

## **SECTION 09 22 16 NON-STRUCTURAL METAL FRAMING**

### **PART 1 - GENERAL**

#### **1.1 DESCRIPTION**

- A. This section specifies steel studs wall systems, ceiling or soffit suspended or furred framing, wall furring, fasteners, and accessories for the screw attachment of gypsum board, plaster bases or other building boards.

#### **1.2 RELATED WORK**

- A. Load bearing framing: Section 05 40 00, COLD-FORMED METAL FRAMING.
- B. Support for wall mounted items: Section 05 50 00, METAL FABRICATIONS.
- C. Pull down tabs in steel decking: Section 05 36 00, COMPOSITE METAL DECKING.
- D. Ceiling suspension systems for acoustical tile or panels and lay in gypsum board panels: Section 09 51 00, ACOUSTICAL CEILINGS, Section 09 29 00, GYPSUM BOARD.

#### **1.3 TERMINOLOGY**

- A. Description of terms to be in accordance with ASTM C754, ASTM C11, ASTM C841 and as specified.
- B. Underside of Structure Overhead: In spaces where steel trusses or bar joists are shown, the underside of structure overhead is defined as the underside of the floor or roof construction supported by beams, trusses, or bar joists.
- C. Thickness of steel specified is the minimum bare (uncoated) steel thickness.

#### **1.4 SUSTAINABILITY REQUIREMENTS**

- A. Materials in this section may contribute towards contract compliance with sustainability requirements. See Section 01 74 19, CONSTRUCTION WASTE MANAGEMENT, for project local/regional materials, emitting materials, recycled content requirements.

#### **1.5 SUBMITTALS**

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Manufacturer's Literature and Data:
  - 1. Studs, runners and accessories.
  - 2. Hanger inserts.
  - 3. Channels (Rolled steel).
  - 4. Furring channels.
  - 5. Screws, clips and other fasteners.

C. Shop Drawings:

1. Typical ceiling suspension system.
2. Typical metal stud and furring construction system including details around openings and corner details.

**1.6 DELIVERY, IDENTIFICATION, HANDLING AND STORAGE**

- A. In accordance with the requirements of ASTM C754.

**1.7 APPLICABLE PUBLICATIONS**

- A. Publications listed below form a part of this specification to extent referenced. Publications are referenced in text by the basic designation only. Comply with applicable provisions and recommendations of the following, except as otherwise shown or specified.

B. American Society For Testing And Materials (ASTM):

A123/A123M-12	Zinc (Hot-dip Galvanized) Coatings on Iron and Steel Products
A641/A641M-09a	Zinc-Coated (Galvanized) Carbon Steel Wire
A653/A653M-11	Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy Coated (Galvannealed) by the Hot-Dip Process
C11-13	Terminology Relating to Gypsum and Related Building Materials and Systems
C635/C635M-13	Manufacture, Performance, and Testing of Metal Suspension System for Acoustical Tile and Lay-in Panel Ceilings
C645-11a	Non-Structural Steel Framing Members
C754-11	Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products
C841-03(2008)c1	Installation of Interior Lathing and Furring
C954-11	Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs from 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness

**PART 2 - PRODUCTS**

**2.1 STEEL STUDS AND RUNNERS (TRACK)**

- A. Framing Members, General: Comply with ASTM C754 for conditions indicated.
1. Deflection Limit:
    - a. L/240 unless otherwise noted.

- b. L/360 where Level 5 gypsum board finish is indicated, at tile backing panels, where plaster veneer is indicated, and elsewhere as indicated.
- 2. Lateral Pressure: 5.0 psf (240 Pa) unless otherwise noted.
- B. Steel Sheet Components: Comply with ASTM C645 requirements for metal, unless otherwise indicated.
- C. Protective Coating: ASTM A653, // Z120 (G40) //Z180 (G60)//, hot-dip galvanized, unless otherwise indicated.
- D. Provide not less than two cutouts in web of each stud, approximately 300 mm (12 inches) from each end, and intermediate cutouts on approximately 600 mm (24 inch) centers.
- E. Doubled studs for openings and studs for supporting concrete backer-board.
- F. Provide studs 3600 mm (12 feet) or less in length in one piece.

## **2.2 FURRING CHANNELS**

- A. Rigid furring channels (hat shape): ASTM C645.
- B. "Z" Furring Channels:
  - 1. Not less than 0.45 mm (0.0179-inch) thick bare metal, with 32 mm (1-1/4 inch) and 19 mm (3/4-inch) flanges.
  - 2. Web furring depth to suit thickness of insulation with slotted perforations.
- C. Rolled Steel Channels: ASTM C754, cold rolled; or, ASTM C841, cold rolled.

## **2.3 FASTENERS, CLIPS, AND OTHER METAL ACCESSORIES**

- A. Conform to ASTM C754, except as otherwise specified.
- B. For fire rated construction: Type and size same as used in fire rating test.
- C. Fasteners for steel studs thicker than 0.84 mm (0.033-inch) thick. Use ASTM C954 steel drill screws of size and type recommended by the manufacturer of the material being fastened.
- D. Clips: ASTM C841 (paragraph 6.11), manufacturer's standard items. Clips used instead of tie wire must have holding power equivalent to that provided by the tie wire for the specific application.
- E. Tie Wire and Hanger Wire:
  - 1. ASTM A641, soft temper, Class 1 coating.
  - 2. Gage (diameter) as specified in ASTM C754 or ASTM C841.
- F. Attachments for Wall Furring:
  - 1. Manufacturers standard items fabricated from zinc-coated (galvanized) steel sheet.

2. For concrete or masonry walls: Metal slots with adjustable inserts or adjustable wall furring brackets. Spacers may be fabricated from 1 mm (0.0396-inch) thick galvanized steel with corrugated edges.

- G. Power Actuated Fasteners: Type and size as recommended by the manufacturer of the material being fastened.

## **2.4 SUSPENDED CEILING SYSTEM FOR GYPSUM BOARD**

- A. Conform to ASTM C635 and C754 for materials and sizes.
1. Grid Suspension System for Ceilings - Contractor Option: ASTM C645, direct-hung system composed of main beams and cross-furring members that interlock.
- B. Conform to ASTM A641 for wire hangers.

## **2.5 COMPONENT FINISH**

- A. Provide framing components with Z180 (G60) minimum per ASTM A123.

## **PART 3 - EXECUTION**

### **3.1 INSTALLATION CRITERIA**

- A. Examine substrates to which gypsum board assemblies attach or abut, installed hollow metal frames, cast-in-anchors, and structural framing, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of assemblies specified in this section.

### **3.2 INSTALLING STUDS**

- A. Install studs in accordance with ASTM C754, except as otherwise shown or specified.
- B. Install runners (tracks) at floors, ceilings, and structural walls and columns where gypsum board stud assemblies abut other construction.
1. Extend partition framing full height to structural supports or substrates above suspended ceilings, except where otherwise indicated. Continue framing over frames of doors and openings and frame around ducts penetrating partitions above ceiling to provide support for gypsum board.
- C. Install steel studs and furring in sizes and at spacing indicated.
- D. Install steel studs so flanges point in the same direction and leading edge or end of each gypsum board panel can be attached to open (unsupported) edges of stud flanges first.
- E. Frame door openings to comply with applicable published recommendations of gypsum board manufacturer, unless otherwise indicated. Attach vertical studs at jambs with screws directly to frames or to jamb anchor clips on door frames; install runner track section (for cripple studs) at head and secure to jamb studs.
1. Install two (2) studs at each jamb, unless otherwise indicated.

- F. Frame openings other than door openings to comply with details indicated or, if none indicated, as required for door openings. Install framing below sills of openings to match framing required above door heads.

### **3.3 INSTALLING FURRED AND SUSPENDED CEILINGS OR SOFFITS**

- A. Install furred and suspended ceilings or soffits in accordance with ASTM C754 or ASTM C841 except as otherwise specified or shown for screw attached gypsum board ceilings and for plaster ceilings or soffits.
- B. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structural or ceiling suspension system. Splay hangers only where required to miss obstructions and offset resulting horizontal forces by bracing, counter splaying, or other equally effective means.
- C. Where width of ducts and other construction within ceiling plenum produces hanger spacing that interfere with the location of hangers required to support standard suspension system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices. Size supplemental suspension members and hangers to support ceiling loads, within performance limits established by referenced standards.
- D. Secure wire hangers by looping and wire-tying, directly to structures or to inserts, eyescrews, or other devices and fasteners that are secure and appropriate for substrate, and in a manner that will not cause them to deteriorate or otherwise fail.
- E. Install suspended steel framing components in sizes and at spacing indicated, but not less than that required by the referenced steel framing installation standard.
  - 1. Wire Hangers: 1219 mm (48 inches) o.c.
  - 2. Carrying Channels (Main Runners): 1219 mm (48 inches) o.c.
  - 3. Furring Channels (Furring Members): 406 mm (16 inches) o.c.
- F. Installation Tolerances: Install steel framing components for suspended ceilings so that cross-furring or grid suspension members are level to within 3 mm (1/8 inch) in 3.66 meters (12 feet) as measured both lengthwise on each member and transversely between parallel members.
- G. Wire-tie or clip furring members to main runners and to other structural supports as indicated.
- H. Grid Suspension System: Attach perimeter wall track or angle where grid suspension system meets vertical surfaces. Mechanically join main beam and cross-furring members to each other and butt-cut to fit into wall track

### **3.4 TOLERANCES**

- A. Fastening surface for application of subsequent materials: Not varying more than 3 mm (1/8-inch) from the layout line.
- B. Plumb and align vertical members within 3 mm (1/8-inch).
- C. Level or align ceilings within 3 mm (1/8-inch).

- - - E N D - - -

## **SECTION 09 29 00 GYPSUM BOARD**

### **PART 1 - GENERAL**

#### **1.1 DESCRIPTION**

- A. This section specifies installation and finishing of gypsum board.

#### **1.2 RELATED WORK**

- A. Installation of steel framing members for walls, partitions, furring, soffits, and ceilings:  
Section 05 40 00, COLD-FORMED METAL FRAMING, and Section 09 22 16, NON-STRUCTURAL METAL FRAMING.
- B. Thermal Insulation: Section 07 21 13, THERMAL INSULATION.
- C. Sealants: Section 07 92 00, JOINT SEALANTS.

#### **1.3 TERMINOLOGY**

- A. Definitions and description of terms to be in accordance with ASTM C11, C840, and as specified.

#### **1.4 SUSTAINABILITY REQUIREMENTS**

- A. Materials in this section may contribute towards contract compliance with sustainability requirements. See Section 01 81 11, SUSTAINABLE DESIGN REQUIREMENTS, for project local/regional materials, recycled content, requirements.
- B. Biobased Material: For products designated by the USDA's BioPreferred® program, provide products that meet or exceed USDA recommendations for biobased content, subject to the products compliance with performance requirements in this Section. For more information regarding the product categories covered by the BioPreferred® program, visit <http://www.biopreferred.gov>.
- C. Any gypsum wallboard panel products used on this project must have passed testing for moisture and mold-resistance.

#### **1.5 SUBMITTALS**

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Manufacturer's Literature and Data:
  - 1. Cornerbead and edge trim.
  - 2. Finishing materials.
  - 3. Gypsum board, each type.
- C. Shop Drawings:

1. Typical gypsum board installation of all assemblies, showing corner details, edge trim details and the like.

D. Samples:

1. Cornerbead.
2. Edge trim.
3. Control joints.

## **1.6 DELIVERY, IDENTIFICATION, HANDLING AND STORAGE**

- A. In accordance with the requirements of ASTM C840.

## **1.7 ENVIRONMENTAL CONDITIONS**

- A. In accordance with the requirements of ASTM C840.

## **1.8 APPLICABLE PUBLICATIONS**

- A. Publications listed below form a part of this specification to extent referenced. Publications are referenced in text by the basic designation only. Comply with applicable provisions and recommendations of the following, except as otherwise shown or specified.

B. American Society for Testing and Materials (ASTM):

C11-13	Terminology Relating to Gypsum and Related Building Materials and Systems
C475/C475M-12	Joint Compound and Joint Tape for Finishing Gypsum Board
C840-11	Application and Finishing of Gypsum Board
C954-11	Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs from 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness
C1002-07	Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs
C1047-10a	Accessories for Gypsum Wallboard and Gypsum Veneer Base
C1177/C1177M-08	Glass Mat Gypsum Substrate for Use as Sheathing
C1280-11	Application of Exterior Gypsum Panel Products for Use as Sheathing
C1325-08b	Fiber Mat Reinforced Cementitious Backer Unit
C1396/C1396M-13	Gypsum Board



C1658/C1658M

Glass Mat Gypsum Panels

D3273-12

Resistance to Growth of Mold on the Surface of Interior  
Coatings in an Environmental Chamber

## **PART 2 - PRODUCTS**

### **2.1 GYPSUM BOARD**

- A. Gypsum Board (Typical) - Mold and Moisture-Resistant: ASTM C1396, (Type X,) 16 mm (5/8 inch) thick unless shown otherwise.
- B. Gypsum Backing Board - Mold and Moisture-Resistant: ASTM C1396, 16 mm (5/8 inch) thick.
- C. Cementitious Backing Board: ASTM C1325, use in showers.
- D. Glass-Mat-Faced Interior Panels: ASTM C1177, Type X, 16 mm (5/8 inch) thick and complying to the requirements of ASTM D3273 for Mold and Mildew resistance.
- E. Provide gypsum cores with a minimum of 95 percent post industrial recycled gypsum content. Provide paper facings with 100 percent post-consumer recycled paper content.

### **2.2 GYPSUM SHEATHING BOARD**

- A. Provide panels complying with ASTM C1177 and ASTM C1396, Type X, water-resistant core, 16 mm (5/8 inch) thick.

### **2.3 ACCESSORIES**

- A. ASTM C1047, except form of 0.39 mm (0.015 inch) thick zinc coated steel sheet or rigid PVC plastic.

### **2.4 FASTENERS**

- A. ASTM C1002 and ASTM C840, except as otherwise specified.
- B. ASTM C954, for steel studs thicker than 0.04 mm (0.33 inch).
- C. For fire rated construction, type and size same as used in fire rating test.

### **2.5 FINISHING MATERIALS AND LAMINATING ADHESIVE**

- A. ASTM C475 and ASTM C840.
- B. Provide material free of antifreeze, vinyl adhesives, preservatives and biocides; VOC content within limits of stated performance requirements.
- C. Joint Tape: Use cross-laminated, tapered edge, reinforced paper, or fiber glass mesh tape recommended by the manufacturer.

## **PART 3 - EXECUTION**

### **3.1 GYPSUM BOARD HEIGHTS**

- A. Extend gypsum board from floor to heights as follows, unless shown otherwise:
  - 1. Not less than 150 mm (6 inches) above suspended acoustical ceilings.
  - 2. At ceiling of suspended gypsum board ceilings.

