

TILE & STONE INSTALLATION SYSTEMS

Gauged porcelain tile panels/slabs – Floors

For interior floor tiles 5 to 6.5 mm (6,5 mm) in thickness

For the purpose of this reference guide, all testing data and recommendations are for interior floors only using gauged porcelain tile panels/slabs measuring 5 to 6.5 mm (6,5 mm) in thickness.

Defining gauged porcelain tile panels/slabs

Gauged porcelain tile panels/slabs are lightweight products that are produced using less materials and less energy. This combination makes them a perfect choice for many “sustainable” installation projects, specifying interior walls, floors and facades.

Typically, “gauged porcelain tile panels/slabs” for walls and floors range in thickness from 3 to 6.5 mm (6,5 mm), and “standard-body porcelain tiles” are greater than 7 mm thick.

Installation of gauged porcelain tile panels/slabs is different from that of standard-body porcelain tile, requiring special techniques to prevent breakage during and after installation. In addition to the reduced tile thickness, many of these thin tiles are produced in large-format sizes ranging from 20" x 20" to 63" x 126" (50 x 50 cm to 160 x 320 cm) or larger, which may require special tools and equipment when placing the tile and making adjustments. The manufacturer of gauged porcelain tile panels/slabs should be consulted before selection and installation to determine the tile's suitability for the specified project. All interior installations must follow the ANSI A108.19-2017 standard 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.”



Example of a gauged, 5-mm gauged porcelain tile panel/slab

For definitions of various types, sizes, physical properties and grading procedures for porcelain tile, refer to ANSI A137.3 - 2017 (“American National Standard Specifications for Gauged

Porcelain Tile and Gauged Porcelain Tile Panels/Slabs”). Refer to the gauged porcelain tile panels/slab manufacturer for the maximum allowable service rating per the ASTM C627 test method for floors.

Surface preparation

Interior floors must be structurally stable and capable of supporting the tile, setting system, and associated live loads and dead loads. Concrete and existing tile over concrete should be fully cured and free of soap scum, dust, dirt, oil, wax, sealers, paint, coatings, and any other substances that could reduce or inhibit proper adhesion performance. For specific surface preparation requirements, refer to MAPEI's reference guide “Surface Preparation Requirements” for Tile & Stone Installation Systems.

Acceptable substrates

- Concrete slab, either on-grade or above-grade
- Existing tile should be sound, well bonded and prepared using either of the following options:
 - ▶ Option 1: Mechanical abrasion with a carborundum disk followed by a clear water wash is recommended. Refer to the most current Tile Council of North America (TCNA) handbook, Method TR712; or the Terrazzo Tile & Marble Association of Canada (TTMAC) Tile Installation Manual, Detail 324 RF.
 - ▶ Option 2: Prime the existing tile (only preexisting tile installed on a concrete substrate) with MAPEI's *ECO Prim Grip*™. Refer to the most current Technical Data Sheet (TDS) at www.mapei.com.
- Such large sizes have increased the potential for differential deflection over plywood and backerboard installations and diminished the breaking strength of gauged porcelain tile panels/slabs. Therefore, MAPEI recommends that installations over plywood and backerboard be restricted to methods that incorporate the criteria contained in F141-17 STONE or F250-17 STONE. MAPEI also recommends that installations over plywood and backerboard be restricted to tiles at least 5.5 mm (5,5 mm) thick.
- Gypsum underlayments are suitable substrates. However, to avoid a chemical reaction known as “ettringite,” they must be primed with MAPEI's

Primer L™, *Primer T™* or *ECO Prim Grip™* before installation of a cementitious mortar system. For details, consult MAPEI's technical bulletin "Gypsum-Based Floors and Walls" at www.mapei.com.

- MAPEI's *Mapesonic™ 2*, *Mapeguard® 2* and *Mapeguard UM* sheet membranes are considered suitable substrates for residential installations only.

