

SECTION 09310 - CERAMIC TILE

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
 - 1. Ceramic mosaic tile.
 - 2. Glazed wall tile.
 - 3. Special-purpose tile.
 - 4. Stone thresholds installed as part of tile installations.
 - 5. Waterproof membrane for thin-set tile installations.
 - 6. Crack-suppression membrane for thin-set tile installations.
 - 7. Cementitious backer units installed as part of tile installations.
 - 8. Metal edge strips installed as part of tile installations.

1.2 DEFINITIONS

- A. Module Size: Actual tile size (minor facial dimension as measured per ASTM C 499) plus joint width indicated.
- B. Facial Dimension: Actual tile size (minor facial dimension as measured per ASTM C 499).
- C. Facial Dimension: Nominal tile size as defined in ANSI A137.1.

1.3 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 C 1028:
 - 1. Level Surfaces: Minimum 0.6.
 - 2. Step Treads: Minimum 0.6.
 - 3. Ramp Surfaces: Minimum 0.8.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Master Grade Certificates: For each shipment, type, and composition of tile, signed by tile manufacturer and Installer.
- C. Product Certificates: For each type of product, signed by product manufacturer.

1.5 QUALITY ASSURANCE

- A. Source Limitations for Tile: Obtain all tile of same type and color or finish tile from one source or producer.
 - 1. Obtain tile from same production run and of consistent quality in appearance and physical properties for each contiguous area.
- B. Source Limitations for Setting and Grouting Materials: Obtain ingredients of a uniform quality for each mortar, adhesive, and grout component from a single manufacturer and each aggregate from one source or producer.
- C. Source Limitations for Other Products: Obtain each of the following products specified in this Section through one source from a single manufacturer for each product:
 - 1. Stone thresholds.
 - 2. Waterproofing.
 - 3. Joint sealants.
 - 4. Cementitious backer units.

5. Metal edge strips.

- D. Mockups: Build mockups to verify selections made under sample Submittals and to demonstrate aesthetic effects.
 - 1. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.
- E. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Management and Coordination."

1.6 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. Store tile and cementitious materials on elevated platforms, under cover, and in a dry location.
- C. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.
- D. Store liquid latexes in unopened containers and protected from freezing.

1.7 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.

1.8 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.
 - 1. Tile and Trim Units: Furnish quantity of full-size units equal to 3 percent of amount installed, for each type, composition, color, pattern, and size indicated.

PART 2 - PRODUCTS

2.1 PRODUCTS, GENERAL

- A. ANSI Ceramic Tile Standard: Provide tile that complies with ANSI A137.1, "Specifications for Ceramic Tile," for types, compositions, and other characteristics indicated.
 - 1. Provide tile complying with Standard grade requirements, unless otherwise indicated.
 - 2. For facial dimensions of tile, comply with requirements relating to tile sizes specified in Part 1 "Definitions" Article.
- B. ANSI Standards for Tile Installation Materials: Provide materials complying with ANSI standards referenced in "Setting and Grouting Materials" Article.
- C. Colors, Textures, and Patterns: Where manufacturer's standard products are indicated for tile, grout, and other products requiring selection of colors, surface textures, patterns, and other appearance characteristics, provide specific products or materials complying with the following requirements:
 - 1. As selected by Architect from manufacturer's full range including premium cost tile.
- D. Factory Blending: For tile exhibiting color variations within ranges selected during Sample submittals, blend tile in factory and package so tile units taken from one package show same range in colors as those taken from other packages and match approved Samples.
- E. Mounting: For factory-mounted tile, provide back- or edge-mounted tile assemblies as standard with manufacturer, unless otherwise indicated.

1. Where tile is indicated for installation on exteriors or in wet areas, do not use back- or edge-mounted tile assemblies unless tile manufacturer specifies in writing that this type of mounting is suitable for installation indicated and has a record of successful in-service performance.

2.2 TILE PRODUCTS

A. Manufacturers:

1. American Olean; Div. of Dal-Tile International Corp.
2. Crossville Ceramics Company, L.P.
3. Daltile; Div. of Dal-Tile International Inc.
4. Lone Star Ceramics Company.
5. Monarch Tile, Inc.
6. Summitville Tiles, Inc.
7. United States Ceramic Tile Company.

