

SECTION 09 30 00

TILING

PART 1 GENERAL

1.01 FILED SUB-BID REQUIRED

- A. The work of this Section shall be included in the Tile Filed Sub-Bid. Refer to Section 09 00 02: Tile Filed Sub-Bid Summary for additional requirements.

1.02 SECTION INCLUDES

- A. Fabricating, furnishing, delivering, and installing the following work:
1. Tile for floor applications.
 - a. Large Format Tile (LFT)
 2. Stone thresholds.
 3. Tile for wall applications.
 - a. Glazed Ceramic Wall Tile (GCT).
 - b.
 4. Accessories and equipment needed for a complete installation including, but not limited to:
 - a. Ceramic trim pieces.
 - b. Non-ceramic trim.
 5. Self leveling underlayments and filler materials for repair of localized surface defects identified by the installer as unacceptable for tile installation.
 6. Waterproofing and anti-fracture membranes
 7. Mortar
 8. Grout
 9. Sealants
 10. Setting materials
 11. Expansion joints

1.03 RELATED REQUIREMENTS

- A. The Conditions of the Contract and General Requirements of the Project Manual apply to this Subcontractor, material suppliers, and all other persons furnishing labor and materials under this Section. The General Conditions, and applicable parts of Division 1 are included as part of this Section.
- B. Work described in other Sections which contain requirements applicable to the work of this Section, or with which this contractor must coordinate the work of this section include the following:
1. Section 03 30 00 - Cast-In-Place Concrete: Floor tile substrate testing and preparation
 2. Section 03 50 00 - Concrete Toppings: Floor tile substrate preparation
 3. Section 04 20 00 - Unit Masonry: Wall tile substrate preparation
 4. Section 07 90 05 - Joint Sealers.
 5. Section 09 21 16 - Gypsum Board Assemblies: Installation of tile backer board.
 6. Section 10 28 00 - Washroom Accessories: equipment installed in tile walls
 7. Section 22 40 00 - Plumbing Fixtures: fixtures installed on or in walls or floors that feature tile.

1.04 REFERENCE STANDARDS

- A. Reference Standards the current editions of the following
1. ANSI. American National Standards Institute; www.ansi.org
 - a. ANSI A108/A118/A136.1 - American National Standard Specifications for the Installation of Ceramic Tile - Version.
 - b. ANSI A108.1A - American National Standard Specifications for Installation of Ceramic Tile in the Wet-Set Method, with Portland Cement Mortar.
 - c. ANSI A108.1B - American National Standard Specifications for Installation of Ceramic Tile on a Cured Portland Cement Mortar Setting Bed with Dry-Set or Latex-Portland Cement Mortar.
 - d. ANSI A108.1C - Specifications for Contractors Option: Installation of Ceramic Tile in the Wet-Set Method with Portland Cement Mortar or Installation of Ceramic Tile on a Cured Portland Cement Mortar Bed with Dry-Set or Latex-Portland Cement Mortar.
 - e. ANSI A108.4 - American National Standard Specifications for Installation of Ceramic Tile with Organic Adhesives or Water Cleanable Tile-Setting Epoxy Adhesive.
 - f. ANSI A108.5 - American National Standard Specifications for Installation of Ceramic Tile with Dry-Set Portland Cement Mortar or Latex-Portland Cement Mortar.
 - g. ANSI A108.6 - American National Standard Specifications for Installation of Ceramic Tile with Chemical Resistant, Water Cleanable Tile-Setting and -Grouting Epoxy.
 - h. ANSI A108.8 - American National Standard Specifications for Installation of Ceramic Tile with Chemical Resistant Furan Resin Mortar and Grout.
 - i. ANSI A108.9 - American National Standard Specifications for Installation of Ceramic Tile with Modified Epoxy Emulsion Mortar/Grout.
 - j. ANSI A108.10 - American National Standard Specifications for Installation of Grout in Tilework.
 - k. ANSI A118.1 - American National Standard Specifications for Dry-Set Cement Mortar.
 - l. ANSI A118.3 - American National Standard Specifications for Chemical Resistant, Water Cleanable Tile-Setting and -Grouting Epoxy and Water Cleanable Tile-Setting Epoxy Adhesive.
 - m. ANSI A118.4 - American National Standard Specifications for Modified Dry-Set Cement Mortar.
 - n. ANSI A118.5 - American National Standard Specifications for Chemical Resistant Furan Mortars and Grouts for Tile Installation.
 - o. ANSI A118.6 - American National Standard Specifications for Standard Cement Grouts for Tile Installation.
 - p. ANSI A118.7 - American National Standard Specifications for High Performance Cement Grouts for Tile Installation.
 - q. ANSI A118.10 - American National Standard Specifications for Load Bearing, Bonded, Waterproof Membranes for Thin-Set Ceramic Tile and Dimension Stone Installation.
 - r. ANSI A118.12 - American National Standard Specifications for Crack Isolation Membranes for Thin-Set Ceramic Tile and Dimension Stone Installation.
 - s. ANSI A136.1 - American National Standard Specifications for Organic Adhesives for Installation of Ceramic Tile.
 - t. ANSI A137.1 - American National Standard Specifications for Ceramic Tile - Version.
 2. ASTM. ASTM International; www.astm.org
 - a. D5957 - Standard Guide for Flood Testing Horizontal Waterproofing Installations
 3. TCNA. Tile Council of North America, Inc.; www.tileusa.com
 - a. TCNA (HB) - Handbook for Ceramic, Glass, and Stone Tile Installation.

