

SECTION 09 3013 - CERAMIC TILING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Ceramic mosaic tile.
2. Quarry tile.
3. Pressed floor tile.
4. Porcelain tile.
5. Glazed wall tile.
6. Glass Tile.
7. Stone thresholds.
8. Tile backing panels.
9. Waterproof membrane for thinset applications.
10. Crack isolation membrane.

B. Related Requirements:

1. Section 03 3000 "Cast-in-Place Concrete" for concrete floor slabs.
2. Section 04 4200 "Unit Masonry" for concrete block walls.
3. Section 079200 "Joint Sealants" for sealing of expansion, contraction, control, and isolation joints in tile surfaces.
4. Section 09 2900 "Gypsum Board" for gypsum board walls.
5. Section 10 2113 "HDPE Toilet Partitions"
6. Section 10 28000 "Toilet Accessories"

1.3 DEFINITIONS

- A. General: Definitions in the ANSI A108 series of tile installation standards and in ANSI A137.1 apply to Work of this Section unless otherwise specified.
- B. ANSI A108 Series: ANSI A108.01, ANSI A108.02, ANSI A108.1A, ANSI A108.1B, ANSI A108.1C, ANSI A108.4, ANSI A108.5, ANSI A108.6, ANSI A108.8, ANSI A108.9, ANSI A108.10, ANSI A108.11, ANSI A108.12, ANSI A108.13, ANSI A108.14, ANSI A108.15, ANSI A108.16, and ANSI A108.17, which are contained in its "Specifications for Installation of Ceramic Tile."
- C. Module Size: Actual tile size plus joint width indicated.
- D. Face Size: Actual tile size, excluding spacer lugs.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. LEED Submittals:
 - 1. Product Data for Credit IEQ 4.1: For adhesives, documentation including printed statement of VOC content.
 - 2. Product Data for Credit IEQ 4.3: For grout sealers, documentation indicating that products comply with requirements of FloorScore certification.
- C. Shop Drawings: Show locations of each type of tile and tile pattern. Show widths, details, and locations of expansion, contraction, control, and isolation joints in tile substrates and finished tile surfaces.
- D. Samples for Initial Selection: For tile, grout, and accessories involving color selection.
- E. Samples for Verification:
 - 1. Full-size units of each type and composition of tile and for each color and finish required. For ceramic mosaic tile in color blend patterns, provide full sheets of each color blend.
 - 2. Full-size units of each type of trim and accessory for each color and finish required.
 - 3. Stone thresholds in 6-inch (150-mm) lengths.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Master Grade Certificates: For each shipment, type, and composition of tile, signed by tile manufacturer and Installer.
- C. Product Certificates: For each type of product.
- D. Product Test Reports: For tile-setting and -grouting products and certified porcelain tile.

1.6 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match and are from same production runs as products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Tile and Trim Units: Furnish quantity of full-size units equal to 3 percent of amount installed for each type, composition, color, pattern, and size indicated.
 - 2. Grout: Furnish quantity of grout equal to 3 percent of amount installed for each type, composition, and color indicated.

1.7 QUALITY ASSURANCE

- A. Comply with the most current edition of the Northwestern University Design Standards.
- B. Installer Qualifications:

1. Installer is a five-star member of the National Tile Contractors Association or a Trowel of Excellence member of the Tile Contractors' Association of America.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use. Comply with requirements in ANSI A137.1 for labeling tile packages.
- B. Store tile and cementitious materials on elevated platforms, under cover, and in a dry location.
- C. Store aggregates where grading and other required characteristics can be maintained and contamination can be avoided.
- D. Store liquid materials in unopened containers and protected from freezing.

