SECTION 09 22 16 – NON-STRUCTURAL METAL FRAMING

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes non-structural metal framing assemblies.

1.2 ASSEMBLY PERFORMANCE REQUIREMENTS

1. Typical Walls: Wall assemblies shall be constructed for deflection not to exceed 1/240 of the wall height when subjected to a positive and negative pressure of 5 psf (239 kPa).
2. Walls with Tile or Stone Finish: Wall assemblies to receive tile finishes shall be constructed for deflection not to exceed 1/360 of the wall height when subjected to a positive and negative pressure of 5 psf (239 kPa). L/600 where supporting stone.
3. Ceilings, bulkheads, soffits, ceiling transitions, ledges, and coves shall be constructed for a deflection not to exceed 1/360 of the distance between supports.
4. Partitions Enclosing Pressurized Mechanical Rooms: Provide metal framing systems of base metal thickness and spacing capable of limiting lateral deflections to L/240 when subjected to a 15 psf uniform lateral load or the design value induced by the mechanical system, whichever is greater.

1.3 SUBMITTALS

A. Product Data: Submit product data for each product indicated.

B. Evaluation Reports: Provide ICC-ESR numbers and LARR identification numbers for Metal Studs, Fasteners, and Suspension Ceilings.

C. Provide Structural Calculations signed by a licensed California Civil or Structural engineer.

1.4 QUALITY ASSURANCE

A. Fire-Test-Response Characteristics: For non-structural metal framing assemblies with fire-resistance ratings, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing and inspecting agency acceptable to authorities having jurisdiction.

1. Fire-Resistance-Rated Assemblies: Indicated by design designations from UL's "Fire Resistance Directory."

B. Sound Transmission Characteristics: For non-structural metal framing faced with gypsum wallboard materials and having STC ratings, provide materials and construction identical to those tested in assembly indicated according to ASTM E 90 and classified according to ASTM E 413 by a qualified independent testing agency.

C. STC-Rated Assemblies: Indicated by design designations from GA-600, "Fire Resistance Design Manual."

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in original packages, containers, or bundles bearing brand name and identification of manufacturer or supplier.

B. Store materials inside under cover and keep them dry and protected against damage from weather, direct sunlight, surface contamination, corrosion, construction traffic, and other causes.

1.6 PRE-INSTALLATION MEETING

A. Prior to start of the non-structural metal framing Work, and at the Contractors direction, meet at the site and review the installation procedures and coordination with other Work. Meeting shall include Contractor, Architect and major material manufacturer as well as the Installer and other subcontractors whose Work must be coordinated with the non-structural metal framing and the gypsum wallboard Work.

1.7 PROJECT CONDITIONS

A. Comply with ASTM C754 requirements or wallboard material manufacturer’s written recommendations, whichever are more stringent.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

A. General: For fire rated assemblies, provide materials, including accessories and fasteners produced by one manufacturer, or, when products of more than one manufacturer are used in a rated system, they shall be acceptable to the Los Angeles Department of Building and Safety.

2.2 STEEL SUSPENDED CEILING FRAMING

A. Components, General: Provide steel framing members sized and spaced as indicated but not less than that required to comply with ASTM C 754 under the maximum deflection conditions specified under Article ‘Assembly Performance Requirements’.

B. Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.0625-inch- (1.59-mm-) diameter wire, or double strand of 0.0475-inch- (1.21-mm-) diameter wire.

C. Hanger Attachments to Overhead Decks: Suitable for application indicated, fabricated from corrosion-resistant materials, with eyepins, clips or other devices for attaching hangers and capable of sustaining, without failure, a load equal to 10 times that imposed by the complete ceiling system.

D. Hangers: As follows:

1. Wire Hangers: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.162-inch (4.12-mm) diameter.
2. Rod Hangers: ASTM A 510 (ASTM A 510M), mild carbon steel.
    a. Diameter: 1/4-inch (6.34-mm).
    b. Protective Coating: ASTM A 153/A 153M, hot-dip galvanized.
3. Flat Hangers: Commercial-steel sheet, ASTM A 653/A 653M, G60 (Z180), hot-dip galvanized.
    a. Size: 1 by 3/16 inch (25.4 by 4.76 mm) by length indicated.

E. Carrying Channels: Cold-rolled, commercial-steel sheet with a base metal thickness of 0.0538 inch (1.37 mm), a minimum 1/2-inch- (12.7-mm-) wide flange, with manufacturer's standard corrosion-resistant zinc coating.

F. Furring Channels (Furring Members): Commercial-steel sheet with ASTM A 653/A 653M, G40 (Z120), hot-dip galvanized zinc coating.
1. Cold Rolled Channels: 0.0538-inch (1.37-mm) bare steel thickness, with minimum 1/2-inch- (12.7-mm-) wide flange, 3/4 inch (19.1 mm) deep.
2. Steel Studs: ASTM C 645, 0.0312 inch (0.79 mm) minimum base metal thickness and minimum depth as required to suit deflection criteria.
3. Hat-Shaped, Rigid Furring Channels: ASTM C 645, 7/8 inch (22.2 mm) deep.
    a. Minimum Base Metal Thickness: 0.0312 inch (0.79 mm).
4. Resilient Furring Channels: 1/2-inch- (12.7-mm-) deep members designed to reduce sound transmission.

G. Grid Suspension System for Interior Ceilings: ASTM C 645, direct-hung system composed of main beams and cross-furring members that interlock.

2.3 STEEL PARTITION AND SOFFIT FRAMING

A. General: Provide steel framing members sized and spaced as indicated but not less than that required to comply with ASTM C 754 under the maximum deflection conditions specified under Article ‘Assembly Performance Requirements’.
1. In areas where top of partitions are dependent on ceiling system for lateral support, coordinate design and installation to comply with the above deflection limitation.
2. Steel Sheet Components: Complying with ASTM C 645 requirements for metal and with ASTM A 653/A 653M, G40 (Z120), hot-dip galvanized zinc coating.

B. Steel Studs and Runners: ASTM C 645, in minimum depth indicated in partition type details.
1. Minimum Base Metal Thickness:
    a. Typical: As required to comply with deflection criteria.
    b. Partitions Supporting Wall Mounted Casework: 16 gauge (0.053 inch) (1.3 mm) minimum thickness.

c. 18 gauge minimum, galvanized metal studs @ 16” oc max at all Restroom, Janitor, and mechanical rooms.

2. Depth: As indicated.

C. Deflection Track: ASTM C645 top runner with custom fabricated flanges with depths sized to accommodate roof and floor deck live and dead load deflections but not less than 2 inch (50.8 mm) deep flanges. Steel sheet top runner manufactured to prevent cracking of gypsum board applied to interior partitions resulting from deflection of structure above; in thickness indicated for studs and in width to accommodate depth of studs; one of the following:

1. CEMCO; CST, slotted Track.
2. Dietrich Metal Framing; SLP-TRK Slotted Deflection Track.
3. MBA Building Supplies; Slotted Deflecto Track
4. Steel Network Incl; VertiClip SLD or VertiTrack VTD Series.
5. Superior metal Trim; Superior Flex Track System (SFT)
6. Telling Industries; Vertical Slip Track.

D. Firestop Track: ASTM C645 top runner with custom fabricated flanges with depths sized to accommodate roof and floor deck live and dead load deflections but not less than 2 inch (50.8 mm) deep flanges. Top runner manufactured to allow partition heads to expand and contract with movement of the structure while maintaining continuity of fire-resistance-rated assembly indicated; in thickness not less than indicated for studs and in width to accommodate depth of studs; one of the following:

1. CEMCO; FAS Track.
2. Fire Trak Corp; Fire Trak System.
3. HILTI.

E. Flat Strap and Backing Plate: 36 -inch (914-mm) wide steel sheet for blocking and bracing required for the attachment of surface mounted items and accessories indicated.

1. Minimum Base Metal Thickness: 0.040 inch (1.024mm) (18 gauge)

F. Cold-Rolled Channel Bridging: For channel bridging for fixture attachment or lateral bracing provide 0.0538-inch (1.37-mm) bare steel thickness, with minimum 1/2-inch- (12.7-mm-) wide flange:

1. Depth: 1-1/2 inches (38.1 mm).
2. Clip Angle: 1-1/2 by 1-1/2 inch (38.1 by 38.1 mm), 0.068-inch- (1.73-mm-) thick, galvanized steel.

G. Hat-Shaped, Rigid Furring Channels: ASTM C 645.

1. Minimum Base Metal Thickness: 0.0179 inch (0.45 mm).
2. Depth: 7/8 inch (22.2 mm).

H. Resilient Furring Channels: 1/2-inch- (12.7-mm-) deep, steel sheet members designed to reduce sound transmission.

I. Fasteners for Metal Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members securely to substrates involved; complying with the recommendations of the gypsum board manufacturers for applications indicated.

NOTE: On the drawings, indicate the locations for each type of metal framing, fasteners, furring or suspension system with the required spacing and corresponding thickness with their related LARR number.

2.4 AUXILIARY MATERIALS

A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written recommendations.

B. Acoustical Sealant for Exposed and Concealed Joints: Non-sag, paintable, non-staining, latex sealant, with a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24), complying with ASTM C 834 that effectively reduces airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.

C. Mold/mildew resistant Firestop materials per ASTM G21 Standard. Provide product data as evaluation for Resistance of Synthetic Polymetric Materials to Fungi.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates to which non-structural metal framing attaches or abuts, installed door frames and structural framing with Installer present for compliance with requirements for installation tolerances and other conditions affecting performance of assemblies specified in this Section. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Coordination with Sprayed Fire-Resistive Materials:

1. Before sprayed fire-resistive materials are applied, attach offset anchor plates or ceiling runners (tracks) to surfaces indicated to receive sprayed-on fire-resistive materials. Where offset anchor plates are required, provide continuous plates fastened to building structure not more than 24 inches (600 mm) o.c.

2. After sprayed fire-resistive materials are applied, remove them only to extent necessary for installation of the non-structural metal framing and without reducing the fire-resistive material thickness below that which is required to obtain fire-resistance rating indicated. Protect remaining fire-resistive materials from damage.

3.3 INSTALLING STEEL FRAMING, GENERAL

A. General: Install steel framing to comply with ASTM C754, ASTM C840 and the gypsum board manufacturers recommendations, where standards conflict the more stringent shall apply.

B. Install supplementary framing, blocking, backerplates and bracing at locations in gypsum board assemblies which are indicated to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction. Comply with details indicated and with gypsum board manufacturer's written recommendations or, if none available, with United States Gypsum's "Gypsum Construction Handbook."

C. Isolate steel framing from building structure to prevent transfer of loading imposed by structural movement.

1. Isolate ceiling assemblies where they abut or are penetrated by building structure.
2. Isolate partition framing and wall furring where it abuts structure, except at floor. Install slip-type joints at head of assemblies that avoid axial loading of assembly and laterally support assembly.
    a. Use deep-leg deflection track where indicated.
    b. Use proprietary firestop track where indicated.

3.4 INSTALLING STEEL SUSPENDED CEILING FRAMING

A. Suspended Ceiling Framing:

1. Suspend ceiling hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structural or ceiling suspension system. Splay hangers only where required to miss obstructions and offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
2. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with the location of hangers required to support standard suspension system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards.
3. Attach hangers to structural members. Do not support ceilings from or attach hangers to permanent metal forms, steel deck tabs, steel roof decks, ducts, pipes, or conduit.
4. Secure wire hangers by looping and wire-tying, to eyescrews, or other devices and fasteners that are secure and appropriate for substrate, and in a manner that will not cause them to deteriorate or otherwise fail.
5. Secure rod and flat hangers to structure, including intermediate framing members, by attaching to devices and fasteners that are secure and appropriate for structure and hanger, and in a manner that will not cause hangers to deteriorate or otherwise fail.

B. Installation Tolerances: Install steel framing components for suspended ceilings so members for panel attachment are level to within 1/8 inch in 12 feet (3 mm in 3.6 m) measured lengthwise on each member and transversely between parallel members.

C. Wire-tie or clip furring channels to supports, as required to comply with requirements for assemblies indicated.

D. Install suspended steel framing components in sizes and spacings indicated, but not less than that required by the referenced steel framing and installation standards unless more stringent spacings are recommended by the gypsum board manufacturer.

E. Grid Suspension System: Attach perimeter wall track or angle where grid suspension system meets vertical surfaces. Mechanically join main beam and cross-furring members to each other and butt-cut to fit into wall track.

3.5 INSTALLING STEEL PARTITION AND SOFFIT FRAMING

A. Install continuous runners (tracks) sized to match studs at floors, ceilings, and structural walls and columns where gypsum board stud assemblies abut other construction. Secure runners to substrates with fasteners spaced a maximum of 24 inches (600 mm) o.c. unless closer spacing is recommended by the framing manufacturer for the floor and ceiling construction involved. Provide fasteners at all corners and ends of runner tracks.

1. Where studs are installed directly against exterior walls, install foam gasket isolation strip between studs and wall.

B. Installation Tolerance: Install each steel framing and furring member so fastening surfaces vary not more than 1/8 inch (3 mm) from the plane formed by the faces of adjacent framing.

C. Extend partition framing full height to structural supports or substrates above suspended ceilings, except where partitions are indicated to terminate at suspended ceilings and at partial height partitions. Continue framing over frames for doors and openings and frame around ducts penetrating partitions above ceiling to provide support for gypsum board.

1. Cut studs 1/2 inch (13 mm) short of full height to provide perimeter relief.
2. For fire-resistance-rated and STC-rated partitions that extend to the underside of floor/roof slabs and decks or other continuous solid-structure surfaces to obtain ratings, install framing around structural and other members extending below floor/roof slabs and decks, as needed to support gypsum board closures and to make partitions continuous from floor to underside of solid structure.
3. Terminate partition framing at suspended ceilings where indicated.
4. Terminate partial height partition framing as indicated.

D. Install steel studs and furring in sizes and at spacing indicated but not less than that required by the referenced steel framing installation standard to comply with maximum deflection and minimum loading requirements specified, unless more stringent requirements are recommended by the gypsum board manufacturer:

1. Space studs 16 inches (400 mm) o.c., unless otherwise indicated.

E. Install steel studs so flanges point in the same direction and leading edge or end of each panel can be attached to open (unsupported) edges of stud flanges first.

F. Install backerplates for support of wall mounted items.

G. Curved Partitions:

1. Cut top and bottom track (runners) through leg and web at 2-inch (50-mm) intervals for arc length. In cutting lengths of track, allow for uncut straight lengths of not less than 12 inches (300 mm) at ends of arcs.
2. Bend track to uniform curve and locate straight lengths so they are tangent to arcs.
3. Support outside (cut) leg of track by clinching steel sheet strip, 1-inch- (25-mm-) high-by-thickness of track metal, to inside of cut legs using metal lock fasteners.
4. Begin and end each arc with a stud, and space intermediate studs equally along arcs at stud spacing recommended in writing by gypsum board manufacturer for radii indicated. On straight lengths of not less than 2 studs at ends of arcs, place studs 6 inches (150 mm) o.c.

H. Frame door openings to comply with GA-600 and with gypsum board manufacturer's applicable written recommendations, unless otherwise indicated. Screw vertical studs at jambs to jamb anchor clips on door frames; install runner track section (for cripple studs) at head and secure to jamb studs.

1. Install two studs at each jamb, unless otherwise indicated. Install one additional stud no more than 6 inches (150 mm) from jamb studs at single doors greater than 48 inches (1200 mm) and at all pairs of doors.
2. Install cripple studs at head adjacent to each jamb stud. Provide runner track and typical studs above door openings with studs spaced not more than 24 inches (600 mm) o.c.
3. At all welded frames with fixed anchor clips secure stud reinforcing to jamb anchor clips with not less than two self tapping screws per clip.
4. Extend jamb studs through suspended ceilings and attach to underside of floor or roof structure above.

I. Frame openings other than door openings the same as required for door openings, unless otherwise indicated. Install framing below sills of openings to match framing required above door heads.

J. Isolation Strip Attachment: Where partitions abut exterior wall window mullions, and partition filler panels are not indicated, adhesively attach isolation strips to window mullions. Center isolation strips on mullion to form a continuous, sound resistant and lightproof, recessed joint seal for the entire length of the interface between the partition studs and trim members and the vertical window mullions.

3.6 CLEANING AND PROTECTION

A. Clean floors of all non-structural metal framing debris and leave broom clean. Excess material, scaffolding, tools and other equipment are to be removed upon completion of the Work.

B. Provide final protection and maintain conditions that ensure non-structural metal framing Work remains without damage or deterioration at time of Substantial Completion.

END OF SECTION 09 22 16

SECTION 09 29 00 - GYPSUM BOARD

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes gypsum board assemblies.

1.2 SUBMITTALS

A. Product Data: Submit product data for each product indicated.

B. Samples: Submit full size samples in 12-inch- (300-mm-) long lengths for each exposed trim accessory indicated.

1.3 QUALITY ASSURANCE

A. Fire-Test-Response Characteristics: For gypsum board assemblies with fire-resistance ratings, provide materials and construction identical to those tested in assembly indicated according to ASTM E119 by an independent testing and inspecting agency acceptable to authorities having jurisdiction.

1. Fire-Resistance-Rated Assemblies: Indicated by design designations from UL's "Fire Resistance Directory", UL Certifications or other LAWA approved testing agencies.

B. Sound Transmission Characteristics: For gypsum board assemblies with STC ratings, provide materials and construction identical to those tested in assembly indicated according to ASTM E90 and classified according to ASTM E413 by a qualified independent testing agency.

C. STC-Rated Assemblies: Indicated by design designations from GA-600, "Fire Resistance Design Manual", UL Certifications or other approved testing agencies."

D. Single-Source Responsibility for Panel Products: Obtain each type of gypsum board and other panel products from a single manufacturer.

E. Single-Source Responsibility for Finishing Materials: Obtain finishing materials from either the same manufacturer that supplies gypsum board and other panel products or from a manufacturer acceptable to gypsum board manufacturer.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in original packages, containers, or bundles bearing brand name and identification of manufacturer or supplier.

B. Store materials inside under cover and keep them dry and protected against damage from weather, direct sunlight, surface contamination, corrosion, construction traffic, and other causes. Stack gypsum panels flat to prevent sagging.

C. Handle gypsum board to prevent damage to edges, ends, and surfaces. Do not bend or otherwise damage metal corner beads and trim.

1.5 PRE-INSTALLATION MEETING

A. Prior to start of each type of gypsum wallboard system, and at the Contractors direction, meet at the site and review the installation procedures and coordination with other Work. Meeting shall include Contractor, Architect and major material manufacturer as well as the Installer and other subcontractors whose Work must be coordinated with the gypsum wallboard Work.

1.6 PROJECT CONDITIONS

A. Comply with ASTM C840 requirements or wallboard material manufacturer's written recommendations, whichever are more stringent.

B. Installation of wallboard joint treatments shall not start until the space to receive wall board joint treatments is heated to maintain a continuous and uniform temperature of not less than 55 degrees F, from one week prior to beginning of joint treatment until joint treatment is completed and thoroughly dry. Ventilation, either natural or supplied by fans, circulators or air conditioning systems shall be provided to remove excess moisture during joint treatment. Temperature requirements may be waived only on recommendation of wallboard materials manufacturer.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

A. General: For fire rated assemblies, provide materials, including accessories and fasteners produced by one manufacturer, or, when products of more than one manufacturer are used in a rated system, they shall be acceptable to authorities having jurisdiction.

2.2 INTERIOR GYPSUM WALLBOARD

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

B. Gypsum Wallboard: ASTM C36 or ASTM C1396/C1396M.

1. Regular Type:
    a. Thickness: 5/8 inch (15.9 mm), unless otherwise indicated.
    b. Long Edges: Tapered.
    c. Location: Vertical surfaces, unless otherwise indicated.
2. Type X:
    a. Thickness: 5/8 inch (15.9 mm).
    b. Long Edges: Tapered.

c. Location: Where required for fire-resistance-rated assembly.

NOTE: On the drawings indicate the locations for each type of gypsum board and tile backing units using the same terminology as in these specifications. On the drawings place UL or LARR numbers for all fire rated gypsum and cementitious backer unit assemblies.

C. Flexible Gypsum Wallboard for Curved Surfaces: ASTM C36 or ASTM C1396/C1396M, manufactured to bend to fit tight radii and to be more flexible than standard regular-type panels of the same thickness.

1. Thickness: 1/4 inch (6.4 mm).
2. Long Edges: Tapered.
3. Location: Apply in double layer at curved assemblies.

D. Sag-Resistant Gypsum Wallboard for Interior Ceilings: ASTM C36 or ASTM C1396/C1396M, manufactured to have more sag resistance than regular-type gypsum board.

1. Thickness: 1/2 inch (12.7 mm).
2. Long Edges: Tapered.
3. Location: Ceiling surfaces.

NOTE: Use Impact Resistant Gypsum Board in areas susceptible to high abuse and the use of alternative materials is not feasible. Use a minimum of 20 gauge metal framing as support.

2.3 TILE BACKING PANELS

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

B. Water-Resistant Gypsum Backing Board: ASTM C630/C630M or ASTM C1396/C1396M.

1. Core: 5/8 inch (15.9 mm).

C. Cementitious Backer Units: ANSI A118.9, in thickness indicated.

1. Thickness: 1/2 inch (12.7 mm).

NOTE: For adhesive applied ceramic tile in rest rooms, use cementitious back units as a sub-strate. When using water-resistant gypsum backing board at tile applications, the metal studs shall be spaced at 16 inches on center. When using water resistant backing board on ceilings spacing of supports shall be 12 inches on center.

