

**SECTION 09 30 13
CERAMIC/PORCELAIN TILING**

PART 1 - GENERAL**1.1 DESCRIPTION**

This section specifies ceramic, porcelain.

1.2 RELATED WORK

- 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: Refer to Finish Legend for Basis of Design products
- C. 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.

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. Mosaic floor tile panels, 12 inches by 12 inche), each type, color, size and pattern.
 - 3. Porcelain tile, each type, color, patterns and size.
 - 4. Wall (or wainscot) tile, each color, size and pattern.
 - 5. 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.
 - 4. Divider strip.
 - 5. Elastomeric membrane and bond coat.
 - 6. Reinforcing tape.
 - 7. Leveling compound.
 - 8. Latex-Portland cement mortar and grout.
 - 9. Waterproofing isolation membrane.
 - 10. Fasteners.

D. Certification:

1. Master grade, ANSI A137.1.
2. Manufacturer's certificates indicating that the following materials comply with specification requirements:
 - a. Chemical resistant mortar and grout (epoxy and furan).
 - b. Cementitious backer unit.
 - c. Elastomeric membrane and bond coat.
 - d. Latex-Portland cement mortar and grout.
 - e. Leveling compound.
 - f. Waterproof isolation membrane.
 - g. Factory mounted tile suitability for application in wet area specified under 2.1, A, 3 with list of successful in-service performance locations.

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.

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):
 - A10.20-05.....Safety Requirements for Ceramic Tile, Terrazzo, and Marble Works
 - A108.1A-05.....Installation of Ceramic Tile in the Wet-Set Method with Portland Cement Mortar
 - A108.1B-05.....Installation of Ceramic Tile on a Cured Portland Cement Mortar Setting Bed with dry-Set or latex-Portland Cement Mortar
 - A108.1C-05.....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
 - A108.4-05.....Installation of Ceramic Tile with Organic Adhesives or Water Cleanable Tile Setting Epoxy Adhesives

- A108.5-05.....Installation of Ceramic Tile with Dry-Set
Portland Cement Mortar or Latex-Portland Cement
Mortar
- A108.6-05.....Installation of Ceramic Tile with Chemical
Resistant, Water Cleanable Tile-Setting and
Grouting Epoxy
- A108.8-05.....Installation of Ceramic Tile with Chemical
Resistant Furan Resin Mortar and Grout
- A108.10-05.....Installation of Grout in Tilework
- A108.11-05.....Interior Installation of Cementitious Backer
Units
- A108.13-05.....Installation of Load Bearing, Bonded,
Waterproof Membranes for Thin-Set Ceramic Tile
and Dimension Stone
- A118.1-05.....Dry-Set Portland Cement Mortar
- A118.3-05.....Chemical Resistant, Water Cleanable Tile-
Setting Epoxy and Water Cleanable Tile-Setting
and Grouting Epoxy Adhesive
- A118.4-05.....Latex-Portland Cement Mortar
- A118.5-05.....Chemical Resistant Furan Mortars and Grouts for
Tile Installation
- A118.6-05.....Standard Cement Grouts for Tile Installation
- A118.9-05.....Cementitious Backer Units
- A118.10-05.....Load Bearing, Bonded, Waterproof Membranes for
Thin-Set Ceramic Tile and Dimension Stone
Installation
- A136.1-05.....Organic Adhesives for Installation of Ceramic
Tile
- A137.1-88.....Ceramic Tile
- C. American Society For Testing And Materials (ASTM):
- A185-07.....Steel Welded Wire Fabric, Plain, for Concrete
Reinforcing
- C109/C109M-07.....Standard Test Method for Compressive Strength
of Hydraulic Cement Mortars (Using 2 inch. or
[50-mm] Cube Specimens)
- C241-90 (R2005).....Abrasion Resistance of Stone Subjected to Foot
Traffic