1.9 FIELD CONDITIONS

- A. Environmental Limitations: Do not install tile until construction in spaces is complete and ambient temperature and humidity conditions are maintained at the levels indicated in referenced standards and manufacturer's written instructions.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations for Tile: Obtain tile of each type from single source or producer.
 1. Obtain tile of each type and color or finish from same production run and of consistent quality in appearance and physical properties for each contiguous area.
- B. Source Limitations for Setting and Grouting Materials: Obtain ingredients of a uniform quality for each mortar, adhesive, and grout component from single manufacturer and each aggregate from single source or producer.
 1. Obtain setting and grouting materials, except for unmodified Portland cement and aggregate, from single manufacturer.
 2. Obtain waterproof membrane and crack isolation membrane, except for sheet products, from manufacturer of setting and grouting materials.
- C. Source Limitations for Other Products: Obtain each of the following products specified in this Section from a single manufacturer:
 1. Stone thresholds.
 2. Waterproof membrane.
 3. Crack isolation membrane.
 4. Cementitious backer units.

2.2 PRODUCTS, GENERAL

- A. ANSI Ceramic Tile Standard: Provide tile that complies with ANSI A137.1 for types, compositions, and other characteristics indicated.
- B. ANSI Standards for Tile Installation Materials: Provide materials complying with ANSI A108.02, ANSI standards referenced in other Part 2 articles, ANSI standards referenced by TCNA installation methods specified in tile installation schedules, and other requirements specified.
- C. Factory Blending: For tile exhibiting color variations within ranges, blend tile in factory and package so tile units taken from one package show same range in colors as those taken from other packages and match approved Samples.
- D. Mounting: For factory-mounted tile, provide back- or edge-mounted tile assemblies as standard with manufacturer unless otherwise indicated.
 1. Where tile is indicated for installation on exteriors or in wet areas, do not use back- or edge-mounted tile assemblies unless tile manufacturer specifies in writing that this type of mounting is suitable for installation indicated and has a record of successful in-service performance.

2.3 TILE PRODUCTS

- A. Ceramic Tile Type: Factory-mounted [**unglazed**] [**glazed**] ceramic mosaic tile.
 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. American Olean; a division of Dal-Tile Corporation.
 - b. Crossville, Inc.
 - c. Daltile.
 2. Composition: [**Porcelain**] [**Impervious natural clay or porcelain**] [**Vitreous or impervious natural clay or porcelain**].
 3. Certification: Porcelain tile certified by the Porcelain Tile Certification Agency.
 4. Module Size: <**Insert dimensions**>.
 5. Thickness: 1/4 inch (6.4 mm).
 6. Face: [**Plain**] [**Pattern of design indicated,**] with cushion edges.
 7. Surface: [**Smooth, without**] [**Slip resistant, with**] abrasive admixture.
 8. Dynamic Coefficient of Friction: Not less than 0.42.
 9. Finish: <**Insert description**> glaze.
 10. Tile Color and Pattern: <**Insert color and pattern**>.
 11. Grout Color: <**Insert color**>.
 12. Trim Units: Coordinated with sizes and coursing of adjoining flat tile where applicable and matching characteristics of adjoining flat tile. Provide shapes as follows, selected from manufacturer's standard shapes:
 - a. Base Cove: Cove, module size <**Insert dimensions**>.
 - b. Base Cap for Portland Cement Mortar Installations: Bead (bullnose), module size <**Insert dimensions**>.
 - c. Base Cap for Thinset Mortar Installations: Surface bullnose, module size Insert dimensions.

- d. Wainscot Cap for Portland Cement Mortar Installations: Bead (bullnose), module size **<Insert dimensions>**.
- e. Wainscot Cap for Thinset Mortar Installations: Surface bullnose, module size **<Insert dimensions>**.
- f. Wainscot Cap for Flush Conditions: Regular flat tile for conditions where tile wainscot is shown flush with wall surface above it, same size as adjoining flat tile.
- g. External Corners for Portland Cement Mortar Installations: Bead (bullnose), module size **<Insert dimensions>**.
- h. External Corners for Thinset Mortar Installations: Surface bullnose, module size **<Insert dimensions>**.
- i. Internal Corners: Cove, module size **<Insert dimensions>**.
- j. Internal Corners: Field-buttet square corners. For coved base and cap, use angle pieces designed to fit with stretcher shapes.

