

SECTION 093213 - SWIMMING POOL TILE

PART 1 - GENERAL

1.01 STIPULATIONS

- A. The Specification Sections "General Conditions of Contract", "Special Conditions" and "Division 01 - General Requirements" form a part of this Section by this reference thereto, and shall have the same force and effect as if printed herewith in full.

1.02 RELATED DOCUMENTS

- A. The drawings and General Provisions of the contract, including General and Supplementary Conditions apply to work of this section.

1.03 SUMMARY

- A. A ceramic tile finish shall be furnished and installed on the floor, walls, stair-nosing, step nosing, depth markings, targets and lane markings and behind the pool edge as shown and detailed on the contract drawings and in strict accordance with these specifications.
- B. A ceramic tile finish shall be furnished and installed on the entire interior surface of the spa.
- C. The CONTRACTOR shall furnish and install the work of this section.

1.04 RELATED SECTIONS

- A. Division 1 - Mock Ups
- B. Division 7 - Joint Sealers
- C. Division 9 - Ceramic Tile
- D. Section 131100 - Swimming Pool

1.05 QUALITY ASSURANCE

- A. Reference Standards: Conform to the following standards unless otherwise required herein.
 - 1. American National Standards Institute (ANSI)
 - a. A108.01 - General Requirements: Subsurfaces and Preparations by Other Trades.
 - b. A108.02 - General Requirements: Materials, Environmental, and Workmanship.
 - c. A108.1, Glazed Wall Tile, Ceramic Mosaic Tile, Quarry Tile and Paver Tile installed with Portland Cement Mortar.
 - d. A108.1C - Contractor's 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 or Installation of Ceramic Tile on a Cured Portland Cement Mortar Setting Bed with Dry Set or Latex-Portland Cement Mortar.
 - e. A108.5 - Installation of Ceramic Tile with Dry-Set Portland Cement Mortar or Latex-Portland Cement Mortar.
 - f. A108.6 - Installation of Ceramic Tile with Chemical Resistant, Water Cleanable Tile Setting and Grouting Epoxy for the Epoxy Grouting Installation Process.
 - g. A108.10 - Installation of Grout in Tile Work.
 - h. A137.1 Standard Specifications for Ceramic Tile.
 - 2. American Society for Testing and Materials (ASTM)
 - a. C144-99, Aggregate for Masonry Mortar
 - b. C150-00, Portland Cement
 - c. C171-97a, Sheet Materials for Curing Concrete
 - d. C206-97, Finishing Hydrated Lime
 - e. C207-91 (R1997), Hydrated Lime for Masonry Purposes

- f. F-1869, Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride
- g. F-2170, Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using In Situ Probes
- 3. Tile Council of North America (TCNA); 2013 Edition, Handbook for Ceramic Tile Installation.
- 4. International Standards Organization (ISO)
 - a. ISO 13007 – Part 1: 2004 Ceramic Tiles – Grouts and adhesives; specifies the value of performance requirements for all tile adhesives.
 - b. ISO 13007 – Part 2: 2005 Ceramic Tiles – Grouts and adhesives; test method for adhesives.
 - c. ISO 13007 – Part 3: 2005 Ceramic Tiles – Grouts and adhesives; terms, definitions and specifications for grout.
 - d. ISO 13007 – Part 4: 2005 Ceramic Tiles – Test methods for grout.
- 5. American Concrete Institute
 - a. ACI 302 – Guide for Concrete and Floor Slab Construction
- 6. International Concrete Repair Institute (ICRI)
 - a. Concrete Surface Profile.(CSP)
- B. Tile installers shall have two years experience in similar pool projects which the Department may require written proof thereof and proper tools to install tile.

1.06 MANUFACTURERS

- A. Subject to compliance with requirements provide ceramic tile, mortar and grout of the following manufacturers: American Olean Tile Co. (tile), Dal-Tile Co. (tile), Büchtal (tile), KlinkerSire (tile), Mapei Corp. (thin-set, waterproofing, grout and admixtures), and Laticrete International Inc. (thin-set, waterproofing, grout and admixtures) or approved equal.