2.4 TRIM ACCESSORIES

A. Interior Steel Trim Accessories: ASTM C1047; formed metal sheet steel zinc coated by hot dipped process. Shapes indicated below by reference to Fig. 1 designations in ASTM C1047.

1. Cornerbead: Use at outside corners.
2. LC-Bead with both face and back flanges to receive joint compound; use at exposed panel edges.
3. U-Bead with face and back flanges; face flange formed to be left without application of joint compound: Use where indicated.
4. Curved-Edge Cornerbead: With notched or flexible flanges; use at curved openings.
5. Expansion (Control) Joint: One-piece control joint formed with V-shaped slot, with removable strip covering slot opening. Use where indicated.

B. Aluminum Trim Accessories: Extruded aluminum trim with 1/4 inch (6.35 mm) diameter holes in fins for attachment to wallboard or studs; longest lengths available in profiles indicated; primed for finish painting; sized for scheduled wallboard thickness shown.

2.5 JOINT TREATMENT MATERIALS

A. General: Provide joint treatment materials complying with ASTM C475 and the recommendations of both the manufacturers of the wallboard products and joint treatment materials for each application indicated.

B. Joint Tape:

1. Interior Gypsum Wallboard over Metal Studs: Paper.
2. Tile Backing Panels: As recommended by panel manufacturer.

C. Joint Compound for Interior Gypsum Wallboard: For each coat use formulation that is compatible with other compounds applied on previous or for successive coats.

1. Prefilling: At open joints and damaged surface areas, use setting-type taping compound.
2. Embedding and First Coat: For embedding tape and first coat on joints, flanges of trim accessories, and fasteners, use setting-type taping compound.
3. Second coat: For filling over tape, beads and fasteners. Use setting-type, sandable topping compound.
4. Third coat: For finishing over tape, beads and fasteners. Use drying-type, all-purpose compound.
5. Skim Coat: For final coat of Level 5 finish, use drying-type, all-purpose compound.

D. Joint Compound for Tile Backing Panels:

1. Water-Resistant Gypsum Backing Board: Use setting-type taping and setting-type, sandable topping compounds.
2. Cementitious Backer Units: As recommended by manufacturer.

2.6 AUXILIARY MATERIALS

A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written recommendations.

B. Acoustical Sealant for Exposed and Concealed Joints: Non-sag, paintable, non-staining, latex sealant, with a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24), complying with ASTM C834 that effectively reduces airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E90.

C. Steel Drill Screws: ASTM C1002, unless otherwise indicated.

1. For fastening cementitious backer units, use screws of type and size recommended by panel manufacturer.

D. Sound Attenuation Blankets, and Fire Resistive Insulation for Installation Within Gypsum Wallboard Partitions: ASTM C665, Type I (blankets without membrane facing) produced by combining thermosetting resins with mineral fibers manufactured from slag wool, or rock wool.

1. Fire-Resistance-Rated Assemblies: Comply with mineral-fiber requirements of assembly.

NOTE: Sound insulation is required in all rest room walls.

E. Laminating Adhesive: Adhesive or joint compound recommended for directly adhering gypsum panels to continuous substrate.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates to which gypsum board assemblies attach or abut, installed door frames and structural framing with Installer present for compliance with requirements for installation tolerances and other conditions affecting performance of assemblies specified in this Section. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 APPLYING AND FINISHING PANELS

A. Gypsum Board Application and Finishing Standards: Install and finish gypsum panels to comply with ASTM C840, GA-216, and the gypsum wallboard manufacturer’s recommendations, where standards conflict, the more stringent shall apply.

B. Install sound attenuation blankets before installing gypsum panels, unless blankets are readily installed after panels have been installed on one side.

C. Single-Layer Application:

1. On ceilings, apply gypsum panels before wall/partition board application to the greatest extent possible and at right angles to framing, unless otherwise indicated. Install ceiling board panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in the central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.
2. On partitions/walls, apply gypsum panels vertically (parallel to framing), unless otherwise indicated or required by fire-resistance-rated assembly, and minimize end joints or avoid them entirely.
    a. Stagger abutting end joints not less than one framing member in alternate courses of board.
    b. At high walls, install panels horizontally, unless otherwise indicated or required by fire-resistance-rated assembly.

D. Multilayer Application:

1. On Partitions/Walls: Apply gypsum board indicated for base layers and face layers vertically (parallel to framing) with joints of base layers located over stud or furring member and face-layer joints offset at least one stud or furring member with base-layer joints, unless otherwise indicated or required by fire-resistance-rated assembly. Stagger joints on opposite sides of partitions.
2. On Ceilings: Apply gypsum board indicated for base layers before applying base layers on walls/partitions; apply base layers in same sequence. Apply base layers at right angles to framing members and offset face layer joints 1 framing member, 16 inches minimum, from parallel base joints, unless otherwise indicated or required by fire-resistance-rated assembly.

E. Single-Layer Fastening Methods: Apply gypsum panels to supports with steel drill screws.

F. Multilayer Fastening Methods: Fasten base layers and face layers separately to supports with screws.

G. Laminating to Substrate: Where gypsum panels are indicated as directly adhered to a substrate (other than studs, furring members, or base layer of gypsum board), comply with gypsum board manufacturer's written recommendations and temporarily brace or fasten gypsum panels until fastening adhesive has set.

H. Curved Partitions:

1. Install panels horizontally and unbroken, to the extent possible, across curved surface plus 12 inches (300 mm) long straight sections at ends of curves and tangent to them.
2. Wet gypsum panels on surfaces that will become compressed where curve radius prevents using dry panels. Comply with gypsum board manufacturer's written recommendations for curve radii, wetting methods, stacking panels after wetting, and other preparations that precede installing wetted gypsum panels.
3. On convex sides of partitions, begin installation at one end of curved surface and fasten gypsum panels to studs as they are wrapped around curve. On concave side, start

fastening panels to stud at center of curve and work outward to panel ends. Fasten panels to framing with screws spaced 12 inches (300 mm) o.c.

4. For double-layer construction, fasten base layer to studs with screws 16 inches (400 mm) o.c. Center gypsum board face layer over joints in base layer, and fasten to studs with screws spaced 12 inches (300 mm) o.c.

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

I. Tile Backing Panels:

1. Water-Resistant Gypsum Backing Board: For substrates indicated to receive thin-set tile, install water-resistant gypsum backing board panels, unless otherwise indicated. Where tile backing panels abut other types of panels in the same plane, shim surfaces to produce a uniform plane across panel surfaces.

2. Cementitious Backer Unit Application: ANSI A108.11 at showers and where otherwise indicated.

J. Install gypsum panels with face side out. Do not install imperfect, damaged, or damp panels. Butt panels together for a light contact at edges and ends with not more than 1/16 inch (1.5 mm) of open space between panels. Do not force into place.

K. Locate edge and end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions.

L. Attach gypsum panels to steel studs so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.

M. Attach gypsum panels to framing provided at openings and cutouts.

N. Cover both faces of steel stud partition framing with gypsum panels in concealed spaces (above ceilings, etc.), except in chases braced internally.

1. Fit gypsum panels around ducts, pipes, and conduits.

2. Where partitions intersect open exterior and interior wall kickers, and other structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by the wall kickers and other structural members; allow 1/4- to 3/8-inch- (6.4- to 9.5-mm-) wide joints to install sealant.

3. Where chase walls are shown, provide bracing between parallel rows of studs. Unless otherwise shown, provide gypsum wallboard braces no less than 1/2-inch- (12.7-mm-) thick x 12-inches- (300-mm-) wide and cut to width of chase. Locate at quarter points in wall height between each pair of parallel studs. Fasten with not less than 3 screws at each stud.

O. Isolate perimeter of non-load-bearing gypsum board partitions at structural abutments, except floors. Provide ¼ to ½ inch (6.4 to 12.7 mm) wide spaces at these locations, and trim edges with U-bead edge trim where edges of gypsum panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.

P. STC-Rated Assemblies: Seal construction at perimeters, behind control and expansion joints, and at openings and penetrations with a continuous bead of acoustical sealant. Install acoustical sealant at both faces of partitions at perimeters and through penetrations. Comply with ASTM C919 and manufacturer's written recommendations for locating edge trim and closing off sound-flanking paths around or through gypsum board assemblies, including sealing partitions above acoustical ceilings.

Q. Cut openings in wallboard for electrical outlets, piping and other penetrations. Maintain close tolerances so that edges will be covered by plates and escutcheons. Cut both face and back paper. Do not install electrical outlets back to back on opposing sides of partitions.

R. Space fasteners in gypsum panels according to referenced gypsum board application and finishing standard and manufacturer's written recommendations.

1. Space screws a maximum of 12 inches (304.8 mm) o.c. for vertical applications.
2. Space fasteners in panels that are tile substrates a maximum of 8 inches (203.2 mm) o.c.
3. Install fasteners not less than 3/8-inch- (9.5-mm-) from ends or edges of wallboard sheets, spacing fasteners opposite each other on adjacent ends or edges.
4. Begin fastening from center of wallboard and proceed toward edges and corners.
5. Apply pressure on surface of wallboard adjacent to fasteners being driven to ensure that wallboard will be secured tightly to supporting members.
    a. Drive fastener with shank perpendicular to face of board.
    b. Drive screws with a power screwdriver as recommended by wallboard manufacturer. Set heads of screws slightly below surface of paper without cutting paper.

3.3 INSTALLING TRIM ACCESSORIES

A. General: Fasten trim accessories according to manufacturer's written instructions for type, length, and spacing of fasteners.

B. Install corner beads at external corners.

C. Install interior trim accessories where edge of gypsum panels would otherwise be exposed or semi-exposed. Provide interior trim accessories with face flange formed to receive joint compound.

D. Install aluminum trim accessories where indicated.

E. Install control joints in locations indicated and where directed by the Architect for visual effect, or if not indicated or directed by the Architect, provide control joints in accordance with ASTM C840 which is as follows:

1. Where a partition, wall or ceiling traverses a construction joint (expansion, seismic, or building control element) in the base building structure.

2. Where a wall or a partition runs in an uninterrupted straight plane exceeding 30 linear feet (9,100 mm).

3. Control joints in interior ceilings with perimeter relief shall be installed so that linear dimensions between control joints do not exceed 50 feet (15,000 mm) and total area between control joints does not exceed 2500 square feet (230 m^2).

4. Control joints in interior ceilings without perimeter relief shall be installed so that linear dimensions between control joints do not exceed 30 linear feet (9,100 mm) and total area between control joints does not exceed 900 square feet (84 m^2).

5. A control joint or intermediate blocking shall be installed where ceiling framing members change direction.

3.4 FINISHING GYPSUM BOARD ASSEMBLIES

A. General: Apply joint treatment at gypsum board joints, flanges of interior trim and aluminum trim accessories, interior angles, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration and levels of gypsum board finish indicated. Produce surfaces free of tool marks and ridges ready for decoration of type indicated. Promptly remove residual joint compound from adjacent surfaces.

B. Prefill open joints and damaged surface areas.

C. Apply joint tape over gypsum board joints, except those with trim having flanges not intended for tape.

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

E. Gypsum Board Finish Levels: Finish panels to levels indicated below, according to ASTM C840, for locations indicated:

1. Level 1: Embed tape at joints in ceiling plenum areas, concealed areas, and where indicated, unless a higher level of finish is required for fire-resistance-rated assemblies and sound-rated assemblies.

2. Level 2: Embed tape and apply separate first coat of joint compound to tape, fasteners, and trim flanges where panels are substrate for tile and where indicated.

3. Level 4: Embed tape and apply separate first, fill, and finish coats of joint compound to tape, fasteners, and trim flanges at panel surfaces that will be exposed to view, unless otherwise indicated.

4. Level 5: Embed tape and apply separate first, fill, and finish coats of joint compound to tape, fasteners, and trim flanges, and apply skim coat of joint compound over entire surface where wallboard is indicated to receive wall coverings, semi-gloss and high gloss paints, and Italian plaster.

3.5 CLEANING AND PROTECTION

A. Clean floors of all wallboard debris and leave broom clean. Excess material, scaffolding, tools and other equipment are to be removed upon completion of the Work.

B. Provide final protection and maintain conditions that ensure gypsum board assemblies remain without damage or deterioration at time of Substantial Completion.

END OF SECTION 09 29 00

SECTION 09 30 00 - TILING

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes ceramic and porcelain tile.

1.2 PERFORMANCE REQUIREMENTS

A. Static Coefficient of Friction: For tile installed on walkway surfaces, provide products with the following values as determined by testing identical products per ASTM C1028:

1. Level Surfaces: Minimum 0.6.
2. Step Treads: Minimum 0.6.
3. Ramp Surfaces: Minimum 0.8.

1.3 SUBMITTALS

A. Product Data: Submit product data for each product used.

B. Samples: Submit samples showing full range of color and texture variations expected.

1. Full size units of each type, composition, color, and finish of tile.
2. Assembled samples with grouted joints for each color grout and for each type, composition, color, and finish of tile.
3. Thresholds in 6-inch (150-mm) lengths, each type.

C. Test Reports: Submit test reports from qualified independent, L.A. City Approved testing laboratory indicating and interpreting test results relative to compliance of tile products with requirements specified for slip resistance.

D. Maintenance instructions: Submit maintenance instructions for each type of product installed.

1.4 QUALITY ASSURANCE

A. Installer: Engage an installer, with a minimum of 5 years of successful commercial tile installations similar in material, design, and scope to that indicated.

B. Source Limitations for Tile: Obtain tile from one source or producer, and from same production run and of consistent quality in appearance and physical properties for each contiguous area.

C. Field-Constructed Sample Installations: Before installing tile, erect sample installations for each form of construction and finish required to verify selections made under sample submittals and to demonstrate aesthetic effects as well as qualities of materials and

execution. Build sample installations to comply with the following requirements, using materials indicated for final unit of Work.

1. Locate sample installations on site, in locations and size indicated or, if not shown or indicated, as directed by LAWA but not less than 100 sq. ft. (9.29 sq. m) area for floors, and not less than 100 sq. ft. (9.29 sq. m) area for walls.
2. Retain and maintain sample installations during construction in undisturbed condition as a standard for judging completed unit of Work.
3. Approved sample installations may become part of the completed Work if undisturbed at time of Substantial Completion.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use. Comply with requirement in ANSI A137.1 for labeling sealed tile packages.

B. Prevent damage or contamination to materials by water, freezing, foreign matter, and other causes.

1.6 PROJECT CONDITIONS

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

B. Maintain temperatures at 50°F or more in tiled areas during installation and for 7 days after completion, unless higher temperatures are required by referenced installation standard or manufacturer's instructions.

C. Illuminate work areas during installation to provide the same or greater level of illumination required to properly perform this work and as will occur in the room or space after the building is in operation.

1.7 EXTRA MATERIALS

A. Provide attic stock equal to the following for each type, color, pattern, and size (or fraction thereof) of tile provided for the project. Supply in manufacturer’s unopened containers, identified with name, brand type, grade, class and all other qualifying information, to a location where directed by LAWA.

1. 2% of amount installed but not less than one box.

PART 2 - PRODUCTS

2.1 TILE PRODUCTS, GENERAL

A. ANSI Ceramic Tile Standard: Provide Standard grade tile that complies with ANSI A137.1, "Specifications for Ceramic Tile," for types, compositions, and other characteristics indicated.

B. Mounting: For factory-mounted tile, provide back- or edge-mounted tile assemblies as standard with manufacturer, unless otherwise indicated.

C. Tile Trim Units: Matching characteristics of adjoining flat tile and coordinated with sizes and coursing where applicable.

D. Floor Tiles

1. Manufacturers: “Crossville”; Daltile; or Approved Equal
2. Size: 12” x 12”

E. Wall Tiles

1. Manufacturers: “Crossville”; Daltile; or Approved Equal
2. Size: Square or rectangular shape with no dimension less than 4”.

F. Wall Base Tiles

1. Manufacturers: Same as Floor Tiles
2. Size: Will be one piece self-coved tile with inside corner and outside corner base tiles.

2.2 ACCESSORY MATERIALS

A. Thresholds: Fabricate to provide transition between adjacent floor finishes. Bevel edges at 1:2 slope, limit height of bevel to 1/2 inch (12.7 mm) or less, and finish bevel to match face of threshold.

1. Marble Thresholds: ASTM C503 with a minimum abrasion resistance of 12 per ASTM C1353 or ASTM C241 and with honed finish.
   a. Description: Uniform, fine- to medium-grained white stone with gray veining.

B. Waterproofing for all Wet Areas and Existing Concrete Slabs on Grade.

1. Fabric-Reinforced, Fluid-Applied Product: System consisting of liquid-latex rubber and fabric reinforcement which are compatible with mortar bed specified and complying with ANSI A118.10; one of the following:
   a. Custom Building Products; 9240 Waterproofing and Anti-Fracture Membrane.
   b. LATICRETE International Inc.; Laticrete 9235 Waterproof Membrane.

c. MAPEI Corporation; Mapelastic 400.

NOTE: All wet areas such as but not limited to kitchens, rest rooms, custodial closets and all existing concrete slabs on grade, will incorporate a waterproofing membrane as part of the floor assembly. Indcate relevant waterproofing details on the drawings. The waterproofing membrane will extend up the wall, a minimum of 3 feet, behind all wall hung plumbing fixtures and 12 inches high at all walls without plumbing fixtures. Provide penetration waterproofing details where partitions or other built-ins are attached to a wall system that has a waterproofing layer.

2.3 SETTING AND GROUTING MATERIALS

A. Manufacturers:

1. Custom Building Products.
2. LATICRETE International Inc.
3. MAPEI Corporation.

B. Source Limitations: For each tile installation, obtain compatible formulations of setting and grouting materials containing latex or latex additives from a single manufacturer.

C. Portland Cement Mortar (Thickset) Installation Materials: ANSI A108.1A and as specified below:

1. Reinforcing Wire Fabric: Galvanized, flat, welded wire fabric, 2” x 2” x 0.062 inch (50.8 x 50.8 mm x 1.57 mm) diameter; comply with ASTM A185 and ASTM A82 except for minimum wire size.
2. Latex Additive: Manufacturer's standard styrene-butadiene-rubber water emulsion, serving as replacement for all gaging water, of type specifically recommended by latex-additive manufacturer for use with field-mixed Portland cement and aggregate mortar bed.

D. Latex-Portland Cement Mortar (Thin Set): ANSI A118.4 consisting of the following:

1. Prepackaged dry-mortar mix combined with liquid-latex additive.
2. For wall applications, provide non-sagging mortar.

E. Medium-Bed, Latex-Portland Cement Mortar: ANSI A118.4:

1. Prepackaged dry-mortar mix combined with liquid-latex additive.

F. Polymer-Modified Tile Grout: ANSI A118.7.

1. Polymer Type: Dry, redispersible form, prepackaged with other dry ingredients.
2. Colors: As selected from manufacturers standards to match tile being grouted.

G. Epoxy Tile Grout: ANSI A118.3:

1. Colors: As selected from manufacturers standards to match tile being grouted.

NOTE: Epoxy grout will be used in all restrooms. Latex grout in restrooms is not allowed. All grout joints will be made as small as possible.

TCA "method F111" for suspended slabs and TCA "method F113" for slabs on grade. Industry approved anti-fracture membrane is required for both methods.

2.4 MISCELLANEOUS MATERIALS

A. Sealants: 'Silicone sanitary sealant'.

B. Tile Cleaner: A neutral cleaner capable of removing soil and residue without harming tile and grout surfaces, specifically approved for materials and installations indicated by tile and grout manufacturers.

2.5 MIXING MORTARS AND GROUT

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

PART 3 - EXECUTION

3.1 PREINSTALLATION MEETING

A. Prior to the installation of tile, meet at the project site to review the material selections, substrate preparations, installation procedures, coordination with other trades, special details and conditions, standard of workmanship, and other pertinent topics related to the Work. The meeting shall include LAWA, the Architect of Record, the Contractor, tile installer, tile and setting material manufacturer's representatives, and representatives of other trades or subcontractors affected by the installation.

3.2 EXAMINATION

A. Examine substrates, areas, and conditions where tile will be installed, with Installer present.

1. Verify that substrates for setting tile are firm; dry; clean; free of oil, waxy films, and curing compounds. Grind concrete substrates to remove existing floor adhesive and mortar residues, films, sealing and curing compounds if they are determined to be present on the substrate.
2. Verify that installation of grounds, anchors, recessed frames, electrical and mechanical units of work, and similar items located in or behind tile has been completed before installing tile.

3. Verify that joints and cracks in tile substrates are coordinated with tile joint locations; if not coordinated, adjust joint locations in consultation with the Architect of Record.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.3 PREPARATION

A. Remove paint, coatings, including curing compounds and other substances that are incompatible with tile-setting materials.

B. Blending: Color blend tiles at Project site before installing.

1. Furnish the same lots, batches, etc. within the same contiguous areas of the site (i.e. corridors on the same floors, common rooms which adjoin each other, etc.).

