INSTRUCTIONS FOR INSTALLING LARGE FORMAT CERAMIC TILES

All solutions from our experience…

This instruction manual on how to install large format tiles correctly is based on the consolidated experience Mapei S.p.A. has matured over the years. Please refer to the current local norms.

The information and advice contained in this manual are for indication purposes only and do not reflect all the different situations that may be encountered on site. In the event of situations or conditions not covered by this manual, the MAPEI Technical Services team is available to help identify the most appropriate solution for each specific intervention. For further details about our products consult the relative product Technical Data Sheets available on our website www.mapei.it.

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1. VERIFYING THE TYPE AND CONDITION OF THE SUBSTRATES

Large format tiles may be installed on all substrates normally used in the building industry such as concrete, cementitious and anhydrite screeds, screeds made from special binders such as *Topcem Pronto* or *Mapecem Pronto*, heated screeds, old ceramic and stone floors, metal, cement-based and gypsum-based render, expanded cement blocks, aerated concrete blocks, plasterboard and internal substrates waterproofed with cementitious products such as *Mapelastic* or synthetic resin-based products such as *Mapegum WPS* and *Mapelastic AquaDefense*.

The suitability of a substrate for this type of installation must be checked beforehand.
As specified by current standards, substrates must always be:

√ **Sound with no cracks**
Any cracks in the screed must be monolithically sealed with epoxy resin, such as *Eporip*, *Epojet* or *Eporip Turbo*.

Cured and dimensionally stable
To reduce installation times make screeds from special binders such as *Topcem Pronto* or *Mapecem Pronto*.

Strong (strong and resistant enough for the loads expected and the area of use).

Dry substrate drying must be verified according to the methods established for every type.

Clean and free of loose parts (dust, grease, oil, wax, paint, form-release compound and any other material which could affect adhesion).
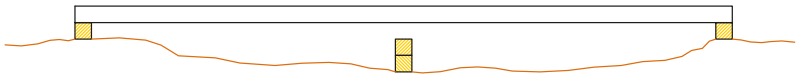
Perfectly flat (recommended tolerance ± 3 mm)
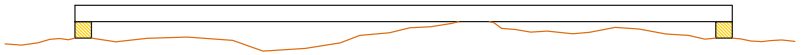If the flatness of the substrate is not within this tolerance, it must be levelled off before installing tiles with a levelling product such as *Ultraplan*, *Ultraplan Maxi*, *Planitop Fast 330* or *Nivorapid*.
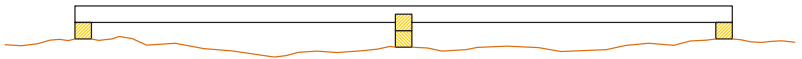
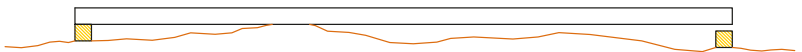
Negative deviation: within tolerance

Negative deviation: out of tolerance

Positive deviation: within tolerance

Positive deviation: out of tolerance

2. CHOOSING THE RIGHT ADHESIVE

Choosing the right adhesive is fundamental to ensure a durable, sound bond over the years and depends on the type of substrate, the type and format (dimensions and thickness) of the tiles, the area of use and the surrounding conditions.