Unacceptable substrates

- Large-format gauged porcelain tile panels/slabs should not be installed over oriented strand board (OSB) due to its dimensional instability in supporting these larger tiles.

Before installation, achieve floor flatness

The surface of the substrate must have the following degree of flatness before installation:

The substrate receiving the gauged porcelain tile panels/slabs should be prepared to a floor flatness (FF) of > 50. All approved and properly prepared substrates should have no more than a permissible variation of 1/8" in 10 feet (3 mm in 3,05 m) from the required plane; nor more than 1/16" in 24" (2 mm in 60 cm) when measured from high points in the surface with a straight edge.

It is important to note that FF numbers are generally taken within 72 hours of slab placement, after which time the slab conditions can change. Slab flatness requirements should be re-evaluated before installation of any gauged porcelain tile panels/slabs.

To achieve the acceptable floor flatness, any MAPEI cementitious self-leveling underlayment can be used before installing the gauged porcelain tile panels/slabs. Always use the appropriate MAPEI primer before application of the self-leveling underlayment. (For gypsum underlayment installations, see the recommendations in the "Acceptable substrates" section above.)

For further information on the correlation between FF numbers, tile size, grout joint size and traditional 10-foot (3,05-m) straight-edge measurements, refer to both the American Concrete Institute (ACI) 302.2R-06 "Guide for Concrete Slabs that Receive Moisture-Sensitive Flooring Materials," Section 1.5 – "Floor flatness changes with time;" and to the National Tile Contractors Association (NTCA) Technical Manual, Section 01/10, Floor Flatness, G-19.

Optional waterproofing

MAPEI's *Mapelastix™ AquaDefense* waterproofing can be installed on interior and exterior tile installations that are exposed to intermittent or continuous wet conditions. (per TCNA Environmental Exposure Classifications Res 1-6 & COM 1-6; consult the most current TCNA handbook to determine the appropriate classification).

- Meets ANSI A118.10 standard
- Listed by IAPMO (International Association of Plumbing and Mechanical Officials): File #3996
- ICC-ES Report: ESR 3474

Selecting and installing the proper mortar

Acceptable MAPEI mortars

The following mortars are acceptable for interior floor applications:

- *Granirapid®* System (classified as ISO 13007 C2FS2P2 and meeting ANSI A118.4F, A118.11 and A118.15F)
- *Kerabond® T / Keralastic®* System (classified as ISO 13007 C2ES2P2 and meeting ANSI A118.4E, A118.11 and A118.15E)
- *Kerabond/Keralastic™* System (classified as ISO 13007 C2ES2P2 and meeting ANSI A118.4E, A118.11 and A118.15E)
- *Ultraflex™ LFT™* (classified as ISO 13007 C2TES1P1 and meeting ANSI A18.4TE, A118.11 and A118.15TE)
- *Ultraflex LFT Rapid* (classified as ISO 13007 C2TFS1P1 and meeting ANSI A18.4TF, A118.11 and A118.15TF)
- *MAPEI Ultralite™ S2* (classified as ISO 13007 C2ES2P2 and meeting ANSI A18.4E, A118.11 and A118.15E)
- *MAPEI Ultralite Mortar* (classified as ISO 13007 C2TES1P1 and meeting ANSI A18.4TE, A118.11 and A118.15TE)
- *MAPEI Ultralite Mortar Pro* (classified as ISO 13007 C1TES1 and meeting ANSI A118.4TE and A118.11)
- *MAPEI Ultralite S1 Quick* (classified as ISO C2TFS1P1 and meeting ANSI A118.4TF, A118.11 and A118.15TF)

To help achieve maximum coverage with each of these mortars, mix to the highest water ratio according to the most current TDS at www.mapei.com.

Selecting the trowel

Use a trowel with a configuration that helps to maximize mortar coverage between the substrate and the gauged porcelain tile panels/slabs, evenly spreading the mortar across the bottom of the tile and minimizing air pockets.

