

SECTION 093000 - TILING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes ceramic, porcelain, quarry, and glass tile.

1.2 PERFORMANCE REQUIREMENTS

- A. General: Provide floor tiles complying with one of the following standard and performance requirements.
- B. Dynamic Coefficient of Friction (DCOF): For tile installed on walkway surfaces, provide products with the following value as determined by testing identical products by the DCOF AcuTest Method per ANSI 137.1, 2012 Edition.
 - 1. Walkway Surfaces: Minimum 0.42.

1.3 ACTION SUBMITTALS

- A. Product Data: For each product indicated.
- B. Shop Drawings: Submit shop drawings showing the extent of each type of movement joint. Show widths, details, and locations of expansion, contraction, control, and isolation joints in tile substrates and finished tile surfaces.
- C. 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. Submit at least three samples of each tile proposed. Where tile size is smaller than 6- by-6-inches, submit sample boards a minimum of 12-by-12-inches showing variation of color and finish.
 - 2. Assembled samples with grouted joints for each color grout and for each type, composition, color, and finish of tile. Minimum size 12-by-12-inches or 3 full tiles.
 - 3. Thresholds in 6-inch lengths, each type.
 - 4. Metal edge strip in 6-inch lengths, each type.

1.4 INFORMATIONAL SUBMITTALS

- A. Test Reports: Submit test reports from qualified independent testing laboratory indicating and interpreting test results relative to compliance of tile products with requirements specified for slip resistance.
- B. Master Grade Certificates: Submit master grade certificates for each shipment, type, and composition of tile, signed by tile manufacturer and Installer.
- C. Product Certificates: Submit manufacturer's certifications for each type of grout and bonding material being provided suitable for the intended use and meet or exceed the referenced standards and the requirements of this Specification.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Instructions: Submit maintenance instructions for each type of product specified.

1.6 MAINTENANCE MATERIAL SUBMITTALS

- 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 manufacture's unopened containers, identified with name, brand type, grade, class and all other qualifying information, to a location where directed by the Owner.
 - 1. Two percent of amount installed but not less than one box.

1.7 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 Architect but not less than 100 sq. ft. area for floors, and not less than 100 sq. ft. 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.

1.8 PREINSTALLATION MEETING

- A. Prior to the installation of tile, 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, tile installer, tile and setting material manufacturer's representatives, and representatives of other trades or subcontractors affected by the installation.

1.9 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.

1.10 FIELD 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. Provide minimum 28 day cure of concrete and concrete masonry units before the installation of the tile work.
- C. Ensure cement and plaster rendering has been applied to interior concrete masonry wall surfaces and has been reviewed by the installer for suitability to receive his mortar bedding materials prior to installation of the tile work.
- D. Maintain temperatures within range recommended by the mortar and grout manufacturer, but not less than 50 deg F or more than 90 deg F, in spaces during tile setting. After installation maintain temperatures within range recommended by the mortar and grout manufacturer

- E. Close spaces to traffic during tile flooring installation.
- F. Close spaces to traffic for 72 hours after tile flooring installation.
- G. Shade all tile, materials and the work area from direct sunlight during the installation as needed to prevent rapid evaporation caused by excessive heat or wind.

PART 2 - PRODUCTS

2.1 TILE PRODUCTS, GENERAL (TL##)

- A. ANSI Ceramic Tile Standard: Provide 'Standard Grade' tile that complies with ANSI A137.1 "Specifications for Ceramic Tile," ANSI A137.2, "Specifications for Glass Tile," ANSI A137.3, "Specifications for Gauged Porcelain Tiles and Gauged Porcelain Tile Panels/Slabs" for types, compositions, and other characteristics indicated.
 - 1. Products and Manufacturers: Provide tile matching the Architect's samples which have been selected from the product lines and manufacturers indicated in Finish Schedule on Drawings.
- 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. Rectified Tile Edges: Provide all tile units having a face dimension of greater than 8" x 8" with factory rectified edges.
- E. FloorScore Compliance: Tile for floors shall comply with requirements of FloorScore Standard.
- F. G2 Green Squared® Certification: Tile products shall comply with sustainable requirements of ANSI A138.1 "Green Squared - American National Standard Specifications for Sustainable Ceramic Tiles, Glass Tiles, and Tile Installation Materials."

