SECTION 09 30 00

SUGGESTED SPECIFICATION FOR CERAMIC TILING – INCLUDING LARGE FORMAT TILE AND GAUGED PORCELAIN TILE/PANELS SETTING MATERIALS AND ACCESSORIES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Large Format Tile and Gauged Porcelain Tile/Panels Setting Materials.

[**NOTE**: **Large Format Tile** is defined as any tile with one edge 15 inches or longer – ANSI A137.1.

Gauged Porcelain Tile and Gauged Porcelain Tile/Panels is defined as porcelain tiles that are one square meter in facial area or larger that are usually in the range of 3.5mm to 6.5mm thick--ANSI A137.3]

B. Standard size tile and setting materials.

[NOTE: **STANDARD SIZE TILE** - ANY CERAMIC TILE WITH ONE EDGE IS 14.9 INCHES OR LESS – ANSI A137.1.

C. Self-Leveling Underlayment.

D. Waterproof membrane.

E. Crack isolation membrane.

F. Flexible sealant.

1.02 RELATED REQUIREMENTS

A. Section 035400 - Cast Underlayment.

1.03 REFERENCE STANDARDS

A. ANSI A108/A118/A136 - American National Standard Specifications for the Installation of Ceramic Tile (Compendium).

B. ANSI A108.1a – American National Standard Specifications for Installation of Ceramic Tile in the Wet-Set Method, with Portland Cement Mortar.

C. ANSI A108.1b – American National Standard Specifications for Installation of Ceramic Tile on a Cured Portland Cement Mortar Setting Bed with Dry-Set or Latex-Portland Cement Mortar.

D. ANSI A108.1c – Specifications for 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 Bed with Dry-Set or Latex-Portland Cement.

E. ANSI A108.2 – American National Standard General Requirements: Materials, Environmental and Workmanship.

F. ANSI A108.4 – American National Standard Specifications for Installation of Ceramic Tile with Organic Adhesives or Water Cleanable Tile-Setting Epoxy Adhesive.

G. ANSI A108.5 – American National Standard Specifications for Installation of Ceramic Tile with Dry-Set Portland Cement Mortar or Latex-Portland Cement Mortar.

H. ANSI A108.6 – American National Standard Specifications for Installation of Ceramic Tile with Chemical Resistant, Water Cleanable Tile-Setting and -Grouting Epoxy.

I. ANSI A108.8 – American National Standard Specifications for Installation of Ceramic Tile with Chemical Resistant Furan Resin Mortar and Grout.

J. ANSI A108.9 – American National Standard Specifications for Installation of Ceramic Tile with Modified Epoxy Emulsion Mortar/Grout.

K. ANSI A108.10 – American National Standard Specifications for Installation of Grout in Tilework.

L. ANSI A108.11 – American National Standard Specifications for Interior Installation of Cementitious Backer Units.

M. ANSI A108.12 – American National Standard for Installation of Ceramic Tile with EGP (Exterior Glue Plywood) Latex-Portland Cement Mortar.

N. ANSI A108.13 – American National Standard for Installation of Load Bearing, Bonded, Waterproof Membranes for Thin-Set Ceramic Tile and Dimension Stone.

O. ANSI A108.19 – American National Standard Specifications for Interior Installation of Gauged Porcelain Tiles and Gauged Porcelain Tile Panels/Slabs by the Thin-Bed Method Bonded with Modified Dry-Set Cement Mortar or Improved Modified Dry-Set Cement Mortar.

P. ANSI A118.3 – American National Standard Specifications for Chemical Resistant, Water Cleanable Tile-Setting and -Grouting Epoxy and Water Cleanable Tile-Setting Epoxy Adhesive.

Q. ANSI A118.4 – American National Standard Specifications for Modified Dry-Set Cement Mortar.

R. ANSI A118.7 – American National Standard Specifications for High Performance Cement Grouts for Tile Installation.

S. ANSI A118.9 – American National Standard Specifications for Test Methods and Specifications for Cementitious Backer Units.

T. ANSI A118.10 – American National Standard Specifications for Load Bearing, Bonded, Waterproof Membranes For Thin-Set Ceramic Tile And Dimension Stone Installation.

U. ANSI A118.12 – American National Standard Specifications for Crack Isolation Membranes for Thin-Set Ceramic Tile and Dimension Stone Installation.