Either of the following trowels is acceptable to use (consult the Website of either Raimondi or European Tile Masters for specific ordering information):



- European Tile Masters' Euro Notch Trowel (which comes in 3 models): 1Y- Euro Notch Trowel (rubber handle); 1YW- Euro Notch Trowel (wood handle); or 2YW- Euro Angle Trowel (ergonomic handle)



- Raimondi's Flow Ridge, Slant Notch Trowel: Part # (183HFV8), with 5/16" x 5/16" (8 x 8 mm) notches

Setting the tile

1. Mortar should be applied with a notched trowel to both the substrate and back of the tile. The trowel ridges on the tile back and the substrate should be troweled in a straight line such that they will be parallel to each other when the tile is placed on the substrate.
2. Do not allow mortar to dry or skin over on either surface before setting the tile. This may require careful planning to ensure sufficient personnel are on site to complete the installation.
3. Place tile into the fresh mortar and firmly press to cause the ridges to flatten out and come together into a continuous void-free bed.



Example of gauged tile over existing tile during a renovation using a mechanical edge-leveling system

4. Install desired spacers. Grout joint width should not be based on the edge-leveling device's strap. Using spacers in addition to the strap will allow for easier cleaning of the grout joint. A minimum grout joint width of 1/16" (1,5 mm) should be maintained through the entire installation.
5. Place the straps along the tile edge according to the recommended spacing and place the caps on the top of the strap, but do not seat them at this time.
6. Ensuring maximum coverage between the tile panel and the substrate is critical to a successful installation. Along with the mortar application techniques described earlier, the following walking pattern for embedding the tile panel/slab is the most reliable and efficient way to eliminate voids in the mortar while maximizing edge-to-edge coverage:
 - ▶ Starting at the center point of the tile panel, walk with small shuffling steps (no more than a half-length of your foot at a time) down the full length of the tile, staying only in the center portion.
 - ▶ Return to the center point and take small shuffling steps (no more than the width of your foot) across the widths of the tile panel, compressing the mortar ridges and forcing any trapped air to escape along the tile panel's edge.
 - ▶ Continue this shuffling process until the entire tile panel has been compressed in the mortar.
 - ▶ Take care to remove any dried mortar or other debris from footwear. (Do not use a rubber mallet as an embedding alternative.)
7. There should be full mortar coverage on the back of the tile. When a mechanical edge-leveling system is used, it is imperative to have sufficient

mortar under the body of the tile, under the corners and at the tile edges for full support. Fill any voids with the mortar for complete support.



Example of a gauged porcelain tile panel/slab with full mortar coverage

8. After installing the mechanical edge-leveling system, install adjacent tile.
9. Remove any excess mortar from grout joints as work progresses.
10. Using the installation tool, pull the caps down into contact with the tile face and apply recommended tension until the tile edges are in alignment. All edges should be fully supported. Remove the air around the tile at 2" (5 cm) from the edge and the edge leveling system by using an electric orbital sander with a soft pad, to avoid damaging the tile surface. Continue this process with each tile across installation area, repeating steps 1-9 and checking edge alignment.
11. For leveling systems with removable caps: Once all caps are in place and tensioned, remove each cap and clean any excess mortar from under the cap area and grout the joint. Replace caps.
12. For leveling systems with a removal tool: When the mortar has cured sufficiently (wait at least 24 hours for a traditional-setting mortar, and at least 3 to 4 hours for a rapid-setting mortar), it is possible to remove the strap and cap. Grip the strap above the cap with the installation tool, set the tension setting to "Strap" and squeeze the tool until the strap snaps off.
13. Light traffic can be allowed after at least 72 hours following the installation for a traditional-setting mortar. For a rapid-setting mortar, allow at least 12 hours before opening the installation to light traffic.