1.07 SUBMITTALS

- A. Submit shop drawings indicating tile layout, patterns, joint layout, color arrangement, perimeter conditions, junctions with dissimilar materials, thresholds and setting details.
- B. Submit product data indicating material specifications, characteristics, and instructions for using adhesives and grouts.
- C. Samples:
 - 1. Mount tile and apply grout on 24 x 24 inch backerboard to indicate pattern, color variation and grout joint size variations of each pattern. Furnish mounted tile samples as requested by the Professional/Using Agency.
- D. Submit manufacturer's installation instruction.
- E. Submit maintenance data.
 - 1. Include recommended cleaning and stain removal methods, cleaning materials.

1.08 PRODUCT DELIVERY AND STORAGE

- A. Deliver tile materials to site in unopened factory containers sealed with grade seals bearing printed name or manufacturer and the words "Standard Grade". Keep the grade seals intact and containers dry until tiles are used. Keep cementitious materials dry until used.

1.09 JOB CONDITIONS

- A. Inspect and verify job conditions. Report all defects in base surfaces for correction before proceeding.
- B. Maintain a temperature range of 40 degrees Fahrenheit to 90 degrees Fahrenheit during installation of tile and grout materials. Tile installation should cure for a minimum 14 days with

average an temperature of 70 degrees, while maintaining the minimum 40 degrees and maximum 90 degrees Fahrenheit, prior to filling pool with water.

- C. Vent temporary heaters to outside to avoid carbon dioxide damage to the new tile work.

1.10 COLORS

- A. Colors to be selected by the Professional. Note that swimming pool regulations may dictate color selections within the pool tank. See 2.01 Tile Materials for price group breakdowns.

1.11 WARRANTIES

- A. The CONTRACTOR warrants to the Department that materials and equipment furnished under the contract will be of good quality and new unless otherwise required or permitted by the contract documents, that the work will be free from defects not inherent in the quality required or permitted and that the work will conform with the requirements of the contract documents. Work not conforming to these requirements including substitutions not properly approved and authorized, may be considered defective. The CONTRACTOR'S warranty excludes remedy for damage or defect caused by abuse, improper or insufficient maintenance, improper operation, modifications not executed by the CONTRACTOR or improper wear and tear under normal usage. If required by the Department, the CONTRACTOR shall furnish satisfactory evidence as to the kind and quality of materials and equipment. All warranties shall be for a period of five years, unless otherwise specified.
- B. All setting materials shall be provided by the same manufacturer. All mixing materials and application procedures shall be done in accordance with manufacturer's recommendations and requirements. Documentation shall be provided to this effect by the contractor with verification from the manufacturer. This documentation shall be included in the operations and maintenance manual under warranties as documentation qualifying the project for a 15 Year Systems Warranty by Laticrete International, Inc., Mapei, Inc. or approved equal.
- C. The CONTRACTOR shall agree to repair or replace any work at no cost to the Department / Using Agency upon written notification from the Department / Using Agency within the warranty period. Pro-rated warranties are not acceptable.

PART 2 - PRODUCTS

2.01 TILE MATERIALS

- A. Standard grade conforming to ANSI A137.1. Provide trimmer units as indicated and specified, including special shapes as detailed or required. Tile patterns and colors shall be as indicated and specified, colors of approved shades. Mesh mounted or perforated paper backed tile is not allowed where the mesh of paper remains as a permanent part of the installation. If dot mounting is used, a minimum of 67% of the depth of the tile shall be free from any dots to ensure proper grout curing. All 1" x 1" tiles shall be face mounted as guaranteed suitable for pool use by the manufacturer.
- B. Unglazed Ceramic Mosaic Tile
 1. Slip-resistant porcelain unglazed ceramic mosaic tile, cushion or all-purpose edges, two inch square from price group 2 for floor, walls, and stair treads unless otherwise noted. Minimum coefficient of friction shall be 0.6 for wet surfaces and 0.8 for ramped surfaces. Where (special shapes) are required they shall be selected from price group 3. Equivalents provided by Knottile, Dal-Tile or American Olean. For wet surfaces: Buchtal Chroma Mosaics with front mount film (seven color options) 2x2 7161HVF or American Olean Unglazed color-body porcelain mosaics 2"x2", price group 1-3. For ramps: Buchtal Chroma non-slip mosaics with glass fiber net (four color options) 2x2 7161H. Or for wet surfaces or ramps: Buchtal Chroma non-slip 5x5 32020H thirteen color options) or Dal-Tile or American Olean Unglazed

