

## SECTION 092216 - NON-STRUCTURAL METAL FRAMING

### 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. This Section includes non-load-bearing steel framing members for the following applications:
  - 1. Interior framing systems e.g., supports for partition walls, framed soffits, furring, etc.
  - 2. Interior suspension systems e.g., supports for ceilings, suspended soffits, etc.

#### 1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.

#### 1.4 QUALITY ASSURANCE

- A. Fire-Test-Response Characteristics: For fire-resistance-rated assemblies that incorporate non-load-bearing steel framing, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing agency.
- B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.

### PART 2 - PRODUCTS

#### 2.1 NON-LOAD-BEARING STEEL FRAMING, GENERAL

- A. Recycled Content of Steel Products: Provide products with average recycled content of steel products such that postconsumer recycled content plus one-half of preconsumer recycled content is not less than 25 percent.
- B. Framing Members, General: Comply with ASTM C 754 for conditions indicated.
  - 1. Steel Sheet Components: Comply with ASTM C 645 requirements for metal, unless otherwise indicated.

2. Protective Coating: ASTM A 653/A 653M, G40 Z120 ASTM A 653/A 653M, G60 Z180 Coating with equivalent corrosion resistance of ASTM A 653/A 653M, G40 Z120, hot-dip galvanized, unless otherwise indicated.

## 2.2 SUSPENSION SYSTEM COMPONENTS

- A. Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.0625-inch- 1.59-mm-diameter wire, or double strand of 0.0475-inch- 1.21-mm- diameter wire.
- B. Hanger Attachments to Concrete:
  1. Anchors: Fabricated from corrosion-resistant materials with holes or loops for attaching wire hangers and capable of sustaining, without failure, a load equal to 5 times that imposed by construction as determined by testing according to ASTM E 488 by an independent testing agency.
    - a. Type: Postinstalled, chemical anchor Postinstalled, expansion anchor.
  2. Powder-Actuated Fasteners: Suitable for application indicated, fabricated from corrosion-resistant materials with clips or other devices for attaching hangers of type indicated, and capable of sustaining, without failure, a load equal to 10 <Insert number> times that imposed by construction as determined by testing according to ASTM E 1190 by an independent testing agency.
- C. Wire Hangers: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.162-inch diameter.
- D. Flat Hangers: Steel sheet, 1 by 3/16 inch by length indicated.
- E. Carrying Channels: Cold-rolled, commercial-steel sheet with a base-metal thickness of 0.0538 inch and minimum 1/2-inch- wide flanges.
  1. Depth: 2 inches.
- F. Furring Channels:
  1. Cold-Rolled Channels: 0.0538-inch bare-steel thickness, with minimum 1/2-inch wide flanges, 3/4 inch deep.
  2. Steel Studs: ASTM C 645.
    - a. Minimum Base-Metal Thickness: 0.0312 inch.
    - b. Depth: As indicated on Drawing.
  3. Hat-Shaped, Rigid Furring Channels: ASTM C 645, 7/8 inch deep.
    - a. Minimum Base Metal Thickness: 0.0312 inch.
  4. Resilient Furring Channels: 1/2-inch deep members designed to reduce sound transmission.
    - a. Configuration: Hat shaped.

- G. Grid Suspension System for Ceilings: ASTM C 645, direct-hung system composed of main beams and cross-furring members that interlock.
  - 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. Armstrong World Industries, Inc.; Drywall Grid Systems.
    - b. Chicago Metallic Corporation; Fire Front 670-C Drywall Furring System.
    - c. USG Corporation; Drywall Suspension System.

### 2.3 STEEL FRAMING FOR FRAMED ASSEMBLIES

- A. Steel Studs and Runners: ASTM C 645.
  - 1. Minimum Base-Metal Thickness: 0.0312 inch.
  - 2. Depth: As indicated on Drawing.
- B. Slip-Type Head Joints: Where indicated, provide the following:
  - 1. Single Long-Leg Runner System: ASTM C 645 top runner with 2-inch deep flanges in thickness not less than indicated for studs, installed with studs friction fit into top runner and with continuous bridging located within 12 inches of the top of studs to provide lateral bracing.
  - 2. Double-Runner System: ASTM C 645 top runners, inside runner with 2-inch deep flanges in thickness not less than indicated for studs and fastened to studs, and outer runner sized to friction fit inside runner.
  - 3. Deflection Track: Steel sheet top runner manufactured to prevent cracking of finishes applied to interior partition framing resulting from deflection of structure above; in thickness not less than indicated for studs and in width to accommodate depth of studs.
    - a. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
    - b. Products: Subject to compliance with requirements, provide one of the following:
      - 1) Steel Network Inc. VertiTrack VTD Series.
      - 2) Superior Metal Trim; Superior Flex Track System SFT.
- C. Firestop Tracks: Top runner manufactured to allow partition heads to expand and contract with movement of the structure while maintaining continuity of fire-resistance-rated assembly indicated; in thickness not less than indicated for studs and in width to accommodate depth of studs.
  - 1. 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. Fire Trak Corp.; Fire Trak attached to studs with Fire Trak Slip Clip.
    - b. Metal-Lite, Inc.; The System.

- D. Hat-Shaped, Rigid Furring Channels: ASTM C 645.
  - 1. Minimum Base Metal Thickness: 0.0312 inch (0.79 mm).
  - 2. Depth: 1-1/2 inches (38.1 mm).

## 2.4 AUXILIARY MATERIALS

- A. General: Provide auxiliary materials that comply with referenced installation standards.
  - 1. Fasteners for Metal Framing: Of type, material, size, corrosion resistance, holding power and other properties required to fasten steel members to substrates.
- B. Isolation Strip at Exterior Walls: Provide one of the following:
  - 1. Asphalt-Saturated Organic Felt: ASTM D 226, Type I No. 15 asphalt felt, nonperforated.
  - 2. Foam Gasket: Adhesive-backed, closed-cell vinyl foam strips that allow fastener penetration without foam displacement, 1/8 inch (3.2 mm thick), in width to suit steel stud size.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

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

### 3.2 PREPARATION

- A. Suspended Assemblies: Coordinate installation of suspension systems with installation of overhead structure to ensure that inserts and other provisions for anchorages to building structure have been installed to receive hangers at spacing required to support the Work and that hangers will develop their full strength.
  - 1. Furnish concrete inserts and other devices indicated to other trades for installation in advance of time needed for coordination and construction.
- B. Coordination with Sprayed Fire-Resistive Materials:
  - 1. Before sprayed fire-resistive materials are applied, attach offset anchor plates or ceiling runners to surfaces indicated to receive sprayed fire-resistive materials. Where offset anchor plates are required, provide continuous plates fastened to building structure not more than 24 inches.
  - 2. After sprayed fire-resistive materials are applied, remove them only to extent necessary for installation of non-load-bearing steel framing. Do not reduce thickness of fire-

resistive materials below that required for fire-resistance ratings indicated. Protect adjacent fire-resistive materials from damage.

### 3.3 INSTALLATION, GENERAL

- A. Installation Standard: ASTM C 754, except comply with framing sizes and spacing indicated.
  - 1. Gypsum Plaster Assemblies: Also comply with requirements in ASTM C 841 that apply to framing installation.
  - 2. Portland Cement Plaster Assemblies: Also comply with requirements in ASTM C 1063 that apply to framing installation.
  - 3. Gypsum Veneer Plaster Assemblies: Also comply with requirements in ASTM C 844 that apply to framing installation.
  - 4. Gypsum Board Assemblies: Also comply with requirements in ASTM C 840 that apply to framing installation.
- B. Install supplementary framing, and blocking to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction.
- C. Install bracing at terminations in assemblies.
- D. Do not bridge building control and expansion joints with non-load-bearing steel framing members. Frame both sides of joints independently.

### 3.4 INSTALLING SUSPENSION SYSTEMS

- A. Install suspension system components in sizes and spacings indicated on Drawings, but not less than those required by referenced installation standards for assembly types and other assembly components indicated.
- B. Isolate suspension systems from building structure where they abut or are penetrated by building structure to prevent transfer of loading imposed by structural movement.
- C. Suspend hangers from building structure as follows:
  - 1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structural or suspension system.
    - a. Splay hangers only where required to miss obstructions and offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
  - 2. Where width of ducts and other construction within ceiling plenum produces hanger spacing's that interfere with locations of hangers required to support standard suspension system members, install supplemental suspension members and hangers in the form of trapezes or equivalent devices.
    - a. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced installation standards.

3. Wire Hangers: Secure by looping and wire tying, either directly to structures or to inserts, eye screws, or other devices and fasteners that are secure and appropriate for substrate, and in a manner that will not cause hangers to deteriorate or otherwise fail.
  4. Flat Hangers: Secure to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices and fasteners that are secure and appropriate for structure and hanger, and in a manner that will not cause hangers to deteriorate or otherwise fail.
  5. Do not attach hangers to steel roof deck.
  6. Do not attach hangers to permanent metal forms. Furnish cast-in-place hanger inserts that extend through forms.
  7. Do not attach hangers to rolled-in hanger tabs of composite steel floor deck.
  8. Do not connect or suspend steel framing from ducts, pipes, or conduit.
- D. Fire-Resistance-Rated Assemblies: Wire tie furring channels to supports.
- E. Seismic Bracing: Sway-brace suspension systems with hangers used for support.
- F. Grid Suspension Systems: Attach perimeter wall track or angle where grid suspension systems meet vertical surfaces. Mechanically join main beam and cross-furring members to each other and butt-cut to fit into wall track.
- G. Installation Tolerances: Install suspension systems that are level to within 1/8 inch in 12 feet measured lengthwise on each member that will receive finishes and transversely between parallel members that will receive finishes.

### 3.5 INSTALLING FRAMED ASSEMBLIES

- A. Where studs are installed directly against exterior masonry walls or dissimilar metals at exterior walls, install isolation strip between studs and exterior wall.
- B. Install studs so flanges within framing system point in same direction.
1. Space studs as follows:
    - a. Single-Layer Application: 16 inches o.c., unless otherwise indicated.
    - b. Multilayer Application: 16 inches o.c., unless otherwise indicated.
    - c. Tile backing panels: 16 inches o.c., unless otherwise indicated.
- C. Install runners at floors and overhead supports. Extend framing full height to structural supports or substrates above suspended ceilings, except where partitions are indicated to terminate at suspended ceilings. Continue framing around ducts penetrating partitions above ceiling.
1. Slip-Type Head Joints: Where framing extends to overhead structural supports, install to produce joints at tops of framing systems that prevent axial loading of finished assemblies.
  2. Door Openings: Screw vertical studs at jambs to jamb anchor clips on door frames; install runner track section at head and secure to jamb studs.
    - a. Install two studs at each jamb, unless otherwise indicated.

- b. Install cripple studs at head adjacent to each jamb stud, with a minimum 1/2-inch clearance from jamb stud to allow for installation of control joint in finished assembly.
    - c. Extend jamb studs through suspended ceilings and attach to underside of overhead structure.
  3. Other Framed Openings: Frame openings other than door openings the same as required for door openings, unless otherwise indicated. Install framing below sills of openings to match framing required above door heads.
  4. Fire-Resistance-Rated Partitions: Install framing to comply with fire-resistance-rated assembly indicated and support closures and to make partitions continuous from floor to underside of solid structure.
    - a. Firestop Track: Where indicated, install to maintain continuity of fire-resistance-rated assembly indicated.
  5. Sound-Rated Partitions: Install framing to comply with sound-rated assembly indicated.
  6. Curved Partitions:
    - a. Bend track to uniform curve and locate straight lengths so they are tangent to arcs.
    - b. Begin and end each arc with a stud, and space intermediate studs equally along arcs. On straight lengths of not less than 2 studs at ends of arcs, place studs 6 inches o.c.
- D. Direct Furring:
  1. Screw to wood framing, or apply approved construction adhesive.
  2. Attach to concrete or masonry with stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 24 inches o.c. Anchor directly into mortar joint.

END OF SECTION 092216

## SECTION 092900 - GYPSUM BOARD

### 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. This Section includes the following:
  - 1. Interior gypsum board.
  - 2. Exterior gypsum board for ceilings and soffits.
  - 3. Tile backing panels.
- B. Related Sections include the following:
  - 1. Division 09 Section "Non-Structural Metal Framing" for non-structural framing and suspension systems that support gypsum board.
  - 2. Division 09 Section "Tiling" for cementitious backer units installed as substrates for ceramic tile.
  - 3. Division 09 painting Sections for primers applied to gypsum board surfaces.

#### 1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Samples: For the following products:
  - 1. Trim Accessories: Full-size Sample in 12-inchlong length for each trim accessory indicated.
  - 2. Textured Finishes: 12" X 12" minimum for each textured finish indicated and on same backing indicated for Work.

#### 1.4 QUALITY ASSURANCE

- A. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing agency.
- B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.



- C. Mockups: Before beginning gypsum board installation, install mockups of at least 100 sq. ft. (9 sq. m) in surface area to demonstrate aesthetic effects and set quality standards for materials and execution. This requirement may be waived if approved by Architect.
  - 1. Install mockups for the following:
    - a. Each level of gypsum board finish indicated for use in exposed locations.
    - b. Each texture finish indicated.
  - 2. Apply or install final decoration indicated, including painting and wallcoverings, on exposed surfaces for review of mockups.
  - 3. Simulate finished lighting conditions for review of mockups.
  - 4. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

#### 1.5 STORAGE AND HANDLING

- A. Store materials inside under cover and keep them dry and protected against damage from weather, condensation, direct sunlight, construction traffic, surface contamination, and other causes. Stack panels flat to prevent sagging, warping and buckling.

#### 1.6 PROJECT CONDITIONS

- A. Environmental Limitations: Comply with ASTM C 840 requirements or gypsum board manufacturer's written recommendations, whichever are more stringent.
- B. Do not install interior products until installation areas are enclosed and conditioned.
- C. Do not install panels that are wet, those that are moisture damaged, and those that are mold damaged.
  - 1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
  - 2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

#### 1.7 PRODUCTS PROHIBITED

- A. The use of products containing asbestos is prohibited on all university projects.

### PART 2 - PRODUCTS

#### 2.1 PANELS, GENERAL

- A. Recycled Content: Provide gypsum panel products with recycled content such that postconsumer recycled content plus one-half of preconsumer recycled content constitutes a minimum of <Insert number> percent by weight.

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

## 2.2 INTERIOR GYPSUM BOARD

- A. General: Complying with ASTM C 36/C 36M or ASTM C 1396/C 1396M, as applicable to type of gypsum board indicated and whichever is more stringent.
  - 1. 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:
  - 2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. American Gypsum Co.
    - b. Certain Teed Building Products.
    - c. G-P Gypsum.
    - d. National Gypsum Company.
    - e. USG Corporation.
- B. Regular Type:
  - 1. Thickness: 5/8 inch.
  - 2. Long Edges: Tapered.
- C. Type X:
  - 1. Thickness: 5/8 inch.
  - 2. Long Edges: Tapered.
- D. Type C:
  - 1. Thickness: As required by fire-resistance-rated assembly indicated on Drawings.
  - 2. Long Edges: Tapered.
- E. Flexible Type: Manufactured to bend to fit radii and to be more flexible than standard regular-type gypsum board of same thickness.
  - 1. Thickness: 1/4 inch.
  - 2. Long Edges: Tapered.
- F. Ceiling Type: Manufactured to have more sag resistance than regular-type gypsum board.
  - 1. Thickness: 5/8 inch.
  - 2. Long Edges: Tapered.
- G. Abuse-Resistant Type: Manufactured to produce greater resistance to surface indentation, through-penetration (impact resistance), and abrasion than standard, regular-type and Type X gypsum board.
  - 1. Core: As indicated on Drawings 5/8 inch, Type X.

2. Long Edges: Tapered.
- H. High-Impact Type: Manufactured with Type X core, plastic film laminated to back side for greater resistance to through-penetration (impact resistance).
1. Core: As indicated on Drawings 5/8 inch thick.
  2. Plastic-Film Thickness: 0.254 mm.
- I. Moisture- and Mold-Resistant Type: With moisture- and mold-resistant core and surfaces.
1. Core: 5/8 inch, Type X.
  2. Long Edges: Tapered.
- J. 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. USG Corporation; DUROCK Cement Board.
  3. Thickness: As indicated on Drawings 5/8 inch (15.9 mm).

## 2.3 TRIM ACCESSORIES

- A. Interior Trim: ASTM C 1047.
1. Material: Galvanized or aluminum-coated steel sheet, rolled zinc, 26 gage minimum.
  2. Shapes:
    - a. Cornerbead. Use at outside corners, unless otherwise indicated.
    - b. Bullnose bead.
    - c. LC-Bead: J-shaped; exposed long flange receives joint compound.
    - d. L-Bead: L-shaped; exposed long flange receives joint compound.
    - e. U-Bead: J-shaped; exposed short flange does not receive joint compound.
    - f. Expansion (control) joint: flanges with bellows and removable strip.
    - g. Curved-Edge Cornerbead: With notched or flexible flanges.
- B. Aluminum Trim: Extruded accessories of profiles and dimensions indicated.
1. 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:
  2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Fry Reglet Corp.
    - b. Gordon, Inc.

c. Pittcon Industries.

3. Aluminum: Alloy and temper with not less than the strength and durability properties of ASTM B 221 (ASTM B 221M), Alloy 6063-T5.
4. Finish: Corrosion-resistant primer compatible with joint compound and finish materials specified.

## 2.4 JOINT TREATMENT MATERIALS

A. General: Comply with ASTM 1047M.

B. Joint Tape:

1. Interior Gypsum Wallboard: Paper.
2. Exterior Gypsum Soffit Board: Paper.
3. Glass-Mat Gypsum Sheathing Board: 10-by-10 glass mesh.
4. 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 drying-type, all-purpose compound.
  - a. Use setting-type compound for installing paper-faced metal trim accessories.
3. Fill Coat: For second coat, use setting-type, sandable topping drying-type, all-purpose compound.
4. Finish Coat: For third coat, use setting-type, sandable topping drying-type, all-purpose compound.
5. Skim Coat: For final coat of Level 5 finish, use setting-type, sandable topping compound drying-type, all-purpose compound high-build interior coating product designed for application by airless sprayer and to be used instead of skim coat to produce Level 5 finish.
6. Cementitious Backer Units: As recommended by backer unit manufacturer.

## 2.5 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.

1. Use adhesives that have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

- 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 (0.84 to 2.84 mm) 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. Acoustical Sealant: As specified in Division 07 Section "Joint Sealants."
  - 1. Provide sealants that have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- F. Thermal Insulation: As specified in Division 07 Section "Thermal Insulation."

## PART 3 - EXECUTION

### 3.1 EXAMINATION

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

### 3.2 APPLYING AND FINISHING PANELS, GENERAL

- A. Comply with ASTM C 840.
- B. Install ceiling panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.
- C. Install panels with face side out. Butt panels together for a light contact at edges and ends with not more than 1/16 inch (1.5 mm) of open space between panels. Do not force panels into place.
- D. Locate edge and end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Do not make joints other than control joints at corners of framed openings.

- E. Form control and expansion joints with space between edges of adjoining gypsum panels.
- F. Cover both faces of support framing with gypsum panels in concealed spaces (above ceilings, etc.), except in chases braced internally.
  - 1. Unless concealed application is indicated or required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than 8 sq. ft. (0.7 sq. m) in area.
  - 2. Fit gypsum panels around ducts, pipes, and conduits.
  - 3. Where partitions intersect structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by structural members; allow 1/4- to 3/8-inch- (6.4- to 9.5-mm-) wide joints to install sealant.
- G. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments, except floors. Provide 1/4- to 1/2-inch- (6.4- to 12.7-mm-) wide spaces at these locations, and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.
- H. Attachment to Steel Framing: Attach panels so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.
- I. Wood Framing: Install gypsum panels over wood framing, with floating internal corner construction. Do not attach gypsum panels across the flat grain of wide-dimension lumber, including floor joists and headers. Float gypsum panels over these members, or provide control joints to counteract wood shrinkage.
- J. STC-Rated Assemblies: Seal construction at perimeters, behind control joints, and at openings and penetrations with a continuous bead of acoustical sealant. Install acoustical sealant at both faces of partitions at perimeters and through penetrations. Comply with ASTM C 919 and with manufacturer's written recommendations for locating edge trim and closing off sound-flanking paths around or through assemblies, including sealing partitions above acoustical ceilings.
- K. Install sound attenuation blankets before installing gypsum panels, unless blankets are readily installed after panels have been installed on one side.

### 3.3 APPLYING INTERIOR GYPSUM BOARD

- A. Install interior gypsum board in the following locations:
  - 1. Regular Type: As indicated on Drawings Vertical surfaces, unless otherwise indicated.
  - 2. Type X: As indicated on Drawings and Where required for fire-resistance-rated assembly.
  - 3. Type C: As indicated on Drawings and where required for specific fire-resistance-rated assembly indicated.
  - 4. Flexible Type: As indicated on Drawings. Apply in double layer at curved assemblies.
  - 5. Ceiling Type: As indicated on Drawings Ceiling surfaces.
  - 6. Foil-Backed Type: As indicated on Drawings.
  - 7. Abuse-Resistant Type: As indicated on Drawings.
  - 8. High-Impact Type: As indicated on Drawings.
  - 9. Moisture- and Mold-Resistant Type: As indicated on Drawings.

B. Single-Layer Application:

1. On ceilings, apply gypsum panels before wall/partition board application to greatest extent possible and at right angles to framing, unless otherwise indicated.
2. On partitions/walls, apply gypsum panels horizontally (perpendicular to framing), unless otherwise indicated or required by fire-resistance-rated assembly, and minimize end joints.
  - a. Stagger abutting end joints not less than one framing member in alternate courses of panels.
  - b. At stairwells and other high walls, install panels horizontally, unless otherwise indicated or required by fire-resistance-rated assembly.
3. On Z-furring members, apply gypsum panels vertically (parallel to framing) with no end joints. Locate edge joints over furring members.
4. Fastening Methods: Apply gypsum panels to supports with steel drill screws.

C. Multilayer Application:

1. On ceilings, apply gypsum board indicated for base layers before applying base layers on walls/partitions; apply face layers in same sequence. Apply base layers at right angles to framing members and offset face-layer joints 1 framing member, 16 inches (400 mm) minimum, from parallel base-layer joints, unless otherwise indicated or required by fire-resistance-rated assembly.
2. On partitions/walls, apply gypsum board indicated for base layers and face layers vertically (parallel to framing) with joints of base layers located over stud or furring member and face-layer joints offset at least one stud or furring member with base-layer joints, unless otherwise indicated or required by fire-resistance-rated assembly. Stagger joints on opposite sides of partitions.
3. On Z-furring members, apply base layer vertically (parallel to framing) and face layer either vertically (parallel to framing) or horizontally (perpendicular to framing) with vertical joints offset at least one furring member. Locate edge joints of base layer over furring members.
4. Fastening Methods: [Fasten base layers and face layers separately to supports with screws] [Fasten base layers with screws; fasten face layers with adhesive and supplementary fasteners].

D. 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.

E. Curved Surfaces:

1. Install panels horizontally (perpendicular to supports) and unbroken, to extent possible, across curved surface plus 12-inch- (300-mm-) long straight sections at ends of curves and tangent to them.
2. For double-layer construction, fasten base layer to studs with screws 16 inches (400 mm) o.c. Center gypsum board face layer over joints in base layer, and fasten to studs with screws spaced 12 inches (300 mm) o.c.

### 3.4 APPLYING TILE BACKING PANELS

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

### 3.5 INSTALLING TRIM ACCESSORIES

- A. General: For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.
- B. Control Joints: Install control joints according to ASTM C 840 and in specific locations approved by Architect for visual effect.
- C. Interior Trim: Install in the following locations:
  - 1. Cornerbead: Use at outside corners, unless otherwise indicated.
  - 2. Bullnose Bead: Use at outside corners.
  - 3. LC-Bead: Use at exposed panel edges.
  - 4. L-Bead: Use where indicated, paintable, chemical film coating.
  - 5. U-Bead: Use at exposed panel edges, paintable, chemical film coating.
  - 6. Curved-Edge Cornerbead: Use at curved openings.
  - 7. Scheduled reveal mold: Use at vertical joints with masonry and cementitious material including, but not limited to, CMU, glazed block, terra cotta, brick and concrete.
- D. Aluminum Trim: Install in locations indicated on Drawings. Color and finish to be selected from manufacturers full range.

