

SECTION 09 30 00 - TILING

PART 1 - GENERAL

1.1 SUMMARY

- A. Provide the work of this Section in accordance with requirements of the Contract Documents
- B. This Section Includes but is not limited to:
 - 1. Tile **TL**
 - 2. Uncoupling / waterproof membrane.
 - 3. Floor drain **FD-01**.
 - 4. Metal edge and trim strips **TS**.
 - 5. Grout **GR**.
- C. Related Requirements:
 - 1. Division 03, Section 03 30 00 "Cast-In-Place Concrete" for floor tolerances for new concrete floors.
 - 2. Division 03, Section 03 54 16 "Hydraulic Cement Underlayment" for underneath large format tile.
 - 3. Division 07, Section 07 92 00 "Joint Sealants" for sealing of expansion, contraction, control, and isolation joints in tile surfaces.
 - 4. Division 09, Section 09 21 00 "Gypsum Board Assemblies" for backer boards.

1.2 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.
- E. Large Format Tile (LFT): Tiles with any one dimension equal to or greater than 15 inches.

1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.
 - 1. Review requirements in ANSI A108.01 for substrates and for preparation by other trades.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Sustainable Design Submittals:
 - 1. Building Product Disclosure and Optimization - Sourcing of Raw Materials:
 - a. Extended Producer Responsibility (EPR): Submit documentation indicating that manufacturers have a take back or recycling program for the product purchased.
 - b. Recycled Content: For products having recycled content, indicate percentages by weight of post-consumer and pre-consumer recycled content.
 - 1) Include statement indicating costs for each product having recycled content.
 - c. Regional Materials: For products that are required to comply with requirements for regional materials, indicating location of material manufacturer and point of extraction, harvest, or recovery for each raw material.
 - 1) Include statement indicating distance to Project, cost for each regional material and the fraction by weight that is considered regional.
 - 2. Indoor Environmental Quality, Low Emitting Materials: Building Products must be tested and compliant with the California Department of Public-Health (CDPH) Standard Method V1.1-2010 or v1.2 2017, using the applicable exposure scenario.
 - a. For paints, and coatings, wet applied, include printed statement of VOC content, showing compliance with the applicable VOC limits of the California Air Resources Board (CARB) 2007, Suggested Control Measure for Architectural Coatings or the South Coast Air Quality Management District (SCAQMD) Rule 1113-2011.
 - b. Adhesives and Sealants: For wet applied on-site products, submit printed statement showing compliance with the applicable chemical content requirements of SCAQMD Rule 1168, effective July 1, 2005, and rule amendment date of January 7, 2005.
 - c. For flooring products, submit documentation of VOC emissions testing compliance for hard surface flooring products, containing any material in addition to composite wood, in the form of FloorScore certification or CDPH Standard Method v1.2 compliance verification.
- C. Shop Drawings: Provide plans and elevations scheduled to receive tiling. Show locations of each type of tile and tile pattern. Indicate tile installation start point. Show widths, details, and locations of expansion, contraction, control, and isolation joints in tile substrates and finished tile surfaces. Show locations and extent of floor drains.
- D. Samples for Initial Selection: For tile, grout, and accessories involving color selection.
- E. Samples for Verification:
 - 1. One full-size unit of each type and composition of tile and for each color and finish required.
 - 2. Full-size units of each type of trim and accessory for each color and finish required.
 - 3. Metal edge strips in 6-inch (150-mm) lengths.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.