- color-body mosaics 2"x2" with 7.5% abrasive grain (7 color options). All colors to be selected by the Professional.
2. Ceramic tile band below the pool gutter lip, crown detail at stairs, and recessed steps shall be selected by Professional from Dal-Tile, Keystone Unglazed Mosaic, 2" x 2" price group 4, American Olean Unglazed color-body porcelain mosaics 2"x2" price group 1-3, or powder glazed 2x2 Buchtal Chroma Mosaics provided by Knoxtile.
 3. Ceramic tile deck band that contains the depth marker letters and numerals shall be selected by the Professional from Dal-Tile, Keystone Unglazed Mosaic, 2"x2", price group 4, American Olean Unglazed color-body porcelain mosaics 2"x2", price group 1-3.
 4. Contrasting ceramic tile nosings at pool stairs, recessed steps, underwater bench, underwater shelf, spa steps and spa bench shall be selected by the Professional from Dal-Tile, Keystone Unglazed Mosaic, price group 3 and 4, American Olean Unglazed color-body porcelain mosaics 2"x2", price group 1-3.
 5. 4" wide contrasting ceramic tile stripe and 12" lane markers on the pool floor shall be selected by Professional from Dal-Tile, Keystone Unglazed Mosaic, 2"x2" price group 3, American Olean Unglazed color-body porcelain mosaics 2"x2" price group 3, or from Knoxtile, as 4x4 Buchtal Chroma Colors 22010H-717, 5556 Grey Black and 5535 Blue or 2x2 Mosaic 7160HVF 5535 Grey Black. The main race course wall targets and lane markers shall be blue.
 6. Ceramic tile at top horizontal plane of the spa and vertical face of the spa shall be selected by Professional from American Olean Unglazed color-body porcelain mosaics 2"x 2" with one or two (2) colors from price group 1-4, Dal-Tile Keystone Unglazed Mosaic 2"x2" from price group 1-4 or from Knoxtile: Buchtal Chroma Mosaics 2x2-7161HVF (seven color options) or non-slip 7161H 2x2.
- C. Handhold Tile at the recreation pool perimeter shall be provided as C701 available from Dal-Tile.
- D. Hand-hold tiles at the competition pool perimeter shall be Buchtal Chroma Handhold Edge from Knoxtile: System-Finland 119x244 mm (5x10 in) 900402-55730 White with Dark Blue Safety Strip, Internal Corners (pair) 112x112 mm 900402-55732 White with Dark Blue Safety Strip, External Corners 240x119mm 55736-900402 White with Dark Blue Safety Strip. KlinkerSire #B-52 Grooved Ribbed Edge shall be considered equal.
- E. Provide tile trim units where indicated or necessary for a complete and finished installation. Provide rounded units for external and internal corners and angles. Provide trim units of material and finish identical to the adjoining tile. Provide SCR/L701 units where the C701 hand hold is interrupted to permit draining. Contractor should request via non-standard production. The SCR/L701 units are available through DalTile at 314-997-6970 or 1-800-672-2086.
- F. Message Tile and Depth Markings
1. Horizontal and vertical depth markings and warning signs shall be 6" x 6" with 4" high numbers and letters. All horizontal depth markers shall be slip resistant.

2.02 SWIMMING POOL / SPA TILE SETTING MATERIALS AND INSTALLATION

A. Surface Preparation

1. Surface preparation shall be in accordance with ACI 302. The surface shall be structurally sound and free of any foreign substances and debris that could reduce or impair adhesion. Sound and remove all loose concrete to firm substrate. Surfaces shall be roughened to a CSP of 3 to 5 (reference ICRI CSP Standards 7 to 9 for acceptable profile height). Thoroughly wash/rinse with clean potable water. Surface defects or holes in the substrate shall be patched per manufacturer's recommendations.

