

## **SECTION 09310 - CERAMIC TILE**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Contract Drawings and general provisions of the Construction Contract, including Contract Clauses and Conditions (CC &C), Supplemental Contract Clauses and Conditions, and Division 1 sections of these Contract Specifications, apply to work of this Section.
  - 1. Refer to Section 09260, "Gypsum Board Assemblies" for cement board or cementitious backer units.

#### **1.2 SUMMARY**

- A. This Section includes the following:
  - 1. Ceramic mosaic tile.
  - 2. Glazed wall tile.
  - 3. Glass mosaic tile, exterior fountain and water trough applications.
  - 4. Ceramic tile markers for swimming pool.
  - 5. Waterproof membrane for thin-set tile installations.
  - 6. Crack-suppression membrane for thin-set tile installations.
  - 7. Metal edge strips installed as part of tile installations.
  - 8. Quarry Tile.
  - 9. Paver tile.

#### **1.3 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).

#### **1.4 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.

#### **1.5 SUBMITTALS**

- A. Product Data: For each type of product indicated.

- B. Shop Drawings: Show locations of each type of tile and tile pattern. Show widths, details, and locations of expansion, contraction, control, and isolation joints in tile substrates and finished tile surfaces.
- C. Samples of grout demonstrating full range of colors available, for initial selection purposes.
  - 1. Provide separate grout color for each type of ceramic tile, as selected by Architect from manufacturer's full range.
- D. Samples for Verification:
  - 1. Full-size units of each type and composition of tile and for each color and finish required.
  - 2. Full-size units of each type of trim and accessory for each color and finish required.
  - 3. Stone thresholds in 150-mm lengths.
  - 4. Metal edge strips in 150-mm lengths.
- E. LEED Submittals (For N.O.B. ONLY):
  - 1. Credit EQ 4.1: Manufacturers' product data for adhesives and sealants, including printed statement of VOC content.

#### 1.6 QUALITY ASSURANCE

- A. Source Limitations for Tile: Obtain all tile of same type and color or finish 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. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Construction Execution and Coordination."

#### 1.7 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 and emulsion adhesives in unopened containers.
- E. Prevent damage or contamination to materials by water, foreign matter, and other causes.

- F. Handle tile that has temporary protective coating on exposed surfaces to prevent coated surfaces from contacting backs or edges of other units. If coating does contact bonding surfaces of tile, remove coating from bonding surfaces before setting tile.

## 1.8 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.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, provide Dal-Tile products from the following distributor, or approved equivalent:
  - 1. Daltile; Tom Drucker, International Sales Manager; (T) 518-452-4771; (F) 518-452-5595; [tom.drucker@daltile.com](mailto:tom.drucker@daltile.com).
- B. Glass Mosaic Tile: Bisazza.

### 2.2 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, or as indicated on Finish Schedule.
- 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.

- F. Factory-Applied Temporary Protective Coating: Where indicated under tile type, protect exposed surfaces of tile against adherence of mortar and grout by precoating with continuous film of petroleum paraffin wax, applied hot. Do not coat unexposed tile surfaces.

## 2.3 TILE PRODUCTS

- A. Unglazed Ceramic Mosaic Tile, CT-1, CT-2, CT-4, CT-5, CT-6, and CT-7: Factory-mounted flat tile as follows:

1. Composition: Porcelain, Vitreous or impervious natural clay or porcelain.
2. Surface: Smooth, and Slip-resistant, with abrasive admixture.
3. Module Sizes:
  - a. CT-1 and CT-2: 36 cm by 36 cm, unless otherwise indicated.
  - b. CT-4: 30 cm by 30 cm, unless otherwise indicated.
  - c. CT-5, CT-6, and CT-7: 3 cm by 3 cm, unless otherwise indicated.
4. Nominal Thickness:
  - a. CT-1, CT-2, and CT-4: 8 mm, unless otherwise indicated.
  - b. CT-5, CT-6, and CT-7: 6 mm, unless otherwise indicated.
5. Face: Plain with cushion edges.
6. Performance Requirements (Empire Series):
  - a. Water Absorption: Less than 0.6-percent; ASTM C 373.
  - b. Breaking Strength: Greater than 425 – 450 lbs.; ASTM C 648.
  - c. Chemical Resistance: Resistant; ASTM C 650.
  - d. Bond Strength: Greater than 200 psi; ASTM C 482.
  - e. Coefficient of Friction (abrasive): Wet 0.6, dry 0.6; ASTM C 1028.
  - f. Abrasive Wear Resistance: 250 – 275; ASTM C 501.
7. Performance Requirements (Porcelto):
  - a. Water Absorption: Less than 0.5-percent; ASTM C 373.
  - b. Breaking Strength: Greater than 478 lbs.; ASTM C 648.
  - c. Chemical Resistance: Resistant; ASTM C 650.
  - d. Bond Strength: Greater than 200 psi; ASTM C 482.
  - e. Coefficient of Friction (abrasive): Wet 0.6, dry 0.88 ASTM C 1028.
  - f. Scratch Hardness: 7.5, MOH's.
8. Performance Requirements (Keystones):
  - a. Water Absorption: Less than 0.5-percent; ASTM C 373.
  - b. Breaking Strength: Greater than 300 lbs.; ASTM C 648.
  - c. Abrasion Resistance: 4, PEI.

- d. Coefficient of Friction (abrasive): Wet 0.6, dry 0.7; ASTM C 1028.
  - e. Abrasive Grain: CT-5 ONLY.
9. Basis-of-Design Products:
- a. CT-1: "Empire Series," as manufactured by Crossville Ceramics Company, L.P.
  - b. CT-2: "Empire Series," as manufactured by Crossville Ceramics Company, L.P.
  - c. CT-4: "Porcelain," Price Group 3, as manufactured by Daltile, Div. of Dal-Tile International Inc.
  - d. CT-5: "Keystones Blends," as manufactured by Daltile, Div. of Dal-Tile International Inc.
  - e. CT-6: "Keystones," as manufactured by Daltile, Div. of Dal-Tile International Inc.
  - f. CT-7: "Keystones Mosaic Pool Markers," (include signage in both English and Spanish), as manufactured by Daltile, Div. of Dal-Tile International Inc.
10. Performance Requirements (Keystones):
- a. Water Absorption: Less than 0.6-percent; ASTM C 373.
  - b. Breaking Strength: Greater than 350 – 420 lbs.; ASTM C 648.
  - c. Chemical Resistance: Resistant; ASTM C 650.
  - d. Bond Strength: Greater than 200 psi; ASTM C 482.
  - e. Coefficient of Friction (abrasive): Wet 0.7, dry 0.8; ASTM C 1028.
11. Colors: As selected from manufacturer's full range, or as indicated Finish Schedule.
12. Mosaic Pool Markers Text: Provide the following:
- a. DANGER – PELIGRO
  - b. SHALLOW WATER – AGUAS POCO PROFUNDAS
  - c. NO DIVING – SALTOS DE TRAMPOLIN PROHIBIDOS
- B. Glazed Ceramic Mosaic Tile, CT-3: Factory-mounted flat tile as follows:
- 1. Composition: Porcelain and Impervious natural clay or porcelain.
  - 2. Module Sizes: 36 cm by 36 cm, unless otherwise indicated.
  - 3. Thickness: 8 mm.
  - 4. Face: Plain with cushion edges.
  - 5. Performance Requirements (Empire Series):
    - a. Water Absorption: Less than 0.6-percent; ASTM C 373.
    - b. Breaking Strength: Greater than 425 – 450 lbs.; ASTM C 648.
    - c. Chemical Resistance: Resistant; ASTM C 650.
    - d. Bond Strength: Greater than 200 psi; ASTM C 482.
    - e. Coefficient of Friction (abrasive): Wet 0.6, dry 0.6; ASTM C 1028.
    - f. Abrasive Wear Resistance: 250 – 275; ASTM C 501.
  - 6. Basis-of-Design Products:
    - a. CT-3: "Empire Series," as manufactured by Crossville Ceramics Company, L.P.
  - 7. Colors: As selected from manufacturer's full range, or as indicated Finish Schedule.