3.4 INSTALLATION, GENERAL

A. ANSI Tile Installation Standards: Comply with parts of ANSI A108 Series "Specifications for Installation of Ceramic Tile" that apply to types of setting and grouting materials.

B. TCA Installation Guidelines: TCA's "Handbook for Ceramic Tile Installation".

C. Extend tile work into recesses and under or behind equipment and fixtures to form complete covering without interruptions, unless otherwise indicated. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.

D. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap tile.

E. Jointing Pattern: Lay tile in grid pattern, unless otherwise indicated. Align joints when adjoining tiles on floor, base, walls, and trim are same size. Lay out tile work and center tile fields in both directions in each space or on each wall area beginning at thresholds. Adjust to minimize tile cutting. Provide uniform joint widths, unless otherwise indicated.

1. For tile mounted in sheets, make joints between tile sheets same width as joints within tile sheets so joints between sheets are not apparent in finished work.

F. Movement (Expansion) Joints: Locate sealant filled expansion joints where recommended by the manufacturers of mortar and tile materials but not less than the requirements of TCA EJ171, and as accepted by the Architect of Record. Form movement joints and other sealant-filled joints during installation of setting materials, mortar beds, and tile. Do not saw-cut joints after installing tiles.

1. Locate joints in tile surfaces directly above joints in concrete substrates.
2. Prepare joints and apply sealants.

NOTE: All control joints to be carried to the surface.

3.5 WATERPROOFING INSTALLATION

A. Install waterproofing to comply with ANSI A108.13 and waterproofing manufacturer's written instructions to produce waterproof membrane of uniform thickness bonded securely to substrate.

1. Do not install tile over waterproofing until waterproofing has cured and been tested to determine that it is watertight.

3.6 FLOOR TILE INSTALLATION

A. Thinset Tile over Concrete Slabs (Typical): Install in accordance with the mortar manufacturer's recommendations and requirements indicated below for ANSI setting bed methods, TCA installation methods related to types of subfloor construction, and grout ANSI installation methods and grout types. Where recommendations and methods conflict, the manufacturer's recommendations shall apply.

1. Mortar: Latex-Portland Cement Mortar: ANSI A108.5.
2. Concrete Subfloors, Interior: TCA F113.
    a. With a trowel, having notches sized as recommended by the mortar manufacturer, comb the surface of the mortar with the notched side of the trowel removing excess mortar. Spread only as much mortar as can be covered in the time limits established by the mortar manufacturers recommendations.
    b. Wipe the back of each tile, with a damp sponge, to remove all dust or dirt immediately before applying mortar to tiles.
    c. Immediately after wiping tile backs, but prior to placing tile, the mortar shall be troweled to back of tile for 100% coverage to thickness of not less than 1/16-inch (1.5-mm).
    d. Place tiles onto mortar bed, maintaining 1/8-inch (3-mm) wide joints, and true accurate pattern as shown. Exercise care to quickly remove spillage from faces of tile using water. Rake out joints to depth required to receive grout as tile units are set.
    e. Prohibit foot and wheel traffic on tiled floors for period of time as recommended by the mortar manufacturer.
3. Grout Installation, Latex-Portland cement: ANSI A108.10.

B. Thinset Tile over Waterproof Membrane (*Toilet Rooms, Kitchens and any other wet areas, in addition to all concrete slabs on grade*): Install in accordance with the mortar manufacturer's recommendations and requirements indicated below for ANSI setting bed methods, TCA installation methods related to types of subfloor construction, and grout ANSI installation methods and grout types. Where recommendations and methods conflict, the manufacturer's recommendations shall apply.

1. Mortar: Latex-Portland Cement Mortar: ANSI A108.5.
2. Concrete Subfloors, Interior: TCA F122.
    a. Apply the mortar to waterproofed slab with the flat side of the trowel.
    b. With a trowel, having notches sized as recommended by the mortar manufacturer, comb the surface of the mortar with the notched side of the trowel removing excess mortar. Spread only as much mortar as can be covered in the time limits established by the mortar manufacturers recommendations.
    c. Wipe the back of each tile, with a damp sponge, to remove all dust or dirt immediately before applying mortar to tiles.
    d. Immediately after wiping tile backs, but prior to placing tile, the mortar shall be troweled to back of tile for 100% coverage to thickness of not less than 1/16-inch (1.5-mm).
    e. Place tiles onto mortar bed, maintaining 1/8-inch (3-mm) wide joints, and true accurate pattern as shown. Exercise care to quickly remove spillage from faces of tile using water. Rake out joints to depth required to receive grout as tile units are set.
    f. Prohibit foot and wheel traffic on tiled floors for period of time as recommended by the mortar manufacturer.
3. Grout Installation, Latex-Portland cement: ANSI A108.10.

C. Mediumset Tile (Only where indicated): Install in accordance with the mortar manufacturer's recommendations and requirements indicated below for ANSI setting bed methods, TCA installation methods related to types of subfloor construction, and grout ANSI installation methods and grout types. Where recommendations and methods conflict, the manufacturer's recommendations shall apply.

1. Mortar: Latex-Portland Cement Mortar: ANSI A108.5.
2. Concrete Subfloors, Interior: TCA F113 except apply medium set bed thickness.
    a. With a trowel, having notches sized as recommended by the mortar manufacturer, comb the surface of the mortar with the notched side of the trowel removing excess mortar. Spread only as much mortar as can be covered in the time limits established by the mortar manufacturers recommendations.
    b. Wipe the back of each tile, with a damp sponge, to remove all dust or dirt immediately before applying mortar to tiles.
    c. Immediately after wiping tile backs, but prior to placing tile, the mortar shall be troweled to back of tile for 100% coverage to thickness of not less than 1/16-inch (1.5-mm).
    d. Place tiles onto mortar bed, maintaining 1/8-inch (3-mm) wide joints, and true accurate pattern as shown. Exercise care to quickly remove spillage from faces of tile using water. Rake out joints to depth required to receive grout as tile units are set.
    e. Prohibit foot and wheel traffic on tiled floors for period of time as recommended by the mortar manufacturer.
3. Grout Installation: Latex-Portland cement: ANSI A108.10.

D. Thickset Tile (Only where indicated): Install in accordance with the mortar manufacturer's recommendations and requirements indicated below for ANSI setting bed methods, TCA installation methods related to types of subfloor construction, and grout

ANSI installation methods and grout types. Where recommendations and methods conflict, the manufacturer's recommendations shall apply.

1. Mortar and Bond Coat:
   a. Latex-Portland Cement Mortar: ANSI A108.1A (Wet Set Method).
   b. Latex-Portland Cement Bond Coat: ANSI A108.5.
2. Concrete Subfloors, Interior: TCA F121.
   a. Apply ½ of the mortar bed to slab and place reinforcing wire fabric. After placing mesh, apply balance of mortar bed. The mortar shall be rodded and compacted with a steel trowel.
   b. Wipe the back of each tile, with a damp sponge, to remove all dust or dirt immediately before applying bond coat to tiles
   c. Immediately after wiping tile backs, but prior to placing tile, the mortar shall be troweled to back of tile sheets for 100% coverage to thickness of not less than 1/16-inch (1.5-mm)
   d. Place tile onto the green mortar bed, maintaining 1/8-inch (3-mm) wide joints for typical tile units and 1/4-inch (6.35-mm) wide joints for quarry tile units if any, and true accurate pattern as shown. Tamp tile with wood block and rubber mallet to produce finish levels of tile matching adjacent tile surfaces. Beating shall take place prior to mortar taking and initial set. Exercise care to quickly remove spillage from faces of tile using water. Rake out joints to depth required to receive grout as tile units are set.
   e. Prohibit foot and wheel traffic on tiled floors for period of time as recommended by the mortar manufacturer.
3. Grout Installation: Latex-Portland cement: ANSI A108.10.

E. Stone Thresholds: Install stone thresholds in one piece, notched to fit neatly at door jambs; set in same type of setting bed as abutting field tile in accordance with TCA Method TR611.

3.7 WALL TILE INSTALLATION

A. Install in accordance with the mortar manufacturer's recommendations and requirements indicated below for ANSI setting bed methods, TCA installation methods related to types of construction, and grout ANSI installation methods and grout types. Where recommendations and methods conflict, the manufacturer's recommendations shall apply.

1. Latex Portland Cement Mortar Installation (using specified latex Portland cement mortar material): ANSI A108.5.
2. Gypsum Wallboard, Interior (Latex Portland Cement Mortar) Method: TCA W243, place tiles maintaining 1/8-inch (3-mm) wide joints, and true accurate pattern as shown.
3. Cementitious Backerboard (Latex Portland Cement Mortar) Method: TCA W244, place tiles maintaining 1/8-inch (3-mm) wide joints, and true accurate pattern as shown.
4. Grout Installation: Latex-Portland cement: ANSI A108.10.

3.8 CLEANING AND PROTECTING

A. Cleaning: On completion of placement and grouting, clean all tile surfaces so they are free of foreign matter.

1. Remove grout residue from tile as soon as possible.
2. Clean grout smears and haze from tile according to tile and grout manufacturer's written instructions, but no sooner than 10 days after installation. Use only cleaners recommended by tile and grout manufacturers and only after determining that cleaners are safe to use by testing on samples of tile and other surfaces to be cleaned. Protect metal surfaces and plumbing fixtures from effects of cleaning. Flush surfaces with clean water before and after cleaning.

B. Finished Tile Work: Leave finished installation clean and free of cracked, chipped, broken, unbonded, and otherwise defective tile work.

C. When recommended by tile manufacturer, apply coat of neutral protective cleaner to completed tile walls and floors. Protect installed tile work with kraft paper or other heavy covering during construction period to prevent staining, damage, and wear.

D. Prohibit foot and wheel traffic from tiled floors for at least seven days after grouting is completed.

END OF SECTION 09 30 00

SECTION 09 51 13 – ACOUSTICAL PANEL CEILINGS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes acoustical panels and exposed suspension systems for ceilings.

1.2 ACTION SUBMITTALS

A. Product Data: For each product indicated.

B. Coordination Drawings: Drawn to scale and coordinating penetrations and ceiling-mounted items. Show the following:

1. Ceiling suspension assembly members.
2. Method of attaching hangers and lateral bracing to building structure.
3. Ceiling-mounted items including lighting fixtures, diffusers, grilles, speakers, sprinklers, access panels, and special moldings.

C. Samples: For each acoustical panel, for each exposed suspension system member, and for each color and texture required.

1.3 INFORMATIONAL SUBMITTALS

A. Product test reports.

B. Research/evaluation reports:

NOTE: Indicate LARR numbers on the drawings as a condition of plan check approval.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance data.

1.5 QUALITY ASSURANCE

A. Acoustical Testing Agency Qualifications: An independent testing laboratory or an NVLAP-accredited laboratory.

B. Fire-Test-Response Characteristics:

1. Fire-Resistance Ratings: Where indicated, provide acoustical panel ceilings identical to those of assemblies tested for fire resistance per ASTM E119 by UL or another testing and inspecting agency acceptable to authorities having jurisdiction. Ratings are indicated by design designations from UL's "Fire Resistance Directory" or from the listings of another testing and inspecting agency.
2. Surface-Burning Characteristics: Acoustical panels complying with ASTM E1264 for Class A materials, when tested per ASTM E84.

C. Seismic Standard: Comply with the following:

1. Los Angeles Department of Building and Safety Document requirements.

NOTE: Refer to LADBS document number P/BC 2008-40: Recommended Standards for Suspended Ceiling Assemblies. This document provides guidelines for designing and installing a suspended ceiling assembly and provides standard support configurations for typical conditions. This document can be found online at www.ladbs.org.

D. Mockups: Build mockups to verify selections made under sample Submittals and to demonstrate aesthetic effects and qualities of materials and execution.

1. Approved mockups are not to become part of the completed Work.

NOTE: The ceiling installing shall not be installed until the installation mock-up has been approved by LAWA.

1.6 EXTRA MATERIALS

A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply for product selection:

1. Products: Subject to compliance with LAWA selection criteria and requirements,

2.2 GENERAL

A. Acoustical Panel Standard: Comply with ASTM E1264.

1. Recycled Content: Provide acoustical panels with recycled content such that post-consumer recycled content plus one-half of pre-consumer recycled content constitutes a minimum of 70 percent by weight.

B. Low-Emitting Materials: Acoustical tile ceilings shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

C. Metal Suspension System Standard: Comply with ASTM C635.

1. Recycled Content: Provide products made from steel sheet with average recycled content such that post-consumer recycled content plus one-half of pre-consumer recycled content is not less than 25 percent.

D. Attachment Devices: Size for five times the design load indicated in ASTM C635, Table 1, "Direct Hung," unless otherwise indicated.

1. Power-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hangers of type indicated, and with capability to sustain, without failure, a load equal to 10 times that imposed by ceiling construction, as determined by testing per ASTM E1190, conducted by a qualified testing and inspecting agency.

NOTE: The use of powder actuated fasteners is by **SPECIAL APPROVAL ONLY**. Prior to the use of these fasteners, the Contractor shall develop and present to LAWA, their procedures and protocol for using such equipment at LAX.

E. Wire Hangers, Braces, and Ties: Zinc-coated carbon-steel wire; ASTM A641/A641M, Class 1 zinc coating, soft temper.

1. Size: Select wire diameter so its stress at three times hanger design load (ASTM C635, Table 1, "Direct Hung") will be less than yield stress of wire, but provide not less than 0.106 inch diameter wire.

F. Rod Hangers: ASTM A510, mild carbon steel.

1. Diameter: 1/4 inch.

2. Protective Coating: ASTM A153/A153M, hot-dip galvanized.

G. Seismic struts and seismic clips.

H. Carrying Channels: Cold-rolled, commercial-steel sheet with a base metal thickness of 0.0538 inch, a minimum 1/2 inch wide flange, and in depth indicated.

I. Metal Edge Moldings and Trim: Type and profile indicated or, if not indicated, manufacturer's standard moldings for edges and penetrations that fit acoustical panel edge details and suspension systems indicated; formed from sheet metal of same material, finish, and color as that used for exposed flanges of suspension system runners.

2.3 ACOUSTICAL PANELS

A. Products: Subject to compliance with requirements, provide one of the following:

1. Armstrong World Industries, Inc.
2. USG Corporation

2.4 METAL SUSPENSION SYSTEM

A. Products: Subject to compliance with requirements, provide one of the following:

1. Chicago Metallic Corporation

2.5 ACOUSTICAL SEALANT

A. Acoustical Sealant for Exposed and Concealed Joints: Manufacturer's standard non-sag, paintable, non-staining latex sealant, that complies with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers," complying with ASTM C834 and effective in reducing airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E90. Provide STC test report for fire resistive materials per ASTM E90. For Non-Fire Rated Acoustical and Smoke Partitions, use mold/mildew resistant sealant per ASTM G21 Standard. Sealants or sprays tested in compliance with ASTM E90, ASTM C 919, and ISO 11600.6.

2.6 INSTALLATION

A. Per manufacturer's instructions and applicable codes.

END OF SECTION 09 51 13

SECTION 09 63 40 – STONE FLOORING, INTERIOR STONEWORK

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes interior stonework.

1.2 PERFORMANCE REQUIREMENTS

A. Static Coefficient of Friction: For stone flooring installed on walkway surfaces, provide finished stone flooring installation with the following values as determined by testing the specified stone per ASTM C 1028, under a wet and a dry condition.

1. Level Surfaces: Minimum 0.6.
2. Step Treads: Minimum 0.6.
3. Ramp Surfaces: Minimum 0.8.

1.3 SUBMITTALS

A. Product Data: Submit manufacturer's technical data for each type of stone, stonework accessory, and other manufactured products required.

1. Include submittal of stone sealer manufacturer’s recommended methods for application of impregnator and surface protection coatings based on testing of project specific stone flooring materials.
2. Include submittal of stone sealer manufacturer’s recommended methods for application of impregnator and surface protection coatings based on testing of project specific stone countertop materials.

B. Shop Drawings: Submit cutting and setting drawings indicating sizes, dimensions, sections and profiles of stone units, arrangement and provisions for jointing, supporting, anchoring and bonding stonework; and other details showing relationships with, attachment to, and reception of, related work.

1. Indicate direction of book matching for stone units.
2. Show the extent of each type of movement joint. Show widths, details, and locations of expansion, contraction, control, and isolation joints in substrates receiving stone and finished stone surfaces.

C. Samples:

1. Submit sets of 12 inch (300-mm) square samples for each color, grade, finish, type and specie of stone consisting of units not less than full face size indicated for each stone

thickness. Include 3 or more units in each set of samples showing the full range of appearance characteristics to be expected in completed Work. Stone delivered to the jobsite, or installed, and which does not fall within the accepted sample range, may be subject to removal and replacement with stone that falls within the accepted sample range at no cost to the Owner.

a. Include sealer treatment on one half of exposed stone face for each sample submitted.

2. Submit one 12-inch (300-mm) long sample of each stone divider and transition strip.

3. Submit 12-inch (300-mm) long grout Samples for each color grout to be used to grout each type, composition, color, and finish of stone.

4. Adhesively Joined Shapes: Submit three (3) samples of stone countertop to apron sections bonded together with specified adhesive for each specie and finish of stone and consisting of units not less than 12-inch (300-mm) long x full size profile shown on the drawings. No fabrication of assembly shall be permitted until approval of sample is obtained.

D. Floor Stone Testing Results: Submit test reports from qualified independent, Los Angeles City Approved testing laboratory indicating and interpreting test results relative to compliance of stone flooring with requirements specified for slip resistance.

E. Maintenance Data: Submit maintenance instructions for each type of product specified.

F. Product Certificates: Submit manufacturers certifications for each type of grout and bonding material being provided are suitable for the intended use and meet or exceed the referenced standards and the requirements of this specification.

1.4 QUALITY ASSURANCE

A. Single Source Responsibility for Stone: Obtain each stone from a single source with resources to provide materials of consistent quality in appearance and physical properties, including the capacity to cut and finish material without delaying the progress of the Work.

B. Installer Qualifications:

1. Subcontract the stonework to a single firm with a minimum of 10 years successful experience in conventional set stonework comparable to that shown and specified, in not less than 3 projects of similar scope to the satisfaction of LAWA. The stonework includes, but is not necessarily limited to, the following:

a. All preparation for stonework, including but not limited to, submittals, site erection, and sample installations as specified herein.

b. Interior direct cladding to architectural woodwork and partitions, interior stone flooring, stone thresholds, and countertops.

c. All anchors, supports, inserts and fasteners for the above, fabrication and installation of same.

d. All sealants and joint fillers in conjunction with the above.

2. The connection system as shown is suggested for the stone installation. Final connection design is the sole responsibility of the Contractor.

C. Floor Stone Testing: Test project specific stone flooring materials (each specie and finish) to verify the dilution rates, visual and physical performance of the impregnator and stone protection coats. Test for slip resistance in accordance with ASTM C1028 and report the static coefficient of friction for each stone specie and finish.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to project in undamaged condition.

B. Store and handle stone and related materials to prevent their deterioration or damage due to moisture, temperature changes, contaminants, corrosion, breakage, chipping, or other causes.

1. Do not use pinch or wrecking bars.

2. Lift with wide-belt type slings where possible; do not use wire rope or ropes containing tar or other substances which might cause staining.

3. Store stones on wood skids or pallets, covered with non-staining, waterproof membrane.

   Place and stack skids and stones to distribute weight evenly and to prevent breakage or cracking of stones.

4. Protect stone on wood skids or pallets, covered with non-staining, waterproof membrane, but allow air to circulate around stones.

5. Store cementitious materials off the ground, under cover and in dry location.

1.6 PROJECT CONDITIONS

A. Maintain temperatures within range recommended by the mortar and grout manufacturer, but not less than 50 deg F (10 deg C) or more than 90 deg F (32 deg C), in spaces during stone setting. After installation maintain temperatures within range recommended by the mortar and grout manufacturer.

B. Close spaces to traffic during stone flooring installation.

C. Close spaces to traffic for 72 hours after stone flooring installation.

D. Shade all stone, materials and the work area from direct sunlight during the installation as needed to prevent rapid evaporation caused by excessive heat or wind.

1.7 PRE-INSTALLATION COORDINATION

A. Pre-Installation Meeting: Prior to the start of interior stonework, a meeting shall be held at the project site to review installation procedures and coordination with other Work. The meeting shall include the interior stone subcontractor, Contractor, Architect, LAWA, membrane installer (if any), and representatives of other trades affected by the Work.

B. Coordinate all aspects of the stonework with contiguous Work and provide components at the proper time and sequence to avoid delays in the Work.

1.8 EXTRA MATERIAL

A. Provide attic stock equal to the following for each type, color, pattern, and size (or fraction thereof) of stone provided for the project. Supply in manufacturer's unopened containers, identified with name, brand type, grade, class and all other qualifying information, to a location where directed by LAWA.

1. 2% of amount installed but not less than one box.

PART 2 - PRODUCTS

2.1 STONE, GENERAL

A. Comply with referenced standards and other requirements indicated applicable to each type of material required.

B. Provide matched blocks from a single quarry for each type, specie, color and quality of stone required. Extract blocks from a single bed of quarry stratum, especially reserved for Project, unless stones from randomly selected blocks are acceptable to Architect for aesthetic effect.

