

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

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

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: 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 shall be in accordance with ASTM C11, C840, and as specified.

**1.4 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.

**1.5 DELIVERY, IDENTIFICATION, HANDLING AND STORAGE**

In accordance with the requirements of ASTM C840.

**1.6 ENVIRONMENTAL CONDITIONS**

In accordance with the requirements of ASTM C840.

**1.7 APPLICABLE PUBLICATIONS**

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only.
- B. American Society for Testing And Materials (ASTM):
  - C11-08c.....Terminology Relating to Gypsum and Related Building Materials and Systems
  - C475-02(R2007).....Joint Compound and Joint Tape for Finishing Gypsum Board

C840-08.....	Application and Finishing of Gypsum Board
C1002-07.....	Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs
C1047-05.....	Accessories for Gypsum Wallboard and Gypsum Veneer Base
C1177-08.....	Glass Mat Gypsum Substrate for Use as Sheathing
C1325-08.....	Fiber Mat Reinforced Cementitious Backer Unit
C1396-09.....	Gypsum Board

## **PART 2 - PRODUCTS**

### **2.1 GYPSUM BOARD**

- A. Gypsum Board: ASTM C1396, (Type X,) 16 mm (5/8 inch) thick unless shown otherwise. Shall contain a minimum of 20 percent recycled gypsum.
- B. Water Resistant Gypsum Backing Board: ASTM C1396, 16 mm (5/8 inch) thick.
- C. Cementitious Backing Board: ASTM C1325, use in showers.
- D. Mold Resistant Panels: ASTM C1177, typex, 16mm (5/8 inch) thick. The panels shall pass the requirements of ASTM G21 and ASTM D3273 for Mold and Mildew resistance.
- E. Gypsum cores shall contain a minimum of 95 percent post industrial recycled gypsum content. Paper facings shall contain 100 percent post-consumer recycled paper content.

### **2.2 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.

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

- A. ASTM C475 and ASTM C840.

## **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.

### **3.2 INSTALLING GYPSUM BOARD**

- A. Install gypsum board in accordance with ASTM C840, except as otherwise specified.
- B. Install control joints in accordance with ASTM C840
- C. 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. Install in accordance with ASTM C840.

### 3.4 FINISHING OF GYPSUM BOARD

- A. Finish joints, edges, corners, and fastener heads in accordance with ASTM C840. 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. 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 nondecorated 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.

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**SECTION 09 30 13**  
**CERAMIC TILING**

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

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. Color, texture and pattern of field tile and trim shapes, size of field tile, trim shapes, and color of grout specified: Section 09 06 00, SCHEDULE FOR FINISHES.
- C. 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 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. Chemical resistant mortar and grout (Epoxy and Furan).
  - 3. Cementitious backer unit.
  - 4. Dry-set Portland cement mortar and grout.
  - 5. Divider strip.
  - 6. Elastomeric membrane and bond coat.
  - 7. Reinforcing tape.
  - 8. Leveling compound.
  - 9. Latex-Portland cement mortar and grout.

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10. Commercial Portland cement grout.
11. Organic adhesive.
12. Slip resistant tile.
13. Waterproofing isolation membrane.
14. Fasteners.

D. Certification:

1. Master grade, ANSI A137.1.
2. Manufacturer's certificates indicating that the following materials comply with specification requirements:
  - a. Chemical resistant mortar and grout (epoxy and furan).
  - b. Modified epoxy emulsion.
  - c. Commercial Portland cement grout.
  - d. Cementitious backer unit.
  - e. Dry-set Portland cement mortar and grout.
  - f. Elastomeric membrane and bond coat.
  - g. Reinforcing tape.
  - h. Latex-Portland cement mortar and grout.
  - i. Leveling compound.

**1.4 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.

**1.5 APPLICABLE PUBLICATIONS**

- A. Publications listed below form a part of this specification to the extent referenced. Publications are referenced in text by basic designation only.
- B. American National Standards Institute (ANSI):
  - A108.1A-11.....Installation of Ceramic Tile in the Wet-Set Method with Portland Cement Mortar
  - A108.1B-11.....Installation of Ceramic Tile on a Cured Portland Cement Mortar Setting Bed with dry-Set or latex-Portland Cement Mortar
  - A108.1C-11.....Contractors Option; Installation of Ceramic Tile in the Wet-Set method with Portland Cement Mortar or Installation of Ceramic Tile on a Cured Portland Cement Mortar Setting Bed with Dry-Set or Latex-Portland Cement Mortar
  - A137.1-08.....Ceramic Tile

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

- A185-07.....Steel Welded Wire Fabric, Plain, for Concrete Reinforcing
- C109/C109M-11.....Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2 inch. or [50-mm] Cube Specimens)
- C241-09(R2005).....Abrasion Resistance of Stone Subjected to Foot Traffic
- C348-08.....Standard Test Method for Flexural Strength of Hydraulic-Cement Mortars
- 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
- C979-10.....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"
- C1028-07.....Determining the Static Coefficient of Friction of Ceramic Tile and Other Like Surfaces by the Horizontal Dynamometer Pull Meter Method
- C1127-09.....Standard Guide for Use of High Solids Content, Cold Liquid-Applied Elastomeric Waterproofing Membrane with an Integral Wearing Surface
- C1178/C1178M-11.....Standard Specification for Coated Glass Mat Water-Resistant Gypsum Backing Panel
- C1325-08.....Non-Asbestos Fiber-Mat Reinforced Cementitious Backer Units
- D4397-08.....Standard Specification for Polyethylene Sheeting for Construction, Industrial and Agricultural Applications
- D5109-99(R2004).....Standard Test Methods for Copper-Clad Thermosetting Laminates for Printed Wiring Boards

D. Marble Institute of America (MIA): Design Manual III-2007

E. Tile Council of America, Inc. (TCA):

- 2009.....Handbook for Ceramic Tile Installation

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**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:
    - a. Tested in accordance with values listed in Table 1, ASTM C 1027.
  - 3. Slip Resistant Tile for Floors:
    - a. Coefficient of friction, when tested in accordance with ASTM C1028, required for level of performance:
      - 1) 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.  
Porcelain tile produced by the dust pressed method shall be made of approximately 50% feldspar; the remaining 50% shall be made up of various high-quality light firing ball clays yielding a tile with a water absorption rate of 0.5% or less and a breaking strength of between 390 to 400 pounds.
- E. 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 and ceiling tile
- B. ASTM C1325.
- C. Joint materials for cementitious backer units

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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, shall 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**

Confirm to ASTM C1178/C1178M, Optional System for Cementitious Backer Units.

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

### **A. Conform to TCA Handbook for Ceramic Tile Installation.**

### **B. Portland Cement Mortar: ANSI A108.1.**

### **C. Latex-Portland Cement Mortar: ANSI A108.1.**

1. For wall applications, provide non-sagging, latex-Portland cement mortar complying with ANSI A108.1.
2. Prepackaged Dry-Mortar Mix: Factory-prepared mixture of Portland cement; dry, redispersible, 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 A108.1. For wall applications, provide non-sagging, latex-Portland cement mortar complying with ANSI A108.1.**

## **2.6 GROUTING MATERIALS**

### **A. Coloring Pigments:**

1. Pure mineral pigments, limeproof and nonfading, complying with ASTM C979.
2. Add coloring pigments to grout by the manufacturer.
3. Job colored grout is not acceptable.
4. Use is required in Commercial Portland Cement Grout, Dry-Set Grout, and Latex-Portland Cement Grout.

### **B. White Portland Cement Grout:**



1. ANSI A108.1.
2. Use one part white Portland cement to one part white sand passing a number 30 screen.
3. Color additive not permitted.

C. Commercial Portland Cement Grout: ANSI A108.1 color as specified.

D. Dry-Set Grout: ANSI A108.1 color as specified.

E. Latex-Portland Cement Grout: ANSI A108.1 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.

## **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 III Groups.
- 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. One piece full width of door opening. Notch thresholds to match profile of door jambs.

## **2.9 METAL DIVIDER STRIPS**

- A. Terrazzo type divider strips.
- B. 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.

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## **2.10 WATER**

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**

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

## **2.13 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 except finish smooth for elastomeric waterproofing.
  - 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 epoxy, or furan-resin shall 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.

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**F. Existing Floors and Walls:**

1. Remove all foreign material from slab intended for tiling. Prepare surface by grinding, chipping, self-contained power blast cleaning or other suitable mechanical methods to completely expose uncontaminated concrete or masonry surfaces. Follow safety requirements of ANSI A10.20.

**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 A108.1 except as specified otherwise.

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

- A. Install in accordance with manufacturer's instructions. TCA Systems W245-01.

**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 TCA Installation Guidelines:
- C. Installing Mortar Beds for Floors:
  1. Install mortar bed to not damage cleavage or waterproof membrane; 32 mm (1-1/2 inch) minimum thickness.
  2. Install floor mortar bed reinforcing centered in mortar fill.
  3. Screed finish to level plane or slope to drains where shown, float finish.
  4. For thin set systems cure mortar bed not less than seven days. Do not use curing compounds or coatings.

5. For tile set with Portland cement paste over plastic mortar bed coordinate to set tile before mortar bed sets.

D. Setting Beds or Bond Coats:

1. Where recessed or depressed floor slabs are filled with Portland cement mortar bed, set ceramic mosaic floor tile in either Portland cement paste over plastic mortar bed or latex-Portland cement mortar over cured mortar bed except as specified otherwise, ANSI A108-1C, TCA System F121-02 or F111-02.
2. Set floor tile in elastomeric bond coat over elastomeric membrane ANSI 108. 13, TCA System F122 where scheduled,
3. Set wall tile installed over concrete backer board in latex-Portland cement mortar, ANSI A108.1B.
4. Set trim shapes in same material specified for setting adjoining tile.

E. 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 CERAMIC TILE INSTALLED WITH PORTLAND CEMENT MORTAR**

- A. Mortar Mixes for Floor, Wall And Base Tile: ANSI A108.1.except specified otherwise.
- B. Installing Wall and Base Tile: ANSI A108.1, except specified otherwise.

- C. Installing Floor Tile: ANSI A108.1, except as specified otherwise. Slope mortar beds to floor drains a minimum of 1 in 100 (1/8 inch per foot).

**3.10 PORCELAIN TILE INSTALLED WITH LATEX PORTLAND CEMENT BONDING MORTAR**

Due to the denseness of porcelain tile use Portland cement bonding mortar that meets their requirements of ANSI A108.1. Bonding mortars shall be mixed in accordance with manufacturer's instructions. Improper liquid ratios and dwell time before placement of bonding mortar and tile shall affect bond.

**3.11 THIN SET CERAMIC TILE INSTALLED WITH DRY-SET PORTLAND CEMENT AND LATEX-PORTLAND CEMENT MORTAR**

- A. Installation of Tile: ANSI A108.1, except as specified otherwise.  
B. Slope tile work to drains not less than 1 in 100 (1/8 inch per foot).

**3.12 THIN SET CERAMIC TILE INSTALLED WITH CHEMICAL-RESISTANT BOND COAT**

- A. Epoxy Resin Type: Install tile in accordance with Installation of Tile with Epoxy Mortar; ANSI A108.1.  
B. Furan Resin Type: Proportion, mix and place in accordance with the manufacturer's printed instructions. Set tile in accordance with ANSI A108.1.