### 3.6 FINISHING GYPSUM BOARD

- A. General: Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.
- B. Prefill open joints, rounded or beveled edges, and damaged surface areas.
- C. Apply joint tape over gypsum board joints, except those with trim having flanges not intended for tape.
- D. Gypsum Board Finish Levels: Finish panels to levels indicated below and according to ASTM C 840:
  - 1. Level 1: Ceiling plenum areas, concealed areas, and where indicated.
  - 2. Level 2: Panels that are substrate for acoustical tile.



3. Level 3: Where indicated on Drawings.
4. Level 5: At panel surfaces that will be exposed to view, unless otherwise indicated, and where indicated on drawings.
  - a. Primer and its application to surfaces are specified in other Division 09 Sections.

- E. Glass-Mat Gypsum Sheathing Board: Finish according to manufacturer's written instructions for use as exposed soffit board.
- F. Glass-Mat, Water-Resistant Backing Panels: Finish according to manufacturer's written instructions.
- G. Cementitious Backer Units: Finish according to manufacturer's written instructions.

### 3.7 PROTECTION

- A. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.
- B. Remove and replace panels that are wet, moisture damaged, and mold damaged.
  1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
  2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION 092900

## SECTION 093100 - TILING

### 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. Ceramic tile.
2. Stone thresholds.
3. Waterproof membrane.
4. Crack isolation membrane.
5. Tile backing panels.
6. Metal edge strips.

- B. Related Sections:

1. Division 07 Section "Joint Sealants" for sealing of expansion, contraction, control, and isolation joints in tile surfaces.
2. Division 09 Section "Gypsum Board" for glass-mat, water-resistant backer board.

#### 1.3 DEFINITIONS

- A. General: Definitions in the ANSI A108 series of tile installation standards and in ANSI A137.1 apply to Work of this Section unless otherwise specified.
- B. ANSI A108 Series: ANSI A108.01, ANSI A108.02, ANSI A108.1A, ANSI A108.1B, ANSI A108.1C, ANSI A108.4, ANSI A108.5, ANSI A108.6, ANSI A108.8, ANSI A108.9, ANSI A108.10, ANSI A108.11, ANSI A108.12, ANSI A108.13, ANSI A108.14, ANSI A108.15, ANSI A108.16, and ANSI A108.17, which are contained in "American National Standard Specifications for Installation of Ceramic Tile."
- C. Module Size: Actual tile size plus joint width indicated.
- D. Face Size: Actual tile size, excluding spacer lugs.

#### 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.

#### 1.5 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: Show locations of each type of tile and tile pattern. Show widths, details, and locations of expansion, contraction, control, and isolation joints in tile substrates and finished tile surfaces.
- C. Samples for Initial Selection: For each type of tile and grout indicated. Include Samples of accessories involving color selection.
- D. Samples for Verification:
  1. Full-size units of each type and composition of tile and for each color and finish required. For ceramic mosaic tile in color blend patterns, provide full sheets of each color blend.
  2. Assembled samples mounted on a rigid panel, with grouted joints, for each type and composition of tile and for each color and finish required. Make samples at least 12 inches (300 mm) square, but not fewer than 4 tiles. Use grout of type and in color or colors approved for completed Work.
  3. Full-size units of each type of trim and accessory for each color and finish required.
  4. Stone thresholds in 6-inch (150-mm) lengths.
  5. Metal edge strips in 6-inch (150-mm) lengths.
- E. Qualification Data: For qualified Installer.

#### 1.6 QUALITY ASSURANCE

- A. Source Limitations for Tile: Obtain tile of each type and color or finish from one source or producer.
  1. Obtain tile of each type and color or finish from same production run and of consistent quality in appearance and physical properties for each contiguous area.
- B. Source Limitations for Setting and Grouting Materials: Obtain ingredients of a uniform quality for each mortar, adhesive, and grout component from one manufacturer and each aggregate from one source or producer.
- C. Source Limitations for Other Products: Obtain each of the following products specified in this Section from a single manufacturer for each product:
  1. Stone thresholds.
  2. Waterproof membrane.
  3. Crack isolation membrane.
  4. Joint sealants.
  5. Cementitious backer units.
  6. Metal edge strips.

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

#### 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 requirements in ANSI A137.1 for labeling tile packages.
- B. Store tile and cementitious materials on elevated platforms, under cover, and in a dry location.
- C. Store aggregates where grading and other required characteristics can be maintained and contamination can be avoided.
- D. Store liquid materials in unopened containers and protected from freezing.
- E. Handle tile that has temporary protective coating on exposed surfaces to prevent coated surfaces from contacting backs or edges of other units. If coating does contact bonding surfaces of tile, remove coating from bonding surfaces before setting tile.

#### 1.8 PROJECT CONDITIONS

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

#### 1.9 EXTRA MATERIALS

- A. Furnish extra materials that match and are from same production runs as products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  - 1. Tile and Trim Units: Furnish quantity of full-size units equal to 3 percent of amount installed for each type, composition, color, pattern, and size indicated.
  - 2. Grout: Furnish quantity of grout equal to 3 percent of amount installed for each type, composition, and color indicated.

### PART 2 - PRODUCTS

#### 2.1 PRODUCTS, GENERAL

- A. ANSI Ceramic Tile Standard: Provide tile that complies with ANSI A137.1 for types, compositions, and other characteristics indicated.
  - 1. Provide tile complying with Standard grade requirements unless otherwise indicated.

- B. ANSI Standards for Tile Installation Materials: Provide materials complying with ANSI A108.02, ANSI standards referenced in other Part 2 articles, ANSI standards referenced by TCA installation methods specified in tile installation schedules, and other requirements specified.
- C. Factory Blending: For tile exhibiting color variations within ranges, blend tile in factory and package so tile units taken from one package show same range in colors as those taken from other packages and match approved Samples.
- D. Mounting: For factory-mounted tile, provide back- or edge-mounted tile assemblies as standard with manufacturer unless otherwise indicated.
  - 1. Where tile is indicated for installation in wet areas, do not use back- or edge-mounted tile assemblies unless tile manufacturer specifies in writing that this type of mounting is suitable for installation indicated and has a record of successful in-service performance.
- E. Factory-Applied Temporary Protective Coating: Where indicated under tile type, protect exposed surfaces of tile against adherence of mortar and grout by precoating with continuous film of petroleum paraffin wax, applied hot. Do not coat unexposed tile surfaces.

## 2.2 TILE PRODUCTS

- A. Tile Type CT: Factory-mounted unglazed glazed ceramic mosaic tile.
  - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
    - a. American Olean; Division of Dal-Tile International Inc.
    - b. Crossville, Inc.
    - c. Daltile; Division of Dal-Tile International Inc.
    - d. Interceramic.
    - e. Lone Star Ceramics Company.
    - f. Portobello America, Inc.
    - g. Seneca Tiles, Inc.
- B. Physical Characteristics:
  - 1. Water Absorption: Less than 0.5 when tested in accordance with ASTM C373.
  - 2. Break Strength: Greater than 364 pounds when tested in accordance with ASTM C648.
  - 3. Chemical Resistance: Resistant when tested in accordance with ASTM C650.
  - 4. Coefficient of Friction (Abrasive, wet): Greater than or equal to 0.80 when tested in accordance with ASTM C1028.
  - 5. Coefficient of Friction (Non-abrasive, wet): Greater than or equal to 0.60 when tested in accordance with ASTM C1028.
  - 6. Coefficient of Friction (Abrasive, dry): Greater than or equal to 0.70 when tested in accordance with ASTM C1028.
  - 7. Coefficient of Friction (Non-abrasive, dry): Greater than or equal to 0.60 when tested in accordance with ASTM C1028.
  - 8. Abrasion Resistance: Heavy commercial in accordance with ISO 10545-7.

- C. Ceramic Trim Units: Matching characteristics of adjoining flat tile and coordinated with sizes and coursing of adjoining flat tile where applicable. Provide shapes as follows, selected from manufacturer's standard shapes:
  - 1. General: Provide manufactured internal, external corners and bullnosed tops as required. Cut or exposed edges will not be permitted.
  - 2. External Corners for Thin-Set Mortar Installations: Surface bullnose, size to match field tile.
  - 3. Internal Corners: Cove, size to match field tile.

## 2.3 THRESHOLDS

- A. General: Fabricate to sizes and profiles indicated or required to provide transition between adjacent floor finishes.
  - 1. Bevel edges at 1:2 slope, with lower edge of bevel aligned with adjacent floor surface. Finish bevel to match top surface of threshold. Limit height of threshold to 1/2 inch (12.7 mm) or less.

## 2.4 TILE BACKING PANELS

- A. Cementitious Backer Units: ANSI A118.9 or ASTM C 1325, in maximum lengths available to minimize end-to-end butt joints.
  - 1. Thickness: As indicated.
- B. Fiber-Cement Underlayment: ASTM C 1288, in maximum lengths available to minimize end-to-end butt joints.
  - 1. Thickness: As indicated.

## 2.5 WATERPROOF MEMBRANE

- A. General: Manufacturer's standard product, selected from the following, that complies with ANSI A118.10 and is recommended by the manufacturer for the application indicated. Include reinforcement and accessories recommended by manufacturer.

## 2.6 CRACK ISOLATION MEMBRANE

- A. General: Manufacturer's standard product, selected from the following, that complies with ANSI A118.12 for standard performance and is recommended by the manufacturer for the application indicated. Include reinforcement and accessories recommended by manufacturer.
- B. Fabric-Reinforced, Fluid-Applied Membrane: System consisting of liquid-latex rubber or elastomeric polymer and fabric reinforcement.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
  - a. Custom Building Products; 9240 Waterproofing and Anti-Fracture Membrane.
  - b. Laticrete International, Inc.; Laticrete 9235 Waterproof Membrane.
  - c. MAPEI Corporation; Mapelastic L (PRP M19).
  - d. Summitville Tiles, Inc.; S-9000.
- C. Latex-Portland Cement: Flexible mortar consisting of cement-based mix and latex additive.
  1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
    - a. C-Cure; UltraCure 971.
    - b. MAPEI Corporation; Mapelastic (PRP 315).
    - c. TEC; a subsidiary of H. B. Fuller Company; Triple Flex Waterproofing, Crack Isolation Membrane & Mortar.

## 2.7 SETTING MATERIALS

- A. Portland Cement Mortar (Thickset) Installation Materials: ANSI A108.02.
  1. Cleavage Membrane: Asphalt felt, ASTM D 226, Type I (No. 15); or polyethylene sheeting, ASTM D 4397, 4.0 mils (0.1 mm) thick.
  2. Reinforcing Wire Fabric: Galvanized, welded wire fabric, 2 by 2 inches (50.8 by 50.8 mm) by 0.062-inch (1.57-mm) diameter; comply with ASTM A 185 and ASTM A 82 except for minimum wire size.
  3. Expanded Metal Lath: Diamond-mesh lath complying with ASTM C 847.
    - a. Base Metal and Finish for Interior Applications: Uncoated or zinc-coated (galvanized) steel sheet, with uncoated steel sheet painted after fabrication into lath.
    - b. Base Metal and Finish for Exterior Applications: Zinc-coated (galvanized) steel sheet.
    - c. Configuration over Studs and Furring: Flat.
    - d. Configuration over Solid Surfaces: Self furring.
    - e. Weight: 2.5 lb/sq. yd. (1.4 kg/sq. m) 3.4 lb/sq. yd. (1.8 kg/sq. m).
  4. Latex Additive: Manufacturer's standard water emulsion, serving as replacement for part or all of gaging water, of type specifically recommended by latex-additive manufacturer for use with field-mixed portland cement and aggregate mortar bed.
- B. Latex-Portland Cement Mortar (Thin Set): ANSI A118.4.
  1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Bonsal American; an Oldcastle company.
    - b. Bostik, Inc.
    - c. Laticrete International, Inc.
    - d. MAPEI Corporation.

e. Summitville Tiles, Inc.

2. Provide prepackaged, dry-mortar mix containing dry, redispersible, vinyl acetate or acrylic additive to which only water must be added at Project site.
3. Provide prepackaged, dry-mortar mix combined with acrylic resin liquid-latex additive at Project site.
4. For wall applications, provide mortar that complies with requirements for nonsagging mortar in addition to the other requirements in ANSI A118.4.

## 2.8 GROUT MATERIALS

- A. Sand-Portland Cement Grout: ANSI A108.10, composed of white or gray cement and white or colored aggregate as required to produce color indicated.
- B. Standard Cement Grout: ANSI A118.6.
  1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  2. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings <Insert manufacturer's name; product name or designation> or comparable product by one of the following:
    - a. Bonsal American; an Oldcastle company.
    - b. Bostik, Inc.
    - c. Laticrete International, Inc.
    - d. MAPEI Corporation.
    - e. Summitville Tiles, Inc.
    - f. TEC; a subsidiary of H. B. Fuller Company.

## 2.9 MISCELLANEOUS MATERIALS

- A. Trowelable Underlayments and Patching Compounds: Latex-modified, portland cement-based formulation provided or approved by manufacturer of tile-setting materials for installations indicated.
- B. Metal Edge Strips: Angle or L-shape, height to match tile and setting-bed thickness, metallic or combination of metal and PVC or neoprene base, designed specifically for flooring applications; stainless-steel, ASTM A 666, 300 Series exposed-edge material.
- C. Temporary Protective Coating: Product indicated below that is formulated to protect exposed surfaces of tile against adherence of mortar and grout; compatible with tile, mortar, and grout products; and easily removable after grouting is completed without damaging grout or tile.
  1. Petroleum paraffin wax, fully refined and odorless, containing at least 0.5 percent oil with a melting point of 120 to 140 deg F (49 to 60 deg C) per ASTM D 87.
  2. Grout release in form of manufacturer's standard proprietary liquid coating that is specially formulated and recommended for use as temporary protective coating for tile.



- D. Tile Cleaner: A neutral cleaner capable of removing soil and residue without harming tile and grout surfaces, specifically approved for materials and installations indicated by tile and grout manufacturers.
- E. Grout Sealer: Manufacturer's standard silicone product for sealing grout joints and that does not change color or appearance of grout.
  - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Bonsal American; an Oldcastle company; Grout Sealer.
    - b. Bostik, Inc.; CeramaSeal Grout & Tile Sealer.
    - c. C-Cure; Penetrating Sealer 978.
    - d. Custom Building Products; Surfaceguard Sealer.
    - e. Jamo Inc.; Penetrating Sealer.
    - f. MAPEI Corporation; KER 004, Keraseal Penetrating Sealer for Unglazed Grout and Tile.
    - g. Southern Grouts & Mortars, Inc.; Silicone Grout Sealer.
    - h. Summitville Tiles, Inc.; SL-15, Invisible Seal Penetrating Grout and Tile Sealer.
    - i. TEC; a subsidiary of H. B. Fuller Company; TA-256 Penetrating Silicone Grout Sealer.

## 2.10 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 of coatings that are incompatible with tile-setting materials including curing compounds and other substances that contain soap, wax, oil, or silicone; and comply with flatness tolerances required by ANSI A108.01 for installations indicated.
  - 2. Verify that concrete substrates for tile floors installed with adhesives, bonded mortar bed, or thin-set mortar comply with surface finish requirements in ANSI A108.01 for installations indicated.

- a. Verify that surfaces that received a steel trowel finish have been mechanically scarified.
  - b. Verify that protrusions, bumps, and ridges have been removed by sanding or grinding.
3. Verify that installation of grounds, anchors, recessed frames, electrical and mechanical units of work, and similar items located in or behind tile has been completed.
  4. Verify that joints and cracks in tile substrates are coordinated with tile joint locations; if not coordinated, adjust joint locations in consultation with Architect.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Fill cracks, holes, and depressions in concrete substrates for tile floors installed with adhesives or thin-set mortar with trowelable leveling and patching compound specifically recommended by tile-setting material manufacturer.
- B. Where indicated, prepare substrates to receive waterproofing by applying a reinforced mortar bed that complies with ANSI A108.1A and is sloped 1/4 inch per foot (1:50) toward drains.
- C. Blending: For tile exhibiting color variations, verify that tile has been factory blended and packaged so tile units taken from one package show same range of colors as those taken from other packages and match approved Samples. If not factory blended, either return to manufacturer or blend tiles at Project site before installing.
- D. Field-Applied Temporary Protective Coating: If indicated under tile type or needed to prevent grout from staining or adhering to exposed tile surfaces, precoat them with continuous film of temporary protective coating, taking care not to coat unexposed tile surfaces.

### 3.3 TILE INSTALLATION

- A. Comply with TCA's "Handbook for Ceramic Tile Installation" for TCA installation methods specified in tile installation schedules. Comply with parts of the ANSI A108 Series "Specifications for Installation of Ceramic Tile" that are referenced in TCA installation methods, specified in tile installation schedules, and apply to types of setting and grouting materials used.
  1. For the following installations, follow procedures in the ANSI A108 Series of tile installation standards for providing 95 percent mortar coverage:
    - a. Tile floors in wet areas.
    - b. Tile floors in laundries.
    - c. Tile floors composed of tiles 8 by 8 inches (200 by 200 mm) or larger.
    - d. Tile floors composed of rib-backed tiles.

- B. Extend tile work into recesses and under or behind equipment and fixtures to form complete covering without interruptions unless otherwise indicated. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.
- C. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap tile.
- D. Jointing Pattern: Lay tile in grid pattern unless otherwise indicated. Lay out tile work and center tile fields in both directions in each space or on each wall area. Lay out tile work to minimize the use of pieces that are less than half of a tile. Provide uniform joint widths unless otherwise indicated.
  - 1. For tile mounted in sheets, make joints between tile sheets same width as joints within tile sheets so joints between sheets are not apparent in finished work.
  - 2. Where adjoining tiles on floor, base, walls, or trim are specified or indicated to be same size, align joints.
  - 3. Where tiles are specified or indicated to be whole integer multiples of adjoining tiles on floor, base, walls, or trim, align joints unless otherwise indicated.
- E. Joint Widths: Unless otherwise indicated, install tile with the following joint widths:
  - 1. Ceramic Mosaic Tile: 1/16 inch (1.6 mm).
  - 2. Quarry Tile: 1/4 inch (6.35 mm).
  - 3. Paver Tile: 1/4 inch (6.35 mm).
  - 4. Glazed Wall Tile: 1/16 inch (1.6 mm).
  - 5. Decorative Thin Wall Tile: 1/16 inch (1.6 mm).
- F. Lay out tile wainscots to dimensions indicated or to next full tile beyond dimensions indicated.
- G. Expansion Joints: Provide expansion joints and other sealant-filled joints, including control, contraction, and isolation joints, where indicated. Form joints during installation of setting materials, mortar beds, and tile. Do not saw-cut joints after installing tiles.
  - 1. Where joints occur in concrete substrates, locate joints in tile surfaces directly above them.
  - 2. Prepare joints and apply sealants to comply with requirements in Division 07 Section "Joint Sealants."
- H. Stone Thresholds: Install stone thresholds in same type of setting bed as adjacent floor unless otherwise indicated.
  - 1. At locations where mortar bed (thickset) would otherwise be exposed above adjacent floor finishes, set thresholds in latex-portland cement mortar (thin set).
  - 2. Do not extend cleavage membrane, waterproofing, or crack isolation membrane under thresholds set in dry-set portland cement or latex-portland cement mortar. Fill joints between such thresholds and adjoining tile set on cleavage membrane, waterproofing, or crack isolation membrane with elastomeric sealant.

- I. Metal Edge Strips: Install at locations indicated and where exposed edge of tile flooring meets carpet, wood, or other flooring that finishes flush with or below top of tile and no threshold is indicated.
- J. Grout Sealer: Apply grout sealer to grout joints according to grout-sealer manufacturer's written instructions. As soon as grout sealer has penetrated grout joints, remove excess sealer and sealer from tile faces by wiping with soft cloth.

### 3.4 TILE BACKING PANEL INSTALLATION

- A. Install cementitious backer units and fiber-cement underlayment and treat joints according to ANSI A108.11 and manufacturer's written instructions for type of application indicated. Use latex-portland cement mortar for bonding material unless otherwise directed in manufacturer's written instructions.

### 3.5 WATERPROOFING INSTALLATION

- A. Install waterproofing to comply with ANSI A108.13 and manufacturer's written instructions to produce waterproof membrane of uniform thickness and bonded securely to substrate.
- B. Do not install tile or setting materials over waterproofing until waterproofing has cured and been tested to determine that it is watertight.

### 3.6 CRACK ISOLATION MEMBRANE INSTALLATION

- A. Install crack isolation membrane to comply with ANSI A108.17 and manufacturer's written instructions to produce membrane of uniform thickness and bonded securely to substrate.
- B. Do not install tile or setting materials over crack isolation membrane until membrane has cured.

### 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 epoxy and latex-portland cement grout residue from tile as soon as possible.
  - 2. Clean grout smears and haze from tile according to tile and grout manufacturer's written instructions but no sooner than 10 days after installation. Use only cleaners recommended by tile and grout manufacturers and only after determining that cleaners are safe to use by testing on samples of tile and other surfaces to be cleaned. Protect metal surfaces and plumbing fixtures from effects of cleaning. Flush surfaces with clean water before and after cleaning.
  - 3. Remove temporary protective coating by method recommended by coating manufacturer and that is acceptable to tile and grout manufacturer. Trap and remove coating to prevent drain clogging.

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

END OF SECTION 093000

## SECTION 095113 - ACOUSTICAL PANEL CEILINGS

### 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. This Section includes acoustical tiles and exposed suspension systems for ceilings. Related Sections include the following:
  - 1. Division 09 Section "Acoustical Panel Ceilings" for ceilings consisting of mineral-base and glass-fiber-base acoustical panels and exposed suspension systems.

#### 1.3 DEFINITIONS

- A. AC: Articulation Class.
- B. CAC: Ceiling Attenuation Class.
- C. LR: Light-Reflectance coefficient.
- D. NRC: Noise Reduction Coefficient.

#### 1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Coordination Drawings: Reflected ceiling plans, drawn to scale, on which the following items are shown and coordinated with each other:
  - 1. Ceiling suspension system members.
  - 2. Method of attaching hangers to building structure.
    - a. Furnish layouts for cast-in-place anchors, clips, and other ceiling attachment devices whose installation is specified in other Sections.
  - 3. Indicate starting and alignment points for layout of grid.
  - 4. Ceiling-mounted items including lighting fixtures, diffusers, grilles, speakers, sprinklers, access panels, and special moldings.
  - 5. Minimum Drawing Scale: 1/4 inch = 1 foot (1:48).
- C. Samples for Initial Selection: For components with factory-applied color finishes.

- D. Samples for Verification: For each component indicated and for each exposed finish required, prepared on Samples of size indicated below.
  - 1. Acoustical panel: Set of 6" square Samples of each type, color, pattern, and texture.
  - 2. Exposed Moldings and Trim: Set of 12-inch- (300-mm-) long Samples of each type and color.
- E. Qualification Data: For testing agency.
- F. Field quality-control test reports.
- G. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for each acoustical panel ceiling.
- H. Research/Evaluation Reports: For acoustical panel ceiling and components and anchor and fastener type.
- I. Maintenance Data: For finishes to include in maintenance manuals.