### **3.2 INSTALLING GYPSUM BOARD**

- A. Install gypsum board in accordance with ASTM C840, except as otherwise specified.
- B. Provide and install moisture and mold-resistant glass-mat-faced interior gypsum wallboard products with moisture-resistant surfaces complying with ASTM C1658 where shown and in high humidity and wet areas or locations which might be subject to moisture exposure during construction.
  - 1. High humidity and wet areas include, but not limited to, wallboard installed at building perimeter, any wallboard furred to concrete or masonry construction, toilet rooms containing a shower.
- C. Ceilings:
  - 1. For single-ply construction, use perpendicular application.
  - 2. For two-ply assemblies:
    - a. Use perpendicular application.
    - b. Apply face ply of gypsum board so that joints of face ply do not occur at joints of base ply with joints over framing members.
- D. Install control joints in accordance with ASTM C840.
- E. Accessories:
  - 1. Install the following accessories in accordance with ASTM C1047.
    - a. Corner Beads.
    - b. Edge Trim (casing beads).

### **3.3 INSTALLING GYPSUM SHEATHING**

- A. Comply with ASTM C1280; install sheathing vertically, with edges butted tight and ends occurring over firm bearing.
- B. Coordinate sheathing installation with flashing and joint-sealant installation so these materials are installed in sequence and manner that prevent exterior moisture from passing through completed exterior wall assembly.
- C. Do not bridge building expansion joints with sheathing; cut and space edges to match spacing of structural support elements.
- D. Seal sheathing joints according to sheathing manufacturer's written recommendations.

1. Apply glass-fiber sheathing tape to glass-mat gypsum sheathing board joints, and apply and trowel silicone emulsion sealant to embed sealant in entire face of tape.
2. Apply sealant to exposed fasteners with a trowel so fasteners are completely covered.
3. Seal other penetrations and openings.

### **3.4 FINISHING OF GYPSUM BOARD**

- A. Finish joints, edges, corners, and fastener heads in accordance with ASTM C840.
- B. Use Level 5 finish for all finished areas open to public view; level 2 finish in utility, maintenance and service areas and level 1 in plenums, attics and other concealed areas.
- C. Follow manufacturer's fire testing reports where fire resistant construction is shown on drawings.

### **3.5 REPAIRS**

- A. After taping and finishing has been completed, and before decoration, repair all damaged and defective work, including non-decorated surfaces.
- B. Patch holes or openings 13 mm (1/2 inch) or less in diameter, or equivalent size, with a setting type finishing compound or patching plaster.
- C. Repair holes or openings over 13 mm (1/2 inch) diameter, or equivalent size, with 16 mm (5/8 inch) thick gypsum board secured in such a manner as to provide solid substrate equivalent to undamaged surface.
- D. Tape and refinish scratched, abraded or damaged finish surfaces including cracks and joints in non-decorated surface to provide fire protection equivalent to the fire rated construction.

- - - E N D - - -

THIS PAGE LEFT BLANK INTENTIONALLY

## **SECTION 09 30 13 TILING**

### **PART 1 - GENERAL**

#### **1.1 DESCRIPTION**

- A. This section specifies ceramic, porcelain, and quarry tile, marble thresholds and window stools, crack isolation membranes, tile backer board.

#### **1.2 RELATED WORK**

- A. Sealing of joints where specified: Section 07 92 00, JOINT SEALANTS.
- B. Metal and resilient edge strips at joints with new resilient flooring, and carpeting: Section 09 65 19, RESILIENT TILE FLOORING Section 09 68 00, CARPETING.

#### **1.3 PERFORMANCE REQUIREMENTS**

- A. Grout: Provide materials complying with SCAQMD Rule 1168; petroleum- and plastic-free grout.
- B. Finish Flooring: Provide Floor Score certification.

#### **1.4 SUSTAINABILITY REQUIREMENTS**

- A. Materials in this section may contribute towards contract compliance with sustainability requirements. See Section 01 74 19, CONSTRUCTION WASTE MANAGEMENT, for project local/regional materials, low-emitting materials, recycled content, requirements.

#### **1.5 SUBMITTALS**

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Samples:
  - 1. Base tile, each type, each color, each size.
  - 2. Paver tile, each size, type, color and pattern.
  - 3. Quarry tile, each type, color, and size.
  - 4. Porcelain tile, each type, color, patterns and size.
  - 5. Wall (or wainscot) tile, each color, size and pattern.
  - 6. Trim shapes, bullnose cap and cove including bullnose cap and base pieces at internal and external corners of vertical surfaces, each type, color, and size.
- C. Product Data:
  - 1. Ceramic and porcelain tile, marked to show each type, size, and shape required.
  - 2. Cementitious backer unit.
  - 3. Dry-set Portland cement mortar and grout.

4. Divider strip.
5. Reinforcing tape.
6. Leveling compound.
7. Latex-Portland cement mortar and grout.
8. Commercial Portland cement grout.
9. Slip resistant tile.
10. Waterproofing isolation membrane.
11. Fasteners.

D. Certification:

1. Master grade, ANSI A137.1.
2. Manufacturer's certificates indicating that the following materials comply with specification requirements:
  - a. Commercial Portland cement grout.
  - b. Cementitious backer unit.
  - c. Dry-set Portland cement mortar and grout.
  - d. Reinforcing tape.
  - e. Latex-Portland cement mortar and grout.
  - f. Leveling compound.

## 1.6 DELIVERY AND STORAGE

- A. Deliver materials in containers with labels legible and intact and grade-seals unbroken.
- B. Store material to prevent damage or contamination.

## 1.7 APPLICABLE PUBLICATIONS

- A. Publications listed below form a part of this specification to extent referenced.

Publications are referenced in text by the basic designation only. Comply with applicable provisions and recommendations of the following, except as otherwise shown or specified.
- B. American National Standards Institute (ANSI):

A108.1B-13	Installation of Ceramic Tile on a Cured Portland Cement Mortar Setting Bed with dry-Set or latex-Portland Cement Mortar
A108.11-10	Interior Installation of Cementitious Backer Units
A108.5-10	Installation of Ceramic Tile with Dry-Set Portland Cement Mortar or Latex-Portland Cement Mortar
A118.1-12	Dry-Set Portland Cement Mortar

A118.4-12	Latex-Portland Cement Mortar
A118.6-10	Standard Cement Grouts for Tile Installation
A118.7-10	High Performance Cement Grouts for Tile Installation
A118.10-08	Load-bearing, Bonded, Waterproof Membranes for Thin-Set Ceramic Tile and Dimension Stone Installation
A137.1-12	Ceramic Tile

C. American Society for Testing and Materials (ASTM):

A185/A185M-07	Steel Welded Wire Fabric, Plain, for Concrete Reinforcing
C241/C241M-13	Abrasion Resistance of Stone Subjected to Foot Traffic
C627-10	Evaluating Ceramic Floor Tile Installation Systems Using the Robinson-Type Floor Tester
C954-11	Steel Drill Screws for the Application of Gypsum Board on Metal Plaster Base to Steel Studs from 0.033 in (0.84 mm) to 0.112 in (2.84 mm) in thickness
C979/C979M-10	Pigments for Integrally Colored Concrete
C1002-07	Steel Self-Piercing Tapping Screws for the Application of Panel Products
C1027-09	Determining "Visible Abrasion Resistance on Glazed Ceramic Tile"
C1028-07e1	Determining the Static Coefficient of Friction of Ceramic Tile and Other Like Surfaces by the Horizontal Dynamometer Pull Meter Method
C1178 /C1178M-11	Coated Glass Mat Water-Resistant Gypsum Backing Panel
C1325-08b	Non-Asbestos Fiber-Mat Reinforced Cementitious Backer Units
D4397-10	Polyethylene Sheeting for Construction, Industrial and Agricultural Applications

D. Marble Institute of America (MIA): Design Manual 7.2-2011

E. South Coast Air Quality Management District (SCAQMD):

SCAQMD Rule 1168 (1989/R2005) Adhesive and Sealant Applications

F. Tile Council of North America, Inc. (TCNA):

Handbook for Ceramic, Glass, and Stone Tile Installation

## **PART 2 - PRODUCTS**

### **2.1 TILE**

- A. Comply with ANSI A137.1, Standard Grade, except as modified:
  - 1. Inspection procedures listed under the Appendix of ANSI A137.1.
  - 2. Abrasion Resistance Classification: Tested in accordance with values listed in Table 1, ASTM C1027.
  - 3. Slip Resistant Tile for Floors - Coefficient of friction, when tested in accordance with ASTM C1028, required for level of performance: Not less than 0.7 (wet condition) for bathing areas.
  - 4. Factory Blending: For tile with color variations, within the ranges selected during sample submittals blend tile in the factory and package so tile units taken from one package show the same range in colors as those taken from other packages and match approved samples.
  - 5. Factory-Applied Temporary Protective Coating:
    - a. Protect exposed face surfaces (top surface) of tile against adherence of mortar and grout by pre-coating with a continuous film of petroleum paraffin wax, applied hot.
    - b. Do not coat unexposed tile surfaces.
    - c. Pre-wax tiles set or grouted with furan or epoxy or latex modified mortars.
- B. Unglazed Quarry Tile: Nominal 13 mm (1/2 inch) thick, square edges.
- C. Glazed Wall Tile: Cushion edges, glazing, as specified in Section 09 06 00, SCHEDULE FOR FINISHES.
- D. Porcelain Paver Tile: Nominal 8 mm (5/16 inch) thick, cushion edges. Produce porcelain tile by the dust pressed method made of approximately 50 percent feldspar; the remaining 50 percent to be made up of various high-quality light firing ball clays yielding a tile with a water absorption rate of 0.5 percent or less and a breaking strength of between 390 to 400 pounds.
- F. Trim Shapes:
  - 1. Conform to applicable requirements of adjoining floor and wall tile.
  - 2. Use trim shapes sizes specified in Section 09 06 00, SCHEDULE FOR FINISHES.

### **2.2 CEMENTITIOUS BACKER UNITS**

- A. Use behind all wall tile.
- B. Comply to ASTM C1325.
- C. Joint materials for Cementitious Backer Units:



1. Reinforcing Tape: Vinyl coated woven glass fiber mesh tape, open weave, 50 mm (2 inches) wide. Tape with pressure sensitive adhesive backing will not be permitted.
2. Tape Embedding Material: Latex-Portland cement mortar complying with ANSI A108.1.
3. Joint material, including reinforcing tape, and tape embedding material, must be as specifically recommended by the backer unit manufacturer.

## **2.3 FASTENERS**

- A. Screws for Cementitious Backer Units:
  1. Standard screws for gypsum board are not acceptable.
  2. Minimum 11 mm (7/16 inch) diameter head, corrosion resistant coated, with washers.
  3. ASTM C954 for steel 1 mm (0.033 inch) thick.
  4. ASTM C1002 for steel framing less than 0.0329 inch thick.
- B. Washers: Galvanized steel, 13 mm (1/2 inch) minimum diameter.

## **2.4 GLASS MAT WATER RESISTANT GYPSUM BACKER BOARD**

- A. Confirm to ASTM C1178 for optional system instead of cementitious backer units for areas other than showers.

## **2.5 SETTING MATERIALS OR BOND COATS**

- A. Conform to TCA Handbook for Ceramic Tile Installation.
- B. Portland Cement Mortar: ANSI A108.1B.
- C. Latex-Portland Cement Mortar: ANSI A118.4.
  1. For wall applications, provide non-sagging, latex-Portland cement mortar complying with ANSI A118.4.
  2. Prepackaged Dry-Mortar Mix: Factory-prepared mixture of Portland cement; dry, re-dispersible, ethylene vinyl acetate additive; and other ingredients to which only water needs to be added at Project site.
- D. Dry-Set Portland Cement Mortar: ANSI A108.5 and ANSI A118.1; floor installation only.
  1. Contractor Option: Latex-Portland cement mortar.

## **2.6 GROUTING MATERIALS**

- A. Coloring Pigments:
  1. Pure mineral pigments, lime-proof and nonfading, complying with ASTM C979.
  2. Addition of coloring pigments to grout must be by the manufacturer; job colored grout is not acceptable.

3. Use is required in Commercial Portland Cement Grout, Dry-Set Grout, and Latex-Portland Cement Grout.
- B. Dry-Set Grout: ANSI A118.6 color as specified.
- C. Latex-Portland Cement Grout: ANSI A118.7 color as specified.
  1. Unsanded grout mixture for joints 3.2 mm (1/8 inch) and narrower.
  2. Sanded grout mixture for joints 3.2 mm (1/8 inch) and wider.
- D. Grout Sealer: Grout manufacturer's standard silicone product for sealing grout joints and that does not change color or appearance of grout.

## **2.7 PATCHING AND LEVELING COMPOUND**

- A. Portland cement base, polymer-modified, self-leveling compound, manufactured specifically for resurfacing and leveling concrete floors. Products containing gypsum are not acceptable.

## **2.8 MARBLE**

- A. Soundness Classification in accordance with MIA Design Manual.
- B. Thresholds:
  1. Group A, Minimum abrasive hardness (Ha) of 10.0 per ASTM C241.
  2. Honed finish on exposed faces.
  3. Thickness and contour as shown.
  4. Fabricate from one piece without holes, cracks, or open seams; full depth of wall or frame opening by full width of wall or frame opening; 19 mm (3/4-inch) minimum thickness and 6 mm (1/4-inch) minimum thickness at beveled edge.
  5. Set not more than 13 mm (1/2-inch) above adjoining finished floor surfaces, with transition edges beveled on a slope of no greater than 1:2. On existing floor slabs provide 13 mm (1/2-inch) above ceramic tile surface with bevel edge joint top flush with adjacent floor.
  6. Provide one piece full width of door opening; notch thresholds to match profile of door jambs.

## **2.9 METAL DIVIDER STRIPS**

- A. Provide terrazzo type divider strips; heavy top type strip with 5 mm (3/16 inch) wide top and 38 mm (1-1/2 inch) long leg.
- C. Embedded leg perforated and deformed for keying to mortar.
- D. Aluminum or brass as specified in Section 09 06 00, SCHEDULE FOR FINISHES.

## **2.10 WATER**

- A. Clean, potable and free from salts and other injurious elements to mortar and grout materials.

## **2.11 CLEANING COMPOUNDS**

- A. Specifically designed for cleaning masonry and concrete and which will not prevent bond of subsequent tile setting materials including patching and leveling compounds and elastomeric waterproofing membrane and coat.
- B. Materials containing acid or caustic material not acceptable.

## **2.12 FLOOR MORTAR BED REINFORCING**

- A. ASTM A185 welded wire fabric without backing, MW3 x MW3 (2 x 2-W0.5 x W0.5).

## **2.13 WATERPROOF AND CRACK ISOLATION MEMBRANE**

- A. Type: Fabric-reinforced, fluid-applied membrane.
- B. Provide manufacturer's standard product that complies with ANSI A118.10 and is recommended by the manufacturer for the application indicated; include reinforcement and accessories recommended by manufacturer.