C. Visual Performance Criteria: All portions of stonework shall be furnished complying with the following criteria, all as reviewed and accepted by the Architect through sample submissions, sample installations, and thereafter on-site observations:

1. Color Range: Matching Architect's samples; uniform with no discernible variations between pieces in any contiguous area.
2. Finishing Technique:
    a. Polished Finish: Uniform highly reflective mirror gloss finish with the full color and crystal structure of the stone visible through the finish. Evidence of swirl shall not be permitted.
    b. Honed Finish: Uniform throughout. Evidence of swirl shall not be permitted.
    c. Thermal (Flamed) Finish: Uniform textured finish produced by the application of a high temperature flame to the stone surface with all panels processed horizontally

(parallel) to grade unless otherwise accepted by the Architect on the shop drawings. Evidence of channeling shall not be permitted.

2.2 STONE TYPES

A. General: Comply with ASTM C503 for marble, ASTM C615 for granite, ASTM C568 for limestone, ASTM C629 for slate, ASTM C1527 for travertine and as follows. Stone shall be sound, durable, and free of imperfections such as spalls, cracks, starts, seams, pits, stain producing minerals, and other defects that will impair its strength, durability and appearance. All material shall be subject to culling as required to match the preselected control samples prior to acquisition and thereafter through all stages of fabrication prior to delivery. Blend stone units at factory/warehouse.

B. Association Standard for Quality and Fabrication:

1. "Design Manual VII" of Marble Institute of America (MIA).
2. "Specifications for Architectural Granite" as published by the National Building Granite Quarriers Association (NBGQA)
3. "Indiana Limestone Handbook" as published by the Indiana Limestone Institute (ILI).

C. Species, Finishes, and Suppliers: Provide stone matching the Architect's samples which have been selected from the product lines, suppliers, and quarriers, indicated in the Finish Schedules on the Drawings.

2.3 SETTING AND GROUTING MATERIALS

A. Manufacturers and Plant Locations:

1. Custom Building Products.
2. LATICRETE International Inc.
3. MAPEI Corporation.

B. Source Limitations: For each type of stone installation, obtain compatible formulations of setting and grouting materials containing latex or latex additives from a single manufacturer.

C. Portland Cement Mortar (Thickset) Installation Materials: ANSI A108.1A and as specified below:

1. Reinforcing Wire Fabric: Galvanized, flat, welded wire fabric, 2" x 2" x 0.062 inch (50.8 x 50.8 mm x 1.57 mm) diameter; comply with ASTM A 185 and ASTM A 82 except for minimum wire size.
2. Latex Additive: Manufacturer's standard styrene-butadiene-rubber water emulsion, serving as replacement for all gaging water, of type specifically recommended by latex-additive manufacturer for use with field-mixed portland cement and aggregate mortar bed.

3. Bond Coats: For setting white and light colored stone use non-staining white, low alkali containing, Portland cement in the mortar that will not show through the stone body.

D. Latex-Portland Cement Mortar (Thin Set): ANSI A118.4 consisting of the following:

1. Prepackaged dry-mortar mix combined with liquid-latex additive.
2. For wall applications, provide non-sagging mortar.
3. For setting white and light colored stone tile units use non-staining white, low alkali containing, Portland cement in the mortar that will not show through the stone tile body.

E. Medium-Bed, Latex-Portland Cement Mortar: ANSI A118.4:

1. Prepackaged dry-mortar mix combined with liquid-latex additive.
2. For setting white and light colored stone tile units use non-staining white, low alkali containing, Portland cement in the mortar that will not show through the stone tile body.

F. Polymer-Modified Tile Grout: ANSI A118.7.

1. Polymer Type: Dry, re-dispersible latex/polymer powder form, prepackaged with other dry ingredients and which contain dyes that have a proven track record of not leaching into natural stone. Use sanded grout at joints 1/8 inch (3 mm) wide or greater, use unsanded grout at joints 1/8 inch (3 mm) wide or less and wherever polished stone surfaces are to be grouted.
2. Colors: As selected by Architect from manufacturers standards to match stone being grouted.

G. Crack Isolation Membrane for Stone Installations:

1. Fabric-Reinforced, Fluid-Applied Product: System consisting of liquid-latex rubber, and fabric reinforcement which are compatible with mortar bed specified and complying with ANSI A118.12; one of the following:
   a. Custom Building Products; 9240 Waterproofing and Anti-Fracture Membrane. which is manufactured in the Miami FL plant.
   b. LATICRETE International Inc.; Laticrete 9235 Waterproof Membrane. which is manufactured in the Bethany, CT plant.
   c. MAPEI Corporation; Mapelastic AquaDefense, which manufactured in the Laval, Quebec, Canada plant.

H. Water for Cleaning and Mixing Spotting Plaster: Clean, non-alkaline and potable.

I. Molding Plaster: Gypsum molding plaster complying with ASTM C59.

2.4 ACCESSORIES

A. General: Use only adhesives formulated for stone and recommended by their manufacturer for the application indicated.

B. Water-Cleanable Epoxy Adhesive for Setting Countertops, ANSI A118.3,

1. Manufacturers:

a. Custom Building Products.

b. Laticrete International, Inc.

c. Mapei Corporation.

C. Stone Seam Adhesive For Countertops: A two-component epoxy or polyester, having high wetting properties, specifically recommended in writing by the epoxy or polyester manufacturer for interior use, stone to stone joints, and for bedding stone anchors. Flowable or pourable paste grade consistency as selected by fabricator for condition of use. Provide adhesive in custom color to match selected stone.

D. Joint Sealants:

1. For Countertops: ''Mildew-Resistant Silicone Sealant'

2. Floor Joints: 'Two-Part Polyurethane Sealant for Paving Applications',

E. Floor Cleaner: Provide stone cleaners of proper formulation for stone types, finishes, and applications indicated, as recommended by stone supplier. Use cleaning agents which do not contain caustic or harsh fillers that will damage stone or stone finishes.

F. Countertop Sealer: Provide stone sealing materials as manufactured by HMK Stone Care System, Hallandale, FL. (800) 424-2HMK, (415) 643-5603 or (954) 964-1658.

1. Impregnator: Low viscosity, UV resistant, water vapor permeable, silicone based impregnator specifically formulated to penetrate stone and grout pore structures without changing the color or sheen of the stone to which it is applied and which provides an invisible barrier of protection from water, dirt, oil, grease, lipstick, wine, and hand cream lotion infiltration.

a. S34N Silicone Impregnator for factory sealing of stone countertop units, if field finishing stone countertops use S32 Silicone Impregnator.

2. Surface Protection Coating: No-rinse type, 100% natural vegetable soap cleanser, which is pH neutral (pH 7), vapor permeable and compatible with impregnator, and which emulsifies dirt and debris on the stone surface while repelling liquids. Will not change the color or sheen of the stone to which it is applied.

a. P24 Liquid Stone Soap "No Rinse".

3. Prepare countertop surfaces to receive sealer in accordance with the countertop sealer manufacturer's recommendations. Apply sealers and surface protection coatings in accordance with the countertop sealer manufacturer's instructions.

G. Floor Sealer: Provide stone sealing materials as manufactured by HMK Stone Care System, (800) 424-2HMK or (954) 964-1658.

1. Impregnator: Slip resistant, low viscosity, UV resistant, water vapor permeable, silicone based impregnator specifically formulated to penetrate stone and grout pore structures without changing the color or sheen of the stone to which it is applied and which provides an invisible barrier of protection from water, dirt, oil, grease, and alkali infiltration.

   a. S32 Silicone Impregnator.

2. Surface Protection Coating: Slip and scuff resistant, no-rinse type, 100% natural vegetable soap cleanser, which is pH neutral (pH 7), vapor permeable and compatible with impregnator, and which emulsifies dirt and debris on the stone surface while repelling liquids. Will not change the color or sheen of the stone to which it is applied.

   a. P24 Liquid Stone Soap "No Rinse".

H. Setting Buttons: Resilient plastic buttons, non-staining to stone, sized to suit joint thicknesses and bed depths of stonework involved.

I. Divider and Transition Strips: Stainless steel shapes and flat bar trims fabricated from ASTM A666 (for flat bar) and ASTM A276 (for shapes) Type 304 stainless steel, 1/4 inch (6.35 mm) wide at top edge unless otherwise indicated, depth as required to suit conditions shown and having an integral provision for anchorage to mortar bed or substrate, unless otherwise indicated. Provide NAAMM #4 satin finish at exposed top edge in the long direction, furnish in longest lengths available.

J. Countertop Framing Supports: Refer to Section 05 50 00, METAL FABRICATIONS.

2.5 STONE ANCHORS AND ATTACHMENTS

A. General: Provide anchors and attachments of type and size required to support stonework and fabricated from the following metals for conditions and anchors indicated below.

1. Expansion Anchors: Stainless steel, Type 304. Type, size and load capacity as required to support loading of 4 times the loads imposed by stone cladding system. Do not use lead shield expansion bolts or cinch anchors.

2. Anchor Tiebacks: Type 304 stainless steel dowels, cramps, straps, discs and rods in standard commercial tempers and hardness as required to sustain imposed loads and in no case less than 3/16 inch (4.5 mm) thick, complying with ASTM A666.

3. Shims: Plastic of the required joint thickness and of the size required to support the stonework.

2.6 FABRICATION

A. General: Fabricate interior stonework in sizes and shapes required to comply with requirements indicated, including details on Drawings and Shop Drawings.

1. Unless otherwise shown, provide square edges typically, with quirk mitered outside corners at stone to stone joints, to the extent indicated.

B. Accurately cut, dress, drill, fit and finish stonework to shapes, profiles and dimensions shown on Drawings and/or final shop and setting drawings. Make exposed surfaces straight, sharp, true and continuous at joints within the tolerances specified.

1. Stone Sizes: As indicated.

2. Stone Thicknesses:

a. Woodwork Tops: 1-1/2-inch (38-mm), unless otherwise shown.

b. Wall Cladding: 3/4-inch (19.05-mm), unless otherwise shown.

c. Flooring Units: 3/4-inch (19.05-mm), unless otherwise shown.

3. Fabrication Tolerances:

a. Size and Squareness:

1) Unit Thickness of 3/8-inch (9.5-mm): +/- 1/64 inch (0.4 mm) in 12" (300 mm) for tiles with polished or honed faces; or plus or minus 1/32 inch (0.8 mm) for tiles with sand-rubbed, natural-cleft, or thermal- finished faces.

2) Unit Thickness of 3/4-inch (19.05-mm) to 1-1/2-inch (38-mm): +/- 1/8-inch in 8 feet (3 mm in 2438 mm).

3) Unit Thickness of Greater than 1-1/2-inch (38-mm): +/- 1/4-inch in 8 feet (6 mm in 2438 mm).

b. Thickness:

1) 3/8-inch (9.5-mm) Stone Tiles with Smooth Finish: Vary from specified thickness by not more than plus or minus 1/32 inch (0.8 mm).

2) 3/8-inch (9.5-mm) Stone Tiles with Natural-Cleft or Thermal Finish: Vary average thickness of each tile from specified thickness by not more than plus 1/16 inch (1.5 mm), minus 0 inches.

3) Stone Tiles 3/4-inch (19.05-mm) thick or greater, All Finishes: Vary average thickness of each tile from specified thickness by not more than plus 1/16 inch (1.5 mm), minus 0 inches.

4. Cut all joints and edges square and at right angles to face, and with backs parallel to face. Cut kerfs, reveals, and rustications as shown. Make arrises straight, sharp, true, and continuous at joints.

C. Fabricate stone thresholds in sizes and profiles as indicated or required to provide transition between adjacent floor finishes.

D. Stone Countertops:

1. Undercounter Lavatories: Make cutouts for under-counter lavatories in shop using template or pattern furnished by lavatory manufacturer. Form cutouts to smooth, even curves with edges at right angles to top. Ease juncture of cutout edges with tops, and finish edges to match tops.
2. Counter-Mounted Sinks: Prepare countertops in shop for field cutting openings for counter-mounted sinks. Mark tops for cutouts and drill holes at corners of cutout locations. Make corner holes of largest radius practical.
3. Fittings: Factory core countertops for plumbing fittings, undercounter soap dispensers, and similar items provided under Section 10 28 00, TOILET AND BATH ACCESSORIES and Division 22 00 00, PLUMBING.
4. All stone countertop aprons shall be adhesively joined to the countertops using epoxy adhesive. Maximum adhesive joint width shall be limited to 1/16-inch (1.5-mm)
    a. Prior to cleaning, lightly abrade stone surfaces to be bonded.
    b. Cleaning: Stone shall be dry and clean from grease, oil, dirt, water, and loose particles.
    c. Precondition stone to be joined with adhesive to a temperature which is within the temperature range recommended by the adhesive manufacturer for assembling and curing the adhesive.
    d. Mix adhesive in parts by weight, or parts by volume, in strict accordance with the adhesive manufacturer's instructions.
    e. Stone countertops shall be assembled and cured, within the temperature range, and under the humidity conditions, recommended by the adhesive manufacturer. Apply adhesive, and brace, or use jigging, to maintain proper alignment of joined stone pieces until adhesive hardens. Remove adhesive from the stone faces which are to remain exposed in the finished Work.
    f. Assembled countertops shall not be moved until the adhesive has cured to ensure the absence of joint slippage.
    g. Apply bracing to the assembled countertops to ensure that the assembled countertops are free of torsional stress during transportation, handling and storage.

E. Carefully inspect finished stones at fabrication plant for compliance with requirements relative to qualities of appearance, material and fabrication; replace defective stones with stones that do comply.

2.7 SPOTTING, MORTAR AND GROUT MIXES

A. Spotting Plaster: Stiff mix of molding plaster and water.

B. Mortars and Grouts: Mix mortars and grouts to comply with the requirements of referenced standards and with manufacturers' written instructions including those for accurate proportioning of materials and liquid latex additive content; mix materials with type of equipment, selection of speeds, in proper containers, for time periods, and other procedure needed to produce mortars and grouts of uniform quality and with optimum performance characteristics for application specified or indicated.

PART 3 - EXECUTION

3.1 PREINSTALLATION MEETING

A. Prior to the installation of stone, and at the Contractor's direction, meet at the project site to review the material selections, substrate preparations, installation procedures, coordination with other trades, special details and conditions, standard of workmanship, and other pertinent topics related to the Work. The meeting shall include the Owner, Architect, the Contractor, stone installer, stone and setting material manufacturer's representatives, and representatives of other trades or subcontractors affected by the installation.

3.2 EXAMINATION

A. Examine substrates and areas where the stonework will be installed, with Installer present.

1. Verify that substrates for setting stone flooring are sound and free of voids, bugholes, rock pockets, honeycombs, and protrusions; and which are dry; clean; free of oil, waxy films, and curing compounds.
2. Verify that installation of grounds, anchors, recessed frames, electrical and mechanical units of work, and similar items located in or behind stone units has been completed before installing stone.
3. Verify that joints and cracks in the existing floor substrates are coordinated with stone floor joint locations; if not coordinated, adjust joint locations in consultation with Architect.
4. Do not commence installation of flooring materials until floor substrate is within the following tolerances in all directions. If substrate is not within tolerance, level the substrate using a method and a product(s) that is compatible with and acceptable to the setting materials manufacturer.
    a. Subfloor Surfaces to Receive Thinset and Medium Set Setting Beds: +/- 1/8 inch in 10 feet (3 mm in 3.05 m) non-cumulative.
    b. Subfloor Surfaces to Receive Thickset Setting Beds: +/- 1/4 inch in 10 feet (6.35 mm in 3.05 m) non-cumulative.
    c. No valleys or ridges greater than 1/8 inch (3 mm).

B. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.3 PREPARATION

A. Grind or scarify concrete substrates to remove existing floor adhesive and mortar residues (if any), laitance, films, sealing and curing compounds if they are determined to be present on the substrate.

B. Blending: Color blend stone flooring units at Project site before installing.

1. Furnish the same lots, batches, etc. within the same contiguous areas of the site (i.e. corridors on the same floors, common rooms which adjoin each other, etc.).

3.4 INSTALLATION, GENERAL

A. Installation Methods and Standards: Stone setting and pointing shall be in accordance with the applicable requirements and recommendations of the Marble Institute of America (MIA), unless otherwise specified or shown.

B. Stonework shall be installed by skilled mechanics. Employ skilled stone fitters at the site to do necessary field cutting as stones are set.

1. Use power saws with diamond tipped blades to cut stone. Cut lines straight and true, with edges eased slightly to prevent snipping.

C. Set stone to comply with requirements indicated on Drawings and Shop Drawings. Install anchors, supports, fasteners, and other attachments indicated or necessary to secure stonework in place. Shim and adjust anchors, supports, and accessories to set stone accurately in locations indicated, with uniform joints of 1/8-inch (3-mm), unless greater widths are indicated, and with edges and faces aligned. Do not install stone units which are warped, curled, cracked, chipped, or broken, discolored or not properly finished.

D. Extend stonework into recesses and under or behind equipment and fixtures to form a complete covering without interruptions, unless otherwise indicated. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.

E. Accurately form intersections and returns. Perform cutting and drilling of stone without marring visible surfaces. Fit stone closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap stone. Where cut edges will be visible after installation, finish to match factory-fabricated edges.

F. Lay stone in grid pattern, unless otherwise indicated. Align joints when adjoining stone units on floor, base, walls, and trim are the same size. Lay out stonework and center stone fields in both directions in each space beginning at thresholds. Lay out stonework and center stone fields in both directions on each wall area. Adjust to minimize cutting.

G. Divider and Transition Strips: Install divider and transition strips at locations indicated and where exposed edge of stone flooring meets carpet or other flooring which finishes flush with top of stone flooring units.

H. Movement (Contraction, Control, Expansion, and Isolation Joints) Joints: Locate sealant filled movement joints where recommended by the manufacturer of mortar and grout materials but not less than the requirements of TCNA EJ171 which follows, and as accepted by the Architect. Form movement joints and other sealant-filled joints during installation of setting materials, mortar beds, and stone. Do not saw-cut joints after installing stone.

1. Spacing Guidelines:

   a. Where stone plane abuts restraining surfaces such as perimeter walls, dissimilar floors, curbs, columns, pipes, ceilings, and where changes occur in backing materials, but not at drain strainers.

   b. In the joint between stone units making up the inside corner of planes.

   c. All contraction, control, expansion, isolation, seismic and cold joints in the horizontal structure and vertical surfaces shall continue through the stone surfaces, but not through membranes.

   d. Vertical and Horizontal Joints Widths: Widths for the stone shall be the same as the grout joint but not less than 1/8 inch (3-mm) or the width of the control, expansion, seismic, joint whichever is greater.

   e. Keep movement joints free from dirt, debris, grout, mortar, and setting bed materials. Prepare joints and apply sealants to comply with requirements in Division 7 Section "Joint Sealants."

3.5 CRACK ISOLATION MEMBRANE INSTALLATION

A. Install crack isolation membrane to comply with ANSI A108.17 and manufacturer's written instructions to produce membrane of uniform thickness and bonded securely to substrate.

1. Do not install stone or setting materials over crack isolation membrane until membrane has cured.

3.6 INSTALLATION TOLERANCES

A. Tolerances: Set stone to comply with the following tolerances:

1. Variation from Plumb: +/- 1/8 inch in 10 feet (3 mm in 3.05 m) non-cumulative.

2. Variation from Level: +/- 1/8 inch in 10 feet (3 mm in 3.05 m) non-cumulative.

3. Variation in Plane between Adjacent Stone Units (Lipping): +/- 1/32-inch (0.8-mm) difference between planes of adjacent units.

4. Face Widths of Joints: +/- 1/32 inch (0.8 mm).

3.7 FLOOR INSTALLATION METHODS

A. Thinset Stone Tile over Concrete Slabs (Typical): Install in accordance with the mortar manufacturer's recommendations and requirements indicated below for ANSI setting bed methods, TCNA installation methods related to types of subfloor construction, and grout ANSI installation methods and grout types. Where recommendations and methods conflict, the manufacturer's recommendations shall apply.

1. Mortar: Latex-Portland Cement Mortar: ANSI A108.5.
2. Concrete Subfloors, Interior: TCNA F113 Stone.
    a. With a trowel, having notches sized as recommended by the mortar manufacturer, comb the surface of the mortar with the notched side of the trowel removing excess mortar. Spread only as much mortar as can be covered in the time limits established by the mortar manufacturers recommendations.
    b. Wipe the back of each stone tile, with a damp sponge, to remove all dust or dirt immediately before applying mortar to stone tiles.
    c. Immediately after wiping stone tile backs, but prior to placing stone tile, the mortar shall be troweled to back of stone tile for 100% coverage to thickness of not less than 1/16-inch (1.5-mm).
    d. Place stone tiles onto mortar bed, maintaining 1/8-inch (3-mm) wide joints, and true accurate pattern as shown. Exercise care to quickly remove spillage from faces of stone tile units using water damp sponges. Rake out joints to depth required to receive grout as stone tile units are set.
    e. Prohibit foot and wheel traffic on stone tiled floors for period of time as recommended by the mortar manufacturer.
3. Grout Installation: Do not begin grouting stone units until they are firmly set and, in no case, in less than 48 hours after they have been installed. Remove spacers, if any, prior to grouting. Comply with Latex-Portland Cement: ANSI A108.10. Fill joints flush with the stone unit surface. Do not permit mortar to show through grouted joints. Provide hard finished grout, which is uniform in color, smooth, and without voids, pinholes, or low spots. Tool surfaces with shallow concave profile.