V. ANSI A118.15 – American National Standard Specifications for Improved Modified Dry-Set Cement Mortar 2012.

W. ANSI A137.1 – American National Standard Specifications for Ceramic Tile.

X. ANSI A137.2 – American National Standard Specifications for Glass Tile.

Y. ANSI A137.3 – American National Standard Specifications for Gauged Porcelain Tiles and Gauged Porcelain Tile Panels/Slabs.

Z. ASTM C373 – Standard Test Methods for Determination of Water Absorption and Associated Properties by Vacuum Method for Pressed Ceramic Tiles and Glass Tiles and Boil Method for Extruded Ceramic Tiles and Non-tile Fired Ceramic Whiteware Products.

AA. TCNA (HB) – Handbook for Ceramic, Glass, and Stone Tile Installation.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide manufacturers' data sheets on tile, mortar, grout, and accessories. Include installation instructions.

C. LEED or ‘green’ requirements: MAS Certified Green compliance certificates for CDPH VOC Emissions for cement based tile setting mortars/grouts and surface preparation products

D. Shop Drawings: Indicate tile layout, patterns, color arrangement, perimeter conditions, junctions with dissimilar materials, control and expansion joints, thresholds, ceramic accessories, and setting details.

E. Storage and handling requirements and recommendations.

F. Samples: Mount tile and apply grout on two plywood panels, minimum 18 by 18 inches (457 by 457 mm) in size illustrating pattern, color variations, and grout joint size variations.

G. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

H. Installer's Qualification Statement:
   1. Submit documentation of National Tile Contractors Association (NTCA) or Tile Contractors' Association of America (TCAA) accreditation.
   2. Submit documentation of completion of apprenticeship and certification programs.

I. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. See Section 016000 - Product Requirements, for additional provisions.
   2. Extra Tile: 10 square feet (1 square meters) of each size, color, and surface finish combination.

1.05 QUALITY ASSURANCE

A. Maintain one copy of and ANSI A108/A118/A136/A137 and TCNA on site.

B. Installer Qualifications:
   1. Company specializing in performing tile installation, with minimum of three years of documented experience.
      Accredited Five-Star member of the National Tile Contractors Association (NTCA) or Trowel of Excellence member of the Tile Contractors' Association of America (TCAA), or
      Ceramic Tile Education Foundation (CTEF): Certified Tile Installer (CTI), or
      Advanced Certifications for Tile Installers (ACT): Certification in the installation of membranes, mortar bed (mud) floors, mortar (mud) walls, shower receptors, large format tile, gauged porcelain tile/panels/slabs, and grouts.
      For Surface Preparation scope - INSTALL Substrate Prep Certified installer / **www.installfloors.org.**
      REQUIRED for INSTALLATION OF GAUGED PORCELAIN TILE/PANELS: Documentation of completion of comprehensive installation program provided by manufacturer of gauged porcelain tiles or gauged porcelain tile panels/slabs.
   2. Source Limitations: Provide each type of product from a single manufacturing source to ensure uniformity.

1.06 FIELD CONDITIONS

A. Maintain ambient and substrate temperature above 50 degrees F (10 degrees C) and below 100 degrees F (38 degrees C) during installation and curing of setting materials.

1.07 PRE-INSTALLATION CONFERENCE

A. Convene one week prior to commencing work of this section

B. Require attendance of setting material manufacturer, tile supplier, tile installer and installers of related work. Review installation procedures and coordination required with related work. Meeting agenda includes but is not limited to:

C. Surface preparation

D. Gauged Porcelain Tile Panel installation procedure

E. Grouting material and procedure

F. Cleaning products and maintenance

1.08 DELIVERY, STORAGE, AND HANDLING

A. Store and handle in strict compliance with tile manufacturer's written instructions and recommendations.

NOTE: Gauged porcelain tile/panels and slabs provide an innovative option for finished surfaces. At thicknesses that range from 1/8 to 1/4 inches (3.0 to 6.0 mm) they are a lightweight alternative to traditional ceramic and natural stone tile. With facial dimensions as great as 39.4 x 118.1 inches (x 3000 mm) they offer increased design possibilities and a unique monolithic appearance. Some manufacturer's panels are as large as 60 x 120 inches (1524 x 3048 mm). All with the durability and ease of maintenance of a porcelain composition.]