- B. Product Test Reports: For tile-setting and -grouting products.
- C. Slip Resistance Test Reports: Submit test reports from qualified independent testing laboratory indicating and interpreting test results relative to compliance of tile products with requirements specified for slip resistance.
- D. Maintenance Instructions: Submit maintenance instructions for each type of product specified.
- E. Sustainable Design Submittals:
 - 1. Building Product Disclosure and Optimization - Environmental Product Declarations
 - a. Submit product specific type III EPDs or Industry wide (generic) EPDs, USGBC approved program declaration or products with a publicly available, critically reviewed life-cycle assessment conforming to ISO 14044 that have at least a cradle to gate scope.
 - 2. Building Product Disclosure and Optimization - Material Ingredients
 - a. Material Ingredient Reporting: Submit documentation confirming chemical inventory of products to at least 0.1 % (1000ppm) with at least one of the following:
 - 1) Submit published manufacturer inventory of ingredients identified by name and Chemical Abstract Service Registration Number (CASRN)
 - 2) Submit documentation that product has been certified as Cradle-to-Cradle v3 at the Bronze Level or better
 - 3) Submit Declare product label indicating that all ingredients have been disclosed down to 1000 ppm or designated as Red List Free or Declared
 - 4) Living Product Challenge
 - 5) Product Lens Certification
 - 6) USGBC approved program.
 - b. Material Ingredient Optimization: Submit documentation confirming chemical inventory of products to at least 0.01 % (100ppm) and/or that has a compliant material ingredient optimization report with at least one of the following:
 - 1) Submit GreenScreen V1.2 Benchmark: Third party report prepared by a licensed GreenScreen List Translator, or a full GreenScreen Assessment.
 - 2) Submit third-party verified documentation that product has been certified as Cradle-to-Cradle v3 at the Bronze Level or better
 - 3) Submit third-party verified Cradle to Cradle v3 Material Health certificate at the Bronze Level or better
 - 4) Submit third-party verified Declare product label indicating that all ingredients have been disclosed down to 100 ppm
 - 5) Submit third-party verified documentation that product is Living Product Challenge certified with a Red List Free or LBC Red List Free Declare label.
 - 6) Submit documentation that product has a manufacturer prepared action plan with material inventory to at least 1000 ppm.

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. 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.
2. Installer employs at least one installer for Project that has completed the Advanced Certification for Tile Installers (ACT) certification for installation of membranes, gauged porcelain tile/gauged porcelain tile panels and slabs and large format tile.

B. Reference Standards: Comply with the applicable provisions and recommendations of references, except as modified by governing codes and by the Contract Documents. Where a recommendation or suggestion occurs in the references, such recommendation or suggestion shall be considered mandatory. In the event of conflict between references, this specification or within themselves, the more stringent standard or requirement shall govern.

1. Tile Council of North America
 - a. TCNA "Handbook for Ceramic Tile Installation".
2. American National Standards Institute
 - a. ANSI A137.1 "Standard Specifications for Ceramic Tile."
 - b. ANSI A108/A118/A136 "Standard Specifications for the Installation of Ceramic Tile."

C. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Build mockup of each type of floor tile installation.
2. Build mockup of each type of wall tile installation.
3. Build room corner mockups of the public toilet room to be constructed in the field include the following:
 - a. Wall tile.
 - b. Floor tile / wall base,
 - c. Corner guards.
 - d. Acoustical panel ceiling system.
 - e. Lighting in accordance with Division 26.
 - f. Linear floor drain in accordance with Division 23.
 - g. Toilet partitions.
 - h. Water closets in accordance with Division 22.
 - i. Washroom accessories.
 - j. Typical countertop with plumbing fixtures in accordance with Division 22.
 - k. Restroom traffic management system.
4. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.

5. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

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.
- E. Handle tile that has temporary protective coating on exposed surfaces to prevent coated surfaces from contacting backs or edges of other units. If coating does contact bonding surfaces of tile, remove coating from bonding surfaces before setting tile.

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.
- B. Temperature Maintenance: Maintain temperatures at 50 deg. F. or more in tiled areas during installation and for 7 days after completion, unless higher temperatures and/or longer cure times are required by referenced installation standard or manufacturer's instructions.

1.10 WARRANTY

- A. Warranty specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and are in addition to and run concurrent with other warranties made by the Contractor under requirements of the Contract Documents.
 1. Special Warranty: Provide a written warranty, directly to the Owner, for a two (2) year period, agreeing to repair or replace Work which has failed as a result of defects in materials or workmanship. Upon notification of such defects, within the warranty period, make the necessary repairs and replacements, at the convenience of the Owner. Warranty shall be signed by the manufacturer and the applicator.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations for Tile: Obtain tile of each type and color or finish 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.
- C. Source Limitations for Other Products: Obtain each of the following products specified in this Section from a single manufacturer:
 - 1. Joint Sealants
 - 2. Metal edge strips.

