SECTION 09 30 13
CERAMIC TILING

SPEC WRITER NOTES:
1. Use this section only for NCA projects.
2. Delete between //______// if not applicable to project. Also delete any other item or paragraph not applicable in the section and renumber the paragraphs.
3. Coordinate with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES, and Section 01 45 29, TESTING LABORATORY SERVICES.
5. Detail wall, floor, and base edge, joints with other materials, and expansion joint conditions for each system. Show locations of expansion joints on drawings.
6. If the Handbook method numbers referenced in specifications for each systems. Use date of Handbook with method number.
7. Waterproof membranes to which tile bonded specified in this section is for use on existing buildings only. Do not use for new buildings.
8. Coordinate paragraphs under Article RELATED WORK with other sections.
9. It is the responsibility of Interior Designer to coordinate colors of floor and wall tiles separately with the accent tiles. Same color tiles may not be available for walls and floors that require slip resistant tiles.

PART 1 - GENERAL

1.1 DESCRIPTION

This section specifies ceramic, porcelain, and quarry tile, // marble thresholds and window stools, // crack isolation membranes, // tile backer board. //

1.2 RELATED WORK

//A. Preformed sealant joints in tile flooring: Section 07 95 13, EXPANSION JOINT COVER ASSEMBLIES.//
A. Sealing of joints where specified: Section 07 92 00, JOINT SEALANTS.
B. Color, texture and pattern of field tile and trim shapes, size of field tile, // trim shapes, // and color of grout specified: Section 09 06 00, SCHEDULE FOR FINISHES.

SPEC WRITER NOTES: Verify and coordinate the following paragraph to include
reference to application of metal lath; DELETE if not applicable. Refer to paragraphs under PART 2 - PRODUCTS.

C. Plastering: // Section 09 23 00, GYPSUM PLASTERING // Section 09 24 00, PORTLAND CEMENT PLASTERING. //

D. Metal and resilient edge strips at joints with new // resilient flooring, // and carpeting: // Section 09 65 19, RESILIENT TILE FLOORING // Section 09 68 00, CARPETING. //

SPEC WRITER NOTES: Delete submittals for products not used.

1.3 SUBMITTALS

A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.

B. Samples:
   1. Base tile, each type, each color, each size.
   2. Paver tile, each size, type, color and pattern.
   3. Quarry tile, each type, color, and size.
   4. Porcelain tile, each type, color, patterns and size.
   5. Wall (or wainscot) tile, each color, size and pattern.
   6. Trim shapes, bullnose cap and cove including bullnose cap and base pieces at internal and external corners of vertical surfaces, each type, color, and size.

C. Product Data:
   1. Ceramic and porcelain tile, marked to show each type, size, and shape required.
   2. Chemical resistant mortar and grout (Epoxy and Furan).
   3. Cementitious backer unit.
   5. Divider strip.
   7. Reinforcing tape.
   8. Leveling compound.
   12. Slip resistant tile.
   14. Fasteners.

D. Certification:
   1. Master grade, ANSI A137.1.

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2. Manufacturer's certificates indicating that the following materials comply with specification requirements:
   a. Chemical resistant mortar and grout (epoxy and furan).
   b. Modified epoxy emulsion.
   c. Commercial Portland cement grout.
   d. Cementitious backer unit.
   e. Dry-set Portland cement mortar and grout.
   f. Elastomeric membrane and bond coat.
   g. Reinforcing tape.
   h. Latex-Portland cement mortar and grout.
   i. Leveling compound.

1.4 DELIVERY AND STORAGE

A. Deliver materials in containers with labels legible and intact and grade-seals unbroken.

B. Store material to prevent damage or contamination.

SPEC WRITER NOTES: Update applicable publications to current issue at time of project preparation.

1.5 APPLICABLE PUBLICATIONS

A. Publications listed below form a part of this specification to the extent referenced. Publications are referenced in text by basic designation only.