- B. Slurry Bond Coat
 - 1. Horizontal surfaces to receive a thick bed mortar application shall be installed over a slurry bond coat of either Laticrete 254 Platinum one-step, polymer-fortified, thin-set mortar, or Mapei 4:1 bag mix with Planicrete AC Additive over a clean concrete slab, in compliance with ANSI A108.1A (2.2 & 5.2). As manufactured by Laticrete International, Mapei, Inc., or approved equal. Note that slurry bond coats are not required under vertical applications of the render and scratch coat.
- C. Mortar & Leveling Beds
 - 1. Bonded Thick Bed Method (Floor / Horizontal Surfaces): Provide a dry pack, thick mortar bed on horizontal surfaces consisting of either Laticrete 3701 Fortified Mortar Bed, or Mapei, 4:1 bag mix with Planicrete AC Additive. Apply over a properly prepared slurry bond coat. Maximum lift thickness not to exceed 2".
 - 2. Render- Scratch and Float Coats (Wall / Vertical Surfaces): Provide wall render (scratch and float coats) on vertical competition turning surfaces to a depth of 4 feet below the water surface, consisting of either Laticrete 3701 Fortified Mortar Bed, or Mapei, 4:1 bag mix with Planicrete AC additive for lift thicknesses up to ½". Wall render is made to a plastic consistency when used vertically. Fill all holes and bring surface up to line and plane as required. As manufactured by Laticrete International, Mapei, Inc. or approved equal. Note that slurry bond coats are not required under vertical applications of the render and scratch coat. (Refer to Course Length Tolerances for competitive pools.)
- D. Tile Thin-Set
 - 1. Use either Laticrete 254 Platinum one-step, polymer fortified, thin-set mortar or Mapei Ultraflex 3 one-step, polymer modified, thin-set mortar, used in accordance with the manufacturer's requirements. As manufactured by Laticrete International, Mapei, Inc., or approved equal.
- E. Tile Grout
 - 1. Use either Laticrete Spectra LOCK Pro Premium Grout or Mapei Opticolor Resin Grout in accordance with the manufacturer's requirements as manufactured by Laticrete International, Mapei, Inc. or approved equal.
- F. Elastomeric Sealant
 - 1. Use Laticrete Latasil sealant for all inside/outside corners, expansion/movement joints, and to seal lighting/plumbing fixture penetrations. Apply sealant over Latasil 9118 primer. All primer and sealant installation shall be in accordance with the manufacturer's requirements. As manufactured by Laticrete International, Inc., or approved equal.
- G. All mixing and application procedures shall be done in accordance with the manufacturer's recommendations and requirements. The manufacturer's representative shall visit the site to verify field conditions, confirm materials and application requirements and ascertain that all materials and systems are so installed. Documentation shall be provided to this effect.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Complete water tightness test prior to tile installation. Concrete tank shall be watertight per ASTM D5957, the Tile Council of North America, and specification 131100.
- B. Clean substrates of dust, dirt, oil, grease and deleterious substances and mechanically roughen concrete and shotcrete for bond. Conform to applicable reference standards and to recommendations of manufacturers of materials used and meeting ICRI, CSP of 3-5.
- C. Substrates to Receive Mortar Setting Beds
 - 1. Dampen concrete substrate to receive tile work according to above referenced standards or tile manufacturer's instructions, as required.

- D. Substrates to receive thin set tile applications shall meet normal construction tolerances of 1/4" in 10' where competition tolerances do not apply, and shall meet competition tolerances where required elsewhere in these specifications, and shall be free of bumps, dips and surface irregularities that may effect the satisfactory installation of the tile.
- E. Tile Wetting
 - 1. Dampen tile according to above reference standards or tile manufacturer's instructions, as required.
- F. Screeds
 - 1. Accurately set temporary screeds to control the finish plane of mortar-bed set tile and remove as soon as setting bed is sufficiently hardened. Fill void spaces from screeds with same mortar.