- C. Glass Mosaic Tile for Fountain and Water Trough Applications, CT-8: Provide paper face mounted flat tile complying with the following requirements:
1. Composition: Square and back-beveled glass.
  2. Wearing Surface: Plain.
  3. Module Size: 20 mm by 20 mm.
  4. Nominal Thickness: 6.35 mm.
  5. Face: Plain with cushioned edges.
  6. Sheet Dimensions: 322 mm by 322 mm.
  7. Joint: 1.5 mm.
  8. Weight: 7 kg/mg.
  9. Performance Requirements:
    - a. Water Absorption Impervious: Less than 0.1-percent, ASTM C 373.
    - b. Wedging ( $\leq 2.0\%$ ): 0.9-percent, ASTM C 502.
    - c. Coefficient of Friction: 0.66, ASTM C 1028.
    - d. Bond Strength (50 lbs/in<sup>2</sup>): Greater than 108 psi, ASTM C 482.
    - e. Thermal Shocks (shall show no disintegration): No disintegration.
    - f. Crazing: No crazing, ASTM C 424.
  10. Collection/Color: As indicated on Drawings, Finish Schedule, and below:
    - a. CT-8: Standard Blends, Book 1, Madagascar, as manufactured by Bisazza.
- D. Unglazed Quarry Tile QT-1: Square-edged flat tile as follows:
1. Wearing Surface: Abrasive aggregate embedded in surface.
  2. Facial Dimensions: 152 by 152 mm.
  3. Thickness: 12.7 mm.
  4. Face: Plain.
  5. For furan-grouted quarry tile, precoat with temporary protective coating.
  6. Performance Requirements:
    - a. Water Absorption: Less than 3-percent, ASTM C 373.
    - b. Breaking Strength: Greater than 350 lbs., ASTM C 648.
    - c. Coefficient of Friction (abrasive): Wet 0.90, dry 0.90; ASTM C 1028.
    - d. Scratch Hardness: 7, MOH's.
  7. Basis-of-Design Product: Quarry Tile™, as manufactured by Dal-Tile®.
  8. Colors: As indicated on Drawings and Finish Schedule.
- E. Unglazed Quarry Tile QT-2: Square-edged flat tile as follows:
1. Wearing Surface: Abrasive aggregate embedded in surface.
  2. Facial Dimensions: 152 by 152 mm.
  3. Thickness: 12.7 mm.
  4. Face: Plain.
  5. For furan-grouted quarry tile, precoat with temporary protective coating.
  6. Performance Requirements:

- a. Water Absorption: Less than 3-percent, ASTM C 373.
  - b. Breaking Strength: Greater than 400 lbs., ASTM C 648.
  - c. Coefficient of Friction (abrasive): Wet 0.80, dry 0.80; ASTM C 1028.
  - d. Scratch Hardness: 7, MOH's.
7. Basis-of-Design Product: Quarry Textures™, as manufactured by Dal-Tile®.
  8. Colors: As indicated on Drawings and Finish Schedule.
- F. Unglazed Paver Tile; PP-1, PP-2, and PP-3: Flat tile as follows:
1. Composition: Porcelain.
  2. Facial Dimensions:
    - a. PP-1 and PP-2: 30 cm by 30 cm, unless otherwise indicated.
    - b. PP-3: 30 cm by 60 cm, unless otherwise indicated.
  3. Thickness: 9.5 mm.
  4. Face: Plain with square or cushion edges.
  5. Performance Requirements:
    - a. Abrasion Wear Resistance: 250 – 275; ASTM C 501.
    - b. Bond Strength: Greater than 200 psi; ASTM C 482.
    - c. Breaking Strength: Greater than 350 lbs.; ASTM C 648.
    - d. Coefficient of Friction (abrasive): Wet 0.60, dry 0.60; ASTM C 1028.
    - e. Water Absorption: Less than 0.1-percent; ASTM C 373.
    - f. Chemical Resistance: Resistant, ASTM C 650.
  6. Basis-of-Design Products:
    - a. PP-1: "New Age," as manufactured by Portobello America.
    - b. PP-2: "New Age Mosaic," as manufactured by Portobello America.
    - c. PP-3: "New Age," as manufactured by Portobello America.
  7. Colors: As selected from manufacturer's full range, or as indicated on Finish Schedule.
- G. Ceramic Mosaic Trim Units: Matching characteristics of adjoining flat tile and coordinated with sizes and coursing of adjoining flat tile where applicable. Provide shapes, but not limited to the following, selected from manufacturer's standard shapes:
1. Base Cove: Cove, module size 50.8 by 25.4 mm.
  2. Base Cove, Straight Top, for CT-5 and CT-6: 25.4 by 25.4 mm; MB-4C, as manufactured by Dal-Tile®. Refer to Drawings and Finish Schedule for locations.
  3. Base Cove, Bullnose Top, for CT-5: 25.4 by 25.4 mm; MB-5, as manufactured by Dal-Tile®. Refer to Drawings and Finish Schedule for locations.
  4. Wainscot Cap for Portland Cement Mortar Installations: Bead (bullnose), module size 25.4 by 25.4 mm.
  5. Wainscot Cap for Thin-Set Mortar Installations: Surface bullnose, module size 50.8 by 50.8 mm
  6. External Corners for Thin-Set Mortar Installations: Surface bullnose, module size 25.4 by 25.4 mm.
  7. Internal Corners: Cove, module size 25.4 by 25.4 mm.

8. Colors: As indicated on Drawings and Finish Schedule.
- H. Quarry Tile Trim Units: Matching characteristics of adjoining flat tile and coordinated with sizes and coursing of adjoining flat tile where applicable. Provide shapes including but not limited to manufacturer's standard shapes:
  1. Base: Coved with surface bullnose top edge, facial dimensions 127 mm by 152 mm.
  2. Colors: As indicated on Drawings and Finish Schedule.
- I. Provide formed shapes as follows:
  1. Cove-shaped base.
  2. Cove-shaped corner.
  3. Cove-shaped inside corner.

## 2.4 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 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.

## 2.5 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. Polyethylene-Sheet Waterproofing: manufacturer's standard proprietary product consisting of composite sheets, 1524 mm wide by a nominal thickness of 0.76 mm, composed of an inner layer of nonplasticized, chlorinated polyethylene sheet faced on both sides with laminated, high-strength, nonwoven polyester material, designed for embedding in latex-portland cement mortar and as the substrate for latex-portland cement mortar setting bed. Provide at all locations for thin-setting, unless noted as mudset on drawings.
  1. Available Products: Subject to compliance with requirements, provide Dal Seal TS, Dal-Tile; or Nobleseal TS, Noble Company; or approved equivalent.
- C. Polyethylene-Sheet Waterproofing: Manufacturer's standard proprietary product consisting of nonplasticized, chlorinated polyethylene sheet, designed for mudsetting bed. Provide at all locations indicated for mud-setting.
  1. Available Products: Subject to compliance with requirements, provide Chloraloy, Noble Company; or approved equivalent.