#### 1.5 QUALITY ASSURANCE

- A. Acoustical Testing Agency Qualifications: An independent testing laboratory, or an NVLAP-accredited laboratory, with the experience and capability to conduct the testing indicated. NVLAP-accredited laboratories must document accreditation, based on a "Certificate of Accreditation" and a "Scope of Accreditation" listing the test methods specified.
- B. Source Limitations:
  - 1. Acoustical Ceiling Panel: Obtain each type through one source from a single manufacturer.
  - 2. Suspension System: Obtain each type through one source from a single manufacturer.
- C. Fire-Test-Response Characteristics: Provide acoustical panel ceilings that comply with the following requirements:
  - 1. Fire-Resistance Characteristics: Where indicated, provide acoustical panel ceilings identical to those of assemblies tested for fire resistance per ASTM E 119 by UL or another testing and inspecting agency acceptable to authorities having jurisdiction.
    - a. Fire-Resistance Ratings: Indicated by design designations from UL's "Fire Resistance Directory" or from other testing and inspecting agency having jurisdiction.
    - b. Identify materials with appropriate markings of applicable testing and inspecting agency.
  - 2. Surface-Burning Characteristics: Provide acoustical tiles with the following surface-burning characteristics complying with ASTM E 1264 for Class A materials as determined by testing identical products per ASTM E 84:
    - a. Smoke-Developed Index: 450 or less.
    - b. Flame Spread 25 or less.

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

#### 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver acoustical panels, suspension system components, and accessories to Project site in original, unopened packages and store them in a fully enclosed, conditioned space where they will be protected against damage from moisture, humidity, temperature extremes, direct sunlight, surface contamination, and other causes.
- B. Before installing acoustical panels, permit them to reach room temperature and stabilized moisture content.
- C. Handle acoustical panels carefully to avoid chipping edges or damaging units in any way.
- D. Salvaged ceiling components: Store and protect salvaged ceiling components. Re install salvaged panels to blend with new. Install all in one space if possible.

#### 1.7 PROJECT CONDITIONS

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

#### 1.8 COORDINATION

- A. Coordinate layout and installation of acoustical panels and suspension system with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, fire-suppression system, and partition assemblies.

#### 1.9 EXTRA MATERIALS

- A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  1. Acoustical Ceiling Units: Full-size tiles equal to 5 percent of quantity installed.
  2. Suspension System Components: Quantity of each concealed grid and exposed component equal to 2.0 percent of quantity installed.



## PART 2 - PRODUCTS

### 2.1 ACOUSTICAL PANELS, GENERAL

- A. Recycled Content: Provide acoustical panels with recycled content such that postconsumer recycled content plus one-half of preconsumer recycled content constitutes a minimum of 20% percent by weight.
- B. Acoustical Panel Standard: Provide manufacturer's standard panels of configuration indicated that comply with ASTM E 1264 classifications as designated by types, patterns, acoustical ratings, and light reflectances, unless otherwise indicated.
  - 1. Mounting Method for Measuring NRC: Type E-400; plenum mounting in which face of test specimen is 15-3/4 inches (400 mm) away from test surface per ASTM E 795.
- C. Acoustical Panel Colors and Patterns: Match appearance characteristics indicated for each product type.
  - 1. Where appearance characteristics of acoustical tiles are indicated by referencing pattern designations in ASTM E 1264 and not manufacturers' proprietary product designations, provide products selected by Architect from each manufacturer's full range that comply with requirements indicated for type, pattern, color, light reflectance, acoustical performance, edge detail, and size.

### 2.2 ACOUSTICAL PANELS FOR ACOUSTICAL PANEL CEILING

- A. Products: Subject to compliance with requirements, provide one of the following:
  - 1. Armstrong World Industries, Inc.
  - 2. USG Interiors, Inc.
  - 3. Certain Teed Corporation.
- B. MANUFACTURERS
  - a. Products: The products specified below have been selected for their physical characteristics, acoustical control properties and appearance. Products of other manufacturers will be considered if they are equivalent in physical and acoustical properties and acceptable in appearance. The Architect/Owner will be the sole judge of visual qualities.
  - 2. ACOUSTICAL PANELS, GENERAL
    - a. Acoustical Panel Standard: Provide manufacturer's standard panels of configuration indicated that comply with ATM E 1264 classifications as designated by types, patterns, acoustical ratings, and light reflectance's, unless otherwise indicated.
  - 3. STANDARD CEILING: ACOUSTICAL PANELS FOR ACOUSTICAL PANEL CEILING (ACP)
    - a. Product: Armstrong Ultima
    - b. Classification: ASTM E 1264

- c. Color: White.
  - d. Acoustics: NRC: Not less than 0.55  
CAC: Not less than 30
  - e. Fire Resistance: Class A: Flame spread 25 or under (UL Labeled) per ASTM E 1264
  - f. Light Reflectance (LR): Not less than 0.80
  - g. Dimensions: 24 Inches X 24 Inches X 5/8 Inch (600mm X 600mm X 15mm)
  - h. Edge Profile: Square lay-in or as indicated on drawings.
  - i. Grid Face: 15/16 inch
4. PREMIUM CEILING: ACOUSTICAL PANELS FOR ACOUSTICAL PANEL CEILING (ACP)
- a. Product: Armstrong Ultima
  - b. Classification: ASTM E 1264
  - c. Color: White
  - d. Acoustics: NRC: Not less than 0.85  
CAC: N/A
  - e. Fire Resistance: Class A. Flame spread 25 or under (UL labeled) per ASTM 1264
  - f. Light Reflectance: (LR): Not less than 0.89
  - g. Dimensions: 24 inches X 24 inches X 3/4 inch (600mm X 600mm X 19mm)
  - h. Edge Profile: Square tegular
  - i. Grid Face: 9/16 inch
- C. Classification: Provide fire-resistance-rated panels complying with ASTM E 1264 for type, form, and pattern as follows:
- 1. Mineral base with painted finish; Form 2, water felted 4, cast or molded.
  - 2. Pattern: As indicated by manufacturer's designation.
- 2.3 METAL SUSPENSION SYSTEMS, GENERAL
- A. Recycled Content: Provide products made from steel sheet with average recycled content such that postconsumer recycled content plus one-half of preconsumer recycled content is not less than 25 percent.
  - B. Metal Suspension System Standard: Provide manufacturer's standard metal suspension systems of types, structural classifications, and finishes indicated that comply with applicable requirements in ASTM C 635.
  - C. Finishes and Colors, General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes. Provide manufacturer's standard factory-applied finish for type of system indicated.
  - D. Attachment Devices: Size for five times the design load indicated in ASTM C 635, Table 1, "Direct Hung," unless otherwise indicated. Comply with seismic design requirements.
    - 1. Anchors in Concrete: Anchors of type and material indicated below, with holes or loops for attaching hangers of type indicated and with capability to sustain, without failure, a load equal to five times that imposed by ceiling construction, as determined by testing

per ASTM E 488 or ASTM E 1512 as applicable, conducted by a qualified testing and inspecting agency.

- a. Type: Postinstalled expansion Postinstalled bonded anchors.
  - b. Corrosion Protection: Carbon-steel components zinc plated to comply with ASTM B 633, Class Fe/Zn 5 (0.005 mm) for Class SC 1 service condition.
  - c. Corrosion Protection: Stainless-steel components complying with ASTM F 593 and ASTM F 594, Group 1 Alloy 304 or 316 for bolts; Alloy 304 or 316 for anchors.
2. Power-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hangers of type indicated, and with capability to sustain, without failure, a load equal to 10 times that imposed by ceiling construction, as determined by testing per ASTM E 1190, conducted by a qualified testing and inspecting agency.
- E. Wire Hangers, Braces, and Ties: Provide wires complying with the following requirements:
1. Zinc-Coated, Carbon-Steel Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper.
  2. Size: Select wire diameter so its stress at 3 times hanger design load (ASTM C 635, Table 1, "Direct Hung") will be less than yield stress of wire, but provide not less than 0.106-inch- (2.69-mm-) 0.135-inch- (3.5-mm) diameter wire.
- F. Hanger Rods: Mild steel, zinc coated or protected with rust-inhibitive paint.
- G. Angle Hangers: Angles with legs not less than 7/8 inch (22 mm) wide; formed with 0.04-inch- (1-mm-) thick, galvanized steel sheet complying with ASTM A 653/A 653M, G90 (Z275) coating designation; with bolted connections and 5/16-inch- (8-mm-) diameter bolts.

## 2.4 METAL SUSPENSION SYSTEM FOR ACOUSTICAL PANEL CEILING

- A. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
- B. Basis-of-Design Product: Subject to compliance with requirements, provide the product indicated on Drawings; product name or designation or a comparable product by one of the following:
1. Armstrong World Industries, Inc.
  2. USG Interiors, Inc.
  3. Certain Teed Corporation.
- C. Indirect-Hung Suspension System: Main and cross runners roll formed from cold-rolled steel sheet, prepainted, electrolytically zinc coated, or hot-dip galvanized according to ASTM A 653/A 653M, G30 (Z90) coating designation.
1. Structural Classification: Intermediate or Heavy-duty system, as noted.
  2. Carrying Channels: Cold-rolled steel, 0.059850-inch- (1.52-mm-) minimum base (uncoated) metal thickness, not less than 3/16-inch- (4.7-mm-) wide flanges by 1-1/2-

inch- (38-mm-) deep steel channels, 475 lb/1000 feet (0.707 kg/m), hot-dip galvanized according to ASTM A 653/A 653M, G60 (Z180) coating designation.

3. Access: Where access is indicated, provide special cross runners or split splines to allow for removal of acoustical units in indicated access areas. Identify access tile with manufacturer's standard unobtrusive markers for each access unit.

## 2.5 METAL EDGE MOLDINGS AND TRIM

- A. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
- B. Products: Subject to compliance with requirements, obtain all components through one source from a single manufacturer:
- C. Extruded-Aluminum Edge Moldings and Trim: Where indicated, provide manufacturer's extruded-aluminum edge moldings and trim of profile indicated or referenced by manufacturer's designations, including splice plates, corner pieces, and attachment and other clips, complying with seismic design requirements and the following:
  1. Aluminum Alloy: Alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated, and with not less than the strength and durability properties of aluminum extrusions complying with ASTM B 221 (ASTM B 221M) for Alloy and Temper 6063-T5.
  2. Finish designations prefixed by AA comply with system established by the Aluminum Association for designating aluminum finishes.
  3. Conversion-Coated Finish: AA-M12C42 (Chemical Finish: cleaned with inhibited chemicals; acid-chromate-fluoride-phosphate conversion coating).
  4. Conversion-Coated and Factory-Primed Finish: AA-M12C42R1x (Chemical Finish: cleaned with inhibited chemicals; acid-chromate-fluoride-phosphate conversion coating; organic coating as follows):
    - a. Manufacturer's standard factory-applied prime-coat finish ready for field painting.
  5. Class II, Clear Anodic Finish: AA-M12C22A31 (Mechanical Finish: nonspecular as fabricated; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class II, clear coating 0.010 mm or thicker) complying with AAMA 611.
  6. Baked-Enamel Finish: AA-C12C42R1x (Chemical Finish: cleaned with inhibited chemicals; Chemical Finish: acid-chromate-fluoride-phosphate conversion coating; organic coating: as specified below). Apply baked enamel complying with paint manufacturer's written instructions for cleaning, conversion coating, and painting.
    - a. Organic Coating: Thermosetting, enamel primer/topcoat system with a minimum dry film thickness of 0.8 to 1.2 mils (0.02 to 0.03 mm).

## 2.6 ACOUSTICAL SEALANT

Refer to Section 079200 Joint Sealant for requirement.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, including structural framing and substrates to which acoustical tile ceilings attach or abut, with Installer present, for compliance with requirements specified in this and other Sections that affect ceiling installation and anchorage and with requirements for installation tolerances and other conditions affecting performance of acoustical tile ceilings.
  - 1. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Testing Substrates: Before installing adhesively applied tiles on wet-placed substrates such as cast-in-place concrete or plaster, test and verify that moisture level is below tile manufacturer's recommended limits.
- B. Measure each ceiling area and establish layout of acoustical tiles to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width tiles at borders, and comply with layout shown on reflected ceiling plans. Report discrepancies to Project Manager and resolve with Project Architect.

### 3.3 INSTALLATION, SUSPENDED ACOUSTICAL PANEL CEILINGS

- A. General: Install acoustical tile ceilings to comply with ASTM C 636 and seismic design requirements indicated, per manufacturer's written instructions and CISCA's "Ceiling Systems Handbook."
  - 1. Fire-Rated Assembly: Install fire-rated ceiling systems according to tested fire-rated design.
- B. Suspend ceiling hangers from building's structural members and as follows:
  - 1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structure or of ceiling suspension system.
  - 2. Splay hangers only where required to miss obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
  - 3. Splay hangers only where required and, if permitted with fire-resistance-rated ceilings, to miss obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
  - 4. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with location of hangers at spacings required to support standard suspension system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices.
  - 5. Secure wire hangers to ceiling suspension members and to supports above with a minimum of three tight turns. Connect hangers directly either to structures or to inserts,

- eye screws, or other devices that are secure and appropriate for substrate and that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.
6. Secure flat, angle, channel, and rod hangers to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices that are secure and appropriate for both structure to which hangers are attached and type of hanger involved. Install hangers in a manner that will not cause them to deteriorate or fail due to age, corrosion, or elevated temperatures.
  7. Do not support ceilings directly from permanent metal forms or floor deck. Fasten hangers to cast-in-place hanger inserts, postinstalled mechanical or adhesive anchors, or power-actuated fasteners that extend through forms into concrete.
  8. When steel framing does not permit installation of hanger wires at spacing required, install carrying channels or other supplemental support for attachment of hanger wires.
  9. Do not attach hangers to steel deck tabs.
  10. Do not attach hangers to steel roof deck. Attach hangers to structural members.
  11. Space hangers not more than 48 inches (1200 mm) o.c. along each member supported directly from hangers, unless otherwise indicated; provide hangers not more than 8 inches (200 mm) from ends of each member.
  12. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards and publications.
- C. Secure bracing wires to ceiling suspension members and to supports with a minimum of four tight turns. Suspend bracing from building's structural members as required for hangers, without attaching to permanent metal forms, steel deck, or steel deck tabs. Fasten bracing wires into concrete with cast-in-place or postinstalled anchors.
- D. Install edge moldings and trim of type indicated at perimeter of acoustical panel ceiling area and where necessary to conceal edges of acoustical tiles.
1. Apply acoustical sealant in a continuous ribbon concealed on back of vertical legs of moldings before they are installed.
  2. Screw attach moldings to substrate at intervals not more than 16 inches (400 mm) o.c. and not more than 3 inches (75 mm) from ends, leveling with ceiling suspension system to a tolerance of 1/8 inch in 12 feet (3.2 mm in 3.6 m). Miter corners accurately and connect securely.
  3. Do not use exposed fasteners, including pop rivets, on moldings and trim.
- E. Install suspension system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.
- F. Arrange directionally patterned acoustical panels as follows:
1. As indicated on reflected ceiling plans.
  2. Install panels with pattern running in one direction parallel to long axis of space, unless noted otherwise.
- G. Install acoustical panels in coordination with suspension system and exposed moldings and trim. Place suspension system flanges into kerfed edges so panel to panel joints are closed by double lap of material.
1. Fit adjoining panel to form flush, tight joints. Scribe and cut panel for accurate fit at borders and around penetrations through tile.

2. Hold panel field in compression by inserting leaf-type, spring-steel spacers between panel and moldings, spaced 12 inches (305 mm) o.c.
3. Protect lighting fixtures and air ducts to comply with requirements indicated for fire-resistance-rated assembly.

#### 3.4 CLEANING

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

END OF SECTION 095123

## SECTION 096513 - RESILIENT 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 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section Includes:

- 1. Resilient base.
- 2. Resilient stair accessories and Landings.

- B. Related Sections:

- 1. Division 09 Section "Resilient Sheet Flooring" for resilient sheet floor coverings.
- 2. Division 09 Section "Linoleum Flooring" for linoleum floor coverings.
- 3. Division 09 Section "Resilient Tile Flooring" for resilient floor tile.
- 4. Division 09 Section "Resilient Athletic Flooring" for resilient floor coverings for use in athletic-activity or support areas.

#### 1.3 SUBMITTALS

- A. Product Data: For each type of product indicated on drawings.
- B. Samples for Initial Selection: For each type of product indicated.
- C. Samples for Verification: For each type of product indicated, in manufacturer's standard-size Samples but not less than 12 inches (300 mm) long, of each resilient product color, texture, and pattern required.

#### 1.4 QUALITY ASSURANCE

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



## 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Store resilient products and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 deg F (10 deg C) or more than 90 deg F (32 deg C).

## 1.6 PROJECT CONDITIONS

- A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 deg F (21 deg C) or more than 95 deg F (35 deg C), in spaces to receive resilient products during the following time periods:
  - 1. 48 hours before installation.
  - 2. During installation.
  - 3. 48 hours after installation.
- B. Until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 deg F (13 deg C) or more than 95 deg F (35 deg C).
- C. Install resilient products after other finishing operations, including painting, have been completed.

## PART 2 - PRODUCTS

### 2.1 RESILIENT BASE

- A. Resilient Base:
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following or as indicated on drawings:
    - a. Allstate Rubber Corp.; Stoler Industries.
    - b. Armstrong World Industries, Inc.
    - c. Burke Mercer Flooring Products; Division of Burke Industries, Inc.
    - d. Endura Rubber Flooring; Division of Burke Industries, Inc.
    - e. Estrie Products International; American Biltrite (Canada) Ltd.
    - f. Flexco, Inc.
    - g. Johnsonite.
    - h. Mondo Rubber International, Inc.
    - i. Nora Rubber Flooring; Freudenberg Building Systems, Inc.
    - j. Roppe Corporation, USA.
- B. Resilient Base Standard: ASTM F 1861.
  - 1. Material Requirement: Type TS (rubber, vulcanized thermoset) Type TP (rubber, thermoplastic) Type TS (rubber, vulcanized thermoset) or Type TP (rubber, thermoplastic).
  - 2. Manufacturing Method: Group I (solid, homogeneous).
  - 3. Style: As indicated on drawings.

- C. Minimum Thickness: 0.125 inch (3.2 mm).
- D. Height and Profile: As indicated on Drawings.
- E. Lengths: Cut lengths 48 inches (1219 mm) long or coils in manufacturer's standard length.
- F. Inside and Outside Corners: Job formed or preformed. Follow manufacturer's recommendations for matching and scoring.
- G. Finish: As selected by Architect from manufacturer's full range.
- H. Colors and Patterns: As selected by Architect from full range of industry colors.

## 2.2 RESILIENT STAIR ACCESSORIES

### A. Resilient Stair Treads:

- 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following or as indicated on drawings:
  - a. Burke Mercer Flooring Products; Division of Burke Industries, Inc.
  - b. Endura Rubber Flooring; Division of Burke Industries, Inc.
  - c. Estrie Products International; American Biltrite (Canada) Ltd.
  - d. Flexco, Inc.
  - e. Johnsonite.
  - f. Mondo Rubber International, Inc.
  - g. Nora Rubber Flooring; Freudenberg Building Systems, Inc.
  - h. R.C.A. Rubber Company (The).
  - i. Roppe Corporation, USA.
  - j. VPI, LLC: Floor Products Division.

### B. Resilient Stair Treads Standard: ASTM F 2169.

- 1. Material Requirement: Type TS (rubber, vulcanized thermoset) Type TP (rubber, thermoplastic) Type TS (rubber, vulcanized thermoset) or Type TP (rubber, thermoplastic).
- 2. Surface Design:
  - a. Pattern: Group 1, raised diamond design; Group 2, raised rib design, selected from manufacturer's full range or as indicated on drawings.
- 3. Manufacturing Method: Group 1, tread with embedded abrasive strips; Group 2, tread with contrasting color for the visually impaired, if indicated on drawings.
- C. Nosing Style: Square, adjustable to cover angles between 60 and 90 degrees round or reinforced, as indicated on drawings
- D. Nosing Height: As required by field conditions.
- E. Thickness: 1/4 inch (6 mm) and tapered to back edge

- F. Size: Lengths and depths to fit each stair tread in one piece or, for treads exceeding maximum lengths manufactured, provide seaming diagram.
  - G. Risers: Smooth, flat, toeless, height and length to cover risers; produced by same manufacturer as treads and recommended by manufacturer for installation with treads, or as indicated on drawings.
    - 1. Thickness: 0.125 inch (3.2 mm).
  - H. Stringers: Of same thickness as risers, height and length after cutting to fit risers and treads and to cover stair stringers; produced by same manufacturer as treads and recommended by manufacturer for installation with treads.
  - I. Colors and Patterns: As indicated by manufacturer's designations or as selected by Architect from full range of industry colors.
- 2.3 Resilient Landings: All stair landings to be selected from manufacturers full range to match stair threads.
- 2.4 INSTALLATION MATERIALS
- A. Trowelable Leveling and Patching Compounds: Latex-modified, portland cement based or blended hydraulic-cement-based formulation provided or approved by manufacturer for applications indicated.
  - B. Adhesives: Water-resistant type recommended by manufacturer to suit resilient products and substrate conditions indicated.
    - 1. Use adhesives that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
      - a. Cove Base Adhesives: Not more than 50 g/L.
      - b. Rubber Floor Adhesives: Not more than 60 g/L.
  - C. Stair-Tread-Nose Filler: Do not use filler. Install nosing tight to substrate.
  - D. Metal Edge Strips: Extruded aluminum with mill finish of width shown, of height required to protect exposed edges of tiles, and in maximum available lengths to minimize running joints.
  - E. Floor Polish: Provide protective liquid floor polish products as recommended by resilient stair tread manufacturer.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

- B. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resilient products.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Prepare substrates according to manufacturer's written instructions to ensure adhesion of resilient products.
- B. Concrete Substrates for Resilient Stair Treads and Accessories: Prepare according to ASTM F 710.
  - 1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
  - 2. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by manufacturer. Do not use solvents.
  - 3. Alkalinity and Adhesion Testing: Perform tests recommended by manufacturer.
  - 4. Moisture Testing: Perform tests recommended by manufacturer. Proceed with installation only after substrates pass testing.
    - a. Perform anhydrous calcium chloride test, ASTM F 1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate recommend by flooring manufacturer.
    - b. Perform relative humidity test using in situ probes, ASTM F 2170. Proceed with installation only after substrates have maximum relative humidity level recommended by flooring manufacturer.
- C. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound and remove bumps and ridges to produce a uniform and smooth substrate. Grind down all collars and protrusions level with adjacent surface.
- D. Do not install resilient products until they are same temperature as the space where they are to be installed.
  - 1. Move resilient products and installation materials into spaces where they will be installed at least 48 hours in advance of installation.
- E. Sweep and vacuum clean substrates to be covered by resilient products immediately before installation.

### 3.3 RESILIENT BASE INSTALLATION

- A. Comply with manufacturer's written instructions for installing resilient base.
- B. Apply resilient base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.

- C. Install resilient base in lengths as long as practicable without gaps at seams and with tops of adjacent pieces aligned.
- D. Tightly adhere resilient base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.
- E. Do not stretch resilient base during installation.
- F. On masonry surfaces or other similar irregular substrates, fill voids along top edge of resilient base with manufacturer's recommended adhesive filler material.
- G. Preformed Corners: Install preformed corners before installing straight pieces.
- H. Job-Formed Corners:
  - 1. Inside and Outside Corners: Use straight pieces of maximum lengths possible. Form without producing discoloration (whitening) at bends using scores and v-cuts.
  - 2. Per manufacturers recommendations to achieve tight fitting corners without gaps.

#### 3.4 CLEANING AND PROTECTION

- A. Comply with manufacturer's written instructions for cleaning and protection of resilient products.
- B. Perform the following operations immediately after completing resilient product installation:
  - 1. Remove adhesive and other blemishes from exposed surfaces.
  - 2. Sweep and vacuum surfaces thoroughly.
  - 3. Damp-mop surfaces to remove marks and soil.
- C. Protect resilient products from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.
- D. Floor Polish: Remove soil, visible adhesive and surface blemishes from resilient stair treads before applying liquid floor polish.
  - 1. Apply finish coats per manufactures recommendations.
- E. Cover and protect resilient products until Substantial Completion.

END OF SECTION 096513

## SECTION 096516.13 - LINOLEUM FLOORING

### 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. Linoleum floor tile and sheet flooring.

- B. Related Sections:

- 1. Division 09 Section "Resilient Base and Accessories" for resilient base, reducer strips, and other accessories installed with linoleum floor covering.