B. American National Standards Institute (ANSI):

   A108.1A-11 ............. Installation of Ceramic Tile in the Wet-Set Method with Portland Cement Mortar
   A108.1B-11 ............. Installation of Ceramic Tile on a Cured Portland Cement Mortar Setting Bed with dry-Set or latex-Portland Cement Mortar
   A108.1C-11 ............. 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 Setting Bed with Dry-Set or Latex-Portland Cement Mortar
   A137.1-08 .............. Ceramic Tile

C. American Society For Testing And Materials (ASTM):

   A185-07 ................. Steel Welded Wire Fabric, Plain, for Concrete Reinforcing

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C348-08 ................. Standard Test Method for Flexural Strength of Hydraulic-Cement Mortars
C627-10 ................. Evaluating Ceramic Floor Tile Installation Systems Using the Robinson-Type Floor Tester
C954-11 .................. Steel Drill Screws for the Application of Gypsum Board on Metal Plaster Base to Steel Studs from 0.033 in (0.84 mm) to 0.112 in (2.84 mm) in thickness
C979-10 .................. Pigments for Integrally Colored Concrete
C1002-07 ............... Steel Self-Piercing Tapping Screws for the Application of Panel Products
C1027-09 ............... Determining “Visible Abrasion Resistance on Glazed Ceramic Tile”
C1028-07 ............... Determining the Static Coefficient of Friction of Ceramic Tile and Other Like Surfaces by the Horizontal Dynamometer Pull Meter Method
C1178/C1178M-11 ......... Standard Specification for Coated Glass Mat Water-Resistant Gypsum Backing Panel
C1325-08 ............... Non-Asbestos Fiber-Mat Reinforced Cementitious Backer Units
D4397-08 ............... Standard Specification for Polyethylene Sheeting for Construction, Industrial and Agricultural Applications
D5109-99(R2004) ........ Standard Test Methods for Copper-Clad Thermosetting Laminates for Printed Wiring Boards

E. Tile Council of America, Inc. (TCA):
2009 ................... Handbook for Ceramic Tile Installation

PART 2 - PRODUCTS

SPEC WRITER NOTES:
1. Make material requirements agree with applicable requirements specified in the referenced Applicable Publications. Update and specify only that which applies to the project. Delete non applicable items.

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2. Where tile is indicated for installation on exteriors, or in wet areas, do not use back- or edge-mounted tile assemblies unless tile manufacturer provides certificate that mounting is suitable for these installations and has a list of successful projects in-service performance.

3. Do not use raised profile tile for slip resistant tile.

4. Do not use glazed tile for floors.

5. Do not edit slip resistant tile paragraph.

2.1 TILE

A. Comply with ANSI A137.1, Standard Grade, except as modified:

1. Inspection procedures listed under the Appendix of ANSI A137.1.

2. Abrasion Resistance Classification:
   a. Tested in accordance with values listed in Table 1, ASTM C 1027.

3. Slip Resistant Tile for Floors:
   a. Coefficient of friction, when tested in accordance with ASTM C1028, required for level of performance:
      1) Not less than 0.7 (wet condition) for bathing areas.

4. Factory Blending: For tile with color variations, within the ranges selected during sample submittals blend tile in the factory and package so tile units taken from one package show the same range in colors as those taken from other packages and match approved samples.

SPEC WRITER NOTE: Use of wax as a temporary protective coating for exposed tile surfaces is required with furan mortars and grouts, latex modified mortars and grouts, and unglazed paver tile.

5. Factory-Applied Temporary Protective Coating:
   a. Protect exposed face surfaces (top surface) of tile against adherence of mortar and grout by pre-coating with a continuous film of petroleum paraffin wax, applied hot.
   b. Do not coat unexposed tile surfaces.
   c. Pre-wax tiles set or grouted with // furan or epoxy // or // latex modified mortars. //

B. Unglazed Quarry Tile: Nominal 13 mm (1/2 inch) thick, square edges.

C. Glazed Wall Tile: Cushion edges, glazing, as specified in Section 09 06 00, SCHEDULE FOR FINISHES.

D. Porcelain Paver Tile: Nominal 8 mm (5/16 inch) thick, cushion edges. Porcelain tile produced by the dust pressed method shall be made of approximately 50% feldspar; the remaining 50% shall be made up of
various high-quality light firing ball clays yielding a tile with a water absorption rate of 0.5% or less and a breaking strength of between 390 to 400 pounds.

