



## **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; Mapelastac 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 jiggling, 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