## **2.14 POLYETHYLENE SHEET**

- A. Polyethylene sheet conforming to ASTM D4397.
- B. Nominal thickness: 0.15 mm (six mils).
- C. Use sheet width to minimize joints.

## **PART 3 - EXECUTION**

### **3.1 ENVIRONMENTAL REQUIREMENTS**

- A. Maintain environmental temperature and humidity within all manufacturers' recommendations.

### **3.2 ALLOWABLE TOLERANCE**

- A. Variation in plane of sub-floor, including concrete fills leveling compounds and mortar beds:
  - 1. Not more than 1 in 500 (1/4 inch in 10 feet) from required elevation where Portland cement mortar setting bed is used.
  - 2. Not more than 1 in 1000 (1/8 inch in 10 feet) where dry-set Portland cement, and latex-Portland cement mortar setting beds and chemical-resistant bond coats are used.
- B. Variation in Plane of Wall Surfaces:
  - 1. Not more than 1 in 400 (1/4 inch in eight feet) from required plane where Portland cement mortar setting bed is used.

2. Not more than 1 in 800 (1/8 inch in eight feet) where dry-set or latex-Portland cement mortar or organic adhesive setting materials is used.

### **3.3 SURFACE PREPARATION**

#### **A. Cleaning New Concrete or Masonry:**

1. Chip out loose material, clean off all oil, grease dirt, adhesives, curing compounds, and other deterrents to bonding by mechanical method, or by using products specifically designed for cleaning concrete and masonry.
2. Use self-contained power blast cleaning systems to remove curing compounds and steel trowel finish from concrete slabs where ceramic tile will be installed directly on concrete surface with thin-set materials.
3. Steam cleaning or the use of acids and solvents for cleaning will not be permitted.

#### **B. Patching and Leveling:**

1. Mix and apply patching and leveling compound in accordance with manufacturer's instructions.
2. Fill holes and cracks and align concrete floors that are out of required plane with patching and leveling compound.
  - a. Thickness of compound as required to bring finish tile system to elevation shown.
  - b. Float finish.
  - c. At substrate expansion, isolation, and other moving joints, allow joint of same width to continue through underlayment.
3. Apply patching and leveling compound to concrete and masonry wall surfaces that are out of required plane.
4. Apply leveling coats of material compatible with wall surface and tile setting material to wall surfaces, other than concrete and masonry that are out of required plane.

#### **C. Mortar Bed for Slopes to Drains:**

1. Slope compound to drain where drains are shown.
2. Install mortar bed in depressed slab sloped to drains not less than 1 in 200 (1/16 inch per foot).
3. Allow not less than 50 mm (2 inch) depression at edge of depressed slab.
4. Screed for slope to drain and float finish.
5. Cure mortar bed for not less than seven days. Do not use curing compounds or coatings.

#### **D. Additional preparation of concrete floors for tile set with waterproof and crack isolation membrane to be in accordance with the manufacturer's printed instructions.**

E. Walls:

1. In showers or other wet areas cover studs with polyethylene sheet.
2. Apply patching and leveling compound to concrete and masonry surfaces that are out of required plane.
3. Apply leveling coats of material compatible with wall surface and tile setting material to wall surfaces, other than concrete and masonry that are out of required plane.
4. Apply waterproof membrane in accordance with manufacturer's printed instructions.

**3.4 CEMENTITIOUS BACKER UNITS**

- A. Remove polyethylene wrapping from cementitious backer units and separate to allow for air circulation. Allow moisture content of backer units to dry down to a maximum of 35 percent before applying joint treatment and tile.
- B. Install in accordance with ANSI A108.11 except as specified otherwise.

**3.5 GLASS MAT WATER-RESISTANT GYPSUM BACKER BOARD**

- A. Install in accordance with manufacturer's instructions.

**3.6 MARBLE**

- A. Secure thresholds and stools in position with minimum of two stainless steel dowels.
- B. Set in dry-set Portland cement mortar or latex-Portland cement mortar bond coat.

**3.7 METAL DIVIDER STRIPS**

- A. Install metal divider strips in floor joints between ceramic and quarry tile floors and between tile floors and adjacent flooring of other materials where the finish floors are flush unless shown otherwise.
- B. Set divider strip in mortar bed to line and level centered under doors or in openings.

**3.8 CERAMIC TILE - GENERAL**

- A. Comply with ANSI A108 series of tile installation standards in "Specifications for Installation of Ceramic Tile" applicable to methods of installation.
- B. Comply with TCNA Installation Guidelines:
- C. Installing Mortar Beds for Floors:
  1. For thin set systems cure mortar bed not less than seven days; do not use curing compounds or coatings.
- D. Workmanship:
  1. Comply with all ANSI 108, 118, 136, and 137 requirements.
  2. Joints:
    - a. Keep all joints in line, straight, level, perpendicular and of even width unless shown otherwise.

- b. Make joints 2 mm (1/16 inch) wide for glazed wall tile and mosaic tile work.
- c. Make joints in quarry tile work not less than 6 mm (1/4 inch) nor more than 9 mm (3/8 inch) wide; finish joints flush with surface of tile.
- d. Make joints in paver tile, porcelain type; maximum 3 mm (1/8 inch) wide.
- 3. Back Buttering: For installations indicated below, obtain 100 percent mortar coverage by complying with applicable special requirements for back buttering of tile in referenced ANSI A108 series of tile installation standards:
  - a. Tile wall installations in wet areas.
  - b. Tile wall installations composed of tiles 200 by 200 mm (8 by 8 inches or larger).

### **3.9 GROUTING**

- A. Grout Type and Location: Refer 09 06 00, SCHEDULE OF FINISHES.
- B. Workmanship:
  - 1. Install and cure grout in accordance with the applicable standard.
  - 2. Portland Cement grout: ANSI A108.1.
  - 3. Epoxy Grout: ANSI A108.1.
  - 4. Dry-set grout: ANSI A108.1.

### **3.10 MOVEMENT JOINTS**

- A. Prepare tile expansion, isolation, construction and contraction joints for installation of sealant. Refer to Section 07 92 00, JOINT SEALANTS.
- B. TCA details EJ 171.

### **3.11 CLEANING**

- A. Thoroughly sponge and wash tile.
- B. Polish glazed surfaces with clean dry cloths.
- C. Methods and materials used must not damage or impair appearance of tile surfaces.
- D. The use of acid or acid cleaners on glazed tile surfaces is prohibited.
- E. Clean tile as recommended by the manufacturer of the grout and bond coat.
- F. Apply grout sealer.

### **3.12 PROTECTION**

- A. Keep traffic off tile floor, until grout and setting material is firmly set and cured.
- B. Where traffic occurs over tile floor, cover tile floor with not less than 9 mm (3/8 inch) thick plywood, wood particle board, or hardboard securely taped in place. Do not remove protective cover until time for final inspection. Clean tile of any tape, adhesive and stains.

### **3.13 TESTING FINISH FLOOR**

- A. Test floors in accordance with ASTM C627 to show compliance with codes 1 through 10.

### **3.14 INTERIOR CERAMIC TILE INSTALLATION SCHEDULE**

A. Interior Floor Installations, Concrete Subfloor:

1. Ceramic Tile Installation: TCNA F113; thin-set mortar.
  - a. Bond Coat for Cured-Bed Method: Dry-set or Latex-Portland cement mortar.
  - b. Grout: Sand-Portland cement grout.
2. Ceramic Tile Installation: TCNA F125A; thin-set mortar on waterproof and crack isolation membrane.
  - a. Thin-set Mortar: Latex- Portland cement mortar.
  - b. Grout: Sand-Portland cement.

B. Interior Wall Installations, Masonry or Concrete:

1. Ceramic Tile Installation: TCNA W202; thin-set mortar.
  - a. Bond Coat for Cured-Bed Method: Dry-set or Latex- Portland cement mortar.
  - b. Grout: Sand-Portland cement.

C. Interior Wall Installations, Metal Studs or Furring:

1. Ceramic Tile Installation: TCNA W244C or TCNA W244F; thin-set mortar on cementitious backer units or fiber-cement backer board over vapor-retarder membrane.
  - a. Thin-set Mortar: Dry-set or Latex- Portland cement mortar.
  - b. Grout: Sand-Portland cement.
2. Ceramic Tile Installation: TCNA W245 or TCNA W248; thin-set mortar on glass-mat, water-resistant gypsum backer board.
  - a. Thin-Set Mortar: Dry-Set or Latex- Portland cement mortar.
  - b. Grout: Sand-Portland cement.

D. Shower Receptor and Wall Installations:

1. Ceramic Tile Installation: TCNA B415; thin-set mortar on waterproof membrane over cementitious backer units over vapor-retarder membrane.
  - a. Thin-set Mortar: Dry-set or Latex- Portland cement mortar.
  - b. Grout: Sand-Portland cement.
2. Ceramic Tile Installation: TCNA B421; thin-set mortar on waterproof membrane over solid backing.
  - a. Thin-set Mortar: Latex-Portland cement mortar.
  - b. Grout: Sand-Portland cement.

--- E N D ---



## **SECTION 09 51 00 ACOUSTICAL CEILINGS**

### **PART 1- GENERAL**

#### **1.1 DESCRIPTION**

- A. Metal ceiling suspension system for acoustical ceilings.
- B. Acoustical units.

#### **1.2 RELATED WORK**

- A. Access doors in adhesive applied tile: Section 08 31 13, ACCESS DOORS AND FRAMES.

#### **1.3 PERFORMANCE REQUIREMENTS**

- A. Seismic Performance: Acoustical ceiling must withstand the effects of earthquake motions determined according to ASCE/SEI 7.
- B. Surface-Burning Characteristics: Comply with ASTM E84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
  - 1. Flame-Spread Index: Comply with ASTM E1264 for Class A materials.
  - 2. Smoke-Developed Index: 25 or less.
- C. Acoustical Ceiling Tile - Recycled Content: Minimum 10 percent post-consumer recycled content, or minimum 40 percent pre-consumer recycled content at contractor's option.
- E. Provide acoustical ceiling tile with anti-microbial treatment to inhibit growth of mold and mildew.
  - 1. Coating-Based Antimicrobial Treatment: Provide acoustical panels with face and back surfaces coated with antimicrobial treatment; and showing no mold or mildew growth when tested in accordance with ASTM D3273.
  - 2. Panel-Based Antimicrobial Treatment: Provide acoustical panels manufactured with antimicrobial treatment in the panels.
- F. Steel Suspension System - Recycled Content: Recycled Content: Minimum 10 percent post-consumer recycled content, or minimum 40 percent pre-consumer recycled content at contractor's option.
- G. VOC Emissions: Provide low VOC products that comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

## 1.4 SUSTAINABILITY REQUIREMENTS

- A. Materials in this section may contribute towards contract compliance with sustainability requirements. See Section 01 81 11, SUSTAINABLE DESIGN REQUIREMENTS, for project local/regional materials, recycled content, requirements.
- B. Biobased Material: For products designated by the USDA's BioPreferred® program, provide products that meet or exceed USDA recommendations for biobased content, subject to the products compliance with performance requirements in this Section. For more information regarding the product categories covered by the BioPreferred® program, visit <http://www.biopreferred.gov>.

## 1.5 SUBMITTALS

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Provide documentation of conformance with performance requirements of this section.
- C. Samples:
  - 1. Acoustical units, each type, with label indicating conformance to specification requirements.
  - 2. Colored markers for units providing access.
- D. Manufacturer's Literature and Data:
  - 1. Ceiling suspension system, each type, showing complete details of installation.
  - 2. Acoustical units, each type.
- E. Manufacturer's Certificates: Acoustical units, each type, in accordance with specification requirements.

## 1.6 DEFINITIONS

- A. Standard definitions as defined in ASTM C634.
- B. Terminology as defined in ASTM E1264.

## 1.7 APPLICABLE PUBLICATIONS

- A. Publications listed below form a part of this specification to extent referenced. Publications are referenced in text by the basic designation only. Comply with applicable provisions and recommendations of the following, except as otherwise shown or specified.
- B. American Society of Civil Engineers/Structural Engineering Institute (ASCE/SEI):  
ASCE/SEI-7-10                      Minimum Design Loads for Buildings and Other Structures
- C. American Society for Testing and Materials (ASTM):  
A641/A641M-09a                      Zinc-coated (Galvanized) Carbon Steel Wire

C423-09a	Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method
C634-11	Standard Terminology Relating to Environmental Acoustics
C635/C635M-13	Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings
C636/C636M-13	Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels
E84-13a	Surface Burning Characteristics of Building Materials
E413-10	Classification for Rating Sound Insulation.
E1264-08c1	Classification for Acoustical Ceiling Products
E1414/E1414M-11a	Airborne Sound Attenuation Between Rooms Sharing a Common Ceiling Plenum

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

- A. Deliver materials to the site in the manufacturer's original unopened containers with brand name and type clearly marked
- B. Carefully handle and store materials in dry, watertight enclosures.
- C. Immediately before installation, store acoustical units for not less than 24 hours at the same temperature and relative humidity as the space where they will be installed in order to assure proper temperature and moisture acclimation.

### **1.9 ENVIRONMENTAL REQUIREMENTS**

- A. Maintain a uniform temperature of not less than 16 degrees C (60 degrees F) nor more than 29 degrees C 85 degrees F and a relative humidity of not more than 70 percent for 24 hours before, during, and 24 hours after installation of acoustical units.

### **1.10 SCHEDULING**

- A. Complete and dry interior finish work such as plastering, concrete and terrazzo work before ceiling installation.
- B. Complete mechanical, electrical, and other work above the ceiling line; install and start operating heating, ventilating, and air conditioning systems in order to maintain temperature and humidity requirements.

## **PART 2- PRODUCTS**

### **2.1 METAL SUSPENSION SYSTEM**

- A. ASTM C635, heavy-duty system, except as otherwise specified.
- B. Exposed grid suspension system and wall molding:
  - 1. Exposed grid width not less than 22 mm (7/8 inch) with not less than 8 mm (5/16 inch) panel bearing surface.

### **2.2 WIRE**

- A. Conform to ASTM A641, Class 1.
- B. Wire Hangers: Minimum diameter 2.68 mm (0.1055 inch).
- C. Bracing Wires: Minimum diameter 3.43 mm (0.1350 inch).

### **2.3 ACOUSTICAL UNITS**

- A. General:
  - 1. Provide panels complying with ASTM E1264; Class A Flame Spread per ASTM E84.
  - 2. Minimum NRC (Noise Reduction Coefficient): 0.55 unless specified otherwise; ASTM C423.
  - 3. Minimum CAC (Ceiling Attenuation Class): 38 unless specified otherwise: ASTM E1414.
  - 4. Manufacturers standard finish, minimum Light Reflectance (LR) coefficient of 0.75 on the exposed surfaces, except as specified otherwise in Section 09 06 00, SCHEDULE FOR FINISHES.
  - 5. Lay-in Panels: Sizes as shown, with reveal edges.

