

SECTION 09 30 00

PORCELAIN TILE PANELS, SETTING MATERIALS AND ACCESSORIES

Guide Specification: Crossville, Inc., Porcelain Tiles Panels, 3+ Interior/Exterior Walls
Crossville, Inc., Porcelain Tiles Panels, 5.6mm Interior Floors

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Porcelain Tile Panels, setting mortars and adhesives.
- B. Grout for Porcelain Tile Panels.

1.2 RELATED SECTIONS

- A. Section 09 30 00 - Tiling: Ceramic tile materials.

1.3 REFERENCES

- A. ANSI A108 Series/A118 Series - American National Standards for Installation of Ceramic Tile.
- B. ANSI A137.1 - American National Standard Specifications for Ceramic Tile.
- C. TCNA (HB) - Handbook for Ceramic, Glass and Stone Tile Installation; Tile Council of North America.
- D. ISO 13007 - International Standards Organization; classification for Grout and Adhesives.
- E. ANSI A137.3 – American National Standard Specifications for Porcelain Tiles and Porcelain Tile Panels/Slabs
- F. ANSI A108.19 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
- G. ANSI A108.20 Exterior Installation of Vertical and Overhead Gauged Porcelain Tiles and Gauged Porcelain Tile Panels/Slabs by the Thin-Bed Method bonded with Improved Modified Dry-Set Cement Mortar

1.4 SUBMITTALS

- A. Submit under provisions of Section 01 30 00.
- B. Product Data: Manufacturer's technical information for each product specified.
- C. Samples: Provide the following submittals before starting any work of this Section:

Samples for Selection: Submit one (1) sample 50mm x 175mm (2 " x 7") of each type of 3+ and/or 5.6 porcelain tile panels showing color. 250mm x 500mm (10 " x 20") are also available as needed.

- D. Interior Installation Instructions: ANSI A108.19 and Manufacturer's printed Technical Manual / Guidelines.
- E. Exterior Installation Instructions: Manufacturer's printed Technical Manual / Guidelines.
- F. Care and Maintenance: Crossville Inc.'s "Care & Maintenance" Brochure

1.5 QUALITY ASSURANCE

- A. Obtain each type and color of 3+ and/or 5.6 from Crossville Inc. or its approved distributor.
- B. To ensure compatibility of products; please provide all grout, setting materials, additives, accessories, and factory-prepared dry-set mortars from the same manufacturer.
- C. Installer Qualifications:
 1. Requiring references and a portfolio along with a bid or estimate is a good way to ensure the installer has successfully completed work of similar size, scope, and complexity.
 2. Due to the unique material characteristics and unconventional installation techniques required of porcelain tiles and porcelain tile panels/slabs, this work requires installers who are equipped with the proper tools and have acquired sufficient product knowledge and installation experience through the completion of an Installer Qualification Program as listed in 10.2.
 3. Installer Qualification Programs
 - Installer certified by Advanced Certification for Tile Installers (ACT) program for Gauged Porcelain Tiles and Gauged Porcelain Tile Panels/Slabs.
 - Installer completion of a comprehensive installation program (See details in informative appendix C) provided by the manufacturer of gauged porcelain tiles or gauged porcelain tile panels/slabs or setting materials for gauged porcelain tiles and gauged porcelain tile panels/slabs.
 - Installer completion of a comprehensive installation program provided by the International Masonry Institute (IMI) tile layer programs or the National Tile Contractors Association (NTCA)
 4. Informative Note: Requirements for installer qualifications shall be listed in the Tiling specification section, PART 1, QUALITY ASSURANCE. Documentation of compliance with required installer qualification criteria shall be required in the Tiling specification section, PART 1, INFORMATION SUBMITTALS.
 5. Crossville maintains a list of installers that have completed installation training. A list by zip code is available on our website at: <https://www.crossvilleinc.com/Locate>

1.6 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.
- C. Review installation procedures and coordination required with related work. Meeting agenda includes but is not limited to:
 1. Surface preparation
 2. Porcelain Tile Panel installation procedure
 3. Grouting material and procedure
 4. Cleaning products and maintenance

1.7 DELIVERY, STORAGE AND HANDLING

- A. Follow Crossville's written guidelines for handling as well as ANSI A108.19 for interior installations or A108.20 for exterior installations. Incorporate all necessary tools as

detailed in the following guidelines and Crossville's Technical Manual / Guidelines (most current revision found at <https://www.crossvilleinc.com>)

1. Handling of the crate – recommend 44” forks to handle the flat crate or A-frame from the side. Important to have 44” forks so they extend all the way across the crate or A-frame to catch the back runner.
2. Shipments of the 3+ and 5.6 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” forks and 5000-pound lift capacity.
3. To correctly lift and handle 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. Porcelain tile panels to be stored both upright and horizontal. 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 Styrofoam.
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.