#### 1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.

- B. Shop Drawings: For each type of floor covering. Include floor covering layouts, locations of seams, edges, columns, doorways, enclosing partitions, built-in furniture, cabinets, and cutouts.

- 1. Show details of special patterns.

- C. Samples for Initial Selection: For each type of floor covering indicated.

- 1. Include similar Samples of installation accessories involving color selection.

- D. Samples for Verification: In manufacturer's standard size, but not less than 6-by-9-inch sections of each color and pattern of floor covering required.

- 1. Heat-Welding Bead: Include manufacturer's standard-size Samples, but not less than 9 inches (230 mm) long, of each color required.

- E. Heat-Welded Seam Samples: For each floor covering product and welding bead color and pattern combination required; with seam running lengthwise and in center of 6-by-9-inch (152-by-230-mm) Sample applied to rigid backing and prepared by Installer for this Project.

- F. Product Schedule: For floor covering. Use same designations indicated on Drawings.

- G. Qualification Data: For qualified Installer.

- H. Maintenance Data: For each type of floor covering to include in maintenance manuals.

#### 1.4 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified installer who employs workers for this Project who are competent in techniques required by manufacturer for floor covering installation.
  - 1. Engage an installer who employs workers for this Project who are trained or certified by manufacturer for installation techniques required.
- B. Fire-Test-Response Characteristics: As determined by testing identical products according to ASTM E 648 or NFPA 253 by a qualified testing agency.
  - 1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.
- C. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
  - 1. Build mockups for floor coverings including base and accessories.
    - a. Size: Minimum 100 sq. ft. for each type, color, and pattern in locations indicated.
- D. Seaming Diagram: Provide scaled, dimensioned drawings indicating seams, directions, offsets, color changes and all other design details.

#### 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Store floor coverings and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 65 deg F or more than 90 deg F.
  - 1. Floor Tile: Store on flat surfaces.
  - 2. Sheet Flooring: Store rolls upright.

#### 1.6 PROJECT CONDITIONS

- A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 deg F or more than 95 deg F, in spaces to receive floor coverings during the following time periods:
  - 1. 72 hours before installation.
  - 2. During installation.
  - 3. 72 hours after installation.
- B. Until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 deg F or more than 95 deg F.
- C. Close spaces to traffic during floor covering installation.

- D. Close spaces to traffic for 72 hours after floor covering installation.
- E. Install floor coverings after other finishing operations, including painting, have been completed.

#### 1.7 EXTRA MATERIALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  - 1. Floor Tile: Furnish 1 box for every 50 boxes or fraction thereof, of each type, color, and pattern of floor tile installed.
  - 2. Sheet Flooring: Furnish not less than 10 linear feet for every 500 linear feet or fraction thereof, in roll form and in full roll width for each color, pattern, and type of sheet flooring installed.

### PART 2 - PRODUCTS

#### 2.1 MANUFACTURERS

- A. Products: Subject to compliance with requirements, provide the following available products that may be incorporated into the Work include, but are not limited to, the following:
  - 1. Armstrong World Industries, Inc.
  - 2. Forbo Flooring, Inc.
  - 3. Tarkett Inc.
  - 4. Johnsonite.

#### 2.2 LINOLEUM FLOOR COVERING

- A. Floor Tile: ASTM F 2195, Type I, linoleum floor tile with fibrous backing.
  - 1. Nominal Floor Tile Size: As indicated on Drawings.
- B. Sheet Flooring: ASTM F 2034, Type I, linoleum sheet with backing.
  - 1. Roll Size: In manufacturer's standard length by not less than 78 inches wide.
- C. Seaming Method: Standard or as noted on Drawings.
- D. Thickness: 0.10 inch min. .
- E. Colors and Patterns: As indicated by manufacturer's designations Supply colors and patterns indicated on drawings..



## 2.3 INSTALLATION MATERIALS

- A. Trowelable Leveling and Patching Compounds: Latex-modified, portland cement based or blended hydraulic-cement-based formulation provided or approved by manufacturer for applications indicated.
- B. Adhesives: Water-resistant type recommended by manufacturer to suit products and substrate conditions indicated.
  - 1. Use adhesives that have a VOC content of not more than 50 g/L <Insert requirement> when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- C. Heat-Welding Bead: Solid-strand product of linoleum floor covering manufacturer.
  - 1. Match linoleum floor covering Submit sample for approval.
- D. Integral-Flash-Cove-Base Accessories:
  - 1. Cove Strip: 1-inch radius provided or approved by manufacturer.
  - 2. Cove-Base Cap Strip: As indicated on Drawings.
- E. Floor Polish: Provide protective liquid floor polish products as recommended by manufacturer coordinate finishing with University of Maryland Department of Building Services.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
- B. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of floor coverings.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Prepare substrates according to manufacturer's written instructions to ensure adhesion of floor coverings.
- B. Concrete Substrates: Prepare according to ASTM F 710.
  - 1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
  - 2. Remove substrate coatings and other substances that are incompatible with floor covering adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by manufacturer. Do not use solvents.

3. Alkalinity and Adhesion Testing: Perform tests recommended by manufacturer. Proceed with installation only after substrates pass testing.
4. Moisture Testing: Perform tests recommended by manufacturer and as follows. Proceed with installation only after substrates pass testing.
  - a. Perform anhydrous calcium chloride test, ASTM F 1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. (1.36 kg of water/92.9 sq. m) in 24 hours.
  - b. Perform relative humidity test using in situ probes, ASTM F 2170. Proceed with installation only after substrates have maximum 75 percent relative humidity level measurement.
- C. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound and remove bumps and ridges to produce a uniform and smooth substrate.
- D. Do not install floor coverings until they are same temperature as space where they are to be installed.
  1. Move floor coverings and installation materials into spaces where they will be installed at least 72 hours in advance of installation.
- E. Sweep and vacuum clean substrates to be covered by floor coverings immediately before installation.

### 3.3 INSTALLATION, GENERAL

- A. Comply with manufacturer's written instructions for installing floor coverings.
- B. Scribe and cut floor coverings to butt neatly and tightly to vertical surfaces, permanent fixtures, and built-in furniture including cabinets, pipes, outlets, edgings, thresholds, and nosings.
- C. Extend floor coverings into toe spaces, door reveals, closets, and similar openings.
- D. Maintain reference markers, holes, or openings that are in place or marked for future cutting by repeating on floor coverings as marked on subfloor. Use chalk or other nonpermanent marking device.
- E. Install floor coverings on covers for telephone and electrical ducts and similar items in finished floor areas. Maintain overall continuity of color and pattern between pieces of floor covering installed on covers and adjoining floor covering. Tightly adhere floor covering edges to substrates that abut covers and to cover perimeters.
- F. Adhere floor coverings to substrates using a full spread of adhesive applied to substrate to produce a completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.
- G. Heat-Welded Seams: Comply with ASTM F 1516. Rout joints and use welding bead to permanently fuse sections into a seamless floor covering. Prepare, weld, and finish seams to produce surfaces flush with adjoining floor covering surfaces.

- H. Seal joint of floor covering and door frames with clear silicone sealant.

### 3.4 LINOLEUM FLOOR TILE INSTALLATION

- A. Lay out floor tiles from center marks established with principal walls, discounting minor offsets, so floor tiles at opposite edges of room are of equal width. Adjust as necessary to avoid using cut widths that equal less than one-half tile at perimeter.
  - 1. Lay floor tiles in pattern indicated.
- B. Match floor tiles for color and pattern by selecting tiles from cartons in same sequence as manufactured and packaged, if so numbered. Discard broken, cracked, chipped, or deformed floor tiles.
  - 1. Lay floor tiles with grain direction As indicated on Drawings. in pattern of colors and sizes indicated.

### 3.5 LINOLEUM SHEET FLOORING INSTALLATION

- A. Unroll sheet floorings and allow them to stabilize before cutting and fitting.
- B. Lay out sheet floorings as follows:
  - 1. Maintain uniformity of floor covering direction.
  - 2. Minimize number of seams; place seams in inconspicuous and low-traffic areas, at least 6 inches away from parallel joints in floor covering substrates, following approved seaming diagram.
  - 3. Match edges of floor coverings for color shading at seams.
  - 4. Avoid cross seams.
  - 5. Eliminate deformations that result from hanging method used during drying process (stove bar marks).
- C. Integral-Flash-Cove Base: Cove linoleum floor covering dimension indicated up vertical surfaces. Support floor covering at horizontal and vertical junction with cove strip. Butt at top against cap strip.

### 3.6 CLEANING AND PROTECTION

- A. Comply with manufacturer's written instructions for cleaning and protection of floor coverings.
- B. Perform the following operations immediately after completing floor covering installation:
  - 1. Remove adhesive and other blemishes from exposed surfaces.
  - 2. Sweep and vacuum surfaces thoroughly.
  - 3. Damp-mop surfaces to remove marks and soil.
- C. Protect floor coverings from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.

- D. Floor Polish: Remove soil, visible adhesive, and surface blemishes from floor coverings before applying liquid floor polish
  - 1. Apply three. Coats to produce a matte finish.
  - 2. Do not apply polish to prefinished materials.
- E. After allowing drying room film (yellow film caused by linseed oil oxidation) to disappear, cover floor coverings until Substantial Completion.

END OF SECTION 096516.13

## SECTION 096516 - RESILIENT SHEET FLOORING

### 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. Vinyl sheet floor covering, with and without backing.
- 2. Rubber sheet floor covering, with and without backing.

- B. Related Sections:

- 1. Division 09 Section "Resilient Base and Accessories" for resilient base, reducer strips, and other accessories installed with resilient floor coverings.
- 2. Division 09 Section "Linoleum Flooring" for linoleum sheet floor coverings.
- 3. Division 09 Section "Resilient Tile Flooring" for resilient floor tile.

#### 1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.

- B. Shop Drawings: For each type of floor covering. Include floor covering layouts, locations of seams, edges, columns, doorways, enclosing partitions, built-in furniture, cabinets, and cutouts. Indicate pattern direction.

- 1. Show details of special patterns.

- C. Samples for Initial Selection: For each type of floor covering indicated.

- D. Samples for Verification: In manufacturer's standard size, but not less than 6-by-9-inch (150-by-230-mm) sections of each different color and pattern of floor covering required.

- 1. For heat-welding bead, manufacturer's standard-size Samples, but not less than 9 inches (230 mm) long, of each color required.

- E. Product Schedule: For floor coverings. Use same designations indicated on Drawings.

- F. Qualification Data: For qualified Installer.

- G. Maintenance Data: For each type of floor covering to include in maintenance manuals.

#### 1.4 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified installer who employs workers for this Project who are competent in techniques required by manufacturer for floor covering installation and seaming method indicated.
  - 1. Engage an installer who employs workers for this Project who are trained or certified by floor covering manufacturer for installation techniques required.
- B. Fire-Test-Response Characteristics: As determined by testing identical products according to ASTM E 648 or NFPA 253 by a qualified testing agency.
  - 1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.

#### 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Store floor coverings and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 deg F (10 deg C) or more than 90 deg F (32 deg C). Store rolls upright.

#### 1.6 PROJECT CONDITIONS

- A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 deg F (21 deg C) more than 95 deg F (35 deg C), in spaces to receive floor coverings during the following time periods:
  - 1. 48 hours before installation.
  - 2. During installation.
  - 3. 48 hours after installation.
- B. Until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 deg F (13 deg C) or more than 95 deg F (35 deg C).
- C. Close spaces to traffic during floor covering installation.
- D. Close spaces to traffic for 48 hours after floor covering installation.
- E. Install floor coverings after other finishing operations, including painting, have been completed.

#### 1.7 EXTRA MATERIALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  - 1. Floor Covering: Furnish quantity not less than 10 linear feet (3 linear m) for every 500 linear feet (150 linear m) or fraction thereof, in roll form and in full roll width for each color, pattern, and type of floor covering installed.

## PART 2 - PRODUCTS

### 2.1 VINYL SHEET FLOOR COVERING

- A. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
1. Altro Group.
  2. Armstrong World Industries, Inc.
  3. Congoleum Corporation.
  4. DzynSpec, Division of Matsinc.
  5. Forbo Flooring, Inc.
  6. Gerflor, Architectural Floor Systems, Inc.
  7. Lonseal, Inc.
  8. Mannington Mills, Inc.
  9. Polyflor, Ltd., Distributed by Gerbert Limited.
  10. Tarkett, Inc.
  11. TOLI International.
- B. Vinyl Sheet Floor Covering with Backing: ASTM F 1303.
1. Type (Binder Content): Type II, minimum binder content of 34 percent.
  2. Wear-Layer Thickness: Grade 1.
  3. Overall Thickness: As standard with manufacturer.
  4. Interlayer Material: As standard with manufacturer.
  5. Backing Class: As standard with manufacturer.
- C. Wearing Surface: Embossed, Smooth with embedded abrasives, or Embossed with embedded abrasives.
- D. Sheet Width: As standard with manufacturer.
- E. Seaming Method: As standard with manufacturer. If options are available, demonstrate all options required for approval by architect.
- F. Colors and Patterns: As selected by Architect from full range of industry colors.

### 2.2 RUBBER SHEET FLOOR COVERING

- A. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
1. Expanko
  2. Estrie Products International, American Biltrite (Canada) Ltd.
  3. Flexco.
  4. Johnsonite.
  5. Mondo Rubber International, Inc.
  6. Nora Rubber Flooring, Freudenberg Building Systems, Inc.

7. Capri Cokk.
8. R.C.A. Rubber Company (The).
9. Yem and Hart

B. Unbacked Rubber Sheet Floor Covering: ASTM F 1859.

1. Type: Type II (layered rubber sheet), or
2. Thickness: As standard with manufacturer.

C. Rubber Sheet Floor Covering with Backing: ASTM F 1860.

1. Type: Type II, layered rubber sheet with backing.
2. Wear-Layer Thickness: As standard with manufacturer.
3. Overall Thickness: As standard with manufacturer .
4. Interlayer Material: As standard with manufacturer.
5. Backing Type: As standard with manufacturer.

D. Recycled Rubber Flooring

1. Compressed Crumb Rubber, color through, without backing.
2. Thickness: Min. 6mm.

E. Hardness: Manufacturer's standard hardness, measured using Shore, Type A durometer per ASTM D 2240.

F. Wearing Surface: Textured or Molded pattern.

1. Molded-Pattern Figure: As indicated on Drawings.

G. Sheet Width: As standard with manufacturer.

H. Seaming Method: As recommended by manufacturer.

I. Colors and Patterns: As selected by Architect from full range of industry colors.

## 2.3 INSTALLATION MATERIALS

A. Trowelable Leveling and Patching Compounds: Latex-modified, portland cement based or blended hydraulic-cement-based formulation provided or approved by manufacturer for applications indicated.

B. Adhesives: Water-resistant type recommended by manufacturer to suit floor covering and substrate conditions indicated.

1. Use adhesives that have a VOC content of not more than 50 g/L when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

C. Seamless-Installation Accessories:

1. Heat-Welding Bead: Manufacturer's solid-strand product for heat welding seams.
  - a. Color: Match floor covering.



2. Chemical-Bonding Compound: Manufacturer's product for chemically bonding seams.
  - a. VOC Content: Not more than 510 g/L. when calculated according to 40 CFR 59, Subpart D (EPA method 24).
- D. Integral-Flash-Cove-Base Accessories:
  1. Cove Strip: 1-inch (25-mm) radius provided or approved by manufacturer.
  2. Cap Strip: Square metal, or rubber cap or provided or approved by manufacturer.
  3. Corners: Metal inside and outside corners and end stops provided or approved by manufacturer.
- E. Floor Polish: Provide protective liquid floor polish products as recommended by manufacturer to produce a matt finish. Coordinate with University of Maryland Building Services.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
- B. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of floor coverings.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

#### 3.2 PREPARATION

- A. Prepare substrates according to manufacturer's written instructions to ensure adhesion of floor coverings.
- B. Concrete Substrates: Prepare according to ASTM F 710.
  1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
  2. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by manufacturer. Do not use solvents.
  3. Alkalinity and Adhesion Testing: Perform tests recommended by manufacturer. Proceed with installation only after substrates pass testing.
  4. Moisture Testing: Perform tests recommended by manufacturer and as follows. Proceed with installation only after substrates pass testing.
    - a. Perform anhydrous calcium chloride test, ASTM F 1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. (1.36 kg of water/92.9 sq. m) in 24 hours.

- b. Perform relative humidity test using in situ probes, ASTM F 2170. Proceed with installation only after substrates have a maximum 75 percent relative humidity level measurement.
- C. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound and remove bumps and ridges to produce a uniform and smooth substrate.
- D. Do not install floor coverings until they are same temperature as space where they are to be installed.
  - 1. Move floor coverings and installation materials into spaces where they will be installed at least 48 hours in advance of installation.
- E. Sweep and vacuum clean substrates to be covered by floor coverings immediately before installation.

### 3.3 FLOOR COVERING INSTALLATION

- A. Comply with manufacturer's written instructions for installing floor coverings.
- B. Unroll floor coverings and allow them to stabilize before cutting and fitting.
- C. Lay out floor coverings as follows:
  - 1. Maintain uniformity of floor covering direction.
  - 2. Minimize number of seams; place seams in inconspicuous and low-traffic areas, at least 6 inches (152 mm) away from parallel joints in floor covering substrates.
  - 3. Match edges of floor coverings for color shading at seams.
  - 4. Avoid cross seams.
- D. Scribe and cut floor coverings to butt neatly and tightly to vertical surfaces, permanent fixtures, and built-in furniture including cabinets, pipes, outlets, and door frames.
- E. Extend floor coverings into toe spaces, door reveals, closets, and similar openings.
- F. Maintain reference markers, holes, or openings that are in place or marked for future cutting by repeating on floor coverings as marked on substrates. Use chalk or other nonpermanent marking device.
- G. Install floor coverings on covers for telephone and electrical ducts and similar items in installation areas. Maintain overall continuity of color and pattern between pieces of floor coverings installed on covers and adjoining floor covering. Tightly adhere floor covering edges to substrates that abut covers and to cover perimeters.
- H. Apply clear silicone sealant all around joint of floor covering and door frames.
- I. Adhere floor coverings to substrates using a full spread of adhesive applied to substrate to produce a completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.

J. Seamless Installation:

1. Heat-Welded Seams: Comply with ASTM F 1516. Rout joints and use welding bead to permanently fuse sections into a seamless floor covering. Prepare, weld, and finish seams to produce surfaces flush with adjoining floor covering surfaces.
2. Chemically-Bonded Seams: Bond seams with chemical-bonding compound to permanently fuse sections into a seamless floor covering. Prepare seams and apply compound to produce tightly-fitted seams without gaps, overlays, or excess bonding compound on floor covering surfaces.

K. Integral-Flash-Cove Base: Cove floor coverings 6 inches (152 mm) up vertical surfaces. Support floor coverings at horizontal and vertical junction by cove strip. Butt at top against cap strip.

1. Install metal corners at inside and outside corners.

3.4 CLEANING AND PROTECTION

A. Comply with manufacturer's written instructions for cleaning and protection of floor coverings.

B. Perform the following operations immediately after completing floor covering installation:

1. Remove adhesive and other blemishes from floor covering surfaces.
2. Sweep and vacuum floor coverings thoroughly.
3. Damp-mop floor coverings to remove marks and soil.

C. Protect floor coverings from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.

D. Floor Polish: Remove soil, visible adhesive, and surface blemishes from floor covering before applying liquid floor polish.

1. Apply coat(s) as recommended by manufacturer, to produce a matt finish. Coordinate with University of Maryland Building Services. Do not apply finish on floors designated as no wax or un-finished.

E. Cover floor coverings until Substantial Completion.

END OF SECTION 096516

## SECTION 096519 - 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 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section Includes:

1. Solid vinyl floor tile.
2. Rubber floor tile.
3. Vinyl composition floor tile.
4. Resilient terrazzo floor tile.
5. Bio based polyester composition floor tile.
6. Chlorine-free commercial tile and plank.
7. Slip resistant floor tile.
8. Heavy duty floor tile.
9. Integrally finished floor tile.

- B. Related Sections:

1. Division 09 Section "Resilient Base and Accessories" for resilient base, reducer strips, and other accessories installed with resilient floor coverings.
2. Division 09 Section "Resilient Sheet Flooring" for resilient sheet floor coverings.
3. Division 09 Section "Linoleum Flooring" for linoleum floor coverings.

#### 1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.

- B. Shop Drawings: For each type of floor tile. Include floor tile layouts, registration points, edges, columns, doorways, enclosing partitions, built-in furniture, cabinets, and cutouts.

1. Show details of special patterns.

- C. Samples for Initial Selection: For each type of floor tile indicated.

- D. Samples for Verification: Full-size units of each color and pattern of floor tile required.

1. For heat-welding bead, manufacturer's standard-size Samples, but not less than 9 inches (230 mm), of each color required.

- E. Seam Samples: For seamless-installation technique indicated and for each flooring product, color, and pattern required; with seam running lengthwise and in center of 6-by-9-inch (150-by-230-mm) Sample applied to a rigid backing and prepared by Installer for this Project.
- F. Product Schedule: For floor tile. Refer to Drawings or RFP.
- G. Qualification Data: For qualified Installer.
- H. Maintenance Data: For each type of floor tile to include in maintenance manuals.

#### 1.4 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified installer who employs workers for this Project who are competent in techniques required by manufacturer for floor tile installation and seaming method indicated.
  - 1. Engage an installer who employs workers for this Project who are trained or certified by manufacturer for installation techniques required.
- B. Fire-Test-Response Characteristics: As determined by testing identical products according to ASTM E 648 or NFPA 253 by a qualified testing agency.
  - 1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.
- C. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
  - 1. Build mockups for floor tile including resilient base and accessories.
    - a. Size: Minimum 100 sq. ft. (9.3 sq. m) for each type, color, and pattern in locations directed by Architect. If accepted, mock-up can be incorporated into finished Work.

#### 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Store floor tile and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 deg F (10 deg C) or more than 90 deg F (32 deg C). Store floor tiles on flat surfaces.

#### 1.6 PROJECT CONDITIONS

- A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 deg F (21 deg C) or more than 95 deg F (35 deg C), in spaces to receive floor tile during the following time periods:
  - 1. 48 hours before installation.
  - 2. During installation.
  - 3. 48 hours after installation.

- B. Until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 deg F (13 deg C) or more than 95 deg F (35 deg C).
- C. Close spaces to traffic during floor tile installation.
- D. Close spaces to traffic for 48 hours after floor tile installation.
- E. Install floor tile after other finishing operations, including painting, have been completed. Coordinate with work of other trades.

## 1.7 EXTRA MATERIALS

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

## PART 2 - PRODUCTS

### 2.1 SOLID VINYL FLOOR TILE

- A. Products: Subject to compliance with requirements, provide product noted on Drawings (or RFP), or comparable product from one of the manufacturers listed below and approved by Architect:
  - 1. Altro Group.
  - 2. Amtico Studio (The), Amtico International Inc.
  - 3. Armstrong World Industries, Inc.
  - 4. Estrie Products International, American Biltrite (Canada) Ltd.
  - 5. Flexco.
  - 6. Johnsonite.
  - 7. Roppe Corporation, USA.
  - 8. Tarkett, Inc.
  - 9. TOLI International.
- B. Tile Standard: ASTM F 1700.
  - 1. Class: As indicated by product designations.
  - 2. Type: As indicated by product designation.
- C. Thickness: 0.120 inch (3.0 mm) minimum, or as noted on Drawings.
- D. Size: As indicated by product designation, or as noted on Drawings.
- E. Seaming Method: As noted on Drawings.
- F. Colors and Patterns: As indicated by manufacturer's designations, as selected by Architect from full range of industry colors, or as noted on Drawings.