1.05 ADMINISTRATIVE REQUIREMENTS

- A. Coordination per Section 01 31 14, and as follows:
 - 1. Section 10 28 00 - Washroom Accessories: Coordinate installation of accessories into wall tile
- B. Preinstallation Meeting per Section 01 70 00

1.06 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturers' data sheets on tile, mortar, grout, and accessories. Include instructions for using grouts and adhesives.
 - 1. Include product data on finishes, protective coatings, use limitation, and recommendations.
 - 2. Submit schedule of proposed installation methods for each room and application according to the TCNA Handbook (HB).
- C. Shop Drawings: Indicate tile layout, patterns, color arrangement, perimeter conditions, junctions with dissimilar materials, control and expansion joints, thresholds, ceramic accessories, and setting details.
- D. Samples: Mount tile and apply grout on three (3) plywood panels, minimum 18 x 18 inches in size illustrating pattern, color variations, and grout joint size variations.
- E. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- F. Maintenance Data: Include recommended cleaning methods, cleaning materials, stain removal methods, and polishes and waxes.
- G. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. See Section 01 60 00 - Product Requirements, for additional provisions.
 - 2. Extra Tile: 2 percent percent of each size, color, and surface finish combination. Turn them over in clean marked cartons.
- H. Qualifications Statements: Installer.

1.07 CLOSEOUT SUBMITTALS:

- A. Submittal Procedures: Section 01 78 00
 - 1. Warranty Documentation: Executed warranty.
 - 2. Operation and Maintenance Data: Include recommended cleaning methods, cleaning materials, stain removal methods, and polishes and waxes.

1.08 QUALITY ASSURANCE

- A. Maintain one copy of and ANSI A108/A118/A136.1 and TCNA (HB) on site.
- B. Installer Qualifications: Company specializing in performing tile installation, with minimum of 5 years of documented experience.
- C. Single Source Responsibility:
 - 1. Obtain each type and color tile material required from single source.
 - 2. Obtain underlayments, waterproofing/antifracture membranes, setting materials, grouts, sealants, and other tile installation products from a single manufacturer and capable of providing the specified tile system warranty.
 - 3. Obtain prefabricated edge protection and transition and movement profiles from one manufacturer to ensure compatibility.
 - 4. Obtain membrane from same manufacturer as setting material or from manufacturer approved by setting material manufacturer to ensure compatibility and warranty requirements are met.