B. For Gauged Porcelain Tile/Panels: These panels require different handling and installation techniques. Typically, the 1/8 inch (3.0 mm) thick panels have a reinforcing mesh backing to minimize breakage during transportation and installation. The purpose of this guide is to inform you of what is required to ensure a successful long lasting installation on interior walls and floors. Always consult with the panel manufacturer prior to panel selection and installation to confirm suitability for the specific project to ensure compliance with all governing building codes. Delete if not required.

C. For Gauged Porcelain Tile/Panels: Follow manufacturer's written guidelines for handling as well as ANSI A108.19 for interior installations. [For exterior installation, contact the manufacturer of tile.]

1. Use 44 inch (1118 mm) forks to handle the flat crate or A-frame from the side, so that forks extend all the way across the crate or A-frame and catch back runner.
2. Shipments of 0.11 or 0.22 inch (3 or 5.6 mm) flat crates or A-frames loaded with the narrow end of the crate or A-frame facing out will require a fork truck with a minimum of 84 inch (2134 mm) forks and 5000 pound (2269 kg) lift capacity.
3. To correctly lift and handle gauged porcelain tile/panels using a forklift, position the forks at a distance of at least 3.3 feet (1 meter) from each other, perpendicular to the long side of the pallet and at the center of the pallet.
4. Gauged Porcelain tile/panels to be stored both upright and horizontal. Two installers should handle the tile panels, always keeping it perpendicular to the floor while protecting the corners from impact. If tile panels are placed on top of each other, ensure that each tile panel is clean and that the surface that the tiles are resting on is flat. If tile panels are stored in their vertical position, rest them on their long side. This side must be protected by wood, cardboard, or XPS panels.
5. Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use. Inspection of material for any shipping damage should be done at time of delivery. Prevent damage or contamination to materials by water, freezing, foreign matter or other causes and in accordance with written manufacturer's recommendations.
6. To aid in handling the 39.4 x 118.1 inches (1 meter x 3 meter) porcelain tile panels,

especially those weakened by drilled holes or openings and to assist the wall/floor application, a suitable frame with suction cups can be used.

D. Protect from damage due to weather, excessive temperature, and construction operations.

1.09 WARRANTY

A. Tile Manufacturer's Warranty: Provide manufacturer's standard limited product warranty.

NOTE TO SPECIFIER: edit below based on needs of your project.

B. Gauged Porcelain Tile/Panels Setting Limited Warranty: Provide system warranty which states the system will maintain the bond between the gauged porcelain tile/panels for interior walls and floors and approved substrate, under normal use provided the product was properly applied as a system.

NOTE TO SPECIFIER: Select "C" if you want system tile setting warranty AND ¼" in-plane tile and grout protection; delete the other tile setting warranties

C. Tile Setting and Surface Preparation: 1⁄4" Crack Isolation System Limited Warranty: Provide system warranty for crack isolation fluid membrane, mortar and grout which states the system will not transfer cracks from the approved substrate through the tile or stone and will maintain the bond between the tile or stone and approved substrate, when subjected to horizontal in-plane movement of cracks up to 1⁄4"; and not transfer cracks from the approved substrate through the grout when subjected to horizontal in-plane movement of cracks up to 1⁄4".

NOTE TO SPECIFIER: Select "D" if you want system tile setting warranty along with Waterproofing AND ¼" in-plane tile and grout protection; delete the other tile setting warranties

D. Tile Setting and Surface Preparation: **Waterproofing** and 1⁄4" Crack Isolation System Limited Warranty: Provide system warranty for crack isolation fluid membrane, mortar and grout which states the system will not transfer cracks from the approved substrate through the tile or stone and will maintain the bond between the tile or stone and approved substrate, when subjected to horizontal in-plane movement of cracks up to 1⁄4"; and not transfer cracks from the approved substrate through the grout when subjected to horizontal in-plane movement of cracks up to 1⁄4"; and prevent positive side (surface) liquid water migration through the membrane to the approved substrate.

NOTE TO SPECIFIER: Select "E" if you want simply a tile setting warranty; delete the other warranties

E. Tile Setting and Surface Preparation: Premium Bond System Limited Warranty: Provide system warranty to maintain **the bond between the tile and approved substrate**, under normal use.