B. Thinset Stone over Crack Isolation Membrane: Install in accordance with the mortar manufacturer's recommendations and requirements indicated below for ANSI setting bed methods, TCNA installation methods related to types of subfloor construction, and grout ANSI installation methods and grout types. Where recommendations and methods conflict, the manufacturer's recommendations shall apply.

1. Mortar: Latex-Portland Cement Mortar: ANSI A108.5.
2. Concrete Subfloors, Interior: TCNA F125-Full Stone.
    a. Apply the mortar to crack isolation membrane covered slab with the flat side of the trowel.
    b. With a trowel, having notches sized as recommended by the mortar manufacturer, comb the surface of the mortar with the notched side of the trowel removing excess

mortar. Spread only as much mortar as can be covered in the time limits established by the mortar manufacturers recommendations.

c. Wipe the back of each stone tile, with a damp sponge, to remove all dust or dirt immediately before applying mortar to stone tiles.

d. Immediately after wiping tile backs, but prior to placing stone tile, the mortar shall be troweled to back of tile for 100% coverage to thickness of not less than 1/16-inch (1.5-mm).

e. Place stone tiles onto mortar bed, maintaining 1/8-inch (3-mm) wide joints, and true accurate pattern as shown. Exercise care to quickly remove spillage from faces of tile using damp sponges. Rake out joints to depth required to receive grout as stone tile units are set.

f. Prohibit foot and wheel traffic on tiled floors for period of time as recommended by the mortar manufacturer.

3. Grout Installation: Do not begin grouting stone units until they are firmly set and, in no case, in less than 48 hours after they have been installed. Remove spacers, if any, prior to grouting. Comply with Latex-Portland Cement: ANSI A108.10. Fill joints flush with the stone unit surface. Do not permit mortar to show through grouted joints. Provide hard finished grout, which is uniform in color, smooth, and without voids, pinholes, or low spots. Tool surfaces with shallow concave profile.

C. Medium-set Stone Tile (Only where indicated): Install in accordance with the mortar manufacturer's recommendations and requirements indicated below for ANSI setting bed methods, TCNA installation methods related to types of subfloor construction, and grout ANSI installation methods and grout types. Where recommendations and methods conflict, the manufacturer's recommendations shall apply.

1. Mortar: Latex-Portland Cement Mortar: ANSI A108.5.

2. Concrete Subfloors, Interior: TCNA F113 Stone except apply medium set bed thickness.

a. With a trowel, having notches sized as recommended by the mortar manufacturer, comb the surface of the mortar with the notched side of the trowel removing excess mortar. Spread only as much mortar as can be covered in the time limits established by the mortar manufacturers recommendations.

b. Wipe the back of each stone tile, with a damp sponge, to remove all dust or dirt immediately before applying mortar to stone tiles.

c. Immediately after wiping stone tile backs, but prior to placing stone tile, the mortar shall be troweled to back of stone tile for 100% coverage to thickness of not less than 1/16-inch (1.5-mm).

d. Place stone tiles onto mortar bed, maintaining 1/8-inch (3-mm) wide joints, and true accurate pattern as shown. Exercise care to quickly remove spillage from faces of stone tile using water damp sponges. Rake out joints to depth required to receive grout as stone tile units are set.

e. Prohibit foot and wheel traffic on stone tiled floors for period of time as recommended by the mortar manufacturer.

3. Grout Installation: Do not begin grouting stone units until they are firmly set and, in no case, in less than 48 hours after they have been installed. Remove spacers, if any, prior to grouting. Comply with Latex-Portland Cement: ANSI A108.10. Fill joints flush with the stone unit surface. Do not permit mortar to show through grouted joints. Provide hard finished grout, which is uniform in color, smooth, and without voids, pinholes, or low spots. Tool surfaces with shallow concave profile.

D. Thick-set Stone Flooring (Only where indicated): Install in accordance with the mortar manufacturer's recommendations and requirements indicated below for ANSI setting bed methods, TCNA installation methods related to types of subfloor construction, and grout ANSI installation methods and grout types. Where recommendations and methods conflict, the manufacturer's recommendations shall apply.

1. Mortar and Bond Coat:

a. Latex-Portland Cement Mortar: ANSI A108.1A (Wet Set Method).

b. Latex-Portland Cement Bond Coat: ANSI A108.5.

2. Concrete Subfloors, Interior: TCNA F121 Stone.

a. Apply ½ of the mortar bed to slab and place reinforcing wire fabric. After placing mesh, apply balance of mortar bed. The mortar shall be rodded and compacted with a steel trowel.

b. Wipe the back of each stone flooring unit, with a damp sponge, to remove all dust or dirt immediately before applying bond coat to stone flooring units c. Immediately after wiping stone flooring backs, but prior to placing them, the mortar shall be troweled to back of each stone flooring unit for 100% coverage to thickness of not less than 1/16-inch (1.5-mm).

d. Place stone flooring unit onto the green mortar bed, maintaining 1/8-inch (3-mm) wide joints and true accurate pattern as shown. Tamp stone flooring unit with wood block and rubber mallet to produce finish levels of stone flooring matching adjacent stone flooring surfaces. Beating shall take place prior to mortar taking and initial set. Exercise care to quickly remove spillage from faces of stone flooring using water damp sponges. Rake out joints to depth required to receive grout as stone flooring units are set.

e. Prohibit foot and wheel traffic on stone floors for period of time as recommended by the mortar manufacturer.

3. Grout Installation: Do not begin grouting stone units until they are firmly set and, in no case, in less than 48 hours after they have been installed. Remove spacers, if any, prior to grouting. Comply with Latex-Portland Cement: ANSI A108.10. Fill joints flush with the stone unit surface. Do not permit mortar to show through grouted joints. Provide hard finished grout, which is uniform in color, smooth, and without voids, pinholes, or low spots. Tool surfaces with shallow concave profile.

E. Stone Thresholds: Install stone thresholds in one piece, notched to fit neatly at door jambs; set in same type of setting bed as abutting field tile in accordance with TCNA Method TR611.

3.8 STONE TILE WALL INSTALLATION

A. Install in accordance with the mortar manufacturer's recommendations and requirements indicated below for ANSI setting bed methods, TCNA installation methods related to types of construction, and grout ANSI installation methods and grout types. Where recommendations and methods conflict, the manufacturer's recommendations shall apply. Exercise care to quickly remove spillage from faces of stone using damp sponges. Rake out joints to depth required to receive grout as stone units are set.

1. Latex Portland Cement Mortar Installation (using specified Latex Portland Cement mortar material): ANSI A108.5.

2. Gypsum Wallboard, Interior (Latex Portland Cement Mortar) Method: TCNA W243 Stone, place tiles maintaining 1/8-inch (3-mm) wide joints, and true accurate pattern as shown.

3. Grout Installation: Do not begin grouting stone units until they are firmly set and, in no case, in less than 48 hours after they have been installed. Remove spacers, if any, prior to grouting. Comply with Latex-Portland Cement: ANSI A108.10. Fill joints flush with the stone unit surface. Do not permit mortar to show through grouted joints. Provide hard finished grout, which is uniform in color, smooth, and without voids, pinholes, or low spots. Tool surfaces with shallow concave profile.

3.9 INSTALLATION OF COUNTERTOPS

A. Uncrate countertops and adhere, or fasten, to substrates where indicated.

1. Install countertops over plywood underlayment with full spread of water-cleanable epoxy adhesive unless otherwise indicated to be mechanically fastened.

B. Erect countertops level and true with joints, if any, uniform in width and accurately aligned. Do not install units which are cracked, chipped, discolored.

1. Make-up plumbing connections located in countertops in accordance with Division 22 work.

C. Grout joints, except joints shown to receive sealants, full and flush with grouts as specified herein. Tool joints uniformly, without voids, pinholes, or low spots, and slightly concave. Remove all grout spillage immediately. Cure grout as recommended by the manufacturer.

3.10 CLEANING, SEALING AND PROTECTION

A. Cleaning:

1. General: Upon completion of placement and grouting remove Latex-Portland Cement grout residue and haze from stone as soon as possible.
2. Flooring:
    a. Curing: Before applying stone impregnator and stone soap allow the setting bed and grout materials to cure a minimum of 21 days.
    b. Floor Preparation: Clean substrates of substances that could impair penetration and bond of the stone impregnator to stone using cleaning solutions, dilution rates, dwell times as recommended by the stone impregnator manufacturer. Apply cleaning solutions using low speed (175 rpm) floor cleaning machine suitable for deep cleaning, and non-damaging to, smooth textured, stone surfaces coupled with a wet vac; by using a mop and bucket; or using auto-scrub brushing techniques each in accordance with the stone impregnator manufacturer's recommendations. If auto-scrub brushing, thoroughly scrub stone flooring using soft medium bristle brush heads, instead of nylon pads, to deep clean textured surfaces and grout joints of polished and honed finished surfaces. Test floor cleaning machine, or auto-scrub brushes, to ensure that they will not harm each of the finishes, and types, of stone flooring prior to cleaning operations. During machine cleaning, or auto-scrubbing, operations monitor the quality and cleanliness of the equipment, or brushes, to assure that they do not become worn or contaminated and scratch the finish of the stone flooring.

B. Sealing:

1. Impregnator Application: Allow floor to thoroughly dry for 24 to 72 hours after floor preparation. Using brush, or roller, applicators apply two thin, even, wet on wet coats of impregnator allowing 5 to 10 minutes between each coat for proper penetration unless otherwise recommended by the impregnator manufacturer. 10 to 15 minutes after final coat is placed, but prior to its surface drying, remove all excess "puddled" impregnator using a white cloth to avoid splotchy/dull areas. Allow 72 hours for impregnator to cure.
2. Surface Protection Coating: Not more than 4 days before occupancy by Owner apply no-rinse stone surface protection coating to stone using dilution rates as recommended by the surface protection coating manufacturer. Apply surface protection coating by using either mop and bucket or auto-scrub brushing techniques in accordance with the surface protection coating manufacturer's recommendations. If scrub brushing, thoroughly scrub stone flooring using soft medium bristle brush heads, instead of nylon pads, to deep clean textured surfaces and grout joints of polished and honed finished surfaces. Test brushes, to ensure that they will not harm each of the finishes, and types, of stone flooring prior to cleaning operations. During auto-scrubbing operations monitor the quality and cleanliness of the brushes, to assure that they do not become worn or contaminated and scratch the finish of the stone flooring. Do not rinse with water as rinsing will remove the stone surface protection coating.

C. Leave finished installation clean and free of warped, curled, cracked, chipped, broken, un- bonded, discolored and otherwise defective stone units.

1. Replace warped, curled, cracked, chipped, broken, unbonded, discolored and otherwise defective stone in manner which results in stonework matching approved samples and field-constructed sample installations, showing no evidence of replacement.

D. Protect installed stone work with minimum 40 lb kraft paper or other heavy, breathable, covering and maintain conditions in a manner acceptable to the stone material manufacturers and installer that ensures that stone work is without damage or deterioration at time of Substantial Completion.

NOTE: This guide specification covers the basic requirements for Interior Stonework.

Incorporate this information into the specifications for your project. For any deviations, please discuss with your designated LAWA representative.

End of Section 09 63 40

SECTION 09 66 13 - PORTLAND CEMENT TERRAZZO FLOORING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Poured-in-place Portland Cement Terrazzo Flooring and Base.

> **NOTE:** Some of the existing terrazzo installations at the airport are cementitious. In the event that one of these existing installations is required to be repaired or replaced, this guide specification section is to be utilized.

1.2 DEFINITIONS

A. Aggregate: Marble chips or other types of aggregate.

1.3 PREINSTALLATION MEETINGS

A. Pre-Installation Conference: Conduct conference at LAX.

1. Review methods and procedures related to terrazzo including, but not limited to, the following:
    a. Inspect and discuss condition of substrate and other preparatory work performed by other trades.
    b. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
    c. Review special terrazzo designs and patterns.
    d. Review procedures for coping with unfavorable forecasted weather conditions.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: Include terrazzo installation requirements. Include plans, elevations, sections, component details, and attachments to other work. Show layout of the following:

1. Divider strips.
2. Control-joint strips.
3. Expansion-joint strips.
4. Accessory strips.

5. Abrasive strips.
6. Stair treads, risers, and landings.
7. Terrazzo patterns.

C. Samples: For each exposed product and for each color and texture specified, 6 inches (150 mm) in size.

D. Samples for Initial Selection: National Terrazzo & Mosaic Association, Inc. (NTMA) color plates showing the full range of colors and patterns available for each terrazzo type.

E. Samples for Verification: For each type, material, color, and pattern of terrazzo and accessory required showing the full range of color, texture, and pattern variations expected. Label each terrazzo sample to identify manufacturer's matrix color and aggregate types, sizes, and proportions. Prepare Samples of same thickness and from same material to be used for the Work, in size indicated below:

1. Terrazzo: 6-inch- (150-mm-) square Samples.
2. Accessories: 6-inch- (150-mm-) long Samples of each exposed strip item required.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: .Engage an experienced Installer who is a current NTMA member in good standing and who has completed a minimum of 3 terrazzo installations similar in material and extent to that indicated for Project – as determined by LAWA – over the last 5 years and that have resulted in construction with a record of successful in-service performance.

NOTE: A letter from the National Terrazzo & Mosaic Association, Inc. (NTMA) dated within 30 days of the bid, stating same, must be submitted with the bid. Any active investigations of contractor's work must be noted in this letter.

B. Material Certificates: For each type of terrazzo material or product, from manufacturer.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: For terrazzo to include in maintenance manuals.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: An installer who is a contractor member of NTMA.

B. Source Limitations for Aggregates: Obtain each color, grade, type, and variety of granular materials from single source with resources to provide materials of consistent quality in appearance and physical properties.

C. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Build mockups for terrazzo including accessories.
    a. Size: Minimum 100 sq. ft. (9 sq. m) of typical poured-in-place flooring condition for each color and pattern in locations directed by LAWA.
2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless LAWA specifically approves such deviations in writing.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to Project site in supplier's original wrappings and containers, labeled with source's or manufacturer's name, material or product brand name, and lot number if any.

B. Store materials in their original, undamaged packages and containers, inside a well-ventilated area protected from weather, moisture, soiling, extreme temperatures, and humidity.

1.9 FIELD CONDITIONS

A. Weather Limitations: Proceed with terrazzo installation only when forecasted weather conditions permit work to be performed according to NTMA's written recommendations.

B. Close spaces to traffic during terrazzo application and for not less than 24 hours after application unless manufacturer recommends a longer period.

C. Control and collect water and dust produced by grinding operations. Protect adjacent construction from detrimental effects of grinding operations.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. NTMA Standards: Comply with NTMA's "Terrazzo Specifications and Design Guide" and with written recommendations for terrazzo type indicated unless more stringent requirements are specified.

B. FloorScore Compliance: Terrazzo floors shall comply with requirements of FloorScore Standard.

C. Low-Emitting Materials: Flooring system shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

2.2 PORTLAND CEMENT TERRAZZO

A. Portland Cement Terrazzo System: Sand cushion.

1. Underbed: Comply with NTMA's "Terrazzo Specifications and Design Guide" for terrazzo system indicated for component proportions and mixing.
2. Topping: Comply with NTMA's "Terrazzo Specifications and Design Guide" for terrazzo system indicated for matrix and aggregate proportions and mixing.
    a. Terrazzo Topping Thickness: As required.
    b. Formulated Mix Color and Pattern: Insert NTMA color plate designation.
    c. Custom Mix Color and Pattern: Match existing.

B. Materials:

1. Portland Cement: ASTM C 150, Type 1.
    a. Color for Exposed Matrix: As required by mix indicated.
2. Water: Potable.
3. Sand: ASTM C 33/C 33M.
4. Aggregates: Comply with NTMA gradation standards for mix indicated and contain no deleterious or foreign matter.
    a. Abrasion and Impact Resistance: Less than 40 percent loss per ASTM C 131.
    b. 24-Hour Absorption Rate: Less than 0.75 percent.
    c. Dust Content: Less than 1.0 percent by weight.
5. Matrix Pigments: Pure mineral or synthetic pigments, alkali resistant, durable under exposure to sunlight, and compatible with terrazzo matrix.
6. Bonding Agent: Neat Portland Cement, or epoxy or acrylic bonding agents formulated for use with topping indicated.
7. Underbed Reinforcement: Galvanized welded-wire reinforcement, wire 2 by 2 inches (51 by 51 mm) by 0.062 inch (1.57 mm) in diameter, complying with ASTM A 185/A 185M and ASTM A 82/A 82M, except for minimum wire size.
8. Isolation Membrane: Polyethylene sheeting, ASTM D 2103, Type 13300, 4 mils (0.1 mm) thick; or unperforated asphalt felt, ASTM D 226, Type I (No. 15).

2.3 STRIP MATERIALS

A. Standard Divider Strips: One-piece, flat-type strips for grouting into sawed joints prepared in substrate.

B. Heavy-Top Divider Strips: One-piece, flat-type strips for grouting into sawed joints prepared in substrate.

C. Heavy-Top Angle Divider Strips: One-piece, L-type angle strips with anchoring device and in depth required for topping thickness indicated.

D. Control-Joint Strips: Separate, double L-type angles, positioned back to back, that match material and color of divider strips and in depth required for topping thickness indicated.

E. Expansion-Joint Strips: Brass, with removable zip-strip top for installing sealant; minimum 1/2 inch (12.7 mm) wide.

F. Accessory Strips: Match divider-strip width, material, and color unless otherwise indicated. Use the following types of accessory strips as required to provide a complete installation:

1. Base-bead strips for exposed top edge of terrazzo base.
2. Edge-bead strips for exposed edges of terrazzo.
3. Nosings for terrazzo stair treads and landings.

2.4 MISCELLANEOUS ACCESSORIES

A. Strip Adhesive: Recommended by manufacturer for this use.

1. Adhesives shall have a VOC content of 70 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
2. Adhesives shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

B. Anchoring Devices:

1. Strips: Provide mechanical anchoring devices or adhesives for strip materials as recommended by manufacturer and as required for secure attachment to substrate.

C. Isolation and Expansion-Joint Material: Closed-cell polyethylene foam, nonabsorbent to liquid water and gas, and non-outgassing in unruptured state; butyl rubber; rubber; minimum 1/2 inch (12.7 mm) wide.

D. Portland Cement Terrazzo Cleaner: Chemically neutral cleaner with pH factor between 7 and 10 that is biodegradable, phosphate free, and recommended by cleaner manufacturer for use on terrazzo type indicated.

E. Sealer: Slip- and stain-resistant, penetrating-type sealer that is chemically neutral; does not affect terrazzo color or physical properties; is recommended by sealer manufacturer; and complies with NTMA's "Terrazzo Specifications and Design Guide" for terrazzo type indicated.

1. Surface Friction: Not less than 0.6 according to ASTM D 2047.
2. Acid-Base Properties: With pH factor between 7 and 10.
3. Sealers shall have a VOC content of 200 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
4. Product: “Scotchgard Stone Floor Protector” or LAWA approved equal.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions, including levelness tolerances, have been corrected.

3.2 PREPARATION

A. Clean substrates of substances, including oil, grease, and curing compounds, that might impair terrazzo bond. Provide clean, dry, and neutral substrate for terrazzo application.

1. Roughen concrete substrates before installing terrazzo system according to NTMA's written recommendations.

B. Verify that concrete substrates are dry and moisture-vapor emissions are within acceptable levels according to manufacturer's written instructions.

1. Moisture Testing: Perform tests indicated below.

a. Calcium Chloride Test: Perform anhydrous calcium chloride test per ASTM F1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. (1.36 kg of water/92.9 sq. m) in 24 hours.

1) Perform tests so that each test area does not exceed 200 sq. ft. (18.6 sq. m), and perform not less than two tests in each installation area and with test areas evenly spaced in installation areas.

b. In-Situ Probe Test: Perform relative-humidity test using in-situ probes per ASTM F2170. Proceed with installation only after substrates have a maximum 75 percent relative-humidity-level measurement.

c. Test Method: Test for moisture content by method recommended in writing by terrazzo manufacturer. Proceed with installation only after substrates pass testing.

C. Protect other work from water and dust generated by grinding operations. Control water and dust to comply with environmental protection regulations.

1. Erect and maintain temporary enclosures and other suitable methods to limit water damage and dust migration and to ensure adequate ambient temperatures and ventilation conditions during installation.

3.3 INSTALLATION, GENERAL

A. Comply with NTMA's written recommendations for terrazzo and accessory installation.

B. Installation Tolerance: Limit variation in terrazzo surface from level to 1/4 inch in 10 feet (6.4 mm in 3 m); noncumulative.

C. Underbed:

1. Comply with NTMA's "Terrazzo Specifications and Design Guide" for underbed installation.
2. Cover entire surface to receive terrazzo with dusting of sand.
3. Install isolation membrane over sand, overlapping ends and edges a minimum of 3 inches (75 mm).
4. Install welded-wire reinforcement, overlapping at edges and ends at least two squares. Stop mesh a minimum of 1 inch (25 mm) short of expansion joints.
5. Place underbed and screed to elevation indicated below finished floor elevation.