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 or less, and finish bevel to match face of threshold.

1. Stone Thresholds: ASTM C 503 for marble, , with a minimum abrasion resistance of 12 per ASTM C 1353 or ASTM C 241 and with honed finish.
 - a. Description: Marble with uniform, fine- to medium-grained white stone with gray veining .
- B. Waterproofing for Toilet Room and Kitchen Tile Installations:
 1. Fabric-Reinforced and Unreinforced Fluid-Applied Product: System consisting of liquid-latex rubber, with a VOC content of 65 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24), 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. which is manufactured in the plant closest to the geographic location of the project.
 - b. LATICRETE International Inc.; Laticrete 9235 Waterproof Membrane. which is manufactured in the plant closest to the geographic location of the project.
 - c. MAPEI Corporation; Mapelastc AquaDefense, which is manufactured in the plant closest to the geographic location of the project.
 - d. Ardex; Ardex 8+9 which is manufactured in the plant closest to the geographic location of the project.
- C. Crack Isolation Membrane for Tile Installations:
 1. Fabric-Reinforced, Fluid-Applied Product: System consisting of liquid-latex rubber, with a VOC content of 65 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24) (ASTM D 3960), 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 plant closest to the geographic location of the project.
 - b. LATICRETE International Inc.; Laticrete 9235 Waterproof Membrane,. which is manufactured in the plant closest to the geographic location of the project.
 - c. MAPEI Corporation; Mapelastc AquaDefense, which is manufactured in the plant closest to the geographic location of the project.

2.3 SETTING AND GROUTING MATERIALS

- A. Manufacturers and Plant Locations: Provide products manufactured in the plant closest to the geographic location of the project.
- B. Source Limitations: For each tile installation, obtain compatible formulations of setting and grouting materials and waterproofing 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-inch by 2-inch by 0.062-inch diameter; comply with ASTM A1064 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.

D. Latex-Portland Cement Mortar (Thin Set):

1. Prepackaged dry-mortar mix combined with dry powder latex additive, the following:
 - a. For Thin Set Placed over Slabs on Grade: Complying with ANSI A118.4 one of the following:
 - 1) Ultraflex 2 Mortar; MAPEI Corporation.
 - 2) Laticrete 253 Gold; Laticrete International Inc.
 - 3) Versabond Flex; Custom Building Products.
 - b. For Thin Set Tile Set over Walls, Membranes and Over Elevated Slabs: Complying with ANSI A118.15, one of the following:
 - 1) Kerabond Keralastic; MAPEI Corporation.
 - 2) Laticrete 272 mixed with Laticrete 333 Superflex; Laticrete International Inc.
2. For wall applications, provide nonsagging mortar.
3. For glass tile applications where a low temperature coating has not been factory applied to the tile, use mortar that will not show through glass tile bodies. For glass tile installations where a low temperature coating has been factory applied follow the glass tile manufacturers written recommendations for mortar selection and application.

E. Dry Set Mortar for Large and Heavy Tile (LHT Mortar): Complying with ANSI A118.4:

1. Prepackaged dry-mortar mix combined with additives to minimize slump and facilitate a thicker bond coat, and specifically manufactured and recommended in writing by the mortar and underlayment manufacturer for use in LHT mortar assemblies; one of the following:
 - a. Ultraflex LFT Mortar; MAPEI Corporation.
 - b. Laticrete 4-XLT; Laticrete International Inc.

