

## SECTION 09 30 00

### PORCELAIN TILES, SETTING MATERIALS AND ACCESSORIES

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

#### PART 1 GENERAL

##### 1.1 SECTION INCLUDES

- A. Thin porcelain tiles setting mortars and adhesives.
- B. Grout for thin porcelain tiles.

##### 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.

##### 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 Laminam 3+ and/or 5.6 thin porcelain tile showing color.

- D. Installation Instructions: Manufacturer's printed Technical Manual / Guidelines.
- E. Care and Maintenance: Crossville Inc.'s "How to Care" Brochure

##### 1.5 QUALITY ASSURANCE

- A. Obtain each type and color of Laminam 3+ and/or 5.6 from Crossville Inc. or its 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:

The use of trained professional contractors for the installation of these thin porcelain tiles is required. In addition, the installer must also have obtained completion of Crossville Sponsored Training provided by Crossville Inc., a Crossville distributor, or other thin-tile specific training authorized/approved by one of the organizations listed below.

## NOTES TO SPECIFIER:

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. Pools, exterior facades, mortar beds, shower pans, steam showers, etc. require different skills. Matching installer ability to the project at hand requires close evaluation of their experience, training, state licensing (where applicable), and certifications/credentials (where applicable). The Ceramic Tile Education Foundation (CTEF) provides a Contractor Questionnaire that can be used to aid in evaluating and comparing contractors ([www.tilecareer.com](http://www.tilecareer.com)).
3. Various programs administered by associations, non-profit educational organizations, unions, and private companies serve the tile industry by providing education, hands-on training, and evaluation of the skills and competency of installers and contractors. It is important to distinguish between the many programs available:
  - Hands-on training
  - Evaluation/certification of installation skills
  - On-line training
  - On-line knowledge evaluation (without a hands-on component)

As with all programs, the rigor and credibility of the program must also be considered.

The following non-profit programs are well-established and recognized by the Tile Council of North America's (TCNA) Handbook Committee (listed alphabetically):

**Advanced Certifications for Tile Installers (ACT):** ACT is an evaluation and certification program for tile installers in advanced, specific skills areas: large format tile installation and substrate preparation, mudwork for walls, mudwork for floors, shower pan installation, and membrane applications. To pass an ACT test module, an installer must demonstrate hands-on proficiency and specific knowledge. Only installers who have already passed the Certified Tile Installer (CTI) test and those who are recognized by the U.S. Department of Labor as Journeyman Tile Layers may register for ACT testing. ACT tests were developed collaboratively by product manufacturers and industry associations including the Ceramic Tile Education Foundation (CTEF), Tile Contractors Association of America (TCAA), International Union of Bricklayers and Allied Craftworkers (IUBAC), International Masonry Institute (IMI), National Tile Contractors Association (NTCA), and Tile Council of North America (TCNA). Certification testing is administered by CTEF and IMI. For more information see [www.tilecertifications.com](http://www.tilecertifications.com). See also: Sample Language for Including Installer and Contractor Qualifications in Specifications.

**Ceramic Tile Education Foundation (CTEF) Certified Tile Installer Program:** CTEF tests hands-on installation skills and knowledge. Installers must achieve the minimum required score on both tests to earn the "CTEF Certified Installer" designation. Contractors that employ CTEF Certified Installers are listed in the CTEF Contractor Directory, found in this *Handbook* and on the CTEF website. See [www.tilecareer.org](http://www.tilecareer.org) for more information. See also: Sample Language for Including Installer and Contractor Qualifications in Specifications.

**International Masonry Institute (IMI) Contractor College Program:** IMI conducts professional and technical courses for union masonry and tile contractors, which lead to certification in installation and project supervision. See [www.imiweb.org](http://www.imiweb.org) for more information. See also: Sample Language for Including Installer and Contractor Qualifications in Specifications.