PART 2 PRODUCTS

2.01 TILE

NOTE TO SPECIFIER: edit for each tile type

A. Manufacturers: All products by the same manufacturer.

1. [--------]

B. Quarry Tile, Type [__]: ANSI A137.1 standard grade.
   1. Moisture Absorption: Over 3.0 but not more than 5.0 percent as tested in accordance with ASTM C373.
   2. Size: 4 by 8 inch (102 by 203 mm), nominal.
   3. Thickness: 1/2 inch (12.7 mm), nominal.
   4. Products:
      a.
      b.

C. Porcelain Tile, Type [_____]: ANSI A137.1 standard grade.
   1. Moisture Absorption: 0 to 0.5 percent as tested in accordance with ASTM C373.
   2. Size: 6 by 6 inch (152 by 152 mm), nominal.
   3. Thickness: 3/8 inch (9.5 mm).
   4. Products:

D. Gauged Porcelain Tiles and Panels/Slabs, Type [_____]: ANSI A137.3 standard grade.
   1. Moisture Absorption: 0 to 0.5 percent as tested in accordance with ASTM C373.
   2. Thickness: 1/4 inch (6.4 mm).
   3. Edges: Square.
   4. Products:

2.02 MORTARS

A. Provide surface preparation, mortar and grout materials from same manufacturer.

B. Manufacturers:
   1. **BASIS OF DESIGN**: TEC/H.B. Fuller Construction Products, Inc; www.tecspecialty.com ; Aurora, IL 60504; Toll Free Tel: 800-832-9002; Email: request info
   2. Merkrete, by Parex USA, Inc.
   3. Bostik Inc.

C. Polymer Modified Large and Heavy Tile (including Gauged Porcelain panels) Mortar and Standard Size Tile Mortar: ANSI A118.4 and ANSI A118.11; ISO 13007 C2TEP1.

NOTE TO SPECIFIER: This one mortar can be used on 98% of projects. Most indoor/outdoor, floors and walls, standard size tile, large format tile, gauged panels, glass tile up to up to 16 in^2, etc. The Porcelain Mosaic Tile Shear Strength (28 day) is 480 psi.

   1. Applications: Use this type of bond coat in all areas not indicated otherwise.
   2. Products:
      a. **BASIS OF DESIGN**: H.B. Fuller Construction Products, Inc; TEC Ultimate 6 Plus Large Tile Mortar: www.tecspecialty.com.
         1) Porcelain Tile 28 day: Equal to or greater than 480 psi
         2) Non-sag/Non-Slump performance for Large Format Tile
         3) Time to grout: 6 hours minimum
         4) Open Time: 6 hours

5) Product Warranty: Lifetime limited.

D. Improved Latex-Portland Cement Mortar Bond Coat: **ANSI A118.15TE,** ANSI A118.4 and ANSI A118.11; ISO C2TES1P2

NOTE TO SPECIFIER: This mortar "D" offers ANSI A118.15 and can be used for most indoor/outdoor, floors and walls, standard size tile, large format tile, gauged panels, glass tile. The Porcelain Mosaic Tile Shear Strength (28 day) is 440 psi

1. Applications: Use this type of bond coat where indicated (harsh conditions; or when you need ANSI A118.15 mortar for other reasons).
2. **Products:**
   a. **BASIS OF DESIGN**: H.B. Fuller Construction Products, Inc; TEC 3N1 Performance Mortar: www.tecspecialty.com.
      1) Easiest troweling mortar—smooth, non-porous, ceramic microspheres roll over each other creating a ball bearing effect that improves workability and reduces tile setter fatigue
      2) Non-sag/Non-Slump performance for Large Format Tile
      3) Lifetime Product Warranty
      4) Porcelain Tile: Equal to or Greater than 440 psi

2.03 GROUTS

A. Provide setting and grout materials from same manufacturer.

B. Manufacturers:
1. **BASIS OF DESIGN**: H.B. Fuller Construction Products, Inc: www.tecspecialty.com.
2. Merkrete, by Parex USA
3. Bostik Inc

C. High Performance Polymer Modified Grout: ANSI A118.7 polymer modified cement grout.
1. Applications: Use this type of grout where indicated .
2. For grout joints from 1 /16" to 1 /2" wide (1.6 mm to 12 mm)
3. Color(s): As indicated on drawings.