C348-02.....Standard Test Method for Flexural Strength of
Hydraulic-Cement Mortars

C627-93(R2007).....Evaluating Ceramic Floor Tile Installation
Systems Using the Robinson-Type Floor Tester

C954-07.....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

C979-05.....Pigments for Integrally Colored Concrete

C1002-07.....Steel Self-Piercing Tapping Screws for the
Application of Panel Products

C1027-99(R2004).....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

C1127-01.....Standard Guide for Use of High Solids Content,
Cold Liquid-Applied Elastomeric Waterproofing
Membrane with an Integral Wearing Surface

C1178/C1178M-06.....Standard Specification for Coated Glass Mat
Water-Resistant Gypsum Backing Panel

D4397-02.....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

D. Marble Institute of America (MIA): Design Manual III-2007

E. Tile Council of America, Inc. (TCA):
2007.....Handbook for Ceramic Tile Installation

PART 2 - PRODUCTS

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.

- b. Class V, 12000 revolutions for floors in Corridors, Kitchens, Storage including Refrigerated Rooms
- c. Class IV, 6000 revolutions for remaining areas.
- 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.
 - 2) Not less than 0.8 on ramps for wet and dry conditions.
 - 3) Not less than 0.6, except 0.8 on ramps as stated above, for wet and dry conditions for other areas.
 - b. Tile Having Abrasive Grains:
 - 1. Unglazed Ceramic Mosaic Tile: Abrasive grains throughout body of the tile.
 - c. Porcelain Paver Tile: Matte surface finish with raised ridges spaced uniformly over tile surface.
- 4. Mosaic tile may be mounted or joined together by a resinous bonding material along tile edges.
- 5. Do not use back mounted tiles in showers unless certified by manufacturer as noted in paragraph 1.3.D.
- 6. 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.
- 7. 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 latex modified mortars.
- B. Unglazed Ceramic Mosaic Tile: Nominal 6 mm (1/4 inch) thick with cushion edges.
- C. Glazed Wall Tile: Cushion edges, glazing, as specified in Section 09 06 00, SCHEDULE FOR FINISHES.
- D. Porcelain Paver Tile: Nominal dimension as noted in Finish schedule (5/16 inch) thick. 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.

F. Trim Shapes:

1. Conform to applicable requirements of adjoining floor and wall tile.
2. Use slip resistant trim shapes for horizontal surfaces of showers, shower curbs, drying area curbs, and seats.
3. Use trim shapes sizes conforming to size of adjoining field wall tile including existing spaces unless detailed or specified otherwise in Section 09 06 00, SCHEDULE FOR FINISHES.
4. Internal and External Corners:
 - a. Square internal and external corner joints are not acceptable.
 - b. External corners including edges: Use bullnose shapes.
 - c. Internal corners: Use cove shapes.
 - d. Base to floor internal corners: Use special shapes providing integral cove vertical and horizontal joint.
 - e. Base to floor external corners: Use special shapes providing bullnose vertical edge with integral cove horizontal joint. Use stop at bottom of openings having bullnose return to wall.
 - f. Wall top edge internal corners: Use special shapes providing integral cove vertical joint with bullnose top edge.
 - g. Wall top edge external corners: Use special shapes providing bullnose vertical and horizontal joint edge.
 - h. For unglazed ceramic mosaic and glazed wall tile installed in latex-Portland cement mortar (thin set method), use cove and surface bullnose shapes as applicable.
 - i. Provide cove and bullnose shapes for countertops, where shown, and required to complete tile work.

2.2 CEMENTITIOUS BACKER UNITS

- A. Use in showers or wet areas.
- B. ANSI A118.9.
- C. Use Cementitious backer units in maximum available lengths.
- D. Backer unit meet or exceed the following additional physical properties:

<u>Property</u>	<u>Test Method</u>	<u>Value</u>
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<u>Property</u>	<u>Test Method</u>	<u>Value</u>
Water absorption	ASTM C948	Less than 20 percent by weight

2.3 JOINT MATERIALS FOR CEMENTITIOUS BACKER UNITS

- A. 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.
- B. Tape Embedding Material: Latex-Portland cement mortar complying with ANSI A118.4.
- C. Joint material, including reinforcing tape, and tape embedding material, shall be as specifically recommended by the backer unit manufacturer.