**3.13 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.

**3.14 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 171-02.

**3.15 CLEANING**

- A. Thoroughly sponge and wash tile. Polish glazed surfaces with clean dry cloths.  
B. Methods and materials used shall not damage or impair appearance of tile surfaces.  
C. The use of acid or acid cleaners on glazed tile surfaces is prohibited.  
D. Clean tile grouted with epoxy, furan and commercial Portland cement grout and tile set in elastomeric bond coat as recommended by the manufacturer of the grout and bond coat.

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**3.16 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.

**3.17 TESTING FINISH FLOOR**

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

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**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. Color, pattern, and location of each type of acoustical unit:  
Section 09 06 00, SCHEDULE FOR FINISHES.

**1.3 SUBMITTAL**

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

**1.4 DEFINITIONS**

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

**1.5 APPLICABLE PUBLICATIONS**

- A. Publications listed below form a part of this specification to extent referenced. Publications are referenced in the text by basic designation only.
- B. American Society for Testing and Materials (ASTM):
  - A641/A641M-09.....Zinc-coated (Galvanized) Carbon Steel Wire
  - A653/A653M-08.....Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-coated (Galvannealed) by the Hot-Dip Process
  - C423-08.....Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method
  - C634-09 (E2007).....Standard Terminology Relating to Environmental Acoustics
  - C635-07.....Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings



C636-08.....Installation of Metal Ceiling Suspension Systems  
for Acoustical Tile and Lay-in Panels  
E84-09.....Surface Burning Characteristics of Building  
Materials  
E119-08.....Fire Tests of Building Construction and  
Materials  
E413-04.....Classification for Rating Sound Insulation.  
E580-08.....Application of Ceiling Suspension Systems for  
Acoustical Tile and Lay-in Panels in Areas  
Requiring Seismic Restraint  
E1264-08.....Classification for Acoustical Ceiling Products

## **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. ASTM A641.
- B. For wire hangers: Minimum diameter 2.68 mm (0.1055 inch).
- C. For bracing wires: Minimum diameter 3.43 mm (0.1350 inch).

### **2.3 ACOUSTICAL UNITS**

- A. General:
  - 1. Provide panels complying with ASTM E1264.2. Class A Flame Spread: ASTM 84
  - 3. Minimum NRC (Noise Reduction Coefficient): 0.55 unless specified otherwise: ASTM C423.
  - 4. Minimum CAC (Ceiling Attenuation Class): 40-44 range unless specified otherwise: ASTM E413.
  - 5. 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.
  - 6. Lay-in panels: Sizes as shown, with square 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:

Color.....Service  
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.
- 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.

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

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

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

**1.2 RELATED WORK**

A. Color and texture: Section 09 06 00, SCHEDULE FOR FINISHES.

**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.
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**

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. The publication listed below form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only.

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

F1861-08.....Resilient Wall Base

## **PART 2 - PRODUCTS**

### **2.1 GENERAL**

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 Rubber, Thermoplastics, Group 2-layered with molded top. Style B-cove.
- B. Where carpet occurs, use Style A-straight.
- C. Use only one type of base throughout.

### **2.3 ADHESIVES**

- A. Use products recommended by the material manufacturer for the conditions of use.
- B. Use low-VOC adhesive during installation. Water based adhesive with low VOC is preferred over solvent based adhesive.

## **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 Resident Engineer.
- B. Submit proposed installation deviation from this specification to the Resident Engineer indicating the differences in the method of installation.
- C. The Resident Engineer reserves the right to have test portions of material installation removed to check for non-uniform adhesion and spotty adhesive coverage.
  - 2. Do not use solvents to remove adhesives.
  - 3. 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.

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

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

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 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 each product.
  - 2. Resilient material manufacturers recommendations for adhesives, underlayment, primers and polish.
  - 3. Application and installation instructions.
- C. 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.
- D. 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.
- E. 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.

**1.4 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. Store materials in weathertight and dry storage facility.

B. Protect from damage from handling, water, and temperature.

#### 1.6 APPLICABLE PUBLICATIONS

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only.
- B. American Society for Testing and Materials (ASTM):
- D4078-02 (R 2008).....Water Emulsion Floor Finish
  - E648-08.....Critical Radiant Flux of Floor Covering Systems  
Using a Radiant Energy Source
  - E662-09.....Specific Optical Density of Smoke Generated by  
Solid Materials
  - E1155-96 (R2008).....Determining Floor Flatness and Floor Levelness  
Numbers
  - F510-93 (R 2008).....Resistance to Abrasion of Resilient Floor  
Coverings Using an Abrader with a Grit Feed  
Method
  - F710-08.....Preparing Concrete Floors to Receive Resilient  
Flooring
  - F1066-04.....Vinyl Composition Floor Tile
  - F1344-04.....Rubber Floor Tile
  - F1700-04.....Solid Vinyl Floor Tile
- C. Resilient Floor Covering Institute (RFCI):
- IP #2.....Installation Practice for Vinyl Composition Tile  
(VCT)
- D. Federal Specifications (Fed. Spec.):
- SS-T-312.....Tile Floor: Asphalt, Rubber, Vinyl and Vinyl  
Composition

### 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 E 648.
- D. Smoke density: Less than 450 per ASTM E662.

#### 2.2 VINYL COMPOSITION TILE

- A. ASTM F1066, Composition 1, Class 2 (through pattern) , 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.
- B. Use low-VOC adhesive during installation. Water based is preferred over solvent based adhesives.

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

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.

## **2.8 POLISH AND CLEANERS**

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

## **2.9 EDGE STRIPS**

- A. 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: Fed. Specs. SS-T-312, Solid vinyl.

## **2.10 SCREWS**

Stainless steel flat head screw.

## **2.11 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 shall not exceed as follows:  
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. Concrete Subfloor Testing:  
Determine Adhesion and dryness of the floor by bond and moisture tests as recommended by RFCI manual MRP.
- 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.
- H. Preparation of existing installation shall include the removal of existing resilient floor and existing adhesive. Do not use solvents to remove adhesives.

### 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 either of shades 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. No tile shall be 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 with no bare spots.
  - a. Conform to RFC1-TM-6 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 Resident Engineer 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**

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.

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**SECTION 09 66 16**  
**TERRAZZO FLOOR TILE**

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

terrazzo tile for installation over concrete floors.

**1.2 RELATED WORK**

- A. Resilient Base: Section 09 65 13, RESILIENT BASE AND ACCESSORIES.
- B. Concrete floors: Section 03 30 00, CAST-IN-PLACE CONCRETE.
- C. Color and Pattern: Section 09 06 00, SCHEDULE FOR FINISHES.

**1.3 MANUFACTURER'S QUALIFICATIONS**

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

**1.4 SUBMITTALS**

- A. In accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES, furnish the following:
- B. Flooring Manufacturer's Literature and Data: Printed installation instructions for conditions indicated.
- C. Certificates: Indicating materials conform to specified requirements. Indicate flooring manufacturer's approval of underlayment, adhesive and cleaners.
- D. Samples: Terrazzo Tile (each color and pattern to be used) and rubber cove base, each color, 150 mm (6 inch) length

**1.5 DELIVERY**

Deliver materials to job in manufacturer's original unopened containers, free of damage, with manufacturer's brand name marked thereon.

**1.6 STORAGE**

Store materials in a protected area. Storage area shall be kept dry and temperature of storage area shall not be lower than 10 degrees C (50 degrees F) or higher than 32 degrees C (90 degrees F).

#### 1.7 PROJECT CONDITIONS

Tiles shall not be installed until all other work that could cause damage to the finish flooring has been completed. Maintain a temperature of not less than 21 degrees C (70 degrees F) in spaces where tile is to be installed for at least 48 hours before, during and after the laying of tiles. Bring tile into such spaces and allow it to condition at not less than 21 degrees C (70 degrees F) at least 48 hours before installing. A minimum temperature of 13 degrees C (55 degrees F) shall be maintained thereafter.

#### 1.8 WARRANTY

Terrazzo tile is subject to terms of "Warranty of Construction" FAR clause 52.246-21, except that warranty period is two years in lieu of one year.

#### 1.9 APPLICABLE PUBLICATIONS

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by basic designation only.
- B. American Society for Testing And Materials (ASTM):
- C109-08.....Compressive Strength of Hydraulic Cement Mortars
- D2047-04.....Static Coefficient of Friction of Polish Coated  
Floor Surfaces as Measured by the James Machine
- E648-08.....Critical Radiant Flux of Floor Covering Systems  
Using a Radiant Heat Energy Source
- C. Military Specifications (Mil. Spec.):
- MIL-D-3134J.....Deck Covering Materials

#### PART 2 - PRODUCTS

##### 2.1 TERRAZZO TILE

- A. Terrazzo tile shall consist of marble and granite chips embedded in a flexible thermo -set resin matrix
- B. Size and style as indicated.
- C. Tile shall have the following properties:

TABLE I - MARBLE TERRAZZO TILE		
PROPERTY	TEST METHOD	VALUE
Compressive strength	ASTM 109	51.7 Mpa (7500 psi) minimum
Water absorption	Mil.Spec.MIL-D-3134	0.4 percent maximum
Hardness	Barcol Hardness	Resin 78, Marble at 25 degrees C 55-85

Coefficient of Friction	ASTM D2047	0.70
Flame Resistance	ASTM E645	0.45 watt/cm square minimum

TABLE II GRANITE TERRAZZO TILE

Compressive strength	ASTM C109	35.8 MPa (5,200 psi)
Water absorption	Mil. Spec. MIL-D-3134	0.4 percent maximum
Hardness at 25 degrees C	Barcol Hardness	Resin 70, 55-85
Coefficient of Friction	ASTM D2047	0.70
Flame Resistance minimum	ASTM E648	0.45 watt/cm square

## 2.2 ADHESIVE

Shall be terrazzo tile manufacturer's standard product or a product recommended by the terrazzo tile manufacturer.

## 2.3 WALL BASE

See Section 09 65 13, RESILIENT BASE AND ACCESSORIES.

## 2.4 METAL EDGE STRIPS

Extruded aluminum, butt-type, approximately 38 mm (1-1/2 inches) wide with thickness to set top surface flush with top of tile and with bevel at exposed edge. Edge strips shall have countersunk holes, near each end and spaced at no more than 300 mm (8 inches) on center for securement.

# PART 3 - EXECUTION

## 3.1 GENERAL

Provide flooring and base on floor surfaces and walls where shown on the drawings. Provide resilient base as scheduled for room or space, for freestanding columns, pilasters, furred spaces convectors and where shown. Resilient base required over metal base of casework is specified in other sections. Except as necessary to install new tile, keep all traffic off new tile for at least 24 hours after installation.

## 3.2 SUBSTRATE PREPARATION

- A. Concrete Floors (New Construction): Fill holes and cracks with approved mortar. Concrete floors shall be free of curing compounds, grease, dirt, loose particles and other foreign matter that would prevent adhesion. Remove projecting irregularities by chipping or grinding smooth. Fill depressions and level uneven surfaces with underlayment. Then rinse subfloors and allow them to dry thoroughly before applying adhesive.
- B. Concrete Floors (Existing Construction): Remove any existing flooring and condition subfloors to provide smooth, clean, continuous surface.

Use underlayment where required to provide level surfaces ready to receive tile. Fill holes and cracks in concrete subfloors with mortar. Remove grease, dirt, loose particles, and other foreign matter that would prevent adhesion. Then, rinse subfloors and allow to dry thoroughly before applying adhesive.

