 8 by 8 inches (203 by 203 mm) or larger.
  - 3. Tile floors composed of rib-backed tiles.

- D. Stone Thresholds: Install stone thresholds at locations indicated; set in same type of setting bed as abutting field tile, unless otherwise indicated.
  - 1. Set thresholds in latex-portland cement mortar for locations where mortar bed would otherwise be exposed above adjacent nontile floor finish.

### 3.6 WALL TILE INSTALLATION

- A. Install types of tile designated for wall installations to comply with requirements in the Ceramic Tile Wall Installation Schedule, including those referencing TCA installation methods and ANSI setting-bed standards.
- B. Joint Widths: Install tile on walls with the following joint widths:
  - 1. Wall Tile: 1/16 inch (1.6 mm).
- C. Back Buttering: For installations indicated, obtain 100 percent mortar coverage by complying with applicable special requirements for back buttering of tile in referenced ANSI A108 series of tile installation standards:
  - 1. Tile wall installations in wet areas, including showers, tub enclosures, laundries.

### 3.7 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 latex-portland cement grout residue from tile as soon as possible.
  - 2. Unglazed tile may be cleaned with acid solutions only when permitted by tile and grout manufacturer's written instructions, but no sooner than 10 days after installation. Protect metal surfaces, cast iron, and vitreous plumbing fixtures from effects of acid cleaning. Flush surface with clean water before and after cleaning.
- B. Finished Tile Work: Leave finished installation clean and free of cracked, chipped, broken, unbonded, and otherwise defective tile work.
- C. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure tile is without damage or deterioration at the time of Substantial Completion.
  - 1. When recommended by tile manufacturer, apply a protective coat of neutral protective cleaner to completed tile walls and floors. Protect installed tile work with kraft paper or other heavy covering during construction period to prevent staining, damage, and wear.
  - 2. Prohibit foot and wheel traffic from tiled floors for at least 7 days after grouting is completed.
- D. Before final inspection, remove protective coverings and rinse neutral cleaner from tile surfaces.
- E. Provide grout sealer, per grout manufacturer's recommendations, at all tile and grout surfaces.

### 3.8 TILE INSTALLATION SCHEDULE

NOTE: All the tiles and types are manufactured or supplied by Dal-Tile or Architect approved equal. All CMU walls scheduled for the tile must receive a mortar scratch coat prior to the tile installation.

END OF SECTION 09310

## SECTION 09650 - RUBBER STAIR TREADS AND NOSINGS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. This Section includes the following: Raised Design stair treads and nosings for use on interior stairs, including pan-filled concrete steps. Rubber treads and nosings are made from specially formed compression-molded high-grade synthetic rubber compound.
- B. Related Sections include the following:
  - 1. Division 5 – Section 05510 “Metal Stairs”.

#### 1.3 SCOPE OF WORK

- A. Consists of furnishing all labor, materials, tools, equipment and service necessary to satisfactorily install the rubber stair treads and nosings as shown on drawings.

#### 1.3 SUBMITTALS

- A. Product Data: For each type of product specified.
- B. Samples for Initial Selection: Manufacturer's color charts consisting of units or sections of units showing the full range of colors and patterns available for each type of product indicated.
- C. Samples for Verification: Full-size tiles of each different color and pattern of resilient floor tile specified, showing the full range of variations expected in these characteristics.
  - 1. Manufacturer's standard-size samples, but not less than 12 inches (300 mm) long, of each color and pattern specified.
- D. Product Certificates: Signed by manufacturers certifying that each product furnished complies with requirements.
- E. Maintenance Data: To include in maintenance manuals as specified in Division 1.

#### 1.4 QUALITY ASSURANCE

- A. Raised Design rubber stair treads conform fully with Federal Specification No. RR-T-650C, Composition A, Types 1, 2 and 4.

#### 1.5 WARRANTY

- A. Provide One Year warranty including labor and materials.

#### 1.6 DELIVERY AND STORAGE

#### 1.7 PROJECT CONDITIONS

- A. Maintain a temperature of not less than 60 deg F (16 deg C) or more than 95 deg F (35 deg C) in spaces to receive treads, nosings, and/or adhesives for at least 48 hours before, during and after installation. In winter, materials should be brought to room temperature - no less than 60 deg F (16 deg C) for 72 hours prior to installation.
- B. Do not install products until they are at the same temperature as the space where they are to be installed.



- C. Close spaces to traffic during construction and for time period after installation recommended in writing by manufacturer.
- D. Installation to occur after other finishing operations, including painting, have been completed.

## PART 2 - PRODUCTS

### 2.1 PRODUCT DESCRIPTION

- A. **COMPOSITION & MATERIALS:** Rubber stair treads are molded of 100% synthetic rubber blended with stabilizing fillers, color pigments, extenders, and processing oils rubber treads are made from a specially formed, compression-molded, high-grade synthetic rubber compound

### 2.2 MANUFACTURERS

- A. All stair treads shall be homogeneously constructed of first-quality resilient rubber compound. All treads shall be free from objectionable odors, blisters, cracks, and other imperfections which will detract from the serviceability and appearance of the treads. Stair treads shall conform to U.S. Federal Specification RR-T-650C, Composition A, Types 1, 2 and 4.
- B. Available Products: Subject to compliance with requirements, products that may be incorporated into the work include, but are not limited to the following:
  - 1. Treads and Risers
    - a. Roppe
    - b. Flexco
    - c. Johnsonite
    - d. Approved equal
  - 2. Nosings
    - a. Roppe
    - b. Flexco
    - c. Johnsonite
    - d. Approved equal

## PART 3 - EXECUTION

### 3.1 STAIR TREAD INSTALLATION

#### A. SURFACE PREPARATION

- 1. Use only on structurally sound surfaces.
- 2. Surfaces must be clean, dry, and free of dust, dirt, wax, grease, loose paint or particles, old adhesive, etc.
- 3. Any cracks, chips, or holes need to be filled with a Portland-based filler.
- 4. Stair treads should be cut and fitted prior to application of adhesive.
- 5. Stair treads must not be bent or folded during fitting. This is so the vertical nosing will not be over-stretched and become wavy.
- 6. Do not store on end. Do not bend carton or material.
- 7. Do not install an obviously defective product. Contact your supplier immediately.

#### B. APPLICATION

- 1. For interior use only.
- 2. The nose of the tread must fit tightly against the face of the stair riser or nosing. There will always be gaps of various sizes. Fill gaps as required with manufacturer's recommended product to prevent cracking.
- 3. Installation of stair treads should begin with the bottom step. The riser part of the stair tread is cut off to fix to the riser of the bottom step, trimmed even with the edge of the step and installed. The remaining part (stair nosing with tread) is used for the top step of the stairway.
- 4. The remaining smooth part of the stair tread should be left on the tread for the top stair. The thickness varies so it can be trimmed to butt up against flooring used on the landing.

5. Stir the adhesive thoroughly, as some settling may have occurred during shipment and storage.
6. Apply the nose filler, after preparation as instructed on the label, filling the nose completely and allowing the filler to cover 1/2" portion of the tread. Be sure to allow nose filler to gel and thicken before the tread is installed. The nose filler should be the consistency of peanut butter when the treads are installed.
7. Apply adhesive using a 3/8" notched trowel. Cover tread completely so there are no gaps or open spaces where the adhesive meets the nose filler. Allow 10-15 minutes for adhesive to become dry to the touch (higher humidity may take longer). Drying time is to allow water to evaporate. If the tread is installed too soon, adhesive will not cure as designed and bubbles could appear in the material. For two-surface application, allow the adhesive to dry to the touch for about 30 minutes.
8. REMEMBER: DO NOT apply adhesive to more than five treads at a time (or the amount that can be installed within 15 minutes after the adhesive is ready). If the adhesive "flashes off" and dries, it will not adhere to the substrate.
9. IF BUTTING TREADS TOGETHER ON ONE STAIR, (tread must be ordered for a butting installation) make sure the order is placed with this stipulation, and epoxy adhesive must be used. Make sure edges butting together are square, and roll each tread towards the seam.
10. Beginning with the nosing, the stair tread is accurately positioned and pressed down. CAUTION: The stair treads must not be bent or folded during fitting so the vertical stair nosing will not be stretched and become wavy. Press the nose into the step so that the nose filler conforms to the shape of the nosing and the step. Be careful not to bend or stretch the tread. After tread is in place, roll the tread from side to side to remove air bubbles and to get a good bond. To make sure the nose stays in the correct position, tape the nosing until the nose caulking is firmly sealed in place (about 24 hours).
11. The transition part on the back (tread riser) is evenly rolled and pressed down with a hand roller. The extending part of the riser is cut off even with the step.
12. After treads are installed, wipe off any excess adhesive with a soft cloth dampened with soapy water.
13. Traffic should not be permitted for at least 24 hours, especially when butting treads together, as movement can occur and gaps may appear.
14. ACCESSIBLE STAIR TREADS: Follow Surface Preparation, Cautions, and Applications as directed above with these exceptions: With severe angles, it may be necessary to scribe out the inside angle at the nose using a top-set gouge tool to relieve the pressure.

NOTE: Some treads have been redesigned with the inside angle already relieved.

### 3.2 RISER & STRINGER INSTALLATION

#### A. SURFACE PREPARATION

1. Use only structurally sound surfaces.
2. Surfaces must be clean, dry, and free of dust, dirt, wax, grease, loose paint or particles, old adhesive, etc.
3. Stair treads should be cut and fitted prior to application of adhesive.

#### B. APPLICATION

1. For interior use only.
2. Use Stair Tread Adhesive as required.

#### C. INSTALLATION

1. Brush or trowel a continuous coat of adhesive on each surface to be bonded. Keep the adhesive film back approximately 1/2" from the edge of the material.
2. Allow the adhesive to air dry 10-15 minutes.
3. Roll all treads, risers, and stringers until a firm bond has been obtained.
4. Remove excess adhesive with soft cloth dampened with soapy water.
5. Do not install an obviously defective product. Contact your supplier immediately
6. Do not store on end. Do not bend carton or material.
7. Back of material must be cleaned with alcohol and/or lightly sanded prior to installation.

### 3.3 MAINTENANCE

- A. Proper maintenance on a regular basis is essential to the appearance and wear-life of the risers and stringers.
- B. Wipe with a damp sponge as needed.
- C. Use a non-skid wax to maintain attractive appearance.
- D. CARE OF RUBBER STAIR TREADS. (Read manufacturer's recommendations before proceeding.)

#### NEW STAIR TREAD

- 1. If the tread is brand new, there is a silicone mold release on it from the manufacturing process. Therefore the floor should be scrubbed with an appropriate cleaner using a 175-rpm single disk machine equipped with a brush.
- 2. Pick up the solution with a wet/dry vacuum.
- 3. Rinse with clear water and pick up rinse water with a wet/dry vacuum and allow the floor to dry.
- 4. Apply a coat of sealer with a mop. If desired, top coat the Shinline Seal with Sheen 17.
  - a. Apply in very thin coats to avoid puddling.

#### CLEANING THE STAIR TREAD

- 1. Vacuum to remove sand and grit. (Dust mopping is not beneficial to this type of floor.)
- 2. Damp mop the floor with Damp Mop Detergent Concentrate or a disinfectant cleaner if desired.

### 3.4 STAIR TREAD AND NOSING SCHEDULE

Provide rubber tread and riser equal to Roppe #96 at all steel pan concrete-filled stairs. Color to be selected from manufacturer's full range.

END OF SECTION 09650

## SECTION 09651 - RESILIENT TILE FLOORING

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. This Section includes the following:
  - 1. Vinyl composition floor tile.
  - 2. Resilient wall base and accessories.
- B. Related Sections include the following:
  - 1. Division 3 Section "Poured-in-Place Concrete" for concrete substrate.
  - 2. Division 9 Section "Self-Leveling Cementitious Underlayment" for concrete underlayment.

#### 1.3 SUBMITTALS

- A. Product Data: For each type of product specified.
- B. Samples for Initial Selection: Manufacturer's color charts consisting of units or sections of units showing the full range of colors and patterns available for each type of product indicated.
- C. Samples for Verification: Full-size tiles of each different color and pattern of resilient floor tile specified, showing the full range of variations expected in these characteristics.
  - 1. For resilient accessories, manufacturer's standard-size samples, but not less than 12 inches (300 mm) long, of each resilient accessory color and pattern specified.
- D. Product Certificates: Signed by manufacturers of resilient products certifying that each product furnished complies with requirements.
- E. Maintenance Data: For resilient floor tile to include in the maintenance manuals specified in Division 1.

#### 1.4 QUALITY ASSURANCE

- A. Installer Qualifications: Engage an experienced installer to perform work of this Section who has specialized in installing resilient products similar to those required for this Project and with a record of successful in-service performance.
- B. Source Limitations: Obtain each type, color, and pattern of product specified from one source with resources to provide products of consistent quality in appearance and physical properties without delaying the Work.
- C. Fire-Test-Response Characteristics: Provide products with the following fire-test-response characteristics as determined by testing identical products per test method indicated below by a testing and inspecting agency acceptable to authorities having jurisdiction.
  - 1. Critical Radiant Flux: 0.45 W/sq. cm or greater when tested per ASTM E 648, Class I.
  - 2. Smoke Density: Maximum specific optical density of 450 or less when tested per ASTM E 662.

#### 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to Project site in manufacturer's original, unopened cartons and containers, each bearing names of product and manufacturer, Project identification, and shipping and handling instructions.

- B. Store products in dry spaces protected from the weather, with ambient temperatures maintained between 50 and 90 deg F (10 and 32 deg C).
- C. Store tiles on flat surfaces.
- D. Move products into spaces where they will be installed at least 48 hours before installation, unless longer conditioning period is recommended in writing by manufacturer.