2.2 PERFORMANCE REQUIREMENTS

- A. Dynamic Coefficient of Friction (DCOF): For tile installed on walkway surfaces, provide products with the following values determined by testing identical products in accordance with ANSI A137.1 using the BOT-3000 to measure slip resistance of flooring, with the following minimum requirement for floor surfaces in wet or dry
 - 1. Level Surfaces and Treads: Minimum 0.42.
 - 2. Ramp Surfaces: 0.65.
- B. Low-Emitting Materials:
 - 1. Adhesives and Sealants wet-applied inside the weather-proofing system must meet the VOC general emissions testing criteria of CDPH Standard Method v1.2.
 - 2. All adhesives and sealants wet-applied inside the weather-proofing system must have VOC content in compliance with the applicable VOC limits (g/L) found in tables in Division 01, Section 01 81 13.14 "Sustainable Design Requirements - LEED v4 BD+C."
 - 3. All flooring products must be Floorscore certified or compliant with the VOC emissions testing criteria of CDPH Standard Method v1.2.

2.3 PRODUCTS, GENERAL

2.4 TILE PRODUCTS

- A. Tile schedule Basis of Design for each scheduled tile is as follows:
 - 1. **TL-01A** Porcelain Floor Tile:
 - a. Product: Daltile Vertuo.
 - b. Size: 24inches x 48 inches x 5/16 inch thick.
 - c. Color: Bravura VR12.
 - d. Finish: Matt.
 - e. Installation Pattern: Refer to drawings.
 - f. Grout Type: Epoxy grout.
 - g. Grout Color: **GR-01**
 - 2. **TL-11A** Porcelain Wall Tile:
 - a. Product: Horizontal Italian Tile Origin.

- b. Size: 24 inches x 48 inches x 3/8 inches thick.
- c. Color: Arctic
- d. Finish: Matte.
- e. Installation Pattern: Refer to drawings.
- f. Grout Type: Epoxy grout.
- g. Grout Color: **GR-01**.

3. **TL-12A** Glass Wall Tile:

- a. Product: American Olean Color Appeal.
- b. Size: 2 inches x 8 inches x 5/16 inch thick.
- c. Color: Pearl C-101.
- d. Finish: Glass.
- e. Installation Pattern: Stack bond, accent pattern to be determined.
- f. Grout Type: [_____]
- g. Grout Color: **GR-06**.

4. **TL-12B** Glass Wall Tile:

- a. Product: American Olean Color Appeal.
- b. Size: 2 inches x 8 inches x 5/16 inch thick.
- c. Color: Mink C-119.
- d. Finish: Glass.
- e. Installation Pattern: Stack bond, accent pattern to be determined.
- f. Grout Type: [_____]
- g. Grout Color: **GR-06**.

5. **TL-12C** Glass Wall Tile:

- a. Product: American Olean Color Appeal.
- b. Size: 2 inches x 8 inches x 5/16 inch thick.
- c. Color: Cherry C117.
- d. Finish: Glass.
- e. Installation Pattern: Stack bond, accent pattern to be determined.
- f. Grout Type: [_____]
- g. Grout Color: **GR-06**.

6. **TL-13** Porcelain Wall Tile:

- a. Product: Crossville Seta Gris.
- b. Size: 39 inches x 118 inches x 1/8 inch thick.
- c. Color: F7464
- d. Finish: Matte.
- e. Installation Pattern: Refer to drawings.
- f. Grout Type: [_____]
- g. Grout Color: **GR-07**

2.5 **WATERPROOF / UNCLOUPLING MEMBRANE**

- A. Waterproofing / Uncoupling Membrane: Corrugated polyethylene with engineered cavity design or dovetail like corrugations with anchoring webbing on the underside.