B. Unglazed Ceramic Mosaic Tile CT-1: Factory-mounted flat tile as follows:

1. Composition: Vitreous or impervious natural clay or porcelain.
2. Surface: Smooth, without abrasive admixture.
3. Module Size: 2 by 2 inches (50.8 by 50.8 mm).
4. Nominal Thickness: 1/4 inch (6.35 mm).
5. Face: Pattern of design indicated, with cushion edges.
6. Products:

Under Paragraphs 2.2C & D, disregard reference to “opaque” glaze for the various tile types. Provide manufacturer’s standard “bright”, “mat”, and “semi-mat” finish as selected by the Architect from the manufacturer’s typical samples of standard and premium color choices. [Add7-12]

C. Glazed Ceramic Mosaic Tile CT-2: Factory-mounted flat tile as follows:

1. Composition: Vitreous or impervious natural clay or porcelain.
2. Module Size: 3 by 3 inches (76.2 by 76.2 mm).
3. Thickness: 1/4 inch (6.35 mm).
4. Face: Pattern of design indicated, with cushion edges.
5. Finish: Bright ~~opaque~~, Mat ~~opaque~~, or Semimat ~~opaque~~ glaze as selected by Architect from manufacturers full range including premium colors.
6. Products:

D. Glazed Wall Tile CT-3: Flat tile as follows:

1. Module Size: 6 by 6 inches (152 by 152 mm).
2. Thickness: 5/16 inch (8 mm).
3. Face: Pattern of design indicated, with manufacturer's standard edges.
4. Finish: Bright ~~opaque~~, Mat ~~opaque~~, or Semimat ~~opaque~~ glaze as selected by the Architects from the manufacturers full range including premium colors.
5. Mounting: Factory back-mounted.
6. Products:

E. Glazed Wall Tile Trim Units: Matching characteristics of adjoining flat tile and coordinated with sizes and coursing of adjoining flat tile where applicable. Provide shapes as follows, selected from manufacturer's standard shapes:

1. Base for Thin-Set Mortar Installations: Straight, module size 6 by 6 inches (152 by 152 mm).
2. Wainscot Cap for Thin-Set Mortar Installations: Surface bullnose, module size 6 by 2 inches (152 by 51 mm).
3. Wainscot Cap for Flush Conditions: Regular flat tile for conditions where tile wainscot is shown flush with wall surface above.
4. External Corners for Thin-Set Mortar Installations: Surface bullnose.
5. Internal Corners: Field-buttet square corners except with coved base and cap angle pieces designed to fit with stretcher shapes.

- F. Ceramic Mosaic Trim Units: Matching characteristics of adjoining flat tile and coordinated with sizes and coursing of adjoining flat tile where applicable. Provide shapes as follows, selected from manufacturer's standard shapes:
 1. Base Cove: Cove, module size as selected by the Architect.
 2. Wainscot Cap for Thin-Set Mortar Installations: Surface bullnose, module size as selected by the Architect.
 3. Wainscot Cap for Flush Conditions: Regular flat tile for conditions where tile wainscot is shown flush with wall surface above.
 4. External Corners for Thin-Set Mortar Installations: Surface bullnose, module size as selected by the Architect.
 5. Internal Corners: Cove, module size as selected by the Architect.
 6. Tapered Transition Tile: Shape designed to effect transition between thickness of tile floor and adjoining floor finishes of different thickness, tapered to provide reduction in thickness from 1/2 to 1/4 inch (12.7 to 6.35 mm) across nominal 4-inch (100-mm) dimension.
- G. Accessories for Glazed Wall Tile: Provide vitreous china accessories of type and size indicated, in color and finish to match adjoining wall tile, and intended for installing by same method as adjoining wall tile.
 1. One soap holder with grab handle for each shower and tub indicated.