#### 1.6 PROJECT CONDITIONS

- A. Maintain a temperature of not less than 70 deg F (21 deg C) or more than 95 deg F (35 deg C) in spaces to receive products for at least 48 hours before installation, during installation, and for at least 48 hours after installation, unless manufacturer's written recommendations specify longer time periods. After postinstallation period, maintain a temperature of not less than 55 deg F (13 deg C) or more than 95 deg F (35 deg C).
- B. Do not install products until they are at the same temperature as the space where they are to be installed.
- C. Close spaces to traffic during flooring installation and for time period after installation recommended in writing by manufacturer.
- D. Install tiles and accessories after other finishing operations, including painting, have been completed.
- E. Do not install flooring over concrete slabs until slabs have cured and are sufficiently dry to bond with adhesive, as determined by flooring manufacturer's recommended bond and moisture test.

#### 1.7 EXTRA MATERIALS

- A. Furnish extra materials described below that match products installed, are packaged with protective covering for storage, and are identified with labels describing contents.
  - 1. Furnish not less than one box for each 50 boxes or fraction thereof, of each type, color, pattern, class, wearing surface, and size of resilient tile flooring installed.
  - 2. Furnish not less than 10 linear feet (3 linear m) for each 500 linear feet (150 linear m) or fraction thereof, of each type, color, pattern, and size of resilient accessory installed.
  - 3. Deliver extra materials to Owner.

### PART 2 - PRODUCTS

#### 2.1 MANUFACTURERS

- A. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, those indicated in the Resilient Tile Flooring Schedule at the end of Part 3.

#### 2.2 RESILIENT TILE

- A. Vinyl Composition Floor Tile: Products complying with ASTM F 1066 and with requirements specified in the Resilient Tile Flooring Schedule.

#### 2.3 RESILIENT ACCESSORIES

- A. Vinyl Wall Base: Products complying with FS SS-W-40, Type II and with requirements specified in the Resilient Tile Flooring Schedule.
- B. Vinyl Accessory Moldings: Products complying with requirements specified in the Resilient Tile Flooring Schedule.

## 2.4 INSTALLATION ACCESSORIES

- A. Trowelable Leveling and Patching Compounds: Latex-modified, portland-cement-based formulation provided or approved by flooring manufacturer for applications indicated.
- B. Adhesives: Water-resistant type recommended by manufacturer to suit resilient products and substrate conditions indicated.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions where installation of resilient products will occur, with Installer present, for compliance with manufacturer's requirements. Verify that substrates and conditions are satisfactory for resilient product installation and comply with requirements specified.
- B. Concrete Subfloors: Verify that concrete slabs comply with ASTM F 710 and the following:
  - 1. Slab substrates are dry and free of curing compounds, sealers, hardeners, and other materials that may interfere with adhesive bond. Determine adhesion and dryness characteristics by performing bond and moisture tests recommended by flooring manufacturer.
  - 2. Subfloor finishes comply with requirements specified in Division 3 Section "Cast-in-Place Concrete" and Division 9 Section "Self-Leveling Cementitious Underlayment" for slabs receiving resilient flooring.
  - 3. Subfloors are free of cracks, ridges, depressions, scale, and foreign deposits.

### 3.2 PREPARATION

- A. General: Comply with resilient product manufacturer's written installation instructions for preparing substrates indicated to receive resilient products.
- B. Use trowelable leveling and patching compounds, according to manufacturer's written instructions, to fill cracks, holes, and depressions in substrates.
- C. Broom and vacuum clean substrates to be covered immediately before product installation. After cleaning, examine substrates for moisture, alkaline salts, carbonation, or dust. Do not proceed with installation until unsatisfactory conditions have been corrected.

### 3.3 TILE INSTALLATION

- A. General: Comply with tile manufacturer's written installation instructions.
- B. Lay out tiles from center marks established with principal walls, discounting minor offsets, so tiles at opposite edges of room are of equal width. Adjust as necessary to avoid using cut widths that equal less than one-half of a tile at perimeter.
  - 1. Lay tiles square with room axis, unless otherwise indicated.
- C. Match tiles for color and pattern by selecting tiles from cartons in the same sequence as manufactured and packaged, if so numbered. Cut tiles neatly around all fixtures. Discard broken, cracked, chipped, or deformed tiles.
  - 1. Lay tiles in basket-weave pattern with grain direction alternating in adjacent tiles.
- D. Scribe, cut, and fit tiles to butt neatly and tightly to vertical surfaces and permanent fixtures, including built-in furniture, cabinets, pipes, outlets, edgings, door frames, thresholds, and nosings, unless otherwise indicated..
- E. Extend tiles into toe spaces, door reveals, closets, and similar openings.
- F. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on finish flooring as marked on subfloor. Use chalk or other nonpermanent, nonstaining marking device.

- G. Install tiles on covers for telephone and electrical ducts, and similar items in finished floor areas. Maintain overall continuity of color and pattern with pieces of flooring installed on covers. Tightly adhere edges to perimeter of floor around covers and to covers.
- H. Adhere tiles to flooring substrates using a full spread of adhesive applied to substrate to comply with tile manufacturer's written instructions, including those for trowel notching, adhesive mixing, and adhesive open and working times.
  - 1. Provide completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.
- I. Hand roll tiles according to tile manufacturer's written instructions.

### 3.4 RESILIENT ACCESSORY INSTALLATION

- A. General: Install resilient accessories according to manufacturer's written installation instructions.
- B. Apply resilient wall base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.
  - 1. Install wall base in lengths as long as practicable without gaps at seams and with tops of adjacent pieces aligned.
  - 2. Tightly adhere wall base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.
  - 3. Do not stretch base during installation.
  - 4. On masonry surfaces or other similar irregular substrates, fill voids along top edge of resilient wall base with manufacturer's recommended adhesive filler material.
  - 5. Form outside corners on job from straight pieces of maximum lengths possible, without whitening at bends. Shave back of base at points where bends occur and remove strips perpendicular to length of base that are only deep enough to produce a snug fit without removing more than half the wall base thickness.
  - 6. Form inside corners on job, from straight pieces of maximum lengths possible, by cutting an inverted V-shaped notch in toe of wall base at the point where corner is formed. Shave back of base where necessary to produce a snug fit to substrate.
- C. Place resilient accessories so they are butted to adjacent materials and bond to substrates with adhesive. Install reducer strips at edges of flooring that would otherwise be exposed.
- D. Apply resilient products to stairs as indicated and according to manufacturer's written installation instructions.

### 3.5 CLEANING AND PROTECTING

- A. Perform the following operations immediately after installing resilient products:
  - 1. Remove adhesive and other surface blemishes using cleaner recommended by resilient product manufacturers.
  - 2. Sweep or vacuum floor thoroughly.
  - 3. Do not wash floor until after time period recommended by flooring manufacturer.
  - 4. Damp-mop floor to remove marks and soil.
- B. Protect flooring against mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during the remainder of construction period. Use protection methods indicated or recommended in writing by flooring manufacturer.
  - 1. Apply protective floor polish to floor surfaces that are free from soil, visible adhesive, and surface blemishes, if recommended in writing by manufacturer.
    - a. Use commercially available product acceptable to flooring manufacturer.
  - 2. Cover products installed on floor surfaces with undyed, untreated building paper until inspection for Substantial Completion.
  - 3. Do not move heavy and sharp objects directly over floor surfaces. Place plywood or hardboard panels over flooring and under objects while they are being moved. Slide or roll objects over panels without moving panels.

- C. Clean floor surfaces not more than 4 days before dates scheduled for inspections intended to establish date of Substantial Completion in each area of Project. Clean products according to manufacturer's written recommendations.
  - 1. Before cleaning, strip protective floor polish that was applied after completing installation only if required to restore polish finish and if recommended by flooring manufacturer.
  - 2. After cleaning, reapply polish to floor surfaces to restore protective floor finish according to flooring manufacturer's written recommendations. Coordinate with Owner's maintenance program.

### 3.6 RESILIENT TILE FLOORING SCHEDULE

- A. Vinyl Composition Tile - VCT: Where this designation is indicated, provide vinyl composition floor tile complying with the following:
  - 1. Available Products: As follows:
    - a. Armstrong World Industries, Inc. Imperial Texture Standard Excelon Vinyl composition Tile, or approved equal.
  - 2. Color and Pattern: Field Color A & B (Plan will be provided at a later date) as selected by Architect from manufacturer's full range of colors and patterns produced for tile complying with requirements indicated. Varying colors are to be used.
  - 3. Class: Class 2 (through-pattern tile).
  - 4. Wearing Surface: Smooth.
  - 5. Thickness: 1/8 inch.
  - 6. Size: 12 by 12 inches.
- B. Vinyl Wall Base: Where this designation is indicated, provide vinyl wall base complying with the following:
  - 1. Available Products: As follows:
    - a. Armstrong Wall Base or approved equal.
  - 2. Color and Pattern: As selected by Architect from manufacturer's full range of colors and patterns produced for vinyl wall base complying with requirements indicated.
  - 3. Style: Cove with top-set toe.
  - 4. Minimum Thickness: 1/8-inch (2.0 mm).
  - 5. Height: 4 inches (101.6 mm).
  - 6. Lengths: Coils in lengths standard with manufacturer, but not less than 96 feet (29.26 m).
  - 7. Outside Corners: Job formed.
  - 8. Inside Corners: Job formed.
  - 9. Surface: Smooth.
- C. Vinyl Accessory Molding: Where this designation is indicated, provide vinyl accessory molding complying with the following:
  - 1. Available Products: As follows:
    - a. Armstrong Wall Base or approved equal.
  - 2. Color: As selected by Architect from manufacturer's full range of colors produced for vinyl accessory molding complying with requirements indicated.
  - 3. Product Description: Includes, but is not limited to: Cap for cove carpet, Cap for cove vinyl sheet floor covering, Carpet edge for glue-down applications, Carpet nosing, Nosing for resilient floor covering, Reducer strip for resilient flooring, as indicated on the drawings.
  - 4. Profile and Dimensions: As indicated.

END OF SECTION



## SECTION 09678 - RESILIENT WALL BASE AND ACCESSORIES

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. This Section includes the following:
  - 1. Resilient wall base.
  - 2. Resilient flooring accessories.
- B. Related Sections: The following Sections contain requirements that relate to this Section:
  - 1. Division 9 Section "Resilient Tile Flooring."

#### 1.3 SUBMITTALS

- A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.
- B. Product data for each type of product specified.
- C. Samples for initial selection purposes of manufacturer's standard sample sets in form of pieces cut from each type of product specified showing full range of colors and patterns available.
- D. Product certificates, in lieu of laboratory test reports when permitted by Architect, signed by manufacturer certifying that each product complies with requirements.

#### 1.4 QUALITY ASSURANCE

- A. Single-Source Responsibility for Products: Obtain each type and color of product specified from a single source with resources to provide products of consistent quality in appearance and physical properties without delaying progress of the Work.
- B. Fire Performance Characteristics: Provide products with the following fire performance characteristics as determined by testing products per ASTM test method indicated below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction.
  - 1. Critical Radiant Flux: 0.45 watts per sq cm or more per ASTM E 648.
  - 2. Smoke Density: Less than 450 per ASTM E 662.

#### 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to Project site in original manufacturer's unopened cartons and containers, each bearing names of product and manufacturer, Project identification, and shipping and handling instructions.
- B. Store products in dry spaces protected from the weather with ambient temperatures maintained between 50 deg F (10 deg C) and 90 deg F (32 deg C).
- C. Move products into spaces where they will be installed at least 48 hours in advance of installation.

#### 1.6 PROJECT CONDITIONS

- A. Maintain a minimum temperature of 70 deg F (21 deg C) in spaces to receive products specified in this Section for at least 48 hours prior to installation, during installation, and for not less than 48 hrs after installation. After this period, maintain a temperature of not less than 55 deg F (13 deg C).
- B. Do not install products until they are at the same temperature as that of the space where they are to be installed.

- C. Close spaces to traffic during installation of products specified in this Section.

#### 1.7 SEQUENCING AND SCHEDULING

- A. Sequence installing products specified in this Section with other construction to minimize possibility of damage and soiling during remainder of construction period.

#### 1.8 EXTRA MATERIALS

- A. Deliver extra materials to Owner. Furnish extra materials matching products installed as described below, packaged with protective covering for storage, and identified with labels clearly describing contents.
  - 1. Furnish not less than 10 linear feet (3 linear meters) for each 500 linear feet (150 linear meters) or fraction thereof of each different type and color of resilient wall base installed.

### PART 2 - PRODUCTS

#### 2.1 MANUFACTURERS

- A. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, those specified in each Product Data Sheet at end of this Section.

#### 2.2 RESILIENT WALL BASE

- A. Vinyl Wall Base: Products complying with FS SS-W-40, Type II, and requirements specified in the Vinyl Wall Base Product Data Sheet at end of this Section.

#### 2.3 RESILIENT ACCESSORIES

- A. Vinyl Accessories: Products complying with requirements specified in Vinyl Accessory Product Data Sheet at end of this Section.

#### 2.4 INSTALLATION ACCESSORIES

- A. Concrete Slab Primer: Nonstaining type as recommended by flooring manufacturer.
- B. Trowelable Underlayments and Patching Compounds: Latex-modified, portland-cement-based formulation provided or approved by flooring manufacturer for applications indicated.
- C. Adhesives: Water-resistant type recommended by manufacturer to suit resilient flooring product and substrate conditions indicated.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Examine areas where installation of products specified in this Section will occur, with Installer present, to verify that substrates and conditions are satisfactory for installation and comply with manufacturer's requirements and those specified in this Section.