### 3.3 MOISTURE TEST

After concrete floor surfaces have been cleaned, spread small patches of adhesive to be used, in several locations in each room and allow to dry overnight. If the adhesive can be peeled easily from the floor surfaces, the floor is not sufficiently dry. The test shall be repeated until the adhesive adheres properly. Lay tile flooring when the adhesive adheres tightly to the subfloor.

### 3.4 INSTALLATION

- A. Install tile in accordance with the tile manufacturer's approved installation instructions, except as specified herein. Lay design symmetrical about center lines of rooms. Joints shall be tight, and inconspicuous as possible, and in true alignment. Cut tile to fit snugly at pipes and other fixed vertical surfaces. Seal joints at pipes with adhesive. Remove spots or smears of adhesive immediately. Make entire surfaces of finished tile floors smooth, straight, and free from bleeding adhesive, buckles, waves or projecting tile edges upon completion. Remove any surface film on back of base due to mold release agents as recommended by base manufacturer, before applying base adhesive.
  - 1. Where metal edge strip transition strip is required, install as detailed.
  - 2. Bleeding of adhesive on finished floors is considered cause for rejection. Replace damaged tiles.
- B. Metal Edge Strips: Secure strips with No. 10 aluminum alloy, counter sunk flathead machine screws with expansion sleeves. Provide metal edge strips, in one piece, at any exposed edges of tile.
- C. Transition Strips: Apply transition strips with adhesive continuous, between ceramic tile finish floors and resilient tile finish floors as shown.
- D. Premolded Base: Install as specified in Section 09 65 13, RESILIENT BASE AND ACCESSORIES.

### 3.5 CLEANING

Upon completion of the installation, and after adhesive has cured, clean flooring in accordance with manufacturer's recommendations.

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### 3.6 PROTECTION

From the time of laying until acceptance, protect the flooring from damage. Replace damaged, loose, broken, or curled tiles.

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**SECTION 09 67 23.30**  
**RESIN (EPOXY RESIN COMPOSITION) MORTAR FLOORING (RES-3)**

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

This section specifies a seamless resinous (epoxy resin composition) and aliphatic poly urethane sealer, flooring systems with integral cove base.

**1.2 RELATED WORK**

- A. Concrete and Moisture Vapor Barrier: Section 03 30 00, CAST-IN-PLACE CONCRETE.
- B. Color and location of each type of resinous (epoxy resin composition) flooring: Section 09 06 00, SCHEDULE FOR FINISHES.
- C. Floor Drains: Division 22, PLUMBING.

**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 each product to be provided.
  - 2. Application and installation instructions.
  - 3. Maintenance Instructions: Submit manufacturer's written instructions for recommended maintenance practices.
- C. Qualification Data: For Installer.
- D. Sustainable Submittal:
  - 1. Product data for products having recycled content, submit documentation indicating percentages by weight of postconsumer and pre consumer recycled content.
    - a. Include statements indicating costs for each product having recycled content, and low emitting materials.
  - 2. Product data for Environmental Quality Credit EQ 4.2 low emitting materials, include printed statement of VOC content indicating compliance with environmental requirements.
  - 3. Product data for Material Resource Credit MR 4.1, 12%-35% post-consumer recycled glass content.
- E. Samples:
  - 1. Each color and texture specified in Section 09 06 00, SCHEDULE FOR FINISHES.
  - 2. Samples for verification: For each (color and texture) resinous flooring system required, 6 inches (152 mm) square, applied to a rigid backing by installer for this project.

3. Sample showing construction from substrate to finish surface in thickness specified and color and texture of finished surfaces. Finished flooring must match the approved samples in color and texture.
  - F. Shop Drawings: Include plans, sections, component details, and attachment to other trades. Indicate layout of the following:
    1. installation of cove base
    2. Edge configurations.
    3. Termination details
  4. details at floor material transitions and where adjoining equipment.
  - G. Certifications and Approvals:
    1. Manufacturer's certification of material and substrate compliance with specification.
    2. Manufacturer's approval of installers.
    3. Contractor's certificate of compliance with Quality Assurance requirements.
  - H. Warranty: As specified in this section.
- 1.4 QUALITY ASSURANCE**
- A. Manufacture Certificate: Manufacture shall certify that a particular resinous flooring system has been in use for a minimum of (3) three years.
  - B. Installer Qualifications: Engage an experienced installer (applicator) who is experienced in applying resinous flooring systems similar in material, design, and extent to those indicated for this project for a minimum period of (5) five years, whose work has resulted in applications with a record of successful in-service performance, and who is acceptable to resinous flooring manufacturer.
    1. Engage an installer who is certified in writing by resinous flooring manufacturer as qualified to apply resinous flooring systems indicated.
    2. Contractor shall have completed at least (5) five projects of similar size and complexity. Include list of at least (5) five projects. List must include owner (purchaser); address of installation, contact information at installation project site; and date of installation.
    3. Installer's Personnel: Employ persons trained for application of specified product.
  - C. Source Limitations:
    1. Obtain primary resinous flooring materials including primers, resins, hardening agents, grouting coats and finish or sealing coats from a single manufacturer.

2. Provide secondary materials, including patching and fill material, joint sealant, and repair material of type and from source recommended by manufacturer of primary materials.
- D. Mockups: Apply mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
  1. Apply full-thickness mockups on 48 inch (1200 mm) square floor area selected by VA Resident Engineer.
    - a. Include 48 inch (1200 mm) length of integral cove base.
  2. Test mock-up with anticipated chemicals to be used in the designated area.
  3. Approved mockups not damaged during the testing may become part of the completed work if undisturbed at time of Substantial Completion.
  4. Sign off from VA Resident Engineer on texture for slip resistance and clean ability must be complete before installation of flooring system.
- E. Pre-Installation Conference:
  1. Convene a meeting not less than thirty days prior to starting work.
  2. Attendance:
    - a. Contractor
    - b. VA Resident Engineer
    - c. Manufacturer and Installer's Representative
  3. Review the following:
    - a. Environmental requirements
      - 1) Air and surface temperature
      - 2) Relative humidity
      - 3) Ventilation
      - 4) Dust and contaminants
    - b. Protection of surfaces not scheduled to be coated
    - c. Inspect and discuss condition of substrate and other preparatory work performed
    - d. Review and verify availability of material; installer's personnel, equipment needed
    - e. Design and patterns and edge conditions.
    - f. Performance of the coating with chemicals anticipated in the area receiving the resinous (epoxy resin composition) flooring system
    - g. Application and repair
    - h. Field quality control
    - i. Cleaning
    - j. Protection of coating systems
    - k. One-year inspection and maintenance

1. Coordination with other work

- F. Manufacturer's Field Services: Manufacturer's representative shall provide technical assistance and guidance for surface preparation and application of resinous flooring systems.
- G. Contractor Job Site Log: Contractor shall document daily; the work accomplished environmental conditions and any other condition event significant to the long term performance of the resinous flooring systems installation. The Contractor shall maintain these records for one year after Substantial Completion.

**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 or delivery, including moisture, heat, cold, direct sunlight, etc.
- C. Maintain temperature of storage area between 50 and 80 degrees F (15 and 26 degrees C).
- D. Keep containers sealed until ready for use.
- E. Do not use materials beyond manufacturer's shelf life limits.
- F. 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. No On site weighing or volumetric measurements are allowed

**1.6 PROJECT CONDITIONS**

- A. Environmental Limitations: Comply with resinous flooring manufacturer's written instructions for substrate temperature, ambient temperature, moisture, ventilation, and other conditions affecting resinous flooring applications.
  - 1. Maintain the ambient room and the floor temperatures at 50 degrees Fahrenheit, or above, for a period extending from 72 hours before, during and after floor installation. Concrete to receive surfacing shall have cured for at least 28 days and shall have been free of water for at least 7 days.
  - 2. Advise other trades of fixtures and fittings not to be installed until flooring is cured and protected.
- B. Lighting: Provide permanent lighting or, if permanent lighting is not in place, simulate permanent lighting conditions during resinous flooring application.

- C. Close spaces to traffic during resinous flooring application and for not less than 24 hours after application, unless manufacturer recommends a longer period.
- D. Concrete substrate shall be properly cured for a minimum of 30 days. A vapor barrier must be present for concrete subfloors on or below grade. Otherwise, an osmotic pressure resistant grout must be installed prior to the resinous flooring.

#### 1.7 WARRANTY

- A. Work subject to the terms of the Article "Warranty of Construction" FAR clause 52.246-21.
- B. Warranty: Manufacture shall furnish a single, written warranty covering the full assembly for both material and workmanship for a extended period of (3) full years from date of installation, or provide a joint and several warranty signed on a single document by manufacturer and applicator jointly and severally warranting the materials and workmanship for a period of (3) full years from date of installation. A sample warranty letter must be included with bid package or bid may be disqualified.

#### 1.8 APPLICABLE PUBLICATIONS

- A. The publication listed below form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only.
- B. American Society for Testing and Materials (ASTM):
  - B221-08.....Standard Specification for Aluminum and Aluminum-Alloy, Extruded Bars, Rods, Wire, Profiles and Tubes.
  - C307-03 (2008).....Standard Test Method for Tensile Strength of Chemical-Resistant Mortar, Grouts, and Monolithic Surfacing
  - C413-01(2006).....Standard Test Method for Absorption of Chemical-Resistant Mortars, Grouts, Monolithic Surfacing and Polymer Concretes
  - C531-00(R2005).....Standard Test Method for Linear Shrinkage and Coefficient of Thermal Expansion of Chemical-Resistant Mortars, Grouts, Monolithic Surfacing and Polymer Concretes
  - C579-01(2006).....Standard Test Method for Compressive Strength of Chemical-Resistant Mortars, Grouts, Monolithic Surfacing, and Polymer Concretes
  - C580-02(2008).....Standard Test Method for Flexural Strength and Modulus of Elasticity of Chemical-Resistant

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Mortars, Grouts, Monolithic Surfacing, and  
Polymer Concretes

C811-98(2008).....Standard Practice for Surface Preparation of  
Concrete for Application of Chemical-Resistant  
Resin Monolithic Surfacing

D1308-02(2007).....Standard Test Method for Effect of Household  
Chemicals on Clear and Pigmented Organic  
Finishes

D2240-05.....Standard Test Method for Rubber Property -  
Durometer Hardness

D4060-07.....Standard Test Method for Abrasion Resistance of  
Organic Coatings by the Taber Abraser

D4226-09.....Standard Test Methods for Impact Resistance of  
Rigid Poly (Vinyl Chloride) (PVC) Building  
Products

D7234-05.....Standard Test Method for Pull-Off Adhesion  
Strength of Coatings on Concrete Using Portable  
Pull-Off Adhesion Testers

F1869-09.....Standard Test Method for Measuring Moisture  
Vapor Emission Rate of Concrete Subfloor Using  
Anhydrous Calcium Chloride

F2170-09.....Standard Test Methods for Determining Relative  
Humidity in Concrete Floor Slabs Using Situ  
Probes

C. National Association of Architectural Metal Manufacturers (NAAMM):  
AMP 500-06.....Finishes for Aluminum

## **PART 2 - PRODUCTS**

### **2.1 SYSTEM DESCRIPTION FOR RESINOUS FLOORING**

#### **A. System Descriptions:**

1. Monolithic, multi-component epoxy chemistry, steel trowel applied resinous flooring mortar system, nominal 3/16"/5mm thick system comprised of a penetrating primer, multi component 100% solids epoxy mortar, grout coat sealer and clear VOC compliant, aliphatic polyurethane non-reflective finish.
2. Decorative quartz broadcast systems will not be accepted. Steel trowel finish mortars only

B. Products: Subject to compliance with applicable fire, health, environmental, and safety requirements for storage, handling, installation, and clean up.