### **2.4 ACCESS IDENTIFICATION**

- A. Markers:
  - 1. Use colored markers with pressure sensitive adhesive on one side.
  - 2. Make colored markers of paper or plastic, 6 to 9 mm (1/4 to 3/8 inch) in diameter.
- B. Use markers of the same diameter throughout building.
- C. Color Code: Use following color markers for service identification:

<b>COLOR</b>	<b>SERVICE</b>
Red	Sprinkler System: Valves and Controls
Green	Domestic Water: Valves and Controls
Yellow	Chilled Water and Heating Water
Orange	Ductwork: Fire Dampers
Blue	Ductwork: Dampers and Controls

Black

Gas: Laboratory, Medical, Air and Vacuum

## **PART 3 - EXECUTION**

### **3.1 CEILING TREATMENT**

- A. Lay out acoustical units symmetrically about center lines of each room or space unless shown otherwise on reflected ceiling plan; miter corners or install corner caps.
- B. Moldings:
  - 1. Install metal wall molding at perimeter of room, column, or edge at vertical surfaces.
  - 2. Install special shaped molding at changes in ceiling heights and at other breaks in ceiling construction to support acoustical units and to conceal their edges.

### **3.2 CEILING SUSPENSION SYSTEM INSTALLATION**

- A. General:
  - 1. Comply with ASTM C635 and C636.
  - 2. Install metal suspension system for acoustical tile and lay-in panels in accordance with ASTM C636, except as specified otherwise.
  - 3. Use direct or indirect hung suspension system or combination thereof as defined in ASTM C635.
  - 4. Support a maximum area of 1.48 m<sup>2</sup> (16 sf) of ceiling per hanger.
  - 5. Prevent deflection in excess of 1/360 of span of cross runner and main runner.
  - 6. Provide extra hangers, minimum of one hanger at each corner of each item of mechanical, electrical and miscellaneous equipment supported by ceiling suspension system not having separate support or hangers.
  - 7. Provide not less than 100 mm (4 inch) clearance from the exposed face of the acoustical units to the underside of ducts, pipe, conduit, secondary suspension channels, concrete beams or joists; and steel beam or bar joist unless furred system is shown,
  - 8. Use main runners not less than 1200 mm (48 inches) in length.
  - 9. Install hanger wires vertically. Angled wires are not acceptable except for seismic restraint bracing wires.

### **3.3 ACOUSTICAL UNIT INSTALLATION**

- A. Comply with ASTM C636.
- B. Markers:
  - 1. Install markers of color code specified to identify the various concealed piping, mechanical, and plumbing systems.

2. Attach colored markers to exposed grid on opposite sides of the units providing access.
3. Attach marker on exposed ceiling surface of upward access acoustical unit.

### **3.4 CLEAN-UP AND COMPLETION**

- A. Replace damaged, discolored, dirty, cracked and broken acoustical units.
- B. Leave finished work free from defects.

- - - E N D - - -

## **SECTION 09 65 13 RESILIENT BASE AND ACCESSORIES**

### **PART 1 - GENERAL**

#### **1.1 DESCRIPTION**

- A. This section specifies the installation of resilient base and resilient stair treads with sheet rubber flooring on landings.

#### **1.2 SUSTAINABILITY REQUIREMENTS**

- A. Materials in this section may contribute towards contract compliance with sustainability requirements. See Section 01 81 11, SUSTAINABLE DESIGN REQUIREMENTS, for project local/regional materials, low-emitting materials, recycled content, requirements.

#### **1.3 SUBMITTALS**

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Manufacturer's Literature and Data:
  - 1. Base and stair material manufacturer's recommendations for adhesives.
  - 2. Application and installation instructions.
- C. Samples:
  - 1. Base: 150 mm (6 inches) long, each type and color.
  - 2. Resilient Stair Treads: 150 mm (6 inches) long.
  - 3. Sheet Rubber Flooring: 300 mm (12 inches) square.
  - 4. Adhesive: Each type.

#### **1.4 DELIVERY**

- A. Deliver materials to the site in original sealed packages or containers, clearly marked with the manufacturer's name or brand, type and color, production run number and date of manufacture.
- B. Materials from containers which have been distorted, damaged or opened prior to installation will be rejected.

#### **1.5 STORAGE**

- A. Follow manufacturer's instruction for storage and protection from damage by handling and construction operations before, during, and after installation.

## **1.6 APPLICABLE PUBLICATIONS**

- A. Publications listed below form a part of this specification to extent referenced.  
Publications are referenced in text by the basic designation only. Comply with applicable provisions and recommendations of the following, except as otherwise shown or specified.
- B. American Society for Testing and Materials (ASTM):
- |                  |   |
|------------------|---|
| F1344-12e1       | Rubber Floor Tile                           |
| F1859-12         | Rubber Sheet Floor Covering without Backing |
| F1860-12         | Rubber Sheet Floor Covering with Backing    |
| F1861-08(2012)e1 | Resilient Wall Base                         |
| F2169-12         | Resilient Stair Treads Base                 |

## **PART 2 - PRODUCTS**

### **2.1 GENERAL**

- A. Use only products by the same manufacturer and from the same production run.

### **2.2 RESILIENT BASE**

- A. ASTM F1861, 3 mm (1/8 inch) thick, 100 mm (4 inches) high, Type TP (Thermoplastic Rubber).
- B. Where carpet occurs, use Style A-straight at carpet locations; Style B-cove other locations.

### **2.3 PRIMER (FOR CONCRETE FLOORS)**

- A. As recommended by the adhesive and tile manufacturer.

### **2.4 LEVELING COMPOUND (FOR CONCRETE FLOORS)**

- A. Provide products with latex or polyvinyl acetate resins in the mix.

### **2.5 ADHESIVES**

- A. Use products recommended by the material manufacturer for the conditions of use.
- B. Provide low VOC products that comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

## **PART 3 - EXECUTION**

### **3.1 PROJECT CONDITIONS**

- A. Maintain temperature of materials above 21° C (70°F), for 48 hours before installation.
- B. Maintain temperature of rooms where work occurs, between 21° C and 27° C (70°F and 80°F) for at least 48 hours, before, during, and after installation.



- C. Do not install materials until building is permanently enclosed and wet construction is complete, dry, and cured.

### **3.2 INSTALLATION REQUIREMENTS**

- A. The respective manufacturer's instructions for application and installation will be considered for use when approved by the COTR.
- B. Submit proposed installation deviation from this specification to the COTR indicating the differences in the method of installation.
- C. The COTR reserves the right to have test portions of material installation removed to check for non-uniform adhesion and spotty adhesive coverage.
  - 1. Do not use solvents to remove adhesives.
  - 2. Prepare substrate as specified.

### **3.3 BASE INSTALLATION**

- A. Location:
  - 1. Unless otherwise specified or shown, where base is scheduled, install base over toe space of base of casework, lockers, and where other equipment occurs.
  - 2. Extend base scheduled for room into adjacent closet, alcoves, and around columns.
- B. Application:
  - 1. Apply adhesive uniformly with no bare spots.
  - 2. Set base with joints aligned and butted to touch for entire height.
  - 3. Before starting installation, layout base material to provide the minimum number of joints with no strip less than 600 mm (24 inches) length.
    - a. Short pieces to save material will not be permitted.
    - b. Locate joints as remote from corners as the material lengths or the wall configuration will permit.
- C. Form corners and end stops as follows:
  - 1. Score back of outside corner.
  - 2. Score face of inside corner and notch cove.
- D. Roll base for complete adhesion.
  - 2. Roll and pound treads to assure adhesion.

### **3.4 CLEANING AND PROTECTION**

- A. Clean all exposed surfaces of base and adjoining areas of adhesive spatter before it sets.
- B. Keep traffic off resilient material for at least 72 hours after installation.
- C. Clean and polish materials in the following order:

1. After two weeks, scrub resilient base materials with a minimum amount of water and a mild detergent. Leave surfaces clean and free of detergent residue. Polish resilient base to a gloss finish.
  2. Do not polish tread and sheet rubber materials.
- D. Where protective materials are removed and immediately prior to acceptance, replace damaged materials and re-clean resilient materials. Damaged materials are defined as having cuts, gouges, scrapes or tears and not fully adhered.

- - - E N D - - -

## **SECTION 09 65 19 RESILIENT TILE FLOORING**

### **PART 1 - GENERAL**

#### **1.1 DESCRIPTION**

- A. This section specifies the installation of vinyl composition tile flooring, and accessories.

#### **1.2 RELATED WORK**

- A. Color and pattern and location in room finish schedule: Section 09 06 00, SCHEDULE FOR FINISHES.
- B. Resilient Base: Section 09 65 13, RESILIENT BASE AND ACCESSORIES.

#### **1.3 PERFORMANCE REQUIREMENTS**

- A. VOC Emissions:
1. Provide low VOC products with Green Seal Certification to GS-36 and description of the basis for certification.
  2. Submit manufacturer's certification that products comply with SCAQMD Rule 1168.
- B. Finish Flooring: Provide Floor Score certification.

#### **1.4 SUSTAINABILITY REQUIREMENTS**

- A. Materials in this section may contribute towards contract compliance with sustainability requirements. See Section 01 74 19, CONSTRUCTION WASTE MANAGEMENT, for project local/regional materials, low-emitting materials, recycled content, requirements.
- B. Biobased Material: For products designated by the USDA's BioPreferred® program, provide products that meet or exceed USDA recommendations for biobased content, subject to the products compliance with performance requirements in this Section. For more information regarding the product categories covered by the BioPreferred® program, visit <http://www.biopreferred.gov>.

#### **1.5 SUBMITTALS**

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Provide documentation of conformance with performance requirements of this section.
- C. Manufacturer's Literature and Data:
1. Description of each product.
  2. Resilient material manufacturers' recommendations for adhesives, underlayment, primers and polish.
  3. Application and installation instructions.

D. Samples:

1. Tile: 300 mm by 300 mm (12 inches by 12 inches) for each type, pattern and color.
2. Edge Strips: 150 mm (6 inches) long, each type.
3. Feature Strips: 150 mm (6 inches) long.

E. Shop Drawings:

1. Layout of patterns shown on the drawings and in Section 09 06 00, SCHEDULE FOR FINISHES.
2. Edge strip locations showing types and detail cross sections.

F. Test Reports:

1. Abrasion Resistance: Depth of wear for each tile type and color and volume loss of tile, certified by independent laboratory.
2. Tested per ASTM F510.

**1.6 DELIVERY**

- A. Deliver materials to the site in original sealed packages or containers, clearly marked with the manufacturer's name or brand, type and color, production run number and date of manufacture.
- B. Materials from containers which have been distorted, damaged or opened prior to installation will be rejected.

**1.7 STORAGE**

- A. Store materials in weathertight and dry storage facility.
- B. Protect from damage from handling, water, and temperature.

**1.8 APPLICABLE PUBLICATIONS**

- A. Publications listed below form a part of this specification to extent referenced.  
Publications are referenced in text by the basic designation only. Comply with applicable provisions and recommendations of the following, except as otherwise shown or specified.
- B. American Society for Testing and Materials (ASTM):

D4078-02(2008)	Water Emulsion Floor Finish
E648-10e1	Critical Radiant Flux of Floor Covering Systems Using a Radiant Energy Source
E662-13b	Specific Optical Density of Smoke Generated by Solid Materials
E1155-96(2008)	Determining Floor Flatness and Floor Levelness Numbers

F510-93(2008)	Resistance to Abrasion of Resilient Floor Coverings Using an Abrader with a Grit Feed Method
F710-11	Preparing Concrete Floors to Receive Resilient Flooring
F1066-04(2010)e1	Vinyl Composition Floor Tile
F1344-12e1	Rubber Floor Tile
F1700-13a	Solid Vinyl Floor Tile
F1869-11	Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride
F2170-11	Determining Relative Humidity in Concrete Floor Slabs using In-situ Probes

C. Green Seal (GS):

GS-36(2000) Commercial Adhesives

D. South Coast Air Quality Management District (SCAQMD)

E. Resilient Floor Covering Institute (RFCI):

Recommended Work Practices for Removal of Resilient Floor Coverings

## **PART 2 - PRODUCTS**

### **2.1 GENERAL**

- A. Furnish product type, materials of the same production run and meeting following criteria.
- B. Use adhesives, underlayment, primers and polish recommended by the floor resilient material manufacturer.
- C. Critical Radiant Flux: 0.45 watts per sq. cm or more, Class I, per ASTM E648.
- D. Smoke Density: Less than 450 per ASTM E662.

### **2.2 VINYL COMPOSITION TILE**

- A. ASTM F1066, Composition 1, //Class I (solid color)// Class 2 (through pattern) //, asbestos-free, 300 mm (12 inches) square, 3 mm (1/8 inch) thick.
- B. Color and pattern uniformly distributed throughout thickness.

### **2.3 ADHESIVES**

- A. Comply with applicable regulations regarding toxic and hazardous materials Green Seal (GS-36) for commercial adhesive.

### **2.4 PRIMER (FOR CONCRETE SUBFLOORS)**

- A. As recommended by the adhesive and tile manufacturer.

### **2.5 LEVELING COMPOUND (FOR CONCRETE FLOORS)**

- A. Provide cementitious products with latex or polyvinyl acetate resins in the mix.

- B. Determine the type of underlayment selected for use by the condition to be corrected.

## **2.6 POLISH AND CLEANERS**

- A. Cleaners RFCI CL-1.
- B. Polish: ASTM D4078.

## **2.7 EDGE STRIPS**

- A. Provide 28 mm (1-1/8 inch) wide unless shown otherwise.
- B. Bevel from maximum thickness to minimum thickness for flush joint unless shown otherwise.
- C. Extruded aluminum, mill finish, mechanically cleaned:
  - 1. Drill and counter sink edge strip for flat head screws.
  - 2. Space holes near ends and approximately 225 mm (9 inches) on center between.
- D. Resilient Edge Strip or Reducer Strip: Solid vinyl.

## **2.8 SCREWS**

- A. Stainless steel flat head screw.

## **2.9 FEATURE STRIPS**

- A. Use same material as floor tile.
- B. Sizes and shapes as shown.

# **PART 3 - EXECUTION**

## **3.1 PROJECT CONDITIONS**

- A. Maintain temperature of materials a minimum of 22 °C (70 °F,) for 48 hours before installation.
- B. Maintain temperature of rooms where work occurs between 21 °C and 27 °C (70 °F and 80 °F), for at least 48 hours, before, during and after installation.
- C. Do not install flooring until building is permanently enclosed and wet construction in or near areas to receive tile materials is complete, dry and cured.