2.1 Mapei adhesives for installing tiles on internal floors and walls

Type of substrate (*) (**)	Size of tile	NORMAL SETTING	
		Adhesive	Class according to EN 12004
Cementitious screeds or renders Anhydrite screeds or renders Self-levelling products Concrete Cement-fibre panels Plasterboard Old ceramic Terrazzo Stone	surface ≤ 3600 cm² side ≤ 60 cm	KERAFLEX MAXI S1 KERAFLEX MAXI S1 ZERØ ULTRALITE S1	C2TE S1 C2TE S1 C2TE S1
	surface > 3600 cm² side ≤ 120 cm		
	surface > 1 m² side > 120 cm	ULTRALITE S2 KERABOND + ISOLASTIC	C2E S2 C2E S2
Heated screeds	surface ≤ 3600 cm² side ≤ 60 cm	ULTRALITE S1 KERAFLEX MAXI S1 KERAFLEX MAXI S1 ZERØ	C2TE S1 C2TE S1 C2TE S1
	surface > 3600 cm² side ≤ 120 cm	ULTRALITE S2 KERABOND + ISOLASTIC	C2E S2 C2E S2
	surface > 1 m² side > 120 cm	ULTRALITE S2 KERABOND + ISOLASTIC	C2E S2 C2E S2
Waterproofing systems (from the MAPELASTIC range and MAPEGUM WPS)	surface ≤ 3600 cm² side ≤ 60 cm	KERAFLEX MAXI S1 KERAFLEX MAXI S1 ZERØ ULTRALITE S1	C2TE S1 C2TE S1 C2TE S1
	surface > 3600 cm² side ≤ 120 cm	ULTRALITE S2 KERABOND + ISOLASTIC	C2E S2 C2E S2
	surface > 1 m² side > 120 cm		
Wood PVC, rubber and linoleum Metal surfaces Resin	All formats	KERALASTIC KERALASTIC T ULTRABOND ECO PU 2K	R2 R2T R2T

(*) Gypsum and anhydrite based surfaces must always be treated beforehand with PRIMER G or ECO PRIM T
(**) Non-absorbent substrates should be treated beforehand with ECO PRIM GRIP if necessary

The Mapei adhesives recommended in the following tables take into consideration current standards and Mapei's consolidated experience about the ceramic tiles' installation.

RAPID SETTING	
Adhesive	**Class according to EN 12004**
GRANIRAPID ULTRALITE S1 QUICK	C2F S1 C2FT S1
ULTRALITE S2 QUICK ELASTORAPID	C2FE S2 C2FTE S2
ULTRALITE S1 QUICK GRANIRAPID	C2FT S1 C2F S1
ELASTORAPID	C2FTE S2
KERAQUICK MAXI S1 + LATEX PLUS	C2FT S2
GRANIRAPID ULTRALITE S1 QUICK KERAQUICK MAXI S1	C2F S1 C2FT S1 C2FT S1
ULTRALITE S2 QUICK KERAQUICK MAXI S1 + LATEX PLUS	C2FE S2 C2FT S2
KERAQUICK MAXI S1 + LATEX PLUS	C2FT S2

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2.2 Mapei adhesives for installing tiles on external walls

| Type of substrate | Size of tile (***) | NORMAL SETTING | |
		Adhesive	Class according to EN 12004
Cementitious render Concrete	surface ≤ 3600 cm² side ≤ 60 cm	KERAFLEX MAXI S1 KERAFLEX MAXI S1 ZERØ ULTRALITE S1	C2TE S1 C2TE S1 C2TE S1
	surface > 3600 cm² side ≤ 120 cm	ULTRALITE S2 KERABOND + ISOLASTIC	C2E S2 C2E S2
	surface > 1 m² side > 120 cm	ULTRALITE S2 KERABOND + ISOLASTIC	C2E S2 C2E S2

(***) For tiles with reinforcement mesh and one side ≥ 120 cm use class R2/R2T adhesives such as KERALASTIC, KERALASTIC T or ULTRABOND ECO PU 2K.

RAPID SETTING	
Adhesive	**Class according to EN 12004**
ULTRALITE S1 QUICK	C2FT S1
ELASTORAPID ULTRALITE S1 QUICK	C2FTE S2 C2FT S1
ULTRALITE S2 QUICK KERAQUICK MAXI S1 + LATEX PLUS	C2FE S2 C2FT S2

The installation instructions in the above tables are for indication purposes only and for normal conditions. For further information, please refer to the relative Technical Data Sheet for each product. Defining the most suitable laying system is highly dependent on specific site conditions and the format of the tiles. For particular installation situations please contact Mapei Technical Services or refer to the relative technical manual.

3. HANDLING LARGE FORMAT TILES AND CUTTING AND MAKING HOLES

Handle large format tiles with great care: at least two people are required and special tools and equipment should be used.

1. To facilitate handling the tiles, it is recommended to carry and install them with runners and frames with suction cups to keep them more rigid and limit any twisting or bending.

Once the tiles have been removed from their packaging, care must be taken when putting them in positioning by resting the long side of the tiles on the ground at an angle of 30° to the support.