C. System Components: Verify specific requirements as systems vary by manufacturer. Verify mortar base product, build up layers of broadcast

systems will not be accepted. Verify compatibility with substrate. Use manufacturer's standard components, compatible with each other and as follows:

**Primer:**

1. Epoxy Primer
  - a. The primer shall be a 100% solids, two component, moisture tolerant penetrating resin.
- B. Elastomeric Basecoat:
  1. Flexible Epoxy
    - a. The elastomeric basecoat shall be a 100% solids, flexible epoxy
    - b. Number of Coats required: 2
- C. Sealer/Topcoat:
  1. Epoxy Coating
    - a. The pigmented topcoat shall be a 100% solids pigmented epoxy coating
    - b. Number of Coats required: 1
- D. Aggregates:
  1. Provide slip-resistant, cleanable textured finish. Samples to be approved by Architect or Owner.
  2. Blended quartz sand or silica sand, 30 mesh.
- E. Finish: Color as selected by Architect or Owner from the manufacturer's standard patterns and colors.
- F. Provide 4 inch integral coved base as required in the drawings.
- D. System Characteristics:
  1. Color and Pattern: As indicated in Section 09 06 00, SCHEDULE OF FINISHES.
  2. Integral cove base: 1 inch (25.4 mm) radius epoxy mortar cove keyed into concrete substrate. Verify cove base installation with manufacturer's system.
  3. Overall System Thickness: Verify thickness as systems vary by manufacturer; between 3/16 inch (4.76 mm) and 1/4 inch (6.35 mm)
  4. Finish: Textured anti-slip resistant to meet or exceed 0.06 dry; 0.08 wet.
- E. Physical Properties:
  1. Physical Properties of flooring system when tested as follows:



Property	Test	Value
Compressive Strength	ASTM C579	7,500 psi after 7 days
Volatile Organic Compound Limits (V.O.C.)	EPA & LEED	Below 100 g/l
Tensile Strength	ASTM C307	1,200 psi
Flexural Modulus of Elasticity	ASTM C580	2,800 psi
Water Absorption	ASTM C413	0.1%
Slip Resistance Index	ASTM F1679	0.81 dry and 0.56 wet. Minimal levels
Impact Resistance	ASTM D4226	> 160 in. lbs
Abrasion Resistance	ASTM D4060 Cs-17 wheel, 1000 cycles	0.06 gm maximum weight loss
Thermal Coefficient of Linear Expansion	ASTM C531	$1.3 \times 10^{-5}$ mm/ °C mm
Hardness Shore D	ASTM D2240	85 to 90
Bond Strength	ASTM D7234	>300 psi 100% concrete failure
Chemical Resistance of the following:	ASTM D1380	No Effect
Betadyne stain resistance		
Acetic acid	5 percent	
Ammonium hydroxide	10 percent	
Citric Acid	50 percent	
Fatty acid Motor Oil, 20W		
Hydrochloric acid		
Salt water	10 percent	
Sodium Hydroxide	10 percent	
Sulfuric acid	10 percent	
Trisodium phosphate	10 percent	
	5 percent	
Urine		
Feces		
Hydrogen peroxide	28 percent	
Distilled Water		
Sodium Hypochloride	5.28 percent	

## 2.2 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 500:
    - 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.

### **2.3 SUPPLEMENTAL MATERIALS**

- A. Textured Top Coat: Type recommended or produced by manufacturer of seamless resinous flooring system, slip resistance type and profile of for desired final finish.
- B. Joint Sealant: Type recommended or produced by resinous flooring manufacturer for type of service or joint conditioned indicated.
- C. Waterproof Membrane: Type recommended or produced by manufacturer of resinous floor coatings for type of service and conditions as indicated in Drawings
- D. Crack Isolation Membrane: Type recommended or produced by manufacturer of resinous flooring for conditions as indicated in Drawings
- E. Patching and Fill Material: Resinous product of or approved by resinous coating manufacturer for application indicated. Resinous based materials only. Cementitious or single component product are not expectable.

## **PART 3 - EXECUTION**

### **3.1 INSPECTION**

- A. Examine the areas and conditions where monolithic resinous flooring system with integral base is to be installed with the VA Resident Engineer.
- B. Moisture Vapor Emission Testing: Perform moisture vapor transmission testing in accordance with ASTM F1869 to determine the MVER of the substrate prior to commencement of the work. See section 3.4, 3.

### **3.2 PROJECT CONDITIONS**

- A. Maintain temperature of rooms (air and surface) where work occurs, between 70 and 90 degrees F (21 and 32 degrees C) for at least 48 hours, before, during, and 24 hours after installation. Maintain temperature at least 70 degrees F (21 degrees C) during cure period.
- B. Maintain relative humidity less than 75 percent.
- C. Do not install materials until building is permanently enclosed and wet construction is complete, dry, and cured.
- D. Maintain proper ventilation of the area during application and curing time period.
  - 1. Comply with infection control measures of the VA Medical Center.

### **3.3 INSTALLATION REQUIREMENTS**

- A. The manufacturer's instructions for application and installation shall be reviewed with the VA Resident Engineer for the seamless resinous flooring system with integral cove base.

B. Substrate shall be approved by manufacture technical representative.

### 3.4 PREPARATION

- A. General: Prepare and clean substrates according to resinous flooring manufacturer's written instructions for substrate indicated. Provide clean, dry, and neutral Ph substrate for resinous flooring application.
- B. Concrete Substrates: Provide sound concrete surfaces free of laitance, glaze, efflorescence, curing compounds, form-release agents, dust, dirt, grease, oil, and other contaminants incompatible with resinous flooring.
  - 1. Prepare concrete substrates as follows:
    - a. Shot-blast surfaces with an apparatus that abrades the concrete surface, contains the dispensed shot within the apparatus, and recirculates the shot by vacuum pickup.
    - b. Comply with ASTM C 811 requirements, unless manufacturer's written instructions are more stringent.
  - 2. Repair damaged and deteriorated concrete according to resinous flooring manufacturer's written recommendations.
  - 3. Verify that concrete substrates are dry.
    - a. Perform anhydrous calcium chloride test, ASTM F 1869. Proceed with application only after substrates have maximum moisture-vapor-emission rate of [5 lb of water/1000 sq. ft. (1.36 kg of water/92.9 sq. m) in 24 hours.
    - b. MVT threshold for monolithic resinous Non - climatic flooring shall not exceed 5 lbs/1000 square feet (0.0001437 kPa) in a 24 hour period. MVT threshold for monolithic resinous climatic flooring shall not exceed 6 lbs/1000 square feet (0.0002155 kPa) over a 24 hour period.
    - c. When MVT emission exceeds this limit, apply manufacturer's recommended vapor control primer or other corrective measures as recommended by manufacturer prior to application of flooring or membrane systems.
    - d. Perform in situ probe test, ASTM F2170. Proceed with application only after substrates do not exceed a maximum potential equilibrium relative humidity of 75-80 percent.
    - e. Provide a written report showing test placement and results.
  - 4. Verify that concrete substrates have neutral Ph and that resinous flooring will adhere to them. Perform tests recommended by manufacturer. Proceed with application only after substrates pass testing.
- C. Resinous Materials: Mix components and prepare materials according to resinous flooring manufacturer's written instructions.

- D. Use patching and fill material to fill holes and depressions in substrates according to manufacturer's written instructions.
- E. Treat control joints and other nonmoving substrate cracks to prevent cracks from reflecting through resinous flooring according to manufacturer's written recommendations. Allowances should be included for flooring manufacturer recommended joint fill material, and concrete crack treatment.
- F. Prepare wall to receive integral cove base :
  - 1. Verify wall material is acceptable for resinous flooring application, if not, install material (e.g. cement board) to receive base.
  - 2. Fill voids in wall surface to receive base, install undercoats (e.g. water proofing membrane, and/or crack isolation membrane) as recommended by resinous flooring manufacturer.
  - 3. Install base prior to flooring if required by resinous flooring manufacturer.
  - 4. Grind, cut or sand protrusions to receive base application.

### 3.5 APPLICATION

- A. **General:** Apply components of resinous flooring system according to manufacturer's written instructions to produce a uniform, monolithic wearing surface of thickness indicated.
  - 1. Coordinate application of components to provide optimum adhesion of resinous flooring system to substrate, and optimum inter-coat adhesion.
  - 2. Cure resinous flooring components according to manufacturer's written instructions. Prevent contamination during application and curing processes.
  - 3. At substrate expansion and isolation joints, provide joint in resinous flooring to comply with resinous flooring manufacturer's written recommendations.
    - a. Apply joint sealant to comply with manufacturer's written recommendations.
- B. Apply Primer: over prepared substrate at manufacturer's recommended spreading rate.
- C. Apply cove base: Trowel to wall surfaces at a 1 inch radius, before applying flooring. Apply according to manufacturer's written instructions and details including those for taping, mixing, priming, and troweling, sanding, and top coating of cove base. Round internal and external corners.
- D. Trowel mortar base: Mix mortar material according to manufacturer's recommended procedures. Uniformly spread mortar over substrate using a specially designed screed box adjusted to manufacturer's recommended

height. Metal trowel hand or plastic blade power trowel, single mortar coat in thickness indicated for flooring system, Pre fill or grout to fill substrate voids. When cured, scrape or lightly stone mortar base to remove left unbounded material.

- E. Grout coat: Mix and roller apply the grout coats with strict adherence to manufacturer's installation procedures and coverage rates. (2) Two grout coatings to insure uniform coverage with wet on wet application.
- F. Topcoat: Mix and roller apply the topcoat(s) with strict adherence to manufacturer's installation procedures and coverage rates.

### 3.6 TOLERANCE

- A. From line of plane: Maximum 1/8 inch (3.18 mm) in total distance of flooring and base.
- B. From radius of cove: Maximum of 1/8 inch (3.18 mm) plus or 1/16-inch (1.59 mm) minus.

### 3.7 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 type paper.
  - 2. Optional 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.

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**SECTION 09 68 00**  
**CARPETING**

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

Section specifies carpet, edge strips, adhesives, and other items required for complete installation.

**1.2 RELATED WORK**

- A. Color and texture of carpet and edge strip: Section 09 06 00, SCHEDULE FOR FINISHES.
- B. Resilient wall base: Section 09 65 13, RESILIENT BASE AND ACCESSORIES.

**1.3 QUALITY ASSURANCE**

- A. Carpet installed by mechanics certified by the Floor Covering Installation Board.
- B. Certify and label the carpet that it has been tested and meets criteria of CRI IAQ Carpet Testing Program for indoor air quality.

**1.4 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.

- 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.

**1.6 ENVIRONMENTAL REQUIREMENTS**

Areas in which carpeting is to be installed shall be maintained at a temperature above 16 degrees C (60 degrees F) for 2 days before installation, during installation and for 2 days after installation. A minimum temperature of 13 degrees C (55 degrees F) shall be maintained thereafter for the duration of the contract. Traffic or movement of furniture or equipment in carpeted area shall not be permitted for 24 hours after installation. Other work which would damage the carpet shall be completed prior to installation of carpet.