2.3 THRESHOLDS

- A. General: Fabricate to sizes and profiles indicated or required to provide transition between adjacent floor finishes.
 1. Bevel edges at 1:2 slope, aligning lower edge of bevel with adjacent floor finish. Limit height of bevel to 1/2 inch (12.7 mm) or less, and finish bevel to match face of threshold.
- B. Marble Thresholds: ASTM C 503 with a minimum abrasion resistance of 10 per ASTM C 1353 or ASTM C 241 and with honed finish.
 1. Description: Uniform, fine- to medium-grained white stone with gray veining.
 2. Description: Match Architect's sample.

2.4 WATERPROOFING AND CRACK-SUPPRESSION MEMBRANES FOR THIN-SET TILE INSTALLATIONS

- A. General: Manufacturer's standard product that complies with ANSI A118.10, selected from the following.
- B. Chlorinated-Polyethylene-Sheet Product: Nonplasticized, chlorinated polyethylene faced on both sides with high-strength, nonwoven polyester fabric, for adhering to latex-portland cement mortar; 60 inches (1524 mm) wide by 0.030-inch (0.76-mm) nominal thickness.
 1. Product: Noble Company (The); Nobleseal TS.
- C. Fabric-Reinforced, Fluid-Applied Product: System consisting of liquid-latex rubber and fabric reinforcement.
 1. Products:
 - a. Custom Building Products; Trowel & Seal Waterproofing and Anti-Fracture Membrane.
 - b. LATICRETE International Inc.; Laticrete 9235 Waterproof Membrane.
 - c. MAPEI Corporation; PRP M19.
 - d. Summitville Tiles, Inc.; S-9000.
- D. Latex-Portland Cement Product: Flexible mortar consisting of cement-based mix and acrylic-latex additive.
 1. Products:
 - a. Boiardi Products Corporation; Elastiment 323.
 - b. MAPEI Corporation; PRP 315.
 - c. Southern Grouts & Mortars, Inc.; Southcrete 1100.
 - d. TEC Specialty Products Inc.; TA-324, Triple Flex.
- E. Urethane Waterproofing and Tile-Setting Adhesive: One-part liquid-applied urethane in a consistency suitable for trowel application and intended for use as both waterproofing and tile-setting adhesive in a two-step process.

1. Products:
 - a. Bostik; Hydroment Ultra-Set.
 - b. Southern Grouts & Mortars, Inc.; Deck-Seal 1000.

2.5 SETTING AND GROUTING MATERIALS

- A. Manufacturers:
 1. Bonsal, W. R., Company.
 2. Bostik.
 3. Custom Building Products.
 4. LATICRETE International Inc.
 5. TEC Specialty Products Inc.
- B. Latex-Portland Cement Mortar (Thin Set): ANSI A118.4, consisting of the following:
 1. Prepackaged dry-mortar mix containing dry, redispersible, ethylene vinyl acetate additive to which only water must be added at Project site.
 2. Prepackaged dry-mortar mix combined with acrylic resin or styrene-butadiene-rubber liquid-latex additive.
 - a. For wall applications, provide nonsagging mortar that complies with Paragraph F-4.6.1 in addition to the other requirements in ANSI A118.4.
- C. Polymer-Modified Tile Grout: ANSI A118.7, color as indicated.
 1. Polymer Type: Acrylic resin or styrene-butadiene rubber in liquid-latex form for addition to prepackaged dry-grout mix.
 2. Polymer Type: Either ethylene vinyl acetate, in dry, redispersible form, prepackaged with other dry ingredients, or acrylic resin or styrene-butadiene rubber in liquid-latex form for addition to prepackaged dry-grout mix.
 - a. Unsanded grout mixture for joints 1/8 inch (3.2 mm) and narrower.
 - b. Sanded grout mixture for joints 1/8 inch (3.2 mm) and wider.
- D. Grout for PregROUTED Tile Sheets: Same silicone rubber used in factory to pregrout tile sheets.