1. Basis of Design: Schluter Systems L.P.; DITRA.

- B. Accessories: Use waterproofing / uncoupling membrane manufacturer's seam tape, prefabricated corners, prefabricated pipe and valve seals and sealant for a complete warranted waterproofing system.
- C. Floor Drain **FD-01**: Use waterproofing / uncoupling membrane manufacturer's frameless tileable linear drain / grate assembly, length of drain as indicated on Drawings. Drain location to be confirmed with Mechanical.
 - 1. Basis of Design: Schluter Systems L.P.; KERDI-LINE, frameless tileable.
- D. Mortar: Use waterproofing / uncoupling membrane manufacturer's recommended mortar for installing waterproofing / uncoupling membrane and for installation of tile over top of waterproofing / uncoupling membrane. Mortar shall be approved for use with by waterproofing / uncoupling membrane manufacturer.

2.6 SETTING MATERIALS

- A. Standard Latex Portland Cement Mortar (Thin set):
 - 1. ANSI A118.4. and ISO 13007: Classification C2ESP2; two component thinset mortar consisting of dry set polymer and liquid latex additive
 - 2. Products:
 - a. Subject to compliance with requirements, provide one of the following:
 - 1) Custom Building Products; Custom Blend Thin Set Mortar with Thin Set Mortar admix
 - 2) Laticrete International, Inc; Laticrete 317 with 333 Super Flexible Additive or 3701 Admix
 - 3) MAPEI Corporation; Kerabond/Keralastic™ System
 - 4) TEC Incorporated; Full Set Plus Premium Thin Set Mortar TA-380/381 with ExtraFlex Acrylic Mortar Additive TA 872
 - 3. For wall applications, provide mortar that complies with requirements for nonsagging mortar in addition to the other requirements in ANSI A118.4.
- B. Improved Modified Dry-Set Mortar (Thinset):
 - 1. ANSI A118.15.
 - 2. Products:
 - a. Subject to compliance with requirements, provide one of the following:
 - 1) Custom Building Products; Pro-Lite Premium.
 - 2) Laticrete International, Inc; 272 Mortar or 317 Mortar with 333 Super Flexible Additive.
 - 3) MAPEI Corporation; Keraflex Super.
 - 3. Provide prepackaged, dry-mortar mix containing dry, redispersible, vinyl acetate or acrylic additive to which only water must be added at Project site.
 - 4. For wall applications, provide mortar that complies with requirements for nonsagging mortar in addition to the other requirements in ANSI A118.15.
- C. LFT Mortar:

1. ANSI A118.15, multi-use, polymer fortified adhesive mortar, non-sag for LFT wall applications and medium bed for LFT floor applications.
2. Products:
 - a. Subject to compliance with requirements, provide one of the following:
 - 1) Laticrete; 4-XLT or Multimax Lite.
 - 2) Mapei; UltraflexLFT.
 - 3) Custom Building Products; Prolite Premium Mortar.

D. Water-Cleanable:

1. Tile-Setting Epoxy: ANSI A118.3.
2. For use where tile is installed over metal substrates.
3. Products:
 - a. Subject to compliance with requirements, provide one of the following:
 - 1) Custom Building Products; EBM-Lite.
 - 2) Laticrete International, Inc; Latapoxy 300.
 - 3) MAPEI Corporation; Kerapoxy 410™.

E. Waterproofing / Uncoupling Membrane Mortar: Refer to Article 2.5 WATERPROOFING / UNCOUPLING MEMBRANE

2.7 GROUT MATERIALS

- A. Latex Portland Cement Sanded Grout (Standard Tile Grout): ANSI A118.6, polymer-modified sanded cement grout for use with non-absorptive vitreous type tile. Factory proportioned cement, liquid polymer additives and alkali resistant non-fading mineral pigments in dry blend to be mixed with water. Grout color as selected by Architect. Provide one of the following:
1. Custom Building Products, "PolyBlend Plus." Or PolyBlend S.
 2. Laticrete International, Inc., Permacolor Select or Permacolor or Laticrete Sanded Grout (1500 Series).
 3. MAPEI Corporation, "Ultracolor Plus."
 4. Bostik Inc. Hydroment Ceramic Tile Grout (Sanded)
- B. Latex-Portland Cement Unsanded Grout (Standard Tile Grout): ANSI A118.6, polymer-modified cement grout for use with non-absorptive vitreous type tile. Factory proportioned cement, liquid polymer additives and alkali resistant non-fading mineral pigments in dry blend to be mixed with water. Grout color as selected by Architect. Provide one of the following:
1. Bostik, Inc.; Hydroment Dry Tile Grout (Unsanded) with 425 Multi-Purpose Acrylic Latex Admixture.
 2. Custom Building Products "PolyBlend Unsanded, PolyBlend Plus".
 3. Laticrete International, Inc; Laticrete TPermacolor Select NS or Permacolor NS or Laticrete Unsanded Grout.
 4. MAPEI Corporation; "Ultracolor Plus" or, Keracolor™ U.
 5. TEC Incorporated; AccuColor Premium Unsanded Grout TA-620 with Acrylic Grout Additive TA-869.
- C. Water-Cleanable Epoxy Grout:

1. ANSI A118.3.
2. Products: Subject to compliance with requirements, provide one of the following:
 - a. Custom Building Products; CEG-Lite, CEG-IG.
 - b. Laticrete International, Inc; SpectraLOCK Pro Premium or SpectraLOCK 2000IG (For chemical resistance).
 - c. MAPEI Corporation; Kerapoxy CQ or Kerapoxy®.
 - d. Bostik, Inc; EzPoxy EzClean.
3. Provide product capable of withstanding continuous and intermittent exposure to temperatures of up to 140 and 212 deg F (60 and 100 deg C), respectively, and certified by manufacturer for intended use.

D. Grout Colors:

1. **GR-01:**
 - a. Basis of Design: Bostik French Gray #142.
2. **GR-06:**
 - a. Basis of Design: Custom Building Products #381 Bright White.
3. **GR-07:**
 - a. Basis of Design: Custom Building Products [_____].

2.8 ELASTOMERIC SEALANTS

- A. General: Provide sealants, primers, backer rods, and other sealant accessories that comply with the following requirements and with the applicable requirements in Section 07 92 00 "Joint Sealants."
 1. Use primers, backer rods, and sealant accessories recommended by sealant manufacturer.
- B. Colors: Provide colors of exposed sealants to match colors of grout in tile adjoining sealed joints unless otherwise indicated.
- C. Mildew-Resistant Silicone Sealant: ASTM C 920; Type S; Grade NS; Class 25; Uses NT, G, A, and, as applicable to nonporous joint substrates indicated, O; formulated with fungicide, intended for sealing interior tile joints and other nonporous substrates that are subject to in-service exposures of high humidity and extreme temperatures.

2.9 MISCELLANEOUS MATERIALS

- A. Metal Edge Strips:
 1. Height to match tile and setting-bed thickness, designed specifically for tile applications; and of maximum lengths to minimize running joints.
 2. **TS-01** Metal Trim:
 - a. Product: Schluter Jolly

- 1) Finish: Aluminum.
3. **TS-02 Metal Trim:**
 - a. Use coordinating end caps and inner and outer corner prefabricated joints.
 - b. Product: Schluter Dilex-AHK.
 - 1) Finish: Stainless.
4. **TS-03 Metal Trim:**
 - a. Product: Schluter Schiene.
 - 1) Finish: Aluminum.
5. **TS-04 Metal Trim:**
 - a. Product: Schluter Reno-U.
 - 1) Finish: Stainless steel.
6. **TS-05 Metal Trim:**
 - a. Product: Schluter Reno-Ramp
 - 1) Finish: Stainless steel.
7. **TS-07 Metal Trim:**
 - a. Product: Schluter Dilex-HKU
 - 1) Finish: Stainless steel.
- B. Temporary Protective Coating: Either product indicated below that is formulated to protect exposed surfaces of tile against adherence of mortar and grout; compatible with tile, mortar, and grout products; and easily removable after grouting is completed without damaging grout or tile.
 1. Grout release in form of manufacturer's standard proprietary liquid coating that is specially formulated and recommended for use as temporary protective coating for tile.
- 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.

2.10 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 specified tolerances. New concrete floor tolerances shall comply with Section 03 30 00 "Cast-In-Place Concrete" . Out of floor tolerances shall be communicated to Architect and Structural Engineer.
 - 2. Verify that concrete substrates for tile floors installed with 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.
 - 5. Do not install wall tile until the lighting level of the room is comparable to the lighting level in the finished installation.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.
- C. Move large format tiles using only equipment and methods approved by tile manufacturer.