## 2.2 RUBBER FLOOR TILE

- A. Products: Subject to compliance with requirements, provide product noted on Drawings (or RFP), or comparable product from one of the manufacturers listed below and approved by Architect:
  - 1. Endura Rubber Flooring, a division of Burke Industries Inc.
  - 2. Estrie Products International, American Biltrite (Canada) Ltd.
  - 3. Flexco.
  - 4. Johnsonite.
  - 5. Mondo Rubber International, Inc.
  - 6. Nora Rubber Flooring, Freudenberg Building Systems, Inc.
  - 7. Roppe Corporation, USA.
  - 8. Capri Cork.
- B. Tile Standard: ASTM F 1344, Class I-A, homogeneous rubber tile, solid color or Class I-B, homogeneous rubber tile, through mottled as indicated by product designation.
- C. Hardness: Manufacturer's standard hardness.
- D. Wearing Surface: As noted.
  - 1. Molded-Pattern Figure: As noted.
- E. Thickness: Minimum 0.125 inch (3.2 mm).
- F. Size: As noted.
- G. Seaming Method: Butt tight, or as noted.
- H. Colors and Patterns: As indicated by manufacturer's designations or as selected by Architect from full range of industry colors.

## 2.3 VINYL COMPOSITION FLOOR TILE

- A. Products: Subject to compliance with requirements, provide product noted on Drawings (or RFP), or comparable product from one of the manufacturers listed below and approved by Architect:
  - 1. AB ColorPlus, American Biltrite (Canada) Ltd.
  - 2. Armstrong World Industries, Inc.
  - 3. Mannington Mills, Inc.
  - 4. Tarkett, Inc.
  - 5. Vinylasa Tile, Distributed by American Tile Inc.
  - 6. Toli International.
- B. Tile Standard: ASTM F 1066, Class 1, solid-color tile or Class 2, through-pattern tile, as indicated by product designation.
- C. Wearing Surface: As indicated by product designation.

- D. Thickness: 0.120 inch (3.0 mm) minimum, or as noted.
- E. Size: As noted.
- F. Colors and Patterns: As indicated by manufacturer's designations or as selected by Architect from full range of industry colors.

#### 2.4 RESILIENT TERRAZZO FLOOR TILE

- A. Resilient Terrazzo Floor Tile: Marble or granite chips embedded in flexible, thermoset-polyester-resin matrix; electrically nonconductive and chemical, oil, and corrosion resistive, with smooth wearing surface and manufacturer's standard factory-applied, protective urethane coating.
  - 1. Products: Subject to compliance with requirements, provide product noted on Drawings (or RFP), or comparable product from one of the manufacturers listed below and approved by Architect:
    - a. Fritz Industries.
    - b. Watson Tile Co.
    - c. Enviroglas, LLC.
- B. Thickness: 1/8 inch (3.0 mm).
- C. Performance Characteristics:
  - 1. Compressive Strength: 2900 to 5000 psi (20 to 34.5 MPa), ASTM C 109/C 109M or ASTM D 695.
  - 2. Abrasion Resistance: Maximum 0.0196 cubic centimeters volume loss, ASTM F 510, Taber abrader, S-39 wheels, at 500 cycles with 1000-gram load.
  - 3. Static Load Limit: 0.0007-inch (0.0177-mm) maximum indentation, ASTM F 970 at 125 lb (57 kg).
  - 4. Resin Matrix Hardness: Not less than 78, as measured using Shore, Type D durometer per ASTM D 2240.
- D. Colors and Patterns: As indicated by manufacturer's designations or as selected by Architect from full range of industry colors.

#### 2.5 INSTALLATION MATERIALS

- A. Trowelable Leveling and Patching Compounds: Latex-modified, portland cement based or blended hydraulic-cement-based formulation provided or approved by manufacturer for applications indicated.
- B. Adhesives: Water-resistant type recommended by manufacturer to suit floor tile and substrate conditions indicated.
  - 1. Use adhesives that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):



- a. VCT and Asphalt Tile Adhesives: Not more than 50 g/L.
  - b. Rubber Floor Adhesives: Not more than 60 g/L.
- C. Seamless-Installation Accessories:
- 1. Heat-Welding Bead: Manufacturer's solid-strand product for heat welding seams.
    - a. Color: As selected by Architect from manufacturer's full range to contrast with floor tile.
  - 2. Chemical-Bonding Compound: Manufacturer's product for chemically bonding seams.
    - a. Use chemical-bonding compound that has a VOC content of 350 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- D. Floor Polish: Provide protective liquid floor polish products as recommended by manufacturer.
- E. Joint Sealant for Resilient Terrazzo Floor Tile: Silicone sealant of type and grade as recommended in writing by manufacturer to suit resilient terrazzo floor tile.
- 1. Use sealant that has a VOC content of not more than 250 g/L when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
  - 2. Joint-Sealant Color: Clear or as selected by Architect from manufacturer's full range to match floor tile.
- F. Sealers and Finish Coats for Resilient Terrazzo Floor Tile: Premium-type products as recommended by manufacturer for resilient terrazzo floor tile.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
- B. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of floor tile.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

#### 3.2 PREPARATION

- A. Prepare substrates according to manufacturer's written instructions to ensure adhesion of resilient products.
- B. Concrete Substrates: Prepare according to ASTM F 710.
  - 1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.

2. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by manufacturer. Do not use solvents.
  3. Alkalinity and Adhesion Testing: Perform tests recommended by manufacturer. Proceed with installation only after substrates pass testing.
  4. Moisture Testing: Perform tests recommended by manufacturer and as follows. Proceed with installation only after substrates pass testing.
    - a. Perform anhydrous calcium chloride test, ASTM F 1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. (1.36 kg of water/92.9 sq. m) in 24 hours.
    - b. Perform relative humidity test using in situ probes, ASTM F 2170. Proceed with installation only after substrates have a maximum 75% relative humidity level measurement.
- C. Access Flooring Panels: Remove protective film of oil or other coating using method recommended by access flooring manufacturer.
- D. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound and remove bumps and ridges to produce a uniform and smooth substrate.
- E. Do not install floor tiles until they are same temperature as space where they are to be installed.
  1. Move resilient products and installation materials into spaces where they will be installed at least 48 hours in advance of installation.
- F. Sweep and vacuum clean substrates to be covered by resilient products immediately before installation.

### 3.3 FLOOR TILE INSTALLATION

- A. Comply with manufacturer's written instructions for installing floor tile.
- B. Lay out floor tiles from center marks established with principal walls, discounting minor offsets, so tiles at opposite edges of room are of equal width. Adjust as necessary to avoid using cut widths that equal less than one-half tile at perimeter.
  1. Lay tiles in pattern indicated.
- C. Match floor tiles for color and pattern by selecting tiles from cartons in the same sequence as manufactured and packaged, if so numbered. Discard broken, cracked, chipped, or deformed tiles.
  1. Lay tiles with grain running in one direction unless noted otherwise.
- D. Scribe, cut, and fit floor tiles to butt neatly and tightly to vertical surfaces and permanent fixtures including built-in furniture, cabinets, pipes, outlets, and door frames.
- E. Extend floor tiles into toe spaces, door reveals, closets, and similar openings. Extend floor tiles to center of door openings.

- F. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on floor tiles as marked on substrates. Use chalk or other nonpermanent, nonstaining marking device.
- G. Install floor tiles on covers for telephone and electrical ducts, building expansion-joint covers, and similar items in finished floor areas. Maintain overall continuity of color and pattern between pieces of tile installed on covers and adjoining tiles. Tightly adhere tile edges to substrates that abut covers and to cover perimeters.
- H. Adhere floor tiles to flooring substrates using a full spread of adhesive applied to substrate to produce a completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.
- I. Seamless Installation:
  - 1. Heat-Welded Seams: Comply with ASTM F 1516. Rout joints and heat weld with welding bead to permanently fuse sections into a seamless floor covering. Prepare, weld, and finish seams to produce surfaces flush with adjoining floor covering surfaces.
  - 2. Chemically Bonded Seams: Bond seams with chemical-bonding compound to permanently fuse sections into a seamless floor covering. Prepare seams and apply compound to produce tightly fitted seams without gaps, overlays, or excess bonding compound on floor covering surfaces.

### 3.4 CLEANING AND PROTECTION

- A. Comply with manufacturer's written instructions for cleaning and protection of floor tile.
- B. Perform the following operations immediately after completing floor tile installation:
  - 1. Remove adhesive and other blemishes from exposed surfaces.
  - 2. Sweep and vacuum surfaces thoroughly.
  - 3. Damp-mop surfaces to remove marks and soil.
- C. Protect floor tile products from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.
- D. Floor Polish: Remove soil, visible adhesive, and surface blemishes from floor tile surfaces before applying finish recommended by manufacturer.
  - 1. Apply finish as directed by UM PM.
- E. Joint Sealant: Apply sealant to resilient terrazzo floor tile perimeter and around columns, at door frames, and at other joints and penetrations.
- F. Sealers and Finish Coats: Remove soil, visible adhesive, and surface blemishes from resilient terrazzo floor tile surfaces before applying liquid cleaners, sealers, and finish products.
  - 1. Finish and seal as directed by UM PM.
- G. Cover floor tile until Substantial Completion.

END OF SECTION 096519

## SECTION 096723 - RESINOUS FLOORING

### 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. High-performance resinous flooring systems—seamless methyl methacrylate (MMA) flooring system.

- B. Related Sections:

- 1. Division 07 Section "Joint Sealants" for sealants installed at joints in resinous flooring systems.

#### 1.3 SYSTEM DESCRIPTION

- A. The work shall consist of preparation of the substrate, the furnishing and application of a methyl methacrylate (MMA) trowel on flooring system. The system shall have the color and texture as specified by the Owner with a nominal thickness of 30 mils with appropriate primer and topcoat. It shall be applied to the prepared area(s) as defined in the plans strictly in accordance with the Manufacturer's recommendations.
- B. Topping system shall cure and be available to normal traffic in no more than 60 minutes at 68°F after application of last coat. The cured material shall have a minimum compressive strength of 6,000 psi in accordance with ASTM C109. It shall have a maximum water absorption value of 0.05 weight percent in accordance with ASTM D570. It shall be chemically resistant to a wide range of acids, alkalis, salts, fats, oils, and other chemicals.
- C. The finished floor coating system shall be uniform in color, texture, and appearance. All edges that terminate at walls, floor discontinuities, and other embedded items shall be sharp, uniform, and cosmetically acceptable with no thick or ragged edge.

#### 1.4 SUBMITTALS

- A. Product Data: For each type of product in the system, include Manufacturer's technical data, application instructions, and recommendations for each resinous flooring component required including but not limited to flexible reinforcing membrane/substrate crack isolation system.
- B. Samples for Initial Selection: For each type of exposed finish required.

- C. Samples for Verification: Submit samples as 6 inches (150 mm) square, applied to a rigid backing by Installer for this work for approval by design team. Installer to coordinate with design team to achieve low contrast chip tones and color match to owner's satisfaction.
- D. Product Schedule: Refer to finish schedule in drawings for RSN-1.
- E. Installer Certificates: Signed by Manufacturer certifying that Installers comply with specified requirements.
- F. Material Certificates: For each resinous flooring component, from Manufacturer.
- G. Material Test Reports: For each resinous flooring system.
- H. Maintenance Data: For resinous flooring to include in maintenance manuals.
- I. Manufacturer's Material Safety Data Sheets (MSDS): For each respective product to be used.
- J. No requests for substitutions shall be considered that would change the generic type of the specified system—100% reactive, methyl methacrylate resinous flooring. Requests for substitution will be considered if submitted within 10 after the execution of the contract. Equivalent materials of other Manufacturers may be substituted only on approval of the Architect.

#### 1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Manufacturer shall have a minimum of 10 years experience in the production, sales and technical support of methyl methacrylate (MMA) industrial flooring and related materials.
- B. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of flooring systems required for this Project.
  - 1. Engage an Installer who is certified in writing by resinous flooring Manufacturer as qualified to apply resinous flooring systems indicated in all phases of the surface preparation and application of product specified. Approved Installer must have 5 years experience of installing the specified flooring system and submit a list of five projects/references as a prequalification requirement. All of the five projects/references must be of the same type, equal size, quantity, and magnitude to this project as a requalification requirement. Owner has the option to personally inspect the projects/references to accept or reject any of the Contractors prior to bid time as a prequalification requirement.
  - 2. Installer (or Subcontractor) must be qualified to prepare surface by shot-blast cleaning method, treat cracks, joints, and penetrations.
- C. Source Limitations: Obtain primary resinous flooring materials, including primers, resins, hardening agents, grouting coats, and topcoats, from single source from single Manufacturer. Provide secondary materials, including patching and fill material, joint sealant, and repair materials, of type and from source recommended by Manufacturer of primary materials.

- D. Mockups: Apply mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
  - 1. Apply full-thickness mockups on 48-inch- (1200-mm-) square floor area selected by Architect.
  - 2. Simulate finished lighting conditions for Architect's review of mockups.
  - 3. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.
- E. Preinstallation Conference: Conduct conference on-site including Installer, Subcontractors (if any), Material Manufacturer and the Owner for review and clarification of this specification, application procedure, quality control, inspection and acceptance criteria, and production schedule. Installer is not authorized to proceed until this conference is held or waived by the Owner.
- F. Coordination: Installer shall meet with University's General Contractor to schedule this work to coordinate with the work of General Contractor.

#### 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in original packages and containers, with seals unbroken, bearing Manufacturer's labels indicating brand name and directions for storage and mixing with other components. Labels must be intact and legible.
- B. Follow all Manufacturer's specific label instructions and product safety practices for storage and handling.
- C. Copies of the Material Safety Data Sheets (MSDS) for all components shall be kept on-site for review by the Engineer or other personnel.

#### 1.7 PROJECT CONDITIONS

- A. Environmental Limitations: Comply with resinous flooring Manufacturer's written instructions for substrate temperature, ambient temperature, moisture, ventilation, and other conditions affecting resinous flooring application.
- B. Lighting: Temporary lighting not in this contract. Available lighting will be adequate for installation, but will not simulate final lighting levels.
- C. Close spaces to traffic during resinous flooring application and for not less than 24 hours after application unless Manufacturer recommends a longer period.
- D. Bond Testing:
  - 1. Surface preparation efforts shall be evaluated by conducting Bond Tests at the site prior to application of the flooring system(s).
- E. Safety Requirements:

1. All open flames and spark-producing equipment shall be removed from the work area prior to commencement of application.
2. “No Smoking” signs shall be posted at the entrances to the work area.
3. Non-related personnel in the work area shall be kept to a minimum, and will be coordinated with Owner’s General Contractor who may be working in the adjacent space.
4. Installer shall ensure that adequate ventilation is available for the work area per UMCP DES requirements. This shall include the use of Manufacturer’s approved fans, smooth bore tubing and closure of the work area.
5. Per UMCP DES requirements, the following safety practices shall be upheld:
  - a. Work Area Preparation.  
Prior to commencing the floor replacement project, the following steps shall be taken:
    - i. The work area shall be determined. The work area is defined as the room(s) or other open areas where the floor surfacing will be applied as well as rooms or areas where support activities (e.g., product mixing, equipment clean-up) will be performed.
    - ii. Exclusion of persons from the work area and warning signs.  
All persons not directly involved in the work operation shall be excluded from the work area. Warning signs shall be posted at all approaches to the work area. Signs shall be posted a sufficient distance from the work area to permit a person to read the sign(s) and take precautionary measures to avoid exposure to dusts and vapors. Signs shall read: “DO NOT ENTER. FLOORING APPLICATION WORK AREA. AUTHORIZED PERSONNEL ONLY.”
    - iii. Shutdown of HVAC Systems.  
The facility heating, ventilation and air-conditioning (HVAC) systems of area where the floor replacement work is being performed shall be shut down, locked out and isolated.
  - b. Isolation of Work Area.  
The area shall be isolated by sealing openings including but not limited to windows, doors, ventilation openings, drains, construction floor openings (holes between floors), grilles, grates with 6 mil thick (minimum) plastic sheeting and duct tape or the equivalent to prevent the passage of toxic and flammable gasses and/or dusts into adjacent building spaces. Large openings such as open doorways, elevator doors, and passageways may require solid construction materials such as stud frames surfaced with two layers of 6 mil plastic sheeting, plywood, sheetrock, gypsum board, or consist of existing suitable barriers and partitions. Plastic sheeting on open framing is not a suitable barrier. All cracks, seams and openings in critical barriers shall be taped or otherwise sealed, so as to prevent the movement of vapors and/or dusts out of the work area. Entrance to the work area should be by means of



only one entrance door. This entrance to the work area shall be covered with at least three overlapping sheets of 6 mil thick plastic sheeting over an existing or temporarily framed doorway. One sheet shall be secured at the top and left side, the second sheet at the top and right, and the third sheet at the top and left side to minimize the inadvertent migration of dusts and vapors from the work area.

c. Work Area Ventilation System.

A work area ventilation system shall be used to maintain a reduced atmospheric pressure within the contained work area at all times; including preparation of old floor surfaces, mixing of components of the flooring product, application of the new flooring, and cleaning of contaminated work equipment. Work area ventilation shall also be used during the full drying/curing process of the newly-applied flooring surfacing. The equipment utilized to reduce air pressure within the contained area (i.e., the exhaust fans) shall be of sufficient number and capacity to provide a minimum of four (4) air changes per hour from the defined work area (see Figure 1 on the next page for how to determine minimum exhaust ventilation requirements). Ventilation units shall be operated in accordance with manufacturer's recommendations. Provisions shall be made for ports for make-up air to enter the work area and replace the air being exhausted. The personnel entry doors to the work area may be used for this purpose but may be insufficient if there are locations within the work area where air movement is not evidenced. With exhaust ventilation operating, the work area shall be maintained under negative pressure. DES shall be called upon to test the ventilation of the work area prior to commencement of work. In all cases any movement of air (visualized with tracer smoke used by DES personnel) shall be from areas on the outside of the contained work area to areas inside. If work area containment is not evidenced, corrections of the work area ventilation system and/or work area containment barriers shall be made before work is allowed to proceed. Additional ventilation units may be required or existing units relocated to ensure proper exhaust flow from the defined work area. Exhaust air tubes or ducts associated with the work area ventilation system shall be free of leaks. In all cases exhaust air shall be discharged to the outside of the building, sufficiently remote from ventilation system fresh air intakes, doors and windows to prevent infiltration into the building. As previously described, the work area ventilation system shall operate continuously from commencement of any floor preparation work to final curing of the applied floor surface. The UM Project Manager shall determine when it is acceptable to discontinue work area ventilation based on the absence of residual odor.

Figure 1.

CALCULATING ROOM AIR CHANGES PER  
HOUR

Step 1. Determine floor surface area in room(s) where work will be performed, in square feet (ft<sup>2</sup>).

Step 2. Determine ceiling height of room(s), in feet (ft). Be sure to include the height of areas over suspended ceilings.

1.8 WARRANTY

- A. Manufacturer warrants that material shipped to buyers at the time of shipment is substantially free from defects and will perform substantially to Manufacturer's published literature if used in accordance with the latest prescribed procedures and prior to the expiration date.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. BASF Construction Chemicals, Inc.; BASF Building Systems.
  - 2. Dur-A-Flex, Inc.
  - 3. Sika Floor USA
  - 4. Stonhard, Inc.
- B. Basis-of-Design Product: Subject to compliance with requirements, provide Degaclad by BASF Building Systems, or approved equal.

2.2 MATERIALS

- A. VOC Content of Resinous Flooring: Provide resinous flooring systems, for use inside the weatherproofing system, that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
  - 1. Resinous Flooring: 100 g/L.

2.3 HIGH-PERFORMANCE RESINOUS FLOORING

- A. Resinous Flooring: Abrasion-, impact- and chemical-resistant, high-performance-aggregate-filled, resin-based, monolithic floor surfacing designed to produce a seamless floor.
- B. System Characteristics:

1. Color and Pattern: As selected by Architect from Manufacturer's full range.
2. Wearing Surface: Matte finish as selected by Architect from Manufacturer's full range.
3. Overall System Thickness: Minimum 3/16 inch (4.8 mm).

C. Body Coats:

1. Resin: Methyl methacrylate.
2. Formulation Description: 100% solids.
3. Application Method: Troweled.
  - a. Thickness of Coats: to achieve final thickness of 3/16 inch (4.8 mm).
4. Aggregates: Micro flake system.

D. Topcoat: Sealing or finish coats.

1. Resin: Methyl methacrylate.
2. Formulation Description: 100% solids.
3. Type: Clear.
4. Finish: Matte.
5. Number of Coats: per Manufacturer's recommendation.

E. System Physical Properties: Provide resinous flooring system with the following minimum physical property requirements when tested according to test methods indicated:

1. Compressive Strength: 6000 psi per ASTM C 579.
2. Tensile Strength: 1500 psi per ASTM C 307.
3. Flexural Modulus of Elasticity: 2500 psi per ASTM C 580.
4. Water Absorption: Less than 0.6% per ASTM C 413.
5. Indentation: Submit percentage, information with initial selection sample percent maximum per MIL-D-3134.
6. Impact Resistance: No chipping, cracking, or delamination and not more than 1/16-inch (1.6-mm) permanent indentation per MIL-D-3134.
7. Resistance to Elevated Temperature: No slip or flow of more than 1/16 inch (1.6 mm) per MIL-D-3134.
8. Abrasion Resistance: Submit percentage, information with initial selection sample maximum weight loss per ASTM D 4060.
9. Flammability: Self-extinguishing per ASTM D 635.
10. Critical Radiant Flux: 0.45 W/sq. cm or greater per NFPA 253.
11. Hardness: Submit percentage, information with initial selection sample, Shore D per ASTM D 2240.
12. Bond Strength: Submit percentage, information with initial selection sample, 100 percent concrete failure per ACI 503R.

## 2.4 ACCESSORIES

A. Primer: Type recommended by Manufacturer for substrate and body coats indicated.

1. Formulation Description: 100% solids.

- B. Waterproofing Membrane: Type recommended by Manufacturer for substrate and primer and body coats indicated.
  - 1. Formulation Description: 100% solids.
- C. Reinforcing Membrane: Flexible resin formulation that is recommended by Manufacturer for substrate and primer and body coats indicated and that prevents substrate cracks from reflecting through resinous flooring.
  - 1. Formulation Description: 100% solids.
    - a. Provide fiberglass scrim embedded in reinforcing membrane at all cracks, per recommendations for crack isolation.
- D. Patching and Fill Material: Resinous product of or approved by resinous flooring Manufacturer and recommended by Manufacturer for application indicated.

### PART 3 - EXECUTION

#### 3.1 PREWORK INSPECTION

- A. Examine all surfaces to be coated with MMA materials systems and report to the Owner and/or Engineer any conditions that will adversely affect the appearance or performance of these coating systems and that cannot be put into acceptable condition by the preparatory work.
- B. Do not proceed with application until the surface is acceptable or authorization to proceed is given by the manufacturer's technical representative.

#### 3.2 PREPARATION

- A. Concrete Substrates: Provide sound concrete surfaces free of laitance, glaze, efflorescence, curing compounds, form-release agents, dust, dirt, grease, oil, and other contaminants incompatible with resinous flooring.
  - 1. Roughen concrete substrates as follows:
    - a. Shot-blast surfaces with an apparatus that abrades the concrete surface, contains the dispensed shot within the apparatus, and recirculates the shot by vacuum pickup.
    - b. Comply with ASTM C 811 requirements unless Manufacturer's written instructions are more stringent.
  - 2. Repair damaged and deteriorated concrete according to resinous flooring Manufacturer's written instructions.
  - 3. Verify that concrete substrates are dry and moisture-vapor emissions are within acceptable levels according to Manufacturer's written instructions.

- a. Perform anhydrous calcium chloride test, ASTM F 1869. Proceed with application of resinous flooring only after substrates have maximum moisture-vapor-emission rate of 5 lb or less of water/1000 sq. ft. of slab area in 24 hours.
  - b. Perform plastic sheet test, ASTM D 4263. Proceed with application only after testing indicates absence of moisture in substrates.
  - c. Perform relative humidity test using in situ probes, ASTM F 2170. Proceed with installation only after substrates have a maximum 75% relative humidity level measurement.
4. Alkalinity and Adhesion Testing: Verify that concrete substrates have pH within acceptable range. Perform tests recommended by Manufacturer. Proceed with application only after substrates pass testing.
- B. Resinous Materials: Mix components and prepare materials according to resinous flooring Manufacturer's written instructions.
- C. Use patching and fill material to fill holes and depressions in substrates according to Manufacturer's written instructions.
- D. Treat control joints and other nonmoving substrate cracks to prevent cracks from reflecting through resinous flooring according to Manufacturer's written instructions.