NOTE TO SPECIFIER: This High-Performance Cement grout offers a Lifetime Limited Product Warranty that specifically protects against efflorescence and color shading. Water absorption is the best in the industry at a low 1.1% and its compressive strength is 10,300 psi; more than double of all competitive grouts in this 'high performance" category.

4. **Products:**
   a. **BASIS OF DESIGN**: H.B. Fuller Construction Products, Inc; TEC Power Grout: www.tecspecialty.com.
      1) Lifetime Limited Product Warranty
         a) Warranting efflorescence and color shading specifically
      2) Shrink/Crack Resistant
      3) Residential to Extra Heavy Commercial Applications; virtually any environment, including high traffic and wet conditions (not commercial kitchens that use enzymatic cleaners)
      4) Color uniform

5) 28 Day Compressive Strength: 10,300 psi minimum
6) 28 Day Water Absorption: 1.1% maximum

D. Epoxy Grout: ANSI A118.3 **100% solids**, chemical resistant and water-cleanable epoxy grout.

NOTE TO SPECIFIER: THIS 100% SOLIDS EPOXY GROUT IS A TRUE ANSI A118.3 GROUT/MORTAR THAT CAN BE USED FOR RESIDENTIAL AND COMMERCIAL INCLUDING COMMERCIAL KITCHENS WHERE ENZYMATIC CLEANERS ARE USED AND WILL DESTORY CEMENT GROUTS. Any other areas where these cleaners or harsh chemicals are not used, TEC Power Grout is the best suggestion.

1. Color(s): 700+ Choices; As indicated on drawings.
2. For grouting installations in Foodservice Operations such as commercial kitchens where enzymatic cleaners are used.
3. Do not use an "hybrid" epoxy grout that is not meant to be used with harsh chemicals or areas exposed to aggressive cleaning regimens in bathrooms/gang showers or commercial kitchens.
4. **Products:**
   a. **BASIS OF DESIGN**: H.B. Fuller Construction Products, Inc; TEC AccuColor EFX Epoxy Special Effects Grout: www.tecspecialty.com.

E. Premixed Modified Acrylic Grout: Single component, ready-to-mix, stain resistant grout.
1. Applications: Where indicated.
2. Use for joints 1/16 inch (1.6 mm) to 1/2 inch (12.7 mm) wide.
3. Color(s): As indicated on drawings.
4. **Products:**
   a. **BASIS OF DESIGN**: H. B. Fuller Construction Products; TEC InColor Grout.

2.04 MAINTENANCE MATERIALS

A. Tile Sealant: Gunnable, 100% silicone; moisture and mildew resistant type. Shall meet ASTM C920 – Type S, NS, Class 50

1. **Products:**
   a. **BASIS OF DESIGN**: H. B. Fuller Construction Products: TEC AccuColor 100 Silicone Sealant.

2.05 ACCESSORY MATERIALS

A. Waterproofing and Crack Isolation Membrane: Ready-to-Use, specifically designed for bonding to cementitious substrate under medium bed or thin-set tile; exceeds ANSI A118.10 and ANSI A118.12.
1. Crack Resistance: No failure at 1/4" inch (6.35 mm)gap, min.
2. IAPMO approved
3. Waterproofing membrane: Two coats required; perpendicular; 46-50 mils wet film thickness over entire surface.
4. Flood Testing (where applicable): Conduct testing after 2 hours under ideal conditions (depending on temperature, relative humidity, substrate porosity and air flow)
5. **Approved over control (saw cut) joints – no need to locate tile or stone field movement joints directly over control joints (full coverage only)**

6. Fluid or Trowel Applied Type
    a. Material: Synthetic rubber or Acrylic.
    b. Thickness: 50 mils total in one or two coats, minimum, wet film thickness(WFT) to obtain maximum ¼" crack resistance.
    c. Thickness: 25 mils total in one or two coats, minimum, wet film thickness(WFT) to obtain maximum ⅛" crack resistance.
    d. Products:
        1) BASIS OF DESIGN: H.B. Fuller Construction Products, Inc; TEC HydraFlex Waterproofing Crack Isolation Membrane: www.tecspecialty.com.