#### 3.2 PREPARATION

- A. General: Comply with manufacturer's installation specifications for preparing substrates indicated to receive products indicated.
- B. Use trowelable leveling and patching compounds per manufacturers directions to fill cracks, holes, and depressions in substrates.
- C. Remove coatings, including curing compounds, and other substances that are incompatible with flooring adhesives and that contain soap, wax, oil, or silicone, by using a terrazzo or concrete grinder, a drum sander, or a polishing machine equipped with a heavy-duty wire brush.

- D. Broom or vacuum clean substrates to be covered immediately before installing products specified in this Section. Following cleaning, examine substrates for moisture, alkaline salts, carbonation, or dust.
- E. Apply concrete slab primer, if recommended by flooring manufacturer, prior to applying adhesive. Apply according to manufacturer's directions.

### 3.3 INSTALLATION

- A. General: Install products specified in this Section using methods indicated according to manufacturer's installation directions.
- B. Apply resilient wall base to walls, columns, pilasters, and other permanent fixtures in rooms and areas where base is required. Install wall base in lengths as long as practicable. Tightly adhere wall base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.
  - 1. On masonry surfaces or other similar irregular substrates, fill voids along top edge of resilient wall base with manufacturer's recommended adhesive filler material.
  - 2. Install inside and exterior corners before installing straight pieces.
- C. Place resilient accessories so they are butted to adjacent materials of type indicated and bond to substrates with adhesive. Install reducer strips at edges of flooring that otherwise would be exposed.
- D. Apply resilient accessories to stairs as indicated and according to manufacturer's installation instructions.

### 3.4 CLEANING AND PROTECTION

- A. Perform the following operations immediately after completing installation:
  - 1. Remove visible adhesive and other surface blemishes using cleaner recommended by manufacturers of resilient product involved.
  - 2. Sweep or vacuum floor thoroughly.
  - 3. Do not wash floor until after time period recommended by manufacturer.
  - 4. Damp-mop resilient accessories to remove black marks and soil.
- B. Protect flooring against mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period. Use protection methods indicated or recommended by manufacturer of resilient product involved.
  - 1. Cover resilient accessories on floors and stairs with undyed, untreated building paper until inspection for Substantial Completion.
- C. Clean products specified in this Section not more than 4 days prior to dates scheduled for inspections intended to establish date of Substantial Completion in each area of Project. Clean products using method recommended by manufacturer.

### PRODUCT DATA SHEET 1 - VINYL WALL BASE

- A. Vinyl Wall Base Designation: VWB
  - B. Style: Straight with no toe.
  - C. Minimum Thickness: 0.080 inch (2 mm).
  - D. Height: 4 inches (100 mm).
  - E. Lengths: Cut lengths 48 inches (1200 mm) long or Coils in lengths standard with manufacturer but not less than 96 feet (29 m).
  - F. Surface Characteristics: Smooth.
  - G. Color and Pattern: As selected by Architect from manufacturer's full range of colors and patterns produced for vinyl wall base complying with requirements indicated.
- Products: Armstrong Excelon or approved equal.

PRODUCT DATA SHEET 2 - VINYL ACCESSORY

- A. Vinyl Accessory Designation: VA
- B. Product Description: Reducer strip for resilient flooring.
- C. Profile and Dimensions: As specified by product designation below.
- D. Color: As selected by Architect from manufacturer's full range of colors Produced for vinyl accessories complying with requirements indicated.
- E. Products: Roppe or approved equal.

END OF SECTION 09678

SECTION 09681-CARPET TILE

PART 1 GENERAL

1.1 Description of Work

- .1 Provide and install all modular carpet and installation work as required by contract documents and their specifications.

1.2 Quality Assurance

.1 Manufacturer –

- .1 The carpet manufacturer shall have no less than fifteen years of production experience with modular carpet similar to type specified.
- .2 Commitment to quality - Carpet manufacturer shall provide verification of registration to the ISO 9001/9002 Quality Management System.
- .3 Carpet manufacturer shall provide verification of registration in the ISO 14001 Environmental Management System.
- .4 Commitment to sustainability - carpet manufacturer shall demonstrate through programs of source reduction, recycling, reuse, water conservation and conservation of raw material usage its commitment to sustainability
- .5 All products offered by the manufacturer shall be “standard running line” products and shall be available with no minimum order (single box availability).
- .6 Manufacturer shall guarantee availability of recycled content product.
- .7 The product warranty required herein shall be provided directly by the carpet manufacturer.

1.3 Installation Provider –

- .1 The installation provider shall be directly responsible for the quality of the completed floorcovering installation, including the quality of both the materials and labor used in the installation.
- .2 The installation provider shall directly warrant to the end use all products, materials and services related to the floorcovering installation (including any floorcovering(s), or other products or materials used in the installation) meeting specifications set forth herein.
- .3 The installation provider shall have successful carpet installation experience on work similar to the work of this Section.

1.4 Submittals – Please submit each of the following with your proposal (unless otherwise noted):

- .1 Manufacturer's Data - Two (2) copies of carpet manufacturer's construction specifications, performance specification, environmental performance and installation instructions for carpet and related items specified.

- .2 Fiber Verification – Certification from the fiber producer verifying use of premium, type 6,6 fiber with post consumer recycled content for the submitted carpet product. (Premium fibers are identified as Invista, Universal and Aquafil).
- .3 Fibers extruded by carpet mills will be considered “non-premium” for purposes of this specification.
- .4 All applicable product warranties provided by manufacturer.
- .5 Installation provider's proof of insurance, copy of contractor's license, and worker's compensation certificate.
- .6 Five (5) current project references for installation provider, with scope, date, and customer contact with phone number in compliance letter.
- .7 Samples – Customary (standard) size carpet samples of each type of carpet, in each specified pattern, color, and construction.
- .8 Any alternatives to specified product(s) or approved manufacturers, to be considered, shall be submitted for approval at least ten (10) working days prior to bid or proposal to be considered.
- .9 Maintenance Instructions - Two (2) copies of the manufacturer's carpet maintenance instructions.

1.5 Warranty

- .1 Provide the following written warranties by carpet manufacturer for a period of not less than 15 years:
- .2 Wear - Surface fiber wear shall not be more than 10% by weight in 15 years. (Note: Wear warranty shall not require use of chair pads)
- .3 Static - Static generation shall be less than 3.0 kV at 70° F, and 20% R.H.
- .4 No delamination
- .5 No edge ravel
- .6 No dimensional instability (i.e., shrinkage, curling and doming) which adversely affect the ability of the tile to lie flat
- .7 Submit manufacturer's National Voluntary Laboratory Accreditation Program (NVLAP) certified test results to show that carpet meets or exceeds product performance specification criteria for carpet testing requirements under Section 2.1 hereof.
- .8 Installation provider shall warrant all installation services will be free from defects in workmanship for a period of at least one (1) year following their completion, and that in the event of defective services, the installation provider will re-perform the effected services and, as necessary, supply new products of the same or similar grade sufficient to repair or replace products adversely affected.

## PART 2 PRODUCTS

**2.1 Structured Back Carpet Performance Standards.** Carpet shall meet the following performance standards:

0.1	Carpet Flammability	
	.1 Pill Test (ASTM D2859 or CPSC FF-1-70)	Passes
	.2 Radiant Panel Test (ASTM E648)	$\geq 0.45$ watts/cm <sup>2</sup> , Class 1
0.2	Smoke Density (ASTM E662)	$\leq 450$ Flaming Mode
0.3	Dimensional Stability (Aachen Method Din 54318)	$\leq 0.1\%$ change
0.4	Static Generation at 70° F (AATCC 134 w/ neolite)	$\leq 3.0$ kV at 20% R.H.
0.5	Lightfastness (AATCC 16E)	$\geq 4.0$ after 60 hours
0.6	Gas Fade (AATCC 23)	4
0.7	Ozone Fade (AATCC 109)	4
0.8.1	Antimicrobial (ASTM E2471-05)	The carpet primary backing should display a minimum performance rating of "CI" (complete inhibition) or "PI" high (partial inhibition high < 10% coverage) against the three challenge microorganisms
or 0.8.2	Antimicrobial (AATCC 174, Part II)	$\geq 90.0\%$ reduction
0.9	Fungicidal (AATCC 174, Part III)	No growth
0.10	Soil/Stain Protection (AATCC 175-1991)	$\geq 8.0$ on the Red 40 Stain Scale
0.11	Sustainable Carpet Assessment Standard – NSF/ANSI 140	Platinum [Gold], as certified by 3 <sup>rd</sup> party
0.12	Carpet & Rug Institute Green Label Plus	Any and all products shall pass Carpet & Rug Institute Green Label Plus. Certification number of the specified product category shall accompany submittal.

**2.2a Product Construction Specification.** Modular carpet tile shall meet the following construction specifications: Equal to Chenille Warp GlasBacRE

- .1 Yarn System: 100% Universal Type 6,6 Nylon with post consumer recycled content. Fiber shall have a cross-section modification ratio no greater than 1.7 to 1.9. (Note: Bidder may propose yarn with a % of biobased material with satisfactory explanation of modification)
- .2 Dye Method: 100% Solution Dyed
- .3 Dye lots: Mergeable
- .4 Construction: Tufted
- .5 Patterning:: Integrated (topical application or wet printed patterning not allowed)
- .6 Texture: Tufted Tip Sheared
- .7 Gauge: 1/12
- .8 Pile Height: 0.15 in.

- .9 Tufted Yarn Weight: Maximum 17 oz per yard (lower face weights are preferable if equal or superior performance can be substantiated by Texture Appearance Retention Testing)
- .10 Pile density: 6,511 oz/yd<sup>3</sup>
- .11 Primary Backing: Non-woven polyester. Woven primary backings not allowed.
- .12 Secondary Backing: Fiberglass Reinforced Thermoplastic Composite (polyolefin-free). Secondary backing shall be 100% recyclable at the end of its useful life and shall contain recycled content. Claims of 'recyclable' shall meet the Federal Trade Commission Part 260 -- Guides for the Use of Environmental Marketing Claims 260.7(d).
- .13 Soil/Stain Resistance: Application by fiber producer and manufacturer required; PFC-free.
- .14 Traffic Classification: Severe
- .15 Preservative Protection: Antifungal and Antibacterial ASTM E 2471-05 Standard Test Method for Use of Seeded Agar for Screening Assessment of Antimicrobial Activity in Carpet. Minimum allowable growth ratings on washed and unwashed carpet samples after 72 hours incubation are complete to partial inhibition (<10% sample coverage) on shaven primary and unshaven fiber layers. Or, if AATCC 174 Parts II & III (AATCC 171 Washed) is used, shall pass both Part II and Part III of AATCC 174 with a minimum of 90% reduction both gram negative and gram positive bacteria and no visible growth against the fungi.
- .16 Indoor Air Quality: CRI Green Label Plus
- .17 Sustainable Carpet Assessment Standard: NSF/ANSI – 140 Platinum
- .18 Tile size: 50 cm x 50 cm
- .19 Quarter Turn or Brick Installation Method: All product shall be designed for quarter turn or brick

## 2.3 Environmental Specifications

- .1 Recycled Content by total product weight: minimum of 69% total recycled content – post-consumer: 34%; post-industrial: 35%
- .2 Recycled versus Recyclable – Primary consideration will be given to carpet products in the following order of priority: (A) use of post consumer recycled content in both fiber and backing, (B) post consumer recycled content in the backing, (C) 100% recyclable product. Claims shall meet the Federal Trade Commission Part 260 -- Guides for the Use of Environmental Marketing Claims.
- .3 Product platform shall have a 3rd party verified Environmental Product Declaration following ISO 14025 guidelines and a 3rd party verified Life Cycle Assessment following ISO 14040 guidelines.
- .4 Carbon footprint of the Product – Proposal shall state the average quantity of greenhouse gas emissions associated with the entire life cycle of the product from raw material extraction through end-of-life, a description of any emission reduction credits used to offset the global warming footprint. If credits are claimed the proposal must identify, quantity claimed and the name of the 3<sup>rd</sup> party verifying this claim.



## 2.4 Minimum Antimicrobial Construction Standards

- .1 Preservative, registered by the EPA for use in carpeting, with broad spectrum efficacy against the growth of bacteria and fungi for a minimum of 15 years, assuming proper maintenance. The preservative ingredient shall meet standards set by the U.S. General Services Administration (GSA) for Antimicrobial Carpet as supported by independent lab testing less than six months old.
- .2 Manufacturer shall provide a stamped EPA technical data sheet for carpet. Preservative shall contain no arsenic, formaldehyde or heavy metals (tin, lead, mercury, silver, copper or zinc), be non-halogenated (no fluorine, chlorine, bromine or iodine) and non-phenolic. Blends of amine neutralized phosphated esters are preferable. Preservative shall have low water solubility (30ppm), a vapor pressure of 12mm Hg at 27° C, and an oral LD<sub>50</sub> toxicity rate less than 2.4 grams/kg.
- .3 The preservative shall be incorporated into the primary backing of the product during the manufacturing process, not topically applied to the carpet fibers.
- .4 The preservative treated carpet when new shall pass GSA parameters for treated carpets via AATCC method 174 parts II and III. Initial performance shall be 90% reduction of the microorganisms (Staphylococcus aureus 6538 and Klebsiella pneumoniae 4352) and no fungal growth on either the primary backing or fibers both on washed (AATCC method 174) and non-washed samples. The Standard Test Method for Use of Seeded Agar for Screening Assessment of Antimicrobial Activity in Carpet (ASTM E 2471-05) may be used in lieu of AATCC method 174 parts II and III.
- .5 The preservative treated carpet shall maintain, for the warranted life of the carpet, a minimum of 90% reduction of the microorganisms (Staphylococcus aureus 6538 and Klebsiella pneumoniae 4352) listed in AATCC method 174 part II, provided the carpet is maintained as specified. Additionally, the preservative treated carpet shall maintain a "no macroscopic growth" rating against Aspergillus niger 6275 at the primary backing in accordance with AATCC 174 part III.
- .6 The preservative shall be biodegradable and not toxic to non-target species as found acceptable by the US EPA.
- .7 Efficacy of the preservative should be documented in professional peer reviewed scientific publications.