**1.7 WARRANTY**

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

**1.8 APPLICABLE PUBLICATIONS**

- A. Publication listed below form a part of this specification to extent referenced. Publications are referenced in text by basic designation only.
- B. American National Standards Institute (ANSI):  
ANSI/NSF 140-07.....Sustainable Carpet Assessment Standard
- C. American Association of Textile Chemists and Colorists (AATCC):  
AATCC 16-04.....Colorfastness to Light  
AATCC 129-05.....Colorfastness to Ozone in the Atmosphere under High Humidities  
AATCC 134-06.....Electric Static Propensity of Carpets  
AATCC 165-08.....Colorfastness to Crocking: Textile Floor Coverings-AATCC Crockmeter Method
- D. American Society for Testing and Materials (ASTM):  
ASTM D1335-05.....Tuft Bind of Pile Yarn Floor Coverings  
ASTM D3278-96 (R2004)...Flash Point of Liquids by Small Scale Closed-Cup Apparatus

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ASTM D5116-06.....Determinations of Organic Emissions from Indoor  
Materials/Products

ASTM D5252-05.....Operation of the Hexapod Tumble Drum Tester

ASTM D5417-05.....Operation of the Vettermann Drum Tester

ASTM E648-09.....Critical Radiant Flux of Floor-Covering Systems  
Using a Radiant Heat Energy Source

E. The Carpet and Rug Institute (CRI):

CRI 104-02.....Installation of Commercial Carpet

## **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. Shall meet platinum level of ANSI/NSF 140.

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.

### **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.



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**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. Concrete Subfloor Preparation: Apply concrete slab primer according to manufacturer's directions where recommended by carpet manufacturer.

**3.2 CARPET INSTALLTION**

- A. Comply with CRI 104 Section 8 "Direct Glue Down"
- 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.

**3.3 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.

**3.4 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.

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**SECTION 09 91 00**  
**PAINTING**

**PART 1-GENERAL**

**1.1 DESCRIPTION**

- A. Section specifies prime coats which may be applied in shop under other sections.
- B. Painting includes shellacs, stains, varnishes, coatings specified, and striping or markers and identity markings.

**1.2 RELATED WORK**

- A. Shop prime painting of steel and ferrous metals: Division 05 - METALS, Division 08 - OPENINGS, Division 10 - SPECIALTIES, , Division 12 - FURNISHINGS, Division 13 - SPECIAL CONSTRUCTION, 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.
- C. Type of Finish, Color, and Gloss Level of Finish Coat: Section 09 06 00, SCHEDULE FOR FINISHES.

**1.3 SUBMITTALS**

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Manufacturer's Literature and Data:  
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).
- D. Manufacturers' Certificates indicating compliance with specified requirements:

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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.

**1.4 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).

**1.5 APPLICABLE PUBLICATIONS**

- A. Publications listed below form a part of this specification to the extent referenced. Publications are referenced in the text by basic designation only.
- 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. American National Standards Institute (ANSI):  
A13.1-07.....Scheme for the Identification of Piping Systems
- D. American Society for Testing and Materials (ASTM):  
D260-86 (2001).....Boiled Linseed Oil
- E. Federal Specifications (Fed Spec):  
TT-P-1411A.....Paint, Copolymer-Resin, Cementitious (For Waterproofing Concrete and Masonry Walls) (CEP)

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F. Master Painters Institute (MPI):

No. 4-08.....Interior/ Exterior Latex Block Filler  
No. 5-02.....Exterior Alkyd Wood Primer  
No. 7-02.....Exterior Oil Wood Primer  
No. 8-07.....Exterior Alkyd, Flat MPI Gloss Level 1 (EO)  
No. 9-07.....Exterior Alkyd Enamel MPI Gloss Level 6 (EO)  
No. 10-07.....Exterior Latex, Flat (AE)  
No. 11-07.....Exterior Latex, Semi-Gloss (AE)  
No. 26-03.....Cementitious Galvanized Metal Primer  
No. 27-07.....Exterior / Interior Alkyd Floor Enamel, Gloss (FE)  
No. 43-06.....Interior Satin Latex, MPI Gloss Level 4  
No. 44-08.....Interior Low Sheen Latex, MPI Gloss Level 2  
No. 45-02.....Interior Primer Sealer  
No. 46-04.....Interior Enamel Undercoat  
No. 47-02.....Interior Alkyd, Semi-Gloss, MPI Gloss Level 5 (AK)  
No. 48-05.....Interior Alkyd, Gloss, MPI Gloss Level 6 (AK)  
No. 49-02.....Interior Alkyd, Flat, MPI Gloss Level 1 (AK)  
No. 50-08.....Interior Latex Primer Sealer  
No. 51-02.....Interior Alkyd, Eggshell, MPI Gloss Level 3  
No. 52-06.....Interior Latex, MPI Gloss Level 3 (LE)  
No. 53-06.....Interior Latex, Flat, MPI Gloss Level 1 (LE)  
No. 54-06.....Interior Latex, Semi-Gloss, MPI Gloss Level 5 (LE)  
No. 59-07.....Interior/Exterior Alkyd Porch & Floor Enamel, Low  
Gloss (FE)  
No. 60-07.....Interior/Exterior Latex Porch & Floor Paint, Low  
Gloss  
No. 68-07.....Interior/ Exterior Latex Porch & Floor Paint,  
Gloss  
No. 77-08.....Epoxy Cold Cured, Gloss (EC)  
No. 79-08.....Marine Alkyd Metal Primer  
No. 94-07.....Exterior Alkyd, Semi-Gloss (EO)  
No. 95-03.....Fast Drying Metal Primer  
No. 101-08.....Epoxy Anti-Corrosive Metal Primer  
No. 108-08.....High Build Epoxy Coating, Low Gloss (EC)  
No. 114-06.....Interior Latex, Gloss (LE) and (LG)  
No. 119-07.....Exterior Latex, High Gloss (acrylic) (AE)  
No. 134-06.....Primer, Galvanized, Water Based  
No. 135-06.....Non-Cementitious Galvanized Primer  
No. 138-06.....Interior High Performance Latex, MPI Gloss Level 2  
(LF)

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No. 139-06.....Interior High Performance Latex, MPI Gloss Level 3  
(LL)

No. 140-06.....Interior High Performance Latex, MPI Gloss Level 4

No. 141-06.....Interior High Performance Latex (SG) MPI Gloss  
Level 5

G. 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. Aluminum Paint (AP)

D. Exterior Alkyd, Flat (EO): MPI 8.

E. Exterior Alkyd Enamel (EO): MPI 9.

F. Exterior Latex, Flat (AE): MPI 10.

G. Exterior Latex, Semi-Gloss (AE): MPI 11.

H. Interior Satin Latex: MPI 43.

I. Interior Low Sheen Latex: MPI 44.

J. Interior Primer Sealer: MPI 45.

K. Interior Alkyd, Semi-Gloss (AK): MPI 47.

L. Interior Latex Primer Sealer: MPI 50.

M. Interior Alkyd, Eggshell: MPI 51

N. Interior Latex, MPI Gloss Level 3 (LE): MPI 52.

O. Interior Latex, Flat, MPI Gloss Level 1 (LE): MPI 53.

P. Interior Latex, Semi-Gloss, MPI Gloss Level 5 (LE): MPI 54.

Q. Interior / Exterior Alkyd Porch & Floor Enamel, Low Gloss (FE): MPI 59.

R. Interior/ Exterior Latex Porch & Floor Paint, Low Gloss: MPI 60.

S. Interior Alkyd Fire Retardant, Clear Top-Coat (ULC Approved) (FC)

T. Interior Latex Fire Retardant, Top-Coat (ULC Approved) (FR)

U. Interior/ Exterior Latex Porch & Floor Paint, gloss: MPI 68.

V. Epoxy Cold Cured, Gloss (EC): MPI 77.

W. Interior Wood Stain, Semi-Transparent (WS)

X. Exterior Alkyd, Semi-Gloss (EO): MPI 94.

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Y. Fast Drying Metal Primer: MPI 95.

Z. High Build Epoxy Coating

AA. Epoxy Anti-Corrosive Metal Primer: MPI 101.

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. Non-Cementitious Galvanized Primer: MPI 135.

## 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/QUALITY ASSURANCE

- A. Paint materials shall conform to the restrictions of the local Environmental and Toxic Control jurisdiction.
  - 1. Volatile Organic Compounds (VOC): VOC content of paint materials shall not exceed 10g/l for interior latex paints/primers and 50g/l for exterior latex paints and primers.
  - 2. Lead-Base Paint:
    - a. Lead based paint is not permitted to be used.
    - b. For lead-paint removal, see Section 02 83 33.13, LEAD-BASED PAINT REMOVAL AND DISPOSAL.
  - 3. Asbestos: Materials shall not contain asbestos.
  - 4. Chromate, Cadmium, Mercury, and Silica: Materials shall not contain zinc-chromate, strontium-chromate, Cadmium, mercury or mercury compounds or free crystalline silica.
  - 5. Human Carcinogens: Materials shall not contain any of the ACGIH-BKLT and ACGHI-DOC confirmed or suspected human carcinogens.
  - 6. Use high performance acrylic paints in place of alkyd paints, where possible.
  - 7. VOC content for solvent-based paints shall not exceed 250g/l and shall not be formulated with more than one percent aromatic hydro carbons 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.

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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. Under no circumstances shall application conditions exceed manufacturer recommendations.
2. Maintain interior temperatures until paint dries hard.
3. Do no exterior painting when it is windy and dusty.
4. Do not paint in direct sunlight or on surfaces that the sun will soon warm.
5. 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.
6. 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.



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- 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. 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.
- F. 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.

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- 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 RE/COTR.
- E. Finish surfaces to show solid even color, free from runs, lumps, brushmarks, 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 RE/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.
- I. 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.

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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.

F. Metals:

1. Steel and iron: MPI 95 (Fast Drying Metal Primer). Use MPI 101 (Cold Curing Epoxy Primer) where High Build Epoxy Coating finish is specified.
2. Zinc-coated steel and iron: MPI 135 (Non-Cementitious Galvanized Primer).
3. Aluminum scheduled to be painted: MPI 95 (Fast Drying Metal Primer).
4. Terne Metal: MPI 95 (Fast Drying Metal Primer).
5. Copper and copper alloys scheduled to be painted: MPI 95 (Fast Drying Metal Primer).
6. Machinery not factory finished: MPI 9 (Exterior Alkyd Enamel (EO)).
7. Asphalt coated metal: Aluminum Paint (AP).

G. Gypsum Board:

1. Surfaces scheduled to have MPI 10 (Exterior Latex, Flat (AE)) MPI 11 (Exterior Latex, Semi-Gloss (AE)) MPI 119 (Exterior Latex, High Gloss (acrylic) (AE)) or MPI 53 (Interior Latex, Flat), MPI Gloss Level 1 (LE)) MPI 52 (Interior Latex, MPI Gloss Level 3 (LE)) MPI 54 (Interior Latex, Semi-Gloss, MPI Gloss Level 5 (LE)) MPI 114 (Interior Latex, Gloss (LE) and (LG)) finish: Use MPI 10 (Exterior Latex, Flat (AE)) MPI 11 (Exterior Latex, Semi-Gloss (AE)) MPI 119 (Exterior Latex, High Gloss (acrylic) (AE)) or MPI 53 (Interior Latex, MPI Gloss Level 3 (LE)) MPI 52 (Interior Latex, MPI Gloss Level 3 (LE)) MPI 54 (Interior Latex, Semi-Gloss, MPI Gloss Level 5 (LE)) MPI 114 (Interior Latex, Gloss (LE) and (LG)) respectively.
2. Primer: MPI 50 (Interior Latex Primer Sealer) except use MPI 45 (Interior Primer Sealer).
3. Surfaces scheduled to receive vinyl coated fabric wall covering:

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Use MPI 45 (Interior Primer Sealer).