B. Ceramic Tile Type: [**Unglazed**] [**Glazed**] square-edged quarry tile.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. American Olean; a division of Dal-Tile Corporation.
 - b. Daltile.
 - c. Florida Brick & Clay Company Inc.
 - d. Quarry Tile Co.
 - e. Summitville Tiles, Inc.
2. Face Size: **<Insert dimensions>**.
3. Thickness: **[3/8 inch (9.5 mm)] [1/2 inch (12.7 mm)] [3/4 inch (19 mm)]**.
4. Wearing Surface: **[Nonabrasive, smooth] [Abrasive aggregate embedded in surface]**.
5. Dynamic Coefficient of Friction: Not less than 0.42.
6. Finish: **<Insert description>** glaze.
7. Tile Color and Pattern: **<Insert color and pattern>**.
8. Grout Color: **<Insert color>**.
9. Trim Units: Coordinated with sizes and coursing of adjoining flat tile where applicable and matching characteristics of adjoining flat tile. Provide shapes as follows, selected from manufacturer's standard shapes:
 - a. Base: Coved with surface bullnose top edge, face size **<Insert dimensions>**.
 - b. Wainscot Cap: Surface bullnose, face size **<Insert dimensions>**.
 - c. Wainscot Cap for Flush Conditions: Regular flat tile for conditions where tile wainscot is shown flush with wall surface above it, same size as adjoining flat tile.

C. Ceramic Tile Type: [**Unglazed**] [**Glazed**] porcelain tile.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. American Olean; a division of Dal-Tile Corporation.
 - b. Crossville, Inc.
 - c. Daltile.
 - d. Florim USA.
2. Certification: Tile certified by the Porcelain Tile Certification Agency.
3. Face Size: **<Insert dimensions>**.
4. Face Size Variation: Rectified.

5. Thickness: [1/4 inch (6.4 mm)] [3/8 inch (9.5 mm)] [1/2 inch (12.7 mm)].
6. Face: [Plain with square or cushion edges] [Plain with square edges] [Plain with cushion edges] [Polished with square edges] [As indicated].
7. Dynamic Coefficient of Friction: Not less than 0.42.
8. Tile Color, Glaze, and Pattern: <Insert color, glaze, and pattern>.
9. Grout Color: <Insert color>.
10. Trim Units: Coordinated with sizes and coursing of adjoining flat tile where applicable and matching characteristics of adjoining flat tile. Provide shapes as follows, selected from manufacturer's standard shapes:
 - a. Base Cap: Surface bullnose, module size same as adjoining flat tile.
 - b. Wainscot Cap: Surface bullnose, module size same as adjoining flat tile.
 - c. Wainscot Cap for Flush Conditions: Regular flat tile for conditions where tile wainscot is shown flush with wall surface above it, same size as adjoining flat tile.
 - d. External Corners: Surface bullnose, module size same as adjoining flat tile.
 - e. Internal Corners: Field-buttet square corners.

D. Ceramic Tile Type: Glazed wall tile.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. American Marazzi Tile, Inc.
 - b. American Olean; a division of Dal-Tile Corporation.
 - c. Daltile.
2. Module Size: <Insert dimensions>.
3. Face Size Variation: Rectified.
4. Thickness: 5/16 inch (8 mm).
5. Face: [Plain with modified square edges or cushion edges] [Plain with modified square edges] [Plain with cushion edges] [Pattern of design indicated, with manufacturer's standard edges].
6. Finish: [Bright, opaque] [Bright, clear] [Mat, opaque] [Mat, clear] [Semimat, opaque] [Semimat, clear] [Vellum, opaque] [Vellum, clear] [Crystalline] <Insert description> glaze.
7. Tile Color and Pattern: <Insert color and pattern>.
8. Grout Color: <Insert color>.
9. Mounting: Factory, back mounted.
10. Trim Units: Coordinated with sizes and coursing of adjoining flat tile where applicable and matching characteristics of adjoining flat tile. Provide shapes as follows, selected from manufacturer's standard shapes:
 - a. Base for Portland Cement Mortar Installations: Coved, module size <Insert dimensions>.
 - b. Base for Thinset Mortar Installations: Straight, module size <Insert dimensions>.
 - c. Wainscot Cap for Portland Cement Mortar Installations: Bullnose cap, module size <Insert dimensions>.
 - d. Wainscot Cap for Thinset Mortar Installations: Surface bullnose, module size <Insert dimensions>.
 - e. Wainscot Cap for Flush Conditions: Regular flat tile for conditions where tile wainscot is shown flush with wall surface above it, same size as adjoining flat tile.
 - f. External Corners for Portland Cement Mortar Installations: Bullnose shape with radius of at least 3/4 inch (19 mm) unless otherwise indicated.

