SECTION 09300

CERAMIC TILE

PART 1 - GENERAL

1.01 WORK INCLUDED

A. Furnish all labor, materials and equipment necessary to complete all work specified herein and as indicated in accompanying drawings to the standards of the tile trade.

B. Provide and install new exterior tile work over a concrete slab on grade (provided by others).

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. 03300 - Cast in Place Concrete
B. 05800 - Expansion Control
C. 07900 - Sealants

1.03 REFERENCE STANDARDS

A. Conform to applicable provisions of the current publication of the following reference standards including but not limited to:

1. American National Standards Specifications (ANSI)
   a. ANSI 108
   b. ANSI 118
   c. ANSI 136.1
   d. ANSI A137.1

2. American Society for the Testing of Materials (ASTM)
   a. ASTM C270

3. Tile Council of America Handbook (TCA)
   a. TCA Method F102
   b. TCA EJ171-03

4. Marble Institute of America

1.04 QUALITY ASSURANCE

A. Contractor Qualifications: The Contractor shall have a minimum of five years of experience in performing work similar in scope and in size to that required by this Section.

B. Material Compatibility: Provide compatible components including tile, setting mortar, grout, and other required materials that will be warranted by the manufacturer(s) as a complete system.

C. Manufacturers: Materials shall be obtained only from manufacturers who will, if required, send a qualified technical representative to the project site for the purpose of advising the Contractor of the procedures and precautions for the use of the materials.

D. Except as modified by governing codes and by the drawings, specifications and other contract documents, comply with the applicable provisions, recommendations, and specifications of the Tile Council of America.

E. Contractor shall perform a pre-installation survey to assess the condition of the substrate. Contractor shall promptly notify Architect if conditions exist that may compromise the completed installation.

1.05 WARRANTY

A. Provide a 5 year written manufacturer warranty covering materials and labor for the repair or replacement of the system

1.06 SAMPLES AND SUBMITTALS

A. Manufacturer’s literature: Product data sheets for all materials used for the Work.

B. Certifications: Prior to delivery, submit certificates to the Architect attesting to compliance with the applicable Specifications herein.

C. Manufacturer’s grout color charts

D. Sample of grout: Cured sample, 2 x 2 inches of selected colors.

E. Statement of Manufacturer's Review: Submit statement, signed by manufacturer of setting materials, that manufacturer has reviewed construction documents related to tile installation and that manufacturer's materials, as specified, are suitable for applications indicated, including types and sizes of tile, tolerances of tile and substrates, setting bed thickness, and other conditions to which installation is subject.

1.07 MOCKUPS AND TESTING

A. Aesthetic Mockup

1. On the site, where approved by the Architect, provide a 10 foot square mock-up of the tile installation, including setting mortar and grout (color selected by Owner) to illustrate the type and quality of the Work required to complete the Project.

    a. Architect shall evaluate the techniques and effectiveness of excess grout removal from tile surfaces.

2. When completed and approved by the Architect, the mock-up shall be incorporated into the finished Work and become the standard of quality for the remainder of the Project. All concealed portions of the mock-up shall be inspected by the Architect and, if approved, photographed for future reference prior to that portion being concealed.

B. Vertical Load Test Mockup

1. Construct 10 foot square mockup in location as directed by Architect. Employ materials and techniques as specified and approved for use in the final work.

2. On three (3) pavers in the sample area selected by the Architect, perform a vertical load test.

3. Test shall consist of 500,000 cycles of a 250-pound load to the paving.

4. Test shall be performed by an independent testing agency.

5. Failure of mockup, before or after testing includes: debonding of any area of tile from setting mortar or setting mortar from substrate, delamination of any of any kind of any area of tile, cracking of tiles. Cracking or debonding of mortar in joints between tiles.

6. Provide test report indicating results of testing, including number, extent, and locations of delamination and cracking of tiles, and number of cycles at which distress occurred.

7. Pavers that exhibit failures by one of the above defects, or other visible evidence of failure, shall be removed in the presence of the Architect and Manufacturer's Representative and existing installation conditions examined.

8. Pavers shall be reinstalled with adjustments to installation procedure as directed by the Architect.

9. Reinstalled tiles shall be retested.

C. Removal of tiles in testing area for inspection

1. After completion of vertical load tests, remove pavers in entire sample area to permit inspection by Architect.

2. Architect will evaluate bond between pavers and mortar setting bed and contact area between mortar and back surface of tile.

3. After completion of tests and inspection, Contractor shall remove paver and bedding material from mockup area and prepare area for installation of pavers.

1.08 Slip Resistance

A. Conduct slip resistance testing of selected ceramic tiles per ASTM F 2048

1. Three (3) dry specimens

2. Three (3) wet specimens

3. Three (3) dry specimens, with applied surface sealer

4. Three (3) wet specimens, with applied surface sealer

1.09 PROJECT CONDITIONS

A. Substrate Conditions

1. Confirm dimensions of concrete substrate by accurate field measurement.

2. Confirm concrete has been in place for at least 28 days prior to commencing tile installation

3. Do not begin work until deficiencies in the substrate are corrected. Commencement of tile installation indicates Contractor's acceptance of substrate.