H. Gypsum Plaster and Veneer Plaster:

1. Surfaces scheduled to receive vinyl coated fabric wall covering:  
Use MPI 45 (Interior Primer Sealer).
2. MPI 45 (Interior Primer Sealer), except use MPI 50 (Interior Latex Primer Sealer) when an alkyd flat finish is specified.
3. Surfaces scheduled to have MPI 11 (Exterior Latex, Semi-Gloss (AE)) respectively.
4. Use MPI 101 (Cold Curing Epoxy Primer) for surfaces scheduled to receive MPI 77 (Epoxy Cold Cured, Gloss (EC)).

I. Concrete Masonry Units except glazed or integrally colored and decorative units:

1. Prime exterior surface as specified for exterior finishes.

J. Cement Plaster or stucco Concrete Masonry, Interior Surfaces of Ceilings and Walls:

1. MPI 53 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.

**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. Machinery: One coat MPI 9 (Exterior Alkyd Enamel (EO)).

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)).

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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. Plaster:
1. One coat of MPI 45 (Interior Primer Sealer).
  2. Two coats of MPI 51 (Interior Alkyd, Eggshell) (AK)).
  3. One coat of MPI 45 (Interior Primer Sealer) or MPI 50 (Interior Latex Primer Sealer).
  4. One coat MPI 101 (Cold Curing Epoxy Prime (EC)).
- E. 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)).
- F. 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)).

**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.

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- 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. In existing rooms and areas where alterations occur, clean existing stained and natural finished wood retouch abraded surfaces and then give entire surface one coat of Polyurethane, Moisture Cured, Clear.
- G. Refinish areas as specified for new work to match adjoining work unless specified or scheduled otherwise.
- H. Coat knots and pitch streaks showing through old finish with Knot Sealer before refinishing.
- I. Sand or dull glossy surfaces prior to painting.
- J. 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. For additional requirements regarding color see Articles, REFINISHING EXISTING PAINTED SURFACE and MECHANICAL AND ELECTRICAL FIELD PAINTING SCHEDULE.
- C. 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.
- D. 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.

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**APPENDIX**

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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 Flat    Ak (MPI 49)

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)

Epoxy Coating    EC (MPI 77 - walls, floors/MPI 108 - CMU, concrete)

Fire Retardant Paint    FR

Fire Retardant Coating (Clear)    FC (intumescent type)

Floor Enamel    FE (MPI 27 - gloss/MPI 59 - eggshell)

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

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**SECTION 10 14 00**  
**EXTERIOR SIGNAGE**

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. This section specifies the work required to furnish and install the indicated and specified exterior cemetery site signage systems, including posts. The signage systems to be provided include all those shown on the drawings.
- B. Signs shall be products of manufacturers regularly engaged in manufacturing signs of types specified.

**1.2 RELATED WORK**

- A. Post Setting Excavation, Material, Backfill, Section 31 20 00, EARTH MOVING.
- B. Concrete Bases for posts: Section 03 30 00, CAST-IN-PLACE CONCRETE

**1.3 MANUFACTURER'S QUALIFICATIONS**

Sign manufacturer shall regularly and presently manufacture signs similar to those specified as one of their principal products. Sign manufacturer shall submit qualifications demonstrating a minimum of three years of experience manufacturing the qualifying signs and shall, if possible, demonstrate the successful manufacturing of exterior site signs installed at one or more State or National Veteran Cemeteries.

**1.4 SUBMITTALS**

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Samples: Submit 3 sets. One set to the Contractor, one set to the CO/COR and one set to the A/E.
  - 1. Post & panel sign mock-up, not less than 8" by 10", shall be constructed and submitted, showing typical color, texture and fonts shown on Contract Drawings. Mock-up shall show typical fabrication methods, including panel to post(s) connection. Sample shall be capable of demonstrating how the face panels can be removed, for repair or replacement, from the mounted location between the posts, for a two post sign system. Mock-ups of all other sign systems for post mounted signs shall be capable of demonstrating how the sign panels are to be removed and replaced from the posts, or mounting support system attached to the posts, without moving the posts. Post shall include typical post cap secured with tamperproof screws.



Top surface of the sign panel shall not contain screws or metal joints that could trap or allow water to enter the sign assembly.

2. Square tube post, 150 mm (6") length, showing typical color and finish.
3. Aluminum samples showing full range of finish colors available.
4. Color samples of each color, 150 mm x 150 mm (6 inches x 6 inches).  
Show anticipated range of color and texture.
5. Sample of typeface, arrow and symbols in a typical full size layout.

C. Shop Drawings: All signs showing material, finish, colors, size of members, details of construction, letter spacing, size and type, numbers, symbols or image details, and mounting details. Identify materials, show joints, welds, anchorage, accessory items, mounting and finishes.

D. Full size layout in full color of the Sign Panels.

E. Manufacturer's Literature and Data (Mark literature to indicate items proposed to be furnished): Signs, each type. Manufacturer's printed specifications, anchorage details, installation and maintenance instructions. Manufacturer's recommendations for mounting the Sign Panels shall be provided.

F. Manufacturer's Certificates: Provide certification from the coating installer, that they prepared the aluminum and applied the coating(s) to the specified thickness(es).

#### **1.5 DELIVERY AND STORAGE**

- A. Package to prevent damage or deterioration during shipment, handling, storage and installation. Maintain protective covering in place and in good repair until removal is necessary.
- B. Deliver signs only when the site, mounting materials, and equipment are ready for installation work to proceed.
- C. Store products in dry condition inside enclosed facilities.

#### **1.6 WARRANTY**

- A. Sign Manufacturer shall guarantee text and symbols application to aluminum for an extended warranty period of five years.

#### **1.7 APPLICABLE PUBLICATIONS**

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only.

- B. US Dept. of Veterans Affairs National Cemetery Signs Manual
- C. Americans with Disabilities Act - 1990
- D. Federal Highway Administration  
Manuals on Uniform Traffic Control Devices for Street and  
Highways. Single Post Traffic Regulatory Signs:
- E. American Society for Testing and Materials (ASTM):
  - B209-07.....Aluminum and Aluminum-Alloy Sheet and Plate
  - B221-07.....Aluminum and Aluminum-Alloy Extruded Bars,  
Rods, Wire, Shapes and Tubes.
  - B449-93(2004).....Standard Specification for Chromates on  
Aluminum
- F. American Architectural Manufacturer's Association (AAMA):
  - AAMA 2604.....Performance Requirements and Test Procedures  
for High Performance Organic Coatings on  
Aluminum extrusions and Panels.
- G. Federal Specifications (Fed. Spec.):
  - MIL-P-8184E Plastic Sheet, Acrylic, Modified.
  - MIL-P-46144C Plastic Sheet, Polycarbonate

## **PART 2 - PRODUCTS**

### **2.1 MATERIALS**

- A. Aluminum, Extruded: Fed. Spec. QQA-200-9, alloy 6063-T5, applicable as material.
- B. Aluminum, Sheet and Plate: ASTM B209
- C. Aluminum, Extrusions and Tubing: ASTM B221
- D. Zinc Chromate Primer: Fed. Spec. TT-P-645.

### **2.2 GENERAL**

- A. Signs shall be of type, size and design shown on the drawings and as specified.
- B. Signs shall be complete with lettering, framing, and related components for a complete sign installation.
- C. Provide graphics items as completed units produced by a single manufacturer, including necessary mounting accessories, fittings and fastenings.
- D. Do not scale drawings for dimensions. Contractor to verify and be responsible for all dimensions and conditions shown by these drawings. CO/COR to be notified of any discrepancy in drawing, in field

directions or conditions, and/or of any changes required for all such construction details.

- E. The Sign Contractor, by commencing work of this section, assumes overall responsibility, as part of his warranty of work, to assure that assemblies, components and parts shown or required within the work of the section, comply with the Contract Documents. The Contractor shall further warrant: That all components, specified or required to satisfactorily complete the installation are compatible with each other and with conditions of installations.
- F. All aluminum sign panels and frames shall match cast bronze, Matthews # MP07458 (background color and posts) with the exception of NC-03.09 Traffic Regulatory Sign (tall) which shall have a background color of Handicapped Blue, Matthews # MP20190. All text shall be reflective white, equal to engineering grade 3M Scotchlite.

### 2.3 SIGN STANDARDS

#### A. Typography:

- 1. Type Style: Optima Bold. Initial caps or and lower case as indicated in Site Signage Plan, unless otherwise indicated.
- 2. Arrow: See graphic standards in drawings.
- 3. Letter spacing: See graphic standards on drawings.
- 4. All text, arrows, and symbols to be provided in size, colors, typefaces and letter spacing shown. Text shall be a true, clean, accurate reproduction of typeface(s) shown. Text shown in drawings are for layout purposes only; final text for signs shall be as approved in the shop drawings.

- B. Sign Colors and Finishes: As specified and approved in the Shop Drawing & Submittal process.

### 2.3 FABRICATION

- A. Design components to allow for expansion and contraction for a minimum material temperature range of 56 °C (100 °F), without causing buckling, excessive opening of joints or over stressing of adhesives, welds and fasteners.
- B. Form work to required shapes and sizes, with true curve lines and angles. Provide necessary rebates, lugs and brackets for assembly of units. Use concealed fasteners whenever and wherever possible.

- C. Shop fabricate so far as practicable. Joints fastened flush to conceal reinforcement, or welded where thickness or section permits.
- D. Contact surfaces of connected members shall be true. Assemble so joints will be tight and practically unnoticeable, without use of filling compound.
- E. Signs shall have fine, even texture and be flat and sound. Lines and miters sharp, arises unbroken, profiles accurate and ornament true to pattern. Plane surfaces be smooth flat and without oil-canning, free of rack and twist. Maximum variation from plane of surface plus or minus 0.3 mm (0.015 inches). Restore texture to filed or cut areas.
- F. Level or straighten wrought work. Members shall have sharp lines and angles and smooth surfaces.
- G. Extruded members to be free from extrusion marks. Square turns and corners sharp, curves true.
- H. Drill holes for bolts and screws. Conceal fastenings where possible. Exposed ends and edges mill smooth, with corners slightly rounded. Form joints exposed to weather to exclude water.
- I. All painted surfaces properly primed. Finish coating of paint to have complete coverage with no light or thin applications allowing substrate or primer to show. Finished surface smooth, free of scratches, gouges, drips, bubbles, thickness variations, foreign matter and other imperfections.
- J. Movable parts, including hardware, are to be cleaned and adjusted to operate as designed without binding or deformation of members. Doors and covers centered in opening or frame. All contact surfaces fit tight and even without forcing or warping components.
- K. Pre-assemble items in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for re-assembly and coordinated installation.
- L. Aluminum plate recesses and all exposed surfaces shall receive the acid etch finish. Aluminum plates installed in post recesses shall be installed prior to delivery to the site. Protect all surfaces from damage.
- M. No signs are to be manufactured until final sign message schedule and location review has been completed by the CO/COR & forwarded to contractor.