2.6 ELASTOMERIC SEALANTS

- A. General: Provide manufacturer's standard chemically curing, elastomeric sealants of base polymer and characteristics indicated that comply with applicable requirements in Division 7 Section "Joint Sealants."
- B. Colors: Provide colors of exposed sealants to match colors of grout in tile adjoining sealed joints, unless otherwise indicated.
- C. One-Part, Mildew-Resistant Silicone Sealant: ASTM C 920; Type S; Grade NS; Class 25; Uses NT, G, A, and, as applicable to nonporous joint substrates indicated, O; formulated with fungicide, intended for sealing interior ceramic tile joints and other nonporous substrates that are subject to in-service exposures of high humidity and extreme temperatures.
 1. Products:
 - a. Dow Corning Corporation; Dow Corning 786.
 - b. GE Silicones; Sanitary 1700.
 - c. Pecora Corporation; Pecora 898 Sanitary Silicone Sealant.
 - d. Tremco, Inc.; Tremsil 600 White.

2.7 CEMENTITIOUS BACKER UNITS

- A. Provide cementitious backer units complying with ANSI A118.9 in maximum lengths available to minimize end-to-end butt joints.
 1. Thickness: 1/2 inch (12.7 mm).
 2. Width: Manufacturer's standard width, but not less than 32 inches (813 mm).
- B. Products:
 1. C-Cure; C-Cure Board 990.
 2. Custom Building Products; Wonderboard.

3. USG Corporation; DUROCK Cement Board.

2.8 MISCELLANEOUS MATERIALS

- A. Trowelable Underlayments and Patching Compounds: Latex-modified, portland cement-based formulation provided or approved by manufacturer of tile-setting materials for installations indicated.
- B. Metal Edge Strips: Angle or L-shape, height to match tile and setting-bed thickness, metallic or combination of metal and PVC or neoprene base, designed specifically for flooring applications, white zinc alloy exposed-edge material.
- C. 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.
- D. Grout Sealer: Manufacturer's standard silicone product for sealing grout joints that does not change color or appearance of grout.
 1. Products:
 - a. Bonsal, W. R., Company; Grout Sealer.
 - b. Bostik; CeramaSeal Grout Sealer.
 - c. Custom Building Products; Surfaceguard Grout and Tile Sealer.

2.9 MIXING MORTARS AND GROUT

- A. Mix mortars and grouts to comply with referenced standards and mortar and grout manufacturers' written instructions.
- B. Add materials, water, and additives in accurate proportions.
- C. 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, for compliance with requirements for installation tolerances and other conditions affecting performance of installed tile.
 1. Verify that substrates for setting tile are firm; dry; clean; free of oil, waxy films, and curing compounds; and within flatness tolerances required by referenced ANSI A108 Series of tile installation standards for installations indicated.
 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 Architect.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Remove coatings, including curing compounds and other substances that contain soap, wax, oil, or silicone, that are incompatible with tile-setting materials.
- B. Provide concrete substrates for tile floors installed with adhesives or thin-set mortar that comply with flatness tolerances specified in referenced ANSI A108 Series of tile installation standards.
 1. Fill cracks, holes, and depressions with trowelable leveling and patching compound according to tile-setting material manufacturer's written instructions. Use product specifically recommended by tile-setting material manufacturer.
 2. Remove protrusions, bumps, and ridges by sanding or grinding.

- C. Blending: For tile exhibiting color variations within ranges selected during Sample submittals, verify that tile has been factory blended and packaged so tile units taken from one package show same range of colors as those taken from other packages and match approved Samples. If not factory blended, either return to manufacturer or blend tiles at Project site before installing.

3.3 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 and to methods indicated in ceramic tile installation schedules.
- B. TCA Installation Guidelines: TCA's "Handbook for Ceramic Tile Installation." Comply with TCA installation methods indicated in ceramic tile installation schedules.
- 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. 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. Lay out tile wainscots to next full tile beyond dimensions indicated.
- G. Expansion Joints: Locate expansion joints and other sealant-filled joints, including control, contraction, and isolation joints, where indicated 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 to comply with requirements in Division 7 Section "Joint Sealants."
- H. Grout tile to comply with requirements of the following tile installation standards:
 - 1. For ceramic tile grouts (sand-portland cement; dry-set, commercial portland cement; and latex-portland cement grouts), comply with ANSI A108.10.
- I. At showers, tubs, and where indicated, install cementitious backer units and treat joints to comply with ANSI A108.11 and manufacturer's written instructions for type of application indicated.