## 2.5 Related Materials

- .1 Leveling compound - Latex type as recommended by carpet manufacturer. Shall be compatible with carpet and curing/sealing compound on concrete.
- .2 Glue - Installation shall be free of the application of any wet adhesive.
- .3 Installation connectors - Compounded acrylic adhesive, applied to PET polyester backing with PET polyester release liner (clear 3" x 3" polyester squares with small quantity of a pressure sensitive adhesive applied on one side of the polyester film). The squares connect the carpet modules together to form a stable surface over almost any hard surface. The connectors shall contain no liquid components and shall have "zero" calculated VOC's.
- .4 Carpet edge guard, non-metallic - Extruded or molded heavy duty vinyl or rubber carpet edge guard of size and profile indicated, and with minimum two inch wide anchorage flange; colors selected by architect/designer from among standard colors available within the industry.

## PART 3 EXECUTION

### 3.1 Pre-Installation Requirements

- .1 All existing carpet and existing carpet waste shall be reused or recycled at no added cost. A reclamation plan shall be submitted in the proposal that will provide directions for the reclamation of all carpet at the job site. Carpet recycling options consist of:
  - .1 Repurposing - reusing the product in another application such as facilitating the donation of used carpeting to charities and other nonprofit organizations.
  - .2 Closed Loop Recycling - turning waste materials into new materials of the same value, such as vinyl backing into vinyl backing and nylon yarn into nylon carpet yarn.
  - .3 Open Loop Recycling – creating other product types from reclaimed carpet. For example, turning nylon face fiber into automotive parts or carpet padding, including nylon face fiber in recycled backings.
  - .4 Waste-to-Energy - using carpet for waste-to-energy. Method of generating power through the disposal of used carpet – usually accomplished through burning.
  - .5 Landfill or incineration – are not approved disposal methods.
- .2 Description of Reclamation Services - Carpet shall be removed by the successful contractor from any existing site and prepared for pickup based on the type of material and reclamation option selected. Documentation such as chain of custody must be provided for each and every job conducted under this contract during the term of the contract. Specifications for removal from the jobsite include:
  - .1 Removal of carpet tile for recycling
    - .1 Carpet tile shall be palletized and secured for shipping, (i.e., shrink wrap, banding, strapping).
    - .2 Carpet tile shall be kept dry and free of any moisture damage.
    - .3 Carpet tile shall be clean of any non-carpet debris.
  - .2 Removal of performance broadloom for recycling.
    - .1 Performance broadloom shall be rolled, palletized and secured for shipping. Cut pieces of performance broadloom shall also be acceptable, provided they are secured for shipping.
    - .2 Performance broadloom shall be kept dry and free from moisture damage.
    - .3 Rolls shall be clean of any non-carpet debris, front and back, other than ordinary soiling in normal use.
  - .3 Removal of broadloom carpet for recycling.
    - .1 Rolled carpet shall not exceed six (6) feet in length x one (1) foot diameter. Width may vary from 2 feet to 12 feet.
    - .2 Carpet shall be accumulated and kept dry for shipping and processing.

- .3 Rolls shall be clean of any non-carpet debris, front and back, other than ordinary soiling in normal use.
- .4 Repurposing of carpet material.
- .1 Approval of old carpet for possible donation shall be determined at the jobsite.
- .5 All possible recycling options shall be clearly presented and submitted in writing to owner and specifier prior to job start. A written description of the used carpet disposal process is required.
  - .1 Description shall contain information as to complete process of diversion from landfill.
  - .2 A certificate shall be furnished upon request verifying the reclamation of the carpet and the pounds of material diverted from the landfill.

### 3.2 Installation

#### .1 General

Comply with manufacturer's instructions and recommendations and in accordance with the Carpet and Rug Institute's Installation Standard. All product shall be installed installation description such as: quarter turn or brick installation.

- .1 A "no-glue" waterless method of installation is preferred using materials described in 2.5.3 above. In the event a releasable glue method of installation is required, the following adhesive description applies. Adhesive shall be water-based and allow for removal of carpet tile at any time without damage to carpet or substrate. Adhesive shall contain antimicrobial preservative and have "zero" calculated VOC's.
- .2 Comply with manufacturer's instructions for subfloor evaluation for moisture and alkalinity. In the event the concrete subfloor does not meet moisture and alkalinity requirements as defined in manufacturer's installation instructions and the moisture vapor emission rates are less than 15 pounds and the alkalinity pH is less than 12.0, a moisture barrier such as MoistureGard 2.0 must be installed. Installation must comply with manufacturer's installation instructions. In the event the moisture vapor emission rate is higher than 15 pounds and the alkalinity is higher than a pH of 12.0, additional remediation of the slab is required.
- .3 Install carpet under open-bottom obstructions and under removable flanges and furnishings, and into alcoves and closets of each space.
- .4 Provide cut outs where required. Conceal cut edges with protective edge guards or overlapping flanges.
- .5 Run carpet under open bottom items such as heating convectors, and install tight against walls, columns and cabinets so the entire floor area is covered with carpet. Cover over all floor type door closures.
- .6 Install edging guard at all openings and doors wherever carpet terminates, unless indicated otherwise.
- .7 Cutting shall be done in accordance with the manufacturer's recommendation, using the tools designed for the carpet being installed.

- .8 Use leveling compound where necessary. Any floor filling or leveling shall have a minimum of 4'0" of feather.
- .9 Expansion joints - Do not bridge building expansion joints with continuous carpeting.
- .10 Chair Pads shall not be recommended or required within installation instructions

### 3.3 Cleaning and Protection

- .1 On completion of the installation in each area, all dirt, carpet scraps, etc. shall be removed from the surface of the carpet.
- .2 Remove debris, and sort pieces to be saved from scraps to be repurposed or recycled.
- .3 Construction manager shall protect carpeting against damage during construction.
- .4 At the completion of the work and when directed by the construction manager, vacuum carpet using commercial dual motor vacuum of type recommended by carpet manufacturer. Remove spots and replace carpet where spots cannot be removed. Remove rejected carpeting and replace with new carpeting. Remove any protruding yarns with shears or sharp scissors.

### 3.4 Inspection

- .1 Upon completion of the installation, manufacturer and installer shall verify and certify by means of an affidavit of compliance that work is complete, properly installed and meets all specification herein.
- .2 Preliminary Acceptance - Upon completion of the carpet installation of each floor, such installation shall be inspected by owner, the construction manager and installation provider.

END OF SECTION

SECTION 09705 - RESINOUS FLOORING

PART I 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. Definitions: Resinous flooring includes penetrating two-component epoxy primers, quartz silica aggregate, three component free flowing epoxy undercoat including resin, hardener and filler, brightly colored vinyl flake broadcast, and two-component, high performance, clear epoxy sealers and a water based, aliphatic polyurethane sealer.
- B. Related Work
  - 1. Division 7 Section Fluid Applied Waterproofing

1.03 SUBMITTALS

- A. Product Data: Submit manufacturer's technical data, installation instructions, and general recommendations for each resinous flooring material required. Include certification indicating compliance of materials with requirements.
- B. Samples: Submit, for verification purposes, 4-inch square samples of each type of resinous flooring required, applied to a rigid backing, in color and finish indicated.
  - 1. For initial selection of colors and finishes, submit manufacturer's color charts showing full range of colors and finishes available.

1.04 QUALITY ASSURANCE

- A. Single Source Responsibility: Obtain primary resinous flooring materials including primers, resins, hardening agents, finish or sealing coats from a single manufacturer with not less than ten years of successful experience in manufacturing and installing principal materials described in this section. Contractor shall have completed at least five projects of similar size and complexity; Stonhard or approved equal. Provide secondary materials only of type and from source recommended by manufacturer of primary materials.
- B. Pre-Installation Conference
  - 1. General contractor shall arrange a meeting not less than thirty days prior to starting work.
  - 2. Attendance
    - a. General Contractor
    - b. Architect/Owner's Representative
    - c. Manufacturer/Installer's Representative
- C. ISO 9001: All materials, including primers, resins, curing agents, finish coats, aggregates and sealants are manufactured and tested under an ISO 9001 registered quality system.

1.05 DELIVERY, STORAGE AND HANDLING

- A. Material shall be delivered to job site and checked by flooring contractor for completeness and shipping damage prior to job start.
- B. All materials used shall be factory pre-weighed and pre-packaged in single, easy to manage batches to eliminate on site mixing errors. No on site weighing or volumetric measurements allowed.

- C. Material shall be stored in a dry, enclosed area protected from exposure to moisture. Temperature of storage area shall be maintained between 60 and 85°F/16 and 30°C.

1.06 PROJECT CONDITIONS

- A. Concrete substrate shall be properly cured for a minimum of 30 days. A vapor barrier must be present for concrete sub-floors on or below grade. Otherwise, an osmotic pressure resistant grout must be installed prior to the resinous flooring.
- B. Utilities, including electric, water, heat (air temperature between 60 and 85°F/16 and 30°C) and finished lighting to be supplied by General Contractor.
- C. Job area to be free of other trades during, and for a period of 24 hours, after floor installation.
- D. Protection of finished floor from damage by subsequent trades shall be the responsibility of the General Contractor.

1.07 WARRANTY

- A. Manufacturer shall furnish a single, written warranty covering both material and workmanship for a period of one (1) full year from date of installation.

2.00 PRODUCTS

- A. Manufactures Equal to:
  - 1. Stonhard-Stontec ERF
  - 2. Rhino Linings Corp.
  - 3. Dex-O-Tex Products

2.01 COLORS

- A. Colors: As selected by Architect from manufacturer's full range of colors.

2.02 EPOXY FLOORING

- A. System shall be comprised of a penetrating two-component epoxy primer, quartz silica aggregate, a three component free flowing epoxy undercoat including resin, hardener and filler, brightly colored vinyl flake broadcast, and two two-component, high performance, clear epoxy sealers.
  - 1. Physical Properties: Provide flooring system in which physical properties of topping including aggregate, when tested in accordance with standards or procedures referenced below, are as follows:

VOC Content . . . . .	0.4 lbs./gal.(50 g/l)
(ASTM 2369)	
Compressive Strength .....	9,000 psi
(ASTM C-579)	
Tensile Strength.....	1,600 psi
(ASTM D-638)	
Flexural Strength.....	4,000 psi
(ASTM C-580)	
Hardness.....	85-90 min.
(ASTM D-2240, Shore D)	
Bond Strength .....	>400 psi
(ASTM D-4541)	(100% concrete failure)
Impact Resistance .....	>160 in. lbs
(MIL-D-3134F)	

Abrasion Resistance .....	0.06 gm max. weight loss
(ASTM D-4060, Taber Abrader CS-17 wheel)	
Flexural Modulus of Elasticity .....	1.0 x 10 <sup>6</sup> psi
(ASTM C-580)	
Water Absorption.....	0.1%
(ASTM C-413)	
Cure Rate .....	8 hours for foot traffic
(at 77°F/25°C)	18 hours for light traffic
	24 hours for normal operations
Slip Index.....	0.85
(ASTM D-1674)	

## 2.03 JOINT SEALANT MATERIALS

- A. Type produced by manufacturer of resinous flooring system for type of service and joint condition indicated.

## PART 3:00 EXECUTION

### 3.01 PREPARATION

- A. Substrate: Concrete preparation shall be by mechanical means and include use of a shot blast machine for removal of bond inhibiting materials such as curing compounds or laitance.

### 3.02 APPLICATION

- A. General: Apply each component of resinous flooring system in compliance with manufacturer's directions to produce a uniform monolithic wearing surface of thickness indicated, uninterrupted cove base except at divider strips, sawn joints or other types of joints (if any), indicated or required.
- B. Primer: Mix and apply primer over properly prepared substrate with strict adherence to manufacturer's installation procedures and coverage rates.
- C. Epoxy Mortar Cove Base: Mix silica, hardener and resin to create a mortar according to manufacturers specification. Trowel apply mortar to form a 6" high cove base with a 1" radius. Terminate on vertical surface with aluminum cove strip
- D. Epoxy Flooring: Immediately broadcast quartz silica aggregate into the membrane using manufacturer's specially designed sprayer. Strict adherence to manufacturer's installation procedures and coverage rates is imperative.
- E. Epoxy Flooring: Mix base material according to manufacturer's recommended procedures. Uniformly spread mixed material over membrane with strict adherence to manufacturer's installation procedures and coverage rates.
- F. Epoxy Flooring: Immediately broadcast vinyl flakes into the undercoat. Strict adherence to manufacturer's installation procedures and coverage rates is imperative.
- G. Epoxy Flooring: first Sealer: Remove excess unbonded flakes by lightly brushing and vacuuming the floor surface. Mix and apply sealer with strict adherence to manufacturer's installation procedures.
- H. Epoxy Flooring: Lightly sand cured first sealer coat. Mix and apply aliphatic urethane top coat.

### 3.03 FIELD QUALITY CONTROL

- A. The right is reserved to invoke the following material testing procedure at any time, and any number of times during period of flooring application.
- B. The Owner will engage service of an independent testing laboratory to sample materials being used on the job site. Samples of material will be taken, identified and sealed, and certified in presence of Contractor.
- C. Testing laboratory will perform tests for any of characteristics specified, using applicable testing procedures referenced herein, or if none referenced, in manufacturer's product data.
- D. If test results show materials being used do not comply with specified requirements, Contractor may be directed by Owner to stop work; remove non-complying materials; pay for testing; reapply flooring materials to properly prepared surfaces which had previously been coated with unacceptable materials.