D. Strip Materials:

1. Divider and Control-Joint Strips:
   a. Locate divider strips directly over control joints, breaks, and saw cuts in concrete slabs.
   b. Install control-joint strips back to back and directly above concrete-slab control joints.
   c. Install control-joint strips with 1/4-inch (6.4-mm) gap between strips, and install sealant in gap.
   d. Install strips in adhesive setting bed without voids below strips, or mechanically anchor strips as required to attach strips to substrate, as recommended by strip manufacturer.
2. Expansion-Joint Strips: Form expansion joints using divider strips and install directly above concrete-slab expansion joints.

NOTE: All expansion and control joints within the existing concrete slab are to be carried through the terrazzo, to the finish surface.

3. Accessory Strips: Install as required to provide a complete installation.
4. Abrasive Strips: Install with surface of abrasive strip positioned 1/16 inch (1.6 mm) higher than terrazzo surface.

3.4 POURED-IN-PLACE TERRAZZO INSTALLATION

A. Pour in place and seed additional aggregates in matrix to uniformly distribute granular material and produce a surface with a minimum of 70 percent aggregate exposure. Cure and finish

Portland Cement Terrazzo according to NTMA's "Terrazzo Specifications and Design Guide" for terrazzo type indicated.

1. Grinding: Delay grinding until heavy trade work is complete and construction traffic through area is restricted. Exercise extreme care to ensure fluids from grinding operation do not react with dividers and strips to produce a stain on aggregate.
    a. Rough Grinding: Grind with 24 or finer grit stones or with comparable diamond plates.
    b. Intermediate Grinding: Follow initial grind with 80 or finer grit stones.
    c. Grouting: Cleanse floor with clean water and rinse thoroughly. Remove excess rinse water by wet vacuum and machine until completely dry. Apply epoxy grout to fill voids.
    d. Fine Grinding: Grind with **120** or finer grit stones until all grout is removed from surface. Upon completion terrazzo shall show a minimum of 70% to 75% of marble chips.

3.5 REPAIR

A. Cut out and replace terrazzo areas that evidence lack of bond with substrate or underbed, including areas that emit a "hollow" sound if tapped. Cut out terrazzo areas in panels defined by strips and replace to match adjacent terrazzo, or repair panels according to NTMA's written recommendations, as approved by LAWA.

3.6 CLEANING AND PROTECTION

A. Terrazzo Cleaning:
    1. Remove grinding dust from installation and adjacent areas.
    2. Wash surfaces with cleaner immediately after final cleaning of terrazzo flooring according to NTMA's written recommendations and manufacturer's written instructions; rinse surfaces with water and allow them to dry thoroughly.

B. Sealing:
    1. Seal surfaces according to NTMA's written recommendations.
    2. Apply sealer according to sealer manufacturer's written instructions.

C. Protection: Provide final protection and maintain conditions, in a manner acceptable to Installer, that ensure that terrazzo is without damage or deterioration at time of Substantial Completion.

END OF SECTION 09 66 13

SECTION 09 66 23 – RESINOUS MATRIX TERRAZZO FLOORING

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes resinous matrix (epoxy) terrazzo.

1.2 PERFORMANCE REQUIREMENTS

A. Static Coefficient of Friction: For terrazzo installed on walkway surfaces, provide finished installation with the following values as determined by testing per ASTM C 1028:

1. Level Surfaces: Minimum 0.6.
2. Step Treads: Minimum 0.6.
3. Ramp Surfaces: Minimum 0.8.

1.3 SUBMITTALS

A. Product Data: Submit product data for each material indicated.

B. Shop Drawings: Submit shop drawings showing the extent of each terrazzo matrix, type, size and layout of divider strips, control joint strips, and edge strips

1. Indicate layout of abrasive strips at stair nosings.
2. Indicate layout of stair treads, risers, and landings.
3. Large scale details of precast terrazzo jointing and edge conditions, including anchorage details.

C. Samples: Submit samples of each of the following items for each type, color, and pattern of terrazzo and accessory required and in size indicated below. Sample submittals shall be for color, pattern and texture only. Compliance with other requirements is the responsibility of the Contractor.

1. Epoxy Terrazzo: 6-inch- (150-mm-) square Samples.
2. Precast Epoxy Terrazzo Base: 12-inch- (300-mm-) long Samples.
3. Precast Epoxy Terrazzo Tread: 12-inch- (300-mm-) long Samples.
4. Precast Epoxy Terrazzo Riser: 12-inch- (300-mm-) long Samples.
5. Accessories: 6-inch- (150-mm-) long Samples of each exposed strip item required.

NOTE: With previous terrazzo installations at the airport, a minimum of three sample runs have been required in order to achieve the approved design.

D. Field Testing: Submit pre-installation relative humidity probe readings and pH testing for information only. Readings shall be prepared in accordance with ASTM F2170.

E. Maintenance Data: Submit copies of instructions for maintenance of each type of terrazzo.

F. Warranty: Submit sample copies of the Moisture Vapor Transmission (MVT) warranty to verify compliance with specification. Submit executed copies of epoxy terrazzo warranty as specified herein.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: Engage an experienced Installer who is a current NTMA member in good standing and who has completed a minimum of 3 terrazzo installations similar in material and extent to that indicated for Project – as determined by LAWA – over the last 5 years and that have resulted in construction with a record of successful in-service performance.

NOTE: A letter from the NTMA dated within 30 days of the bid, stating same, must be submitted with the bid. Any active investigations of contractor's work must be noted in this letter.

B. Standard: Except as modified by governing codes and by the Contract Documents, comply with applicable provisions and recommendations of the NTMA Terrazzo Information Guide Specification.

C. Sample Installations:

1. Following acceptance of samples, provide sample installations of the following where directed by the LAWA.

    a. Floors: Cast a typical module (minimum 10' x 10') of interior flooring including divider strips.

2. Sample installations shall be complete with all bedding, jointing, and sealants as shown in accordance with the final shop drawings. Sample installations shall be reviewed by the Architect for acceptance of terrazzo assemblies including jointing and workmanship. Replace unsatisfactory work as directed. Maintain sample installations during construction as a standard for judging acceptability of terrazzo work. Properly finished and maintained sample installations shall be retained as a portion of the completed work.

1.5 PROJECT CONDITIONS

A. Deliver materials, other than bulk materials, in manufacturer's unopened containers, fully identified with trade name, grade and color.

B. Store materials above grade, protected from the weather, soiling or damage from any source. Store in accordance with manufacturer's instructions.

C. Wrap precast units individually in polyethylene film or other non-staining protective cover and mark each unit for proper identification of installed location.

1.6 PROTECTION

A. Protect terrazzo work throughout the construction period so that it will be without any indication of use or damage at the time of acceptance by LAWA.

1.7 WARRANTY

A. Manufacturer and installer shall supply to LAWA a three year Joint and Several Warranty from the date of substantial completion stating that the Moisture Vapor Barrier shall protect the epoxy terrazzo installation from moisture related blistering or dis-bondment and that in the event of defects related to moisture vapor transmission within the stipulated period, the manufacturer and installer shall jointly or severally effect all repairs or replacement necessary to remedy defects at the convenience of, and no cost to LAWA.

PART 2 - PRODUCTS

2.1 EPOXY TERRAZZO

A. Epoxy Terrazzo Material Products and Manufacturers: The epoxy resin terrazzo specifications are based on Terroxy Resin System by Terrazzo and Marble (T & M) Supply Companies.

1. The following terrazzo systems and manufacturers are capable of providing epoxy resin terrazzo flooring complying with the requirements of the Contract Documents.
    a. General Polymers; Thin-Set Epoxy Terrazzo #1100 Flooring System.
    b. Crossfield Products Corp., Dex-O-Tex Division; Dex-O-Tex Cheminert Terrazzo.
    c. Master Terrazzo Technologies, LLC; Morricite.
    d. Terrazzo and Marble (T & M) Supply Companies; Terroxy Resin Systems – Thin-set Epoxy Terrazzo
2. System Performance: The epoxy resin flooring system shall possess the following properties:

Compressive Strength, ASTM D695	10,000 psi
Water Absorption, ASTM D570	0.10 %
Tensile Strength, ASTM D638	3,000 psi
Flexural Strength, ASTM D790	4,500 psi
Adhesion, ACI 503R	350 psi, 100% concrete failure
Hardness, ASTM D2240	65-85 Shore D
Impact Resistance – MIL-D-3134, Sec. 4.7.3	Withstands 16 ft/lbs. no chipping, cracking, spalling or loss of adhesion.
Abrasion Resistance, ASTM D4060, CS 17 Wheel	70-90 milligrams lost
Slip Resistance	Meets ADA Standards
Critical Radiant Flux, ASTM D648	.90
Thermal coefficient of linear expansion, ASTM D696	25 x 10^{-6} in/in/ degree F.

B. Moisture Vapor Barrier: One of the following:

1. Moisture Vapor Treatment; Terrazzo and Marble (T & M) Supply Companies.
2. FasTop MVT or AquArmorS; General Polymers.

C. Flexible Epoxy Membrane (Crack Bridging Membrane): 100% solids for crack preparation followed by full coverage application.

1. Products: One of the following:
   a. Isocrack Membrane; Terrazzo and Marble (T & M) Supply Companies.
   b. 3556 EPO-FLEX Flexible Epoxy Membrane; General Polymers.
2. System Performance: The flexible epoxy membrane shall possess the following properties:

Tensile Strength, ASTM D412	1,000-1,300 psi
Elongation at Break, ASTM D412	130-145%
Adhesion, ACI 503R	350 psi, 100% concrete failure
Hardness, ASTM D2240	23 Shore D
Thermal Cycling, ASTM C884 (24 hours, -21C to +25C	No Cracking
Flammability	Self-extinguishing over concrete
VOC	Zero
The epoxy elastomer must be free of solvent, external plasticizers, coal tar, known carcinogens, rubber compounds or nitrile butadienes	

D. Fabric Reinforcing: Fiberglass of type and manufacture recommended and acceptable to the matrix manufacturer.

1. FS38-4.4 Fiberglass Scrim; General Polymers.

E. Aggregates: Natural, sound, crushed stone chips, mother of pearl, glass, plastic, and metal filings with colors selected and graded to match Architect's samples, but with maximum size within limits of workability for terrazzo thickness indicated.

1. Sizes shall be **#1's** and **#0's only,** conforming with N.T.M.A. standards.
2. Abrasion and impact resistance shall not exceed 40% loss per ASTM C131.
3. 24 hour absorption rate not to exceed 0.75 percent.
4. Chips shall contain no deleterious or foreign matter.
5. Dust content less than 1% by weight.
6. Obtain and stockpile each aggregate material from a single source of consistent quality in appearance and physical properties for the entire project.

F. Epoxy Fill Mortar: 100% Solids fill mortar system including blended aggregate of a type recommended by the epoxy resin terrazzo manufacturer. One of the following:

1. Terroxy Fill; Terrazzo and Marble (T & M) Supply Companies.
2. 3520 Epoxy Terrazzo Matrix as the binder resin mixed with dry silica sand; General Polymers.

G. Finishing Grout: 100% solids resin-based grout with filler and pigments as recommended by matrix manufacturer. One of the following:

1. Terroxy Grout; Terrazzo and Marble (T & M) Supply Companies.
2. 3520 Epoxy Terrazzo Matrix with 5271 Terrazzo Grout Additive; General Polymers.

H. Substrate Primer: 100% solids, moisture insensitive, two-component resin recommended by matrix manufacturer. No solvent containing primers are allowed.

2.2 MIXES

A. Toppings: Adjust topping mixes as required to obtain LAWA's acceptance for each type, color, pattern and finish. Refer to the drawings and finish schedules for the extent of each topping and finish; the following topping mixes were used to develop the Architect's samples. The samples were prepared by and reflect sample controls numbers of using Terrazzo and Marble (T & M) Supply Companies terrazzo materials. Each precast terrazzo unit shall be composed of a single mix design prepared using the matrices specified, precast units consisting of a face mix and a backup mix shall not be permitted. Adjust Portland cement precast mixes, for bases, treads and riser units, as required to obtain LAWA's acceptance for matching the type, color, pattern and finish of the epoxy matrix type, color pattern and finish indicated on the drawings for the base, tread and riser units.

1. TR-01: Refer to Sample #1 in the Terrazzo Chart below.
2. TR-02: Refer to Sample #2 in the Terrazzo Chart below.

NOTE: A white field with dark aggregate will maintain a clear appearance longer. In a multi-color design, a matrix with a repetition of aggregate is helpful in order to create a more unified appearance.

TERRAZZO CHART

Sample #1		**Chip Blend**		
Matrix Color	**Resin Color # & Fanfold**	**Aggregate**	**Size**	**%**
	Resin Color selected to match		0's	90
			0's	10
Sample #2		**Chip Blend**		
Matrix Color	**Color # & Fanfold**	**Aggregate**	**Size**	**%**
	Resin Color selected to match		1's & 0's	90
			1's, & 0's	10

B. Precast Terrazzo Base and Stair Tread/Riser Setting Beds:

1. Cement Setting Bed Mix: 226 Thick Bed Mortar Mix; Laticrete International Inc.
2. Liquid Latex Additives: Laticrete 3701 Liquid Latex Mortar Admix.
3. Mixing: Comply with the manufacturers printed recommendations for either machine or hand mixing of setting bed mixes.
    a. Mix 6 bags of cement setting bed mix to 1 pail (5 gal.) of liquid latex additive. Adjust quantity of liquid latex additive to bring the cement setting bed to the proper consistency for placing.
4. Welded Wire Fabric for Setting Bed Reinforcement at Metal Stair Risers and Treads: ASTM A185, 2 in. x 2 in. x 16 gage, galvanized.

C. Grout for Precast Items: Polymer-modified tile grout composed of ethylene vinyl acetate, in dry, redispersible form, prepackaged with other dry ingredients to which only water must be added at Project site, and complying with ANSI A118.6, custom colored to match adjacent precast terrazzo tile units.

NOTE: the mix design shall consist no more than 40% glass / mirror. Recycled glass is not permitted. All glass/mirror or aggregate shall be no larger than #1, (#0s and #1s only).

The Contractor shall also premix all terrazzo ingredients which are able to be combined prior to installation (Epoxy Part A and B and aggregate mixes). This premix process shall occur in a clean and neat factory or laboratory environment. Quantities should be carefully measured on certified/calibrated scales and mixing shall follow laboratory best practices. The resulting premixed ingredients shall then be packaged in clean, clearly labeled, hard sided containers in ratios whereby labor staff can combine in the field with no need to calculate or measure. LAWA or its authorized third party inspectors shall have continuous and unabated access to witness/inspect the factory/laboratory premix and packaging processes.

2.3 ACCESSORIES

A. Divider and Stop Strips: White alloy zinc, 1/8" in. thick x depth as indicated for terrazzo topping. Angle or "T" - types. Verify compatibility of divider and stop strips with resin supplier prior to ordering.

1. Control Joint Strips: Laminations of 16 gage zinc, back to back strips infilled with Flexible Epoxy Membrane pigmented to match resin color of epoxy terrazzo.

B. Cleaner: A neutral chemical cleaner, specially compounded for cleaning terrazzo of the types indicated, as recommended by the manufacturer of the cleaner with the following minimum characteristics.

1. pH factor between 7 and 10.
2. Biodegradable and phosphate free.
3. Free form crystallizing salts or water soluble alkaline salts.

C. Floor Sealer: Waterbased, colorless, stain-resistant penetrating sealer with Ph factor between 7 and 10, that does not affect color or physical properties of terrazzo surface, and which will provide an anti-slip coefficient of friction of greater than 0.6.

1. Product: “Scotchgard Stone Floor Protector”
2. LAWA approved Equal

D. Joint Sealants: Two-Part Polyurethane Sealant (Self Leveling), refer to Section 079200, JOINT SEALANTS.

E. Channels to receive abrasive inserts at Precast Stair Nosings: 16 gauge aluminum channel.

F. Abrasive Inserts: One line composition strips filled with 100 or finer carborundum, aluminum oxide or silicon carbide, black, mixed 4 parts to 1 with a binding material.

G. Reinforcing, Anchors and Fasteners for Precast Units:

1. Reinforcing for Treads and Risers: ASTM A615, grade as selected by fabricator. Reinforcing adjacent to the exposed surface of panels is to be positioned and firmly held in place by hangers, or other means without the use of form-contact bar supports.
2. Welded Wire Fabric for Treads and Risers: ASTM A185, 2 in. x 2 in. x 16 gage, galvanized.
3. Anchors and Fasteners: All anchors, clips, shapes, fasteners, dowels, cramps, and accessories for erecting precast terrazzo units shall be galvanized steel devices of grade, type, size and number required to attach precast terrazzo to supporting stair substrates.

H. Precast Portland Cement Terrazzo Base, Tread and Riser Materials (To be used when proposing Alternate):

1. Portland Cement: ASTM C150, Type I, non-air entraining, non-staining white and gray as required to match Architect's epoxy terrazzo samples. Obtain cement from a single source for all work of one color.
2. Sand: ASTM C33 for fine aggregates as required to match Architect's epoxy terrazzo samples.
3. Water: Fresh, clean and potable.
4. Aggregates, Glass, Plastic and Shell Materials: As required to match Architect's epoxy terrazzo samples.
5. Pigments: Pure mineral pigments, resistant to alkalis, nonfading and weatherproof, colors as required to match Architect's epoxy terrazzo samples.

2.4 PRECAST UNIT FABRICATION

A. Precast Terrazzo Bases: Fabricate precast terrazzo bases from epoxy terrazzo materials to the sizes, shapes and profiles shown and from the terrazzo mix(es) indicated.

1. The minimum thickness of the precast terrazzo base shall be ½”.
2. Forms: Construct forms of non-staining metal, fiberglass reinforced polyester, plywood, or other acceptable material. Fabricate and reinforce forms for close control of dimensions and

details. Construct forms tightly to prevent leakage of mixes. Form joints will not be permitted on faces exposed to view in the finished work.

3. Mixing and Placing: Mix terrazzo mixes to distribute fine and coarse aggregate evenly throughout. Place terrazzo so as to prevent segregation in the forms.

4. Curing: Allow units to cure.

5. Casting Tolerances: As required to achieve installation tolerances. Units which have bowed, warped, or curled shall not be acceptable.

B. Precast Terrazzo Treads and Risers: Fabricate precast terrazzo treads and risers from epoxy terrazzo materials to the sizes, shapes and profiles shown to match the epoxy terrazzo mix indicated for treads and risers.

1. The minimum thickness of the precast terrazzo stairs and treads shall be 1-1/2". Provide 2 lines of abrasive insert at stair tread nosing.

2. Forms: Construct forms of non-staining metal, fiberglass reinforced polyester, plywood, or other acceptable material. Fabricate and reinforce forms for close control of dimensions and details. Construct forms tightly to prevent leakage of mixes. Form joints will not be permitted on faces exposed to view in the finished work.

3. Reinforcement: Place welded wire and reinforcing bars of size and spacings as required to resist shrinkage, temperature and handling stresses. Support and space reinforcement using devices to ensure that it will remain positioned in the precast terrazzo units as required. Keep reinforcement from the edges and surfaces of the units.

4. Mixing and Placing: Mix terrazzo mixes to distribute fine and coarse aggregate evenly throughout. Place terrazzo so as to prevent segregation in the forms.

5. Curing: Allow units to cure.

6. Casting Tolerances: As required to achieve installation tolerances. Units which have bowed, warped, or curled shall not be acceptable.

C. Surface Treatment:

1. Finish surfaces exposed to view to match accepted samples in all respects. Provide smooth joints and square edges.

2. Finish: Allow terrazzo to obtain sufficient strength prior to grinding and as required to withstand handling stresses and to produce a terrazzo finish consistent with the accepted samples. Protect corners and edges to preserve uniform, straight arrisses and corners. Grind in a continuous operation, using grinding equipment to achieve a uniform appearance. Do not change equipment, materials, procedure or operating personnel during the course of the grinding work for the entire Project. Discard and replace terrazzo units which develop any irregular penetration or appearance, or swirl marks as a result of grinding. Select type of grit gradation(s) and speed of operation to achieve the following:

a. Match finish of cast in place epoxy terrazzo as specified under Part 3 – Execution below.

3. Abrasive Inserts for Stair Treads:

a. Carefully mask terrazzo on either side of abrasive channel to protect finished terrazzo.

b. Clean all foreign matter from channel.

c. Trowel abrasive mix into channel with finished elevation approximately 1/16" above terrazzo tread.

d. After abrasive mix has set, remove masking material and allow to cure.

PART 3 - EXECUTION

3.1 CONDITION OF SURFACES

A. Examine the substrates and adjoining construction and the conditions under which the Work is to be installed. Do not proceed with the Work until unsatisfactory conditions have been corrected. Examine areas to receive terrazzo for:

1. Defects in existing work that affect proper execution of terrazzo work.
2. Deviations beyond allowable tolerances for the concrete slab work. The substrate shall not exceed ¼" in a 10'-0" span. When placing a 10 foot straightedge anywhere on the substrate, at no point shall the gap between the straightedge and the substrate exceed ¼".
3. Ensure that the building expansion joints in the floor area are raised or lowered to actual finish elevation of terrazzo.
4. Ensure that drains in installation area are functional and raised or lowered to actual finish elevation of terrazzo.

3.2 PREPARATION

A. General: Comply with NTMA specifications and recommendations, unless otherwise shown or specified for preparation of substrate.