- g. External Corners for Thinset Mortar Installations: Surface bullnose, same size as adjoining flat tile.
- h. Internal Corners: Field-buttet square corners. For coved base and cap use angle pieces designed to fit with stretcher shapes.

2.4 Glass Tile

A. Glass Tile Type: Large format glass tile, **[cast] [fused] [low temperature]**.

- 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. American Olean; a division of Dal-Tile Corporation.
 - b. Crossville, Inc.
 - c. Florida Tile, Inc.
- 2. Face Size: <Insert dimensions>.
- 3. Sizing Category: **[Standard] [Natural]**.
- 4. Aesthetic Class: **[V0] [V1] [V2] [V3] [V4]**.
- 5. Tile Color and Pattern: [As indicated by manufacturer's designations] [Match Architect's sample] [As selected by Architect from manufacturer's full range] <Insert color and pattern>.
- 6. Grout Color: [As indicated by manufacturer's designations] [Match Architect's sample] [As selected by Architect from manufacturer's full range] <Insert color>.

B. Glass Tile Type: Factory-mounted mosaic glass tile, **[cast] [fused] [low temperature]**.

- 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. American Marazzi Tile, Inc.
 - b. American Olean; a division of Dal-Tile Corporation.
 - c. Crossville, Inc.
 - d. Florida Tile, Inc.
- 2. Module Size: <Insert dimensions>.
- 3. Sizing Category: **[Standard] [Natural]**.
- 4. Aesthetic Class: **[V0] [V1] [V2] [V3] [V4]**.
- 5. Tile Color and Pattern: [As indicated by manufacturer's designations] [Match Architect's sample] [As selected by Architect from manufacturer's full range] <Insert color and pattern>.
- 6. Grout Color: [As indicated by manufacturer's designations] [Match Architect's sample] [As selected by Architect from manufacturer's full range] <Insert color>.

C. Glass Tile Type: Factory-mounted miniature mosaic glass tile, **[cast] [fused] [low temperature]**.

- 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. American Marazzi Tile, Inc.
 - b. American Olean; a division of Dal-Tile Corporation.
 - c. Crossville, Inc.

- d. Daltile.
- e. Florida Tile, Inc.

- 2. Module Size: <Insert dimensions>.
- 3. Sizing Category: [Standard] [Natural].
- 4. Aesthetic Class: [V0] [V1] [V2] [V3] [V4].
- 5. Tile Color and Pattern: [As indicated by manufacturer's designations] [Match Architect's sample] [As selected by Architect from manufacturer's full range] <Insert color and pattern>.
- 6. Grout Color: [As indicated by manufacturer's designations] [Match Architect's sample] [As selected by Architect from manufacturer's full range] <Insert color>.

2.5 THRESHOLDS

- A. General: Fabricate to sizes and profiles indicated or required to provide transition between adjacent floor finishes.
 - 1. Bevel edges at 1:2 slope, with lower edge of bevel aligned with or up to 1/16 inch (1.5 mm) above adjacent floor surface. Finish bevel to match top surface of threshold. Limit height of threshold to 1/2 inch (12.7 mm) or less above adjacent floor surface.
- B. Granite Thresholds: ASTM C 615/C 615M, with [polished] [honed] finish.
 - 1. Description: Uniform, [fine] [medium]-grained, <Insert color> stone without veining.
 - 2. Description: Match Architect's sample.
- C. Marble Thresholds: ASTM C 503/C 503M, with a minimum abrasion resistance of [10] [12] according to ASTM C 1353 or ASTM C 241/C 241M and with honed finish.
 - 1. Description: Uniform, fine- to medium-grained white stone with gray veining.
 - 2. Description: Match Architect's sample.