SPEC WRITER NOTES:
1. Coordinate trim shape requirements with tile sizes scheduled in Section 09 06 00, SCHEDULE FOR FINISHES.
2. Coordinate for tile sizes when combined with ANSI A137.1 that rounded trim shapes, will produce complete wall or floor tile patterns as per color design.
3. Rounded, cove and bullnose shapes are mandatory shapes.
4. At top of tile wainscot that finish flush with wall surfaces above shown on details use flat cap (top) shape.
5. Bullnose cap pieces of internal corner at top of wainscot set by thin set method is available only in 106 mm by 106 mm (4-1/4 by 4-1/4 inch) size; coordinate with Section 09 06 00, SCHEDULE FOR FINISHES.
6. Assure details show trim shape lay out when trim shape is not the size of adjoining tile and cove and bullnose trim shapes for installation methods specified.
7. When Section 09 06 00, SCHEDULE FOR FINISHES specifies that new tile work in existing spaces shall not match existing tile work, see subparagraph 3.3, G, PART 3 for existing conditions.
8. Square internal and external corners are not acceptable. Do not change requirements.

E. Trim Shapes:
1. Conform to applicable requirements of adjoining floor and wall tile.
2. Use trim shapes sizes specified in Section 09 06 00, SCHEDULE FOR FINISHES.

2.2 CEMENTITIOUS BACKER UNITS
A. Use behind all wall and ceiling tile
B. ASTM C1325.
C. Joint materials for cementitious backer units
   1. Reinforcing Tape: Vinyl coated woven glass fiber mesh tape, open weave, 50 mm (2 inches) wide. Tape with pressure sensitive adhesive backing will not be permitted.
3. Joint material, including reinforcing tape, and tape embedding material, shall be as specifically recommended by the backer unit manufacturer.

2.3 FASTENERS
A. Screws for Cementitious Backer Units.
   1. Standard screws for gypsum board are not acceptable.
   2. Minimum 11 mm (7/16 inch) diameter head, corrosion resistant coated, with washers.
   3. ASTM C954 for steel 1 mm (0.033 inch) thick.
   4. ASTM C1002 for steel framing less than 0.0329 inch thick.
B. Washers: Galvanized steel, 13 mm (1/2 inch) minimum diameter.

2.4 GLASS MAT WATER RESISTANT GYPSUM BACKER BOARD
   Confirm to ASTM C1178/C1178M, Optional System for Cementious Backer Units.

2.5 SETTING MATERIALS OR BOND COATS
A. Conform to TCA Handbook for Ceramic Tile Installation.
   1. For wall applications, provide non-sagging, latex-Portland cement mortar complying with ANSI A108.1.
   2. Prepackaged Dry-Mortar Mix: Factory-prepared mixture of Portland cement; dry, redispersible, ethylene vinyl acetate additive; and other ingredients to which only water needs to be added at Project site.

2.6 GROUTING MATERIALS
A. Coloring Pigments:
   1. Pure mineral pigments, limeproof and nonfading, complying with ASTM C979.
   2. Add coloring pigments to grout by the manufacturer.
   3. Job colored grout is not acceptable.
B. White Portland Cement Grout:
   1. ANSI A108.1.
   2. Use one part white Portland cement to one part white sand passing a number 30 screen.
   3. Color additive not permitted.
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SPEC WRITER NOTES: Commercial Portland Cement Grout is sanded, and Dry-Set Grout is unsanded.

C. Commercial Portland Cement Grout: ANSI A108.1 color as specified.
D. Dry-Set Grout: ANSI A108.1 color as specified.
E. Latex-Portland Cement Grout: ANSI A108.1 color as specified.

1. Unsanded grout mixture for joints 3.2 mm (1/8 inch) and narrower.
2. Sanded grout mixture for joints 3.2 mm (1/8 inch) and wider.