**Journeyman Tile Layer Apprenticeship Programs:** Installers recognized by the U.S. Department of Labor (DOL) as Journeyman Tile Layers are required to fulfill and document several years of training and on-the-job experience as apprentices to become Journeymen. The majority of these installers earn their Journeyman status through union-affiliated training programs, although some non-union tile contractors administer their own DOL-recognized apprenticeship programs and employ journeyman tile layers. Contractors that employ union Journeyman Tile Setters can be found through the union locals that list their signatory contractors, primarily the Bricklayer and Allied Craft workers (BAC) and the United Brotherhood of Carpenters (UBC). See [www.bacweb.org](http://www.bacweb.org) and [www.carpenters.org](http://www.carpenters.org) for more information. See also: Sample Language for Including Installer and Contractor Qualifications in Specifications.

**National Tile Contractors Association (NTCA) Five Star Contractor Program:** NTCA is a tile contractors association, with membership open to all tile contractors. Their Five Star program is a peer review program to recognize NTCA members who have demonstrated a track record of providing successful installations. Earning the Five Star designation requires recommendations from customers, suppliers, and peers as well as participation in continuing education, training, and safety programs. See [www.tile-assn.com](http://www.tile-assn.com) for more information. See also: Sample Language for Including Installer and Contractor Qualifications in Specifications.

**Tile Contractors' Association of America (TCAA) Trowel of Excellence Program:** TCAA is a contractors association for BAC signatory contractors. Its Trowel of Excellence program is a peer review program to recognize TCAA members who have demonstrated a track record of providing successful installations. Earning the Trowel of Excellence designation requires letters of reference, submittal of a detailed project description and photos, employee participation in educational programming, and proof of financial responsibility. See [www.tcaainc.org](http://www.tcaainc.org) for more information. See also: Sample Language for Including Installer and Contractor Qualifications in Specifications.

### **Sample Language for Including Installer and Contractor Qualifications in Specifications**

Where inclusion of installer and contractor qualifications in project specifications is desired, include the qualifications under Quality Assurance and require proof of qualifications under Submittals. The language below may be used for the purpose of including such requirements.

Installing contractor is [a five-star member of the National Tile Contractors Association] [or] [a Trowel of Excellence member of the Tile Contractors' Association of America].

Installing contractor's foreman or superintendent for the Project holds the International Masonry Institute's Foreman Certification<sup>1</sup>.

Installing contractor employs [Ceramic Tile Education Foundation Certified Installers] [or] [installers recognized by the U.S. Department of Labor as Journeyman Tile Layers].

Individual installer(s) working for installing contractor are certified through Advanced Certifications for Tile Installers (ACT) for installation of [Large Format Tile and Substrate Preparation] [Membranes] [Mud (Mortar Bed) Floors] [Mud (Mortar) Walls] [Shower Receptors].

Installer meets the requirements of a program identified and approved by the architect with the criteria for such program similar to or exceeding [Advanced Certifications for Tile Installers (ACT) for installation of] [Large Format Tile and Substrate Preparation] [Membranes] [Mud (Mortar Bed) Floors] [Mud (Mortar) Walls] [Shower Receptors][or] [Ceramic Tile Education Foundation (CTEF) Certified Tile Installer Program] [or] [International Masonry Institute (IMI) Contractor College Program] [or] [Journeyman Tile Layer Apprenticeship Programs] [or] [National Tile Contractors' Association (NTCA) Five Star Contractor Program] [or] [Tile Contractors' Association of America (TCAA) Trowel of Excellence Program ].

<sup>1</sup>The International Masonry Institute's Foreman Certification is available only to members of the International Union of Bricklayers and Allied Craftworkers; accordingly, only IUBAC signatory contractors can meet this requirement.

## 1.6 PRE INSTALLATION CONFERENCE

- A. Convene one week prior to commencing work of this section
- B. Require attendance of installation 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. Thin Porcelain Tile 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. Incorporate all necessary tools as detailed in the following guidelines and Crossville's Technical Manual / Guidelines (most current revision found at [www.laminambycrossville.com](http://www.laminambycrossville.com))
  - 1. Handling of the crate – recommend 44" forks to handle the crate from the side. Important to have 44" forks so they extend all the way across the crate to catch the back runner.
  - 2. Shipments of the Laminam 3+ and 5.6 crates loaded with the narrow end of the crate facing out will require a fork truck with a minimum of 84" forks and 5000 pound lift capacity.
  - 3. To correctly lift and handle thin porcelain tiles 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. Thin porcelain tiles to be stored both upright and horizontal. If slabs are placed on top of each other, ensure that each tile is clean and that the surface that the tiles are resting on is flat. If tiles 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. 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 5% minimum additional 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. 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.
2. Maintain continuous and uniform building temperatures of not less than 10°C (50°F) during installation.
3. Ventilate spaces receiving tile in accordance with material manufacturer's instructions.