B. Self-Leveling Underlayment: calcium aluminate-based, self-leveling underlayment that provides and smooth surface for large format tile.
1. Applications: Floor Flatness.
    a. Tile Installation time: 4 hours
    b. Compressive Strength, 28 Day: 5,500 psi minimum
    c. Flexural Strength, 28 Day: Greater than 1100 psi.
    d. Products:
        1) **BASIS OF DESIGN**: H. B. Fuller Construction Products: TEC Level Set 300 self-leveling underlayment.
2. Backer Board: Cementitious type complying with ANSI A118.9; high density, glass fiber reinforced, 1/2 inch (12.7 mm) thick; 2 inch (51 mm) wide coated glass fiber tape for joints and corners.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that subfloor surfaces are smooth and flat within the tolerances specified for that type of work and are ready to receive tile. For tiles with at least one edge 15 inches in length or longer, maximum allowable variation from the required plane shall be 1/8 inch in 10 feet with no more than 1/16-inch variation in 24 inches.

B. Verify that wall surfaces are plumb, smooth and flat within the tolerances specified for that type of work, are dust-free, and are ready to receive tile.

C. Verify that subfloor surfaces are dust free and free of substances that could impair bonding of setting materials to subfloor surfaces.

3.02 PREPARATION

A. Protect surrounding work from damage.

B. Vacuum clean surfaces and damp clean.

C. Seal substrate surface cracks with filler. Level existing substrate surfaces to acceptable flatness tolerances.

D. Deflection of substrate not to exceed 1/360th of the span 1/2 inch in 15 feet in accordance with ANSI A108.01–2.3. Allow for live and impact load as well as dead load weight of tile and setting bed.

E. Install backer board in accordance with ANSI A108.11 and board manufacturer's instructions. Tape joints and corners, cover with skim coat of setting material to a feather edge.

F. Prepare substrate surfaces for adhesive installation in accordance with adhesive manufacturer's instructions.

3.03 INSTALLATION – WATERPROOFING MEMBRANE

A. Install in accordance with manufacturer's instructions, approved submittals, and in proper relationship with adjacent construction.

B. Install in compliance with ANSIA108.1, ANSI A108.13, and ANSI A108.17.

C. Required wet film thickness is 46 to 50 mils (1.2 to 1.3 mm) over entire surface.

D. Pre-fill all concrete crack and plywood gaps up to 1/8 inch (3 mm) wide as expansion joints.

E. Apply membrane to entire surface using a 1/4 to 1/2 inch (6 to 12 mm) nap roller, 3/16 inch (5 mm) v-notch trowel, or airless sprayer.

F. Apply in two coats, 25 mil (0.64 mm) wet film thickness each. Cure first coat approximately 1 hour before applying second coat at right angles to first coat.

3.04 INSTALLATION – CRACK ISOLATION MEMBRANE IN FULL COVERAGE

A. Install in accordance with manufacturer's instructions, approved submittals, and in proper relationship with adjacent construction.

B. Cracks and Generic Movement Joints

C. Place movement joints per TCNA EJ171.

D. Expansion, Isolation and Construction Joints:

1. Ensure cracks or joints are clean and free of all debris.
2. Install compressible backer rod.
3. Compress specified sealant into the joint per sealant manufacturer's instructions, leaving it flush with surface.
4. After sealant has cured, cover joint with bond breaker tape.
5. Apply membrane as directed.
6. After installing membrane over entire surface ensuring 50 mil (1.3 mm) wet film thickness and required cure time, place bond breaker tape over the joint and install tile without bridging the joint.
7. Caulk joint with specified sealant.

3.05 INSTALLATION - GENERAL

NOTE: In order to achieve accurately comparable labor quotes the specification must contain language indicating that the work is to be bid assuming the substrates are within the required tolerances. If the substrates are found not to be within those tolerances, language and/or pricing should be included in the installation contractor's bid which qualifies which trade is to do the work needed to bring the substrate into required tolerances.

A. Install in accordance with manufacturer's instructions.

B. Tile Installation Standards: Comply with parts of ANSI A108 Series "Specifications for Installation of Ceramic Tile" and the TCNA's "Handbook for Ceramic, Glass, and Stone Tile Installation" that apply to types of setting and grouting materials and to methods indicated.

C. Place movement joints per TCNA EJ171.

D. Lay tile to pattern indicated. Do not interrupt tile pattern through openings.

E. Cut and fit tile to penetrations through tile, leaving sealant joint space. Form corners and bases neatly. Align floor joints.

F. Place tile joints uniform in width, subject to variance in tolerance allowed in tile size. Make grout joints without voids, cracks, excess mortar or excess grout, or too little grout.