2.7 PATCHING AND LEVELING COMPOUND

A. Portland cement base, polymer-modified, self-leveling compound, manufactured specifically for resurfacing and leveling concrete floors. Products containing gypsum are not acceptable.

SPEC WRITER NOTES: Include marble when limited to items specified and no other marble is used on project. Include marble in new section on marble if other marble items occur. Do not use synthetic marble unless abrasive hardness is 10 or more.

2.8 MARBLE

A. Soundness Classification in accordance with MIA Design Manual III Groups.

B. Thresholds:

1. Group A, Minimum abrasive hardness (Ha) of 10.0 per ASTM C241.
2. Honed finish on exposed faces.

SPEC WRITER NOTES:

2. Coordinate details for beveled edges where marble thresholds project above adjacent flooring with 19 mm (3/4 inch) minimum thickness and 6 mm (1/4 inch) minimum thickness at beveled edge.
3. Detail joint with other materials, and show where used.
4. Detail thresholds not more than 12.7 mm (1/2 inch) above adjoining finished floor surfaces, with transition edges beveled on a slope of no greater than 1:2 on existing floor slabs provide 13 mm (1/2 inch) about ceramic tile surface with beveled edges.

3. Thickness and contour as shown.
4. Fabricate from one piece without holes, cracks, or open seams; full depth of wall or frame opening by full width of wall or frame opening; 19 mm (3/4-inch) minimum thickness and 6 mm (1/4-inch) minimum thickness at beveled edge.
5. Set not more than 13 mm (1/2-inch) above adjoining finished floor surfaces, with transition edges beveled on a slope of no greater than
1:2. On existing floor slabs provide 13 mm (1/2-inch) above ceramic tile surface with bevel edge joint top flush with adjacent floor.

6. One piece full width of door opening. Notch thresholds to match profile of door jambs.

SPEC WRITER NOTES: Coordinate with details to show joints with other materials and show location where used.

2.9 METAL DIVIDER STRIPS
A. Terrazzo type divider strips.
B. Heavy top type strip with 5 mm (3/16 inch) wide top and 38 mm (1-1/2 inch) long leg.
C. Embedded leg perforated and deformed for keying to mortar.
D. Aluminum or brass as specified in Section 09 06 00, SCHEDULE FOR FINISHES.

2.10 WATER
Clean, potable and free from salts and other injurious elements to mortar and grout materials.

2.11 CLEANING COMPOUNDS
A. Specifically designed for cleaning masonry and concrete and which will not prevent bond of subsequent tile setting materials including patching and leveling compounds and elastomeric waterproofing membrane and coat.
B. Materials containing acid or caustic material not acceptable.

2.12 FLOOR MORTAR BED REINFORCING
ASTM A185 welded wire fabric without backing, MW3 x MW3 (2 x 2-W0.5 x W0.5).

2.13 POLYETHYLENE SHEET
A. Polyethylene sheet conforming to ASTM D4397.
B. Nominal thickness: 0.15 mm (six mils).
C. Use sheet width to minimize joints.

PART 3 - EXECUTION

3.1 ENVIRONMENTAL REQUIREMENTS
A. Maintain environmental temperature and humidity within all manufacturers recommendations.

3.2 ALLOWABLE TOLERANCE
A. Variation in plane of sub-floor, including concrete fills leveling compounds and mortar beds:
   1. Not more than 1 in 500 (1/4 inch in 10 feet) from required elevation where Portland cement mortar setting bed is used.
   2. Not more than 1 in 1000 (1/8 inch in 10 feet) where dry-set Portland cement, and latex-Portland cement mortar setting beds and chemical-resistant bond coats are used.
B. Variation in Plane of Wall Surfaces:
   1. Not more than 1 in 400 (1/4 inch in eight feet) from required plane where Portland cement mortar setting bed is used.
   2. Not more than 1 in 800 (1/8 inch in eight feet) where dry-set or latex-Portland cement mortar or organic adhesive setting materials is used.