1.09 DELIVERY, STORAGE, AND HANDLING

- A. Comply with manufacturer's instructions and recommendations, the TCNA (HB), Section 01 60 00, and as follows:
1. Protect adhesives from freezing or overheating in accordance with manufacturer's instructions.

1.10 FIELD CONDITIONS

- A. Ambient Conditions: Maintain ambient and substrate temperature of a minimum 50 deg F during installation of mortar materials and for 7 days after completion.
1. Temporary heaters, if used, shall vent to the outside to eliminate possible carbon dioxide damage to new tile work and to workers.

1.11 WARRANTY

- A. Manufacturer / Special Warranty: Prepare and submit in accordance with Section 01 78 00 - Closeout Submittals.
1. Tile Installation System: Provide a written 25 year full system written warranty that each tile assembly used is free from manufacturing defects and the component products will not break down or deteriorate when installed in accordance with the manufacturer's written specifications and guidelines. Warranty shall be issued upon completion of the work, and begin on the date of Substantial Completion.
 2. Tiles: Provide manufacturer's standard material warranty.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Subject to compliance with the requirements of this section, provide tile products from one of the following manufacturers:
1. Basis of Design: Daltile Corporation; materials as identified in Index of Finishes in drawings.
 2. Crossville Ceramics; www.crossvilleinc.com.
 3. American Olean; www.americanolean.com
 4. Florida Tile, www.floridatile.com
 5. Porcelanite, Inc.; Lexington, NC; (336) 249-3931
 6. Graniti Fiandre; www.granitifiandre.com
- B. Subject to compliance with the requirements of this section, provide tile setting systems from one of the following manufacturers:
1. Basis of Design: Laticrete.
 2. Bostik.
 3. Merkrete.
- C. Substitution Limitations: See Section 01 60 00, Product Requirements.

2.02 REGULATORY REQUIREMENTS:

- A. General: Manufactured tile shall conform with ANSI A137.1 with respect to abrasive wear, water absorption, bonding capability, thickness, facial dimensions, facial warpage, wedging, crazing, breaking strength and thermal shock, unless otherwise indicated.
- B. Tile Flooring Surfaces: Static Coefficient of Friction per ANSI A1264.2
- C. Provide materials obtained from only one source, manufactured under TCNA license to insure consistent quality and compatibility.

2.03 TILE MATERIALS

- A. Glazed Porcelain Tile – Lobby and Restrooms: ANSI A137.1, and as follows:
1. Basis of Design Product: Daltile Willow Bend 6x36".
 2. Moisture Absorption: 0 to 0.5 percent.
 3. Size and Shape: 2 inch square.

4. Edges: Cushioned.
 5. Surface Finish: Unglazed.
 6. Trim Units: Matching bead, cove, and surface bullnose shapes in sizes coordinated with field tile. Cove base at wall to match floor tile.
- B. Glazed Wall Tile Type (GCT): ANSI A137.1, and as follows:
1. Basis of Design Product: Daltile large 4x12".
 2. Size and Shape: 4 inches by 12 inches.
 3. Thickness: 1/4 inch.
 4. Edges: Cushioned.
 5. Surface Finish: Semi-gloss.
 6. Trim Units: Matching bead, bullnose, cove, and base shapes in sizes coordinated with field tile.

2.04 TRIM AND ACCESSORIES

- A. Ceramic Trim: Matching bullnose, double bullnose, cove base, and cove ceramic shapes in sizes coordinated with field tile.
1. Applications: Use in the following locations:
 - a. Open Edges: Bullnose.
 - b. Inside Corners: Jointed.
 - c. Floor to Wall Joints: Cove base.
 2. Manufacturer: Same as for tile.

3. Applications: Use in the following locations:
 - a. Open edges of floor tile.
 - b. Transition between floor finishes of different heights.
- B. Thresholds: Marble, white, honed finish; 5 inches wide by full width of wall or frame opening; 1/2 inch thick; beveled one long edge with radiused corners on top side; without holes, cracks, or open seams.
 1. Applications: Provide at the following locations:
 - a. At doorways where floor tile meets different floor finish.