1.8 EXTRA MATERIALS STOCK

- A. Upon completion of the work of this section, deliver to the owner an appropriate amount of additional tile panels of each type, color, pattern and size used in the work, as well as extra stock of adhesives, mortars, grouts and other installation materials for the owner's use in replacement and maintenance. Extra stock is to be from same production run or batch as original tile and installation materials.

1.9 ENVIRONMENTAL REQUIREMENTS

Comply with requirements of referenced standards and recommendations of material manufacturers for environmental conditions before, during, and after installation.

- A. For interior applications:

1. ANSI A108.19
2. Do not begin installation until building is completely enclosed and HVAC system is operating and maintaining temperature and humidity conditions consistent with "after occupancy" conditions for a minimum of 2 weeks.
3. Maintain continuous and uniform building temperatures of not less than 10°C (50°F) during installation.
4. Ventilate spaces receiving tile in accordance with material manufacturer's instructions.

- B. For exterior applications:

1. ANSI A108.20

PART 2 PRODUCTS

2.1 TILE MANUFACTURERS

- A. Crossville, Inc.; 349 Sweeney Drive; Crossville, TN 38555;
website: <https://www.crossvilleinc.com/Resources/Tile-101/Porcelain-Tile-Panel>

2.2 Crossville Porcelain Tile Panels

2.3 WALL TILE MATERIALS – Interior and exterior walls

- a. All series available for interior and exterior walls
- b. Meets the requirements of ANSI A137.3 Table 4 or 5 depending on thickness

NOTE TO SPECIFIER: edit for each tile type

- A. Porcelain Tile Panel: 3+ or 5.6 mm
- B. Size:
- C. Finish:
- D. Color:
- E. Special shapes:
- F. Location:

2.4 WALL TILE MATERIALS –Exterior walls - vertical field applied direct bond method

- 1. See ANSI A108.20 and Exterior field applied direct bond guidelines in Crossville's Technical Manual/Guidelines.
 - a. All series except FILO available for exterior walls
 - b. Meets the requirements of ANSI A137.3 Table 4 or 5 depending on thickness
 - c. FILO is not recommended in exterior applications

NOTE TO SPECIFIER: edit for each tile type

- A. Porcelain Tile Panel: 3+ or 5.6 mm
- B. Size: See exterior direct bond guidelines:
<https://www.crossvilleinc.com/Resources/Library?keyword=Panel>
- C. Finish:
- D. Color:
- E. Special shapes:
- F. Location:

2.5 FLOOR TILE MATERIALS – Interior floors over slab on grade, below grade, or above grade concrete and/or over existing tile securely bonded and properly prepared on above, below, or on grade concrete.

- a. Meets the requirements of ANSI A137.3 Table 4

NOTE TO SPECIFIER: edit for each tile type

Contact Crossville Technical Services at 931-484-2110 for project review. Extra heavy commercial (food plants, dairies) applications are not recommended. 5.6mm porcelain tile panels should not be used in installations exposed to steel wheel traffic.

- A. Porcelain Tile Panel: 5.6mm
- B. Size:
- C. Finish:
- D. Color:
- E. Special shapes:
- F. Location:

2.6 INSTALLATION MATERIALS MANUFACTURER

- A. Acceptable Manufacturers:
 - 1. ARDEX Americas, www.ardexamericas.com, 888-512-7339
 - 2. Bostik Inc., www.bostik-us.com, 800-523-6530
 - 3. Custom Building Products, www.custombuildingproducts.com, 800-272-8786
 - 4. Laticrete International, www.laticrete.com, 800-243-4788
 - 5. MAPEI Americas U.S.A., www.mapei.com, 800-992-6273
 - 6. TEC Specialty Products Inc., www.tecspecialty.com, 800-832-9023
- B. Substitutions: Not permitted.

2.7 SURFACE PREPARATION, MORTAR, GROUT, AND SEALANT MATERIALS

- A. Refer to Crossville's Technical Manual / Guidelines for specific surface preparation, mortar, grout, and sealant selections or contact the manufacturers in section 2.4
- B. For interior applications also reference ANSI A108.19
- C. For exterior applications also reference ANSI A108.20

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that surfaces to be covered with porcelain tile panels are:
 - 1. Sound, rigid and conform to good design/engineering practices; Systems, including the framing system and panels, over which porcelain panels will be installed shall be in conformance with the International Residential Code (IRC) for residential applications, the International Building Code (IBC) for commercial applications, or applicable building codes (floor systems over which the tile will be installed should not exceed L/360 under live load).
 - 2. Clean and free of dust, dirt, oil, grease, sealers, curing compounds, laitance, efflorescence, form oil, loose plaster, paint, and scale.
 - 3. For thin-bed porcelain tile installations when a cementitious bonding material will be used, including large and heavy tile mortar: maximum allowable

variation in the tile substrate is 1/8" in 10' (3mm in 3m) from the required plane, with no more than 1/16" variation in 24" (1.5mm variation in 600mm) when measured from the high points in the surface. For modular substrate units, such as adjacent concrete masonry units, adjacent edges cannot exceed 1/32" (0.8mm) difference in height.