### 3.3 APPLICATION

- A. General: Apply components of resinous flooring system according to Manufacturer's written instructions to produce a uniform, monolithic wearing surface of thickness indicated.
1. Coordinate application of components to provide optimum adhesion of resinous flooring system to substrate, and optimum intercoat adhesion.
  2. Cure resinous flooring components according to Manufacturer's written instructions. Prevent contamination during application and curing processes.
  3. At substrate expansion and isolation joints, comply with resinous flooring Manufacturer's written instructions.
- B. Apply primer over prepared substrate at Manufacturer's recommended spreading rate.
- C. Apply reinforcing membrane to substrate cracks.
- D. Apply troweled or screeded body coats in thickness indicated for flooring system. Hand or power trowel and grout to fill voids. When cured, remove trowel marks and roughness using method recommended by Manufacturer.
- E. Apply grout coat, of type recommended by resinous flooring Manufacturer, to fill voids in surface of final body coat and to produce wearing surface indicated.
- F. Apply topcoats in number indicated for flooring system and at spreading rates recommended in writing by Manufacturer.

### 3.4 FIELD QUALITY CONTROL

- A. Core Sampling: At the direction of Owner and at locations designated by Owner, take one core sample per 1000 sq. ft. (92.9 sq. m) of resinous flooring, or portion of, to verify thickness. For each sample that fails to comply with requirements, take two additional samples. Repair damage caused by coring and correct deficiencies.
- B. Material Sampling: Owner may at any time and any number of times during resinous flooring application require material samples for testing for compliance with requirements.
  - 1. Owner will engage an independent testing agency to take samples of materials being used. Material samples will be taken, identified, sealed, and certified in presence of Contractor.
  - 2. Testing agency will test samples for compliance with requirements, using applicable referenced testing procedures or, if not referenced, using testing procedures listed in Manufacturer's product data.
  - 3. If test results show applied materials do not comply with specified requirements, pay for testing, remove noncompliant materials, prepare surfaces coated with unacceptable materials, and reapply flooring materials to comply with requirements.

### 3.5 CLEANING

- A. Installer shall remove any material spatters and other material that is not where it should be. Remove masking and covers taking care not to contaminate surrounding area.
- B. Installer shall repair any damage that should arise from either the application or clean-up effort.

### 3.6 PROTECTION

- A. Protect resinous flooring from damage and wear during the remainder of construction period. Floor protection to be installed by Owner's General Contractor. Coordinate installation of protection/UMPM. Provide information for methods and materials, including temporary covering, recommended in writing by resinous flooring Manufacturer.

END OF SECTION 096723

## SECTION 096813 - TILE CARPETING

### 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. This Section includes modular, fusion-bonded, and tufted carpet tile.
- B. Related Sections include the following:
  - 1. Division 02 Section "Selective Structure Demolition" for removing existing floor coverings.
  - 2. Division 09 Section "Resilient Base and Accessories, Resilient Tile Flooring" for resilient wall base and accessories installed with carpet tile.
  - 3. Division 09 Section "Sheet Carpeting."

#### 1.3 SUBMITTALS

- A. Product Data: For each type of product indicated. Include manufacturer's written data on physical characteristics, durability, and fade resistance. Include installation recommendations for each type of substrate.
- B. Samples: For each of the following products and for each color and texture required. Label each Sample with manufacturer's name, material description, color, pattern, and designation indicated on Drawings and in schedules.
  - 1. Carpet Tile: Full-size Sample.
  - 2. Exposed Edge, Transition, and other Accessory Stripping: 12-inch- (300-mm-) long Samples.
- C. Product Schedule: For carpet tile. Use same designations indicated on Drawings.
- D. Qualification Data: For Installer.
- E. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency.
- F. Maintenance Data: For carpet tiles to include in maintenance manuals. Include the following:
  - 1. Methods for maintaining carpet tile, including cleaning and stain-removal products and procedures and manufacturer's recommended maintenance schedule.
  - 2. Precautions for cleaning materials and methods that could be detrimental to carpet tile.

- G. Warranty: Special warranty specified in this Section.

#### 1.4 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer who is certified by the Floor Covering Installation Board or who can demonstrate compliance with its certification program requirements.
- B. Fire-Test-Response Characteristics: Provide products with the critical radiant flux classification indicated in Part 2, as determined by testing identical products per ASTM E 648 by an independent testing and inspecting agency acceptable to authorities having jurisdiction.
- C. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination." Review methods and procedures related to carpet tile installation including, but not limited to, the following:
  - 1. Review delivery, storage, and handling procedures.
  - 2. Review ambient conditions and ventilation procedures.

#### 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Comply with CRI 104, Section 5, "Storage and Handling."

#### 1.6 PROJECT CONDITIONS

- A. Comply with CRI 104, Section 7.2, "Site Conditions; Temperature and Humidity" and Section 7.12, "Ventilation."
- B. Environmental Limitations: Do not install carpet tiles until wet work in spaces is complete and dry, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.
- C. Do not install carpet tiles over concrete slabs until slabs have cured and are sufficiently dry to bond with adhesive and concrete slabs have pH range recommended by carpet tile manufacturer.
- D. Where demountable partitions or other items are indicated for installation on top of carpet tiles, install carpet tiles before installing these items.

#### 1.7 WARRANTY

- A. Special Warranty for Carpet Tiles: Manufacturer's standard form in which manufacturer agrees to repair or replace components of carpet tile installation that fail in materials or workmanship within specified warranty period.
  - 1. Warranty does not include deterioration or failure of carpet tile due to unusual traffic, failure of substrate, vandalism, or abuse.



2. Failures include, but are not limited to, more than 10 percent loss of face fiber, edge raveling, snags, runs, loss of tuft bind strength, dimensional stability, excess static discharge, and delamination.
3. Warranty Period: 10 years from date of Substantial Completion.

## 1.8 EXTRA MATERIALS

- A. Furnish extra materials described below, before installation begins, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  1. Carpet Tile: Full-size units equal to 5 percent of amount installed for each type indicated, but not less than 10 sq. yd. (8.3 sq. m).

SCHEDULE 1 - PRODUCTS: See drawings for manufacturer and product description.

## 1.1 INSTALLATION ACCESSORIES

- A. Trowelable Leveling and Patching Compounds: Latex-modified, hydraulic-cement-based formulation provided or recommended by carpet tile manufacturer.
- B. Adhesives: Water-resistant, mildew-resistant, nonstaining, pressure-sensitive type to suit products and subfloor conditions indicated, that complies with flammability requirements for installed carpet tile and is recommended by carpet tile manufacturer for releasable installation.
  1. VOC Limits: Provide adhesives with VOC content not more than 50 g/L when calculated according to 40 CFR 59, Subpart D (EPA method 24).

## PART 2 - EXECUTION

### 2.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for maximum moisture content, alkalinity range, installation tolerances, and other conditions affecting carpet tile performance. Examine carpet tile for type, color, pattern, and potential defects.
- B. 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 carpet tile manufacturer.
  2. Subfloor finishes comply with requirements specified in Division 03 Section "Cast-in-Place Concrete" for slabs receiving carpet tile.
  3. Subfloors are free of cracks, ridges, depressions, scale, and foreign deposits.

- C. For wood subfloors, verify the following:
  - 1. Underlayment over subfloor complies with requirements specified in Division 06 Section "Rough Carpentry."
  - 2. Underlayment surface is free of irregularities and substances that may interfere with adhesive bond or show through surface.
- D. For metal subfloors, verify the following:
  - 1. Underlayment surface is free of irregularities and substances that may interfere with adhesive bond or show through surface.
- E. For painted subfloors, verify the following:
  - 1. Perform bond test recommended in writing by adhesive manufacturer.
- F. For raised access flooring systems, verify the following:
  - 1. Access floor complies with requirements specified in Division 09 Section "Access Flooring."
  - 2. Access floor substrate is compatible with carpet tile and adhesive if any.
  - 3. Underlayment surface is flat, smooth, evenly planed, tightly jointed, and free of irregularities, gaps greater than 1/8 inch (3 mm), protrusions more than 1/32 inch (0.8 mm), and substances that may interfere with adhesive bond or show through surface.
- G. Proceed with installation only after unsatisfactory conditions have been corrected.

## 2.2 PREPARATION

- A. General: Comply with CRI 104, Section 6.2, "Site Conditions; Floor Preparation," and with carpet tile manufacturer's written installation instructions for preparing substrates indicated to receive carpet tile installation.
- B. Use trowelable leveling and patching compounds, according to manufacturer's written instructions, to fill cracks, holes, depressions, and protrusions in substrates. Fill or level cracks, holes and depressions 1/8 inch (3 mm) wide or wider and protrusions more than 1/32 inch (0.8 mm), unless more stringent requirements are required by manufacturer's written instructions.
- C. Remove coatings, including curing compounds, and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, without using solvents. Use mechanical methods recommended in writing by carpet tile manufacturer.
- D. Clean metal substrates of grease, oil, soil and rust, and prime if directed by adhesive manufacturer. Rough sand painted metal surfaces and remove loose paint. Sand aluminum surfaces, to remove metal oxides, immediately before applying adhesive.
- E. Broom and vacuum clean substrates to be covered immediately before installing carpet tile.

## 2.3 INSTALLATION

- A. General: Comply with CRI 104, Section 14, "Carpet Modules," and with carpet tile manufacturer's written installation instructions.
- B. Installation Method: As recommended in writing by carpet tile manufacturer.
- C. Maintain dye lot integrity. Do not mix dye lots in same area.
- D. Cut and fit carpet tile to butt tightly to vertical surfaces, permanent fixtures, and built-in furniture including cabinets, pipes, outlets, edgings, thresholds, and nosings. Bind or seal cut edges as recommended by carpet tile manufacturer.
- E. Extend carpet tile into toe spaces, door reveals, closets, open-bottomed obstructions, removable flanges, alcoves, 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 nonpermanent, nonstaining marking device.
- G. Install pattern parallel to walls and borders.
- H. Stagger joints of carpet tiles so carpet tile grid is offset from access flooring panel grid. Do not fill seams of access flooring panels with carpet adhesive; keep seams free of adhesive.

## 2.4 CLEANING AND PROTECTION

- A. Perform the following operations immediately after installing carpet tile:
  - 1. Remove excess adhesive, seam sealer, and other surface blemishes using cleaner recommended by carpet tile manufacturer.
  - 2. Remove yarns that protrude from carpet tile surface.
  - 3. Vacuum carpet tile using commercial machine with face-beater element.
- B. Protect installed carpet tile to comply with CRI 104, Section 16, "Protection of Indoor Installations."
- C. Protect carpet tile against damage from construction operations and placement of equipment and fixtures during the remainder of construction period. Use protection methods indicated or recommended in writing by carpet tile manufacturer.

END OF SECTION 096813

## SECTION 096816 - SHEET CARPETING

### 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. This Section includes the following:
  - 1. Tufted carpet.
  - 2. Woven carpet.
- B. Related Sections include the following:
  - 1. Division 02 Section "Selective Structure Demolition" for removing existing floor coverings.
  - 2. Division 09 Section "Resilient Tile Flooring, Resilient Base and Accessories" for resilient wall base and accessories installed with carpet.
  - 3. Division 09 Section "Tile Carpeting."

#### 1.3 SUBMITTALS

- A. Product Data: For the following, including installation recommendations for each type of substrate:
  - 1. Carpet: For each type indicated. Include manufacturer's written data on physical characteristics, durability, and fade resistance.
- B. Shop Drawings: Show the following:
  - 1. Columns, doorways, enclosing walls or partitions, built-in cabinets, and locations where cutouts are required in carpet.
  - 2. Carpet type, color, and dye lot.
  - 3. Seam locations, types, and methods.
  - 4. Type of installation.
  - 5. Pattern type, repeat size, location, direction, and starting point.
  - 6. Type, color, and location of insets and borders.
  - 7. Type, color, and location of edge, transition, and other accessory strips.
- C. Samples: For each of the following products and for each color and texture required. Label each Sample with manufacturer's name, material description, color, pattern, and designation indicated on Drawings and in schedules.

1. Carpet: 18-inch- (300-mm-) square Sample.
  2. Exposed Edge, Transition, and other Accessory Stripping: 12-inch- (300-mm-) long Samples.
  3. Carpet Seam: 6-inch (150-mm) Sample.
- D. Product Schedule: For carpet. Use same designations indicated on Drawings.
- E. Qualification Data: For Installer.
- F. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency.
- G. Maintenance Data: For carpet to include in maintenance manuals. Include the following:
1. Methods for maintaining carpet, including cleaning and stain-removal products and procedures and manufacturer's recommended maintenance schedule.
  2. Precautions for cleaning materials and methods that could be detrimental to carpet.
- H. Warranties: Special warranties specified in this Section.

#### 1.4 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer who is certified by the Floor Covering Installation Board or who can demonstrate compliance with its certification program requirements.
- B. Fire-Test-Response Characteristics: Provide products with the critical radiant flux classification indicated in Part 2, as determined by testing identical products per ASTM E 648 by an independent testing and inspecting agency acceptable to authorities having jurisdiction.
- C. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination." Review methods and procedures related to carpet installation including, but not limited to, the following:
1. Review delivery, storage, and handling procedures.
  2. Review ambient conditions and ventilation procedures.

#### 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Comply with CRI 104, Section 5, "Storage and Handling."

#### 1.6 PROJECT CONDITIONS

- A. Comply with CRI 104, Section 7.2, "Site Conditions; Temperature and Humidity" and Section 7.12, "Ventilation."
- B. Environmental Limitations: Do not install carpet until wet work in spaces is complete and dry, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

- C. Do not install carpet over concrete slabs until slabs have cured, are sufficiently dry to bond with adhesive, and have pH range recommended by carpet manufacturer.
- D. Where demountable partitions or other items are indicated for installation on top of carpet, install carpet before installing these items.

## 1.7 WARRANTY

- A. Special Warranty for Carpet: Manufacturer's standard form in which manufacturer agrees to repair or replace components of carpet installation that fail in materials or workmanship within specified warranty period.
  - 1. Warranty does not include deterioration or failure of carpet due to unusual traffic, failure of substrate, vandalism, or abuse.
  - 2. Failures include, but are not limited to, more than 10 percent loss of face fiber, edge raveling, snags, runs, loss of tuft bind strength, excess static discharge, and delamination.
  - 3. Warranty Period: 10 years from date of Substantial Completion.

## 1.8 EXTRA MATERIALS

- A. Furnish extra materials described below, before installation begins, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  - 1. Carpet: Full-width rolls equal to 5 percent of amount installed for each type indicated, but not less than 10 sq. yd. (8.3 sq. m).

## PART 2 - PRODUCTS

### 2.1 TUFTED CARPET

- A. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
- B. Products: Subject to compliance with requirements, provide products as per the Drawings or Scope of Work.

### 2.2 WOVEN CARPET <Insert designation>

- A. Products: Subject to compliance with requirements, provide products as per the Drawings or Scope of Work.

### 2.3 INSTALLATION ACCESSORIES

- A. Trowelable Leveling and Patching Compounds: Latex-modified, hydraulic-cement-based formulation provided or recommended by carpet manufacturer.

- B. Adhesives: Water-resistant, mildew-resistant, nonstaining type to suit products and subfloor conditions indicated, that complies with flammability requirements for installed carpet and is recommended or provided by carpet manufacturer.
  - 1. VOC Limits: Provide adhesives with VOC content not more than 50g/L when calculated according to 40 CFR 59, Subpart D (EPA method 24).
- C. Tackless Carpet Stripping: Water-resistant plywood, in strips as required to match cushion thickness and that comply with CRI 104, Section 12.2.
- D. Seam Adhesive: Hot-melt adhesive tape or similar product recommended by carpet manufacturer for sealing and taping seams and butting cut edges at backing to form secure seams and to prevent pile loss at seams.
- E. Metal Edge Strips: Extruded aluminum with mill finish of width shown, of height required to protect exposed edge of carpet, and of maximum lengths to minimize running joints.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for maximum moisture content, alkalinity range, installation tolerances, and other conditions affecting carpet performance. Examine carpet for type, color, pattern, and potential defects.
- 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 carpet cushion manufacturer.
  - 2. Subfloor finishes comply with requirements specified in Division 03 Section "Cast-in-Place Concrete" for slabs receiving carpet.
  - 3. Subfloors are free of cracks, ridges, depressions, scale, and foreign deposits.
- C. For wood subfloors, verify the following:
  - 1. Underlayment over subfloor complies with requirements specified in Division 06 Section "Rough Carpentry."
  - 2. Underlayment surface is free of irregularities and substances that may interfere with adhesive bond or show through surface.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. General: Comply with CRI 104, Section 7.3, "Site Conditions; Floor Preparation," and with carpet manufacturer's written installation instructions for preparing substrates.
- B. Use trowelable leveling and patching compounds, according to manufacturer's written instructions, to fill cracks, holes, depressions, and protrusions in substrates. Fill or level cracks, holes and depressions 1/8 inch (3 mm) wide or wider, and protrusions more than 1/32 inch (0.8 mm), unless more stringent requirements are required by manufacturer's written instructions.
- C. Remove coatings, including curing compounds, and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, without using solvents. Use mechanical methods recommended in writing by carpet manufacturer.
- D. Broom and vacuum clean substrates to be covered immediately before installing carpet.

### 3.3 INSTALLATION

- A. Comply with CRI 104 and carpet manufacturer's written installation instructions for the following:
  - 1. Direct-Glue-Down Installation: Comply with CRI 104, Section 9, "Direct Glue-Down Installation."
  - 2. Double-Glue-Down Installation: Comply with CRI 104, Section 10, "Double Glue-Down Installation."
  - 3. Carpet with Attached-Cushion Installation: Comply with CRI 104, Section 11, "Attached-Cushion Installations."
  - 4. Preapplied Adhesive Installation: Comply with CRI 104, Section 11.4, "Pre-Applied Adhesive Systems (Peel and Stick)."
  - 5. Hook-and-Loop Installation: Comply with CRI 104, Section 11.5, "Hook and Loop Technology."
  - 6. Stretch-in Installation: Comply with CRI 104, Section 12, "Stretch-in Installation."
  - 7. Stair Installation: Comply with CRI 104, Section 13, "Carpet on Stairs" for stretch-in or glue-down installation.
- B. Comply with carpet manufacturer's written recommendations and Shop Drawings for seam locations and direction of carpet; maintain uniformity of carpet direction and lay of pile. At doorways, center seams under the door in closed position.
- C. Do not bridge building expansion joints with carpet.
- D. Cut and fit carpet to butt tightly to vertical surfaces, permanent fixtures, and built-in furniture including cabinets, pipes, outlets, edgings, thresholds, and nosings. Bind or seal cut edges as recommended by carpet manufacturer.
- E. Extend carpet into toe spaces, door reveals, closets, open-bottomed obstructions, removable flanges, alcoves, 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 nonpermanent, nonstaining marking device.
- G. Install pattern parallel to walls and borders to comply with CRI 104, Section 15, "Patterned Carpet Installations" and with carpet manufacturer's written recommendations.

#### 3.4 CLEANING AND PROTECTING

- A. Perform the following operations immediately after installing carpet:
  - 1. Remove excess adhesive, seam sealer, and other surface blemishes using cleaner recommended by carpet manufacturer.
  - 2. Remove yarns that protrude from carpet surface.
  - 3. Vacuum carpet using commercial machine with face-beater element.
- B. Protect installed carpet to comply with CRI 104, Section 16, "Protection of Indoor Installations."
- C. Protect carpet against damage from construction operations and placement of equipment and fixtures during the remainder of construction period. Use protection methods indicated or recommended in writing by carpet manufacturer and carpet adhesive manufacturer.

END OF SECTION 096816

## SECTION 099123 - INTERIOR PAINTING

### 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. This Section includes surface preparation and the application of paint systems on the following interior substrates:

1. Concrete.
2. Clay masonry.
3. Concrete masonry units (CMU).
4. Steel.
5. Galvanized metal.
6. Aluminum (not anodized or otherwise coated).
7. Wood.
8. Gypsum board.
9. Plaster.
10. Cotton or canvas insulation covering.

- B. Related Sections include the following:

1. Division 05 Sections for shop priming of metal substrates with primers specified in this Section.
2. Division 06 Sections for shop priming carpentry with primers specified in this Section.
3. Division 08 Sections for factory priming windows and doors with primers specified in this Section.
4. Division 09 painting Sections for special-use coatings.

#### 1.3 SUBMITTALS

- A. Product Data: For each type of product indicated on drawings.
- B. Samples for Verification: For each type of paint system and in each color and gloss of topcoat indicated.
  1. Step coats on Samples to show each coat required for system.
  2. Label each coat of each Sample.
  3. Label each Sample for location and application area.
- C. Product List: For each product indicated, include the following:

1. Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules.

#### 1.4 QUALITY ASSURANCE

##### A. MPI Standards:

1. Products: Complying with MPI standards indicated and listed in "MPI Approved Products List."
2. Preparation and Workmanship: Comply with requirements in "MPI Architectural Painting Specification Manual" for products and paint systems indicated.

##### B. Mockups: Apply benchmark samples of each paint system indicated and each color and finish selected to verify preliminary selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Architect will select one surface to represent surfaces and conditions for application of each paint system specified in Part 3.
  - a. Wall and Ceiling Surfaces: Provide samples of at least 100 sq. ft. (9 sq. m).
  - b. Other Items: Architect will designate items or areas required.
2. Apply benchmark samples after permanent lighting and other environmental services have been activated.
3. Final approval of color selections will be based on benchmark samples.
  - a. If preliminary color selections are not approved, apply additional benchmark samples of additional colors selected by Architect at no added cost to Owner.

#### 1.5 DELIVERY, STORAGE, AND HANDLING

##### A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F (7 deg C).

1. Maintain containers in clean condition, free of foreign materials and residue.
2. Remove rags and waste from storage areas daily.

#### 1.6 PROJECT CONDITIONS

##### A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F (10 and 35 deg C).

##### B. Do not apply paints when relative humidity exceeds 85 percent; at temperatures less than 5 deg F (3 deg C) above the dew point; or to damp or wet surfaces.

## 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:
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Benjamin Moore & Co.
  - 2. Duron, Inc.
  - 3. ICI Paints.
  - 4. M.A.B. Paints.
  - 5. PPG Architectural Finishes, Inc.
  - 6. Sherwin-Williams Company (The).
  - 7. Valspar.

### 2.2 PAINT, GENERAL

- A. Material Compatibility:
  - 1. Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
  - 2. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.
- B. VOC Content of Field-Applied Interior Paints and Coatings: Provide products that comply with the following limits for VOC content, exclusive of colorants added to a tint base, when calculated according to 40 CFR 59, Subpart D (EPA Method 24); these requirements do not apply to paints and coatings that are applied in a fabrication or finishing shop:
  - 1. Flat Paints, Coatings, and Primers: VOC content of not more than 50 g/L.
  - 2. Nonflat Paints, Coatings, and Primers: VOC content of not more than 150 g/L.
  - 3. Anti-Corrosive and Anti-Rust Paints Applied to Ferrous Metals: VOC not more than 250 g/L.
  - 4. Floor Coatings: VOC not more than 100 g/L.
  - 5. Shellacs, Clear: VOC not more than 730 g/L.
  - 6. Shellacs, Pigmented: VOC not more than 550 g/L.
  - 7. Flat Topcoat Paints: VOC content of not more than 50 g/L.
  - 8. Nonflat Topcoat Paints: VOC content of not more than 150 g/L.
  - 9. Anti-Corrosive and Anti-Rust Paints Applied to Ferrous Metals: VOC not more than 250 g/L.
  - 10. Floor Coatings: VOC not more than 100 g/L.
  - 11. Shellacs, Clear: VOC not more than 730 g/L.
  - 12. Shellacs, Pigmented: VOC not more than 550 g/L.
  - 13. Primers, Sealers, and Undercoaters: VOC content of not more than 200 g/L.
  - 14. Dry-Fog Coatings: VOC content of not more than 400 g/L.