## **3.2 SUBFLOOR PREPARATION**

- A. Verify that concrete slabs comply with ASTM F710. At existing slabs, determine levelness by F-number method in accordance with ASTM E1155; overall value not to exceed FF30/FL20.
- B. Correct conditions which will impair proper installation.
- C. Fill cracks, joints and other irregularities in concrete with leveling compound:
  - 1. Do not use adhesive for filling or leveling purposes.
  - 2. Do not use leveling compound to correct imperfections which can be corrected by spot grinding.

3. Trowel to smooth surface free of trowel marks, pits, dents, protrusions, cracks or joints.
- D. Clean floor of oil, paint, dust, and deleterious substances: Leave floor dry and cured free of residue from existing curing or cleaning agents.
- E. Moisture Testing: Perform moisture and pH test as recommended by the flooring and adhesive manufacturers. Perform test locations starting on the deepest part of the concrete structure. Proceed with installation only after concrete substrates meet or exceed the manufacturer's requirements. In the absence of specific guidance from the flooring or adhesive manufacturer the following requirements are to be met:
  1. Perform moisture vapor emission tests in accordance with ASTM F1869. Proceed with installation only after substrates have a maximum moisture-vapor-emission rate of 1.36 kg of water/92.9 sq. m (3lb of water/1000 sq. ft.) in 24 hours.
  2. Perform concrete internal relative humidity testing using situ probes in accordance with ASTM F2170. Proceed with installation only after concrete reaches maximum 75 percent relative humidity level measurement.
- F. Perform additional subfloor preparation to obtain satisfactory adherence of flooring if subfloor test patches allows easy removal of tile.
- G. Prime the concrete subfloor if the primer will seal slab conditions that would inhibit bonding, or if priming is recommended by the tile or adhesive manufacturers.

### **3.3 INSTALLATION**

- A. Install in accordance with manufacturer's instructions for application and installation unless specified otherwise.
- B. Mix tile from at least two containers. An apparent line of shade or pattern variance will not be accepted.
- C. Tile Layout:
  1. If layout is not shown on drawings, lay tile symmetrically about center of room or space with joints aligned.
  2. Do not provide tile less than 150 mm (6 inches) and of equal width at walls.
  3. Place tile pattern in the same direction; do not alternate tiles.
- D. Trim tiles to touch for the length of intersections at pipes and vertical projections, seal joints at pipes with waterproof cement.
- E. Application:
  1. Apply adhesive uniformly without open cracks, voids, raising and puckering at joint, or other surface imperfections.

- a. Conform to manufacturer's instructions for joint tightness and for corner intersection unless layout pattern shows random corner intersection.
- b. More than 5 percent of the joints not touching will not be accepted.
2. Roll tile floor with a minimum 45 kg (100 pound) roller. No exceptions.
3. The COTR may have test tiles removed to check for non-uniform adhesion, spotty adhesive coverage, and ease of removal. Install new tile for broken removed tile.
- F. Installation of Edge Strips:
  1. Locate edge strips under center line of doors unless otherwise shown.
  2. Set resilient edge strips in adhesive. Anchor metal edge strips with anchors and screws specified.
  3. Where tile edge is exposed, butt edge strip to touch along tile edge.
  4. Where thin set ceramic tile abuts resilient tile, set edge strip against floor file and against the ceramic tile edge.

### **3.4 CLEANING AND PROTECTION**

- A. Follow manufacturer's instructions for cleaning and protection during the construction period.

### **3.5 LOCATION**

- A. Unless otherwise specified or shown, install tile flooring, on floor under areas where casework and other equipment occurs, except where mounted in wall recesses.
- B. Extend tile flooring for room into adjacent closets and alcoves.

- - - E N D - - -



## **SECTION 09 67 00 FLUID-APPLIED FLOORING**

### **PART 1 - GENERAL**

#### **1.1 DESCRIPTION**

- A. This section covers a traffic bearing, trowel applied, vinyl resin, neoprene resin, or polyacrylate resin flooring system. Incorporate a reinforced elastomeric waterproof membrane with the latex mastic flooring.

#### **1.2 MANUFACTURERS AND INSTALLERS QUALIFICATIONS**

- A. Approval by Contracting Officer is required of products or service of proposed manufacturer, suppliers and installers, and will be based upon submission by Contractor of certification that:
- B. Manufacturer regularly and presently manufactures latex mastic flooring as specified as one of his principal products.
- C. Installer has technical qualifications, experience, factory trained personnel and facilities to install specified items. Approval will not be given, however, where experience record is one of unsatisfactory performance.
- D. Manufacturer's product submitted has been in satisfactory and efficient operation on three installations similar and equivalent to this project for three years. Submit list of installations.

#### **1.3 SUSTAINABILITY REQUIREMENTS**

- A. Materials in this section may contribute towards contract compliance with sustainability requirements. See Section 01 81 11, SUSTAINABLE DESIGN REQUIREMENTS, for project local/regional materials, low-emitting materials, and recycled content, requirements.

#### **1.4 SUBMITTALS**

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Samples: Latex mastic flooring, troweled sample on plywood, 300 mm (one foot) square, each color specified; sample to be the thickness and composition of the selected flooring.
- C. Manufacturer's Literature and Data: Description of mastic flooring material // including waterproof membrane //installation instructions.
- D. Certificates:
  - 1. Document manufacturers' and installers' qualifications as specified.

2. Provide certificate stating that latex mastic flooring meets specified requirements and that it is unaffected by urine or other body waste matter.
3. Provide documentation from an independent testing agency, indicating compliance with the FloorScore standard.

## **1.5 PRODUCT DELIVERY AND STORAGE**

- A. Deliver materials to the job site in original sealed containers, labeled for identification with the manufacturer's name and brand.
- B. Store the unopened containers in a dry enclosed area, where temperature is maintained at 10 °C (50 °F) or above.

## **1.6 WARRANTY**

- A. Work subject to the terms of Article "Warranty of Construction" FAR clause 52.246-21.
- B. Warranty period extended to two years.

## **PART 2 - PRODUCTS**

### **2.1 LATEX MASTIC FLOORING**

- A. Comply with requirements of FloorScore standard.

### **2.2 WATERPROOF MEMBRANE**

- A. Neoprene emulsion or elastomeric polyurethane resin reinforced with fiberglass net or cloth.

## **PART 3 - EXECUTION**

### **3.1 PREPARING SUBFLOORS**

- A. Remove any existing resilient flooring and condition subfloors to provide smooth, clean continuous surfaces. Fill holes and cracks in concrete subfloors with a crack filler compatible with the specified mastic flooring.

### **3.2 APPLICATION**

- A. Install waterproof membrane in accordance with manufacturer's specifications and turn up on vertical surfaces behind base.
- A. Trowel apply mastic flooring to a minimum thickness of 5 mm (3/16 inch) minimum. Application must be smooth, uniform and cannot reflect slight imperfections in the sub-floor.
- B. Cove Base:
  1. At the intersection of the wall with the floor, create a 13 mm (1/2 inch) radius cove and extend the floor material up the wall 150 mm (6 inches).
  2. Feather top of base to a uniform line. Coordinate the top of the base with the wall finish application to provide a water tight intersection.

- C. Slab Penetrations: Projections through the slab such as columns and pipes to receive the integral treatment specified for the base. Trowel the material into the deck flange of floor drains to provide a water tight installation.

- - - E N D - - -

THIS PAGE LEFT BLANK INTENTIONALLY

## **SECTION 09 67 23 RESINOUS FLOORING**

### **PART 1 - GENERAL**

#### **1.1 DESCRIPTION**

- A. This section specifies a seamless flooring system with integral base.
- B. Flooring consists of epoxy resin, aggregate, and finish coats for non-slip finish.

#### **1.2 SUSTAINABILITY REQUIREMENTS**

- A. Materials in this section may contribute towards contract compliance with sustainability requirements. See Section 01 81 11, SUSTAINABLE DESIGN REQUIREMENTS, for project local/regional materials, low-emitting materials, recycled content requirements.

#### **1.3 SUBMITTALS**

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Manufacturer's Literature and Data:
  - 1. Description of product to be provided; technical data showing compliance with specifications.
  - 2. Application and installation instructions, including proposed deviations from specifications.
- C. Samples:
  - 1. Each color specified in Section 09 06 00, SCHEDULE FOR FINISHES.
  - 2. Sample 300 mm (12-inch) square in each finish specified.
  - 3. Sample showing construction from substrate to finish surface in thickness specified.
- D. Certification and Approval:
  - 1. Submit manufacturer's certification of material compliance.
  - 2. Provide statement of manufacturer's approval of installers.
  - 3. Submit Contractor's certificate of compliance with Quality Assurance requirements.
  - 4. Provide documentation from an independent testing agency indicating compliance with the FloorScore standard.
- E. Warranty: Manufacturer's warranty of materials and installation.

#### **1.4 QUALITY ASSURANCE**

- A. Single Source Responsibility:
  - 1. Obtain primary resinous flooring materials including primers, resins, hardening agents, finish or sealing coats from a single manufacturer.

2. Provide secondary materials only of type and from source recommended by manufacturer of primary materials.
- B. Installer Qualifications: Installer trained and approved by manufacturer of primary material and having completed at least five projects of similar size and complexity.
- C. Pre-Installation Conference:
  1. Arrange a meeting not less than thirty days prior to starting work.
  2. Attendance:
    - a. Contractor.
    - b. COTR.
    - c. Manufacturer and Installer's Representative.

### **1.5 MATERIAL PACKAGING DELIVERY AND STORAGE**

- A. Deliver materials to the site in original sealed packages or containers, clearly marked with the manufacturer's name or brand, type and color, production run number and date of manufacture.
- B. Protect materials from damage and contamination in storage.
- C. Maintain temperature of storage area between 15°C and 32°C (60° and 90°F).
- D. Package materials in factory pre-weighed and in single, easy to manage batches sized for ease of handling and mixing proportions from entire package or packages.

### **1.6 WARRANTY**

- A. Work subject to the terms of the Article "Warranty of Construction" FAR clause 52.246-21.
- B. Extend warranty period to three years.

### **1.7 APPLICABLE PUBLICATIONS**

- A. Publications listed below form a part of this specification to extent referenced.  
Publications are referenced in text by the basic designation only. Comply with applicable provisions and recommendations of the following, except as otherwise shown or specified.
- B. American Society for Testing and Materials (ASTM):

B221-13	Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Shapes, and Tubes
C267-07(2013)	Chemical Resistance of Mortars, Grouts, and Monolithic Surfacing
C413-01(2012)	Absorption of Chemical-Resistant Mortars, Grouts, and Monolithic Surfacing, and Polymer Concretes

C580-02(2012)	Flexural Strength and Modulus of Elasticity of Chemical Resistant Mortars, Grouts, Monolithic Surfacing and Polymer Concretes
C722-04(2012)	Chemical-Resistant Resin Monolithic Surfacing
C882/C882M-12	Bond Strength of Epoxy-Resin Systems Used with Concrete by Slant Shear
D635-10	Rate of Burning and/or Extent and Time of Burning of Plastics in a Horizontal Position
D2047-11	Static Coefficient of Friction of Polish-Coated Floor Surfaces as Measured by the James Machine
D2240-05(2010)	Rubber Property - Durometer Hardness
D4060-10	Abrasion Resistance of Organic Coatings by the Taber Abraser
F1869-11	Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride
F2170-11	Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes

C. National Association of Architectural Metal Manufacturers (NAAMM):

AMP 501	Finishes for Aluminum
---------	-----------------------

## PART 2 - PRODUCTS

### 2.1 SYSTEM DESCRIPTION

- A. Epoxy resinous flooring includes concrete epoxy primer, colored quartz aggregate epoxy resin mortar, clear epoxy sealer coat, and finish coat for non-slip finish.
- B. System to be resistant to chemicals and abrasion.
- C. Comply with requirements of FloorScore standard.

### 2.2 EPOXY FLOORING SYSTEM

- A. Conform to ASTM C722, Type A, Epoxy resin, quartz aggregate.
- B. Physical Properties of flooring system addition to C722 when tested as follows:

PROPERTY	TEST	VALUE
Hardness	ASTM D2240 Shore Durometer	75-80
Bond	ASTM C882 Bonding epoxy flooring to hardened concrete	min 400 psi
Water Absorption	ASTM C413	max 0.1 percent
Abrasion Resistance	ASTM D4060	max 0.10 gms.

PROPERTY	TEST	VALUE
	Taber Abrader CS-17 wheel, 1000 gm load; 1000 cycle	weight loss
Flexural Strength	ASTM C580	min 2200 psi
Extent of Burning extinguishing Heat Resistant	ASTM D635 For continuous exposure min 140 deg. F For intermittent spills min 200 deg. F	max 0.25 inch self No Effect  No Effect
Coefficient of Friction	ASTM D 2047	0.7
Chemical Resistance of the following:	ASTM C267	No Effect
Acetic acid	5 percent	
Ammonium hydroxide	10 percent	
Citric Acid	50 percent	
Fatty acid Motor Oil, 20W		
Hydrochloric acid	10 percent	
Salt water	10 percent	
Sodium Hydroxide	10 percent	
Sulfuric acid	10 percent	
Trisodium phosphate	5 percent	
Urine		
Feces		
Hydrogen peroxide	28 percent	
Distilled Water		
Sodium Hypochloride	5.28 percent	

- C. Primer, Coloring, Sealer, and Finish coats as standard with manufacture of flooring system.
- D. Base Cap: Extruded aluminum, clear anodized finish unless specified otherwise in Section 09 06 00, SCHEDULE FOR FINISHES.

## 2.3 BASE CAP STRIP

- A. Aluminum, Extruded: ASTM B221, Alloy 6063-T6.
- B. Shape for 5 mm (3/16 inch) depth of base material, "J" configuration.
- C. Finish:
  - 1. Finish exposed surfaces in accordance with NAAMM Metal Finishes Manual.
  - 2. Aluminum: NAAMM Amp 501:
    - a. Clear anodic coating, AA-C22A41 chemically etched medium matte, with Architectural Class 1, 0.7 mils or thicker.
    - b. Colored anodic coating, AA-C22A42, chemically etched medium matte with Architectural Class 1, 0.7 mils or thicker.



## **PART 3 - EXECUTION**

### **3.1 PROJECT CONDITIONS**

- A. Maintain temperature of materials above 21°C (70 degrees F), for 48 hours before installation.
- B. Maintain temperature of rooms where work occurs, between 21°C and 32°C (70°F and 90°F) for at least 48 hours, before, during, and 24 hours after installation. Maintain temperature at least 21°C (70 degrees F) thereafter.
- C. Do not install materials until building is permanently enclosed and wet construction is complete, dry, and cured.
- D. Concrete substrate cured and not less than 30 days old.
- E. Area free of other trades during and for a period of 24 hours after installation.

### **3.2 INSTALLATION REQUIREMENTS**

- A. The respective manufacturer's instructions for application and installation will be considered for use when approved by the COTR.
- B. Submit proposed installation deviation from this specification to the COTR indicating the differences in the method of installation.

