

Successfully Installing Large Format Tile

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2 Foot x 4 Foot Installed Porcelain Tile
Brocade Communications Systems, Inc.,
San Jose, CA

With today's architectural and design community focusing on sustainability, specifying large format tile and stone is an easy solution because it provides a longer life cycle and an aesthetic value unmatched by other types of finish materials. Tile contractors need to be aware of the proper surface preparation steps and ideal setting materials to ensure a successful installation.

SURFACE PREPARATION

The most important consideration when setting large format tile is that substrate flatness is paramount. The ANSI (American National Standards Institute) Specification for the Installation of Ceramic Tile sets forth a maximum allowable flatness tolerance for both horizontal and vertical installations at 1/4-inch per ten feet, and 1/16-inch per foot, regardless of tile unit size. Many large format tile manufacturers recommend 1/8-inch per ten feet maximum substrate variation when setting large unit material (tile greater than 15-inches on one side).





2 Foot x 2 Foot Installed Travertine
Private Residence,
Laguna Beach, CA

One of the most significant advancements for large format tile and stone is the development of thin-set mortars with medium-bed capabilities.

The real difference with a two-part system is that liquid polymer additives have already been dispersed, but have not been dried afterward. It is the way polymers are dried that makes them re-dispersible. It is the amount of polymer solids and type of polymers that give mortars the added bond strengths to denser substrates and stones with improved flexibility to more closely match the thermal expansion and contractions of the substrate, stone and tile. Incorporating dry polymers into the mix reduces the risk of liquid admixtures being diluted with water prior to mixing with the mortar. Most liquid admixtures are pre-diluted by the manufacturer to the required level for the specific mortar type, thus adding additional water would lower the solids content and reduce the effectiveness of the admixture and performance of the mortar. Re-dispersible polymers tend to coalesce faster within the mortar's matrix and allow complete water submersion of tile and stone installations sooner. In today's hurried world, this could be a positive attribute.

Today installers prefer to use single component, polymer-modified thin-set mortar — as an all-purpose adhesive for installing a wide variety of tile and stone products over a broad range of substrates. Despite the proven success of new developments in dried polymer technology, there is still a misunderstanding that they are inferior to the latex additives used with cement mortars. Many times the dried polymer is the same chemical composition as that found in the latex additive. The fact is to get the ultimate performance in today's demanding installation environments it is necessary to use mortars containing dried polymers.

One of the most significant advancements for large format tile and stone is the development of thin-set mortars with medium-bed capabilities. Mortars shrink as they cure — the displacement of water causes the mortar to retract and pull the tile as it hardens. This can cause tiles to crack or leave an uneven surface from tile to tile known as "lippage," an unwanted finish result that can be a tripping hazard. Mortars with medium-bed features are formulated to control the amount of shrinking that occurs during the curing process, allowing the tile to stay in position. With the introduction of innovative lightweight mortars, medium-bed mortars are easy to spread, offer non-slump/non-slip support, and are available in rapid setting formulations that quickly lock tile into place — so that within a matter of hours it's ready for grouting. Whereas standard mortars are capable of a bed 3/32 to 3/16-inch thick, a mortar with medium-bed features can span from 3/32 up to 3/4-inch thickness after beat-in, providing maximum support and coverage.

Following these guidelines for surface preparation, mortar selection and installation tips will produce a beautiful, low maintenance, long life cycle and sustainable finish that is unmatched by other finishes available in today's style conscious world.



The dips found in all concrete slabs or wood subfloors are a landscape of mountains and valleys when setting tile sizes 18 x 18-inches and greater. A substrate that exceeds these standards should be filled with an appropriate self-leveling underlayment or ground to the correct tolerance. Note: Floor deflection is also an important consideration — check your floor span and tile weight to local building codes. Expansion joints should not be covered but should be continued through to the finished surface, and cracked substrates should be covered with an appropriate crack isolation membrane.

CHOOSING THE RIGHT MORTAR

Using the ideal mortar can make a huge difference in the installation of large format tile — saving time and money. Traditionally, contractors have used a 2-part mortar system: a Portland cement mortar meeting ANSI A118.1 and a liquid latex (acrylic or SBR) additive. The latex additive, used in lieu of water, helps non-modified mortars form an adhesive bond to compensate for the lack of mechanical bonding to dense substrates, stone and tile, and turn the A118.1 mortar into an A118.4 and/or A118.11 mortar.

Drawbacks to 2-Part Systems:

- Using fewer than recommended amounts of additive, instead of the recommended dosage, offers no advantages at all.
- When mixing at high speeds, the additives can generate foam, this air entrapment into the mortar leads to weak bond, low tensile and compressive strengths.
- Latex additives with high solids typically take longer to combine within the mortar matrix and can extend the cure time.
- If exposed to rain or wet conditions too quickly, “latex leaching” can occur. This can result in white streaks running down the face of vertically installed tile — often mistaken for efflorescence.
- With less interest in liquid additives, there has been less research and product development so the admixtures available today are frequently the same as those 20 years ago.

There is a misconception that if you add liquid latex to an ANSI A118.1 — you will get less shrinkage than with polymer-modified mortars. All liquid latex admixes contain water in varying amounts. Since re-dispersible polymers additives are dry powders, they can help to reduce shrinkage because less liquid is required to obtain a workable mortar mix.



3 Foot x 3 Foot Installed Porcelain Tile
Brocade Communications Systems, Inc.,
San Jose, CA

In this category there are a variety of polymer-modified mortars for specific applications with unique attributes that add to the ease of installation and longevity of the installation:

- Rapid Setting Mortars
- Lightweight Mortars
- Crack Prevention Mortars
- Complete Contact Mortars

MORTAR COVERAGE WITH NOTCH TROWELS

With large format tile, mortar coverage transferred from the substrate to the back of the tile without leaving voids can be a challenge. Using the correctly-sized notch trowel provides a proper setting bed and reduces the amount of time spent on pulling or resetting tile due to lack of coverage. To increase mortar coverage required for large format tile use a larger notched trowel, such as 1/2 x 1/2-inch square notch. For any large format tile exhibiting cupping or bowing, as well as ungauged stone, use a 3/4 x 3/4-inch u-notch trowel to make up differences. The correct notch sized trowel and the appropriate medium-bed mortar will help to ensure that large format tiles are properly installed with 95 percent of their dimension support with mortar.

Following these guidelines for surface preparation, mortar selection and installation tips will produce a beautiful, low maintenance, long life cycle, sustainable finish that is unmatched by other finishes available in today's style-conscious world.



ABOUT THE AUTHOR

Steve Taylor is Director of Architecture and Technical Marketing for Custom Building Products and has more than 30 years of experience developing products for the construction industry. Steve is a member of the Tile Council of North America (TCNA), helping to determine proper tile installation methods and standards; including the simplification of tile installation processes which enables tile professionals to save time and money.