## 2.4 PROTECTION OF ALUMINUM

- A. Isolate aluminum in contact with or fastened to dissimilar metals other than stainless steel, white bronze or other metals compatible with aluminum by one of the following:
  - 1. Painting the dissimilar metal with a prime coat of zinc-chromate or other suitable primer, followed by two coats of aluminum paint.
  - 2. Placing an approved caulking compound, or a non-absorptive tape, or gasket between the aluminum and the dissimilar metal.
- B. Paint aluminum in contact with or built into mortar, concrete, or other masonry materials with bituminous paint or zinc chromate primer.

## 2.5 DOUBLE-POST-PANEL SIGNS

- A. Sign panel assembly shall be constructed with extruded aluminum support channels and fasteners that secure a removable powder-coated aluminum sign panel assembly. Aluminum sign panel faces shall be 1/8" minimum thick. The design for the sign panel system shall be such that the sign panels can be removed and replaced, if damaged, without having to move the posts that secure the sign panel assembly. The sign panel assembly shall be constructed so there are no gaps or holes in the assembly that could let insects enter and construct nests or otherwise become a nuisance. The top of the sign panel assembly shall be constructed such that it is water tight from above and shall not have unsealed joints where water can collect or enter the assembly. The sign configuration and mounting shall be as depicted in the drawings.
- B. Lettering shall be as indicated on the "Contract Drawings."
- C. Exposed fasteners shall be aluminum, tamper-proof type, and shall be colored to match the color for the sign panels.
- D. Finishes of exposed aluminum surfaces:
  - 1. Pretreatment: Before the finish is applied, a five-stage pretreatment must be applied to assure maximum adhesion and corrosion resistance:
    - a. Stage 1: High alkaline cleaner to prepare the surface
    - b. Stage 2: Water rinse
    - c. Stage 3: Combination of chromic, phosphoric and hydrofluoric acids that produce the chrome-phosphate conversion coating for maximum adhesion and corrosion resistance.
    - d. Stage 4: Water rinse
    - e. Stage 5: Water rinse

2. Coating: After pretreatment, the metal is dried and paint is then applied. The aluminum shall have an electrostatically applied baked-on flexible acrylic finish that meet or exceeds industry standard tests, achieving a 75 - 125 micron (3.0 - 5.0 mil) thickness, super-tough finish with maximum exterior durability and superior adhesion characteristics. Color as indicated on the drawings and approved submittal.
3. Tests:
  - a. AAMA 2604 (covers Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum extrusions and Panels)
  - b. ASTM D2247 (Humidity resistance of 1,000 hours)
  - c. ASTM B117 (Salt spray resistance of 1,000 hours)
  - d. Accelerated weathering for 500 hours under Method 6152 of Federal Test Method 141 shall show no adhesion loss, with only slight fading, chalking and water staining.
  - e. Outdoor weathering shall show no adhesion loss, checking or crazing, with only slight fade and chalk when exposed for one year in Florida facing south at a 45 degree angle.
  - f. Minimum hardness of 2H using ASTM D3363.
  - g. Color of exposed portions of fastenings shall match sign panel being attached.

## 2.7 SINGLE-POST TRAFFIC REGULATORY SIGNS

- A. Signs shall be constructed of square tubular galvanized steel post with an aluminum plate sign panel.
- B. Sign panel shall be a 2 mm (0.080") aluminum plate with surface applied reflective vinyl traffic regulatory decals. Panel, text & graphics shall comply with the Department of Transportation, Manual for Uniform Traffic Control Devices in color, shape, proportions, text and symbols. Panel shall mechanically fasten to support post with tamper resistant fasteners.
- C. Posts shall be dimensioned and finished as specified on the Details.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Set work accurately, in alignment and where shown. Signs shall be plumb, level, free of rack and twist and set parallel or perpendicular as required to line and plane the surface.

- B. Signs shall be installed with direct burial of post into concrete as shown on Contract Drawings.
- C. Protect aluminum in contact with dissimilar metals or mortar as specified in Paragraph 2.4.
- D. Furnish setting drawings and instructions for installation of anchors and for the positioning of items having anchors or sleeves to be built into construction. Provide temporary bracing for such items until permanent anchors are set.
- E. Provide anchoring devices and fasteners as shown and as necessary for securing signs to construction as specified.
- F. Utilize approved layout template for the installation of the cast metal lettering on the entry wall. Pins shall be securely anchored as detailed. Face of all lettering shall be in a constant plane, while at the same time minimizing the distance between the back of the letters and the stone wall. Maintain a minimum gap as detailed between the back of the letter and the face of the stone wall.
- G. Certain signs may be installed on glass. A blank glass back up is required to be placed on opposite side of glass exactly behind sign being installed. This blank glass back up is to be the same size as sign being installed.
- H. Contractor will be responsible for verifying that behind each sign location there are no utility lines that will be affected by installation of signs. Any damage during installation of signs to utilities will be the sole responsibility of the Contractor to correct and repair.
- I. Furnish inserts and anchoring devices which must be set in concrete or other material for installation of signs. Provide setting drawings, templates, instructions and directions for installation of anchorage devices which may involve other trades.

### 3.2 CLEANING

- A. After installation, all items shall be cleaned as recommended by the manufacturer and protected from damage until completion of the project.

### 3.3 PROTECTION

- A. Protect finished surfaces from damage during fabrication, erection and after completion of the work.

--END--

**SECTION 10 14 05**  
**INTERIOR SIGNAGE**

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. This section specifies interior signage for room numbers, directional signs, code required signs, telephone identification signs and temporary interior signs.
- B. Installation of Government furnished dedication plaque and VA seal.

**1.2 RELATED WORK**

- A. Electrical: Related Electrical Specification Sections.
- B. Lighted EXIT signs for egress purposes are specified under Division 26, ELECTRICAL.
- C. Color Finish: Section 09 06 00, SCHEDULE FOR FINISHES.

**1.3 MANUFACTURER'S QUALIFICATIONS**

Sign manufacturer shall provide evidence that they regularly and presently manufacture signs similar to those specified in this section as one of their principal products.

**1.4 SUBMITTALS**

- A. Submit in accordance with Section 01 33 00, SHOP DRAWINGS, PRODUCT DATA AND SAMPLES.
- B. Samples: Sign panels and frames, with letters and symbols, each type. Submit 2 sets. One set of samples will be retained by Resident Engineer, other returned to Contractor.
  - 1. Sign Panel, 200 mm x 250 mm (8 inches x 10 inches), with letters.
  - 2. Color samples of each color, 150 mm x 150 mm (6 inches x 6 inches. Show anticipated range of color and texture.
  - 3. Sample of typeface, arrow and symbols in a typical full size layout.
- C. Manufacturer's Literature:
  - 1. Showing the methods and procedures proposed for the concealed anchorage of the signage system to each surface type.
  - 2. Manufacturer's printed specifications, anchorage details, installation and maintenance instructions.
- D. Samples: Sign location plan, showing location, type and total number of signs required.
- E. Shop Drawings: Scaled for manufacture and fabrication of sign types. Identify materials, show joints, welds, anchorage, accessory items, mounting and finishes.
- F. Full size layout patterns for dimensional letters.



#### **1.5 DELIVERY AND STORAGE**

- A. Deliver materials to job in manufacturer's original sealed containers with brand name marked thereon. Protect materials from damage.
- B. Package to prevent damage or deterioration during shipment, handling, storage and installation. Maintain protective covering in place and in good repair until removal is necessary.
- C. Deliver signs only when the site and mounting services are ready for installation work to proceed.
- D. Store products in dry condition inside enclosed facilities.

#### **1.6 APPLICABLE PUBLICATIONS**

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only.
- B. American Society for Testing and Materials (ASTM):
  - B209-07.....Aluminum and Aluminum-Alloy Sheet and Plate
  - B221-06.....Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Shapes, and tubes.
- C. Federal Specifications (Fed Spec):
  - MIL-PRF-8184F.....Plastic Sheet, Acrylic, Modified.
  - MIL-P-46144C.....Plastic Sheet, Polycarbonate

#### **1.7 MINIMUM SIGN REQUIREMENTS**

- A. Permanent Rooms and Spaces:
  - 1. Tactile and Braille Characters, raised minimum 0.793 mm (1/32 in). Characters shall be accompanied by Grade 2 Braille.
  - 2. Type Styles: Characters shall be uppercase, Helvetica Medium, Helvetica Medium Condensed and Helvetica Regular.
  - 3. Character Height: Minimum 16 mm (5/8 in) high, Maximum 50 mm (2 in).
  - 4. Symbols (Pictograms): Equivalent written description shall be placed directly below symbol, outside of symbol's background field. Border dimensions of symbol background shall be minimum 150 mm (6 in) high.
  - 5. Finish and Contrast: Characters and background shall be eggshell, matte or other non-glare finish with adequate contrast with background.
  - 6. Mounting Location and Height: As shown. Mounted on wall adjacent to the latch side of the door and to avoid door swing and protruding objects.

#### **1.8 COLORS AND FINISHES:**

Section 09 06 00, SCHEDULE FOR FINISHES.

**PART 2 - PRODUCTS**

**2.1 GENERAL**

- A. Signs of type, size and design shown on the drawings and as specified.
- B. Signs complete with lettering, framing and related components for a complete installation.
- C. Provide graphics items as completed units produced by a single manufacturer, including necessary mounting accessories, fittings and fastenings.
- D. Do not scale drawings for dimensions. Contractor to verify and be responsible for all dimensions and conditions shown by these drawings. Resident Engineer to be notified of any discrepancy in drawing, in field directions or conditions, and/or of any changes required for all such construction details.
- E. The Sign Contractor, by commencing work of this section, assumes overall responsibility, as part of his warranty of work, to assure that assemblies, components and parts shown or required within the work of the section, comply with the Contract Documents. The Contractor shall further warrant: That all components, specified or required to satisfactorily complete the installation are compatible with each other and with conditions of installations.

**2.2 PRODUCTS**

- A. Cast Acrylic Sheet: MIL-PRF-8184F; Type II, class 1, Water white non-glare optically clear. Matt finish water white clear acrylic shall not be acceptable.
- B. Vinyl: 0.1 mm thick machine cut, having a pressure sensitive adhesive and integral colors.

**2.3 SIGN STANDARDS**

- A. Topography:
  - 1. Type Style: Helvetica Medium and Helvetica Medium Condensed. Initial caps or all caps as indicated in Sign Message Schedule.
  - 2. Arrow: See graphic standards in drawings.
  - 3. Letter spacing: See graphic standards on drawings.
  - 4. Letter spacing: See graphic standards on drawings.
  - 5. All text, arrows, and symbols to be provided in size, colors, typefaces and letter spacing shown. Text shall be a true, clean, accurate reproduction of typeface(s) shown. Text shown in drawings are for layout purposes only; final text for signs is listed in Sign Message Schedule.
- B. Project Colors and Finishes: See Section 09 06 00, SCHEDULE FOR FINISHES.

## 2.4 SIGN TYPES

### A. General:

1. The interior sign system is comprised of sign types families that are identified by a letter and number which identify a particular group of signs. An additional number identifies a specific type of sign within that family.
  - a. NC indicates a component construction based sign.

### B. Sign Type Family 14 and 15:

1. All text and graphics are to be first surface silk-screened.
2. NC-14 and NC-15: Refer to Sign Type 03 specification for tactile and Braille portion of sign.