2.05 SETTING MATERIALS

A. SETTING MATERIALS

1. Subject to compliance with the requirements of this section, provide materials from one of the following manufacturers:
 - a. Basis of Design: Laticrete International.
 - b. Bostik, Inc: www.bostik-us.com.
 - c. Custom Building Products: www.custombuildingproducts.com.
 - d. Mapei Corporation ; www.mapei.com
 - e. Kaiser Building Products; www.kaiserbuildingproducts.com
 - f. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Latex-Portland Cement Mortar Bond Coat: ANSI A118.4.
 1. Application(s): Use this type of bond coat for glazed, unglazed, and quarry type floor and wall tile, except as noted below.
 2. Basis of Design Products:
 - a. LATICRETE International, Inc; LATICRETE 254 Platinum: www.laticrete.com or equal.
- C. Epoxy Adhesive and Mortar Bond Coat: ANSI A118.3.
 1. Applications: Food processing areas and commercial kitchen floors, and stone saddles.
 2. Products:
 - a. LATICRETE International, Inc; LATICRETE LATAPOXY 300 Adhesive: www.laticrete.com.
- D. Gypsum Wallboard Organic Adhesive: ANSI A136.1 Type I or Type II TCNA W223
 1. Basis-of-Design Products: Laticrete #15 Multi Mastic or equal
- E. Organic Adhesive: ANSI A136.1, thinset mastic type.
 1. Applications: Thinset wall tile..
 2. Use Type I in areas subject to prolonged moisture exposure.
 3. Products:
 - a. LATICRETE International, Inc; LATICRETE 15 Premium Mastic: www.laticrete.com.

2.06 GROUTS

- A. Provide grouts from same manufacturer as setting materials and other tile installation products.
- B. Polymer Modified Grout: ANSI A118.7 polymer modified cement grout.
 1. Applications: Use this type of grout where indicated and where no other type of grout is indicated.
 2. Use sanded grout for joints 1/8 inch wide and larger; use unsanded grout for joints less than 1/8 inch wide.
 3. Color(s): As selected by Architect from manufacturer's full line.
 4. Products:
 - a. LATICRETE International, Inc; LATICRETE PermaColor: www.laticrete.com.

2.07 ACCESSORY MATERIALS

- A. Waterproofing Membrane at Floors: Specifically designed for bonding to cementitious substrate under thick mortar bed or thin-set tile; complying with ANSI A118.10.
1. Provide materials from same manufacturer as setting materials and grouts.
 2. Type: Fluid-applied.
 3. Material: SBS rubber, with polyester fabric reinforcing at edges, corners, joints, and cracks.
 4. Thickness: 0.020 inch thick, minimum
 5. Provide at all tile floors with floor drains at elevated slabs.
 6. Basis-of-Design Products: Laticrete #9235 or equal.
- B. Waterproofing Membrane at Showers and Tiled Tubs: Specifically designed for bonding to cementitious substrate under thick mortar bed or thin-set tile; complying with ANSI A118.10.
1. Type: Fluid-applied.
 2. Material: SBS rubber.
 3. Thickness: 25 mils, minimum, dry film thickness.
 4. Products:
 - a. LATICRETE International, Inc; LATICRETE Hydro Ban: www.laticrete.com.
- C. Underlayment at Floors: Specifically designed for bonding to thin-set setting mortar; not primarily a waterproofing material and having the following characteristics:
1. Crack Isolation: Comply with ANSI A118.12.
 2. Water Resistance: Comply with ANSI A118.10, bonded waterproofing.
 3. Uncoupling Function: Allow for separation between membrane and the mortar adhering tile to the membrane when subjected to excessive substrate movement.
 - a. The General Contractor shall cover costs for labor and materials of this product should subfloor require its use to achieve an acceptable substrate per tile manufacturer's recommendations.
 - b. Basis-of-Design Product: Laticrete HydroBan or equal.
 - c. Suitable for installation over green concrete.
 - d. Type: Fluid-applied.
 4. Do Not Use: Gypsum or cementitious based self-leveling underlayment.
- D. Sealants
1. Provide sealants from same manufacturer as setting bed and grouts.
 2. High performance, one component, neutral cure, 100% silicone sealant designed for ceramic tile & stone applications.
 3. Color to match grout color.
 4. Provide sealants at expansion joints at expansion joints and where tile abuts perpendicular surfaces and dissimilar materials
- E. Expansion Joints:
1. Flexible and compressible back-up strip of closed cell foam polyethylene, butyl rubber, or open cell and closed cell polyurethane, rounded at surface to contact sealant, as shown on the details and as recommended by sealant manufacturers. Fit neatly without compacting and to such a height to allow sealant depth of half of joint. Sealant must not bond to back-up material.
 2. Width (vertical and Horizontal)
 - a. Ceramic Mosaic and Glazed Wall Tile: Preferred not less than 1/4 inch and not less than 1/8 inch.
 3. Preparation