2.4 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.

2.5 GLASS MAT WATER RESISTANT GYPSUM BACKER BOARD

Confirm to ASTM C1178/C1178M, Optional System for Cementitious Backer Units.

2.6 SETTING MATERIALS OR BOND COATS

- A. Conform to TCA Handbook for Ceramic Tile Installation.
- B. Latex-Portland Cement Mortar: ANSI A118.4.
 - 1. For wall applications, provide non-sagging, latex-Portland cement mortar complying with ANSI A118.4.
- C. Chemical-Resistant Bond Coat:
 - 1. Epoxy Resin Type: ANSI A118.3.
- D. Elastomeric Waterproofing Membrane and Bond Coat:
 - 1. TCA F122-02.
 - 2. ANSI A118.10.
 - 3. One component polyurethane, liquid applied material having the following additional physical properties:
 - a. Hardness: Shore "A" between 40-60.
 - b. Elongation: Between 300-600 percent.
 - c. Tensile strength: Between 40-60 psig.

- d. No volatile compounds.
4. Coal tar modified urethanes are not acceptable.
- E. Waterproofing Isolation Membrane:
1. Sheet System TCA F122-02.
 2. Optional System to elastomeric waterproof membrane.
 3. Composite sheet consisting of ASTM D5109, Type II, Grade I Chlorinated Polyethylene (CM) sheet reinforced on both sides with a non-woven polyester fiber.
 4. Designed for use in wet areas as an isolation and positive waterproofing membranes for thin-set bonding of sheet to substrate and thin-set bonding of ceramic and porcelain tile or marble to sheet. Suited for both horizontal and vertical applications.
 5. Conform to the following additional physical properties:

Property	Units	Results	Test Method
Hardness Shore A	Points	70-80	ASTM D2240 (10 Second Reading)
Shrinkage	Percent	5 maximum	ASTM D1204
Brittleness		No crack remains flexible at temperature-37 degrees C (-25 degrees F)	ASTM D2497 13 mm (1/2- inch) Mandrel Bend
Retention of Properties after Heat Aging	Percent of original	80 Tensile 80 Breaking 80 Elongation	ASTM D3045, 90 degrees C (194 degrees F) for 168 hours

6. Manufacturer's standard sheet size with prefabricated or preformed inside and outside corners.
7. Sheet manufacturer's solvent welding liquid or xylene and edge sealant.

2.7 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.
 4. Use is required in Latex-Portland Cement Grout.

- B. Latex-Portland Cement Grout **to be used in Wall Installations:** ANSI A118.6 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.
- C. Chemical-Resistant Grout **to be used in all Floor Installations:**
 - 1. Epoxy grout, ANSI A118.3.

2.8 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.
- B. Shall have minimum following physical properties:
 - 1. Compressive strength - 25 MPa (3500 psig) per ASTM C109/C109M.
 - 2. Flexural strength - 7 MPa (1000 psig) per ASTM C348 (28 day value).
 - 3. Tensile strength - 600 psi per ANSI 118.7.
 - 4. Density - 1.9.
- C. Capable of being applied in layers up to 38 mm (1-1/2 inches) thick without fillers and up to 100 mm (four inches) thick with fillers, being brought to a feather edge, and being trowelled to a smooth finish.
- D. Primers, fillers, and reinforcement as required by manufacturer for application and substrate condition.
- E. Ready for use in 48 hours after application.

2.10 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.

2.11 WATER

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

2.12 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.