3.4 WATERPROOFING AND CRACK-SUPPRESSION MEMBRANE 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.
- B. Install crack-suppression membrane to comply with manufacturer's written instructions to produce membrane of uniform thickness bonded securely to substrate.
- C. Do not install tile over waterproofing until waterproofing has cured and been tested to determine that it is watertight.

3.5 FLOOR TILE INSTALLATION

- A. General: Install tile to comply with requirements in the Floor Tile Installation Schedule, including those referencing TCA installation methods and ANSI A108 Series of tile installation standards.

1. For installations indicated below, follow procedures in ANSI A108 Series tile installation standards for providing 95 percent mortar coverage.
 - a. Tile floors in wet areas.
 - b. Tile floors composed of rib-backed tiles.

B. Joint Widths: Install tile on floors with the following joint widths:

1. Ceramic Mosaic Tile: 1/16 inch (1.6 mm).

C. Stone Thresholds: Install stone thresholds at locations indicated; set in same type of setting bed as abutting field tile, unless otherwise indicated.

1. Set thresholds in latex-portland cement mortar for locations where mortar bed would otherwise be exposed above adjacent nontile floor finish.

D. Metal Edge Strips: Install at locations indicated or where exposed edge of tile flooring meets carpet, wood, or other flooring that finishes flush with top of tile.

E. Grout Sealer: Apply grout sealer to grout joints according to grout-sealer manufacturer's written instructions. As soon as grout sealer has penetrated grout joints, remove excess sealer and sealer that has gotten on tile faces by wiping with soft cloth.

3.6 WALL TILE INSTALLATION

A. Install types of tile designated for wall installations to comply with requirements in the Wall Tile Installation Schedule, including those referencing TCA installation methods and ANSI setting-bed standards.

B. Joint Widths: Install tile on walls with the following joint widths:

1. Ceramic Mosaic Tile: 1/16 inch (1.6 mm).
2. Glazed Wall Tile: 1/16 inch (1.6 mm).

3.7 CLEANING AND PROTECTING

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

1. Remove latex-portland cement 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.
3. Remove temporary protective coating by method recommended by coating manufacturer that is acceptable to tile and grout manufacturer. Trap and remove coating to prevent it from clogging drains.

B. 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.

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

D. Before final inspection, remove protective coverings and rinse neutral cleaner from tile surfaces.

3.8 FLOOR TILE INSTALLATION SCHEDULE

A. Tile Installation FTI-2: Interior floor installation on waterproof membrane over concrete; thin-set mortar; TCA F122 and ANSI A108.5.

1. Tile Type: Unglazed ceramic mosaic tile.
2. Thin-Set Mortar: Latex-portland cement mortar.
3. Grout: Polymer-modified grout.

3.9 WALL TILE INSTALLATION SCHEDULE

- A. Tile Installation WTI-1: interior wall installation over sound, dimensionally stable masonry or concrete; thin-set mortar; TCA W202 and ANSI A108.5.
 - 1. Tile Type: Glazed wall tile.
 - 2. Thin-Set Mortar: Latex- portland cement mortar.
 - 3. Grout: Polymer-modified unsanded grout.

- B. Tile Installation WTI-2: Interior wall installation over gypsum board; thin-set mortar; TCA W243 and ANSI A108.5.
 - 1. Tile Type: Glazed wall tile.
 - 2. Thin-Set Mortar: Latex- portland cement mortar.
 - 3. Grout: Polymer-modified unsanded grout.

- C. Tile Installation WTI-3: Interior wall and shower-receptor installation over cementitious backer units; thin-set mortar; TCA B415, TCA W244, and ANSI A108.5.
 - 1. Tile Type: Glazed wall tile.
 - 2. Thin-Set Mortar: Latex- portland cement mortar.
 - 3. Grout: Polymer-modified unsanded grout.

END OF SECTION 09310