3.3 SURFACE PREPARATION

SPEC WRITER NOTES:
1. Read the requirements of the "Forward, Explanation and Notes" of ANSI A108.1, A and B and the referenced ANSI specifications for the installation of ceramic tiles.
2. Coordinate specifications and details for existing conditions.
3. Clarify and use the term "thin set" on drawings and in the specifications.
4. Details are required to show interface conditions and joints with other materials, especially for different conditions such as new construction and existing conditions.

A. Cleaning New Concrete or Masonry:
   1. Chip out loose material, clean off all oil, grease dirt, adhesives, curing compounds, and other deterrents to bonding by mechanical method, or by using products specifically designed for cleaning concrete and masonry.
   2. Use self-contained power blast cleaning systems to remove curing compounds and steel trowel finish from concrete slabs where ceramic tile will be installed directly on concrete surface with thin-set materials.
   3. Steam cleaning or the use of acids and solvents for cleaning will not be permitted.

B. Patching and Leveling:
   1. Mix and apply patching and leveling compound in accordance with manufacturer's instructions.
   2. Fill holes and cracks and align concrete floors that are out of required plane with patching and leveling compound.
      a. Thickness of compound as required to bring finish tile system to elevation shown.
      b. Float finish // except finish smooth for elastomeric waterproofing. //
      c. At substrate expansion, isolation, and other moving joints, allow joint of same width to continue through underlayment.
3. Apply patching and leveling compound to concrete and masonry wall surfaces that are out of required plane.

4. Apply leveling coats of material compatible with wall surface and tile setting material to wall surfaces, other than concrete and masonry that are out of required plane.

C. Mortar Bed for Slopes to Drains:

1. Slope compound to drain where drains are shown.
2. Install mortar bed in depressed slab sloped to drains not less than 1 in 200 (1/16 inch per foot).
3. Allow not less than 50 mm (2 inch) depression at edge of depressed slab.
4. Screed for slope to drain and float finish.
5. Cure mortar bed for not less than seven days. Do not use curing compounds or coatings.

D. Additional preparation of concrete floors for tile set with epoxy, or furan-resin shall be in accordance with the manufacturer's printed instructions.

E. Walls:

1. In showers or other wet areas cover studs with polyethylene sheet.

SPEC WRITER NOTES:

1. Where full height tile walls or tile wainscots are required on new metal lath surfaces, specify scratch and leveling coats applied as specified below.
2. Coordinate with Paragraph 1.2, and with specification Section 09 23 00, GYPSUM PLASTERING and 09 24 00, PORTLAND CEMENT PLASTERING for metal lath installation with this section for tile set in Portland cement, scratch and leveling coat on metal lath.
3. Use of Cementitious Backer unit is preferred in showers or other wet areas.

F. Existing Floors and Walls:

SPEC WRITER NOTES: Use paragraph F when alterations occur in existing work and removal of existing finish flooring and walls occurs.
1. Remove all foreign material from slab intended for tiling. Prepare surface by grinding, chipping, self-contained power blast cleaning or other suitable mechanical methods to completely expose uncontaminated concrete or masonry surfaces. Follow safety requirements of ANSI A10.20.

SPEC WRITER NOTES: See "Handbook for Ceramic Tile Installation". Details for plumbing items, expansion joints, and where waterproof membranes occur.

3.4 CEMENTITIOUS BACKER UNITS
A. Remove polyethylene wrapping from cementitious backer units and separate to allow for air circulation. Allow moisture content of backer units to dry down to a maximum of 35 percent before applying joint treatment and tile.
B. Install in accordance with ANSI A108.1 except as specified otherwise.

3.5 GLASS MAT WATER-RESISTANT GYPSUM BACKER BOARD
A. Install in accordance with manufacturer’s instructions. TCA Systems W245-01.

3.6 MARBLE
A. Secure thresholds and stools in position with minimum of two stainless steel dowels.
B. Set in dry-set Portland cement mortar or latex-Portland cement mortar bond coat.