B. Environmental Conditions

1. Do not use units that have a film of frozen water, frost, or dirt.

2. Protect the work from direct exposure to precipitation and wind for at least seven days.

3. Install mortar, set and grout tile when surface temperature is minimum 50 degrees F and rising but no more than 90 degrees F.

4. Do not install mortar, set or grout tile when inclement weather conditions are expected within 48 hours after work is completed.

5. Protect partially completed tile work against weather when work is not in progress.

C. Replace tile damaged during installation. Repair of damaged tile is not permitted.

1.10 DELIVERY, STORAGE AND HANDLING

A. Deliver, store, and handle all material so as to prevent deterioration or the intrusion of any foreign matter. Deliver and store packaged material in the original packages. Do not use materials from broken packages or showing evidence of damage.

B. Store materials in such a manner as not to damage or place undue stress on the existing structure or component of the building.

C. Take necessary precautions to meet the following conditions:

1. Store all material off ground to prevent contamination by mud, dust, or materials likely to cause staining or other defects.

2. Cover material to protect from elements and neglect.

PART 2 - PRODUCTS

2.01 CERAMIC TILES

A. Comply with ANSI A137.1 for types, compositions and grades of tile indicated.

B. Unglazed Ceramic floor tiles manufactured by Gladding McBean

1. Dimensions, 11/16” thick – 6 in. x 12 in., 12 in. x 12 in., 12 in. x 18 in.

2. Color, as shown on Drawings

2.02 POLYMER MODIFIED SETTING MORTAR

A. Latex-Portland Cement Mortar

1. Conform with the requirements of ANSI A118.4-1999

2. Conform to ASTM C270, Type S, except that latex polymer additive shall be mixed with the cementitious materials

3. Cement shall conform to ASTM C 150, Type I, complying with the staining requirements of ASTM C91 for not more than 0.03 percent water soluble alkali.

4. Sand shall conform to ASTM C 144.

5. Hydrated lime shall conform to ASTM C207

6. Shear bond strength, 500 psi minimum after 28 days

7. Compressive strength, 2,500 psi minimum after 28 days

B. Subject to compliance with requirements, acceptable latex modified thin-set mortar products include the following:

1. Master-Blend Thin-Set Mortar gauged with CustomFlex by Custom Building Products

2. MegaFlex by Custom Building Products

2.03 POLYMER MODIFIED SANDED GROUT

A. Conform with requirements of ANSI 118.6-1999 and ANSI 118.7-1999

B. Cement shall conform to ASTM C150, Type I, complying with the staining requirements of ASTM C91 for not more than 0.03 percent water soluble alkali.

C. Sand shall conform to ASTM C 144.

D. Coloring additive shall be premixed by grout manufacturer

1. Mortar coloring additive shall have mineral oxide pigment and shall be certified by the supplier to be resistant to alkali, light, and weather, and shall be of a chemical composition unaffected by cement, and free of water and soluble salts.

2. Color pigment in grout mixture shall not exceed 10 percent of the portland cement content.

3. Color to be selected by Owner.

E. Subject to compliance with requirements, acceptable latex modified thin-set mortar products include the following:

1. Polyblend Grout by Custom Building Products for joints 1/8 inch to 1/2 inch width

2. Saltillo Grout Mix by Custom Building Products for joints 3/4 inch to 1-1/4 inch width

F. Tile Sealer / Protection

1. Tilelab Surfaceguard by Tilelab

PART 3 - EXECUTION

3.01 Inspection

A. Examine surfaces which are to receive tile.

1. Do not proceed with work until defects or conditions which would adversely affect quality, execution and permanence of finished tile work are corrected (ANSI AN-3 and A-3).

2. Condition of surface to receive tile.

3. Assure that surfaces to receive tile are stable, flat, firm, dry, clean and free of cracks, oil, waxes and curing compounds or any material that would interfere with direct bonding.

3.02 GENERAL MIXING

A. All Mortars and grouts shall be mixed in strict accordance with manufacturer's printed instructions.

B. Mix all cementitious materials, aggregate, and latex additive with mechanical mixer at speed indicated by manufacturer.

C. Ensure that liquid components are thoroughly mixed prior to mixing with dry components.

D. Do not proportion mortar and grout mix by shovels. Mix whole bags of dry product with quantity of liquid components indicated in manufacturer’s instructions. Measure all liquid components by volume with measuring cups with incremented marking appropriate for the quantity of material being measured.