2. Before handling and moving the tiles, it is recommended to clean the surface of the tile and the suction cups with a damp sponge to get a better grip.

3. There are two types of suction cups available, the traditional type and those with an in-built pump. The latter type is more secure and provides a better grip and the vacuum in the sucker cup can be re-established using the pump, even after a certain period of time. Always make sure a good vacuum has been created between the lifting device and the surface of the tile.

4. If the tile has been cut and is potentially weaker in that area, it is recommended to add more runners or cross-members to reduce any bend or twist.
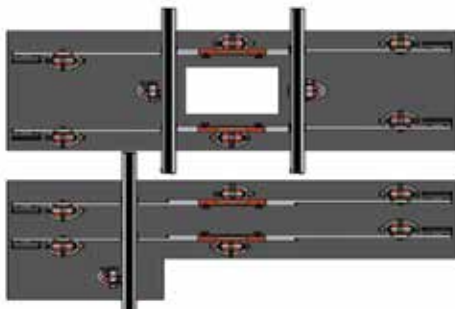
5. To get a neat cut or make an accurate hole, the tile must be placed on a stable, flat and sturdy work surface.

6. When making a straight cut, place the cutting guide on the tile along the line to be cut and block it in place with suction cups.

7. Make a small cut 1 to 2 cm long at each end of the tile from the inside towards the outside.

8. Then complete the cut from one end to the other, making sure you apply the same amount of pressure on the cutting tool for the entire length of the cut.

9. Break each end of the tile along the line of the cut with tile snips.

10. The tile is then broken in two by simply bending it until the two pieces come apart.

It is generally recommended to use two people for this operation so that the cut piece doesn't fall or break.

11. If there is reinforcement mesh in the tile this can be cut and trimmed with a cutter.

12. If the edges of the tile are sharp or uneven after it has been broken, clean and smooth the edges with a diamond pad or an abrasive disk.


13. A straight cut may also be made with a disk cutter which runs along the cutting guide. A through cut or a partial cut may be made with this method. In this case, the tile will have a cleaner and better defined edge than by cutting and breaking the tile.

14. Use a dry or wet diamond cutter to make round holes.

Place the tile on the work surface and mark the position where the hole is to made.

Start making the hole with the cutting head placed at an angle with respect to the tile so that it cuts through it more accurately. Once the cutting head has started to make the hole, press down and apply a small circular movement. Keep the cutting area wet if using the wet method or remove all the resulting dust during the drilling operation if using the dry method.
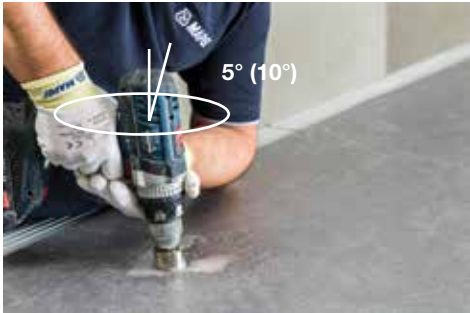
15. To make rectangular holes in a tile, start by making a round hole at each corner of the rectangle. Then make straight cuts between each hole with a disk cutter with a diamond disk. This will prevent excessive stresses being generated at the corners of the rectangle which could then form a crack in the tile itself.

4. INSTALLATION TECHNIQUE

The following procedure describes how to install large format tiles correctly and is based on current standards and the consolidated experience matured by Mapei over the years.

1. As described in section 2, the adhesive must be chosen according to the type of substrate material, the type and size of the tiles and the area of use.
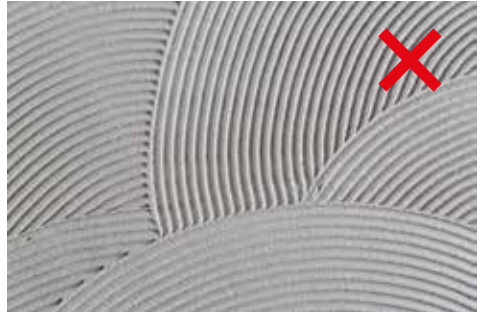

2. To spread the adhesive on the substrate use a spreader with sloping notches (with a pitch of at least 10 mm) to get better distribution of the adhesive.