3.04 CURING, PROTECTION AND CLEANING

- A. Cure resinous flooring materials in compliance with manufacturer's directions, taking care to prevent contamination during stages of application and prior to completion of curing process. Close area of application for a minimum of 12 hours.
- B. Protect resinous flooring materials from damage and wear during construction operation. Where temporary covering is required for this purpose, comply with manufacturer's recommendations for protective materials and method of application. General Contractor is responsible for protection and cleaning of surfaces after final coats.
- C. Cleaning: Remove temporary covering and clean resinous flooring just prior to final inspection. Use cleaning materials and procedures recommended by resinous flooring manufacturer.

END OF SECTION



SECTION 09900 - PAINTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes surface preparation and field painting of the following:
  - 1. Exposed exterior items and surfaces as indicated on the drawings and in the finish schedule.
  - 2. Exposed interior items and surfaces, including but not limited to: columns, exposed steel, exposed underside of deck, exposed steel at trusses, sprinkler piping, electrical conduit, fasteners & clips, other piping, exposed and round ductwork, hangers, elevator door and frames, hollow metal frames, etc. and as noted in the finish schedule and not specifically indicated as not to be painted.
  - 3. Exposed wood doors, at underside of deck and wood trusses in Pavilion to be stained and as noted in the finish schedule.
  - 4. Surface preparation, priming, and finish coats specified in this Section are in addition to shop priming and surface treatment specified in other Sections.
- B. Paint exposed surfaces, except where the paint schedules indicate that a surface or material is not to be painted or is to remain natural. If the paint schedules do not specifically mention an item or a surface, paint the item or surface the same as similar adjacent materials or surfaces whether or not schedules indicate colors. If the schedules do not indicate color or finish, the Architect will select from standard colors and finishes available.
  - 1. Painting includes field painting of exposed bare and covered pipes and ducts (including color coding), hangers, exposed steel and iron work, and primed metal surfaces of mechanical and electrical equipment.
- C. Do not paint prefinished items, concealed surfaces, finished metal surfaces, operating parts, and labels.
  - 1. Prefinished items include the following factory-finished components:
    - a. Architectural woodwork and casework.
    - b. Metal toilet enclosures.
    - c. Metal lockers.
    - d. Finished mechanical and electrical equipment.
    - e. Light fixtures.
    - f. Distribution cabinets.
  - 2. Concealed surfaces include walls or ceilings in the following generally inaccessible spaces:
    - a. Furred areas.
    - b. Ceiling plenums.
    - c. Pipe spaces.
    - d. Duct shafts.
    - e. Elevator shafts.
  - 3. Finished metal surfaces include the following:
    - a. Anodized aluminum.
    - b. Stainless steel.
    - c. Chromium plate.
    - d. Copper.
  - 4. Operating parts include moving parts of operating equipment and the following:
    - a. Valve and damper operators.
    - b. Linkages.
    - c. Sensing devices.
    - d. Motor and fan shafts.

5. Labels: Do not paint over Underwriters Laboratories (UL), Factory Mutual (FM), or other code-required labels or equipment name, identification, performance rating, or nomenclature plates.

D. Related Sections include the following:

1. Division 5 Section "Structural Steel" for shop priming structural steel.
2. Division 5 Section "Metal Fabrications" for shop priming ferrous metal.
3. Division 8 Section "Steel Doors and Frames" for shop priming steel doors and frames.
4. Division 9 Section "Gypsum Board Assemblies" for surface preparation for gypsum board.
5. Divisions 15 and 16: Painting of mechanical and electrical work is specified in Divisions 15 and 16, respectively.

### 1.3 DEFINITIONS

A. General: Standard coating terms defined in ASTM D 16 apply to this Section.

1. Flat refers to a lusterless or matte finish with a gloss range below 15 when measured at an 85-degree meter.
2. Eggshell refers to low-sheen finish with a gloss range between 5 and 20 when measured at a 60-degree meter.
3. Satin refers to low-sheen finish with a gloss range between 15 and 35 when measured at a 60-degree meter.
4. Semigloss refers to medium-sheen finish with a gloss range between 30 and 65 when measured at a 60-degree meter.
5. Full gloss refers to high-sheen finish with a gloss range more than 65 when measured at a 60-degree meter.

### 1.4 SUBMITTALS

A. Product Data: For each paint system specified. Include block fillers and primers.

1. Material List: Provide an inclusive list of required coating materials. Indicate each material and cross-reference specific coating, finish system, and application. Identify each material by manufacturer's catalog number and general classification.
2. Manufacturer's Information: Provide manufacturer's technical information, including label analysis and instructions for handling, storing, and applying each coating material proposed for use.
3. Certification by the manufacturer that products supplied comply with local regulations controlling use of volatile organic compounds (VOCs).

B. Samples for Initial Selection: Manufacturer's color charts showing the full range of colors available for each type of finish-coat material indicated.

1. After color selection, the Architect will furnish color chips for surfaces to be coated.

C. Samples for Verification: Of each color and material to be applied, with texture to simulate actual conditions, on representative Samples of the actual substrate.

1. Provide stepped Samples, defining each separate coat, including block fillers and primers. Use representative colors when preparing Samples for review. Resubmit until required sheen, color, and texture are achieved.
2. Provide a list of materials and applications for each coat of each sample. Label each sample for location and application.
3. Submit Samples on the following substrates for the Architect's review of color and texture only:
  - a. Concrete: Provide two 4-inch- (100-mm-) square samples for each color and finish.
  - b. Concrete Masonry: Provide two 4-by-8-inch (100-by-200-mm) samples of masonry, with mortar joint in the center, for each finish and color.
  - c. Painted Wood: Provide two 12-inch- (300-mm-) square samples of each color and material on hardboard.
  - d. Stained or Natural Wood: Provide two 4-by-8-inch (100-by-200-mm) samples of natural- or stained-wood finish on actual wood surfaces.

- e. Ferrous Metal: Provide two 4-inch- (100-mm-) square samples of flat metal and two 8-inch- (200-mm-) long samples of solid metal for each color and finish.
- D. Qualification Data: For firms and persons specified in the "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

#### 1.5 QUALITY ASSURANCE

- A. Applicator Qualifications: Engage an experienced applicator who has completed painting system applications similar in material and extent to that indicated for this Project with a record of successful in-service performance.
- B. Source Limitations: Obtain block fillers, primers, and undercoat materials for each coating system from the same manufacturer as the finish coats.
- C. Benchmark Samples (Mockups): Provide a full-coat benchmark finish sample of each type of coating and substrate required on the Project. Comply with procedures specified in PDCA P5. Duplicate finish of approved prepared samples.
  - 1. The Architect will select one room or surface to represent surfaces and conditions for each type of coating and substrate to be painted.
    - a. Wall Surfaces: Provide samples on at least 100 sq. ft. (9 sq. m) of wall surface.
    - b. Small Areas and Items: The Architect will designate an item or area as required.
  - 2. After permanent lighting and other environmental services have been activated, apply coatings in this room or to each surface according to the Schedule or as specified. Provide required sheen, color, and texture on each surface.
    - a. After finishes are accepted, the Architect will use the room or surface to evaluate coating systems of a similar nature.
  - 3. Final approval of colors will be from job-applied samples.

#### 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to the Project Site in manufacturer's original, unopened packages and containers bearing manufacturer's name and label, and the following information:
  - 1. Product name or title of material.
  - 2. Product description (generic classification or binder type).
  - 3. Manufacturer's stock number and date of manufacture.
  - 4. Contents by volume, for pigment and vehicle constituents.
  - 5. Thinning instructions.
  - 6. Application instructions.
  - 7. Color name and number.
  - 8. VOC content.
- B. Store materials not in use in tightly covered containers in a well-ventilated area at a minimum ambient temperature of 45 deg F (7 deg C). Maintain containers used in storage in a clean condition, free of foreign materials and residue.
  - 1. Protect from freezing. Keep storage area neat and orderly. Remove oily rags and waste daily. Take necessary measures to ensure that workers and work areas are protected from fire and health hazards resulting from handling, mixing, and application.
  - 2. Do not store volatile materials in the building addition under construction until the fire sprinkler system is fully functional and then only in fire rated storage spaces.

#### 1.7 PROJECT CONDITIONS

- A. Apply water-based paints only when the temperature of surfaces to be painted and surrounding air temperatures are between 50 and 90 deg F (10 and 32 deg C).

- B. Apply solvent-thinned paints only when the temperature of surfaces to be painted and surrounding air temperatures are between 45 and 95 deg F (7.2 and 35 deg C).
- C. Do not apply paint in snow, rain, fog, or mist; or when the relative humidity exceeds 85 percent; or at temperatures less than 5 deg F (3 deg C) above the dew point; or to damp or wet surfaces.
  - 1. Painting may continue during inclement weather if surfaces and areas to be painted are enclosed and heated within temperature limits specified by manufacturer during application and drying periods.

## 1.8 EXTRA MATERIALS

- A. Furnish extra paint materials from the same production run as the materials applied in the quantities described below. Package paint materials in unopened, factory-sealed containers for storage and identify with labels describing contents. Deliver extra materials to the Owner.
  - 1. Quantity: Furnish the Owner with an additional 5 percent, but not less than 1 gal. (3.785 L) or 1 case, as appropriate, of each material and color applied.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, products listed in the paint schedules.
- B. Manufacturers Names: The following manufacturers are referred to in the paint schedules by use of shortened versions of their names, which are shown in parentheses:
  - 1. Devoe & Raynolds Co. (Devoe).
  - 2. Fuller-O'Brien Paints (Fuller).
  - 3. Glidden Co. (The) (Glidden).
  - 4. Benjamin Moore & Co. (Moore).
  - 5. PPG Industries, Inc. (PPG).
  - 6. Pratt & Lambert, Inc. (P & L).
  - 7. Sherwin-Williams Co. (S-W).
  - 8. Or approved equal.

### 2.2 PAINT MATERIALS, GENERAL

- A. Material Compatibility: Provide block fillers, primers, undercoats, and finish-coat materials that are compatible with one another and the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.
- B. Material Quality: Provide manufacturer's best-quality paint material of the various coating types specified. Paint-material containers not displaying manufacturer's product identification will not be acceptable.
  - 1. Proprietary Names: Use of manufacturer's proprietary product names to designate colors or materials is not intended to imply that products named are required to be used to the exclusion of equivalent products of other manufacturers. Furnish manufacturer's material data and certificates of performance for proposed substitutions.
- C. Colors: Provide color selections made by the Architect.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with the Applicator present, under which painting will be performed for compliance with paint application requirements.
  - 1. Do not begin to apply paint until unsatisfactory conditions have been corrected and surfaces receiving paint are thoroughly dry.
  - 2. Start of painting will be construed as the Applicator's acceptance of surfaces and conditions within a particular area.
- B. Coordination of Work: Review other Sections in which primers are provided to ensure compatibility of the total system for various substrates. On request, furnish information on characteristics of finish materials to ensure use of compatible primers.
  - 1. Notify the Architect about anticipated problems using the materials specified over substrates primed by others.

#### 3.2 PREPARATION

- A. General: Remove hardware and hardware accessories, plates, machined surfaces, lighting fixtures, and similar items already installed that are not to be painted. If removal is impractical or impossible because of the size or weight of the item, provide surface-applied protection before surface preparation and painting.
  - 1. After completing painting operations in each space or area, reinstall items removed using workers skilled in the trades involved.
- B. Cleaning: Before applying paint or other surface treatments, clean the substrates of substances that could impair the bond of the various coatings. Remove oil and grease before cleaning.
  - 1. Schedule cleaning and painting so dust and other contaminants from the cleaning process will not fall on wet, newly painted surfaces.
- C. Surface Preparation: Clean and prepare surfaces to be painted according to manufacturer's written instructions for each particular substrate condition and as specified.
  - 1. Provide barrier coats over incompatible primers or remove and reprime.
  - 2. Cementitious Materials: Prepare concrete, concrete masonry block, cement plaster, and mineral-fiber-reinforced cement panel surfaces to be painted. Remove efflorescence, chalk, dust, dirt, grease, oils, and release agents. Roughen as required to remove glaze. If hardeners or sealers have been used to improve curing, use mechanical methods of surface preparation.
    - a. Use abrasive blast-cleaning methods if recommended by paint manufacturer.
    - b. Determine alkalinity and moisture content of surfaces by performing appropriate tests. If surfaces are sufficiently alkaline to cause the finish paint to blister and burn, correct this condition before application. Do not paint surfaces where moisture content exceeds that permitted in manufacturer's written instructions.
  - 3. Wood: Clean surfaces of dirt, oil, and other foreign substances with scrapers, mineral spirits, and sandpaper, as required. Sand surfaces exposed to view smooth and dust off.
    - a. Scrape and clean small, dry, seasoned knots, and apply a thin coat of white shellac or other recommended knot sealer before applying primer. After priming, fill holes and imperfections in finish surfaces with putty or plastic wood filler. Sand smooth when dried.
    - b. Prime, stain, or seal wood to be painted immediately on delivery. Prime edges, ends, faces, undersides, and backsides of wood, including cabinets, counters, cases, and paneling.
    - c. When transparent finish is required, backprime with spar varnish.
    - d. Backprime paneling on interior partitions where masonry, plaster, or other wet wall construction occurs on backside.
    - e. Seal tops, bottoms, and cutouts of unprimed wood doors with a heavy coat of varnish or sealer immediately on delivery.