- a. Edges to be clean and dry. Sand or grind for optimum bond.
 - b. Primer when recommended by sealant manufacturer on edges. Keep primer off face of tile.
4. Location
- a. Where tile abuts restraining surfaces such as perimeter walls dissimilar floors, curbs, columns, pipes, ceilings, and where changes occur in backing materials.
 - b. All expansion, control, construction, cold, and seismic joints in the structure shall continue through the tile work including such joints as vertical surfaces.
 - c. Joints through tile work directly over structural joints must never be narrower than the structural joint.
5. Follow TCNA Joint Design Essentials EJ171.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examination and Acceptance of Conditions per Section 01 40 00 - Quality Requirements, and as follows:
- 1. Carefully examine installation areas with Installer/Applicator present, for compliance with requirements affecting Work performance.
 - 2. Verify that sub-floor surfaces are smooth and flat within the tolerances specified for that type of work and are ready to receive tile.
 - a. Flatness for floor: 1/4 inch in 10 feet and 1/16 inch in 1 foot from the required plane
 - 3. Verify that wall surfaces are smooth and flat within the tolerances specified for that type of work, are dust-free, and are ready to receive tile.
 - a. Flatness for walls: 1/4 inch in 8 feet.
 - 4. Verify that sub-floor surfaces are dust-free and free of substances that could impair bonding of setting materials to sub-floor surfaces.
 - 5. Preinstallation Testing: Substrates surfaces will be tested to verify that bond is not impaired. Abrade, treat or otherwise prepare surface to ensure bonding using manufacturer recommended methods.
 - a. Do not install tile until Owner engaged Independent Testing Agency testing results show:
 - 1) Tile and setting material manufacturer's recommended moisture emission rate and alkalinity requirements of the slab.
 - b. If concrete is found to be unacceptable substrate for tile work, this contractor shall notify General Contractor and Architect. General Contractor shall make repairs as required to meet the recommendations of the tile and setting materials. This contractor shall not continue with work until substrate is acceptable as required by manufacturer of tile and setting materials. Starting of installation constitutes acceptance of surfaces.
 - 6. Verify that required floor-mounted utilities are in correct location.

3.02 PREPARATION

- A. Protection of in-place conditions. Protect surrounding work from damage.
- B. Surface Preparation: Refer to manufacturer's instructions and recommendations for preparation of substrates.
 - 1. Vacuum clean surfaces and damp clean.
 - 2. Seal substrate surface cracks with a cementitious-based or epoxy-based filler.
 - 3. Level existing substrate surfaces to acceptable flatness tolerances with a cementitious-based leveling material or by grinding.
- C. Blending: For tile exhibiting color variations within ranges selected during Sample submittals, verify that tile has been factory blended to include full range within each carton. If not, blend tile on site prior to setting tile.
- D. Prepare substrate surfaces for adhesive installation in accordance with adhesive manufacturer's instructions.