2. For glass tile applications where a low temperature coating has not been factory applied to the tile, use mortar that will not show through glass tile bodies. For glass tile installations where a low temperature coating has been factory applied follow the glass tile manufacturers written recommendations for mortar selection and application.
- F. Polymer-Modified Tile Grout (For Typical Applications): Complying with ANSI A118.7 compounded with calcium aluminate cement, non-shrinking, efflorescence free grout. Provide, and stockpile, grout for each exposed color from a single manufactured and packaged batch source for the entire Project.
1. Polymer Type: Dry, redispersible latex/polymer powder form, prepackaged with other dry ingredients, one of the following:
 - a. Prism; Custom Building Products.
 - b. Permacolor; Laticrete International Inc.
 - c. Ultracolor Plus FA; Mapei Corporation.
 2. Colors: As selected by Architect from manufacturers standards to match tile being grouted.

2.4 MISCELLANEOUS MATERIALS

- A. Joint Sealants:
1. Typical Surfaces: "Mildew-Resistant Silicone Sealant", as specified in Section 079200 "Joint Sealants."
 2. Floor Joints: "Two-Part Polyurethane Sealant for Paving Applications," as specified in Section 079200 "Joint Sealants."
- 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.
- C. Grout Sealer: Grout manufacturers recommended product for sealing cementitious grout joints and that does not change color or appearance of grout.
- D. Underlayment Product for Leveling and Patching Floors indicated to receive Tiles: Latex-modified, cement-based formulation provided or approved by manufacturer of tile-setting materials for installations indicated.
1. Either Ultraplan or Novaplan Underlayment; MAPEI Corporation.
 2. NXT Level Plus Underlayment; Laticrete International Inc.

- E. Metal Edge Strips for Wall Applications: Metallic, angle or L-shaped, depth to match tile and setting-bed thickness and having an integral provision for anchorage to substrate; aluminum alloy exposed-edge material; furnish in longest lengths available.
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Blanke Corporation.
 - b. Ceramic Tool Company, Inc.
 - c. Schluter Systems L.P.
- F. Divider, Transition, and Movement Joint Strips:
1. Divider and Transition Strips: Stainless steel shapes and flat bar trims fabricated from ASTM A 666 (for flat bar) and ASTM A 276 (for shapes) Type 304 stainless steel, 1/4 inch 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.
 2. Movement Joint Strips: Laminations of extruded aluminum or formed stainless steel angle shapes, depth as required to finish flush with top surface of adjacent tile flooring fields, back to back installed with full height flexible filler to accommodate movement. Control joints shall have either an exposed approximately 5/8 inch wide interlocking continuous top to conceal prefabricated flexible filler or an exposed custom flexible prefabricated filler to accommodate movement. Joint assembly shall have a total movement capability of approximately 1/4 +1/8 inch/-3/32 /inch. Finish of exposed top to be satin. One of the following:
 - a. Basis of Design: Emseal Series ESF 16 AL; Emseal Joint Systems, Ltd.
 - b. Schluter; Dilex - EDP, fabricated to comply with the specified requirements.
 - c. CTC (Ceramic Tool Company); CTC Joint custom fabricated to comply with the specified requirements.
 - d. Vexcolt; Ti-Lock Metal, TAM NL 42151 (for thickset) or TAM NA 1212 (for medium and thinset).

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 EXAMINATION

- A. Examine substrates, areas, and conditions where tile will be installed, with Installer present.
 - 1. Verify that substrates for setting tile 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. 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.
 - 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 the existing floor substrates are coordinated with tile 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 an underlayment product(s) that is compatible with and acceptable to the setting materials manufacturer.
 - a. Subfloor Surfaces to Receive Thinset and LHT Mortar Setting Beds: +/- 1/8 inch in 10 feet Subfloor Surfaces to Receive Thickset Setting Beds: +/- 1/4 inch in 10 feet No valleys or ridges greater than 1/8 inch
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 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.).

3.3 INSTALLATION, GENERAL

- A. Tile Installation Standards: Comply with parts of ANSI A108 Series "Specifications for Installation of Ceramic Tile" and the TCNA's "Handbook for Ceramic, Glass, and Stone Tile Installation" that apply to types of setting and grouting materials and to methods indicated.