2.13 FLOOR MORTAR BED REINFORCING

ASTM A185 welded wire fabric without backing, MW3 x MW3 (2 x 2-W0.5 x W0.5).

2.14 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 ambient temperature of work areas at not less than 16 degree C (60 degrees F), without interruption, for not less than 24 hours before installation and not less than three days after installation.

B. Maintain higher temperatures for a longer period of time where required by manufacturer's recommendation and ANSI Specifications for installation.

C. Do not install tile when the temperature is above 38 degrees C (100 degrees F).

D. Do not install materials when the temperature of the substrate is below 16 degrees C (60 degrees F).

E. Do not allow temperature to fall below 10 degrees C (50 degrees F) after fourth day of completion of tile work.

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

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. Cleavage Membrane:

1. Install polythene sheet as cleavage membrane in depressed slab when waterproof membrane is not scheduled or indicated.
2. Turn up at edge of depressed floor slab to top of floor.

F. Walls:

1. In showers or other wet areas cover studs with polyethylene sheet.
2. Apply patching and leveling compound to concrete and masonry surfaces that are out of required plane.
3. 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.
4. Apply metal lath to framing in accordance with ANSI A108.1:
 - a. Use fasteners specified in paragraph "Fasteners." Use washers when lath opening is larger than screw head.
 - b. Apply scratch and leveling coats to metal lath in accordance with ANSI A108.1.C.
 - c. Total thickness of scratch and leveling coats:
 - 1) Apply 9 mm to 16 mm (3/8 inch to 5/8 inch) thick over solid backing.
 - 2) 16 mm to 19 mm (5/8 to 3/4 inch) thick on metal lath over studs.
 - 3) Where wainscots are required to finish flush with wall surface above, adjust thickness required for flush finish.
 - d. Apply scratch and leveling coats more than 19 mm (3/4 inch) thick in two coats.

G. Existing Floors and Walls:

1. Remove existing composition floor finishes and adhesive. 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.
2. Remove existing concrete fill or topping to structural slab. Clean and level the substrate for new setting bed and waterproof membrane or cleavage membrane.

3. Where new tile bases are required to finish flush with plaster above or where they are extensions of similar bases in conjunction with existing floor tiles cut channel in floor slab and expose rough wall construction sufficiently to accommodate new tile base and setting material.

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 A108.11 except as specified otherwise.
- C. Install units horizontally or vertically to minimize joints with end joints over framing members. Units with rounded edges; face rounded edge away from studs to form a V joint for joint treatment.
- D. Secure cementitious backer units to each framing member with screws spaced not more than 200 mm (eight inches) on center and not closer than 13 mm (1/2 inch) from the edge of the backer unit or as recommended by backer unit manufacturer. Install screws so that the screw heads are flush with the surface of the backer unit.
- E. Where backer unit joins shower pans or waterproofing, lap backer unit over turned up waterproof system. Install fasteners only through top one-inch of turned up waterproof systems.
- F. Do not install joint treatment for seven days after installation of cementitious backer unit.
- G. Joint Treatment:
 1. Fill horizontal and vertical joints and corners with latex-Portland cement mortar. Apply fiberglass tape over joints and corners and embed with same mortar.
 2. Leave 6 mm (1/4 inch) space for sealant at lips of tubs, sinks, or other plumbing receptors.

3.5 GLASS MAT WATER-RESISTANT GYPSUM BACKER BOARD

- A. Install in accordance with manufacturer's instructions. TCA Systems W245-01.
- B. Treat joints with tape and latex-Portland cement mortar or adhesive.

3.6 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.
 - 1. Comply with recommendations in TCA "Handbook for Ceramic Tile Installation" Vertical and Horizontal Joint Design Essentials. TCA System EJ 171-02.
 - a. Locate joint in tile surfaces directly above joint in sub-floor or where indicated when used with isolation membranes to allow off-setting of joint location from sub-floor joint.
 - b. Fasten full length to sub-floor using a construction adhesive.
 - c. Trowel setting material with full coverage over the entire leg.
 - 2. Set tile up against the joint ensuring that the top edge of the joint is flush or slightly below the top of the tile.