3.7 METAL DIVIDER STRIPS
A. Install metal divider strips in floor joints between ceramic and quarry tile floors and between tile floors and adjacent flooring of other materials where the finish floors are flush unless shown otherwise.
B. Set divider strip in mortar bed to line and level centered under doors or in openings.

//C. At preformed sealant joint: Refer to Section 07 95 13, EXPANSION JOINT COVER ASSEMBLIES.

3.8 CERAMIC TILE - GENERAL
A. Comply with ANSI A108 series of tile installation standards in "Specifications for Installation of Ceramic Tile" applicable to methods of installation.
B. Comply with TCA Installation Guidelines:

SPEC WRITER NOTES:
1. Modify and edit setting bed materials to suit job conditions.

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2. For new work set floor tile on mortar bed minimum thickness of 32 mm (1-1/4 inches), increased to provide positive slopes to drains.
3. Use with reinforcing over cleavage or waterproof membranes.
4. Tile in depressed slab areas may also be set in epoxy or furan mortar, dry-set or latex-Portland cement mortar over "set-up" mortar fills.
5. 75 mm (3 inches) depressed floor slabs are required for floor mortar beds.
6. For existing areas where floors can not be cut for depressed mortar beds and a waterproof membrane is required, consider an elastomeric bond coat over an elastic membrane with waterproof isolation membrane system option.
7. Note requirement for drying period (14 to over 60 days) for latex-Portland cement mortar setting beds. Latex (except acrylic) will re-emulsify if exposed to water when not thoroughly dry. Do not use latex-Portland cement in water pools.
8. Coordinate to show on drawing, details of each different method of setting at wall, cap strip and base. Show details and extent of expansion joints, waterproofing, and location of areas to be sloped and differences in elevation of floors, top of drains, curbs, and similar features.
9. Clearly define, or show on drawings, where each different setting method is to be used if not clearly defined in Section 09 06 00, SCHEDULE FOR FINISHES finish schedule remarks.
10. For design of various systems see Tile Council of America Inc., "Handbook for Ceramic Tile Installation."
11. Thin-set tile can only follow slope of sub-floor or contour of walls as only a minimum amount of adjustment can be made.
12. Do not install building expansion joints in ceramic tile floors over water-proof membranes.

C. Installing Mortar Beds for Floors:
1. Install mortar bed to not damage cleavage or waterproof membrane; 32 mm (1-1/2 inch) minimum thickness.
2. Install floor mortar bed reinforcing centered in mortar fill.
3. Screed finish to level plane or slope to drains where shown, float finish.
4. For thin set systems cure mortar bed not less than seven days. Do not use curing compounds or coatings.
5. For tile set with Portland cement paste over plastic mortar bed coordinate to set tile before mortar bed sets.

D. Setting Beds or Bond Coats:
1. Where recessed or depressed floor slabs are filled with Portland cement mortar bed, set ceramic mosaic floor tile in either Portland cement paste over plastic mortar bed or latex-Portland cement mortar over cured mortar bed except as specified otherwise, ANSI A108-1C, TCA System F121-02 or F111-02.

SPEC WRITER NOTES:
1. List or specify locations where elastomeric bond coat systems occurs by room number and name and coordinate with specification Section 09 06 00, SCHEDULE FOR FINISHES.
2. Use only for existing buildings where a depressed slab cannot be installed and a curb is not acceptable.
3. Insure details show and identify these system including joints with adjacent materials.
4. Do not use in new buildings.

2. Set floor tile in elastomeric bond coat over elastomeric membrane ANSI 108. 13, TCA System F122 // where scheduled, // in following spaces, // and where shown. //
   a.
   b.
   c.

3. Set wall tile installed over concrete backer board in latex-Portland cement mortar, ANSI A108.1B.
4. Set trim shapes in same material specified for setting adjoining tile.