15. Zinc-Rich Industrial Maintenance Primers: VOC content of not more than 340 g/L.
  16. Pre-Treatment Wash Primers: VOC content of not more than 420 g/L.
- C. Chemical Components of Field-Applied Interior Paints and Coatings: Provide topcoat paints and anti-corrosive and anti-rust paints applied to ferrous metals that comply with the following chemical restrictions; these requirements do not apply to paints and coatings that are applied in a fabrication or finishing shop:
1. Aromatic Compounds: Paints and coatings shall not contain more than 1.0 percent by weight of total aromatic compounds (hydrocarbon compounds containing one or more benzene rings).
  2. Restricted Components: Paints and coatings shall not contain any of the following:
    - a. Acrolein.
    - b. Acrylonitrile.
    - c. Antimony.
    - d. Benzene.
    - e. Butyl benzyl phthalate.
    - f. Cadmium.
    - g. Di (2-ethylhexyl) phthalate.
    - h. Di-n-butyl phthalate.
    - i. Di-n-octyl phthalate.
    - j. 1,2-dichlorobenzene.
    - k. Diethyl phthalate.
    - l. Dimethyl phthalate.
    - m. Ethylbenzene.
    - n. Formaldehyde.
    - o. Hexavalent chromium.
    - p. Isophorone.
    - q. Lead.
    - r. Mercury.
    - s. Methyl ethyl ketone.
    - t. Methyl isobutyl ketone.
    - u. Methylene chloride.
    - v. Naphthalene.
    - w. Toluene (methylbenzene).
    - x. 1,1,1-trichloroethane.
    - y. Vinyl chloride.
- D. Colors: As selected by Architect from manufacturer's full rangeAs indicated in a color schedule .

## 2.3 BLOCK FILLERS

- A. Interior/Exterior Latex Block Filler: MPI #4.
1. VOC Content: E Range of E2.

## 2.4 PRIMERS/SEALERS

- A. Interior Latex Primer/Sealer: MPI #50.
  - 1. VOC Content: E Range of E3.
  - 2. Environmental Performance Rating: EPR 3.
- B. Interior Alkyd Primer/Sealer: MPI #45.
  - 1. VOC Content: E Range of E2.
- C. Wood-Knot Sealer: Sealer recommended in writing by topcoat manufacturer for use in paint systems indicated.

## 2.5 METAL PRIMERS

- A. Alkyd Anticorrosive Metal Primer: MPI #79.
  - 1. VOC Content: E Range of E2.
- B. Quick-Drying Alkyd Metal Primer: MPI #76.
  - 1. VOC Content: E Range of E3.
- C. Rust-Inhibitive Primer (Water Based): MPI #107.
  - 1. VOC Content: E Range of E3.
  - 2. Environmental Performance Rating: EPR 3.
- D. Cementitious Galvanized-Metal Primer: MPI #26.
  - 1. VOC Content: E Range of E1.
- E. Waterborne Galvanized-Metal Primer: MPI #134.
  - 1. VOC Content: E Range of E3.
  - 2. Environmental Performance Rating: EPR 3.
- F. Vinyl Wash Primer: MPI #80.
  - 1. VOC Content: E Range of E3.
- G. Quick-Drying Primer for Aluminum: MPI #95.
  - 1. VOC Content: E Range of E3.

## 2.6 WOOD PRIMERS

- A. Interior Latex-Based Wood Primer: MPI #39.

1. VOC Content: E Range of E3.
2. Environmental Performance Rating: EPR 3.

## 2.7 LATEX PAINTS

- A. Interior Latex (Flat): MPI #53 (Gloss Level 1).
  1. VOC Content: E Range of E3.
  2. Environmental Performance Rating: EPR 2.5.
- B. Interior Latex (Low Sheen): MPI #44 (Gloss Level 2).
  1. VOC Content: E Range of E3.
  2. Environmental Performance Rating: EPR 3.
- C. Interior Latex (Eggshell): MPI #52 (Gloss Level 3).
  1. VOC Content: E Range of E3.
  2. Environmental Performance Rating: EPR 3.
- D. Interior Latex (Satin): MPI #43 (Gloss Level 4).
  1. VOC Content: E Range of E3.
  2. Environmental Performance Rating: EPR 3.5.
- E. Interior Latex (Semigloss): MPI #54 (Gloss Level 5).
  1. VOC Content: E Range of E3.
  2. Environmental Performance Rating: EPR 4.
- F. Interior Latex (Gloss): MPI #114 (Gloss Level 6, except minimum gloss of 65 units at 60 deg).
  1. VOC Content: E Range of E3.
  2. Environmental Performance Rating: EPR 4.
- G. Institutional Low-Odor/VOC Latex (Flat): MPI #143 (Gloss Level 1).
  1. VOC Content: E Range of E3.
  2. Environmental Performance Rating: EPR 5.5.
- H. Institutional Low-Odor/VOC Latex (Low Sheen): MPI #144 (Gloss Level 2).
  1. VOC Content: E Range of E3.
  2. Environmental Performance Rating: EPR 4.5.
- I. Institutional Low-Odor/VOC Latex (Eggshell): MPI #145 (Gloss Level 3).
  1. VOC Content: E Range of E3.
  2. Environmental Performance Rating: EPR 4.5.
- J. Institutional Low-Odor/VOC Latex (Semigloss): MPI #147 (Gloss Level 5).

1. VOC Content: E Range of E3.
  2. Environmental Performance Rating: EPR 5.5.
- K. High-Performance Architectural Latex (Low Sheen): MPI #138 (Gloss Level 2).
1. VOC Content: E Range of E2.
  2. Environmental Performance Rating: EPR 6.
- L. High-Performance Architectural Latex (Eggshell): MPI #139 (Gloss Level 3).
1. VOC Content: E Range of E3.
  2. Environmental Performance Rating: EPR 5 EPR 6.
- M. High-Performance Architectural Latex (Satin): MPI #140 (Gloss Level 4).
1. VOC Content: E Range of E3.
  2. Environmental Performance Rating: EPR 6.5.
- N. High-Performance Architectural Latex (Semigloss): MPI #141 (Gloss Level 5).
1. VOC Content: E Range of E3.
  2. Environmental Performance Rating: EPR 7.
- O. Exterior Latex (Flat): MPI #10 (Gloss Level 1).
1. VOC Content: E Range of E3.
- P. Exterior Latex (Semigloss): MPI #11 (Gloss Level 5).
1. VOC Content: E Range of E3.
- Q. Exterior Latex (Gloss): MPI #119 (Gloss Level 6, except minimum gloss of 65 units at 60 deg).
1. VOC Content: E Range of E3.

## 2.8 ALKYD PAINTS

- A. Interior Alkyd (Flat): MPI #49 (Gloss Level 1).
1. VOC Content: E Range of E3.
- B. Interior Alkyd (Eggshell): MPI #51 (Gloss Level 3).
1. VOC Content: E Range of E2.
- C. Interior Alkyd (Semigloss): MPI #47 (Gloss Level 5).
1. VOC Content: E Range of E2.
  2. Environmental Performance Rating: EPR 3.
- D. Interior Alkyd (Gloss): MPI #48 (Gloss Level 6).



1. VOC Content: E Range of E2.

## 2.9 QUICK-DRYING ENAMELS

- A. Quick-Drying Enamel (Semigloss): MPI #81 (Gloss Level 5).
  1. VOC Content: E Range of E3.
- B. Quick-Drying Enamel (High Gloss): MPI #96 (Gloss Level 7).
  1. VOC Content: E Range of E3.

## 2.10 TEXTURED COATING

- A. Latex Stucco and Masonry Textured Coating: MPI #42.
  1. VOC Content: E Range of E3.

## 2.11 DRY FOG/FALL COATINGS

- A. Latex Dry Fog/Fall: MPI #118.
  1. VOC Content: E Range of E3.
  2. Environmental Performance Rating: EPR 3.
- B. Waterborne Dry Fall: MPI #133.
  1. VOC Content: E Range of E3.
  2. Environmental Performance Rating: EPR 3.
- C. Interior Alkyd Dry Fog/Fall: MPI #55.
  1. VOC Content: E Range of E3.

## 2.12 ALUMINUM PAINT

- A. Aluminum Paint: MPI #1.
  1. VOC Content: E Range of E3.

## 2.13 FLOOR COATINGS

- A. Interior Concrete Floor Stain: MPI #58.
  1. VOC Content: E Range of E3.
  2. Environmental Performance Rating: EPR 2.

- B. Interior/Exterior Clear Concrete Floor Sealer (Water Based): MPI #99.
  - 1. VOC Content: E Range of E3.
- C. Interior/Exterior Clear Concrete Floor Sealer (Solvent Based): MPI #104.
  - 1. VOC Content: E Range of E2.
- D. Interior/Exterior Latex Floor and Porch Paint (Low Gloss): MPI #60 (maximum Gloss Level 3).
  - 1. VOC Content: E Range of E3.
  - 2. Environmental Performance Rating: EPR 3.
- E. Exterior/Interior Alkyd Floor Enamel (Gloss): MPI #27 (Gloss Level 6).
  - 1. VOC Content: E Range of E2.
  - 2. Additives: Manufacturer's standard additive to increase skid resistance of painted surface.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of work.
- B. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.
- C. Begin coating application only after unsatisfactory conditions have been corrected and surfaces are dry.
  - 1. Beginning coating application constitutes Contractor's acceptance of substrates and conditions.

### 3.2 PREPARATION

- A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates indicated.
- B. Remove plates, machined surfaces, and similar items already in place that are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.
  - 1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.
  - 2. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.

- C. Clean substrates of substances that could impair bond of paints, including dirt, oil, grease, and incompatible paints and encapsulants.
  - 1. Remove incompatible primers and reprime substrate with compatible primers as required to produce paint systems indicated.
- D. Concrete Substrates: Remove release agents, curing compounds, efflorescence, and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.
- E. Clay Masonry Substrates: Remove efflorescence and chalk. Do not paint surfaces if moisture content of surfaces or alkalinity of mortar joints to be painted exceed that permitted in manufacturer's written instructions.
- F. Concrete Masonry Substrates: Remove efflorescence and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.
- G. Steel Substrates: Remove rust and loose mill scale. Clean using methods recommended in writing by paint manufacturer.
- H. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal fabricated from coil stock by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.
- I. Aluminum Substrates: Remove surface oxidation.
- J. Wood Substrates:
  - 1. Scrape and clean knots, and apply coat of knot sealer before applying primer.
  - 2. Sand surfaces that will be exposed to view, and dust off.
  - 3. Prime edges, ends, faces, undersides, and backsides of wood.
  - 4. After priming, fill holes and imperfections in the finish surfaces with putty or plastic wood filler. Sand smooth when dried.
- K. Gypsum Board Substrates: Do not begin paint application until finishing compound is dry and sanded smooth.
- L. Plaster Substrates: Do not begin paint application until plaster is fully cured and dry.
- M. Spray-Textured Ceiling Substrates: Do not begin paint application until surfaces are dry.
- N. Cotton or Canvas Insulation Covering Substrates: Remove dust, dirt, and other foreign material that might impair bond of paints to substrates.

### 3.3 APPLICATION

- A. Apply paints according to manufacturer's written instructions.
  - 1. Use applicators and techniques suited for paint and substrate indicated.

2. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
  3. Paint front and backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.
- B. Tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Tint undercoats to match color of topcoat, but provide sufficient difference in shade of undercoats to distinguish each separate coat.
- C. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.
- D. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.
- E. Painting Mechanical and Electrical Work: Paint items exposed in equipment rooms and occupied spaces including, but not limited to, the following:
1. Mechanical Work:
    - a. Uninsulated metal piping.
    - b. Uninsulated plastic piping.
    - c. Pipe hangers and supports.
    - d. Tanks that do not have factory-applied final finishes.
    - e. Visible portions of internal surfaces of metal ducts, without liner, behind air inlets and outlets.
    - f. Duct, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material.
    - g. Mechanical equipment that is indicated to have a factory-primed finish for field painting.
  2. Electrical Work:
    - a. Switchgear.
    - b. Panelboards.
    - c. Electrical equipment that is indicated to have a factory-primed finish for field painting.

### 3.4 CLEANING AND PROTECTION

- A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.
- B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.

- C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
- D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

### 3.5 INTERIOR PAINTING SCHEDULE

#### A. Concrete Substrates, Nontraffic Surfaces:

- 1. Latex System: MPI INT 3.1E.
  - a. Prime Coat: Interior latex matching topcoat.
  - b. Intermediate Coat: Interior latex matching topcoat.
  - c. Topcoat: Interior latex.
- 2. Latex Over Sealer System: MPI INT 3.1A.
  - a. Prime Coat: Interior latex primer/sealer.
  - b. Intermediate Coat: Interior latex matching topcoat.
  - c. Topcoat: Interior latex.
- 3. Latex Over Latex Aggregate System: MPI INT 3.1B.
  - a. Prime Coat: Latex stucco and masonry textured coating.
  - b. Intermediate Coat: Exterior latex matching topcoat.
  - c. Topcoat: Exterior latex.
- 4. Alkyd System: MPI INT 3.1D.
  - a. Prime Coat: Interior latex primer/sealer.
  - b. Intermediate Coat: Interior alkyd matching topcoat.
  - c. Topcoat: Interior alkyd.
- 5. Institutional Low-Odor/VOC Latex System: MPI INT 3.1M.
  - a. Prime Coat: Institutional low-odor/VOC interior latex matching topcoat.
  - b. Intermediate Coat: Institutional low-odor/VOC interior latex matching topcoat.
  - c. Topcoat: Institutional low-odor/VOC interior latex.
- 6. High-Performance Architectural Latex System: MPI INT 3.1C.
  - a. Prime Coat: Interior latex primer/sealer.
  - b. Intermediate Coat: High-performance architectural latex matching topcoat.
  - c. Topcoat: High-performance architectural latex.

#### B. Concrete Substrates, Traffic Surfaces:

- 1. Latex Floor Enamel System: MPI INT 3.2A.

- a. Prime Coat: Interior/exterior latex floor and porch paint (low gloss).
  - b. Intermediate Coat: Interior/exterior latex floor and porch paint (low gloss).
  - c. Topcoat: Interior/exterior latex floor and porch paint (low gloss).
2. Alkyd Floor Enamel System: MPI INT 3.2B.
    - a. Prime Coat: Exterior/interior alkyd floor enamel (gloss).
    - b. Intermediate Coat: Exterior/interior alkyd floor enamel (gloss).
    - c. Topcoat: Exterior/interior alkyd floor enamel (gloss).
  3. Concrete Stain System: MPI INT 3.2E.
    - a. First Coat: Interior concrete floor stain.
    - b. Topcoat: Interior concrete floor stain.
  4. Clear Sealer System: MPI INT 3.2F.
    - a. First Coat: Interior/exterior clear concrete floor sealer (solvent based).
    - b. Topcoat: Interior/exterior clear concrete floor sealer (solvent based).
  5. Water-Based Clear Sealer System: MPI INT 3.2G.
    - a. First Coat: Interior/exterior clear concrete floor sealer (water based).
    - b. Topcoat: Interior/exterior clear concrete floor sealer (water based).
- C. Clay-Masonry Substrates:
1. Latex System: MPI INT 4.1A.
    - a. Prime Coat: Interior latex matching topcoat.
    - b. Intermediate Coat: Interior latex matching topcoat.
    - c. Topcoat: Interior latex.
  2. Alkyd System: MPI INT 4.1D.
    - a. Prime Coat: Interior latex primer/sealer.
    - b. Intermediate Coat: Interior alkyd matching topcoat.
    - c. Topcoat: Interior alkyd.
  3. Latex Aggregate System: MPI INT 4.1B.
    - a. Prime Coat: As recommended in writing by topcoat manufacturer.
    - b. Intermediate Coat: As recommended in writing by topcoat manufacturer.
    - c. Topcoat: Latex stucco and masonry textured coating.
  4. Institutional Low-Odor/VOC Latex System: MPI INT 4.1M.
    - a. Prime Coat: Institutional low-odor/VOC interior latex matching topcoat.
    - b. Intermediate Coat: Institutional low-odor/VOC interior latex matching topcoat.
    - c. Topcoat: Institutional low-odor/VOC interior latex.

5. High-Performance Architectural Latex System: MPI INT 4.1L.
    - a. Prime Coat: High-performance architectural latex matching topcoat.
    - b. Intermediate Coat: High-performance architectural latex matching topcoat.
    - c. Topcoat: High-performance architectural latex.
- D. CMU Substrates:
1. Latex System: MPI INT 4.2A.
    - a. Prime Coat: Interior/exterior latex block filler.
    - b. Intermediate Coat: Interior latex matching topcoat.
    - c. Topcoat: Interior latex.
  2. Alkyd System: MPI INT 4.2C.
    - a. Prime Coat: Interior/exterior latex block filler.
    - b. Intermediate Coat: Interior alkyd matching topcoat.
    - c. Topcoat: Interior alkyd.
  3. Alkyd Over Latex Sealer System: MPI INT 4.2N.
    - a. Prime Coat: Interior/exterior latex block filler.
    - b. Sealer Coat: Interior latex primer/sealer.
    - c. Intermediate Coat: Interior alkyd matching topcoat.
    - d. Topcoat: Interior alkyd.
  4. Institutional Low-Odor/VOC Latex System: MPI INT 4.2E.
    - a. Prime Coat: Interior/exterior latex block filler.
    - b. Intermediate Coat: Institutional low-odor/VOC interior latex matching topcoat.
    - c. Topcoat: Institutional low-odor/VOC interior latex.
  5. High-Performance Architectural Latex System: MPI INT 4.2D.
    - a. Prime Coat: Interior/exterior latex block filler.
    - b. Intermediate Coat: High-performance architectural latex matching topcoat.
    - c. Topcoat: High-performance architectural latex.
- E. Steel Substrates:
1. Quick-Drying Enamel System: MPI INT 5.1A.
    - a. Prime Coat: Quick-drying alkyd metal primer.
    - b. Intermediate Coat: Quick-drying enamel matching topcoat.
    - c. Topcoat: Quick-drying enamel.
  2. Water-Based Dry-Fall System: MPI INT 5.1C.
    - a. Prime Coat: Alkyd anticorrosive Quick-drying alkyd metal primer.
    - b. Topcoat: Latex dry fog/fall Waterborne dry fall.

3. Alkyd Dry-Fall System: MPI INT 5.1D.
    - a. Prime Coat: Alkyd anticorrosive Quick-drying alkyd metal primer.
    - b. Topcoat: Interior alkyd dry fog/fall.
  4. Latex Over Alkyd Primer System: MPI INT 5.1Q.
    - a. Prime Coat: Alkyd anticorrosive Quick-drying alkyd metal primer.
    - b. Intermediate Coat: Interior latex matching topcoat.
    - c. Topcoat: Interior latex.
  5. Alkyd System: MPI INT 5.1E.
    - a. Prime Coat: Alkyd anticorrosive Quick-drying alkyd metal primer.
    - b. Intermediate Coat: Interior alkyd matching topcoat.
    - c. Topcoat: Interior alkyd.
  6. Aluminum Paint System: MPI INT 5.1M.
    - a. Prime Coat: Alkyd anticorrosive Quick-drying alkyd metal primer.
    - b. Intermediate Coat: Aluminum paint.
    - c. Topcoat: Aluminum paint.
  7. Institutional Low-Odor/VOC Latex System: MPI INT 5.1S.
    - a. Prime Coat: Rust-inhibitive primer (water based).
    - b. Intermediate Coat: Institutional low-odor/VOC interior latex matching topcoat.
    - c. Topcoat: Institutional low-odor/VOC interior latex.
  8. High-Performance Architectural Latex System: MPI INT 5.1R.
    - a. Prime Coat: Alkyd anticorrosive Quick-drying alkyd metal primer.
    - b. Intermediate Coat: High-performance architectural latex matching topcoat.
    - c. Topcoat: High-performance architectural latex.
- F. Galvanized-Metal Substrates:
1. Water-Based Dry-Fall System: MPI INT 5.3H.
    - a. Prime Coat: Waterborne dry fall.
    - b. Topcoat: Waterborne dry fall.
  2. Alkyd Dry-Fall System: MPI INT 5.3F.
    - a. Prime Coat: Cementitious galvanized-metal primer.
    - b. Topcoat: Interior alkyd dry fog/fall.
  3. Latex System: MPI INT 5.3A.
    - a. Prime Coat: Cementitious galvanized-metal primer.
    - b. Intermediate Coat: Interior latex matching topcoat.



- c. Topcoat: Interior.
  4. Latex Over Waterborne Primer System: MPI INT 5.3J.
    - a. Prime Coat: Waterborne galvanized-metal primer.
    - b. Intermediate Coat: Interior latex matching topcoat.
    - c. Topcoat: Interior latex.
  5. Alkyd System: MPI INT 5.3C.
    - a. Prime Coat: Cementitious galvanized-metal primer.
    - b. Intermediate Coat: Interior alkyd matching topcoat.
    - c. Topcoat: Interior alkyd.
  6. Aluminum Paint System: MPI INT 5.3G.
    - a. Prime Coat: Cementitious galvanized-metal primer.
    - b. Intermediate Coat: Aluminum paint.
    - c. Topcoat: Aluminum paint.
  7. Institutional Low-Odor/VOC Latex System: MPI INT 5.3N.
    - a. Prime Coat: Waterborne galvanized-metal primer.
    - b. Intermediate Coat: Institutional low-odor/VOC interior latex matching topcoat.
    - c. Topcoat: Institutional low-odor/VOC interior latex.
  8. High-Performance Architectural Latex System: MPI INT 5.3M.
    - a. Prime Coat: Waterborne galvanized-metal primer.
    - b. Intermediate Coat: High-performance architectural latex matching topcoat.
    - c. Topcoat: High-performance architectural latex.
- G. Aluminum (Not Anodized or Otherwise Coated) Substrates:
  1. Latex System: MPI INT 5.4H.
    - a. Prime Coat: Quick-drying primer for aluminum.
    - b. Intermediate Coat: Interior latex matching topcoat.
    - c. Topcoat: Interior latex.
  2. Alkyd Over Vinyl Wash Primer System: MPI INT 5.4A.
    - a. Prime Coat: Vinyl wash primer.
    - b. Intermediate Coat: Interior alkyd matching topcoat.
    - c. Topcoat: Interior alkyd.
  3. Alkyd Over Quick-Drying Primer System: MPI INT 5.4J.
    - a. Prime Coat: Quick-drying primer for aluminum.
    - b. Intermediate Coat: Interior alkyd matching topcoat.
    - c. Topcoat: Interior alkyd.

4. Aluminum Paint System: MPI INT 5.4D.
    - a. Prime Coat: Vinyl wash primer.
    - b. Intermediate Coat: Aluminum paint.
    - c. Topcoat: Aluminum paint.
  5. Institutional Low-Odor/VOC Latex System: MPI INT 5.4G.
    - a. Prime Coat: Quick-drying primer for aluminum.
    - b. Intermediate Coat: Institutional low-odor/VOC interior latex matching topcoat.
    - c. Topcoat: Institutional low-odor/VOC interior latex.
  6. High-Performance Architectural Latex System: MPI INT 5.4F.
    - a. Prime Coat: Quick-drying primer for aluminum.
    - b. Intermediate Coat: High-performance architectural latex matching topcoat.
    - c. Topcoat: High-performance architectural latex.
- H. Glue-Laminated Beam and Column Substrates:
1. Latex System: MPI INT 6.1M.
    - a. Prime Coat: Interior latex-based wood primer.
    - b. Intermediate Coat: Interior latex matching topcoat.
    - c. Topcoat: Interior latex.
  2. Latex Over Alkyd Primer System: MPI INT 6.1A.
    - a. Prime Coat: Interior alkyd primer/sealer.
    - b. Intermediate Coat: Interior latex matching topcoat.
    - c. Topcoat: Interior latex.
  3. Alkyd System: MPI INT 6.1B.
    - a. Prime Coat: Interior alkyd primer/sealer.
    - b. Intermediate Coat: Interior alkyd matching topcoat.
    - c. Topcoat: Interior alkyd.
  4. Institutional Low-Odor/VOC Latex System: MPI INT 6.1Q.
    - a. Prime Coat: Interior latex-based wood primer.
    - b. Intermediate Coat: Institutional low-odor/VOC interior latex matching topcoat.
    - c. Topcoat: Institutional low-odor/VOC interior latex.
  5. High-Performance Architectural Latex System: MPI INT 6.1N.
    - a. Prime Coat: Interior latex-based wood primer.
    - b. Intermediate Coat: High-performance architectural latex matching topcoat.
    - c. Topcoat: High-performance architectural latex.
- I. Dressed Lumber Substrates: Including architectural woodwork doors.