4. Ferrous Metals: Clean ungalvanized ferrous-metal surfaces that have not been shop coated; remove oil, grease, dirt, loose mill scale, and other foreign substances. Use solvent or mechanical cleaning methods that comply with the Steel Structures Painting Council's (SSPC) recommendations.
    - a. Treat bare and sandblasted or pickled clean metal with a metal treatment wash coat before priming.
    - b. Touch up bare areas and shop-applied prime coats that have been damaged. Wire-brush, clean with solvents recommended by paint manufacturer, and touch up with the same primer as the shop coat.
  5. Galvanized Surfaces: Clean galvanized surfaces with nonpetroleum-based solvents so surface is free of oil and surface contaminants. Remove pretreatment from galvanized sheet metal fabricated from coil stock by mechanical methods.
- D. Materials Preparation: Mix and prepare paint materials according to manufacturer's written instructions.
1. Maintain containers used in mixing and applying paint in a clean condition, free of foreign materials and residue.
  2. Stir material before application to produce a mixture of uniform density. Stir as required during application. Do not stir surface film into material. If necessary, remove surface film and strain material before using.
  3. Use only thinners approved by paint manufacturer and only within recommended limits.
- E. Tinting: Tint each undercoat a lighter shade to simplify identification of each coat when multiple coats of the same material are applied. Tint undercoats to match the color of the finish coat, but provide sufficient differences in shade of undercoats to distinguish each separate coat.

### 3.3 APPLICATION

- A. General: Apply paint according to manufacturer's written instructions. Use applicators and techniques best suited for substrate and type of material being applied.
1. Paint colors, surface treatments, and finishes as selected by the Architect.
  2. Do not paint over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions detrimental to formation of a durable paint film.
  3. Provide finish coats that are compatible with primers used.
  4. The term "exposed surfaces" includes areas visible when permanent or built-in fixtures, convector covers, covers for finned-tube radiation, grilles, and similar components are in place. Extend coatings in these areas, as required, to maintain the system integrity and provide desired protection.
  5. Paint surfaces behind movable equipment and furniture the same as similar exposed surfaces. Before the final installation of equipment, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
  6. Paint interior surfaces of ducts with a flat, nonspecular black paint where visible through registers or grilles.
  7. Paint back sides of access panels and removable or hinged covers to match exposed surfaces.
  8. Finish exterior doors on tops, bottoms, and side edges the same as exterior faces.
  9. Paint all exposed conduit, ductwork, piping, fasteners and clips, etc., unless specifically noted as not to be painted.
  10. Sand lightly between each succeeding enamel or varnish coat.
- B. Scheduling Painting: Apply first coat to surfaces that have been cleaned, pretreated, or otherwise prepared for painting as soon as practicable after preparation and before subsequent surface deterioration.
1. The number of coats and the film thickness required are the same regardless of application method. Do not apply succeeding coats until the previous coat has cured as recommended by the manufacturer. If sanding is required to produce a smooth, even surface according to manufacturer's written instructions, sand between applications.
  2. Omit primer on metal surfaces that have been shop primed and touchup painted.

3. If undercoats, stains, or other conditions show through final coat of paint, apply additional coats until paint film is of uniform finish, color, and appearance. Give special attention to ensure edges, corners, crevices, welds, and exposed fasteners receive a dry film thickness equivalent to that of flat surfaces.
  4. Allow sufficient time between successive coats to permit proper drying. Do not recoat surfaces until paint has dried to where it feels firm, does not deform or feel sticky under moderate thumb pressure, and where application of another coat of paint does not cause the undercoat to lift or lose adhesion.
- C. Application Procedures: Apply paints and coatings by brush, roller, spray, or other applicators according to manufacturer's written instructions.
1. Brushes: Use brushes best suited for the type of material applied. Use brush of appropriate size for the surface or item being painted.
  2. Rollers: Use rollers of carpet, velvet back, or high-pile sheep's wool as recommended by the manufacturer for the material and texture required.
  3. Spray Equipment: Use airless spray equipment with orifice size as recommended by the manufacturer for the material and texture required.
- D. Minimum Coating Thickness: Apply paint materials no thinner than manufacturer's recommended spreading rate. Provide the total dry film thickness of the entire system as recommended by the manufacturer.
- E. Mechanical and Electrical Work: Painting of mechanical and electrical work is limited to items exposed in equipment rooms and in occupied spaces.
- F. Mechanical items to be painted include, but are not limited to, the following:
1. Piping, pipe hangers, and supports.
  2. Heat exchangers.
  3. Tanks.
  4. Ductwork.
  5. Insulation.
  6. Motors and mechanical equipment.
  7. Accessory items.
- G. Electrical items to be painted include, but are not limited to, the following:
1. Conduit and fittings.
  2. Switchgear.
  3. Panelboards.
- H. Block Fillers: Apply block fillers to smooth concrete masonry block at a rate to ensure complete coverage with pores filled.
- I. Prime Coats: Before applying finish coats, apply a prime coat of material, as recommended by the manufacturer, to material that is required to be painted or finished and that has not been prime coated by others. Recoat primed and sealed surfaces where evidence of suction spots or unsealed areas in first coat appears, to ensure a finish coat with no burn through or other defects due to insufficient sealing.
- J. Pigmented (Opaque) Finishes: Completely cover surfaces as necessary to provide a smooth, opaque surface of uniform finish, color, appearance, and coverage. Cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, or other surface imperfections will not be acceptable.
- K. Transparent (Clear) Finishes: Use multiple coats to produce a glass-smooth surface film of even luster. Provide a finish free of laps, runs, cloudiness, color irregularity, brush marks, orange peel, nail holes, or other surface imperfections.
1. Provide satin finish for final coats.
- L. Completed Work: Match approved samples for color, texture, and coverage. Remove, refinish, or repaint work not complying with requirements.

### 3.4 FIELD QUALITY CONTROL

- A. The Owner reserves the right to invoke the following test procedure at any time and as often as the Owner deems necessary during the period when paint is being applied:
1. The Owner will engage the services of an independent testing agency to sample the paint material being used. Samples of material delivered to the Project will be taken, identified, sealed, and certified in the presence of the Contractor.
  2. The testing agency will perform appropriate tests for the following characteristics as required by the Owner:
    - a. Quantitative material analysis.
    - b. Abrasion resistance.
    - c. Apparent reflectivity.
    - d. Flexibility.
    - e. Washability.
    - f. Absorption.
    - g. Accelerated weathering.
    - h. Dry opacity.
    - i. Accelerated yellowness.
    - j. Recoating.
    - k. Skinning.
    - l. Color retention.
    - m. Alkali and mildew resistance.
  3. The Owner may direct the Contractor to stop painting if test results show material being used does not comply with specified requirements. The Contractor shall remove noncomplying paint from the site, pay for testing, and repaint surfaces previously coated with the rejected paint. If necessary, the Contractor may be required to remove rejected paint from previously painted surfaces if, on repainting with specified paint, the 2 coatings are incompatible.

### 3.5 CLEANING

- A. Cleanup: At the end of each workday, remove empty cans, rags, rubbish, and other discarded paint materials from the site.
1. After completing painting, clean glass and paint-spattered surfaces. Remove spattered paint by washing and scraping. Be careful not to scratch or damage adjacent finished surfaces.

### 3.6 PROTECTION

- A. Protect work of other trades, whether being painted or not, against damage by painting. Correct damage by cleaning, repairing or replacing, and repainting, as approved by Architect.
- B. Provide "Wet Paint" signs to protect newly painted finishes. Remove temporary protective wrappings provided by others to protect their work after completing painting operations.
1. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces. Comply with procedures specified in PDCA P1.

### 3.7 EXTERIOR PAINT SCHEDULE

- A. Ferrous Metal: Provide the following finish systems over exterior ferrous metal. Primer is not required on shop-primed items.
1. Low-Luster Acrylic Finish: 2 finish coats over a rust-inhibitive primer.
    - a. Primer: Rust-inhibitive metal primer applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 1.3 mils (0.033 mm).
      - 1) Devco: 13101 Mirrolac Rust Penetrating Metal Primer.
      - 2) Fuller: 621-04 Blox-Rust Alkyd Metal Primer.
      - 3) Glidden: 5205 Glid-Guard Tank & Structural Primer, Red.
      - 4) Moore: IronClad Retardo Rust-Inhibitive Paint #163.



- 5) PPG: 6-208 Speedhide Interior/Exterior Rust Inhibitive Steel Primer, Red.
  - 6) P & L: S/D 1009 Suprime "9" Interior/Exterior Alkyd Metal Primer.
  - b. First and Second Coat: Low-sheen (eggshell or satin), exterior, acrylic-latex paint applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 2.8 mils (0.071 mm).
    - 1) Devoe: 16XX Wonder-Shield Exterior Latex Satin House and Trim Paint.
    - 2) Fuller: 261-XX Eggshell Sheen Latex House and Trim Paint.
    - 3) Glidden: 6700 Series Spred Ultra Exterior Satin Latex House and Trim Paint.
    - 4) Moore: MoorGard Latex House Paint #103.
    - 5) PPG: 76 Line Sun-Proof Exterior House & Trim Acrylic Satin Latex.
    - 6) P & L: Z/F 4200 Series Accolade Exterior Eggshell.
- B. Zinc-Coated Metal: Provide the following finish systems over exterior zinc-coated (galvanized) metal surfaces:
1. Low-Luster Finish: 2 finish coats over a galvanized metal primer.
    - a. Primer: Galvanized metal primer applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 1.2 mils (0.031 mm).
      - 1) Devoe: 8502/8520 Mirrolac Interior/Exterior Waterborne Flat DTM Primer and Finish.
      - 2) Fuller: 621-05 Blox-Rust Latex Metal Primer.
      - 3) Glidden: 5205 Glid-Guard Tank & Structural Primer, Red.
      - 4) Moore: IronClad Galvanized Metal Latex Primer #155.
      - 5) PPG: 90-709 Pitt-Tech One Pack Interior/Exterior Primer/Finish DTM Industrial Enamel.
      - 6) P & L: Z/F 1003 Suprime "3" Interior/Exterior Latex Metal Primer.
    - b. First and Second Coat: Low-luster (eggshell of satin), exterior, acrylic-latex paint applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 2.8 mils (0.071 mm).
      - 1) Devoe: 16XX Wonder-Shield Exterior Acrylic Latex Satin House and Trim Paint.
      - 2) Fuller: 261-XX Eggshell Sheen Latex House and Trim Paint.
      - 3) Glidden: 6700 Series Spred Ultra Exterior Satin Latex House and Trim Paint.
      - 4) Moore: MoorGard Latex House Paint #103.
      - 5) PPG: 76 Line Sun-Proof Exterior House & Trim Acrylic Satin Latex.

### 3.8 INTERIOR PAINT SCHEDULE

- A. Concrete Masonry Units: Provide the following finish systems over interior concrete masonry block units:
1. Low-Luster, Acrylic-Enamel Finish: 2 finish coats over a block filler.
    - a. Block Filler: High-performance, latex-based, block filler applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 5.0 mils (0.13 mm).
      - 1) Devoe: 52902 Bloxfil 200 Interior/Exterior Latex Block Filler.
      - 2) Fuller: 280-00 Interior/Exterior Latex Block Filler.
      - 3) Glidden: 5317 Ultra-Hide Block Filler, Latex Interior-Exterior.
      - 4) Moore: Moorcraft Interior & Exterior Block Filler #173.
      - 5) PPG: 6-7 Speedhide Interior/Exterior Masonry Latex Block Filler.
      - 6) P & L: Z 98 Pro-Hide Plus Latex Block Filler.

- b. First and Second Coats: Low-luster (eggshell or satin), acrylic-latex, interior enamel applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 2.8 mils (0.071 mm).
  - 1) Devoe: 34XX Wonder-Tones Interior Latex Eggshell Enamel.
  - 2) Fuller: 212-XX AA Enamel Interior Acrylic Latex Eggshell Enamel.
  - 3) Glidden: 4100 Series Spred Ultra Eggshell Latex Wall & Trim Paint.
  - 4) Moore: Moore's Regal AquaVelvet #319.
  - 5) PPG: 89 Line Manor Hall Eggshell Latex Wall and Trim Enamel.
  - 6) P & L: Z/F 4000 Series Accolade Interior Velvet.
- B. Gypsum Board: Provide the following finish systems over interior gypsum board surfaces:
  - 1. Low-Luster, Acrylic-Enamel Finish: 2 finish coats over a primer.
    - a. Primer: Latex-based, interior primer applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 1.2 mils (0.031 mm).
      - 1) Devoe: 50801 Wonder-Tones Interior Vinyl Latex Primer-Sealer.
      - 2) Fuller: 220-20 Pro-Tech Interior Latex Wall Primer and Sealer.
      - 3) Glidden: 5111 Spred Ultra Latex Primer-Sealer.
      - 4) Moore: Regal First Coat Interior Latex Primer & Underbody #216.
      - 5) PPG: 17-10 Quick-Drying Interior Latex Primer-Sealer.
      - 6) P & L: Z/F 1004 Suprime "4" Interior Latex Wall Primer.
    - b. First and Second Coats: Low-luster eggshell , acrylic-latex, interior enamel applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 2.8 mils (0.071 mm).
      - 1) Devoe: 34XX Wonder-Tones Interior Latex Eggshell Enamel.
      - 2) Fuller: 212-XX AA Enamel Acrylic Latex Eggshell Enamel.
      - 3) Glidden: 4100 Series Spred Ultra Eggshell Latex Wall & Trim Paint.
      - 4) Moore: Moore's Regal AquaVelvet #319.
      - 5) PPG: 89 Line Manor Hall Eggshell Latex Wall and Trim Enamel.
      - 6) P & L: Z/F 4000 Series Accolade Interior Velvet.
- C. Stained Woodwork: Provide the following stained finishes over new, interior woodwork:
  - 1. Waterborne, Satin-Varnish Finish: 2 finish coats of a waterborne, clear-satin varnish over a sealer coat and a waterborne, interior wood stain. Wipe wood filler before applying stain.
    - a. Filler Coat: Paste-wood filler applied at spreading rate recommended by the manufacturer.
      - 1) Devoe: None required.
      - 2) Moore: Benwood Paste Wood Filler #238.
      - 3) PPG: None required.
      - 4) P & L: None required.
    - b. Stain Coat: Waterborne, interior wood stain applied at spreading rate recommended by the manufacturer.
      - 1) Devoe: 41XX WoodWorks Waterborne Interior Stain.
      - 2) Moore: Benwood Penetrating Stain #234.
      - 3) PPG: 77-302 Rez Interior Semi-Transparent Stain.
      - 4) P & L: Z 197 Acrylic Latex Stain Interior.
    - c. Sealer Coat: Clear sanding sealer applied at spreading rate recommended by the manufacturer.
      - 1) Devoe: 4200 WoodWorks Waterborne Quick-Dry Clear Sealer.
      - 2) Moore: None recommended.
      - 3) PPG: 77-30 Rez Interior Quick-Drying Sealer and Finish.