### **3.3 PREPARATION**

- A. Prepare surface in accordance with manufacturer's instructions.
- B. Mechanically remove bond inhibiting materials and loose or laitance materials to ensure bond.
- C. Moisture Testing: Perform moisture and pH test as recommended by the flooring and adhesive manufacturers. Perform test locations starting on the deepest part of the concrete structure. Proceed with installation only after concrete substrates meet or exceed the manufacturer's requirements. In the absence of specific guidance from the flooring or adhesive manufacturer the following requirements are to be met:
  - 1. Perform moisture vapor emission tests in accordance with ASTM F1869. Proceed with installation only after substrates have a maximum moisture-vapor-emission rate of 1.36 kg of water/92.9 sq. m (3lb of water/1000 sq. ft.) in 24 hours.
  - 2. Perform concrete internal relative humidity testing using situ probes in accordance with ASTM F2170. Proceed with installation only after concrete reaches maximum 75 percent relative humidity level measurement.
- D. Prepare wall and set base cap mold level.
  - 1. Fill voids within the height of the wall where base is applied even with the wall surface.

2. Grind, sand, or cut away protrusions.

### **3.4 APPLICATION**

- A. Mix and apply each component of resinous flooring system in compliance with manufacturer's specifications to produce a uniform monolithic flooring surface of 5 mm (3/16 inch) minimum thickness.
- B. Turn flooring up for coved 100 mm (4-inch) high base at vertical wall surfaces and penetrations. Cove joint with floor; 6 mm (1/4 inch) radius. Round interior and external corners.
- C. Apply primer over prepared substrate at manufacturer's specified rate. Coordinate timing of primer application with application of troweled mortar to ensure optimum adhesion between resinous flooring materials and substrate.
- D. Uniformly spread mortar over substrate adjusted to manufacturer's recommended maximum thickness to plane line of floor.
- E. Trowel finish for smooth surface on base and coved surface.
- F. Grout mortar surface as specified by manufacturer and broad cast colored quartz aggregate uniformly distributed for non-slip texture on floors to within one inch of base cove horizontal edge.
- G. Apply a clear finish coat.

### **3.5 CURING, PROTECTION, AND CLEANING**

- A. Cure resinous flooring materials in compliance with manufacturer's directions, taking care to prevent contamination during stages of application and prior to completion of curing process.
- B. Close area of application for a minimum of 24 hours.
- C. Protect resinous flooring materials from damage and wear during construction operation.
  1. Cover flooring with kraft paper.
  2. Covers paper with 6 mm (1/4 inch) thick hardboard, plywood, or particle board where area is in foot or vehicle traffic pattern, rolling or fixed scaffolding and overhead work occurs.
- D. Remove temporary covering and clean resinous flooring just prior to final inspection. Use cleaning materials and procedures recommended by resinous flooring manufacturer.

### **3.6 TOLERANCE**

- A. From Line of Plane: Maximum 3 mm (1/8 inch) in total distance of flooring and base.
- B. From Radius of Cove: Maximum of 3 mm (1/8 inch) plus or 1.6 mm (1/16-inch) minus.

- - - E N D - - -

## **SECTION 09 68 00 CARPETING**

### **PART 1 - GENERAL**

#### **1.1 DESCRIPTION**

- A. Section specifies sheet and modular carpet, edge strips, adhesives, and other items required for complete installation.

#### **1.2 RELATED WORK**

- A. Resilient Wall Base: Section 09 65 13, RESILIENT BASE AND ACCESSORIES.

#### **1.3 PERFORMANCE REQUIREMENTS**

- A. Flammability and Critical Radiant Flux Requirements: Provide carpet with a minimum average critical radiant flux of 0.45 watts per square centimeter when tested in accordance with ASTM E648.
- B. Tuft Bind: Provide tuft bind force required to pull a tuft or loop free from carpet backing with a minimum 40 N (10 pound) average force for loop pile.
- C. Colorfastness to Crocking: Comply dry and wet crocking with AATCC 165 and with a Class 4 minimum rating on the AATCC Color Transference Chart for all colors.
- D. Colorfastness to Light: Comply colorfastness to light with AATCC 16, Test Option E "Water-Cooled Xenon-Arc Lamp, Continuous Light" and with a minimum 4 grey scale rating after 40 hours.
- E. Colorfastness to Water: Comply colorfastness to water with AATCC 107 and with a minimum 4.0 gray scale rating and a minimum 4.0 transfer scale rating.
- F. Delamination Strength: Provide delamination strength for tufted carpet with a secondary back of minimum 440 N/m (2.5 lbs/inch).

#### **1.4 QUALITY ASSURANCE**

- A. Installer Qualifications: An experienced Installer who is certified by the International Certified Floorcovering Installers Association at the Commercial II certification level.

#### **1.5 SUSTAINABILITY REQUIREMENTS**

- A. Materials in this section may contribute towards contract compliance with sustainability requirements. See Section 01 81 11, SUSTAINABLE DESIGN REQUIREMENTS, for project local/regional materials, low-emitting materials, recycled content requirements.

#### **1.6 REGULATORY REQUIREMENTS FOR RECYCLED CONTENT**

- A. Products and Materials with Post-Consumer Content and Recovered Materials Content:

1. Contractor is obligated by contract to satisfy Federal mandates for procurement of products and materials meeting recommendations for post-consumer content and recovered materials content; the list of designated product categories with recommendations has been compiled by the EPA - refer to <http://www.epa.gov/wastes/conservation/tools/cpg/products/>.
  2. Materials or products specified by this section may be obligated to satisfy this Federal mandate and Comprehensive Procurement Guidelines program.
  3. The EPA website also provides tools such as a Product Supplier Directory search engine and product resource guides.
- B. Fulfillment of regulatory requirements does not relieve the Contractor of satisfying sustainability requirements stipulated by Section 01 81 11, SUSTAINABLE DESIGN REQUIREMENTS, as it relates to recycled content; additional product and material selections with recycled content may be required, as determined by Contractor's Sustainability Action Plan.

## **1.7 SUBMITTALS**

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Product Data:
1. Manufacturer's catalog data and printed documentation stating physical characteristics, durability, resistance to fading and flame resistance characteristics for each type of carpet material and installation accessory.
  2. Manufacturer's printed installation instructions for the carpet, including preparation of installation substrate, seaming techniques and recommended adhesives and tapes.
  3. Manufacturer's certificate verifying carpet containing recycled materials include percentage of recycled materials as specified.
- C. Samples:
1. Carpet: "Production Quality" samples 300 x 300 mm (12 x 12 inches) of carpets, showing quality, pattern and color specified in Section 09 06 00, SCHEDULE FOR FINISHES.
  2. Floor Edge Strip (Molding): 150 mm (6 inches) long of each color and type specified.
  3. Base Edge Strip (Molding): 150 mm (6 inches) long of each color specified.
- D. Shop Drawings: Installers layout plan showing seams and cuts for sheet carpet and carpet module.

- E. Maintenance Data: Carpet manufacturer's maintenance instructions describing recommended type of cleaning equipment and material, spotting and cleaning methods and cleaning cycles.

## **1.8 DELIVERY AND STORAGE**

- A. Deliver carpet in manufacturer's original wrappings and packages clearly labeled with manufacturer's name, brand, name, size, dye lot number and related information.
- B. Deliver adhesives in containers clearly labeled with manufacturer's name, brand name, number, installation instructions, safety instructions and flash points.
- C. Store in a clean, dry, well-ventilated area, protected from damage and soiling. Maintain storage space at a temperature above 16 degrees C (60 degrees F) for 2 days prior to installation.

## **1.9 ENVIRONMENTAL REQUIREMENTS**

- A. Maintain areas in which carpeting is to be installed at a temperature above 16 degrees C (60 degrees F) for 2 days before installation, during installation and for 2 days after installation. Maintain a minimum temperature of 13 degrees C (55 degrees F) thereafter for the duration of the contract. Do not permit traffic or movement of furniture or equipment in carpeted area for 24 hours after installation; complete other work which would damage the carpet prior to installation of carpet.

## **1.10 WARRANTY**

- A. Carpet and installation subject to terms of "Warranty of Construction" FAR clause 52.246-21, except that warranty period is extended to two years.

## **1.11 APPLICABLE PUBLICATIONS**

- A. Publications listed below form a part of this specification to extent referenced.  
Publications are referenced in text by the basic designation only. Comply with applicable provisions and recommendations of the following, except as otherwise shown or specified.
- B. American National Standards Institute (ANSI)/NSF International (NSF):  
NSF/ANSI/140-07                      Sustainable Carpet Assessment Standard
- C. American Association of Textile Chemists and Colorists (AATCC):  
16.1-12                                  Colorfastness to Light  
107-13                                  Colorfastness to Water  
134-11                                  Electric Static Propensity of Carpets  
165-08                                  Colorfastness to Crocking: Textile Floor Conerings-AATCC  
Crockmeter Method

D. American Society for Testing and Materials (ASTM):

D3278-96(2011)	Flash Point of Liquids by Small Scale Closed-Cup Apparatus
D5116-10	Determinations of Organic Emissions from Indoor Materials/Products
E648-10e1	Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source
F1869-11	Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride
F2170-11	Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes

E. The Carpet and Rug Institute (CRI):

Carpet Installation Standard (2011)

**PART 2 - PRODUCTS**

**2.1 CARPET**

A. General:

1. Provide product as indicated and selected by Architect.
2. VOC Limits: Use carpet and carpet adhesive that comply with the following limits for VOC content when tested according to ASTM D 5116:
  - a. Carpet, Total VOCs: 0.5 mg/sq.m x hr.
  - b. Carpet, 4-PC (4-Phenylcyclohexene): 0.05 mg/sq.m x hr.
  - c. Carpet, Formaldehyde: 0.05 mg/sq.m x hr.
  - d. Carpet, Styrene: 0.4 mg/sq.m x hr.
  - e. Adhesive, Total VOCs: 10.00 mg/sq.m x hr.
  - f. Adhesive, Formaldehyde: 0.05 mg/sq.m x hr.
  - g. Adhesive, 2-Ethyl-1-Hexanol: 3.00 mg/sq.m x hr.

B. Certification: Platinum level of NSF/ANSI 140 and CRI's "Green Label Plus" program.

C. Color, Texture, and Pattern: As specified in Section 09 06 00, SCHEDULE FOR FINISHES.

**2.2 ADHESIVE AND CONCRETE PRIMER**

- A. Water-resistant, mildew resistant, non-staining to suit products and subfloor conditions indicated to comply with flammability requirements for installed carpet as recommended by the carpet manufacturer.
- B. Comply with ASTM D3278.

## **2.3 SEAMING TAPE**

- A. Hot-melt adhesive tape or similar product recommended by carpet manufacturer for taping seams and butting cut edges at backing to form secure seams and to prevent pile loss at seams.
- B. VOC content of any seam sealant must be less than 50 grams/liter; do not use sealants that contain 1,1,1-trichloroethane or toluene.

## **2.4 LEVELING COMPOUND (FOR CONCRETE FLOORS)**

- A. Provide Portland cement bases polymer modifier with latex or polyvinyl acetate resin manufactured specifically for resurfacing and leveling concrete floors. Products containing gypsum are not acceptable.
- B. Determine the type of underlayment selected for use by condition to be corrected.

## **PART 3 - EXECUTION**

### **3.1 SURFACE PREPARATION**

- A. Comply with manufacturer's recommendations to prepare substrates indicated to receive carpet.
- B. Remove subfloor coatings, including curing compounds and other substances that are incompatible with adhesives.
- C. Broom and vacuum clean subfloors to be covered with carpet. After cleaning, examine subfloor for moisture, alkaline salts, carbonation, or dust.
- D. Moisture Testing: Perform moisture and pH test as recommended by the flooring and adhesive manufacturers. Perform test locations starting on the deepest part of the concrete structure. Proceed with installation only after concrete substrates meet or exceed the manufacturer's requirements. In the absence of specific guidance from the flooring or adhesive manufacturer the following requirements are to be met:
  - 1. Perform moisture vapor emission tests in accordance with ASTM F1869. Proceed with installation only after substrates have a maximum moisture-vapor-emission rate of 1.36 kg of water/92.9 sq. m (3lb of water/1000 sq. ft.) in 24 hours.
  - 2. Perform concrete internal relative humidity testing using situ probes in accordance with ASTM F2170. Proceed with installation only after concrete reaches maximum 75 percent relative humidity level measurement.
- E. Concrete Subfloor Preparation: Apply concrete slab primer according to manufacturer's directions where recommended by carpet manufacturer.

### **3.3 SHEET CARPET INSTALLATION**

- A. Comply with CRI Carpet Installation Standard.

- B. Comply with carpet manufacturer's recommendations for seam locations and direction of carpet. Maintain uniformity of carpet direction and lay of pile.
- C. Cut and fit to butt tightly to vertical surfaces, permanent fixtures and built-in furniture.

### **3.4 MODULAR TILE INSTALLATION**

- A. Install modular tiles with permanent vinyl-compatible adhesive and snugly jointed together. Lay tiles in an alternating pattern with accessibility to the subfloor where required.

### **3.5 ENTRANCE CARPET INSTALLATION**

- A. Install tiles with permanent vinyl-compatible adhesive and tightly butt together.
- B. /Lay tiles in an alternating pattern.
- C. Install roll goods smooth, uniform, and secure, with a minimum of seams. Prepare regular, unnoticeable, and treated seams with a seam adhesive. Install breadths parallel, with carpet pile in the same direction. Match patterns accurately. Neatly cut and fit, securely, cutouts at door jambs, columns, and ducts. Locate seams at doorways parallel to and centered directly under doors. Do not make seams perpendicular to doors or at pivot points.
- D. Cut mats to specified size and finish them with a tapered vinyl edge that is glued and sewn on.

### **3.6 EDGE STRIPS INSTALLATION**

- A. Install edge strips over exposed carpet edges adjacent to uncarpeted finish flooring.
- B. Anchor metal strips to floor per manufacturer's recommendations.

### **3.7 PROTECTION AND CLEANING**

- A. Remove waste, fasteners and other cuttings from carpet floors.
- B. Vacuum carpet and provide suitable protection. Do not use polyethylene film.
- C. Do not permit traffic on carpeted surfaces for at least 48 hours after installation. Protect the carpet in accordance with CRI 104.
- D. Do not move furniture or equipment on unprotected carpeted surfaces.
- E. Just before final acceptance of work, remove protection and vacuum carpet clean.

- - - E N D - - -



## **SECTION 09 91 00 PAINTING**

### **PART 1-GENERAL**

#### **1.1 DESCRIPTION**

- A. Section specifies field painting.
- B. Section specifies prime coats which may be applied in shop under other sections.
- C. Painting includes shellacs, stains, varnishes, and coatings specified.