4. **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.**
 5. Examine substrates for compliance with requirements for conditions affecting performance of the work. Refer to ANSI A108.01; General requirements for sub-surfaces and preparations by other trades materials.
 6. For Interior installations reference ANSI A108.19
 7. For exterior installations reference ANSI A108.20
- B. Do not proceed with tile work until surfaces and conditions comply with requirements indicated in referenced tile installation standard and Crossville's Technical Manual / Guidelines.
- C. Tile contractor by commencing work assumes overall responsibility to assure that all components and parts shown or required within the installation comply with contract documents and are compatible with each other and with the conditions and expected use. Commencement of work signifies acceptance of substrate and installation conditions.

3.2 INSTALLATION

NOTE TO SPECIFIER:

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

- A. Install porcelain tile panels in accordance with:
1. Crossville, Inc.; Technical Manual / Guidelines for Porcelain Tile Panels.
 2. For Interior installation install per ANSI A108.19
 3. For Exterior Installation install per ANSI A108.20

- B. Install porcelain tile panels in accordance with applicable requirements of ANSI A108 Series for the materials being used.
- C. When possible specify an installation system from a single setting material manufacturer/source to ensure compatibility and warranty.
- D. Install expansion and control joints in accordance with TCNA method EJ171. Movement joints in the substrate must not be bridged with the thin porcelain tile.

E. Interior walls and floors:

- 1. For interior walls and floors an 1/8-inch movement joint installed every 20 feet will accommodate the needed movement of the tile layer on grade, below grade, or above grade* (all other requirements such as perimeter joints etc. in EJ-171 should followed)

**Assuming a class 25 sealant installed at 70°F, using a high temperature of 105°F and a low temperature of 40°F.
If specific movement joint requirements need to be calculated, use the anticipated temperature differentials, the appropriate class of sealant (25 or 12.5) and a thermal expansion coefficient of 6.5×10^{-6} in/in/°C.*

- 2. For floors subjected to heavy/hard rubber wheel rolling loads commercial grade pre-fabricated movement joints should be used in lieu of sealant to maximize edge protection of the 5.6.

F. Exterior walls:

- 1. ANSI A108.20
- 2. Movement Joints: Installation of 3+ and 5.6 on exterior walls will be in accordance with the applicable Tile Council of North America (TCNA) Handbook exterior wall details. Movement joints shall be in compliance with EJ-171 of the current TCNA Handbook. While the size and interval of movement joints must be in accordance with the TCNA guidelines and specified by the architectural/engineering authority with strict attention to the environmental demands of the project, at a minimum Crossville recommends that all joints be at least 3/16 inch and all joints treated as soft joints (no hard-grouting materials in any joint) *. Tile panels have similar expansion and contraction characteristics when compared to traditional thickness porcelain tile, their thinner nature means that they will reach maximum thermal gain and cycle through expansion/contraction more rapidly than a traditional thickness tile. For this reason, proper movement accommodation is extremely critical for success of the installation.

**Note: Joint width calculations were done using a coefficient of thermal expansion of 6.5×10^{-6} in/in/°C for the tile panels and installation of a class 25 sealant material at 70°F, using a high temperature of 190°F and a low temperature of -30°F.*

Cap Flashing: The elimination of water intrusion into the bond coat is extremely critical for success of any exterior applied veneer. Proper detailing of capping and/or flashing at the roof line or at the top of the exposed tile layer is necessary. If not properly specified and installed, efflorescence, latex leaching, and freeze thaw damage can occur.

3.3 GROUTING

- A. Grout joints in accordance with A108.19 or A108.20, manufacturer's instructions,
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and ANSI A108.10 or ANSI A108.6.

- B. Following the installation of the porcelain tile panels, grout application times can vary from 24 hours to 72 hours; refer to specific guidelines per the grout manufacturer.

1. WALLS

- i. 2mm to 3mm grout joint size is recommended based on wall flatness
- ii. For interior walls the use of commercially available sanded, unsanded or epoxy grout is acceptable, appropriate caulking material is also acceptable for wall installations. For exterior walls see section 3.2 (F).
- iii. Install and clean per manufacturer's instructions

2. FLOORS

- i. Use a minimum of 3mm grout joint size due to lack of floor flatness and variable tolerances in field-cut thin porcelain tile panels.
- ii. For residential and light commercial applications, the use of sanded grout is acceptable. For commercial applications epoxy grout is required.
- iii. Setting mortars and their CURE TIMES can vary significantly from 72 hours to 7 days. Therefore, it is CRITICAL to refer to the specific mortar manufacturer's requirements before opening the finished floor to foot traffic.
- iv. Install and clean per manufacturer's instructions

3.4 PROTECTION

- A. Protect installed porcelain tile panel work from damages by other trades and general abuse until substantial work completion and acceptance.
- B. Refer to manufacturer's product data sheet for recommendations regarding protection.

END OF SECTION