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:
- 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.

6. Set wall tile installed over concrete backer board in latex-Portland cement mortar, ANSI A108.1B.
7. Set wall tile installed over Portland cement mortar bed on metal lath base in Portland cement paste over plastic mortar bed, or dry-set Portland cement mortar or latex-Portland cement mortar over a cured mortar bed, ANSI A108.1C, TCA System W231-02, W241-02.
10. Set trim shapes in same material specified for setting adjoining tile.

E. Workmanship:

1. Lay out tile work so that no tile less than one-half full size is used. Make all cuts on the outer edge of the field. Align new tile work scheduled for existing spaces to the existing tile work unless specified otherwise.
2. Set tile firmly in place with finish surfaces in true planes. Align tile flush with adjacent tile unless shown otherwise.
3. Form intersections and returns accurately.
4. Cut and drill tile neatly without marring surface.
5. Cut edges of tile abutting penetrations, finish, or built-in items:
 - a. Fit tile closely around electrical outlets, piping, fixtures and fittings, so that plates, escutcheons, collars and flanges will overlap cut edge of tile.
 - b. Seal tile joints water tight as specified in Section 07 92 00, JOINT SEALANTS, around electrical outlets, piping fixtures and fittings before cover plates and escutcheons are set in place.
6. Completed work shall be free from hollow sounding areas and loose, cracked or defective tile.
7. Remove and reset tiles that are out of plane or misaligned.
8. Floors:
 - a. Extend floor tile beneath casework and equipment, except those units mounted in wall recesses.
 - b. Align finish surface of new tile work flush with other and existing adjoining floor finish where shown.
 - c. In areas where floor drains occur, slope to drains where shown.
 - d. Shove and vibrate tiles over 200 mm (8 inches) square to achieve full support of bond coat.

9. Walls:

- a. Cover walls and partitions, including pilasters, furred areas, and freestanding columns from floor to ceiling, or from floor to nominal wainscot heights shown with tile.
- b. Finish reveals of openings with tile, except where other finish materials are shown or specified.
- c. At window openings, provide tile stools and reveals, except where other finish materials are shown or specified.
- d. Finish wall surfaces behind and at sides of casework and equipment, except those units mounted in wall recesses, with same tile as scheduled for room proper.

10. 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.
- d. Make joints in Paver tile, porcelain type; maximum 3 mm (1/8 inch) wide.

11. 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, including showers, tub enclosures, laundries and swimming pools.
- b. Tile installed with chemical-resistant mortars and grouts.
- c. Tile wall installations composed of tiles 200 by 200 mm (8 by 8 inches or larger).
- d. Exterior tile wall installations.

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

- A. Installation of Tile: ANSI A108.5, except as specified otherwise.
- B. Slope tile work to drains not less than 1 in 100 (1/8 inch per foot).

3.15 GROUTING

A. Grout Type and Location:

- 1. Grout for glazed wall and base tile, paver tile and unglazed mosaic tile latex-Portland cement grout

B. Workmanship:

1. Install and cure grout in accordance with the applicable standard.
2. Latex **Portland Cement grout sanded and un-sanded at wall installation:** ANSI A108.10.
3. **Epoxy Grout at all Floor installations:** ANSI A108.6.

3.16 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.
- C. At expansion joints, rake out joint full depth of tile and setting bed and mortar bed. Do not cut waterproof or isolation membrane.
- D. Rake out grout at joints between tile, , service sink, at toe of base, and where shown not less than 6 mm (1/4 inch) deep.

3.17 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.

3.18 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.

3.19 TESTING FINISH FLOOR

- A. Test floors in accordance with ASTM C627 to show compliance with codes 1 through 10.

- - - E N D - - -