- B. Extend tile work into recesses and under or behind equipment and fixtures to form complete covering without interruptions, unless otherwise indicated. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.
- C. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap tile.
1. Glass Tile Cutting: Use a blade suitable for cutting glass which must be constantly kept wet with water. Cut tiles with the colored surface turned upwards. Cutting shall not be carried out near the edges of the individual tiles. Smooth off any sharp edges with sandpaper. Holes can be made with a drill bit specifically recommended for drilling glass with a diameter up to 5/16-inch. Apply water continually while drilling.
- D. 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.
- E. Finished Surfaces: Unless otherwise accepted in the sample installation(s), if any, finished surfaces shall present a flat, even appearance, free from waver, projections, and depressions.
- F. 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 tile. Do not saw-cut joints after installing tiles. Where movement joints are to be butted, the ends shall touch and align.
1. Spacing Guidelines:
 - a. 20 to 25 feet in each direction where interior tile work is not exposed to direct sunlight or moisture.
 - b. 8 to 12 feet in each direction where interior tile work is exposed to direct sunlight and moisture.
 - c. Where tilework 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.
 - d. In the joint between tiles making up the inside corner of planes.

- e. All contraction, control, expansion, isolation, seismic and cold joints in the horizontal structure and vertical surfaces shall continue through the tile surfaces, but not through membranes.
 - f. Vertical and Horizontal Joints Widths: Widths for quarry tile and paver tile shall be the same as the grout joint but not less than 1/4 inch or the width of the contraction, control, expansion, seismic, isolation joint whichever is greater; widths for ceramic mosaic tile and glazed wall tile shall not be less than 1/8 inch or the width of the control, expansion, seismic, joint whichever is greater.
 - g. Keep movement joints free from dirt, debris, grout, mortar, and setting bed materials. Prepare joints and apply sealants to comply with requirements in Section 079200 "Joint Sealants."
- G. Metal Edge Strips: Install where exposed edge of wall tile meets other wall finishes that finish flush with or below face of tile and the manufacturer of the field tile does not manufacture a tile edge transition trim. Where metal edge strips are indicated and full length single units are not available, joints are to be butted, ends shall touch and align.
- H. Grout Sealer: Apply grout sealer to cementitious grout joints in tile floors according to grout sealer manufacturer's written instructions. As soon as sealer has penetrated grout joints, remove excess sealer and sealer from tile faces by wiping with soft cloth.

3.4 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 at each horizontal installation, has been tested for water tightness. Test waterproofing membrane for watertightness by damming the floor drain, and creating a dam at the perimeter of the waterproofed basin followed by filling the basin with water, marking the height, and verifying the same height after 48 hours. Repair leaks before continuing with the installation of subsequent tile.

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 tile or setting materials over crack isolation membrane until membrane has cured.

3.6 FLOOR TILE INSTALLATION

- A. Thinsset Tile over Concrete Slabs (Typical): Install in accordance with the mortar manufacturer's recommendations and requirements indicated below for setting bed methods, installation methods related to types of subfloor construction, and grout 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.
 - 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 manufacturer's 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 percent coverage to thickness of not less than 1/16-inch.
 - d. Place tiles onto mortar bed, maintaining 1/8-inch wide joints, and true accurate pattern as shown. Exercise care to quickly remove spillage from faces of tile using damp sponge. 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: Do not begin grouting tiles 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. For typical installations, comply with latex-portland cement: ANSI A108.10. Fill joints of cushion edged tile to the depth of the cushion; fill joints of square edge tile flush with the tile surface. Do not permit mortar, mounting mesh, or spacer material 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. Thinsset Tile over Waterproof Membrane (Toilet Rooms): Install in accordance with the mortar manufacturer's recommendations and requirements indicated below for setting bed methods, installation methods related to types of subfloor construction, and grout 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 F122 (on ground) and F122A (above ground).