## 2.6 SETTING AND GROUTING MATERIALS

- A. Portland Cement Mortar Materials: Comply with ANSI A108.1 and as specified below:
1. Portland Cement: ASTM C 150, Type 1.
  2. Sand: ASTM C 144.
  3. Water: Potable.
- B. Portland Cement Mortar (Thickset) Installation Materials: ANSI A108.1A and as specified below:
1. Cleavage Membrane: Asphalt felt, ASTM D 226, Type I (No. 15); or polyethylene sheeting, ASTM D 4397, 0.1 mm thick.
  2. Reinforcing Wire Fabric: Galvanized, welded wire fabric, 50.8 by 50.8 mm by 1.57-mm diameter; comply with ASTM A 185 and ASTM A 82 except for minimum wire size.
- C. 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.
    - 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.
- D. Latex-Portland Cement Grout for Unglazed Tile: ANSI A118.6, consisting of commercial sanded portland cement grout with latex additive. Provide the following, or approved equivalent, in colors as selected by Architect.
1. Laticrete Spectralock Floor Grout and Joint Filler (Sanded) with Laticrete Grout Admix; Laticrete International, Inc.
- E. Latex-Portland Cement Grout for Glazed Tile: ANSI A118.6, consisting of commercial unsanded portland cement grout with latex additive. Provide the following, or approved equivalent, in colors as selected by Architect.
1. Laticrete Spectralock Dry-Set Wall Grout (Unsanded) with Laticrete Grout Admix; Laticrete International, Inc.
- F. Chemical-Resistant Epoxy Grout: ANSI A118.3; provide one of the following, or approved equivalent, in colors as selected by Architect:
1. Latapoxy 2000; Laticrete International, Inc.
  2. Kerapoxy; MAPEI Corporation.
- G. Grout Colors: Provide separate colors for each type and color of tile as selected by Architect from grout manufacturer's full range.

## 2.7 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, half-hard brass or stainless steel; ASTM A 666, 300 Series exposed-edge material.
- C. Temporary Protective Coating: Either product indicated below that is formulated to protect exposed surfaces of tile against adherence of mortar and grout; compatible with tile, mortar, and grout products; and easily removable after grouting is completed without damaging grout or tile.
  - 1. Petroleum paraffin wax, fully refined and odorless, containing at least 0.5 percent oil with a melting point of 49 to 60 deg C per ASTM D 87.
  - 2. Grout release in form of manufacturer's standard proprietary liquid coating that is specially formulated and recommended for use as temporary protective coating for tile.
- D. 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.
- E. Grout Sealer: Manufacturer's standard silicone product for sealing grout joints that does not change color or appearance of grout.
  - 1. Available Products:
    - a. Grout Sealer; Bonsal, W.R., Company.
    - b. CeramaSeal Grout Sealer; Bostik.
    - c. 004, Keraseal Penetrating Sealer for Unglazed Grout and Tile; MAPEI Corporation.
    - d. Approved equivalent.

## 2.8 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 COR Representative.
  - 4. Perform moisture test at rate of one per 185 sq. m.
- 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.
  - 3. Remove coatings, including curing compounds, and other substances that could interfere with adhesion of tile by using a grinder, sander, or polishing machine with a heavy-duty wire brush.
- C. Broom or vacuum clean substrates to be covered by tiles immediately before tile installation. Following cleaning, examine substrates for moisture, alkaline salts, carbonation, or dust.
- D. 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.
- E. Field-Applied Temporary Protective Coating: Where indicated under tile type or needed to prevent grout from staining or adhering to exposed tile surfaces, precoat them with continuous film of temporary protective coating, taking care not to coat unexposed tile surfaces.

### 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. Tile Patterns: Comply with patterns indicated on Contract Drawings.
- G. Lay out tile wainscots to next full tile beyond dimensions indicated.
- H. 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.
- I. 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.
- J. 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.
- D. Cove and extend waterproofing up walls 100 mm above finished flooring.