3.2 PREPARATION

- A. Remove coatings, including curing compounds and other substances that contain soap, wax, oil, or silicone, that are incompatible with tile-setting materials.
- B. Provide concrete substrates for tile floors installed with thin-set mortar that comply with flatness tolerances specified in referenced ANSI A108 Series of tile installation standards.
 - 1. Tile Flooring for the installation of large format floor tile should not exceed L/360 under live load.
 - 2. For non large format tile, confirm that structure or substrate is limited to variation of 1/4 inch in 10 ft. from the required plane, and no more than 1/16 inch in 12 inches when measured from tile surface high points
 - 3. For large format tile, confirm that structure or substrate is limited to 1/8 inch in 10 ft. from the required plane, and no more than 1/16 inch in 24 inches when measured from tile surface high points.

- C. Fill cracks, holes, and depressions in concrete substrates for tile floors installed with adhesives or thinset mortar with self-leveling polymer modified Portland cement underlayment and patching compound specifically recommended by tile-setting material manufacturer.
 - 1. Remove protrusions, bumps, and ridges by sanding or grinding.
 - 2. Bring substrates up to 1/8 inch in 10 ft. in compliance with TCNA requirements.
- D. 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 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. Tile shall have minimum 90% mortar coverage.
 - 2. For the following installations, follow procedures in the ANSI A108 series of tile installation standards and TCNA's "Handbook for Ceramic, Glass, and Stone Tile Installation" and back butter tile to provide 100% percent mortar coverage.
 - a. Tile installed with chemical resistant mortars and grouts.
 - b. Tile having any dimension 12" (304 mm) or larger in any direction.
 - c. Tile with raised or textured backs.
 - d. Tile installation rated for Heavy or Extra Heavy Duty.
 - e. Porcelain tiles with more than 20% of the tile backs covered with firing release dust back buttered so that 100% of the back is covered with mortar rated for C627, Extra Heavy Duty rating.
- B. Remove any excess setting material from the joint area so that 2/3 of the depth of the tile is available for grouting.
- C. 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.
- D. 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.
- E. Provide metal edge trim shapes where necessary to eliminate exposed tile edges and where indicated.
- F. Where accent tile differs in thickness from field tile, vary setting-bed thickness so that tiles are flush.
- G. 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.

H. Joint Widths: Unless otherwise indicated, install tile with 1/8 inch wide joints.

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.
2. For large format tiles, provide 1/8 inch movement joint every 20 feet minimum, or more often if shown on drawings.

J. Grout tile to comply with requirements of the following tile installation standards:

1. For tile grouts (sand-portland cement; dry-set, commercial portland cement; and latex-portland cement grouts), comply with ANSI A108.10.
2. Porcelain Tile: Unless otherwise shown use factory pre-mixed grout with latex additive specified for non-vitreous body tile, porcelain body tile. Comply with the following for grouting: ANSI 108.10.

K. Floor Sealer: Apply floor sealer to cementitious grout joints in tile floors according to floor-sealer manufacturer's written instructions. As soon as floor sealer has penetrated grout joints, remove excess sealer and sealer from tile faces by wiping with soft cloth.

3.4 UNCOUPLING / WATERPROOFING INSTALLATION

A. Install waterproofing to comply with ANSI A108.13 and manufacturer's written instructions to produce uncoupling / waterproof membrane of uniform thickness that is bonded securely to substrate.

1. Prohibit foot and wheel traffic on waterproofed floors for time period as recommended by the manufacturer.

B. Field Testing: Allow waterproofing to cure and verify by testing specified in Field Quality Control article that it is watertight before installing tile or setting materials over it. Report results of test to Architect and Owner. Make repairs to waterproofing prior to installation of tiling.

1. Do not install tile or setting materials over waterproofing until waterproofing has cured and been tested to determine that it is watertight.

3.5 FLOOR TILE INSTALLATION

A. General: Install tile to comply with requirements in the Floor Tile Installation Schedule, including those referencing TCA installation methods and ANSI A108 Series of tile installation standards.