- 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 manufacturer's 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 percent coverage to thickness of not less than 1/16-inch.
 - e. Place tiles onto mortar bed, maintaining 1/8-inch wide joints, and true accurate pattern as shown. Exercise care to quickly remove spillage from faces of tile using damp sponge. 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: Do not begin grouting tiles 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. For typical installations, comply with latex-portland cement: ANSI A108.10. Fill joints of cushion edged tile to the depth of the cushion; fill joints of square edge tile flush with the tile surface. Do not permit mortar, mounting mesh, or spacer material 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. Thinset Tile over Crack Isolation Membrane: Install in accordance with the mortar manufacturer's recommendations and requirements indicated below for setting bed methods, installation methods related to types of subfloor construction, and grout 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.
 - 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 manufacturer's 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 percent coverage to thickness of not less than 1/16-inch.
 - e. Place tiles onto mortar bed, maintaining 1/8-inch 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 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 tiles 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 of cushion edged tile to the depth of the cushion; fill joints of square edge tile flush with the tile surface. Do not permit mortar, mounting mesh, or spacer material 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. LHT Set Tile (Only where indicated): Install in accordance with the mortar manufacturer's recommendations and requirements indicated below for setting bed methods, installation methods related to types of subfloor construction, and grout 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 F205 (on-ground slabs) and TCNA F205A (above ground slabs) except apply LHT bed in thickness of 3/4" unless otherwise indicated.
 - a. Where required by the conditions indicated, apply underlayment using methods and within time limits recommended by the mortar manufacturer.
 - b. With a trowel, having notches sized as recommended by the mortar manufacturer, place and 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.
 - e. Place tiles onto mortar bed, maintaining 1/8-inch 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 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 tiles 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 of cushion edged tile to the depth of the cushion; fill joints of square edge tile flush with the tile surface. Do not permit mortar, mounting mesh, or spacer material 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. Thickset Tile (only where indicated): Install in accordance with the mortar manufacturer's recommendations and requirements indicated below for setting bed methods, installation methods related to types of subfloor construction, and grout installation methods and grout types. Where recommendations and methods conflict, the manufacturer's recommendations shall apply. Thickness of mortar bed: Between 1-1/4-inch and 2-inches.
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.
 - a. Apply half 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 percent coverage to thickness of not less than 1/16-inch.
 - d. Place tile onto the green mortar bed, maintaining 1/8-inch wide joints for typical tile units and 1/4-inch 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. Maintain fully plastic bed throughout tile installation.
 - e. 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 tiles 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. For typical installations, comply with Latex-portland cement: ANSI A108.10. Fill joints of cushion edged tile to the depth of the cushion; fill joints of square edge tile flush with the tile surface. Do not permit mortar, mounting mesh, or spacer material 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.
- F. 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.

3.7 WALL TILE 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.
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, place tiles maintaining 1/8-inch wide joints, and true accurate pattern as shown.
 3. Cementitious Backerboard (Latex Portland Cement Mortar) Method: TCNA W244C, place tiles maintaining 1/8-inch wide joints, and true accurate pattern as shown.
 4. Grout Installation: Do not begin grouting tiles 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 of cushion edged tile to the depth of the cushion; fill joints of square edge tile flush with the tile surface. Do not permit mortar, mounting mesh, or spacer material 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.

3.8 RECESSED ACCESS DOOR PANEL INSTALLATION

- A. Install in accordance with the mortar manufacturer's recommendations and requirements indicated below for setting bed methods, installation methods related to types of construction, and grout 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 tile using damp sponges. Rake out joints to depth required to receive grout as tile units are set.

1. Latex Portland Cement Mortar Installation (using specified latex portland cement mortar material): ANSI A108.5, applied to access panel manufacturer supplied metal lath welded to panel substrate.
2. Gypsum Wallboard, Interior (Latex Portland Cement Mortar) Method: TCNA W243, place tiles maintaining 1/8-inch wide joints, and true accurate pattern as shown.
3. Grout Installation: Do not begin grouting tile 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 tile 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 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. Replace all cracked, chipped, and broken tile units with matching tile units; patched tile units will not be permitted.
- 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