

Crack Suppression and Waterproofing in Tile Installations: Do You Need a Membrane?



By Dave Gobis

Photo courtesy of LATICRETE International, Inc.

One area of ceramic tile installation that has been receiving increasing attention from both manufacturers of setting materials and end users is that of crack isolation and waterproofing membrane systems. Today's building practices call for faster construction while at the same time wanting higher performance from their ceramic tile installations. Building of amenities such as pools, spas and water features are becoming much more common as well. Then there are the current fears, both founded and unfounded, about mold contamination that are doing part in driving increased sales and use of waterproofing products in applications that were not previously considered for such measures, such as complete waterproofing of tub areas, floors and countertop applications. These have all been growth areas for the sales of existing products and causing many new products to be developed. In the past crack isolation and waterproofing systems were often used only when ceramic tile was specified over problem-prone substrates or waterproofing was mandatory. They tended not to be utilized unless really needed. Recent years have seen a rather dramatic change in the attitude.

Besides new trends there are other considerations that are changing the way we install tile and the products we use doing it. Waterproofing tile installations with even intermittent exposure to moisture has become much more common. Today's typical installations are truly a departure from those of even 20 years ago. Building materials and methods have continued to change, sometimes for the better, and some for the worse. Building codes require higher energy efficient structures and are employing exterior membrane systems, flashing systems, and other energy efficient construction practices, all aimed at lower heating and cooling cost and preserving natural resources with a tighter building envelope.

We no longer have the luxury of frequent air exchanges, also known as drafts,

that provided for some air movement, nature's best means of drying things out. When water enters the building cavity of today's energy efficient structures, it does not have the ability to dissipate as it did in years past. This can create a perfect breeding ground for one of earth's oldest life forms, mold. In reality, we breathe billions mold spores each and every day. There are very few that have proved toxic, but of those that do, their favorite breeding ground is when water enters the building envelope, according to research done at Texas A&M University. According to the American Insurance Institute, you have a three times more likely chance of getting struck and killed by lightning rather than dying of a mold-related illness. None the less, given that we graduate three times as many attorneys as doctors, there are plenty looking for work and I am sure neither you nor I wish to make a contribution for this particular installation-related issue.

Crack suppression membranes have also gained favor in recent years for both wood and concrete applications. Like all building trades, the concrete industry has also become a fast-paced and competitive environment. Even when given adequate time and training, crack-free concrete is extremely difficult to achieve. Control joints, vital for controlling shrinkage cracks, are often omitted or poorly placed. The resulting action of this omission is uncontrolled cracking that may not occur for many years as the concrete continues to create internal stresses all of its natural life.

In wood structures we are seeing much

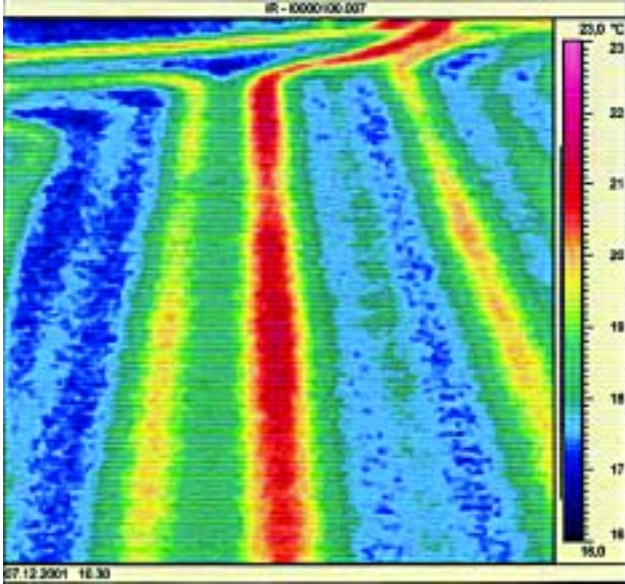
longer spans and with those spans, increased movement. A good polymer modified thinset can accommodate a certain amount of deformation but it is all on a single plane, like pulling on a rubber band. Employing a crack suppression membrane offers a layered effect, increasing the amount of movement allowable in a tile installation. If you consider all this, there are very few instances where you could not make a case that use of a membrane is a wise decision in almost every application based on purely technical merit. While not the focus of this article, unless movement accommodation joints are employed in the installation and use of any membrane system, it will not perform. If you want it to move, you need to give it space to do so.

When using a membrane system it is important to make sure it is suitable for the application. Waterproofing systems are currently covered under ANSI A118.10 American National Standard Specifications for Load Bearing, Bonded, and Waterproof Membranes for Thinset Ceramic Tile and Stone. Not all membranes are suitable for all applications under this standard. Some waterproof membrane systems provide protection from intermittent water exposure, some for submerge application. Waterproof does not mean vapor proof, such as applications in steam showers. It is possible to waterproof a surface and still provide for vapor passage. While sometimes desirable, is not a desirable trait when used in a steam shower.