2.6 TILE BACKING PANELS

- A. Cementitious Backer Units: ANSI A118.9 or ASTM C 1325, Type A, in maximum lengths available to minimize end-to-end butt joints.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. C-Cure.
 - b. Custom Building Products.
 - c. Georgia-Pacific Building Products.
 - 2. Thickness: 5/8 inch (15.9 mm).

2.7 WATERPROOF MEMBRANE

- A. General: Manufacturer's standard product that complies with ANSI A118.10 and is recommended by the manufacturer for the application indicated. Include reinforcement and accessories recommended by manufacturer.

- B. Fabric-Reinforced, Modified-Bituminous Sheet: Self-adhering, SBS-modified-bituminous sheet with fabric reinforcement facing; 0.040-inch (1 -mm) nominal thickness.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Boiardi Products Corporation; a QEP company.

2.8 CRACK ISOLATION MEMBRANE

- A. General: Manufacturer's standard product that complies with ANSI A118.12 for high performance and is recommended by the manufacturer for the application indicated. Include reinforcement and accessories recommended by manufacturer.
- B. Latex-Portland Cement Crack-Resistant Mortar: Flexible mortar consisting of cement-based mix and latex additive.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. ARDEX Americas.
 - b. Boiardi Products Corporation; a QEP company.
 - c. C-Cure.
 - d. MAPEI Corporation.

2.9 SETTING MATERIALS

- A. Portland Cement Mortar (Thickset) Installation Materials: ANSI A108.02.
 - 1. Cleavage Membrane: Asphalt felt, ASTM D 226/D 226M, Type I (No. 15); or polyethylene sheeting, ASTM D 4397, 4.0 mils (0.1 mm) thick.
 - 2. Reinforcing Wire Fabric: Galvanized, welded-wire fabric, 2 by 2 inches (50.8 by 50.8 mm) by 0.062-inch (1.57-mm) diameter; comply with ASTM A 185/A 185M and ASTM A 82/A 82M, except for minimum wire size.
 - 3. Expanded Metal Lath: Diamond-mesh lath complying with ASTM C 847.
 - a. Base Metal and Finish for Interior Applications: Uncoated or zinc-coated (galvanized) steel sheet, with uncoated steel sheet painted after fabrication into lath.
 - b. Base Metal and Finish for Exterior Applications: Zinc-coated (galvanized) steel sheet.
 - c. Configuration over Studs and Furring: Flat.
 - d. Configuration over Solid Surfaces: Self-furring.
 - e. Weight: 2.5 lb/sq. yd. (1.4 kg/sq. m).
- B. Dry-Set Portland Cement Mortar (Thinset): ANSI A118.1.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Boiardi Products Corporation; a QEP company.
 - b. Bonsal American, an Oldcastle company.
 - c. Bostik, Inc.

- d. Laticrete International, Inc.
 - e. MAPEI Corporation.
2. For wall applications, provide mortar that complies with requirements for nonsagging mortar in addition to the other requirements in ANSI A118.1.
- C. Latex-Portland Cement Mortar (Thinset): ANSI A118.4.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Bostik, Inc.
 - b. Custom Building Products.
 - c. Laticrete International, Inc.
 - d. MAPEI Corporation.
 2. Provide prepackaged, dry-mortar mix containing dry, redispersible, vinyl acetate or acrylic additive to which only water must be added at Project site.
 3. For wall applications, provide mortar that complies with requirements for nonsagging mortar in addition to the other requirements in ANSI A118.4.