G. Form internal angles square and external angles bullnosed.

H. Sound tile after setting. Replace hollow sounding units.

I. Keep control and expansion joints free of mortar, grout, and adhesive.

J. Prior to grouting, allow installation to completely cure; minimum of 48 hours.

K. Grout tile joints unless otherwise indicated.

L. Movement (Contraction, Control, Expansion, and Isolation Joints) Joints: Locate sealant filled movement joints where indicated by the Architect. Form movement joints and other sealant-filled joints during installation of setting materials, mortar beds, and tile. Do not saw-cut joints after installing tiles. Where movement joints are to be butted, the ends shall touch and align.

1. Spacing Guidelines:
    a. 20 to 25 feet (6,096 to 7,620-mm) in each direction where interior tile work is not exposed to direct sunlight or moisture.
    b. 8 to 12 feet (2,438 to 3,658-mm) in each direction where interior tile work is exposed to direct sunlight and moisture.
    c. Where tilework abuts restraining surfaces such as perimeter walls, dissimilar floors, curbs, columns, pipes, ceilings, and where changes occur in backing materials, but not at drain strainers.
    d. In the joint between tiles making up the inside corner of planes.
    e. All contraction, control, expansion, isolation, seismic and cold joints in the horizontal structure and vertical surfaces shall continue through the tile surfaces, but not through membranes.
    f. Vertical and Horizontal Joints Widths: Widths for quarry tile and paver tile shall be the same as the grout joint but not less than 1/4 inch (6-mm) or the width of the contraction, control, expansion, seismic, isolation joint whichever is greater; widths for ceramic mosaic tile and glazed wall tile shall not be less than 1/8 inch (3-mm) or the width of the control, expansion, seismic, joint whichever is greater.
    g. Keep movement joints free from dirt, debris, grout, mortar, and setting bed materials.
2. Metal Edge Strips: Install where exposed edge of wall tile meets other wall finishes that finish flush with or below face of tile and the manufacturer of the field tile does not manufacture a tile edge transition trim. Where metal edge strips are indicated and full length single units are not available, joints are to be butted, ends shall touch and align.
3. At changes in plane and tile-to-tile control joints, use 100% silicone tile sealant (same color and manufacturer as nearby grout) instead of grout, with either bond breaker tape or backer rod as appropriate to prevent three-sided bonding.

3.06 INSTALLATION – INTERIOR FLOORS - THIN-SET METHODS

NOTE TO SPECIFIER: TCNA Methods listed below are suggestions only. Your specific project and needs may dictate a different TCNA Method that is not included on this specification. Consult the latest TCNA Handbook at https://www.tcnatile.com/products-and-services/publications/218-english-publications/188-handbook.html

A. Over interior concrete substrates, install in accordance with TCNA (HB) Method ____, dry-set or latex-Portland cement bond coat, with high performance cement grout, unless otherwise indicated.
   1. Where waterproofing membrane is indicated, install in accordance with TCNA (HB) Method ____, with latex-Portland cement grout.

B. Install tile-to-tile floor movement joints in accordance with TCNA (HB) Method EJ171F unless not required for control joints by crack isolation liquid membrane manufacturer.

C. Install tile in accordance with TCNA F125-FULL with crack isolation fluid membrane.
   1. Ceramic Tile Type: As indicated on drawings.
   2. Mortar: Improved modified dry-set mortar.
   3. Cement Grout: High Performance grout

3.07 INSTALLATION - FLOORS – THINSET TILE OVER CONCRETE SLABS (TYPICAL AND AT KIICHENS)

A. Over interior concrete substrates, install in accordance with TCNA (HB) Method ____, unless otherwise indicated.
   1. Where waterproofing membrane is indicated, with high performance cement grout or no mention of grout type, install in accordance with TCNA (HB) Method ____.

B. Mortar Bed Thickness: 5/8 inch (15.9 mm), unless otherwise indicated.

C. Grout Installation: Do not begin grouting tiles until they are firmly set and, in no case, in less than 24 hours after they have been installed. Remove spacers, if any, prior to grouting. Fill joints of cushion edged tile to the depth of the cushion; fill joints of square edge tile flush with the tile surface. Do not permit mortar, mounting mesh, or spacer material to show through grouted joints. Provide hard finished grout, which is uniform in color, smooth, and without voids, pinholes, or low spots. Tool surfaces with shallow concave profile.