1. Follow procedures in ANSI A108 Series tile installation standards for providing 95 percent mortar coverage.
- B. Installation:
 1. Install uncoupling / waterproof membrane where indicated on drawings.
 2. Spread only as much mortar as can be covered in the time limits established by the mortar manufacturer's recommendations.
 3. Wipe the back of each tile with a damp sponge to remove all dust or dirt immediately before applying mortar to tiles.
 4. Place tile sheets onto wet mortar, maintaining specified joint widths, and true accurate pattern as shown. Tamp tile with wood block or rubber mallet to produce finish levels of tile matching adjacent tile surfaces. Beating shall take place prior to mortar taking initial set.
 5. Prohibit foot and wheel traffic on tiled floors for period of time as recommended by the mortar manufacturer.
- C. Grout Installation: ANSI A108.10.
- D. For large format tiles, tool all joints flush with tile surface.

3.6 WALL TILE INSTALLATION

- A. Install types of tile designated for wall installations to comply with requirements in the Wall Tile Installation Schedule, including those referencing TCA installation methods and ANSI setting-bed standards.
- B. Grout Installation: ANSI A108.10.
- C. Metal Edge Strips: Install at locations indicated.
- D. For large format tiles, tool all joints flush with tile surface.

3.7 CLEANING AND PROTECTING

- 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 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. Remove temporary protective coating by method recommended by coating manufacturer and that is acceptable to tile and grout manufacturer. Trap and remove coating to prevent drain clogging.

- C. Finished Tile Work: Leave finished installation clean and free of cracked, chipped, broken, unbonded, and otherwise defective tile work.
- D. 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.
- E. Prohibit foot and wheel traffic from tiled floors for at least seven days after grouting is completed.
- F. Before final inspection, remove protective coverings and rinse neutral protective cleaner from tile surfaces.

3.8 FIELD QUALITY CONTROL

- A. Upon completion of uncoupling / waterproofing installation in locations with drains, and before installation of tiling, test waterproof membrane for integrity according to ANSI A118.10. Plug drains, dam perimeter of uncoupling /waterproofing and fill with water minimum 2 inches deep and maintain for 24 hours.
 - 1. Inspect uncoupling / waterproofing for leaks
 - 2. Repair leaks and re-test until watertight
- B. Prepare test and inspection reports. Indicate corrective measures required to make installation watertight.

3.9 INTERIOR TILE INSTALLATION SCHEDULE

- A. Interior Floor Installations, Concrete Subfloor:
 - 1. Floor Tile Installation TCNA F205-Full thin set mortar on waterproofing membrane for washrooms, cementitious self-levelling underlayment as required.
 - a. Tile Type: Typical at elevated slabs unless otherwise indicated on drawings or specified. Waterproofing membrane shall be located at all washrooms.
 - b. Thinset Mortar: Improved modified dry set mortar, approved for LHT
 - c. applications for large and heavy tile.
 - d. Grout: High-performance unsanded grout.
 - 2. Floor Tile Installation TCNA F132; water-cleanable, tile-setting epoxy on cured cement mortar bed installed over cleavage membrane; epoxy grout.
 - a. Tile Type: Kitchens and food service areas.
 - b. Grout: Water-cleanable epoxy grout.
- B. Interior Wall Installations; Masonry or Concrete:
 - 1. Wall Tile Installation: TCNA W202I; thin-set mortar.
 - a. Locations: Typical at Masonry or Concrete, unless otherwise indicated.
 - b. Thinset Mortar: Improved modified dry set mortar, approved for LHT applications for large and heavy tile.
 - c. Grout: High performance un-sanded grout.

C. Interior Wall Installations, Metal Studs:

1. Wall Tile Installation: TCNA W244C or TCNA W244F; thin-set mortar on cementitious backer units.
 - a. Locations: Typical for wall tile locations, unless otherwise indicated.
 - b. Thinset Mortar: Improved modified dry set mortar, approved for LHT applications for large and heavy tile. Use white mortar for glass tile.
 - c. Grout: High performance un-sanded grout.

END OF SECTION