1. Latex System: MPI INT 6.3T.
    - a. Prime Coat: Interior latex-based wood primer.
    - b. Intermediate Coat: Interior latex matching topcoat.
    - c. Topcoat: Interior latex.
  2. Latex Over Alkyd Primer System: MPI INT 6.3U.
    - a. Prime Coat: Interior alkyd primer/sealer.
    - b. Intermediate Coat: Interior latex matching topcoat.
    - c. Topcoat: Interior latex.
  3. Alkyd System: MPI INT 6.3B.
    - a. Prime Coat: Interior alkyd primer/sealer.
    - b. Intermediate Coat: Interior alkyd matching topcoat.
    - c. Topcoat: Interior alkyd.
  4. Institutional Low-Odor/VOC Latex System: MPI INT 6.3V.
    - a. Prime Coat: Interior latex-based wood primer.
    - b. Intermediate Coat: Institutional low-odor/VOC interior latex matching topcoat.
    - c. Topcoat: Institutional low-odor/VOC interior latex.
  5. High-Performance Architectural Latex System: MPI INT 6.3A.
    - a. Prime Coat: Interior latex-based wood primer.
    - b. Intermediate Coat: High-performance architectural latex matching topcoat.
    - c. Topcoat: High-performance architectural latex.
- J. Wood Panel Substrates: Including painted plywood, medium-density, fiberboard hardboard.
1. Latex System: MPI INT 6.4R.
    - a. Prime Coat: Interior latex-based wood primer.
    - b. Intermediate Coat: Interior latex matching topcoat.
    - c. Topcoat: Interior latex.
  2. Latex Over Alkyd Primer System: MPI INT 6.4A.
    - a. Prime Coat: Interior alkyd primer/sealer.
    - b. Intermediate Coat: Interior latex matching topcoat.
    - c. Topcoat: Interior latex.
  3. Alkyd System: MPI INT 6.4B.
    - a. Prime Coat: Interior alkyd primer/sealer.
    - b. Intermediate Coat: Interior alkyd matching topcoat.
    - c. Topcoat: Interior alkyd.
  4. Institutional Low-Odor/VOC Latex System: MPI INT 6.4T.

- a. Prime Coat: Interior latex-based wood primer.
    - b. Intermediate Coat: Institutional low-odor/VOC interior latex matching topcoat.
    - c. Topcoat: Institutional low-odor/VOC interior latex.
  5. High-Performance Architectural Latex System: MPI INT 6.4S.
    - a. Prime Coat: Interior latex-based wood primer.
    - b. Intermediate Coat: High-performance architectural latex matching topcoat.
    - c. Topcoat: High-performance architectural latex.
- K. Dimension Lumber Substrates, Nontraffic Surfaces: Including exposed joists, exposed beams.
1. Latex System: MPI INT 6.2D.
    - a. Prime Coat: Interior latex-based wood primer.
    - b. Intermediate Coat: Interior latex matching topcoat.
    - c. Topcoat: Interior latex.
  2. Latex Over Alkyd Primer System: MPI INT 6.2A.
    - a. Prime Coat: Interior alkyd primer/sealer.
    - b. Intermediate Coat: Interior latex matching topcoat.
    - c. Topcoat: Interior latex.
  3. Alkyd System: MPI INT 6.2C.
    - a. Prime Coat: Interior alkyd primer/sealer.
    - b. Intermediate Coat: Interior alkyd matching topcoat.
    - c. Topcoat: Interior alkyd.
  4. Institutional Low-Odor/VOC Latex System: MPI INT 6.2L.
    - a. Prime Coat: Interior latex-based wood primer.
    - b. Intermediate Coat: Institutional low-odor/VOC interior latex matching topcoat.
    - c. Topcoat: Institutional low-odor/VOC interior latex.
  5. High-Performance Architectural Latex System: MPI INT 6.2B.
    - a. Prime Coat: Interior alkyd primer/sealer.
    - b. Intermediate Coat: High-performance architectural latex matching topcoat.
    - c. Topcoat: High-performance architectural latex.
- L. Wood Substrates, Traffic Surfaces:
1. Latex Floor Paint System: MPI INT 6.5G.
    - a. Prime Coat: Interior alkyd primer/sealer.
    - b. Intermediate Coat: Interior/exterior latex floor and porch paint (low gloss).
    - c. Topcoat: Interior/exterior latex floor and porch paint (low gloss).
  2. Alkyd Floor Enamel System: MPI INT 6.5A.

- a. Prime Coat: Exterior/interior alkyd floor enamel (gloss).
- b. Intermediate Coat: Exterior/interior alkyd floor enamel (gloss).
- c. Topcoat: Exterior/interior alkyd floor enamel (gloss).

M. Gypsum Board Substrates:

1. Latex System: MPI INT 9.2A.
  - a. Prime Coat: Interior latex primer/sealer, matching topcoat.
  - b. Intermediate Coat: Interior latex matching topcoat.
  - c. Topcoat: Interior latex.
2. Alkyd Over Latex Primer System: MPI INT 9.2C.
  - a. Prime Coat: Interior latex primer/sealer.
  - b. Intermediate Coat: Interior alkyd matching topcoat.
  - c. Topcoat: Interior alkyd.
3. Institutional Low-Odor/VOC Latex System: MPI INT 9.2M.
  - a. Prime Coat: Interior latex primer/sealer.
  - b. Intermediate Coat: Institutional low-odor/VOC interior latex matching topcoat.
  - c. Topcoat: Institutional low-odor/VOC interior latex.
4. High-Performance Architectural Latex System: MPI INT 9.2B.
  - a. Prime Coat: Interior latex primer/sealer.
  - b. Intermediate Coat: High-performance architectural latex matching topcoat.
  - c. Topcoat: High-performance architectural latex.

N. Plaster Substrates:

1. Latex System: MPI INT 9.2A.
  - a. Prime Coat: Interior latex primer/sealer, matching topcoat.
  - b. Intermediate Coat: Interior latex matching topcoat.
  - c. Topcoat: Interior latex.
2. Latex Over Alkyd Primer System: MPI INT 9.2K.
  - a. Prime Coat: Interior alkyd primer/sealer.
  - b. Intermediate Coat: Interior latex matching topcoat.
  - c. Topcoat: Interior latex.
3. Alkyd Over Latex Primer System: MPI INT 9.2C.
  - a. Prime Coat: Interior latex primer/sealer.
  - b. Intermediate Coat: Interior alkyd matching topcoat.
  - c. Topcoat: Interior alkyd.
4. Institutional Low-Odor/VOC Latex System: MPI INT 9.2M.

- a. Prime Coat: Interior latex primer/sealer.
  - b. Intermediate Coat: Institutional low-odor/VOC interior latex matching topcoat.
  - c. Topcoat: Institutional low-odor/VOC interior latex.
5. High-Performance Architectural Latex System: MPI INT 9.2B.
- a. Prime Coat: Interior latex primer/sealer.
  - b. Intermediate Coat: High-performance architectural latex matching topcoat.
  - c. Topcoat: High-performance architectural latex.
- O. Spray-Textured Ceiling Substrates:
- 1. Latex (Flat) System: MPI INT 9.1A, spray applied.
    - a. Prime Coat: Interior latex.
    - b. Topcoat: Interior latex (flat).
  - 2. Latex System: MPI INT 9.1E, spray applied.
    - a. Prime Coat: Interior latex matching topcoat.
    - b. Intermediate Coat: Interior latex matching topcoat.
    - c. Topcoat: Interior latex.
  - 3. Latex Over Alkyd Primer System: MPI INT 9.1B.
    - a. Prime Coat: Interior alkyd primer/sealer.
    - b. Topcoat: Interior latex.
  - 4. Alkyd (Flat) System: MPI INT 9.1C.
    - a. Prime Coat: Interior alkyd (flat).
    - b. Topcoat: Interior alkyd (flat).
  - 5. Alkyd System: MPI INT 9.1D.
    - a. Prime Coat: Interior alkyd primer/sealer.
    - b. Intermediate Coat: Interior alkyd matching topcoat.
    - c. Topcoat: Interior alkyd.
- P. Cotton or Canvas Insulation-Covering Substrates: Including pipe and duct coverings .
- 1. Latex System: MPI INT 10.1A.
    - a. Prime Coat: Interior latex primer/sealer, matching topcoat.
    - b. Intermediate Coat: Interior latex matching topcoat.
    - c. Topcoat: Interior latex.
  - 2. Alkyd Over Latex Primer System: MPI INT 10.1B.
    - a. Prime Coat: Interior latex primer/sealer.
    - b. Intermediate Coat: Interior alkyd matching topcoat.

- c. Topcoat: Interior alkyd.
- 3. Aluminum Paint System: MPI INT 10.1C.
  - a. Prime Coat: Interior latex primer/sealer.
  - b. Intermediate Coat: Aluminum paint.
  - c. Topcoat: Aluminum paint.
- 4. Institutional Low-Odor/VOC Latex System: MPI INT 10.1D.
  - a. Prime Coat: Interior latex primer/sealer.
  - b. Intermediate Coat: Institutional low-odor/VOC interior latex matching topcoat.
  - c. Topcoat: Institutional low-odor/VOC interior latex.

END OF SECTION 099123

## SECTION 099419 - MULTICOLOR INTERIOR FINISHING

### 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. This Section includes surface preparation and field application of multicolor interior coating systems applied on the following substrates:
  - 1. Vertical concrete.
  - 2. Cementitious composition board.
  - 3. Clay masonry units.
  - 4. Concrete masonry units (CMU).
  - 5. Wood.
  - 6. Fiberglass moldings and trim.
  - 7. Plastic moldings and trim.
  - 8. Plaster.
  - 9. Gypsum board.
- B. Related Sections include the following:
  - 1. Division 09 painting Sections for special-use coatings and general field painting.

#### 1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Samples for Initial Selection: For each coating system indicated.
- C. Samples for Verification: For each coating system and in each color, pattern, and pigment density indicated.
  - 1. Submit Samples on rigid backing, 8 inches (200 mm) square.
  - 2. Label each Sample for location and application area.

#### 1.4 QUALITY ASSURANCE

- A. Master Painters Institute (MPI) Standards: Comply with recommendations in "MPI Architectural Painting Specification Manual" applicable to products and coating systems indicated.



- B. Mockups: Apply benchmark samples of each coating system indicated to verify preliminary selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
  - 1. Architect will select one surface to represent surfaces and conditions for application of each coating system and type of substrate.
    - a. Wall Surfaces: Provide samples of at least 32-40 sq. ft.
    - b. Other Items: Architect will designate items or areas required.
  - 2. Apply benchmark samples after permanent lighting and other environmental services have been activated.
  - 3. Final approval of color and pattern selections will be based on benchmark samples.
    - a. If preliminary color and pattern selections are not approved, apply additional benchmark samples of additional colors and patterns selected by Architect at no added cost to Owner.

#### 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F (7 deg C).
  - 1. Maintain containers in clean condition, free of foreign materials and residue.
  - 2. Remove rags and waste from storage areas daily.

#### 1.6 PROJECT CONDITIONS

- A. Environmental Limitations: Do not apply coatings until spaces are enclosed and weatherproof, work above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

### PART 2 - PRODUCTS

#### 2.1 MULTICOLOR COATING SYSTEMS, GENERAL

- A. Material Compatibility: Provide materials for use within each coating system that are compatible with one another and substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.
- B. VOC Content of Interior Paints and Coatings: Provide products that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
  - 1. Flat Paints, Coatings, and Primers: VOC content of not more than 50 g/L.
  - 2. Nonflat Paints, Coatings, and Primers: VOC content of not more than 150 g/L.
  - 3. Clear Wood Finishes, Varnishes: VOC not more than 350 g/L.
  - 4. Shellacs, Clear: VOC not more than 730 g/L.

5. Shellacs, Pigmented: VOC not more than 550 g/L.
  6. Flat Topcoat Paints: VOC content of not more than 50 g/L.
  7. Nonflat Topcoat Paints: VOC content of not more than 150 g/L.
  8. Clear Wood Finishes, Varnishes: VOC not more than 350 g/L.
  9. Shellacs, Clear: VOC not more than 730 g/L.
  10. Shellacs, Pigmented: VOC not more than 550 g/L.
  11. Primers, Sealers, and Undercoaters: VOC content of not more than 200 g/L.
- C. Chemical Components of Interior Paints and Coatings: Provide topcoat paints that comply with the following chemical restrictions; these requirements do not apply to paints and coatings that are applied in a fabrication or finishing shop:
1. Aromatic Compounds: Paints and coatings shall not contain more than 1.0 percent by weight of total aromatic compounds (hydrocarbon compounds containing 1 or more benzene rings).
  2. Restricted Components: Paints and coatings shall not contain any of the following:
    - a. Acrolein.
    - b. Acrylonitrile.
    - c. Antimony.
    - d. Benzene.
    - e. Butyl benzyl phthalate.
    - f. Cadmium.
    - g. Di (2-ethylhexyl) phthalate.
    - h. Di-n-butyl phthalate.
    - i. Di-n-octyl phthalate.
    - j. 1,2-dichlorobenzene.
    - k. Diethyl phthalate.
    - l. Dimethyl phthalate.
    - m. Ethylbenzene.
    - n. Formaldehyde.
    - o. Hexavalent chromium.
    - p. Isophorone.
    - q. Lead.
    - r. Mercury.
    - s. Methyl ethyl ketone.
    - t. Methyl isobutyl ketone.
    - u. Methylene chloride.
    - v. Naphthalene.
    - w. Toluene (methylbenzene).
    - x. 1,1,1-trichloroethane.
    - y. Vinyl chloride.
- D. Colors and Patterns: Match Architect's samples or as selected by Architect from manufacturer's full range.

## 2.2 FILLERS AND PRIMERS

- A. General: Undercoatings recommended in writing for use in coating systems by manufacturer of multicolor interior coating on substrates and under conditions indicated.

- B. Latex Block Filler: Waterborne, high-solids, emulsion-type, pigmented coating product recommended in writing for use in coating system indicated by manufacturer of multicolor interior coating, with bridging and filling properties, and formulated for filling surfaces of CMU for subsequent applications of finish coatings.
  - 1. VOC Content: Minimum E Range of E2 according to requirements for MPI #4.
- C. Wood Filler Paste: Solvent-based, high-solids, clear paste product recommended in writing for use in coating system indicated by manufacturer of multicolor interior coating, for use on open-grained or damaged woods and that fills hardwood pores with minimal surface residues and without showing cracking or shrinkage. When dry, sanding filler produces a smooth surface without clogging or gumming sandpaper.
  - 1. VOC Content: Minimum E Range of E2 according to requirements for MPI #91.
- D. Wood-Knot Sealer: White shellac or other sealer recommended in writing for this purpose by manufacturer of multicolor interior coating.
- E. Primer/Sealer for Multicolor Systems: Acrylic or acrylic/polyvinyl acetate (PVA) co-polymer emulsion-type, pigmented primer/sealer product recommended in writing for use in coating system indicated by manufacturer of multicolor interior coating.
  - 1. VOC Content: Minimum E Range of E2 according to requirements for MPI #125.
- F. Interior Alkyd Primer/Sealer: Solvent-based, pigmented primer/sealer.
  - 1. VOC Content: Minimum E Range of E2 according to requirements for MPI #45.
- G. Water-Based Bonding Primer: Water-based, emulsion-type, pigmented primer product recommended in writing for use in coating system indicated by manufacturer of multicolor interior coating, and formulated to promote adhesion of subsequent coatings.
  - 1. VOC Content: Minimum E Range of E2 according to requirements for MPI #17.
- H. Solvent-Based Bonding Primer: Solvent-based, pigmented product recommended in writing for use in coating system indicated by manufacturer of multicolor interior coating, and formulated to promote adhesion of subsequent coatings to substrate.
  - 1. VOC Content: Minimum E Range of E2 according to requirements for MPI #69.

## 2.3 MULTICOLOR COATINGS

- A. Multicolor Coatings: Complying with MPI #112 and listed in "MPI Approved Products List."
  - 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. Cloverdale Paint; Classic Coatings, Polospec.
    - b. Columbia Paint & Coatings; Multi-Spec.

- c. Coronado Paint; Cor-O-Fect III, Multi-Color Seamless Wallcoating, 134 line.
  - d. Duron, Inc.; Vara-Flic, Int. Waterborne Multicolor Finish, 75 series.
  - e. Frazee Paint; Zolatone.
  - f. General Paint; Coronado, Cor-O-fect, 93 line.
  - g. Mills Paint; Spectura, Multi-Color Interior Finish, 68 series.
  - h. Parker Paint Mfg. Co. Inc.; Zolatone, Polomyx Waterbase.
  - i. PPG Architectural Finishes, Inc.; COLOR SPEC in Canada.
  - j. Rodda Paint Co.; Polomyx, Multicolor Wall Finish.
  - k. Sherwin-Williams Company (The); Multi-Spec, 400.
  - l. Polomyx/ Zolatone.
3. VOC Content: Minimum E Range of E3.
- B. Clear Topcoat: Product of multicolor coating manufacturer complying with MPI #121 and listed in "MPI Approved Products List."
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. Cloverdale Paint; Acrylic Urethane Varnish, 423 series.
    - b. Columbia Paint & Coatings; Multi-Spec, Clear.
    - c. Coronado Paint; Aqua-Plastic Waterborne Urethane, 70 line.
    - d. Frazee Paint; Zolatone, Clear Top Coat.
    - e. General Paint; Flecto, Diamond Elite, Gloss, S.G., Satin.
    - f. Parker Paint Mfg. Co. Inc.; Zolatone, Clear Acrylic Topcoat, SP1000.
    - g. PPG Architectural Finishes, Inc.; Rez, Interior Acrylic Polyurethane Gloss, 77-45.
    - h. Rodda Paint Co.; SPI, Clear Acrylic Topcoat, SP1000.
    - i. Sherwin-Williams Company (The); Multi-Spec Clear.
    - j. <Insert manufacturer's name; product name or designation.>
  3. VOC Content: Minimum E Range of E2.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Applicator present, for compliance with requirements and conditions affecting performance of coatings.
1. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
    - a. Concrete: 12 percent.
    - b. Masonry (Clay and CMU): 12 percent.
    - c. Wood: 15 percent.
    - d. Plaster: 12 percent.
    - e. Gypsum Veneer Plaster: 12 percent.
    - f. Gypsum Board: 12 percent.

2. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
3. Proceed with coating application only after unsatisfactory conditions have been corrected and surfaces receiving coating are dry.
4. Coating application indicates acceptance of surfaces and conditions.

### 3.2 PREPARATION

- A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates indicated.
- B. Remove plates, machined surfaces, and similar items already in place that are not to be coated. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and coating.
  1. After completing coating operations, reinstall items that were removed; use workers skilled in the trades involved.
- C. Clean substrates of substances that could impair bond of coatings, including dirt, oil, grease, and incompatible primers, paints, and encapsulants.
- D. Concrete Substrates: Remove release agents, curing compounds, efflorescence, and chalk. Do not coat surfaces if moisture content or alkalinity of surfaces to be coated exceeds that permitted in manufacturer's written instructions.
- E. Clay Masonry Substrates: Remove efflorescence and chalk. Do not coat surfaces if moisture content or alkalinity of surfaces to be coated exceeds that permitted in manufacturer's written instructions.
- F. Concrete Masonry Substrates: Remove efflorescence and chalk. Do not coat surfaces if moisture content or alkalinity of surfaces to be coated exceeds that permitted in manufacturer's written instructions.
- G. Wood Substrates:
  1. Scrape and clean small, dry, seasoned knots, and apply a thin coat of knot sealer before applying primer.
  2. Sand surfaces that will be exposed to view and dust off.
  3. Prime edges, ends, faces, undersides, and back sides of wood.
  4. After priming, fill holes and imperfections in the finish surfaces with putty or plastic wood filler. Sand smooth when dried.

### 3.3 APPLICATION

- A. Apply coatings according to manufacturer's written instructions using applicators and techniques suited for coating and substrate indicated.

- B. Coat surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, coat surfaces behind permanently fixed equipment or furniture with prime coat only.
- C. Coat back sides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.
- D. Apply coating systems to produce uniformly textured, colored, and patterned finished-surface films without substrates, undercoats, marks, or stains showing through. Produce sharp, even glass lines and color breaks.

### 3.4 CLEANING AND PROTECTION

- A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.
- B. After completing coating application, clean spattered surfaces. Remove spattered coatings by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.
- C. Protect work of other trades against damage from coating operation. Correct damage by cleaning, repairing, replacing, and recoating, as approved by Architect, and leave in an undamaged condition.
- D. At completion of construction activities of other trades, touch up and restore damaged or defaced coated surfaces.

### 3.5 MULTICOLOR INTERIOR COATING SCHEDULE

- A. Vertical Concrete Substrates:
  - 1. Prime Coat: Primer/sealer for multicolor systems.
  - 2. Multicolor Base Coat: Multicolor coating, MPI #112.
  - 3. Multicolor Pattern Coat: Multicolor coating, MPI #112.
  - 4. Topcoat: Clear topcoat, MPI #121.
- B. Cementitious Composition Board Substrates:
  - 1. Prime Coat: Primer/sealer for multicolor systems.
  - 2. Multicolor Base Coat: Multicolor coating, MPI #112.
  - 3. Multicolor Pattern Coat: Multicolor coating, MPI #112.
  - 4. Topcoat: Clear topcoat, MPI #121.
- C. Clay Masonry Units Substrates:
  - 1. Prime Coat: Primer/sealer for multicolor systems tinted to match multicolor basecoat.
  - 2. Multicolor Base Coat: Multicolor coating, MPI #112.
  - 3. Multicolor Pattern Coat: Multicolor coating, MPI #112.
  - 4. Topcoat: Clear topcoat, MPI #121.

D. CMU Substrates:

1. Block Filler: Latex block filler.
2. Prime Coat: Primer/sealer for multicolor systems.
3. Multicolor Base Coat: Multicolor coating, MPI #112.
4. Multicolor Pattern Coat: Multicolor coating, MPI #112.
5. Topcoat: Clear topcoat, MPI #121.

E. Wood Substrates:

1. Fill Coat: Wood filler paste.
2. Prime Coat: Interior alkyd primer/sealer tinted to match multicolor base coat.
3. Multicolor Base Coat: Multicolor coating, MPI #112.
4. Multicolor Pattern Coat: Multicolor coating, MPI #112.
5. Topcoat: Clear topcoat, MPI #121.

F. Fiberglass Molding and Trim Substrates:

1. Prime Coat: Solvent-based bonding primer.
2. Multicolor Base Coat: Multicolor coating, MPI #112.
3. Multicolor Pattern Coat: Multicolor coating, MPI #112.
4. Topcoat: Clear topcoat, MPI #121.

G. Plastic Molding and Trim Substrates:

1. Prime Coat: Solvent-based bonding primer.
2. Multicolor Base Coat: Multicolor coating, MPI #112.
3. Multicolor Pattern Coat: Multicolor coating, MPI #112.
4. Topcoat: Clear topcoat, MPI #121.

H. Plaster or Gypsum Board Substrates:

1. Prime Coat: Primer/sealer for multicolor systems.
2. Multicolor Base Coat: Multicolor coating, MPI #112.
3. Multicolor Pattern Coat: Multicolor coating, MPI #112.
4. Topcoat: Clear topcoat, MPI #121.

END OF SECTION 099419