

Tile & Stone Installation Systems

Installing moisture-sensitive stone

Moisture-sensitive stone is susceptible to dimensional changes when its minerals react chemically with water. Those dimensional changes can induce cupping, curling, doming and warping. And if stone changes shape, it can exhibit significant movement and begin to pull away from the mortar bed. In the case of stone tile, it can pull away from the mortar bed, resulting in a bond failure or damage to the tile over time.

Generally, stone or stone tile that has changed shape cannot be repaired or reinstalled. Instead, the stone must be removed and replaced. A recent trend in the tile industry is for stone tiles to be cut thinner but with larger facial dimensions. As stone tile is cut thinner and larger, the potential for dimensional changes increases. Moisture that migrates through the stone can cause other issues, such as picture framing, water marks, efflorescence, blotchiness and discoloration. The damage caused by both dimensional change and mineral migration may not be reversible.

Types of moisture-sensitive stone tiles

MAPEI has identified the following types of stone as susceptible to dimensional changes due to moisture sensitivity. Because similar stones can have different names depending on the importer, distributor or retailer, alternate names are listed in parentheses. Also considered to be moisture-sensitive are any Portland-cement-based and resin-based agglomerate tiles made with chips or pieces of these moisture-sensitive types of natural stone:

- Alpine Green Marble (Verde Alpi, Verdi Antico Alpi, Royal Green Marble, Veined Alpine Green, Dark Green Marble, Dark Verde)
- Ardesia Liguria Slate (Peitra Ardesia Nera, Italian Black Slate)
- Bianco Carrara Marble (White Carrara)
- Cantera Limestone (Cantera Quarry Stone, Mexican Cantera)
- Carnico Gray Marble (Grigio Carnico)
- Copper Granite
- Gray-Green Porphyry Granite (Grigio-Verde Granite, Porfido Verde, Sarentino Porfido, Sarner Porphyre Granite)
- Guatemala Green Marble (Verde Guatemala Marble, Verde Guatemala Indiano, Indian Green Marble)
- Issoire Green Marble (Verde Issori, Italian Green Marble, Verde Aver)
- Jade Green Marble (Green Jade Marble, Chinese Jade)
- Julian Green Marble (Julian Jade, Hualien Jade, Empress Green)
- Limestone
- Mergozzo Green Granite (Verde Mergozzo)
- Negro Marquina Marble (Noir Marquina, Nero Markina)
- Pearl White Marble (White Pearl Marble)
- Pietra Matraia Sandstone (Pietra Matraia Limestone, Macigno Sandstone)
- Pietra Serena Sandstone (Pietra Serena Stone, Serena Limestone)
- Porfido Viola di Predazzo Granite (Violet Granite, Purple Granite, Italian Lilac Granite)
- Portoro Marble (Portoro Gold, Nero Portoro, Golden Black Marble)
- Red Porphyry Granite (Rosso Porfido, Imperial Porphyre)
- Rosso Levanto Marble (Rosso Levante Marble)
- Rosso Predazzo Granite (Rosa Predazzo, Italian Red Granite)
- Ruby Red Granite
- Verde Candeias Granite (Verde Floresta, Candeas Granite, Candayas Granite)
- Verde Mare Marble (Verde Mare Light)
- Verde Speranza Granite (Verde Speranza Granite, Porfido Speranza Granite)

Note: The list above is not meant to include every type of stone in the market that may be considered moisture-sensitive. Verify with the stone supplier whether or not a stone is considered to be moisture-sensitive.

Installing moisture-sensitive tiles

When setting moisture-sensitive solid stone tiles or moisture-sensitive agglomerate tiles, choose from the following MAPEI water-free setting materials.

- *Planicrete® W*
- *Kerapoxy® 410*
- *Kerapoxy* (color #00 White or #38 Avalanche*)
- *Kerapoxy CQ* (color #00 White or #38 Avalanche*)

* These colors are recommended for translucent and light-veined tile and stone.

Note that because the four mortars listed above are reaction-resin, units must never be partially mixed. *Kerapoxy* and *Kerapoxy CQ* are available in multiple sizes including small units that measure 1 U.S. qt. (946 mL), which can be helpful when working alone or when setting a small amount of moisture-sensitive tile.

Installations of moisture-sensitive stones and agglomerates, even those using water-free setting materials as listed above, are restricted to areas that are dry and with limited water exposure: TCNA Res1 (Residential Dry), TCNA Res2 (Residential Limited Water Exposure), TCNA Com1 (Commercial Dry) and TCNA Com2 (Commercial Limited Water Exposure).