#### **1.2 RELATED WORK**

- A. Shop prime painting of steel and ferrous metals: Division 05 - METALS, Division 08 - OPENINGS, Division 10 - SPECIALTIES, Division 11 - EQUIPMENT, Division 12 - FURNISHINGS, Division 22 - PLUMBING, Division 23 – HEATING, VENTILATION AND AIR-CONDITIONING, Division 26 - ELECTRICAL, Division 27 - COMMUNICATIONS, and Division 28 – ELECTRONIC SAFETY AND SECURITY sections.
- B. Contractor Option: Prefinished flush doors with transparent finishes: Section 08 14 00, WOOD DOORS.

#### **1.3 SUSTAINABILITY REQUIREMENTS**

- A. Materials in this section may contribute towards contract compliance with sustainability requirements. See Section 01 74 19, CONSTRUCTION WASTE MANAGEMENT, for project local/regional materials, low-emitting materials, recycled content, requirements.
- B. Biobased Material: For products designated by the USDA's BioPreferred® program, provide products that meet or exceed USDA recommendations for biobased content, subject to the products compliance with performance requirements in this Section. For more information regarding the product categories covered by the BioPreferred® program, visit <http://www.biopreferred.gov>.

#### **1.4 REGULATORY REQUIREMENTS FOR RECYCLED CONTENT**

- A. Products and Materials with Post-Consumer Content and Recovered Materials Content:
  - 1. Contractor is obligated by contract to satisfy Federal mandates for procurement of products and materials meeting recommendations for post-consumer content and recovered materials content; the list of designated product categories with recommendations has been compiled by the EPA - refer to <http://www.epa.gov/wastes/conserve/tools/cpg/products/>.
  - 2. Materials or products specified by this section may be obligated to satisfy this Federal mandate and Comprehensive Procurement Guidelines program.

3. The EPA website also provides tools such as a Product Supplier Directory search engine and product resource guides.
- B. Fulfillment of regulatory requirements does not relieve the Contractor of satisfying sustainability requirements stipulated by Section 01 81 11, SUSTAINABLE DESIGN REQUIREMENTS, as it relates to recycled content; additional product and material selections with recycled content may be required, as determined by Contractor's Sustainability Action Plan.

## **1.5 SUBMITTALS**

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Manufacturer's Literature and Data:
  1. Before work is started, or sample panels are prepared, submit manufacturer's literature, the current Master Painters Institute (MPI) "Approved Product List" indicating brand label, product name and product code as of the date of contract award, will be used to determine compliance with the submittal requirements of this specification. The Contractor may choose to use subsequent MPI "Approved Product List", however, only one list may be used for the entire contract and each coating system is to be from a single manufacturer. All coats on a particular substrate must be from a single manufacturer. No variation from the MPI "Approved Product List" where applicable is acceptable.
- C. Samples:
  1. After painters' materials have been approved and before work is started submit samples showing each type of finish and color specified.
  2. Samples to show color: Composition board, 150 by 150 (6 inch by 6 inch).
  3. Panel to show transparent finishes: Wood of same species and grain pattern as wood approved for use, 100 by 250 by 3 mm (4 inch by 10 inch face by 1/4 inch) thick minimum, and where both flat and edge grain will be exposed, 250 mm (10 inches) long by sufficient size, 50 by 50 mm (2 by 2 inch) minimum or actual wood member to show complete finish.
- D. Manufacturers' Certificates indicating compliance with specified requirements:
  1. Manufacturer's paint substituted for Federal Specification paints meets or exceeds performance of paint specified.
  2. High temperature aluminum paint.
  3. Epoxy coating.

4. Intumescent clear coating or fire retardant paint.
5. Plastic floor coating.

## 1.6 DELIVERY AND STORAGE

- A. Deliver materials to site in manufacturer's sealed container marked to show following:
  1. Name of manufacturer.
  2. Product type.
  3. Batch number.
  4. Instructions for use.
  5. Safety precautions.
- B. In addition to manufacturer's label, provide a label legibly printed as following:
  1. Federal Specification Number, where applicable, and name of material.
  2. Surface upon which material is to be applied.
  3. If paint or other coating, state coat types; prime, body or finish.
- C. Maintain space for storage, and handling of painting materials and equipment in a neat and orderly condition to prevent spontaneous combustion from occurring or igniting adjacent items.
- D. Store materials at site at least 24 hours before using, at a temperature between 18 and 30 degrees C (65 and 85 degrees F).

## 1.7 APPLICABLE PUBLICATIONS

- A. Publications listed below form a part of this specification to extent referenced.  
Publications are referenced in text by the basic designation only. Comply with applicable provisions and recommendations of the following, except as otherwise shown or specified.
- B. American Conference of Governmental Industrial Hygienists (ACGIH):

ACGIH TLV-BKLT-2009	Threshold Limit Values (TLV) for Chemical Substances and Physical Agents and Biological Exposure Indices (BEIs)
ACGIH TLV-DOC-2009	Documentation of Threshold Limit Values and Biological Exposure Indices, (Seventh Edition)
- C. Master Painters Institute (MPI):

No. 4-13	Interior/ Exterior Latex Block Filler
No. 5-13	Exterior Alkyd Wood Primer
No. 7-13	Exterior Oil Wood Primer
No. 8-13	Exterior Alkyd, Flat MPI Gloss Level 1 (EO)

No. 9-13	Exterior Alkyd Enamel MPI Gloss Level 6 (EO)
No. 10-13	Exterior Latex, Flat (AE)
No. 11-13	Exterior Latex, Semi-Gloss (AE)
No. 31-13	Polyurethane, Moisture Cured, Clear Gloss (PV)
No. 36-13	Knot Sealer
No. 43-13	Interior Satin Latex, MPI Gloss Level 4
No. 44-13	Interior Low Sheen Latex, MPI Gloss Level 2
No. 45-13	Interior Primer Sealer
No. 46-13	Interior Enamel Undercoat
No. 47-13	Interior Alkyd, Semi-Gloss, MPI Gloss Level 5 (AK)
No. 48-13	Interior Alkyd, Gloss, MPI Gloss Level 6 (AK)
No. 50-13	Interior Latex Primer Sealer
No. 51-13	Interior Alkyd, Eggshell, MPI Gloss Level 3
No. 52-13	Interior Latex, MPI Gloss Level 3 (LE)
No. 53-13	Interior Latex, Flat, MPI Gloss Level 1 (LE)
No. 54-13	Interior Latex, Semi-Gloss, MPI Gloss Level 5 (LE)
No. 60-13	Interior/Exterior Latex Porch & Floor Paint, Low Gloss
No. 68-13	Interior/ Exterior Latex Porch & Floor Paint, Gloss
No. 71-13	Polyurethane, Moisture Cured, Clear, Flat (PV)
No. 90-13	Interior Wood Stain, Semi-Transparent (WS)
No. 94-13	Exterior Alkyd, Semi-Gloss (EO)
No. 95-13	Fast Drying Metal Primer
No. 114-13	Interior Latex, Gloss (LE) and (LG)
No. 119-13	Exterior Latex, High Gloss (acrylic) (AE)
No. 134-13	Primer, Galvanized, Water Based
No. 138-13	Interior High Performance Latex, MPI Gloss Level 2 (LF)
No. 139-13	Interior High Performance Latex, MPI Gloss Level 3 (LL)
No. 140-13	Interior High Performance Latex, MPI Gloss Level 4
No. 141-13	Interior High Performance Latex (SG) MPI Gloss Level 5
D. Steel Structures Painting Council (SSPC):	
SSPC SP 1-04	Solvent Cleaning
SSPC SP 2-04	Hand Tool Cleaning
SSPC SP 3-04	Power Tool Cleaning

## **PART 2 - PRODUCTS**

### **2.1 MATERIALS**

- A. Wood Sealer: Thinned with thinner recommended by manufacturer at rate of about one part of thinner to four parts of varnish.
- B. Plastic Tape:
  - 1. Pigmented vinyl plastic film in colors as specified in Section 09 06 00, SCHEDULE FOR FINISHES or specified.
  - 2. Pressure sensitive adhesive back.
  - 3. Widths as shown.
- C. Interior/Exterior Latex Block Filler: MPI 4.
- D. Exterior Alkyd Wood Primer: MPI 5.
- E. Exterior Oil Wood Primer: MPI 7.
- F. Exterior Alkyd, Flat (EO): MPI 8.
- G. Exterior Alkyd Enamel (EO): MPI 9.
- H. Exterior Latex, Flat (AE): MPI 10.
- I. Exterior Latex, Semi-Gloss (AE): MPI 11.
- J. Polyurethane, Clear Gloss: MPI 31.
- K. Knot Sealer: MPI 36.
- L. Interior Satin Latex: MPI 43.
- M. Interior Low Sheen Latex: MPI 44.
- N. Interior Primer Sealer: MPI 45.
- O. Interior Enamel Undercoat: MPI 46.
- P. Interior Alkyd, Semi-Gloss (AK): MPI 47.
- Q. Interior Latex Primer Sealer: MPI 50.
- R. Interior Alkyd, Eggshell: MPI 51
- S. Interior Latex, MPI Gloss Level 3 (LE): MPI 52.
- T. Interior Latex, Flat, MPI Gloss Level 1 (LE): MPI 53.
- U. Interior Latex, Semi-Gloss, MPI Gloss Level 5 (LE): MPI 54.
- V. Interior/ Exterior Latex Porch & Floor Paint, Low Gloss: MPI 60.
- W. Interior/ Exterior Latex Porch & Floor Paint, gloss: MPI 68.
- X. Polyurethane, Moisture Cured, Clear, Flat (PV): MPI 71.
- Y. Interior Wood Stain, Semi-Transparent (WS): MPI 90.
- Z. Exterior Alkyd, Semi-Gloss (EO): MPI 94.
- AA. Fast Drying Metal Primer: MPI 95.

- BB. Interior latex, Gloss (LE) and (LG): MPI 114.
- CC. Exterior Latex, High Gloss (acrylic) (AE): MPI 119.
- DD. Waterborne Galvanized Primer: MPI 134.
- EE. Interior High Performance Latex, MPI Gloss Level 2(LF): MPI 138.
- FF. Interior High Performance Latex, MPI Gloss Level 3 (LL): MPI 139.
- GG. Interior High Performance Latex, MPI Gloss Level 4: MPI 140.
- HH. Interior High Performance Latex (SG), MPI Gloss Level 5: MPI 141.

## **2.2 PAINT PROPERTIES**

- A. Use ready-mixed (including colors), except two component epoxies, polyurethanes, polyesters, paints having metallic powders packaged separately and paints requiring specified additives.
- B. Where no requirements are given in the referenced specifications for primers, use primers with pigment and vehicle, compatible with substrate and finish coats specified.

## **2.3 REGULATORY REQUIREMENTS**

- A. Paint materials must conform to the restrictions of the local Environmental and Toxic Control jurisdiction or the requirements of this section, whichever is most stringent.
  - 1. Lead-Based Paint:
    - a. Lead based paint is not permitted to be used.
  - 2. Asbestos: Materials must not contain asbestos.
  - 3. Chromate, Cadmium, Mercury, and Silica: Materials must not contain zinc-chromate, strontium-chromate, Cadmium, mercury or mercury compounds or free crystalline silica.
  - 4. Human Carcinogens: Materials must not contain any of the ACGIH-BKLT and ACGHI-DOC confirmed or suspected human carcinogens.
  - 5. Use high performance acrylic paints in place of alkyd paints, where possible.
  - 6. VOC content for solvent-based paints must not exceed specified performance requirement; aromatic hydro carbons contained in solvent-based paints must not exceed one percent by weight.

## **PART 3 - EXECUTION**

### **3.1 JOB CONDITIONS**

- A. Safety: Observe required safety regulations and manufacturer's warning and instructions for storage, handling and application of painting materials.
  - 1. Take necessary precautions to protect personnel and property from hazards due to falls, injuries, toxic fumes, fire, explosion, or other harm.

2. Deposit soiled cleaning rags and waste materials in metal containers approved for that purpose. Dispose of such items off the site at end of each day's work.
- B. Atmospheric and Surface Conditions:
1. Do not apply coating when air or substrate conditions are:
    - a. Less than 3 degrees C (5 degrees F) above dew point.
    - b. Below 10 degrees C (50 degrees F) or over 35 degrees C (95 degrees F), unless specifically pre-approved by the Contracting Officer and the product manufacturer.
  2. Do not exceed application conditions recommended by the manufacturer.
  3. Maintain interior temperatures until paint dries hard.
  4. Do no exterior painting when it is windy and dusty.
  5. Do not paint in direct sunlight or on surfaces that the sun will soon warm.
  6. Apply only on clean, dry and frost free surfaces except as follows:
    - a. Apply water thinned acrylic and cementitious paints to damp (not wet) surfaces where allowed by manufacturer's printed instructions.
    - b. Dampened with a fine mist of water on hot dry days concrete and masonry surfaces to which water thinned acrylic and cementitious paints are applied to prevent excessive suction and to cool surface.
  7. Varnishing:
    - a. Apply in clean areas and in still air.
    - b. Before varnishing vacuum and dust area.
    - c. Immediately before varnishing wipe down surfaces with a tack rag.

### **3.2 SURFACE PREPARATION**

- A. Method of surface preparation is optional, provided results of finish painting produce solid even color and texture specified with no overlays.
- B. General:
1. Remove prefinished items not to be painted such as lighting fixtures, escutcheon plates, hardware, trim, and similar items for reinstallation after paint is dried.
  2. Remove items for reinstallation and complete painting of such items and adjacent areas when item or adjacent surface is not accessible or finish is different.
  3. See other sections of specifications for specified surface conditions and prime coat.
  4. Clean surfaces for painting with materials and methods compatible with substrate and specified finish. Remove any residue remaining from cleaning agents used. Do not use solvents, acid, or steam on concrete and masonry.

C. Wood:

1. Sand to a smooth even surface and then dust off.
2. Sand surfaces showing raised grain smooth between each coat.
3. Wipe surface with a tack rag prior to applying finish.
4. Surface painted with an opaque finish:
  - a. Coat knots, sap and pitch streaks with Knot Sealer before applying paint.
  - b. Apply two coats of Knot Sealer over large knots.
5. After application of prime or first coat of stain, fill cracks, nail and screw holes, depressions and similar defects with wood filler paste. Sand the surface to make smooth and finish flush with adjacent surface.
6. Before applying finish coat, reapply wood filler paste if required, and sand surface to remove surface blemishes. Finish flush with adjacent surfaces.
7. Fill open grained wood such as oak, walnut, ash and mahogany with Wood Filler Paste, colored to match wood color.
  - a. Thin filler in accordance with manufacturer's instructions for application.
  - b. Remove excess filler, wipe as clean as possible, dry, and sand as specified.