B. Substrates to Receive Epoxy Terrazzo: After the removal of existing floor coverings in areas to receive the terrazzo work, and before the terrazzo flooring installation, visit the jobsite to evaluate substrate condition. The evaluation shall include a determination of the suitableness of the substrate to receive the epoxy terrazzo materials and to test for moisture and alkalinity of the substrate. Test for moisture by relative humidity probe and digital meter method according to ASTM F 2170 "Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using In-situ Probes" and the probe manufactures instructions. Use a minimum of 1 probe for every 5,000 sf of surface to receive terrazzo flooring. Proceed with the epoxy floor system installation only after substrates have a maximum relative-humidity-measurement reading of 75 percent in 24 hours. If the pH of the slab is 10 or lower, notify the manufacturer for preparations required to ensure a good bond.

1. Probe Manufacturer: A relative humidity probe kit and manufacturer known to comply with the requirements includes "The Rapid RH Probe" manufactured by Wagner Electronic Products, Inc., Rogue River, OR. (800) 207-2164 (v).

C. Surface Treatment:

1. Prepare slab substrates, (*including any existing cementitious terrazzo*) to "open" surface pores by means of light scarification, medium shot blast or medium scarification with a vacuum unit. Surface preparation results shall achieve a minimum Concrete Surface Profile (CSP) of 5 according to International Concrete Repair Institute Guideline No. 03732. Remove all contaminating or bond breaking substances including but not limited to dust, laitance, curing compounds, coatings, sealers, oil, grease, existing floor covering adhesives and mastics. All oil or grease not removed by scarification or blasting shall be removed by either detergent scrubbing with heavy duty cleaner/degreaser, low pressure water cleaning, steam cleaning, or chemical cleaning methods in accordance with the manufacturers written instructions. All spalled or deteriorated slab surfaces shall be mechanically removed by scabbling or chipping hammers. Acid etching is not acceptable.

NOTE: Many of the existing sub-floor areas of the existing Terminals are not level and require extensive floor prep. All existing finishes such as but not limited to Fritztile are to be removed from the concrete slab.

2. Apply moisture vapor barrier across the entire area to receive the epoxy terrazzo in accordance with the manufacturer's recommendations.

3. Repair or level damaged slab surfaces with epoxy fill mortar. Latex fills or self-leveling underlayments are not acceptable.

4. Flexible Epoxy Membrane (Crack Bridging Membrane) Placement:

   a. Install flexible epoxy membrane at 40 mils thickness over the moisture vapor barrier and embed fabric reinforcement. Follow the specific recommendations of the flooring manufacturer for detailing at terminations, construction control joints, construction joints, building columns, and base conditions. Thoroughly mix flexible epoxy membrane and apply to prepared moisture vapor coated slab substrates according to manufacturer's instructions. Allow membrane to level until no ridges are showing.

5. Cracks and non-expansion joints greater than 1/16" wide after surface preparation shall be prepared until sound and treated with membrane materials in accordance with the instructions of the epoxy terrazzo manufacturer and as follows. Allow in base bid for above crack detailing as follows - 5% of lineal footage of total project square footage for combined Type 1 & 2, and 3% of lineal footage of Type 3. (i.e., a 10,000 sq ft project would allow for a combined 500 lineal feet of Type 1 & 2 repairs and 300 lineal feet of Type 3 repairs.

   a. Type 1 Crack Detailing: Hairline cracks shall receive detail coat of epoxy primer with 6" fabric reinforcement.

   b. Type 2 Crack Detailing Fill cracks greater than hairline but less than 1/16" wide after surface preparation with neat, epoxy membrane. Place detail coat of epoxy membrane over crack and embed 12" fiberglass cloth. Lightly abrade or solvent wipe treated cracks prior to applying primer.

c. Type 3 Crack Detailing Fill cracks greater than 1/16" with flexible epoxy membrane. Place 25-30 mil detail coat so that flexible epoxy membrane extends at least 9” to 12” on each side of crack or joint. After flexible epoxy membrane has leveled, lay precut reinforcing fabric into wet membrane. Smooth cloth with a flat steel trowel, allowing cloth to be encapsulated but remain exposed on the surface of flexible epoxy membrane. Lightly abrade or solvent wipe treated cracks prior to applying primer.

NOTE: For the floor leveling purposes, the Bid cost for Epoxy Terrazzo shall include the price for installing a 5/8” minimum epoxy sand level.

3.3 INSTALLATION

A. General: Comply with NTMA specifications and recommendations, unless otherwise shown or specified for installation of strips, placing, curing, grinding, and finishing of terrazzo. Make provisions for protecting adjacent work from terrazzo placement and finishing.

1. Extend terrazzo work into recesses and under equipment in the spaces shown or scheduled to receive terrazzo. Form a complete covering without interruptions or seams, except provide divider strips where shown. Place and finish terrazzo uniformly and neatly around obstructions so as to achieve continuous color, pattern and finish throughout the Work.
2. Complete terrazzo work prior to contiguous work which might be damaged by water or other materials used.

B. Epoxy Terrazzo:

1. Control Joints, Stop Strips and Divider Strips:

a. Control Joints: Place back to back angle divider strips **directly over concrete control joints** leaving a space appropriate for anticipated movement – typically 1/4” – 3/8”. Fill gap between control joints with divider strip joint sealant. If flexible membrane was placed greater than 72 hours before placement of epoxy terrazzo, solvent wipe completely prior to installing epoxy primer and terrazzo.

NOTE: All control joints to be carried to the surface.

b. Stop Strips: Install stop strips at perimeter of epoxy terrazzo flooring fields. Adhere stop strips with substrate primer – do not fasten to concrete. If flexible membrane was placed greater than 72 hours before placement of epoxy terrazzo, solvent wipe completely prior to installing epoxy primer and terrazzo.

c. Divider Strips: Place divider strips directly over concrete where indicated on the drawings. Adhere divider strips with substrate primer – do not fasten to concrete. If flexible membrane was placed greater than 72 hours before placement of epoxy terrazzo, solvent wipe completely prior to installing epoxy primer and terrazzo.

NOTE: All pours to be to the divider strips. Phased pours in areas within the divider strips shall not be allowed unless directed otherwise by LAWA. The leg of the divider strip shall be fully bonded to the slab. When two divider strips are joined, the ends shall touch and align.

2. Placing Epoxy Terrazzo:
    a. Clean and prepare substrate to comply with NTMA specifications for type of terrazzo application indicated. Clean substrate of loose chips and foreign matter.
    b. Priming: Apply epoxy primer evenly over prepared flexible membrane at the rate of 200-300 square feet per gallon, to thoroughly wet surface, but avoiding "ponding" the material.
    c. For thin-set terrazzo topping, comply with resin manufacturer's recommendations for proportioning mixes.
    d. Comply with NTMA guide specifications previously referenced under "Thin-Set Terrazzo Materials" and with matrix manufacturer's directions for installing thin-set terrazzo. Match Architect's samples and provide total material thickness of not less than 3/8”. Allow cure per manufacturer's recommendations prior to grinding operations.
3. Grinding: Exercise extreme care to ensure fluids from grinding operation do not react with dividers and strips to produce a stain on aggregate. Delay grinding until heavy trade work is completed and construction traffic through the area is restricted.
    a. Rough Grinding: Grind with 24 or finer grit stones or with comparable diamond plates.
    b. Intermediate Grinding: Follow initial grind with 80 or finer grit stones.
    c. Grouting: Cleanse floor with clean water and rinse thoroughly. Remove excess rinse water by wet vacuum and machine until completely dry. Apply epoxy grout to fill voids.
    d. Fine Grinding: Grind with 120 or finer grit stones until all grout is removed from surface. Upon completion terrazzo shall show a minimum of 70% to 75% of marble chips.

C. Precast Terrazzo:
1. Preparation: Clean precast terrazzo surfaces which have become dirty or stained prior to setting to remove soil, stains and foreign materials. Clean precast terrazzo by thoroughly scrubbing with fiber brushes followed by a thorough drenching with clear water. Use only mild cleaning compounds that contain no caustic or harsh filler or abrasives.
2. Installation, General:
    a. Employ only skilled and experienced workmen to install the precast terrazzo work. Use carborundum or diamond tipped power saws to cut precast terrazzo units which need to be fitted to existing field conditions.

b. Set precast terrazzo units to comply with requirements indicated on drawings and final shop drawings. Install anchors, supports, fasteners and other attachments indicated or necessary to secure precast terrazzo work in place. Shim and adjust anchors, supports and accessories to set precast terrazzo work accurately in locations indicated with uniform joints of widths indicated and with edges and faces aligned.

c. Installation Tolerances:

1) Joint Widths: +/- 1/16".

2) Variation from Plumb: +/- 1/16".

3) Variation from Level: +/- 1/8" in 20', non-cumulative.

4) Piece Alignments (Edge to Edge): +/- 1/32".

3. Installation of Wall Base: Install base where indicated, after placing floors, and in accordance with NTMA, and the applicable provisions of TCA W243 and ANSI A108.5. Tamp units into setting bed to achieve a full bond without voids. Level units at joints. Grind at joints to remove any minor discrepancies in level of units. Replace warped, stained, damaged and non-matching units as directed. Grout joints, except those shown to receive sealant or divider strips, with a mixture of Portland cement, pigment and water, matching the matrix of the unit being grouted.

4. Installation of Stair Tread/Risers: Place setting bed on steel pan and poured in place concrete type stairs where shown and in accordance with NTMA, and the applicable provisions of TCA S151 Method F111 (for steel pan stairs) and Methods F112 and W211 (for concrete stairs) and ANSI A108.1A. Tamp units into setting bed to achieve a full bond without voids. Level units at joints. Grind at joints to remove any minor discrepancies in level of units. Replace warped, stained, damaged and non-matching units as directed. Grout joints, except those shown to receive sealant or divider strips, with a mixture of Portland cement, pigment and water, matching the matrix of the units being grouted.

3.4 CLEANING, SEALING AND PROTECTION

A. Clean terrazzo after installing and grinding operations are completed by thoroughly washing all terrazzo surfaces with a neutral cleaner. Rinse with clean water and allow surface to dry thoroughly. Apply sealer per manufacturer's recommendations.

B. Apply 3M Stone Floor Protector Sealer in two coats at the coverage rate of 2500 sq./gallon per coat in compliance with sealer manufacture instructions.

END OF SECTION 09 66 23

SECTION 09 68 13 – TILE CARPETING

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes carpet tile.

1.2 STANDARDS

A. Except as modified by governing codes and by the Contract Documents, comply with the applicable provisions and recommendations of the following:

1. The Carpet and Rug Institute "The Carpet Specifiers' Handbook."
2. The Carpet and Rug Institute "CRI 104 Commercial Carpet Installation Standard."

1.3 SUBMITTALS

A. Product Data: Submit product data, specifications, and installation instructions for materials specified herein and other data as may be required to show compliance with the Contract Documents. Include installation recommendations for each type of substrate required.

B. Shop Drawings: Submit shop drawings showing the following:

1. Existing floor materials to be removed.
2. Existing floor materials to remain.
3. Columns, doorways, enclosing walls or partitions, built-in cabinets, and locations where cutouts are required in carpet tiles.
4. Carpet tile type, color, and dye lot.
5. Type of subfloor.
6. Type of installation.
7. Pattern of installation, carpet locations, direction, and starting points per floor.
8. Type, color, and location of insets and borders.
9. Type, color, and location of edge, transition, and other accessory strips.
10. Pile direction.
11. Transition and other accessory strips.
12. Transition details to other flooring materials.

C. Samples: Submit samples showing full range of color, texture, and pattern variations expected. Prepare samples from same material to be used for the Work. Label each Sample with manufacturer's name, material description, color, pattern, and designation indicated on Drawings and in schedules. Submit the following:

1. Carpet Tile: Full-size Samples.
2. Exposed Edge Stripping and Accessory: 12-inch- (300-mm-) long Samples.

D. Maintenance Data: Submit copies of instructions for care, cleaning, maintenance and repair of carpeting.

1. Each carpet manufacturer shall meet with the authorized LAWA personnel, to review the characteristics of his product and to recommend appropriate maintenance procedures, prior to occupancy of the finished spaces.

E. Warranty: Submit special warranties specified in this Section.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: Engage a carpet installer, who has completed a minimum of three (3) projects over the last 10 years which were similar in material, design and extent to that indicated for the project - as determined by the LAWA – and which have resulted in construction with a record of successful in service performance.

1. In the case where the Installer is actually a Dealer, it is understood that the terms Installer, Dealer, Carpeting Contractor and Contractor shall be one and the same for purposes of this Contract. He shall assume responsibility for all of the work, including acquisition of the materials from the manufacturers herein specified.

B. Mill Inspection: The carpeting may be inspected to determine compliance with the Contract Documents with respect to manufacture, materials, pattern and colors. Inspection may be made at the mill by a representative of LAWA at any time during the process of manufacture.

C. Sample Installations: Before installing carpet, install sample installation, for each type of carpet installation required to demonstrate aesthetic effects and qualities of materials and execution. Install sample installations to comply with the following requirements, using materials indicated for the completed Work:

1. Size and Location: Provide 250 square foot (23.23 sq.m) sample installation in location as directed by LAWA.
2. Demonstrate the proposed range of aesthetic effects and workmanship.
3. Obtain LAWA's approval of sample installations before starting work.
4. Maintain sample installations during construction in an undisturbed condition as a standard for judging the completed Work.
5. Approved sample installations may become part of the completed Work if undamaged at time of Substantial Completion.

NOTE: The contractor shall not proceed with installation until the required mock up has been approved by LAWA.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver carpeting in original mill protective wrapping with mill register numbers and tags attached.

B. Deliver other materials in manufacturers unopened containers identified with name, brand, type, grade, class, and other qualifying information.

C. Store materials in a dry location, in such a manner as to prevent damage.

1.6 PROJECT CONDITIONS

A. Environmental Limitations: Do not install carpet tile until wet work in spaces is complete and dry, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

B. Do not install carpet tile over concrete slabs until slabs have cured and are sufficiently dry to bond with adhesive and concrete slabs have pH range recommended by carpet tile manufacturer.

1.7 WARRANTY

A. Carpet Manufacturer's Warranty: Written warranty, signed by carpet tile manufacturer agreeing to replace carpet tile that does not comply with requirements or that fails within specified warranty period. Warranty does not include deterioration or failure of carpet tile due to unusual traffic, failure of substrate, vandalism, or abuse. Failures include, but are not limited to, more than 10 percent loss of face fiber, wear, static buildup in excess of 3.0 kV when tested under the Standard Shuffle Test at 70 deg. F (21 deg. C) and 20% RH, edge raveling without seam sealers, tuft bind loss, zippering (wet or dry), shrinkage, curling, doming, snags, runs, and delamination. Warrantees shall be a non-prorated limited lifetime warranty. This shall include surface wear, static electricity, edge ravel, zippering, delamination and backing resiliency.

1.8 EXTRA MATERIALS AND ATTIC STOCK

A. Attic Stock: Package and deliver usable remnants of carpet to LAWA at the conclusion of the job. Include any uncut carpet tiles.

PART 2 - PRODUCTS

2.1 CARPET TILE

A. Carpet Tile Types: Provide manufacturers commercial grade carpet tile for a 100% glue down installation.

B. Provide carpet tile by one of the following:

1. Tandus (LAWA Basis of Design)
2. Mohawk Group
3. Mannington

C. Fiber Content: **6 or 6.6 Branded Nylon**

D. Pile Characteristics: **No Over-Tufting.**

E. Dye Process: **Solution-dye** or **yarn dyed is required**

F. Density: Greater than 5000.

2.2 INSTALLATION ACCESSORIES

A. Trowelable Leveling and Patching Compounds: Portland cement-based formulation provided by or recommended by carpet tile manufacturer. Do not use gypsum based compounds.

B. Carpet Adhesives: Water-resistant, mildew resistant, and nonstaining, high solids, low VOC emitting formulations that are specifically recommended by the carpet manufacturer, as verified through compatibility and adhesion testing for the intended substrate and application, and that comply with flammability requirements for installed carpet. Adhesives shall meet all sustainability requirements for the State of California.

C. Carpet Edging: Provide rubber composition carpet edging in single lengths wherever possible, keeping the number of joints or splices to a minimum. Provide in quantities and locations as job required based upon the recommended good practice of the industry; include in every location where carpet terminates and other flooring continues. Color to match adjacent carpet types.

D. Floor Sealer: Type as recommended and manufactured by the carpet tile manufacturer for the applications indicated. Floor sealers shall not contain silicates.

PART 3 - EXECUTION

3.1 PRE-INSTALLATION MEETING

A. Prior to the installation, meet at the project site to review the material selections, substrate preparations, installation procedures, coordination with other trades, special details and conditions, standard of workmanship, and other pertinent topics related to the Work. The meeting shall include LAWA, the Architect of Record, the Contractor, the installer, material manufacturer's representatives, and representatives of other trades or subcontractors affected by the installation.

3.2 PREPARATION

A. Coordinate the installation of carpet so as not to delay the occupancy of the site or interfere with the completion of construction.

B. Examine the substrates, adjoining construction and the conditions under which the Work is to be installed. Verify recommended limits for moisture content and alkalinity of concrete substrates with carpet manufacturer.

1. Moisture Content: Verify moisture content using a standard calcium chloride crystal test or a 1 square yard (0.84 sq.m) clear plastic test. Perform testing at a frequency as recommended by the carpet manufacturer. Perform testing at a frequency of not less than once every 1,000 square feet (93 sq.m). Moisture reading shall not exceed MVER, 8.01 lbs., PH <11.0.

2. Alkalinity Test: Verify alkalinity of concrete substrates by drilling a 3/8 inch (9.5 mm) diameter hole approximately 1/4 inch (6.35 mm) deep, remove all residue; fill with distilled water, allow water to stand 3 minutes and test with a calibrated electronic meter

or Ph paper. Perform testing at a frequency of not less than once every 1,000 square feet (93 sq.m). Ph in-situ/RH, 85% in combination with readings listed in 3.2.B.1.

3. Alternative test procedures for moisture content and alkalinity may be acceptable subject to the carpet manufacturer's review and written acceptance.

C. Concrete Subfloors: Verify that concrete slabs comply with the following:

1. Remove coatings, including curing compounds, existing floor covering adhesive residues, and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, without using solvents. Use mechanical methods recommended in writing by the carpet manufacturer. Do not use oil-based or silicone based sweeping compound.

2. Slab substrates are dry and free of curing compounds, sealers, hardeners, and other materials that may interfere with adhesive bond. Determine adhesion and dryness characteristics by performing bond and moisture tests recommended by the carpet manufacturer.

3. Use leveling and patching compounds recommended by flooring manufacturer for filling cracks, holes and depressions in the substrate. Surface shall be smooth, level and at proper elevation. Remove ridges, roughness and protrusions from concrete surfaces by grinding. The floor should be flat to within 1/8" within 10 feet.

D. Broom and vacuum clean substrates to be covered immediately before installing carpet.

E. Carpet installation shall not commence until painting and finishing work are complete and ceiling and overhead work is tested, approved, and completed.

F. Proceed with installation only after unsatisfactory conditions have been corrected

3.3 INSTALLATION

A. General: Comply with the manufacturer's instructions, specified industry standards and recommendations, and as required to match the accepted sample installations. Apply adhesive in accordance with adhesive manufacturer's directions.

B. Apply adhesive as a full spread directly to the concrete after snap lines and layout have been determined. Adhere all full size, perimeter tiles, and cut tiles, with a full spread of adhesive. Dry fit cut tiles and apply adhesive to tile back after tile has been cut. Use full uncut tiles down the center of corridors and, where necessary, cut perimeter tiles to butt walls.

1. Cut and fit carpet tile to butt tightly to vertical surfaces, permanent fixtures, and built-in furniture including cabinets, pipes, outlets, edgings, thresholds, and nosings. Bind or seal cut edges as recommended by carpet tile manufacturer.

2. Cut openings in carpet for electrical outlets, piping and other penetrations. Maintain close tolerances so that edges of carpet will be covered by plates and escutcheons.

3. Extend carpet tile into toe spaces, door reveals, closets, open-bottomed obstructions, removable flanges, alcoves, and similar openings.

C. Butt carpet tile tightly together to form seams without gaps or entrapped pile yarns and aligned with adjoining tiles.

D. Edge Strip Installation: Install edge strip at every location where edge of carpet is exposed to traffic, unless otherwise indicated. Unless otherwise directed by the Architect of Record, install in single lengths and secure in accordance with manufacturer's directions.

E. Traffic over adhesive installations shall be restricted until adhesive has properly cured in accordance with the adhesive manufacturers recommendations.

3.4 CLEANING AND PROTECTION

A. Cleaning: As the carpeting is installed, remove and dispose of all trimmings, excess pieces of carpeting and laying materials from each area as it is completed. Vacuum carpeting with a commercial vacuum, having a cylindrical brush or beater bar and high suction. Remove adhesives, stains, and soil spots in accordance with the carpet manufacturer's recommendations.

B. Protection: Protect carpeting against damage of every kind as damaged carpeting shall be rejected. Use non-staining cover material for protection. Tape joints of protective covering.

1. Plastic and polyethylene sheet protective coverings shall not be permitted.

2. Remove and replace rejected carpeting with new carpeting. At the completion of the work, remove covering, vacuum clean carpeting and remove soiling and stains (if any) to the satisfaction of LAWA.