To spread the adhesive on the back of the tiles, on the other hand, use a spreader with smaller notches (square notches of at least 3-4 mm) so that almost 100% of the surface is wetted with adhesive.

3. The adhesive should be applied in a straight line, with no circular movements, parallel to the short side of the tile to reduce the distance travelled by the air being pushed out.

4. The adhesive must be spread in the same direction on the back of the tile and on the substrate (in straight lines parallel to the short side of the tile).

5. To make handling and installing the tiles easier and safer, it is recommended to use runners and cross-members or a frame with suction-cups.
The tiles are installed by placing the ribs of adhesive on the substrate and on the back of the slab parallel to help push the air out.

6. To ensure the tile is completely bonded and that all the air has come out, go over the surface of the tile with a vibro-plate or tap the surface by hand with a special anti-bounce float made from rubber.

We suggest tapping the tile from the centre working towards the edges in the same direction as the ribs of adhesive, that is, parallel to the short side, to ensure all the air under the tile is forced out.

7. The same technique is used to install both floor and wall tiles.

When installing tiles on facades, the design engineer must assess whether additional mechanical safety fasteners are required.

8. Another essential requirement when installing large format tiles is that the adhesive must guarantee a high level of wetting of the back of the tiles so that gaps are not created, otherwise the soundness and durability of the bond could be affected.

5. GROUTING LARGE FORMAT CERAMIC TILES

The grout line between each tile must be at least 2 mm wide and must be increased according to the size and type of the tiles, the area of use (floor or wall tiles, internal or external) and the stresses expected when in service.

1. To maintain the correct gap between each tile and reduce out-of-flatness between adjacent tiles, it is recommended to use spacers between the tiles (around one spacer every 50 cm).

It is important to place the spacers in position before installing the tile and that the spacers are embedded in the adhesive.

2. To make this operation easier, a special positioning tool may be used to correct the width of the grout line between adjacent tiles and bring the tiles to the position required.

3. The grout lines may be filled with cementitious grout, such as *Ultracolor Plus*, or with epoxy grout, such as *Kerapoxy*, *Kerapoxy Design* or *Kerapoxy CQ*.

Always clean out the grout lines with a cutter, an abrasive scraper, etc. before grouting.

4. Clean the grouting by using a small amount of water and an abrasive pad (such as Scotch-Brite®) followed by a firm cellulose sponge, taking care not to remove the grout.

5. Unlike cementitious grouts, the cleaning of floor and will tiles grouted with epoxy mortar must be carried out while the grout is still fresh, with a higher amount of water if necessary, in order to remove completely all epoxy resin residuals.

6. SEALING JOINTS

The width of the joint is determined according to the thickness and size of the tiles, the characteristics of the substrate, the area of use and the loads present.

To set the depth of the joint and prevent sealant adhering to the bottom, insert **Mapefoam** along the bottom of the joint. The depth of the joint must be according to the following table:

a - width of joint	b - depth of joint
from 0 to 4 (mm)	increase the width of the joint
from 5 to 9 (mm)	b = a
from 10 to 20 (mm)	b = 10 (mm)
from 21 to 40 (mm)	b = a/2 (mm)
more than 40 (mm)	reduce the width of the joint sealant

Sealant

MAPEFOAM
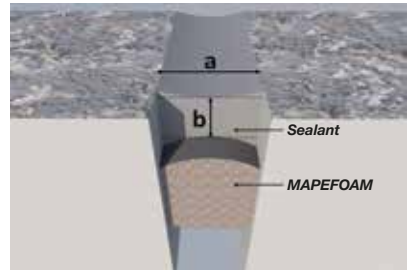
1. When installing tiles, the layout of expansion joints, structural joints and perimeter joints must be respected.