3.08 THINSET TILE OVER WATERPROOF MEMBRANE (TOILET ROOMS AND AT KITCHENS):

A. Install in accordance with the mortar manufacturer's recommendations and requirements indicated below for setting bed methods, installation methods related to types of subfloor construction, and grout installation methods and grout types. Where recommendations and methods conflict, the manufacturer's recommendations shall apply.
   1. Mortar: Latex-Portland Cement Mortar: ANSI A108.5.
   2. Concrete Subfloors, Interior: TCNA ____ (on ground) and ____ (above ground).

B. Grout Installation: Do not begin grouting tiles until they are firmly set and, in no case, in less than 24 hours after they have been installed. Remove spacers, if any, prior to grouting. Fill joints of cushion edged tile to the depth of the cushion; fill joints of square edge tile flush with the tile surface. Do not permit mortar, mounting mesh, or spacer material to show through grouted joints. Provide hard finished grout, which is uniform in color, smooth, and without voids, pinholes, or low spots. Tool surfaces with shallow concave profile.

3.09 THINSET TILE OVER CRACK ISOLATION MEMBRANE:

A. Install in accordance with the mortar manufacturer's recommendations and requirements indicated below for setting bed methods, installation methods related to types of subfloor construction, and grout installation methods and grout types. Where recommendations and methods conflict, the manufacturer's recommendations shall apply.
   1. Mortar: Latex-Portland Cement Mortar: ANSI A108.5.
   2. Concrete Subfloors, Interior: TCNA F125-Full.

B. Grout Installation: Do not begin grouting tiles until they are firmly set and, in no case, in less than 24 hours after they have been installed. Remove spacers, if any, prior to grouting. Fill joints of cushion edged tile to the depth of the cushion; fill joints of square edge tile flush with the tile surface. Do not permit mortar, mounting mesh, or spacer material to show through grouted joints. Provide hard finished grout, which is uniform in color, smooth, and without voids, pinholes, or low spots. Tool surfaces with shallow concave profile.

3.10 INSTALLATION - SHOWERS AND BATHTUB WALLS

A. At tiled shower receptors install in accordance with TCNA (HB) Method ____, mortar bed floor, and Method ____, thin-set over cementitious backer unit walls.

B. Grout with high performance cement grout as specified above.

3.11 INSTALLATION - WALL TILE

A. Over interior concrete and masonry install in accordance with TCNA (HB) Method ____, thin-set with dry-set or latex-Portland cement bond coat.

B. Over wood studs without backer install in accordance with TCNA (HB) Method ____, mortar bed, with membrane where indicated.

C. Over metal studs without backer install in accordance with TCNA (HB) Method ____, mortar bed, with membrane where indicated.

3.12 INSTALLATION – GAUGED PORCELAIN PANELS

A. Substrate variation shall not exceed 1/8 inch (3 mm) in 10 feet (3 meters) and 1/16 (1.5 mm) inch in 24 inches (610 mm) from the required plane.

B. Interior Walls and Floors: Install per gauged porcelain tile/panel manufacturer's recommendations and ANSI A108.19.

NOTE: See for installation information from TEC https://www.tecspecialty.com/hbfuller-media/1429/tec_gaugedporcelaintps_installationguide_r0917_web1.pdf

NOTE: The edges of the gauged porcelain tile panels are not eased or beveled making them susceptible to damage from heavy rolling loads and impact. Full and flush grout joints should be specified to minimize edge impact.

NOTE: Minimum Shore A hardness rating of 25 or greater (per the TCNA Handbook) should be specified for all movement joints in traffic situations. Compressible joint fillers with less than a Shore A hardness of 25 should not be used. For installations exposed to heavy/hard

rubber wheel rolling loads, pre-fabricated commercial grade movement joints should be considered.

NOTE: All expansion joints specific to structural movement: material types and placement should be specified by architectural/engineering authority on the project.

3.13 CLEANING

A. Clean tile and grout surfaces.

3.14 PROTECTION

A. Do not permit traffic over finished floor surface for 4 days after installation in areas where cement grout is applied. For 100% epoxy grout areas, job may be opened to light traffic (but not other trades) and intermittent water exposure 24 hours after grouting. Complete cure and stain resistance will be achieved in 7 days.

END OF SECTION