Resin-backed stone

Some stone tile is manufactured with a resin coating on the back. This coating adds dimensional stability to the stone and is typically applied to stone tiles that are moisture-sensitive as well as tiles made from certain types of marble that are commonly prone to cracking. Resin-backed stones can be installed using any of the setting materials recommended for moisture-sensitive stone. Or, MAPEI's *ECO Prim Grip*™ primer can be used to coat the back of the stone used in interior installations. Once *ECO Prim Grip* is dry, the tile can be set using a cement-based mortar that meets the ANSI A118.11 standard or is classified as ISO C2P1 or better.

Membranes

Waterproofing and crack-isolation membranes typically reduce the porosity of the substrate. This adds an additional element to the problem of moisture sensitivity. Portland-cement-based mortars that are installed over membranes take longer to dry, which exposes the stone to moisture for a longer period of time. The result is that a normal stone tile (not typically considered to be moisture-sensitive) can exhibit unusual movement. It is best to use a rapid-set mortar such as MAPEI's *Granirapid*®, *Ultraflex*™ RS or *Ultraflex LFT*™ Rapid.

Grouting

When grouting polished natural stone and agglomerate tiles, use an unsanded grout such as MAPEI's *Keracolor*® U. If a sanded appearance is desired, a larger variety of grouts may be used, such as *Keracolor S* and *Ultracolor Plus FA*. Grouts offering a colored quartz appearance include *MAPEI Flexcolor*™ CQ and *Kerapoxy CQ*. Regardless of the grout selected, a test panel should be grouted and inspected for scratching before grouting to confirm the desired results.

Sealing

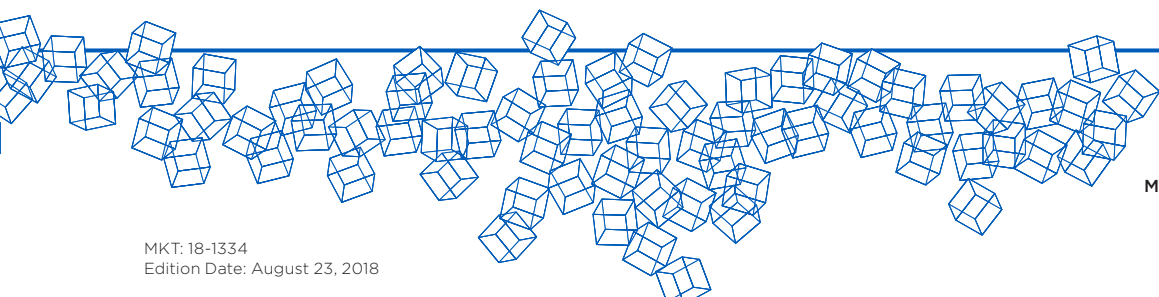
Most moisture-sensitive stone tile should be sealed on all sides before being installed and grouted. After the grout has cured, an additional coat of sealer should be applied to the entire area. Sealers are not permanent, so follow the sealer's directions regarding reapplication and proper maintenance for the best

results. And be sure to test the sealer in an inconspicuous area to confirm the desired results.

MAPEI sealers are as follow:

- For porous stone tiles:
 - *UltraCare*™ Penetrating Plus Stone, Tile & Grout Sealer
- For granite, marble, porcelain tiles and other dense stone tiles:
 - *UltraCare* Penetrating SB Stone, Tile & Grout Sealer
 - *UltraCare* Penetrating Plus SB Stone & Porcelain Tile Sealer
- For cement-based agglomerate tiles (such as cement terrazzo):
 - *UltraCare* Penetrating Stone, Tile & Grout Sealer
 - *UltraCare* Penetrating SB Stone, Tile & Grout Sealer
 - *UltraCare* Penetrating Plus Stone, Tile & Grout Sealer
 - *UltraCare* Penetrating Plus SB Stone & Porcelain Tile Sealer
 - *UltraCare* High-Gloss Sealer & Finish
 - *UltraCare* Low-Sheen Sealer & Finish
- For resin-based agglomerate tiles (such as epoxy terrazzo):
 - *UltraCare* High-Gloss Sealer & Finish
 - *UltraCare* Low-Sheen Sealer & Finish

Jobsite conditions vary and may present installation issues not covered in this technical bulletin. For the most current product information, visit www.mapei.com or contact MAPEI's Technical Services Product Support Team.



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