### 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 in laundries.
    - c. Tile floors composed of tiles 200 by 200 mm or larger.
    - d. Tile floors composed of rib-backed tiles.
- B. Ceramic Mosaic Tile: Install tile to comply with requirements indicated below for setting bed methods, TCA installation methods related to types of subfloor construction, and grout types:
  - 1. Concrete Subfloor – TCA F122, modified to comply with membrane manufacturer's installation instructions, details on drawings and as follows:
    - a. Bond Coat for Membrane: Latex-portland cement mortar, ANSI A108.5 over subfloor.
    - b. Sheet membrane over bond coat, extend up walls 100 mm; flood test installed membrane and correct leaks.
    - c. Bond Coat for Tile: Latex-portland cement mortar, ANSI A108.5 over membrane.
    - d. Grout: Latex-portland cement.
  - 2. Concrete Subfloor, TCA F114, (where indicated as mud set) and as follows:
    - a. CPE sheet membrane over sloped mortar bed and extended up walls 150 mm; flood test installed membrane and correct leaks and defects before installing topping mortar bed.
    - b. Reinforced mortar bed, ANSI A108.1.
    - c. Bond coat of portland cement paste on a mortar bed that is still plastic or latex-portland cement mortar on a cured bed.
    - d. Grout: Latex-portland cement.
- C. Quarry Tile: Install tile to comply with requirements indicated below for setting bed methods, TCA installation methods related to types of subfloor construction, and grout types:
  - 1. Concrete subfloor, TCA F114, and as follows:
    - a. Cleavage membrane over subfloor.

- b. Reinforced portland cement mortar bed; slope to drain.
  - c. Bond coat of portland cement paste on a mortar bed that is still plastic or latex-portland cement mortar on a cured bed.
  - d. Grout: Epoxy, ANSI A108.6.
- D. Paver Tile: Install tile to comply with requirements indicated below for setting bed methods, TCA installation methods related to types of subfloor construction, and grout types:
1. Concrete subfloor, TCA F122, and as follows:
    - a. Bond Coat: Latex-portland cement mortar, ANSI A108.5 over subfloor.
    - b. Bond Coat for Tile: Latex-portland cement mortar, ANSI A108.5 over membrane.
    - c. Grout: Latex-portland cement.
- E. Joint Widths: Install tile on floors with the following joint widths:
1. Ceramic Mosaic Tile: 1.6 mm.
  2. Quarry Tile: 6.35 mm.
  3. Paver Tile: 9.5 mm.
- F. Back Buttering: For installations indicated, obtain 100-percent mortar coverage by complying with applicable special requirements for back buttering of tile in referenced ANSI A108 series of tile installation standards.
1. Mud set tile floors.
  2. Tile floors composed of tiles 203 by 203 mm or larger.
- G. 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.
- H. 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.
- I. Grout Sealer: Apply grout sealer to cementitious 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. Install metal lath and scratch coat for walls to comply with ANSI A108.1A, Section 4.1.
- C. Glazed Wall Tile: Install tile to comply with requirements indicated below for setting-bed methods, TCA installation methods related to subsurface wall conditions, and grout types.

1. Cementitious Backer Units over Metal Studs – TCA W244, and as follows:
  - a. Bond Coat: Latex-portland cement mortar, ANSI A108.5, over glass mesh mortar units.
  - b. Grout: Latex-portland cement.
2. Concrete Masonry Units – TCA W202:
  - a. Bond Coat: Latex-portland cement mortar, ANSI A108.5, over concrete masonry units.
  - b. Grout: Latex-portland cement, ANSI A108.10.

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

1. Ceramic Mosaic Tile: 1.6 mm.
2. Glazed Wall Tile: 1.6 mm.
3. Quarry Tile: 6.35 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. Finished Tile Work: Leave finished installation clean and free of cracked, chipped, broken, unbonded, and otherwise defective tile work.
- C. When recommended by tile manufacturer, apply coat of neutral protective cleaner to completed tile walls and floors. Protect installed tile work with kraft paper or other heavy covering during construction period to prevent staining, damage, and wear.
- D. Prohibit foot and wheel traffic from tiled floors for at least seven days after grouting is completed.
- E. Before final inspection, remove protective coverings and rinse neutral cleaner from tile surfaces.

END OF SECTION 09310