Though not covered in current industry standards due to steam showers fairly



Right: This tank and reflecting pond proved the perfect setting for a liquid applied waterproofing product.



Left: Membranes are recommended over all radiant heat applications. Tile may crack if exposed to thermal stripping, as shown in this picture.

recent rise in popularity, it is generally accepted that membranes used in steam showers should have a vapor permeable level rating of 1 or less. When using membranes with higher perm ratings there are typically additional steps required by the manufacturer which must be taken to insure a “vapor proof” installation as recommended in steam applications. When any type of membrane is used in floor applications, there is also the load bearing abilities of

the membrane to consider. Some are rated for residential use, some light commercial, and a few heavy commercial. This is a seemingly little known fact often not discovered until a problem has occurred. Always check with the manufacturer about the duty rating of your chosen product if unsure.

Only recently has a standard been approved for crack isolation, ANSI A118.12 -2005 the American National Standard Specifications for Crack Isolation Membranes for Thinset Ceramic Tile and Dimension Stone Installations. There are also 2 different methods called out in the TCA Handbook for Ceramic Tile Installation. One provides for singular crack isolation and control joint relocation, the other calls for full field application. If you are a bidder or specifier, you will want to be sure you know the difference. Control joint relocation is a very popular application of these products as they are typically encountered on every concrete job. But, not all membrane systems, particularly liquid systems, allow for control joint relocation. It would be wise to check with the manufacturer for suitability before problems occur.

There is no such thing as a dead concrete joint, a term I heard constantly when I made my argument in the field for inclusion of

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Left: Some membrane systems allow for use as an underlayment in addition to offering crack suppression or waterproofing values. These added features plus the problem solving reduced height profile are all rolled up into one product.

a crack isolation system to relocate the joints. Using the wrong system will not provide the movement accommodation needed. Even with the right system you should not oversell the abilities of the product. Note the following sentence in the scope of the ANSI A118.12 standard: "This standard was developed to provide specifiers and installers with the minimum criteria necessary for a

material to function as a deterrent to crack propagation from the substrate through the finished thin-set tile or stone installation." The key word here is deterrent. Once again, in floor applications, there are load bearing recommendations to consider, residential use, light commercial, and heavy commercial.

In 8 years of teaching a generic membrane class using 12 different systems, I can assure you of one thing: no two products are alike relative to installation requirements. Though some products may appear to share similar application techniques, all they are similar. Adherence to industry standards and manufacturers instructions are required to achieve proper product performance. There continues to be widespread use of untested products never designed for ceramic tile membrane systems. Uses of roofing felt, sheet vinyl, scribing paper, or scrim reinforced Kraft paper with unknown values on concrete slabs and wood floor systems have a long history of failure. These products typically lack the performance features and criteria that would allow effective control of concrete fractures and wood structure movement without transmission of cracks through the finished tile. Similarly, there are also

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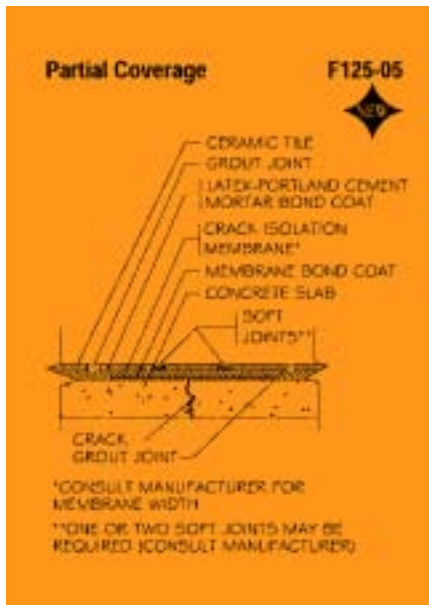


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Left: When bidding or specifying, make sure you use the appropriate detail. Full field coverage or strip application are both covered under method F125. Full coverage is noted by the letter "A."

About the Author

David M. Gobis CTC CSI, a third-generation tile setter, is the Executive Director of the Ceramic Tile Education Foundation. He is member of the Construction Specification Institute, National Tile Contractors Technical Committee, and voting member of The American National Standards for Ceramic Tile Installation and Setting Materials (ANSI A108/118) and Tile Council of America Installation Handbook committees. He can be reached via email, dave@tileschool.org

some commonly used products in the waterproofing category that offer only short term intermittent performance. Use of waterproofing and crack isolation systems always carries greater risk of error for

the installer. Most of this risk can be completely avoided using industry approved products and installation methods and understanding the limitations of the selected products. **TILE**

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