E. Workmanship:
1. Comply with all ANSI 108, 118, 136, and 137 requirements.
2. Joints:
   a. Keep all joints in line, straight, level, perpendicular and of even width unless shown otherwise.
   b. Make joints 2 mm (1/16 inch) wide for glazed wall tile and mosaic tile work.
   c. Make joints in quarry tile work not less than 6 mm (1/4 inch) nor more than 9 mm (3/8 inch) wide. Finish joints flush with surface of tile.
   d. Make joints in Paver tile, porcelain type; maximum 3 mm (1/8 inch) wide.
3. Back Buttering: For installations indicated below, 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:
   a. Tile wall installations in wet areas.
   b. Tile wall installations composed of tiles 200 by 200 mm (8 by 8 inches or larger).

3.9 CERAMIC TILE INSTALLED WITH PORTLAND CEMENT MORTAR

   SPEC WRITER NOTES:
   1. Slope mortar fill to floor drains.
   2. Mortar bed thickness should be the same thickness throughout where no drain occur.
   3. Mortar and other requirements for shower receptors are specified in ANSI A108.1. Coordinate with details shown.
   4. Clearly detail fills for minimum and maximum thickness required by slopes.

   A. Mortar Mixes for Floor, Wall And Base Tile (including Showers, and Therapeutic Pools): ANSI A108.1 except specified otherwise.
   B. Installing Wall and Base Tile: ANSI A108.1, except specified otherwise.
   C. Installing Floor Tile: ANSI A108.1, except as specified otherwise. Slope mortar beds to floor drains a minimum of 1 in 100 (1/8 inch per foot).

3.10 PORCELAIN TILE INSTALLED WITH LATEX PORTLAND CEMENT BONDING MORTAR

Due to the denseness of porcelain tile use Portland cement bonding mortar that meets their requirements of ANSI A108.1. Bonding mortars shall be mixed in accordance with manufacturer’s instructions. Improper liquid ratios and dwell time before placement of bonding mortar and tile shall affect bond.

3.11 THIN SET CERAMIC TILE INSTALLED WITH DRY-SET PORTLAND CEMENT AND LATEX-PORTLAND CEMENT MORTAR

   A. Installation of Tile: ANSI A108.1, except as specified otherwise.
   B. Slope tile work to drains not less than 1 in 100 (1/8 inch per foot).

3.12 THIN SET CERAMIC TILE INSTALLED WITH CHEMICAL-RESISTANT BOND COAT

   A. Epoxy Resin Type: Install tile in accordance with Installation of Tile with Epoxy Mortar; ANSI A108.1.
   B. Furan Resin Type: Proportion, mix and place in accordance with the manufacturer's printed instructions. Set tile in accordance with ANSI A108.1.

   SPEC WRITER NOTES:
   Use 3.13 and 3.14 only for existing slabs where depressed floor slab is not possible.

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3.13 GROUTING
A. Grout Type and Location: Refer 09 06 00 Schedule of Finishes
B. Workmanship:
   1. Install and cure grout in accordance with the applicable standard.

SPEC WRITER NOTES: Sealant installed at paragraph 3.15 joints only. This work is not to be confused with joint sealing of grouted joints.

3.14 MOVEMENT JOINTS
A. Prepare tile expansion, isolation, construction and contraction joints for installation of sealant. Refer to Section 07 92 00, JOINT SEALANTS.
B. TCA details EJ 171-02.

3.15 CLEANING
A. Thoroughly sponge and wash tile. Polish glazed surfaces with clean dry cloths.
B. Methods and materials used shall not damage or impair appearance of tile surfaces.
C. The use of acid or acid cleaners on glazed tile surfaces is prohibited.
D. Clean tile grouted with epoxy, furan and commercial Portland cement grout and tile set in elastomeric bond coat as recommended by the manufacturer of the grout and bond coat.

3.16 PROTECTION
A. Keep traffic off tile floor, until grout and setting material is firmly set and cured.
B. Where traffic occurs over tile floor, cover tile floor with not less than 9 mm (3/8 inch) thick plywood, wood particle board, or hardboard securely taped in place. Do not remove protective cover until time for final inspection. Clean tile of any tape, adhesive and stains.

3.17 TESTING FINISH FLOOR
A. Test floors in accordance with ASTM C627 to show compliance with codes 1 through 10.