### C. Sign Type Families 03:

1. Tactile sign is to be made from a material that provides for letters, numbers and Braille to be integral with sign plaque material such as: photosensitive polyamide resin, etched metal, sandblasted phenolic or embossed material. Do not apply letters, numbers and Braille with adhesive.
2. Numbers, letters and Braille to be raised 0.793 mm (.0312 inches) from the background surface. The draft of the letters, numbers and Braille to be tapered, vertical and clean.
3. Braille dots are to conform with standard dimensions for literary Braille; (a) Dot base diameter: 1.5 mm (.059 inches) (b) Inter-dot spacing: 2.3 mm (.090 inches) (c) Horizontal separation between cells: 6.0 mm (.241 inches) (d) Vertical separation between cells: 10.0 mm (.395 inches)
4. Entire assembly is painted in specified color. After painting, apply white or other specified color to surface of the numbers and letters. Entire sign is to have a protective clear coat sealant applied.
5. Complete sign is to have an eggshell finish (11 to 19 degree on a 60 degree glossmeter).

## 2.5 FABRICATION

- A. Design components to allow for expansion and contraction for a minimum material temperature range of 56 °C (100 °F), without causing buckling, excessive opening of joints or over stressing of adhesives, welds and fasteners.
- B. Form work to required shapes and sizes, with true curve lines and angles. Provide necessary rebates, lugs and brackets for assembly of units. Use concealed fasteners whenever and wherever possible.
- C. Shop fabricate so far as practicable. Joints fastened flush to conceal reinforcement, or welded where thickness or section permits.

- D. Contact surfaces of connected members be true. Assembled so joints will be tight and practically unnoticeable, without use of filling compound.
- E. Signs shall have fine, even texture and be flat and sound. Lines and miters sharp, arises unbroken, profiles accurate and ornament true to pattern. Plane surfaces be smooth flat and without oil-canning, free of rack and twist. Maximum variation from plane of surface plus or minus 0.3 mm (0.015 inches). Restore texture to filed or cut areas.
- F. Level or straighten wrought work. Members shall have sharp lines and angles and smooth surfaces.
- G. Extruded members to be free from extrusion marks. Square turns and corners sharp, curves true.
- H. Drill holes for bolts and screws. Conceal fastenings where possible. Exposed ends and edges mill smooth, with corners slightly rounded. Form joints exposed to weather to exclude water.
- I. Finish hollow signs with matching material on all faces, tops, bottoms and ends. Edge joints tightly mitered to give appearance of solid material.
- J. All painted surfaces properly primed. Finish coating of paint to have complete coverage with no light or thin applications allowing substrate or primer to show. Finished surface smooth, free of scratches, gouges, drips, bubbles, thickness variations, foreign matter and other imperfections.
- K. Movable parts, including hardware, are be cleaned and adjusted to operate as designed without binding or deformation of members. Doors and covers centered in opening or frame. All contact surfaces fit tight and even without forcing or warping components.
- L. Pre-assemble items in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for re-assembly and coordinated installation.
- M. No signs are to be manufactured until final sign message schedule and location review has been completed by the Resident Engineer & forwarded to contractor.

### **PART 3 - EXECUTION**

#### **3.1 INSTALLATION**

- A. Protect products against damage during field handling and installation. Protect adjacent existing and newly placed construction, landscaping and finishes as necessary to prevent damage during installation. Paint and touch up any exposed fasteners and connecting hardware to match color and finish of surrounding surface.

- B. Mount signs in proper alignment, level and plumb according to the sign location plan and the dimensions given on elevation and sign location drawings. Where otherwise not dimensioned, signs shall be installed where best suited to provide a consistent appearance throughout the project. When exact position, angle, height or location is in doubt, contact Resident Engineer for clarification.
- C. Contractor shall be responsible for all signs that are damaged, lost or stolen while materials are on the job site and up until the completion and final acceptance of the job.
- D. Remove or correct signs or installation work Resident Engineer determines as unsafe or as an unsafe condition.
- E. At completion of sign installation, clean exposed sign surfaces. Clean and repair any adjoining surfaces and landscaping that became soiled or damaged as a result of installation of signs.
- F. Locate signs as shown on the Sign Location Plans.
- G. Certain signs may be installed on glass. A blank glass back up is required to be placed on opposite side of glass exactly behind sign being installed. This blank glass back up is to be the same size as sign being installed.
- H. Contractor will be responsible for verifying that behind each sign location there are no utility lines that will be affected by installation of signs. Any damage during installation of signs to utilities will be the sole responsibility of the Contractor to correct and repair.
- I. Furnish inserts and anchoring devices which must be set in concrete or other material for installation of signs. Provide setting drawings, templates, instructions and directions for installation of anchorage devices which may involve other trades.

- - - END - - -

## Primary Room Identification

### Size

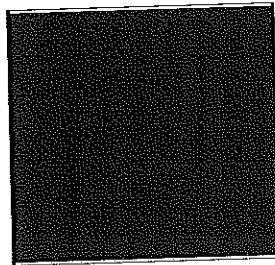
152 mm H x 152 mm W  
(6" H x 6" W)

### Description and Use

This sign must always be tactile and Braille. Use this sign to identify the occupant or activity within a room.

### Message Configuration

(Refer to layout drawing for lettering sizes and dimensions)  
Layout A is suggested for department identification. Layout B for rooms and departments with long words or names. Layout C for rooms with a common name but are in need of specific identification.



### Sign Components

Vary by sign system.

### Graphic Process

Tactile raised text and Braille

### Colors

Text: refer to color chart.  
Background: refer to color chart.

### Typography and Size

ADA/ABA compliant  
Helvetica Bold, Upper Case  
Grade 2 Braille

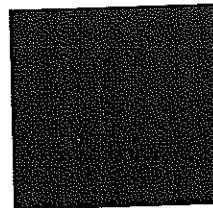
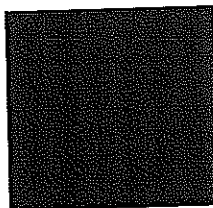
### Mounting

Double sided foam tape, silastic adhesive or screw

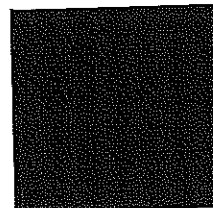
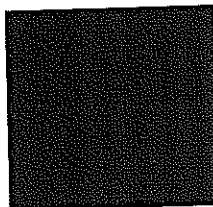
### Installation

Knob side of door, 1524 mm (60")  
to top of sign and 51 mm (2")  
over from door frame.

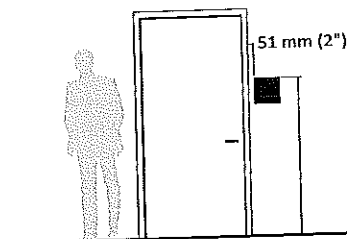
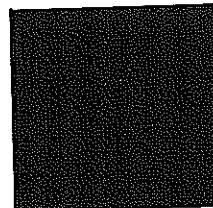
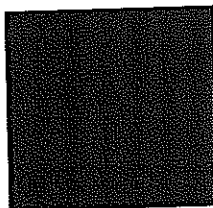
Message Layout A



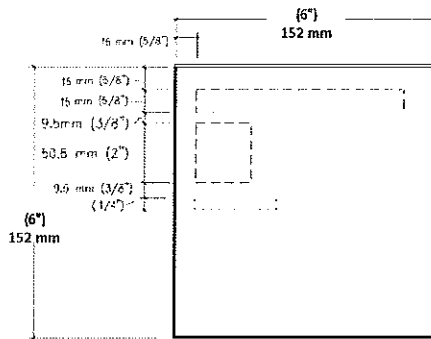
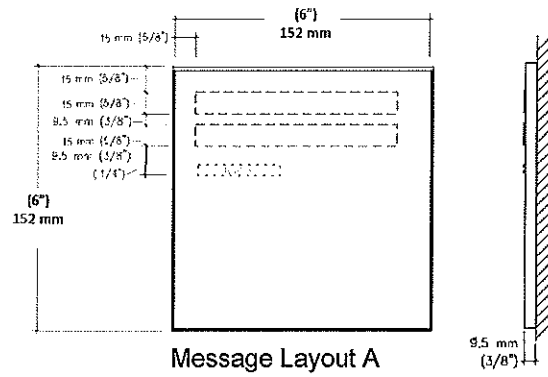
Message Layout B



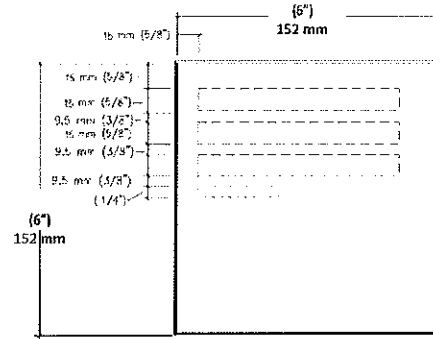
Message Layout C



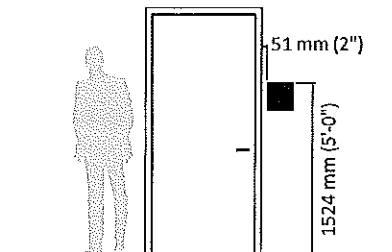
## Primary Room Identification



Message Layout B



Message Layout C



## Restroom Identification

### Size

203 mm H x 152 mm W  
(8" H x 6" W)

### Description and Use

Use these signs to inform with a symbol as well as text.

### Message Configuration

(Refer to layout drawing for lettering sizes and dimensions).

### Sign Components

Acrylic plaque

### Graphic Process

Tactile symbol and text with accompanying Braille is required

### Colors

Text: refer to color chart.  
Background and accent bar: refer to color chart.

### Typography and Size

ADA/ABA compliant  
Helvetica Bold, Upper Case  
Grade 2 Braille

### Mounting

Double sided foam tape or silastic adhesive

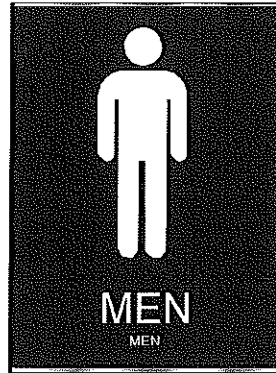
### Installation

On wall or door 1524 mm (60") to

top of sign and on door, center.

### Recommendations

These signs are for use at restrooms



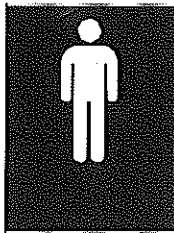
NC-15.01



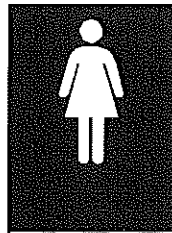
NC-15.02



NC-15.03



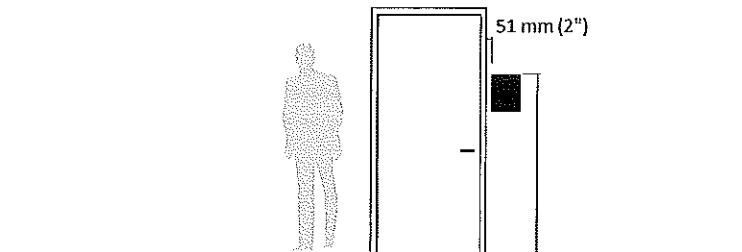
NC-15.04



NC-15.05



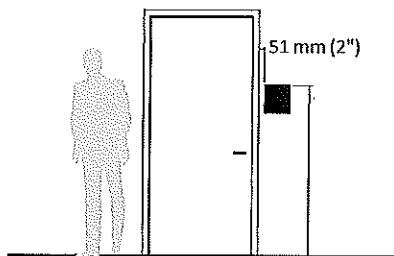
NC-15.06



Wall mounted



\_\_\_\_\_



INTERIOR SIGNAGE  
10 14 05 - 10