Use **Mapesil AC** to fill expansion joints in internal walls and floors, while for external applications use **Mapesil LM** for wall tiles and **Mapesil AC** for floor tiles.
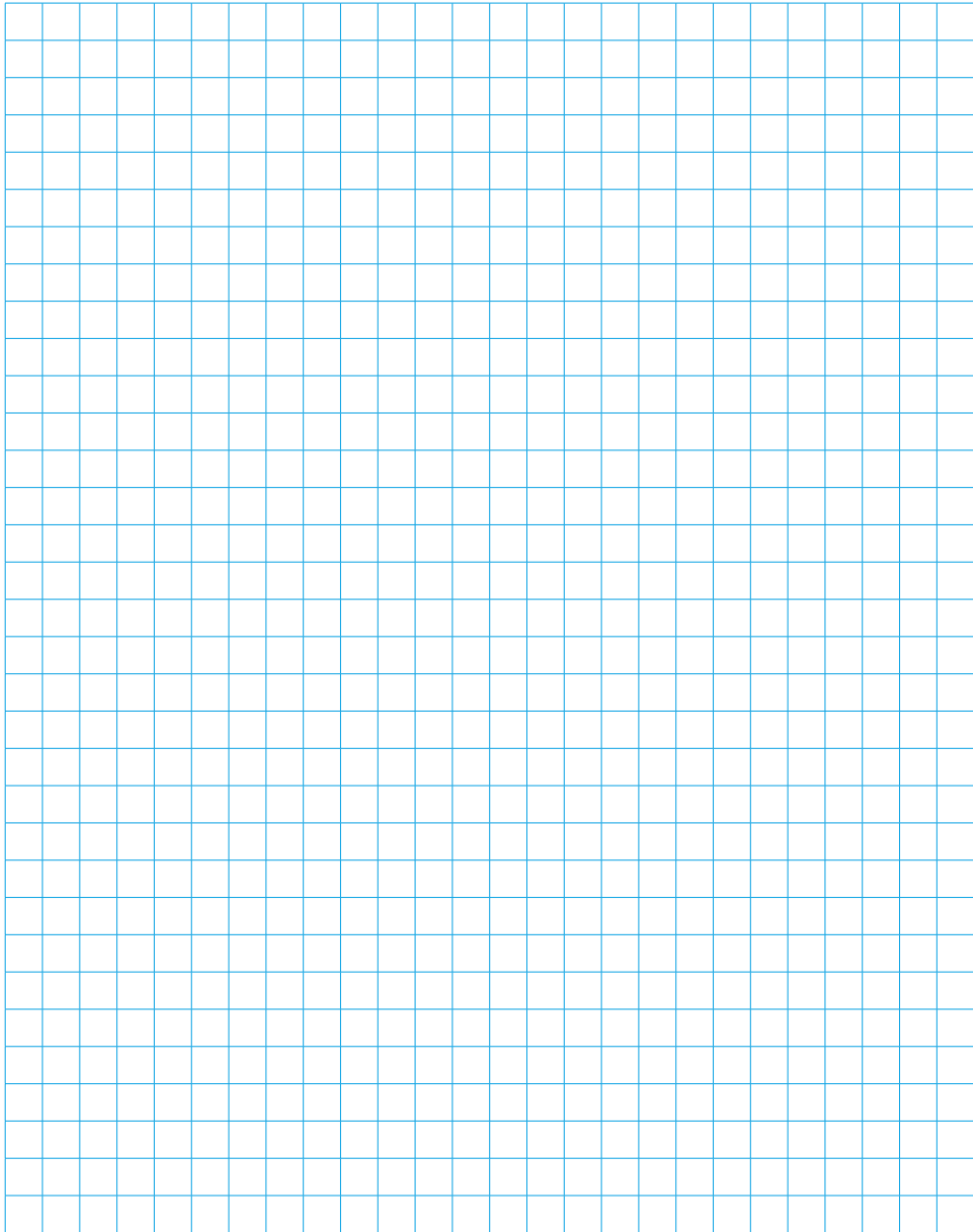
For particular mechanical strength requirements, use **Mapeflex PU20**, **Mapeflex PU21**, **Mapeflex PU45 FT** and **Mapeflex PU50 SL**.

2. Since large format tiles are often chosen to enable large areas of seamless flooring to be created, to increase this effect and avoid having to cut the tiles in correspondence with the joints, it is possible to include an antifracture membrane, such as **Mapetex System**. The sheets of **Mapetex System** are bonded to the substrate so they straddle the joints in the screed (as long as they are not structural joints) with rapid, deformable adhesive. While the layer of adhesive is drying, whole tiles may then be installed without having to cut them in correspondence with the joints in the screed.

Notes

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