## PART 2 PRODUCTS

### 2.1 TILE MANUFACTURERS

- A. Crossville, Inc.; 349 Sweeney Drive; Crossville, TN 38555;  
website: <http://laminambycrossville.com>

### 2.2 WALL TILE MATERIALS – Interior walls

All series available for interior walls

#### ***NOTE TO SPECIFIER: edit for each tile type***

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

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

See Exterior field applied direct bond guidelines at:

<http://crossvilleinc.com/wordpress/wp-content/uploads/2014/05/Laminam-Exterior-3-Direct-Bond-Guidelines-5-12-15.pdf>

***FLO is not recommended in exterior applications***

#### ***NOTE TO SPECIFIER: edit for each tile type***

- A. Porcelain Tile: LAMINAM 3+ or 5.6 mm  
B. Size: Exterior walls maximum dimension 1 Meter x 1 Meter (39 3/8" x 39 3/8")  
C. Finish:  
D. Color:  
E. Special shapes:

F. Location:

2.4 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

**NOTE TO SPECIFIER: edit for each tile type**

***Laminam 5.6 Thin Porcelain Tiles when considered for heavy commercial (shopping malls, airports) applications will be considered on a case by case basis. Contact Crossville Technical Services at 931-484-2110 for project review. Extra heavy commercial (food plants, dairies) applications are not recommended. Laminam 5.6 porcelain tile panels should not be used in installations exposed to steel wheel traffic.***

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

2.5 INSTALLATION MATERIALS MANUFACTURER

- A. Acceptable Manufacturers:
  - 1. ARDEX Americas, [www.ardexamericas.com](http://www.ardexamericas.com), 888-512-7339
  - 2. Bostik Inc., [www.bostik-us.com](http://www.bostik-us.com), 800-523-6530
  - 3. Custom Building Products, [www.custombuildingproducts.com](http://www.custombuildingproducts.com), 800-272-8786
  - 4. Laticrete International, [www.laticrete.com](http://www.laticrete.com), 800-243-4788
  - 5. MAPEI Americas U.S.A., [www.mapei.com](http://www.mapei.com), 800-992-6273
  - 6. ProSpec Inc., [www.prospec.com](http://www.prospec.com), 800-334-0784
  - 7. TEC Specialty Products Inc., [www.tecspecialty.com](http://www.tecspecialty.com), 800-832-9023
- B. Substitutions: Not permitted.

2.6 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

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Verify that surfaces to be covered with large format, thin porcelain tiles 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).  
Substrates supported by wood framed floor structures are not acceptable for the installation of Laminam thin porcelain tiles.
  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.
- 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 thin porcelain tile 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 35 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 35 should not be used.*

- **All expansion joints specific to structural movement: material types and placement should be specified by architectural/engineering authority on the project.**
  - A. Install thin porcelain tiles in accordance with manufacturer's printed instructions
    - 1. Crossville, Inc.; Technical Manual / Guidelines for Laminam Thin Porcelain Tiles.
  - B. Install thin porcelain tiles in accordance with applicable requirements of ANSI A108 Series for the materials being used.
  - C. 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.
  - D. 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  $6.5 \times 10^{-6}$  in/in/°C.*
  - E. Exterior walls:
    - 1. Movement Joints: Installation of LAMINAM 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)\*. LAMINAM tiles 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  $6.5 \times 10^{-6}$  in/in/°C for the Laminam tiles 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 manufacturer's instructions and ANSI A108.10 or ANSI A108.6.
- B. Following the installation of the thin porcelain tiles, 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. Use of commercially available sanded, unsanded or epoxy grout is acceptable, appropriate caulking material is also acceptable for wall installations.
- 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 tiles
- 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 thin porcelain tile 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