3.5 SUSTAINABILITY

A. Carpet tile shall contain a minimum of 27% post consumer recycled content.

B. Carpet tile shall meet NSF/ANSI 140 Platinum rating.

C. Carpet tile shall meet “Cradle to Cradle” requirements and be certified a minimum Silver V.3.1.

D. Carpet tile shall be 100% recyclable in a SCS Certified Recycling Facility.

E. Carpet tile shall conform to all State of California Proposition 65 requirements.

END OF SECTION 09 68 13

SECTION 09 68 16 – SHEET CARPETING

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes broadloom carpet.

1.2 STANDARDS

A. Except as modified by governing codes and by the Contract Documents, comply with the applicable provisions and recommendations of the following:

1. The Carpet and Rug Institute "The Carpet Specifier's Handbook."
2. The Carpet and Rug Institute "CRI 104 Commercial Carpet Installation Standard."

1.3 SUBMITTALS

A. Product Data: Submit product data, specifications, installation instructions for materials specified herein and other data as may be required to show compliance with the Contract Documents. Include installation recommendations for each type of substrate required.

B. Shop Drawings: Submit shop drawings showing the following:

1. Existing floor materials to be removed.
2. Existing floor materials to remain.
3. Columns, doorways, enclosing walls or partitions, built-in cabinets, and locations where cutouts are required in carpet.
4. Dye lots, pattern types, repeats, locations, pile direction, and starting points per floor.
5. Seam locations, types, and methods.
6. Type of installation.
7. Type, color, and location of insets and borders.
8. Type, color, and location of edge, transition, and other accessory strips.
9. Show details of cutouts.
10. Type of cushion.
11. Include on shop drawings dimensions which verify field conditions.
12. Transition, and other accessory strips.
13. Transition details to other flooring materials.

C. Samples: Submit samples showing full range of color, texture, and pattern variations expected. Prepare samples from same material to be used for the Work. Label each Sample with manufacturer's name, material description, color, pattern, and designation indicated on Drawings and in schedules. Submit the following:

1. Carpet: 24-inch- (600-mm-) square Samples of each carpet required.
2. Exposed Edge Stripping and Accessory: 12-inch- (300-mm-) long Samples.
3. Carpet Cushion: 6-inch- (150-mm-) square Sample.

4. Mitered Carpet Border Seam: 12-inch- (300-mm-) square Sample. Show carpet pattern alignment.

D. Maintenance Data: Submit copies of instructions for care, cleaning, maintenance and repair of carpeting.

1. Each carpet manufacturer shall meet with the authorized LAWA personnel, to review the characteristics of their product and to recommend appropriate maintenance procedures, prior to occupancy of the finished spaces.

E. Warranties: Submit special warranties specified in this Section.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: Engage a carpet installer who has completed a minimum of three (3) projects over the last 10 years which were similar in material, design and extent to that indicated for the project - as determined by LAWA – and which have resulted in construction with a record of successful in service performance.

1. In the case where the Installer is actually a Dealer, it is understood that the terms Installer, Dealer, Carpeting Contractor and Contractor shall be one and the same for purposes of this Contract. He shall assume responsibility for all of the work, including acquisition of the materials from the manufacturers herein specified.

B. Mill Inspection: The carpeting may be inspected to determine compliance with the Contract Documents with respect to manufacture, materials, pattern and colors. Inspection may be made at the mill by a representative of LAWA at any time during the process of manufacture.

C. Sample Installations: Before installing carpet, install sample installations for each type of carpet installation required to demonstrate aesthetic effects and qualities of materials and execution. Install sample installations to comply with the following requirements, using materials indicated for the completed Work:

1. Size and Location: Provide 250 square foot (23.23 sq.m) sample installations in locations as directed by LAWA. Subdivide the sample installation with one continuous seam of the type specified.
2. Demonstrate the proposed range of aesthetic effects and workmanship.
3. Obtain LAWA's approval of sample installations before starting work.
4. Maintain sample installations during construction in an undisturbed condition as a standard for judging the completed Work.
5. Approved sample installations may become part of the completed Work if undamaged at time of Substantial Completion.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver carpeting in original mill protective wrapping with mill register numbers and tags attached.

B. Deliver other materials in manufacturers unopened containers identified with name, brand, type, grade, class, and other qualifying information.

C. Store materials in a dry location, in such a manner as to prevent damage.

1.6 PROJECT CONDITIONS

A. Environmental Limitations: Do not install carpet until wet work in spaces is complete and dry, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use. Stack rolls horizontally no higher than two high on a flat surface. Store carpet and adhesive at minimum temperature of 180 degrees Celsius and relative humidity of maximum of 65% for a minimum of 48 hours before installation. General Contractor is to prepare and share moisture testing to the architect before carpet is laid.

B. Do not install carpet over concrete slabs until slabs have cured and are sufficiently dry to bond with adhesive and concrete slabs have pH range recommended by carpet manufacturer. Substrate shall be within moisture and alkalinity limits prescribed by the manufacturer. Maintain relative humidity between 10 and 65% RH for 48 hours before, during and after installation.

1.7 WARRANTY

A. Carpet Manufacturer's Warranty: Written warranty, signed by carpet manufacturer agreeing to replace carpet that does not comply with requirements or that fails within specified warranty period. Warranty does not include deterioration or failure of carpet due to unusual traffic, failure of substrate, vandalism, or abuse. Failures include, but are not limited to, more than 10 percent loss of face fiber, wear, static buildup in excess of 3.0 kV when tested under the Standard Shuffle Test at 70 deg. F (21 deg. C) and 20% RH, edge raveling, tuft bind loss, shrinkage, zippering (wet or dry), and delamination. Warrantees shall be full term, not pro-rated for the specified warranty period.

1. Warranty Period: 10 years from date of Substantial Completion.

1.8 EXTRA MATERIALS AND ATTIC STOCK

A. Attic Stock: Package and deliver usable remnants of carpet to a storage room as directed by LAWA at the conclusion of the job. Include pieces of broadloom 20 square feet (1.86 sq.m) in area or greater.

PART 2 - PRODUCTS

2.1 CARPET

A. Carpet Types: Provide manufacturers commercial grade broadloom carpet for **100% glue down** installation.

B. Provide carpet tile by one of the following:

1. Tandus (LAWA Basis of Design)
2. Mohawk Group
3. Mannington

C. Fiber Content: **6 or 6.6 Branded Nylon**

D. Pile Characteristics: **No Over-Tufting.**

E. Dye Process: **Solution-dye** or **yarn dyed is required**

F. Density: Greater than 5000.

2.2 CARPET CUSHION

A. Product as recommended in writing by the carpet manufacturer for the application indicated and which will not void the specified warranties, (*if required*).

2.3 INSTALLATION ACCESSORIES

A. Trowelable Leveling and Patching Compounds: Portland cement based formulation provided by or recommended by the following. Do not use gypsum based compounds.

1. Carpet manufacturer.
2. Carpet cushion manufacturer.

B. Carpet Adhesives: Water-resistant, mildew resistant, and non-staining, high solids, low VOC emitting formulations that are specifically recommended by the carpet manufacturer, as verified through compatibility and adhesion testing for the intended substrate and application, and that comply with flammability requirements for installed carpet. Adhesives will comply with Green Label Plus testing of the Carpet and Rug Institute. Adhesives and Primers must also comply to all State of California Proposition 65 requirements.

C. Tackless Carpet Stripping (Stretch-In Installations): Water-resistant plywood in minimum 1 inch (25 mm) wide strips, thickness to match cushion thickness, with minimum 3 rows of prenailed angular pins protruding from the top designed to grip and hold stretched carpet at backing.

D. Plastic Coated Fabric Tape (Stretch-In and Double Stick Broadloom Cushion Installations): Woven fabric impregnated with plastic and coated with adhesive having high-tack adhesion forming a secure bond for application to cushion top seams to resist peaking. Provide water-resistant plastic-coated tape which will unwind without adhesive transfer.

E. Seaming Tape: Hot melt adhesive tape, 6" wide, recommended by the carpet mill as suitable for backing specified.

F. Seaming Cement: Water-resistant and flame-resistant carpet adhesive for sealing raw edges, seaming, reinforcing seams and patching. Provide fast drying, easy spreading carpet seaming adhesive having excellent aging characteristics recommended by the carpet manufacturer.

G. Metal Edge Strips: Extruded aluminum with mill finish of width shown, of height required to protect exposed edge of carpet, and of maximum lengths to minimize running joints.

H. Carpet Edging: Provide rubber composition carpet edging in single lengths wherever possible, keeping the number of joints or splices to a minimum. Provide in quantities and locations as job required based upon the recommended good practice of the industry; include in every location where carpet terminates and other flooring continues. Color to match adjacent carpet types.

I. Floor Sealer: Type as recommended and manufactured by the carpet manufacturer for the applications indicated. Carpet and floor sealers will not contain silicates.

PART 3 - EXECUTION

3.1 PRE-INSTALLATION MEETING

A. Prior to the installation, meet at the project site to review the material selections, substrate preparations, installation procedures, coordination with other trades, special details and conditions, standard of workmanship, and other pertinent topics related to the Work. The meeting shall include the LAWA, the Architect of Record, the Contractor, the installer, material manufacturer's representatives, and representatives of other trades or subcontractors affected by the installation.

3.2 PREPARATION

A. Coordinate the installation of carpet so as not to delay the occupancy of the site or interfere with the completion of construction.

B. Examine the substrates, adjoining construction and the conditions under which the Work is to be installed. Verify recommended limits for moisture content and alkalinity of concrete substrates with carpet manufacturer.

1. Moisture Content: Verify moisture content using a standard calcium chloride crystal test or a 1 square yard (0.84 sq.m) clear plastic test. Perform testing at a frequency of not less than once every 1,000 square feet (93 sq.m).

2. Alkalinity Test: Verify alkalinity of concrete substrates by drilling a 3/8 inch (9.5 mm) diameter hole approximately 1/4 inch (6.35 mm) deep, remove all residue; fill with distilled water, allow water to stand 3 minutes and test with a calibrated electronic meter or Ph paper. Perform testing at a frequency of not less than once every 1,000 square feet (93 sq.m).

3. Alternative test procedures for moisture content and alkalinity may be acceptable subject to the carpet manufacturer’s review and written acceptance.

C. Concrete Subfloors: Verify that concrete slabs comply with the following:

1. Remove coatings, including curing compounds, existing floor covering adhesive residues, and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, without using solvents. Use mechanical methods recommended in writing by the carpet manufacturer.

2. Slab substrates are dry and free of curing compounds, sealers, hardeners, and other materials that may interfere with adhesive bond. Determine adhesion and dryness characteristics by performing bond and moisture tests recommended by the carpet manufacturer.

3. Use leveling and patching compounds recommended by flooring manufacturer for filling cracks, holes and depressions in the substrate. Surface shall be smooth, level and at proper elevation. Remove ridges, roughness and protrusions from concrete surfaces by grinding.

D. Broom and vacuum clean substrates to be covered immediately before installing carpet.

E. Carpet installation shall not commence until painting and finishing work are complete and ceiling and overhead work is tested, approved, and completed.

F. Proceed with installation only after unsatisfactory conditions have been corrected.

3.3 INSTALLATION

A. 100% Direct Glue Down of Broadloom Carpet: Comply with the manufacturer's instructions, specified industry standards and recommendations, and as required to match the accepted sample installations.

1. Carpet Layout, Cutting and Edge Trim Seaming: Prior to applying adhesives, place seams at locations indicated on accepted shop drawings. All carpet rolls shall be installed in the exact roll number sequence as listed on the carpet rolls. Maintain direction of pattern, texture and lay of pile. Side to end seaming shall not be allowed. All edges of all rolls of carpet shall be finish trimmed prior to laying to assure a perfect seam condition and carpet match. All trimmed edges shall then be treated with latex seaming adhesive to assure that loose and cut yarns are not left to ravel or pull out.

   a. Cut and fit carpet to butt tightly to vertical surfaces, permanent fixtures, and built-in furniture including cabinets, pipes, outlets, edgings, thresholds, and nosings. Bind or seal cut edges as recommended by carpet manufacturer.

   b. Extend carpet into closets and offsets, and under movable equipment of the rooms and spaces shown or scheduled to receive carpet, including recessed covers within those spaces.

   c. Provide cutouts as required for removable access covers in substrates except do not cutout for floor closer cover plates. Bind edges neatly and secure to substrate. Cut only 3 sides wherever it is feasible to provide carpet flap in lieu of fully removable cutout.

   d. At doorways, center seams under door in closed position; do not place seams perpendicular to door frame in direction of traffic through doorway.

e. Cut openings in carpet for electrical outlets, piping and other penetrations. Maintain close tolerances so that edges of carpet will be covered by plates and escutcheons.

f. Seams shall be located away from areas subject to pivoting traffic.

2. Apply adhesive in accordance with adhesive manufacturer's directions. Cracks 3mm wide or protrusions over .8mm will be filled and leveled with appropriate and compatible latex/polymer fortified patching compound. Do not exceed the manufacturers recommendation for patch thickness. Large patch areas to be primed with a primer. Trowel size will be minimum 3/32" x 3/32" V-notched for tufted styles and minimum 1/8" x 1/8" V-notched for woven carpets.

3. Adhere carpet with a full spread of adhesive. Ensure uniform bond over the entire area.

a. Butt carpet tightly together to form seams without gaps or entrapped pile yarns and aligned with adjoining rolls of carpet. Seams shall be pressed by hand and/or suitable tool to produce the best possible even top pile width-to-width. Adjacent widths of carpet must be installed to finish at exactly the same elevation.

b. Roll carpet uniformly, removing air pockets and bubble using a 75 pound roller.

c. If the pile of the carpet has been compressed while laying in storage, so that there appears to be a difference in color in adjacent widths of material, the Contractor shall neutralize the pile with a steam machine and obtain a uniform pile direction throughout by brushing the carpet while it is still damp, at no additional cost to LAWA.

4. Edge Strip Installation: Install edge strip at every location where edge of carpet is exposed to traffic, unless otherwise indicated. Unless otherwise directed by the Architect of Record, install in single lengths and secure in accordance with manufacturer's directions.

5. Traffic over adhesive installations shall be restricted until adhesive has properly cured in accordance with the adhesive manufacturers recommendations.

B. Stair Carpeting: Comply with the manufacturer's instructions, specified industry standards and recommendations, and as follows:

1. Glue Down Installation: Tightly secure carpet to treads and risers using carpet adhesive. Stairs with a return nosing shall be cut and installed with the tread and risers being separate pieces.

3.4 CLEANING AND PROTECTION

A. Cleaning: As the carpeting is installed, remove and dispose of all trimmings, excess pieces of carpeting and laying materials from each area as it is completed. Vacuum carpeting with a commercial vacuum, having a cylindrical brush or beater bar and high suction. Remove adhesives, stains, and soil spots in accordance with the carpet manufacturer's recommendations. Remove any excess seam adhesive along the seams with recommended seam cleaner and a white cloth. When the adhesive has set up, remove any stay nails that may have been required.

B. Protection: Protect carpeting against damage of every kind as damaged carpeting shall be rejected. Use non-staining cover material for protection. Tape joints of protective covering.

1. Plastic and polyethylene sheet protective coverings shall not be permitted over glue down installations.

2. Remove and replace rejected carpeting with new carpeting. At the completion of the work and when directed by LAWA, remove covering, vacuum clean carpeting and remove soiling and stains (if any) to the satisfaction of LAWA.

3.5 TESTING MINIMUMS

A. Electrostatic Propensity: maximum 3.0 kv to AATCC 134

B. Tuft bind: 10 pound minimum to ASTM D1335

C. Appearance and color retention: 3.0 when tested without under cushion to ASTM D5252 after 12,000 cycles in the Hexapod Drum or 22,000 cycles in the Vettermann Drum to ASTM 5417.

D. Lightfastness: minimum L5 to AATC 16E

3.6 SUSTAINABILITY

A. Broadloom should contain 22-37% overall recycled content.

B. 100% of broadloom is to be recycled.

C. Low emitting materials: flooring VOC, 0.5 mg/m3 or less. Adhesives meet Green Label Plus and California South Coast Air Quality Management District (SCAQMD) Rule 1168 and are 50 g/L.

END OF SECTION 09 68 16

SECTION **09 91 23 - INTERIOR PAINTING**

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes surface preparation and the application of paint systems.

1.2 SUBMITTALS

A. Product Data: For each type of product. Include preparation requirements and application instructions.

B. Samples for Initial Selection: For each type of topcoat product.

C. Product List: For each product indicated.

1.3 EXTRA MATERIALS

A. Furnish extra materials from the same production run as the material applied.

1.4 QUALITY ASSURANCE

A. Mockups: Apply mockups of each paint system indicated and each color and finish selected to verify preliminary selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1. LAWA will select one surface to represent surfaces and conditions for application of each paint system.
    a. Vertical and Horizontal Surfaces: Provide to LAWA, samples of at least 100 sq. ft..
    b. Other Items: LAWA may designate items or areas required.
2. Final LAWA approval of paint selections will be based on mockups.
3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with LAWA requirements:

1. Benjamin Moore & Co.

2. Dunn-Edwards Corporation.
3. Kelly-Moore Paints
4. PPG Architectural Coatings / PPG Industries, Inc.
(includes ICI Paints / Glidden)
5. Sherwin-Williams Company.
(includes Frazee Paints)
6. Vista Paint.

2.2 PAINT, GENERAL

A. Material Compatibility:

1. Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
2. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.

B. VOC Content: Products shall comply with VOC limits of Los Angeles Department of Building and Safety and LAWA requirements.

C. FLOOR COATINGS:

1. Frazee; Monochem Dex-coat 2600
2. Glidden (formerly ICI; Groundworks), 3214 Water-based Clear Acrylic Concrete Sealer
3. PPG; Perma-Crete Plex-Seal WB Interior/Exterior Clear Sealer 4-6200
4. Sherwin Williams; H&C Concrete & Masonry Waterproofing Sealer

2.3 SOURCE QUALITY CONTROL

A. Testing of Paint Materials: LAWA reserves the right to invoke the following procedure:

1. LAWA may engage the services of a qualified testing agency to sample paint materials. Contractor will be notified in advance and may be present when samples are taken. If paint materials have already been delivered to Project site, samples may be taken at Project site. Samples will be identified, sealed, and certified by testing agency.

PART 3 - EXECUTION

3.1 EXAMINATION

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

B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:

1. Concrete: 12 percent.
2. Masonry (Clay and CMU): 12 percent.
3. Gypsum Board: 12 percent.
4. Plaster: 12 percent.

3.2 PREPARATION

A. Comply with manufacturer's written instructions and recommendations in "MPI Manual" applicable to substrates indicated.

B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.

1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.

C. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.

1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.

NOTE: When planning, either partial or full removal of existing coatings, regulatory restrictions and procedures shall be followed.

D. Concrete Substrates: Remove release agents, curing compounds, efflorescence, and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.

E. Masonry Substrates: Remove efflorescence and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces or mortar joints exceed that permitted in manufacturer's written instructions.

F. Steel Substrates: Remove rust, loose mill scale, and shop primer, if any. Clean using methods recommended in writing by paint manufacturer but not less than the following:

1. SSPC-SP 2, "Hand Tool Cleaning."
2. SSPC-SP 3, "Power Tool Cleaning."
3. SSPC-SP 7/NACE No. 4, "Brush-off Blast Cleaning."
4. SSPC-SP 11, "Power Tool Cleaning to Bare Metal."

G. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.

H. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal fabricated from coil stock by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.

3.3 APPLICATION

A. Apply paints according to manufacturer's written instructions and to recommendations.

B.

1. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
2. Paint front and backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.
3. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.

C. Painting Fire Suppression, Plumbing, HVAC, Electrical, Communication, and Electronic Safety and Security Work:

1. Paint the following work where exposed in LAWA equipment rooms:
    a. Equipment, including panelboards and switch gear.
    b. Uninsulated metal piping.
    c. Uninsulated plastic piping
    d. Pipe hangers and support.
    e. Metal conduit.
    f. Plastic conduit.
    g. Tanks that do not have factory-applied final finishes.
    h. Duct, equipment and pipe insulation having cotton or canvas insulation covering or other paintable jacket material.
    i. Mechanical and electrical equipment that is indicated to have a factory primed finish for field painting.
2. Paint portions of internal surfaces of metal ducts, without liner, behind air inlets and outlets that are visible from occupied spaces.

3.4 FIELD QUALITY CONTROL

A. Dry Film Thickness Testing: LAWA may engage the services of a qualified testing and inspecting agency to inspect and test paint for dry film thickness.

1. Contractor shall touch up and restore painted surfaces damaged by testing.

2. If test results show that dry film thickness of applied paint does not comply with paint manufacturer's written recommendations, Contractor shall pay for testing and apply additional coats as needed to provide dry film thickness that complies with paint manufacturer's written recommendations.

3.5 CLEANING AND PROTECTION

A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site as per LAWA direction.

B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.

C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by LAWA, and leave in an undamaged condition.

D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.6 INTERIOR PAINTING SCHEDULE

Provide interior painting schedule indicating the type of prime coat, intermediate coat and top coat for all substrates applicable to your project.

END OF SECTION 09 91 23