

Tile & Stone Installation Systems

Installing moisture-sensitive stone



TECHNICAL BULLETIN 010403-TB

Moisture-sensitive stone has the potential to change shape due to a chemical reaction from water interacting with the minerals in the stone. This change in shape is commonly referred to as cupping, curling, doming or warping. As the stone changes shape, it can exhibit significant movement and begin to pull away from the mortar bed. As the stone pulls away, it can delaminate from the mortar bed, resulting in a bond failure.

Stone tile that has changed shape generally cannot be repaired or reinstalled. Instead, the stone must be removed and new stone must be reinstalled. 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/longer, the potential for movement increases.

Types of moisture-sensitive stone tiles

MAPEI has labeled the following stones as susceptible to extreme movement 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)
- 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, Sarnar 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)
- Mergozzo Green Granite (Verde Mergazzo)
- 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 Esperanza Granite, Porfido Speranza Granite)

Note: This 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 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: 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 stone 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).

Moisture-sensitive, resin-backed stone

Some stone tile is manufactured with a resin coating on the back of the stone. 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 mortar that meets the ANSI A118.11 standard or is classified ISO C2P1... or better.

Note: For resin-backed, moisture-sensitive stone using *ECO Prim Grip* as well as the cement-based mortars as described above, installations are limited to dry areas: TCNA Res1 (Residential Dry) and TCNA Com1 (Commercial Dry).

Membranes

Waterproofing membranes 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 water 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 when installed using a traditional Portland-cement-based setting material over such a membrane. When setting stone tile that is not normally considered to be moisture-sensitive over membranes, use a rapid-set mortar such as MAPEI's *Ultraflex™ RS* or *Ultraflex LFT™ Rapid*.

Pre-sealing

Extremely porous stones such as travertine, limestone and some types of marble should be sealed before grouting to prevent grout pigment from staining the surface. Grouting a test sample of the stone in question will help to determine the need for pre-sealing.

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 colored quartz (CQ) grout such as *MAPEI Flexcolor™ CQ* can sometimes be used successfully, but a test panel should be grouted and inspected for unacceptable scratching before grouting.

Sealing

All stone installations should be sealed. Even dense stones such as granite can contain porous areas that will be susceptible to staining. Unsanded grouts such as *Keracolor U* should also be sealed. Sealers are not permanent, so follow the sealer's directions regarding reapplication for the best results. MAPEI's stone sealers are as follows:

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

For the most current installation instructions, Technical Data Sheets and Safety Data Sheets, always refer to MAPEI's Website at www.mapei.com. For additional information, please contact MAPEI's Technical Services Department.



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MAPEI Headquarters of the Americas

1144 East Newport Center Drive
Deerfield Beach, Florida 33442
1-888-US-MAPEI (1-888-876-2734) /
(954) 246-8888

Technical Services

1-800-992-6273 (U.S. and Puerto Rico)
1-800-361-9309 (Canada)

Customer Service

1-800-42-MAPEI (1-800-426-2734)

Services in Mexico

0-1-800-MX-MAPEI (0-1-800-696-2734)

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