3.02 TILE INSTALLATION

- A. Arrange tile according to patterns detailed. Set tile with flush well-fitted joints, finished in true planes, plumb, square, joints of uniform size. Provide approved trimmers as shown or required. Cut tile without marring. Carefully grind and joint tile edges and cuts.
- B. Follow Tile Council of North America installation methods P601 and B417 to achieve total tile system thickness for thin or thick-set.
 - 1. Thick Set
 - a. Apply specified setting bed mortar, up to 2" in thickness, on cured and dried concrete pool shell. Tamp and screed to required planes. Spread no more mortar than can be covered with tile before initial set. Do not use re-tempered mortar. Trowel 3/32" to 1/8" thick bond coat over plastic setting bed mortar just before setting tile or apply bond coat to back of each tile placed. 95% coverage of the back of the tile or tile sheet is required. Set tile in position and beat firmly into the setting bed mortar. Bring tile faces to a true and correct plane. Complete all beating and leveling before mortar sets and in no case later than one hour after first placing. When ready, wet and remove paper and glue avoiding excess water. At this time adjust any out-of-line or out-of-level tile.
 - 2. Thin Set
 - a. Apply specified bond coat on cured and dried concrete pool shell. Trowel 3/32" to 1/8" thick bond coat over concrete pool shell just before setting tile or apply bond coat to back of each tile placed. 95% coverage of the back of the tile or tile sheet is required. Set tile in position and beat firmly into the setting bed mortar. Bring tile faces to a true and correct plane. Complete all beating and leveling before mortar sets and in no case later than one hour after first placing. When ready, wet and remove paper and glue avoiding excess water. At this time adjust any out-of-line or out-of-level tile.
- C. Finished tile surface shall be level and in plane, with no sharp or protruding edges. Tiles out or plane more than 1/16" shall be removed and replaced. Sharp edges shall be stoned smooth.
- D. Grout Joint Sizes
 - 1. Unless otherwise approved, install tile with uniform 3/32 inch joint width. A maximum 1/8" joint width may be utilized to meet specific installation requirements, if required.
- E. Ceramic Tile Joint Grouting
 - 1. Mix grout to a thick creamy consistency and force into joints for entire thick depth, flush with surface. Clean off all excess and fill skips and gaps before grout sets. Color selection by Professional. Provide dampness for minimum 3-day curing and polish with clean dry cloths (not required when epoxy grouts are used).
- F. Expansion Joints
 - 1. Place expansion joint per applicable TCNA Method P601MB, P601TB, or P602 and conforming to Method EJ171. Provide shop drawings showing backer rod and joint dimensions. All expansion, control, construction, cold, and seismic joints in the pool structure

should continue through the tile work, including such joints at vertical surfaces. Movement joints shall be placed at all changes in direction and elevation. Refer to the structural engineer for additional required movement joints. Joint size shall be a minimum of 1/8". Joints through tile work directly over structural joints shall not be narrower than the structural joint. The Contractor shall use cement compatible coatings when using chalk lines for joint layout purposes.

G. Fill and Empty Rates

1. Use a fill and drain rate of 2 feet per 24 hours to minimize thermal shock and structural movement. Maintain a temperature differential of 10 degrees Fahrenheit or less between the pool water and the substrate during fill and drain cycles.

3.03 TESTING AND INSPECTION

- A. Before filling of the pool, and its subsequent provisional acceptance at substantial completion, the tile installation shall be visually inspected and sounded in the presence of the Professionals and/or the Department's representative to verify adhesion of the tile to its substrate as well as its overall compliance with the requirements of this Section.
- B. Any and all tile work found to be loose, improperly adhered, out of plane, misaligned or otherwise non-conforming shall be removed and replaced at no additional cost to the Department.

3.04 CLEANING

- A. Upon completion of placement and grouting, clean tile installation as recommended by TCNA and manufacturers of proprietary materials. Tile shall be cleaned with pH neutral solutions, free of both sodium and potassium, in accordance with the tile and grout manufacturer's printed instruction.
- B. Leave finished installation clean and free of cracked, chipped, broken, un-bonded or otherwise defective tile work.
- C. Protect installed tile work with non-staining Kraft paper, polyethylene sheeting, or other approved heavy covering during the construction period to prevent damage.

3.05 REPLACEMENT TILE

- A. Provide Using Agency with approximately 10% or 25 square feet (whichever is least) of each color and type tile used on the project for Using Agency's repair and replacement requirements.

END OF SECTION 093213