2.10 GROUT MATERIALS

- A. Sand-Portland Cement Grout: ANSI A108.10, consisting of white or gray cement and white or colored aggregate as required to produce color indicated.
- B. Standard Cement Grout: ANSI A118.6.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Bostik, Inc.
 - b. Laticrete International, Inc.
 - c. MAPEI Corporation.
- C. High-Performance Tile Grout: ANSI A118.7.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Bostik, Inc.
 - b. Laticrete International, Inc.
 - c. MAPEI Corporation.
 2. Polymer Type: Ethylene vinyl acetate or acrylic additive, in dry, redispersible form, prepackaged with other dry ingredients.
- D. Water-Cleanable Epoxy Grout: ANSI A118.3, with a VOC content of 65 g/L or less.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Boiardi Products Corporation; a QEP company.

- b. Bostik, Inc.
- c. Laticrete International, Inc.
- d. MAPEI Corporation.

2.11 MISCELLANEOUS MATERIALS

- A. Trowelable Underlayments and Patching Compounds: Latex-modified, portland cement-based formulation provided or approved by manufacturer of tile-setting materials for installations indicated.
- B. Vapor-Retarder Membrane: Polyethylene sheeting, ASTM D 4397, 4.0 mils (0.1 mm) thick.
- C. Tile Cleaner: A neutral cleaner capable of removing soil and residue without harming tile and grout surfaces, specifically approved for materials and installations indicated by tile and grout manufacturers.
- D. Grout Sealer: Manufacturer's standard product for sealing grout joints and that does not change color or appearance of grout.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Bonsal American, an Oldcastle company.
 - b. Custom Building Products.
 - c. Southern Grouts & Mortars, Inc.
 - 2. Grout sealers shall comply with requirements of FloorScore certification.

2.12 MIXING MORTARS AND GROUT

- A. Mix mortars and grouts to comply with referenced standards and mortar and grout manufacturers' written instructions.
- B. Add materials, water, and additives in accurate proportions.
- C. Obtain and use type of mixing equipment, mixer speeds, mixing containers, mixing time, and other procedures to produce mortars and grouts of uniform quality with optimum performance characteristics for installations indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions where tile will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
 - 1. Verify that substrates for setting tile are firm; dry; clean; free of coatings that are incompatible with tile-setting materials, including curing compounds and other substances that contain soap, wax, oil, or silicone; and comply with flatness tolerances required by ANSI A108.01 for installations indicated.

2. Verify that concrete substrates for tile floors installed with bonded mortar bed or thinset mortar comply with surface finish requirements in ANSI A108.01 for installations indicated.
 - a. Verify that surfaces that received a steel trowel finish have been mechanically scarified.
 - b. Verify that protrusions, bumps, and ridges have been removed by sanding or grinding.
 3. Verify that installation of grounds, anchors, recessed frames, electrical and mechanical units of work, and similar items located in or behind tile has been completed.
 4. Verify that joints and cracks in tile substrates are coordinated with tile joint locations; if not coordinated, adjust joint locations in consultation with Architect.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Fill cracks, holes, and depressions in concrete substrates for tile floors installed with thinset mortar with trowelable leveling and patching compound specifically recommended by tile-setting material manufacturer.
- B. Where indicated, prepare substrates to receive waterproofing by applying a reinforced mortar bed that complies with ANSI A108.1A and is sloped 1/4 inch per foot (1:50) toward drains.
- C. Blending: For tile exhibiting color variations, verify that tile has been factory blended and packaged so tile units taken from one package show same range of colors as those taken from other packages and match approved Samples. If not factory blended, either return to manufacturer or blend tiles at Project site before installing.

3.3 CERAMIC TILE INSTALLATION

- A. Comply with TCNA's "Handbook for Ceramic, Glass, and Stone Tile Installation" for TCNA installation methods specified in tile installation schedules. Comply with parts of the ANSI A108 series "Specifications for Installation of Ceramic Tile" that are referenced in TCNA installation methods, specified in tile installation schedules, and apply to types of setting and grouting materials used.
 1. For the following installations, follow procedures in the ANSI A108 series of tile installation standards for providing 95 percent mortar coverage:
 - a. Exterior tile floors.
 - b. Tile floors in wet areas.
 - c. Tile swimming pool decks.
 - d. Tile floors in laundries.
 - e. Tile floors consisting of tiles 8 by 8 inches (200 by 200 mm) or larger.
 - f. Tile floors consisting of rib-backed tiles.
- B. Extend tile work into recesses and under or behind equipment and fixtures to form complete covering without interruptions unless otherwise indicated. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.