- 4) P & L: Z 7520 Latex Sanding Sealer.
    - d. First and Second Finish Coats: Waterborne, varnish finish applied at spreading rate recommended by the manufacturer.
      - 1) Devoe: 4300 WoodWorks Waterborne Crystal Clear Finish, Satin.
      - 2) Moore: Stays Clear Acrylic Polyurethane #423, Satin.
      - 3) PPG: 77-49 Rez Satin Acrylic Clear Polyurethane.
      - 4) P & L: Z 17 Acrylic Latex Varnish, Satin.
  - D. Natural-Finish Woodwork: Provide the following natural finishes over new, interior woodwork:
    - 1. Waterborne, Satin-Varnish Finish: 2 finish coats of a waterborne, clear-satin varnish over a sanding sealer. Wipe wood filler before applying stain.
      - a. Filler Coat: Paste-wood filler applied at spreading rate recommended by the manufacturer.
        - 1) Devoe: None required.
        - 2) Moore: Benwood Paste Wood Filler #238.
        - 3) PPG: None required.
        - 4) P & L: None required.
      - b. Sealer Coat: Clear sanding sealer applied at spreading rate recommended by the manufacturer.
        - 1) Devoe: 4200 WoodWorks Waterborne Quick-Dry Clear Sealer.
        - 2) Moore: None recommended.
        - 3) PPG: 77-30 Rez Interior Quick-Drying Sealer and Finish.
        - 4) P & L: Z 7520 Latex Sanding Sealer.
      - c. First and Second Finish Coats: Waterborne, varnish finish applied at spreading rate recommended by the manufacturer.
        - 1) Devoe: 4300 WoodWorks Waterborne Crystal Clear Finish, Satin.
        - 2) Moore: Stays Clear Acrylic Polyurethane #423, Satin.
        - 3) PPG: 77-49 Rez Satin Acrylic Clear Polyurethane.
        - 4) P & L: Z 17 Acrylic Latex Varnish, Satin.
  - E. Ferrous Metal: Provide the following finish systems over ferrous metal:
    - 1. Semigloss, Alkyd-Enamel Finish: One finish coat over an enamel undercoater and a primer.
      - a. Primer: Quick-drying, rust-inhibitive, alkyd-based or epoxy-metal primer, as recommended by the manufacturer for this substrate, applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 1.5 mils (0.038 mm).
        - 1) Devoe: 13101 Mirrolac Rust Penetrating Metal Primer.
        - 2) Fuller: 621-04 Blox-Rust Alkyd Metal Primer.
        - 3) Glidden: 5207 Glid-Guard Tank & Structural Primer, White.
        - 4) Moore: IronClad Retardo Rust-Inhibitive Paint #163.
        - 5) PPG: 6-208 Speedhide Interior/Exterior Rust Inhibitive Steel Primer.
        - 6) P & L: S 4551 Tech-Gard High Performance Rust Inhibitor Primer.
        - 7) S-W: Kem Kromik Metal Primer B50N2/B50W1.
      - b. Undercoat: Alkyd, interior enamel undercoat or semigloss, interior, alkyd-enamel finish coat, as recommended by the manufacturer for this substrate, applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 1.2 mils (0.031 mm).
        - 1) Devoe: 26XX Velour Interior Alkyd Semi-Gloss Enamel.
        - 2) Fuller: 220-07 Interior Alkyd Enamel Undercoat.
        - 3) Glidden: UH 8400 Ultra Traditional Alkyd Semi-Gloss Enamel.
        - 4) Moore: Moore's Alkyd Enamel Underbody #217.
        - 5) PPG: 6-6 Speedhide Interior Quick-Drying Enamel Undercoater.
        - 6) P & L: S/D 1011 Suprime "11" Interior Alkyd Wood Primer.

- 7) S-W: ProMar 200 Interior Alkyd Semi-Gloss Enamel B34W200.
- c. Finish Coat: Odorless, semigloss, alkyd, interior enamel applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 1.4 mils (0.036 mm).
  - 1) Devoe: 26XX Velour Interior Alkyd Semi-Gloss Enamel.
  - 2) Fuller: 110-XX Fullerglo Alkyd Semi-Gloss Enamel.
  - 3) Glidden: UH 8400 Ultra Traditional Alkyd Semi-Gloss Enamel.
  - 4) Moore: Satin Impervo #235.
  - 5) PPG: 27 Line Wallhide Low Odor Interior Enamel Wall and Trim Semi-Gloss Oil.
  - 6) P & L: S/D 5700 Cellu-Tone Alkyd Satin Enamel.
  - 7) S-W: Classic 99 Interior/Exterior Semi-Gloss Alkyd Enamel A-40 Series.
- F. Zinc-Coated Metal: Provide the following finish systems over zinc-coated metal:
  - 1. Semigloss, Alkyd-Enamel Finish: One finish coat over an undercoat and a primer.
    - a. Primer: Galvanized metal primer applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 1.2 mils (0.031 mm).
      - 1) Devoe: 13201 Mirrolac Galvanized Metal Primer.
      - 2) Fuller: 621-05 Blox-Rust Latex Metal Primer.
      - 3) Glidden: 5207 Glid-Guard Tank & Structural Primer, White.
      - 4) Moore: IronClad Galvanized Metal Latex Primer #155.
      - 5) PPG: 90-709 Pitt-Tech One Pack Interior/Exterior Primer/Finish DTM Industrial Enamel.
      - 6) P & L: Z/F 1003 Suprime "3" Interior/Exterior Latex Metal Primer.
      - 7) S-W: Galvite Paint B50W3.
    - b. Undercoat: Alkyd, interior enamel undercoat or semigloss, interior, alkyd-enamel finish coat, as recommended by the manufacturer for this substrate, applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 1.2 mils (0.031 mm).
      - 1) Devoe: 26XX Velour Interior Alkyd Semi-Gloss Enamel.
      - 2) Fuller: 220-07 Interior Alkyd Enamel Undercoat.
      - 3) Glidden: UH 8400 Series Spred Ultra Traditional Alkyd Semi-Gloss Enamel.
      - 4) Moore: Moore's Alkyd Enamel Underbody #217.
      - 5) PPG: 6-6 Speedhide Interior Quick-Drying Enamel Undercoater.
      - 6) P & L: S/D 1011 Suprime "11" Interior Alkyd Wood Primer.
      - 7) S-W: ProMar 200 Interior Alkyd Semi-Gloss Enamel B34W200.
    - c. Finish Coat: Odorless, semigloss, alkyd, interior enamel applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 1.4 mils (0.036 mm).
      - 1) Devoe: 26XX Velour Interior Alkyd Semi-Gloss Enamel.
      - 2) Fuller: 110-XX Fullerglo Alkyd Semi-Gloss Enamel.
      - 3) Glidden: UH 8400 Ultra Traditional Alkyd Semi-Gloss Enamel.
      - 4) Moore: Satin Impervo #235.
      - 5) PPG: 27 Line Wallhide Low Odor Interior Enamel Wall and Trim Semi-Gloss Oil.
      - 6) P & L: S/D 5700 Cellu-Tone Alkyd Satin Enamel.
      - 7) S-W: Classic 99 Interior Alkyd Semi-Gloss Enamel A-40 Series.

END OF SECTION 09900

## SECTION 10425 - SIGNS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. This Section includes the following types of signs:
  - 1. Panel signs.
- B. Related Sections: The following Sections contain requirements that relate to this Section:
  - 1. Division 15 Section "HVAC" for labels, tags, and nameplates for mechanical equipment.
  - 2. Division 16 Section "Electrical" for labels, tags, and nameplates for electrical equipment and for illuminated exit signs.

#### 1.3 ALLOWANCES

- A. Refer to Division 1 Section "Allowances" for additional information regarding allowances for this section.

#### 1.4 SUBMITTALS

- A. General: Submit the following according to the Conditions of the Contract and Division 1 Specification Sections.
- B. Product data for each type of sign specified, including details of construction relative to materials, dimensions of individual components, profiles, and finishes.
- C. Shop drawings showing fabrication and erection of signs. Include plans, elevations, and large-scale sections of typical members and other components. Show anchors, grounds, layout, reinforcement, accessories, and installation details.
  - 1. Provide message list for each sign required, including large-scale details of wording and lettering layout.
  - 2. For signs supported by or anchored to permanent construction, provide setting drawings, templates, and directions for installation of anchor bolts and other anchors to be installed as a unit of Work in other Sections.
  - 3. Templates: Furnish full-size spacing templates for individually mounted dimensional letters and numbers.
  - 4. Furnish full-size rubbings for metal plaques.
  - 5. Show graphics: Submit shop drawings for fabrication, include plans elevations and large scale details of symbols.
  - 6. Show anchorage and accessory items. Furnish location templated drawings for items supported or anchored to permanent construction. All signage shall meet handicapped requirements.
- D. Samples: Provide the following samples of each sign component for initial selection of color, pattern and surface texture as required and for verification of compliance with requirements indicated.
  - 1. Samples for initial selection of color, pattern, and texture:
    - a. Cast Acrylic Sheet and Plastic Laminate: Manufacturer's color charts consisting of actual sections of material including the full range of colors available for each material required.
    - b. Aluminum: Samples of each finish type and color, on 6-inch-long sections of extrusions and not less than 4-inch squares of sheet or plate, showing the full range of colors available.
  - 2. Samples for verification of color, pattern, and texture selected and compliance with requirements indicated:

- a. Cast Acrylic Sheet and Plastic Laminate: Provide a sample panel not less than 8-1/2 inches by 11 inches for each material, color, texture, and pattern required. On each panel include a representative sample of the graphic image process required, showing graphic style, and colors and finishes of letters, numbers, and other graphic devices.
- b. Aluminum: Samples of each finish type and color, on 6-inch-long sections of extrusions and not less than 4-inch squares of sheet or plate. Where finishes involve normal color and texture variations, include sample sets showing the full range of variations expected.
- c. Dimensional Letters: Provide full-size representative samples of each dimensional letter type required, showing letter style, color, and material finish and method of attachment.

## 1.5 QUALITY ASSURANCE

- A. Sign Fabricator Qualifications: Firm experienced in producing signs similar to those indicated for this Project, with a record of successful in-service performance, and sufficient production capacity to produce sign units required without causing delay in the Work.
- B. Single-Source Responsibility: For each separate sign type required, obtain signs from one source of a single manufacturer.
- C. Design Concept: The Drawings indicate sizes, profiles, and dimensional requirements of signs and are based on the specific types and models indicated. Sign units by other manufacturers may be considered provided deviations in dimensions and profiles do not change the design concept as judged by the Architect. The burden of proof of equality is on the proposer.

## 1.6 PROJECT CONDITIONS

- A. Field Measurements: Take field measurements prior to preparation of shop drawings and fabrication to ensure proper fitting. Show recorded measurements on final shop drawings. Coordinate fabrication schedule with construction progress to avoid delay.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated in the Work include, but are not limited to, the following:
  1. Manufacturers of Panel Signs:
    - a. ASI Sign Systems, Inc.
    - b. Charleston Industries, Inc.
    - c. Mohawk Sign Systems.

### 2.2 MATERIALS

- A. Cast Acrylic Sheet: Provide cast (not extruded or continuous cast) methyl methacrylate monomer plastic sheet, .125 inches thick, with a minimum flexural strength of 16,000 psi when tested according to ASTM D 790, with a minimum allowable continuous service temperature of 176 deg F (80 deg C), and of the following general types:
  1. White Translucent Sheet: Where sheet material is indicated as "white," provide white translucent sheet of density required to produce uniform brightness and minimum halation effects.
  2. Opaque Sheet: Where sheet material is indicated as "opaque," provide colored opaque acrylic sheet in colors and finishes as selected from the manufacturer's standards.
- B. Plastic Laminate: Provide high-pressure plastic laminate engraving stock with face and core plies in contrasting colors, in finishes and color combinations indicated or, if not indicated, as selected from the manufacturer's standards.

- C. Colored Coatings for Acrylic Plastic Sheet: Use colored coatings, including inks and paints for copy and background colors, that are recommended by acrylic manufacturers for optimum adherence to acrylic surface and are nonfading for the application intended.