Note that any tile failure due to inadequate mortar transfer or coverage will not be covered by MAPEI's limited warranty program. Grout is not to be considered compensation for lack of coverage and should not be mixed to a loose consistency to attempt filling of gaps under the tile edge.

Mechanical edge-leveling systems

Mechanical edge-leveling systems – such as the MLT, Tuscan Leveling System or Raimondi Tile Leveling System – will greatly assist in the installation of gauged porcelain tile panels/slabs to reduce the effects of lippage.

Mechanical edge-leveling systems are intended to be used along with good substrate-preparation practices (FF > 50 or 1/8" in 10 feet [3 mm in 3,05 m]), not

as a substitute for those practices. To demonstrate the use of a mechanical edge-leveling system, the Tuscan Leveling System will be referenced in this Reference Guide. However, it is up to the installer to decide which mechanical edge-leveling system will be used.

For the most current information on the MLT, Tuscan or Raimondi mechanical edge-leveling system, please visit the associated Website.



Example of a gauged tile being installed using a mechanical edge-leveling system to reduce lippage

Movement joints

Field movement joints are required within tile installations. Expansion, construction and contraction joints should be carried through the tile without exception. Refer to the most current TCNA handbook, Method EJ171; or the TTMAC Tile Installation Manual, Detail 301MJ.

MAPEI recommends the use of *Mapesil™ T*, a professional-grade, 100%-silicone sealant that meets TCNA EJ171 requirements for heavy traffic and expansion/movement joints.

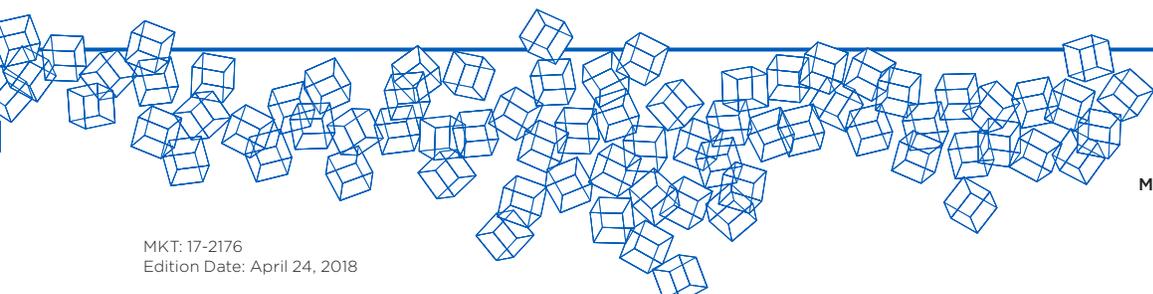
Grouting the tile

Grout the joints with any of the following MAPEI grouts, according to installation needs. All grout joints should be packed full and free of voids.

- *Ultracolor® Plus FA* (classified as ISO 13007 CG2WAF and meeting ANSI A118.7). It is also SCS Green Squared Certified, meeting the standard criteria of ANSI A138.1. All cementitious MAPEI grouts have a TCNA Industry-Average UL Certified EPD for Grouts.
- *Kerapoxy® CQ* (classified as ISO 13007 R2/RG and meeting ANSI A118.3)
- *Kerapoxy IEG CQ* (for settings with extreme chemical resistance requirements; classified as ISO 13007 RG and meeting ANSI A118.3/5)
- *MAPEI Flexcolor™ CQ* (meets or exceeds specific tests in ANSI A118.3 and A118.6 standards covering other grout types, although ready-to-use grouts do not yet have ANSI requirements)

When these recommendations are followed along with the ANSI A108.19-2017 standard for "Interior Installation of Gauged Porcelain Tiles and Gauged Porcelain Tile Panels/Slabs by the Thin-Bed Method," a successful project

should be achieved. Refer to the most current TDSs for details regarding the use of MAPEI products. Technical data sheets and safety data sheets are available at www.mapei.com.



MKT: 17-2176
Edition Date: April 24, 2018



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