D. Ferrous Metals:

1. Remove oil, grease, soil, drawing and cutting compounds, flux and other detrimental foreign matter in accordance with SSPC-SP 1 (Solvent Cleaning).
2. Remove loose mill scale, rust, and paint, by hand or power tool cleaning, as defined in SSPC-SP 2 (Hand Tool Cleaning) and SSPC-SP 3 (Power Tool Cleaning).  
Exception: where high temperature aluminum paint is used, prepare surface in accordance with paint manufacturer's instructions.
3. Fill dents, holes and similar voids and depressions in flat exposed surfaces of hollow steel doors and frames, access panels, roll-up steel doors and similar items specified to have semi-gloss or gloss finish with TT-F-322D (Filler, Two-Component Type, For Dents, Small Holes and Blow-Holes). Finish flush with adjacent surfaces.
  - a. This includes flat head countersunk screws used for permanent anchors.
  - b. Do not fill screws of item intended for removal such as glazing beads.
4. Spot prime abraded and damaged areas in shop prime coat which expose bare metal with same type of paint used for prime coat. Feather edge of spot prime to produce smooth finish coat.
5. Spot prime abraded and damaged areas which expose bare metal of factory finished items with paint as recommended by manufacturer of item.



E. Zinc-Coated (Galvanized) Metal, Aluminum, Copper and Copper Alloys Surfaces

Specified Painted:

1. Clean surfaces to remove grease, oil and other deterrents to paint adhesion in accordance with SSPC-SP 1 (Solvent Cleaning).
2. Spot coat abraded and damaged areas of zinc-coating which expose base metal on hot-dip zinc-coated items with Organic Zinc Rich Coating. Prime or spot prime with MPI 134 (Waterborne Galvanized Primer) depending on finish coat compatibility.

F. Masonry, Concrete, Cement Board, Cement Plaster and Stucco:

1. Clean and remove dust, dirt, oil, grease efflorescence, form release agents, laitance, and other deterrents to paint adhesion.
2. Use emulsion type cleaning agents to remove oil, grease, paint and similar products. Use of solvents, acid, or steam is not permitted.
3. Remove loose mortar in masonry work.
4. Replace mortar and fill open joints, holes, cracks and depressions with new mortar specified in Section 04 05 13, MASONRY MORTARING Section 04 05 16, MASONRY GROUTING. Do not fill weep holes. Finish to match adjacent surfaces.
5. Neutralize Concrete floors to be painted by washing with a solution of 1.4 Kg (3 pounds) of zinc sulfate crystals to 3.8 L (1 gallon) of water, allow to dry three days and brush thoroughly free of crystals.
6. Repair broken and spalled concrete edges with concrete patching compound to match adjacent surfaces as specified in CONCRETE Sections. Remove projections to level of adjacent surface by grinding or similar methods.

G. Gypsum Plaster and Gypsum Board:

1. Remove efflorescence, loose and chalking plaster or finishing materials.
2. Remove dust, dirt, and other deterrents to paint adhesion.
3. Fill holes, cracks, and other depressions with CID-A-A-1272A [Plaster, Gypsum (Spackling Compound) finished flush with adjacent surface, with texture to match texture of adjacent surface. Patch holes over 25 mm (1-inch) in diameter as specified in Section for plaster or gypsum board.

### 3.3 PAINT PREPARATION

- A. Thoroughly mix painting materials to ensure uniformity of color, complete dispersion of pigment and uniform composition.

- B. Do not thin unless necessary for application and when finish paint is used for body and prime coats. Use materials and quantities for thinning as specified in manufacturer's printed instructions.
- C. Remove paint skins, then strain paint through commercial paint strainer to remove lumps and other particles.
- D. Mix two component and two part paint and those requiring additives in such a manner as to uniformly blend as specified in manufacturer's printed instructions unless specified otherwise.
- E. For tinting required to produce exact shades specified, use color pigment recommended by the paint manufacturer.

### **3.4 APPLICATION**

- A. Start of surface preparation or painting will be construed as acceptance of the surface as satisfactory for the application of materials.
- B. Unless otherwise specified, apply paint in three coats; prime, body, and finish. When two coats applied to prime coat are the same, first coat applied over primer is body coat and second coat is finish coat.
- C. Apply each coat evenly and cover substrate completely.
- D. Allow not less than 48 hours between application of succeeding coats, except as allowed by manufacturer's printed instructions, and approved by COTR.
- E. Finish surfaces to show solid even color, free from runs, lumps, brush marks, laps, holidays, or other defects.
- F. Apply by brush, roller or spray, except as otherwise specified.
- G. Do not spray paint in existing occupied spaces unless approved by COTR, except in spaces sealed from existing occupied spaces.
  - 1. Apply painting materials specifically required by manufacturer to be applied by spraying.
  - 2. In areas, where paint is applied by spray, mask or enclose with polyethylene, or similar air tight material with edges and seams continuously sealed including items specified in WORK NOT PAINTED, motors, controls, telephone, and electrical equipment, fronts of sterilizes and other recessed equipment and similar prefinished items.
- H. Do not paint in closed position operable items such as access doors and panels, window sashes, overhead doors, and similar items except overhead roll-up doors and shutters.

### 3.5 PRIME PAINTING

- A. After surface preparation, prime surfaces before application of body and finish coats, except as otherwise specified.
- B. Spot prime and apply body coat to damaged and abraded painted surfaces before applying succeeding coats.
- C. Additional field applied prime coats over shop or factory applied prime coats are not required except for exterior exposed steel. Apply an additional prime coat.
- D. Prime rebates for stop and face glazing of wood, and for face glazing of steel.
- E. Wood and Wood Particleboard:
  - 1. Use same kind of primer specified for exposed face surface.
    - a. Exterior wood: MPI 7 (Exterior Oil Wood Primer) for new construction and MPI 5 (Exterior Alkyd Wood Primer) for repainting bare wood primer except where Interior Wood Stain, Semi-Transparent (WS) is scheduled.
    - b. Interior wood except for transparent finish: MPI 45 (Interior Primer Sealer) or MPI 46 (Interior Enamel Undercoat), thinned if recommended by manufacturer.
    - c. Transparent finishes as specified under Transparent Finishes on Wood.
  - 2. Apply one coat of primer MPI 7 (Exterior Oil Wood Primer) or MPI 5 (Exterior Alkyd Wood Primer) or sealer MPI 45 (Interior Primer Sealer) or MPI 46 (Interior Enamel Undercoat) as soon as delivered to site to surfaces of unfinished woodwork, except concealed surfaces of shop fabricated or assembled millwork and surfaces specified to have varnish, stain or natural finish.
  - 3. Back prime and seal ends of exterior woodwork, and edges of exterior plywood specified to be finished.
- F. Metals:
  - 1. Steel and Iron: MPI 95 (Fast Drying Metal Primer).
  - 2. Zinc-coated Steel and Iron: MPI 134 (Waterborne Galvanized Primer).
  - 3. Machinery Not Factory Finished: MPI 9 (Exterior Alkyd Enamel (EO)).
- G. Gypsum Board and Hardboard:
  - 1. Surfaces scheduled to have MPI 11 (Exterior Latex, Semi-Gloss (AE)) or MPI 54 (Interior Latex, Semi-Gloss, MPI Gloss Level 5 (LE)): Use MPI 11 (Exterior Latex, Semi-Gloss (AE)) or MPI 53 (Interior Latex, MPI Gloss Level 3 (LE)) respectively.
  - 2. Primer: MPI 50 (Interior Latex Primer Sealer) except use MPI 45 (Interior Primer Sealer) or MPI 46 (Interior Enamel Undercoat) in shower and bathrooms.
- H. Concrete Masonry Units except glazed or integrally colored and decorative units:

1. MPI 4 (Block Filler) on interior surfaces.
- I. Concrete Masonry, Brick Masonry Interior Surfaces of Ceilings and Walls:
  1. MPI 52 (Interior Latex, MPI Gloss Level 3 (LE)) except use two coats where substrate has aged less than six months.

### **3.6 EXTERIOR FINISHES**

- A. Apply following finish coats where specified in Section 09 06 00, SCHEDULE FOR FINISHES.
- B. Steel and Ferrous Metal:
  1. Two coats of MPI 9 (Exterior Alkyd Enamel (EO)) on exposed surfaces, except on surfaces over 94 degrees C (200 degrees F).

### **3.7 INTERIOR FINISHES**

- A. Apply following finish coats over prime coats in spaces or on surfaces specified in Section 09 06 00, SCHEDULE FOR FINISHES.
- B. Metal Work:
  1. Apply to exposed surfaces.
  2. Omit body and finish coats on surfaces concealed after installation except electrical conduit containing conductors over 600 volts.
  3. Ferrous Metal, Galvanized Metal, and Other Metals Scheduled:
    - a. Apply two coats of MPI 47 (Interior Alkyd, Semi-Gloss (AK)) unless specified otherwise.
    - b. Two coats of MPI 51 (Interior Alkyd, Eggshell (AK)).
- C. Gypsum Board:
  1. One coat of MPI 45 (Interior Primer Sealer) plus one coat of MPI 139 (Interior High Performance Latex, MPI Gloss level 3 (LL)).
  2. Two coats of MPI 138 (Interior High Performance Latex, MPI Gloss Level 2 (LF)).
  3. One coat of MPI 45 (Interior Primer Sealer) plus one coat of MPI 54 (Interior Latex, Semi-Gloss, MPI Gloss Level 5 (LE)) or MPI 114 (Interior Latex, Gloss (LE) and (LG)).
  4. One coat of MPI 45 (Interior Primer Sealer) plus one coat of MPI 48 (Interior Alkyd Gloss (AK)).
- D. Masonry and Concrete Walls:
  1. Over MPI 4 (Interior/Exterior Latex Block Filler) on CMU surfaces.
  2. Two coats of MPI 52 (Interior Latex, MPI Gloss Level 3 (LE)).
- E. Wood:

1. Sanding:
  - a. Use 220-grit sandpaper.
  - b. Sand sealers and varnish between coats.
  - c. Sand enough to scarify surface to assure good adhesion of subsequent coats, to level roughly applied sealer and varnish, and to knock off "whiskers" of any raised grain as well as dust particles.
2. Sealers:
  - a. Apply sealers specified except sealer may be omitted where pigmented, penetrating, or wiping stains containing resins are used.
  - b. Allow manufacturer's recommended drying time before sanding, but not less than 24 hours or 36 hours in damp or muggy weather.
  - c. Sand as specified.
3. Paint Finish:
  - a. One coat of MPI 45 (Interior Primer Sealer) plus one coat of MPI 47 (Interior Alkyd, Semi-Gloss (AK)) (SG).
  - b. One coat of MPI 45 Interior Primer Sealer.
  - c. Two coats of MPI 51 (Interior Alkyd, Eggshell) (AK)).
4. Transparent Finishes on Wood Except Floors.
  - a. Natural Finish:
    - 1) One coat of sealer as written in 2.1 E.
    - 2) Two coats of MPI 71 Polyurethane, Moisture Cured, Clear Flat (PV).
  - b. Stain Finish:
    - 1) One coat of MPI 90 Interior Wood Stain, Semi-Transparent (WS).
    - 2) Use wood stain of type and color required to achieve finish specified. Do not use varnish type stains.
    - 3) One coat of sealer as written in 2.1 E.
    - 4) Two coats of MPI 31 Polyurethane Moisture Cured, Clear Gloss (PV).
  - c. Varnish Finish:
    - 1) One coat of sealer as written in 2.1 E.
    - 2) Two coats of MPI 31 Polyurethane Moisture Cured, Clear Gloss (PV).

### **3.8 REFINISHING EXISTING PAINTED SURFACES**

- A. Clean, patch and repair existing surfaces as specified under surface preparation.
- B. Remove and reinstall items as specified under surface preparation.

- C. Remove existing finishes or apply separation coats to prevent non-compatible coatings from having contact.
- D. Patched or Replaced Areas in Surfaces and Components: Apply spot prime and body coats as specified for new work to repaired areas or replaced components.
- E. Except where scheduled for complete painting apply finish coat over plane surface to nearest break in plane, such as corner, reveal, or frame.
- F. Refinish areas as specified for new work to match adjoining work unless specified or scheduled otherwise.
- G. Coat knots and pitch streaks showing through old finish with Knot Sealer before refinishing.
- H. Sand or dull glossy surfaces prior to painting.
- I. Sand existing coatings to a feather edge so that transition between new and existing finish will not show in finished work.

### **3.9 PAINT COLOR**

- A. Color and gloss of finish coats is specified in Section 09 06 00, SCHEDULE FOR FINISHES.
- B. Coat Colors:
  - 1. Color of priming coat: Lighter than body coat.
  - 2. Color of body coat: Lighter than finish coat.
  - 3. Color prime and body coats to not show through the finish coat and to mask surface imperfections or contrasts.
- C. Painting, Caulking, Closures, and Fillers Adjacent to Casework:
  - 1. Paint to match color of casework where casework has a paint finish.
  - 2. Paint to match color of wall where casework is stainless steel, plastic laminate, or varnished wood.

### **3.10 PROTECTION CLEAN UP, AND TOUCH-UP**

- A. Protect work from paint droppings and spattering by use of masking, drop cloths, removal of items or by other approved methods.
- B. Upon completion, clean paint from hardware, glass and other surfaces and items not required to be painted of paint drops or smears.
- C. Before final inspection, touch-up or refinished in a manner to produce solid even color and finish texture, free from defects in work which was damaged or discolored.

- - - E N D - - -

## APPENDIX

Coordinate the following abbreviations used in Section 09 91 00, PAINTING, with other Sections, especially Section 09 06 00, SCHEDULE FOR FINISHES and other COATING SECTIONS listed. Use the same abbreviation and terms consistently.

Paint or coating	Abbreviation
Acrylic Emulsion	AE (MPI 10 – flat/MPI 11 – semigloss/MPI 119 - gloss)
Alkyd Gloss Enamel	G (MPI 48)
Alkyd Semigloss Enamel	SG (MPI 47)
Aluminum Paint	AP)
Cementitious Paint	CEP (TT-P-1411)
Exterior Latex	EL?? (MPI 10 / 11 / 119)
Exterior Oil	EO (MPI 9 – gloss/MPI 8 – flat/MPI 94 – semigloss)
Fire Retardant Paint	FR
Fire Retardant Coating (Clear)	FC (intumescent type)
Heat Resistant Paint	HR
Latex Emulsion	LE (MPI 53, flat/MPI 52, eggshell/MPI 54, semigloss/MPI 114, gloss Level 6
Latex Flat	LF (MPI 138)
Latex Gloss	LG (MPI 114)
Latex Semigloss	SG (MPI 141)
Latex Low Luster	LL (MPI 139)
Plastic Floor Coating	PL
Polyurethane Varnish	PV
Rubber Paint	RF (CID-A-A-3120 - Paint for Swimming Pools (RF))
Water Paint, Cement WPC	(CID-A-A-1555 - Water Paint, Powder).
Wood Stain	WS

--- E N D ---

THIS PAGE LEFT BLANK INTENTIONALLY