## 2.3 PANEL SIGNS

- A. Panel Signs: Comply with requirements indicated for materials, thicknesses, finishes, colors, designs, shapes, sizes, and details of construction.
  - 1. Produce smooth, even, level sign panel surfaces, constructed to remain flat under installed conditions within a tolerance of plus or minus 1/32 inch measured diagonally.
  - 2. Signs shall be .125 inches thick acrylic plastic with photo polymer film bonded overlay.
  - 3. Sign edges are to be straight and free from saw marks or other imperfections. The corners of the sign are to be square.
- B. Unframed Panel Signs: Fabricate signs with edges mechanically and smoothly finished to conform with the following requirements:
  - 1. Edge Condition: Square cut.
  - 2. Edge Color for Plastic Laminate: Edge color same as copy.
  - 3. Corner Condition: Square corners.
- C. Framed Panel Signs: Fabricate frames to profile indicated; comply with the following requirements for materials and corner conditions:
  - 1. Material: Acrylic plastic.
  - 2. Corner Condition: Square corners.
- D. Laminated Sign Panels: Permanently laminate face panels to backing sheets of material and thickness indicated using the manufacturer's standard process.
- E. Brackets: Fabricate brackets and fittings for bracket-mounted signs from extruded aluminum to suit sign panel construction and mounting conditions indicated. Factory-paint brackets in a color matching the background color of the sign panel.
- F. Graphic Content and Style: Provide sign copy that complies with the requirements indicated for size, style, spacing, content, position, material, finishes, and colors of letters, numbers, and other graphic devices.
- G. Subsurface Copy: Apply copy to the back face of clear acrylic sheet forming the panel face by process indicated to produce precisely formed opaque images free from rough edges.
  - 1. Use Dupont Chromalin heat- and pressure-laminated photopolymer film system to form copy and background color.
    - a. The manufacturer has the option of selecting either process indicated above, or using subsurface engraving process, as appropriate to the copy form and the economics of production.
- H. Raised Copy: Machine-cut copy characters from matte-finished opaque acrylic sheet and chemically weld onto the acrylic sheet forming sign panel face. Produce precisely formed characters with square cut edges free from burrs and cut marks.
  - 1. Panel Material: Matte-finished clear acrylic with opaque color coating subsurface applied.
  - 2. Raised Copy Thickness: Not less than 1/32 inch.
- I. Finish: Non-Gloss finish 11 deg. To 19 deg. On 60 deg. Glossimeter. Finish to be eggshell matte, non-glare. All edges of signs to be painted to match face color.
- J. Type to be simple serif or sans serif at 5/8 inch high capital letters. All copy also to be translated into Grade II Braille.
- K. Background color: Color selected must provide 70% contrast between type and background color.
- L. Copy Color: Black or white.
- M. Mounting heights of signs to be 48 inches to top of sign, unless otherwise noted.

- N. Panel Sign Types-Refer to Drawing TTL-2 for additional types.

## 2.4 FINISHES

- A. Colors and Surface Textures: For exposed sign material that requires selection of materials with integral or applied colors, surface textures or other characteristics related to appearance, provide color matches indicated, or if not indicated, as selected by the Architect from the manufacturer's standards.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. General: Locate sign units and accessories where indicated, using mounting methods of the type described and in compliance with the manufacturer's instructions.
  - 1. Install signs level, plumb, and at the height indicated, with sign surfaces free from distortion or other defects in appearance.
- B. Wall-Mounted Panel Signs: Attach panel signs to wall surfaces using the methods indicated below:
  - 1. Shim Plate Mounting: Provide 1/8-inch-thick concealed aluminum shim plates with predrilled and countersunk holes, at locations indicated, and where other mounting methods are not practicable. Attach the plate with fasteners and anchors suitable for secure attachment to the substrate. Attach panel sign units to the plate using the method specified above.
- C. Bracket-Mounted Units: Provide the manufacturer's standard brackets, fittings, and hardware as appropriate for mounting signs that project at right angles from walls and ceilings. Attach brackets and fittings securely to walls or ceilings with concealed fasteners and anchoring devices to comply with manufacturer's directions.

### 3.2 CLEANING AND PROTECTION

- A. After installation, clean soiled sign surfaces according to the manufacturer's instructions. Protect units from damage until acceptance by the Owner.

END OF SECTION 10425



## SECTION 10523 - FIRE EXTINGUISHERS, CABINETS AND ACCESSORIES

### PART 1 GENERAL

#### 1.01 SECTION INCLUDES

- A. Fire extinguishers.
- B. Fire extinguisher cabinets.
- C. Accessories.

#### 1.02 RELATED SECTIONS

- A. Section 06114 - Wood Blocking and Curbing: Wood blocking and shims.

#### 1.03 REFERENCES

- A. NFPA 10 - Standard for Portable Fire Extinguishers; National Fire Protection Association; 2002.
- B. UL (FPED) - Fire Protection Equipment Directory; Underwriters Laboratories Inc.; current edition.

#### 1.04 PERFORMANCE REQUIREMENTS

- A. Conform to NFPA 10.
- B. Provide extinguishers classified and labeled by Underwriters Laboratories Inc. for the purpose specified and indicated.

#### 1.05 SUBMITTALS

- A. See Section 01300 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate cabinet physical dimensions.
- C. Product Data: Provide extinguisher operational features.
- D. Manufacturer's Installation Instructions: Indicate special criteria and wall opening coordination requirements.

#### 1.06 ENVIRONMENTAL REQUIREMENTS

- A. Do not install extinguishers when ambient temperature may cause freezing of extinguisher ingredients.

### PART 2 PRODUCTS

#### 2.01 MANUFACTURERS

- A. Fire Extinguishers, Cabinets and Accessories:
  - 1. JL Industries, Inc: [www.jlindustries.com](http://www.jlindustries.com).
  - 2. Larsen's Manufacturing Co: [www.larsensmfg.com](http://www.larsensmfg.com).
  - 3. Potter-Roemer: [www.potterroemer.com](http://www.potterroemer.com).
  - 4. Substitutions: See Section 01600 - Product Requirements.

#### 2.02 FIRE EXTINGUISHERS

- A. Foam Type: Stainless steel tank, with pressure gage.
  - 1. Class A,B,C.
  - 2. Size 10.

3. Finish: Baked enamel, Red color.

## 2.03 FIRE EXTINGUISHER CABINETS

- A. Metal: Formed primed steel sheet; 0.036 inch (0.9 mm) thick base metal.
- B. Cabinet Configuration: Recessed type.
  1. Sized to accommodate accessories.
  2. Trimless type.
- C. Door Glazing: Glass, clear, 1/8 inch (3 mm) thick float. Set in resilient channel gasket glazing
- D. Cabinet Mounting Hardware: Appropriate to cabinet. Pre-drill for anchors.
- E. Weld, fill, and grind components smooth.
- F. Finish of Cabinet Exterior Trim and Door: Primed for field paint finish.
- G. Finish of Cabinet Interior: White enamel.

## 2.04 ACCESSORIES

- A. Extinguisher Brackets: Formed steel, chrome-plated.
- B. Cabinet Signage:

## PART 3 EXECUTION 3.01 EXAMINATION

- A. Verify rough openings for cabinet are correctly sized and located.

## 3.02 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Secure rigidly in place.
- C. Place extinguishers and accessories in cabinets.

## 3.03 Schedule

- A. Supply and install 1 fire extinguisher and cabinet per apartment and 1 per common area at each floor.  
Exact locations to be coordinated at a later date

END OF SECTION

## SECTION 10800 - TOILET AND BATH ACCESSORIES

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. See toilet plumbing accessories on drawings for more information.

#### 1.2 SUMMARY

- A. This Section includes toilet and bath accessory items as scheduled.

#### 1.3 SUBMITTALS

- A. General: Submit the following according to Conditions of Contract and Division 1 Specifications Sections.
- B. Product data for each toilet accessory item specified, including construction details relative to materials, dimensions, gages, profiles, mounting method, specified options, and finishes.
- C. Setting drawings where cutouts are required in other work, including templates, substrate preparation instructions, and directions for preparing cutouts and installing anchorage devices.
- D. Maintenance instructions including replaceable parts and service recommendations.

#### 1.4 QUALITY ASSURANCE

- A. Inserts and Anchorages: Furnish accessory manufacturers' standard inserts and anchoring devices that must be set in concrete or built into masonry. Coordinate delivery with other work to avoid delay.
- B. Single-Source Responsibility: Provide products of same manufacturer for each type of accessory unit and for units exposed to view in same areas, unless otherwise acceptable to Architect.

#### 1.5 PROJECT CONDITIONS

- A. Coordination: Coordinate accessory locations, installation, and sequencing with other work to avoid interference with and ensure proper installation, operation, adjustment, cleaning, and servicing of toilet accessory items.

#### 1.6 WARRANTY

- A. Warranty: Submit a written warranty executed by mirror manufacturer, agreeing to replace any mirrors that develop visible silver spoilage defects within warranty period.
- B. Warranty Period: 15 years from date of Substantial Completion.
- C. The warranty shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and will be in addition to and run concurrent with other warranties made by the Contractor under requirements of the Contract Documents.

### PART 2 - PRODUCTS

#### 2.1 ACCEPTABLE MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide toilet accessories equal to one of the following:
  - 1. American Specialties, Inc.
  - 2. Bobrick Washroom Equipment, Inc.
  - 3. Bradley Corporation.

## 2.2 MATERIALS, GENERAL

- A. Stainless Steel: AISI Type 302/304, with polished No. 4 finish, 0.034 inch (0.9 mm) minimum thickness.
- B. Mirror Glass: Nominal 6.0 mm thick, conforming to ASTM C 1036, Type I, Class 1, Quality q2, and with silvering, electro-plated copper coating, and protective organic coating.
- C. Galvanized Steel Mounting Devices: ASTM A 153, hot-dip galvanized after fabrication.
- D. Fasteners: Screws, bolts, and other devices of same material as accessory unit, or of galvanized steel where concealed.

## 2.3 TOILET TISSUE DISPENSERS

- A. Double-Roll Dispenser: Size to accommodate two separate rolls of core type tissue to 5 1/4 inch diameter roll.
  - 1. Fabrication: Satin stainless, steel construction with heavy duty spindles; designed for surface mounting, self-locking device extends through core and prevents core removal until roll is empty.
  - 2. Mounting: Surface mounted concealed anchorage.

## 2.4 WASTE RECEPTACLE UNITS

- A. Recessed Unit: Stainless steel unit fabricated for nominal 4-inch wall depth with continuous, seamless wall flange. Waste receptacle provided with reusable, heavy-duty vinyl liner, leakproof, minimum 12 gallon capacity. Provide flush doors with piano hinges and tumbler locks on compartments.

## 2.5 GRAB BARS

- A. Stainless Steel Type: Provide grab bars with wall thickness not less than 0.05 inch (1.3 mm) in shapes indicated on drawings and as follows:
  - 1. Mounting: Concealed, manufacturer's standard flanges and anchorages.
  - 2. Clearance: 1-1/2 inch (38 mm) clearance between wall surface and inside face of bar.
  - 3. Gripping Surfaces: Manufacturer's standard nonslip texture.
  - 4. Heavy-Duty Size: Outside diameter of 1-1/2 inches (38 mm).

## 2.6 SOAP DISPENSERS

- A. Liquid Soap Dispenser, Surface-Mounted: Satin stainless steel container unit with a minimum 40 fluid ounce capacity.
  - 1. Equip unit with valve for dispensing soap in liquid form.

## 2.7 MIRROR UNITS

- A. Stainless Steel Framed Mirror Units: Fabricate frame with angle shapes not less than 0.05 inch (1.3 mm), with square corners mitered, welded, and ground smooth. Provide in No. 4 satin polished finish.

## 2.12 FABRICATION

- A. General: Only a maximum 1-1/2 inch (38 mm) diameter, unobtrusive stamped manufacturer logo, as approved by Architect, is permitted on exposed face of toilet or bath accessory units. On either interior surface not exposed to view or back surface, provide additional identification by either a printed, waterproof label or a stamped nameplate, indicating manufacturer's name and product model number.
- B. Surface-Mounted Toilet Accessories, General: Except where otherwise indicated, fabricate units with tight seams and joints, exposed edges rolled. Hang doors or access panels with continuous stainless steel piano hinge. Provide concealed anchorage wherever possible.

- C. Recessed Toilet Accessories, General: Except where otherwise indicated, fabricate units of all-welded construction, without mitered corners. Hang doors or access panels with full-length, stainless steel piano hinge. Provide anchorage that is fully concealed when unit is closed.
- D. Framed Mirror Units, General: Fabricate frames for glass mirror units to accommodate wood, felt, plastic, or other glass edge protection material. Provide mirror backing and support system that will permit rigid, tamperproof glass installation and prevent moisture accumulation, as follows:
  - 1. Provide galvanized-steel backing sheet, not less than 0.034 inch (0.9 mm) and full mirror size, with nonabsorptive filler material. Corrugated cardboard is not an acceptable filler material.
- E. Mirror Unit Hangers: Provide system for mounting mirror units that will permit rigid, tamperproof, and theftproof installation, as follows:
  - 1. Heavy-duty wall brackets of galvanized steel, equipped with concealed locking devices requiring a special tool to remove.
- F. Keys: Provide universal keys for access to toilet accessory units requiring internal access for servicing, resupply, etc. Provide minimum of six keys to Owner's representative.

### PART 3 - EXECUTION

#### 3.1 INSTALLATION

- A. Install toilet accessory units according to manufacturers' instructions, using fasteners appropriate to substrate as recommended by unit manufacturer. Install units plumb and level, firmly anchored in locations and at heights indicated.
- B. Secure mirrors to walls in concealed, tamperproof manner with special hangers, toggle bolts, or screws. Set units plumb, level, and square at locations indicated, according to manufacturer's instructions for type of substrate involved.
- C. Install grab bars to withstand a downward load of at least 250 lbf (1100 N), complying with ASTM F 446.

#### 3.2 ADJUSTING AND CLEANING

- A. Adjust toilet accessories for proper operation and verify that mechanisms function smoothly. Replace damaged or defective items.
- B. Clean and polish all exposed surfaces strictly according to manufacturer's recommendations after removing temporary labels and protective coatings.

END OF SECTION 10800