- C. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap tile.
- D. Provide manufacturer's standard trim shapes where necessary to eliminate exposed tile edges.
- E. Where accent tile differs in thickness from field tile, vary setting-bed thickness so that tiles are flush.
- F. Jointing Pattern: Lay tile in grid pattern unless otherwise indicated. Lay out tile work and center tile fields in both directions in each space or on each wall area. Lay out tile work to minimize the use of pieces that are less than half of a tile. Provide uniform joint widths unless otherwise indicated.
1. For tile mounted in sheets, make joints between tile sheets same width as joints within tile sheets so joints between sheets are not apparent in finished work.
 2. Where adjoining tiles on floor, base, walls, or trim are specified or indicated to be same size, align joints.
 3. Where tiles are specified or indicated to be whole integer multiples of adjoining tiles on floor, base, walls, or trim, align joints unless otherwise indicated.
- G. Joint Widths: Unless otherwise indicated, install tile with the following joint widths:
1. Ceramic Mosaic Tile: [1/16 inch (1.6 mm)] [1/8 inch (3.2 mm)].
 2. Quarry Tile: [1/4 inch (6.4 mm)] [3/8 inch (9.5 mm)].
 3. Pressed Floor Tile: [1/4 inch (6.4 mm)] [3/8 inch (9.5 mm)].
 4. Glazed Wall Tile: [1/16 inch (1.6 mm)] [1/8 inch (3.2 mm)].
 5. Porcelain Tile: [1/4 inch (6.4 mm)] [3/8 inch (9.5 mm)].
- H. Lay out tile wainscots to dimensions indicated or to next full tile beyond dimensions indicated.
- I. Expansion Joints: Provide expansion joints and other sealant-filled joints, including control, contraction, and isolation joints, where indicated. Form joints during installation of setting materials, mortar beds, and tile. Do not saw-cut joints after installing tiles.
1. Where joints occur in concrete substrates, locate joints in tile surfaces directly above them.
- J. Stone Thresholds: Install stone thresholds in same type of setting bed as adjacent floor unless otherwise indicated.
1. At locations where mortar bed (thickset) would otherwise be exposed above adjacent floor finishes, set thresholds in latex-portland cement mortar (thinset).
 2. Do not extend cleavage membrane waterproofing or crack isolation membrane under thresholds set in dry-set portland cement or latex-portland cement mortar. Fill joints between such thresholds and adjoining tile set on cleavage membrane waterproofing or crack isolation membrane with elastomeric sealant.
- K. Grout Sealer: Apply grout sealer to cementitious grout joints in tile floors according to grout-sealer manufacturer's written instructions. As soon as grout sealer has penetrated grout joints, remove excess sealer and sealer from tile faces by wiping with soft cloth.