3.03 INSTALLATION - GENERAL

- A. Install tile and thresholds and grout in accordance with applicable requirements of ANSI A108.1 through A108.13, manufacturer's instructions, and The Tile Council of North America Handbook recommendations and as follows:
 - 1. Lay tile to pattern indicated. Do not interrupt tile pattern through openings.
 - 2. Cut and fit tile to penetrations through tile, leaving sealant joint space. Form corners and bases neatly. Align floor joints.
 - 3. Place tile joints uniform in width, subject to variance in tolerance allowed in tile size. Make grout joints without voids, cracks, excess mortar or excess grout, or too little grout.
 - 4. Form internal angles square and external angles bullnosed.
 - 5. Install non-ceramic trim in accordance with manufacturer's instructions.
 - 6. Install thresholds where indicated.
 - 7. Sound tile after setting. Replace hollow sounding units.
 - 8. Keep expansion joints free of adhesive or grout. Apply sealant to joints.
 - 9. Prior to grouting, allow installation to completely cure; minimum of 48 hours.
 - 10. Grout tile joints. Use standard grout unless otherwise indicated.
 - 11. Apply sealant to junction of tile and dissimilar materials and junction of dissimilar planes.

3.04 INSTALLATION - FLOORS - THIN-SET METHODS

- A. Over interior concrete substrates, install in accordance with TCNA (HB) Method F113, dry-set or latex-Portland cement bond coat, with standard grout, unless otherwise indicated.
 - 1. Where waterproofing membrane is indicated, install in accordance with TCNA (HB) Method F122, with latex-Portland cement grout.

3.05 INSTALLATION - FLOORS - MORTAR BEDMETHODS

- A. Over interior concrete substrates, install in accordance with TCNA (HB) Method F111, with cleavage membrane, unless otherwise indicated.
- B. Cleavage Membrane: Lap edges and ends.

3.06 WATERPROOFING AND CRACK-SUPPRESSION MEMBRANE INSTALLATION

- A. Provide at all elevated slabs floors containing floor drains.
- B. Install waterproofing to comply with ANSI A108.10 and waterproofing manufacturer's written instructions to produce waterproof 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

3.07 INSTALLATION - WALL TILE

- A. Over coated glass mat backer board on studs, install in accordance with TCNA (HB) Method W245.

3.08 FIELD QUALITY CONTROL

- A. Maintain and reference one complete copy of TCNA Handbook and ANSI A108 Series/A118 Series on site.
 - 1. Be sure cut edges are clean before installing tiles, fit tile carefully against trim, around pipes, electrical boxes and other built in fixtures so that escutcheons, plates and collars will completely overlap cut edges.
 - 2. When using glazing tile sheets, minimize tearing sheets apart by drilling pipe holes as much as possible.
 - 3. Near floor drains, keep tile floor level, dishing slightly only in area of drain.
- B. Field Tests and Inspections the as follows:
 - 1. Interior Floor Waterproofing: Flood test critical areas per ASTM D 5957 for plaza decks, and floors and showers where slope does not exceed 1/4 inch per foot, and as directed by the Architect.
 - a. Cure Time: 7 days at 70 deg F prior to flood test.

- C. Non-Conforming Work per General and Supplementary Conditions, and as follows: Remove, Repair and Reinstall or Restore in Place damaged items prior to inspection for Substantial Completion.

- 1. Replace damaged materials or items with New if repair not acceptable to Architect.

3.09 CLEANING

- A. Comply with requirements of Section 01 74 19 - Construction Waste Management and Disposal
- B. Clean tile surfaces as thoroughly as possible on completion of grouting.
 - 1. Remove all grout haze, observing tile manufacturer's recommendations as to use of cleaners.
 - 2. Do not use acids.
 - 3. Rinse tile work thoroughly with clean water before and after using chemical cleaners.
 - 4. Polish surfaces of glazed tile work with soft cloth

3.10 PROTECTION

- A. Protect installed [work] from subsequent construction operations until date of Final Completion or Owner Occupancy, whichever occurs first.
- B. Do not permit traffic over finished floor surface for four (4) days after installation.
- C. Where traffic is unavoidable, place large flat boards in walkways and wheel ways for seven (7) days.

END OF SECTION