3.03 MORTAR MIXING

A. Add dry mix to measured quantity of liquid components in accordance with manufacturer's instructions.

B. Mix thoroughly with mechanical mixer.

C. Slake for duration indicated by manufacturer and remix before using

D. Re-mix periodically to maintain a workable consistency. Do not re-temper.

E. Discard mortar not used within two hours unless manufacturer permits additional working time.

3.04 GROUT MIXING

A. Add dry mix to measured quantity of liquid components in accordance with manufacturer's instructions.

B. Dry mix grouts of same color with different batch numbers prior to mixing with liquid components.

C. Mix thoroughly with mechanical mixer.

D. Slake for 15 minutes and remix before using

E. Re-mix periodically to maintain a workable consistency. Do not re-temper.

F. Discard grout not used within one hour.

3.05 INSTALLATION

A. Surface preparation for tile work

1. General
    a. All supporting surfaces shall be structurally sound, solid, stable, level, plumb, and true to a tolerance in plane of 1/4" in 10'0" for walls and floors. They shall be clean and free of cracks, dust, oil, grease, paint, tar, wax, curing compound, primer, sealer, form release agent, laitance, loosely bonded topping, loose particles or any deleterious substance and debris which may prevent or reduce adhesion.
    b. Mechanically sand and scarify the substrate to completely remove all paint, loosely bonded topping, loose particles and construction debris.
    c. Test for and neutralize any trace of strong acid or alkali.
    d. All substrates shall be dry. The moisture content shall not exceed 50%.
    e. Turn off all forced ventilation and radiant heating systems and protect work against drafts during installation and for a period of at least 72 hours after completion. Use indirect auxiliary heaters to maintain the temperatures in the area at the recommended workable level. Vent temporary heater to exterior to prevent damage to tile work from carbon dioxide build-up.
    f. Presswood, hardwood, particle board, chipboard, masonite, gypsum based patching or leveling compounds, asbestos board, Luan and similar dimensionally

unstable materials or materials not intended for exterior use are not acceptable substrates of patching materials.

g. Before work commences examine the areas to be covered and report any flaw or adverse condition in writing to the architect and to the general contractor. Do not proceed with work until surfaces and conditions comply with the requirements indicated in ANSI A108 specifications.

2. Concrete Substrate
   a. All concrete substrates shall be at least 28 days old, completely cured and free of hydrostatic conditions, and/or moisture problems.
   b. New concrete surfaces for dry set mortar installations shall be wood floated or broom finished.
   c. On grade or below grade concrete slabs must be installed over an effective vapor barrier and be exempt from hydrostatic pressures.
   d. Over excessively dry porous concrete, keep the concrete substrate continuously moist for at least 24 hours before work begins when using dry-set mortars or medium-bed mortars. Remove all excess water or standing water allowing the surface to become almost dry before installing the leveling coat or dry-set mortar.
   e. Areas of substrate requiring patching, leveling, or repair of hairline cracks shall be repaired with a product acceptable to the Architect, Tile Manufacturer, and Mortar/Grout Manufacturer.

B. Tile Installation

1. Install mortar in accordance with ANSI A108.10 and manufacturer's directions.

2. Install mortar in accordance with manufacturer’s written instructions.

3. Install mortar use of a 1/4 x 1/4 notched trowel to achieve a bed thickness of between 3/32 to 1/8 inch after tile installation.

4. Install mortar using method that produces maximum coverage with edges and cornes of tile fully supported.

5. Provide 95 percent coverage or greater of mortar for each tile unit.

6. Periodically remove and check tile to assure that proper coverage is being attained.

7. Center and balance tiles between boundaries and edges unless otherwise indicated on the Drawings.

8. Cuts in tiles resulting in installation of tile less than a half tile in width are not permitted.

9. Provide smooth cut edges. Ragged or flaked edges are not permitted.

10. Maximum lippage between tiles, 1/16 inch

11. Centerline of all joints to be straight, true, and of uniform width.

12. Provide expansion joints located in compliance with TCA EJ171 and as shown on Drawings
    a. Expansion joints must be and filled with the appropriate materials that accommodate joint movement with out damage to adjacent tile.

    b. Joints must be carried through all layers of installation materials, including tile, directly over joints in substrate.

C. Grout Installation

1. Allow tile installation to cure 24 to 48 hours prior to installation of grout.

2. Install tile in accordance with ANSI A108.5 and manufacturer's directions.

3. Proper curing of grout entails covering installation with non-staining kraft paper for a period of 72 hours.

3.06 CLEANING AND PROTECTION

A. Clean upon completion of setting and grouting; clean all ceramic tile surfaces so they are free of foreign matter. Polish tiles with dry, clean cloth (cheese cloth is recommended.

B. High pressure washing, acid washes, abrasives, wire brushes or other techniques that damage the tile surface are not acceptable

C. Clean with TileLab Concentrated Tile & Stone Cleaner.

D. Protection: Protect finished installation from traffic and incidental dirt for duration of construction period.

E. Sealing of tile and grout with TileLab SurfaceGard will simplify maintenance.

END OF SECTION