3.4 GLASS TILE INSTALLATION

- A. Comply with TCNA's "Handbook for Ceramic, Glass, and Stone Tile Installation" for TCNA installation methods specified in tile installation schedules. Comply with parts of the ANSI A108 series "Specifications for Installation of Ceramic Tile" that are referenced in TCNA installation methods, specified in tile installation schedules, and apply to types of setting and grouting materials used.
- B. Extend tile work into recesses and under or behind equipment and fixtures to form complete covering without interruptions unless otherwise indicated. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.
- C. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap tile.
- D. Where accent tile differs in thickness from field tile, vary setting-bed thickness so that tiles are flush.
- E. Jointing Pattern: Lay tile in grid pattern unless otherwise indicated. Lay out tile work and center tile fields in both directions in each space or on each wall area. Lay out tile work to minimize the use of pieces that are less than half of a tile. Provide uniform joint widths unless otherwise indicated.
 - 1. For tile mounted in sheets, make joints between tile sheets same width as joints within tile sheets so joints between sheets are not apparent in finished work.
- F. Joint Widths: Unless otherwise indicated, install tile with the following joint widths:
 - 1. Large Format Glass Tile: **[1/16 inch (1.6 mm)] [1/8 inch (3.2 mm)]**.
 - 2. Mosaic Glass Tile: **[1/16 inch (1.6 mm)] [1/8 inch (3.2 mm)]**.
 - 3. Miniature Mosaic Glass Tile: **[1/16 inch (1.6 mm)] [1/8 inch (3.2 mm)]**.
- G. Lay out tile wainscots to dimensions indicated or to next full tile beyond dimensions indicated.
- H. Expansion Joints: Provide expansion joints and other sealant-filled joints, including control, contraction, and isolation joints, where indicated. Form joints during installation of setting materials, mortar beds, and tile. Do not saw-cut joints after installing tiles.
 - 1. Where joints occur in concrete substrates, locate joints in tile surfaces directly above them.
- I. Metal Edge Strips: Install at locations indicated.
- J. Grout Sealer: Apply grout sealer to grout joints according to grout-sealer manufacturer's written instructions. As soon as grout sealer has penetrated grout joints, remove excess sealer and sealer from tile faces by wiping with soft cloth.

3.5 TILE BACKING PANEL INSTALLATION

- A. Install panels and treat joints according to ANSI A108.11 and manufacturer's written instructions for type of application indicated.

3.6 WATERPROOFING INSTALLATION

- A. Install waterproofing to comply with ANSI A108.13 and manufacturer's written instructions to produce waterproof membrane of uniform thickness that is bonded securely to substrate.
- B. Allow waterproofing to cure and verify by testing that it is watertight before installing tile or setting materials over it.
 - 1. Testing Agency: Engage a qualified testing agency to inspect substrate conditions, surface preparation, and membrane application, and furnish reports to Architect.
 - 2. Flood Testing: Flood test each waterproofed area for leaks, according to recommendations in ASTM D 5957, after completing waterproofing installation but before overlying construction is placed. Install temporary containment assemblies, plug or dam drains, and flood with potable water.
 - a. Flood to an average depth of 2-1/2 inches (65 mm) with a minimum depth of 1 inch (25 mm) and not exceeding a depth of 4 inches (100 mm).
 - b. Flood each area for 48 hours.
 - c. After flood testing, repair leaks, repeat flood tests, and make further repairs until installations are watertight.

3.7 CRACK ISOLATION MEMBRANE INSTALLATION

- A. Install crack isolation membrane to comply with ANSI A108.17 and manufacturer's written instructions to produce membrane of uniform thickness that is bonded securely to substrate.
- B. Allow crack isolation membrane to cure before installing tile or setting materials over it.

3.8 ADJUSTING AND CLEANING

- A. Remove and replace tile that is damaged or that does not match adjoining tile. Provide new matching units, installed as specified and in a manner to eliminate evidence of replacement.
- B. Cleaning: On completion of placement and grouting, clean all ceramic tile surfaces so they are free of foreign matter.
 - 1. Remove grout residue from tile as soon as possible.
 - 2. Clean grout smears and haze from tile according to tile and grout manufacturer's written instructions but no sooner than 10 days after installation. Use only cleaners recommended by tile and grout manufacturers and only after determining that cleaners are safe to use by testing on samples of tile and other surfaces to be cleaned. Protect metal surfaces and plumbing fixtures from effects of cleaning. Flush surfaces with clean water before and after cleaning.

3.9 PROTECTION

- A. Protect installed tile work with kraft paper or other heavy covering during construction period to prevent staining, damage, and wear. If recommended by tile manufacturer, apply coat of neutral protective cleaner to completed tile walls and floors.
- B. Prohibit foot and wheel traffic from tiled floors for at least seven days after grouting is completed.

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- C. Before final inspection, remove protective coverings and rinse neutral protective cleaner from tile surfaces.

END OF SECTION 09 3013