



Decoding Multi-purpose Waterproofing, Crack Isolation, Sound Reduction and Uncoupling Membranes

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There are many reasons to include a membrane in a ceramic or natural stone tile installation. Membranes are used to prevent cracks in the substrate from migrating into the tile. They block water and moisture from intruding into wall cavities or seeping below the tile assembly, which can ultimately lead to very serious damage. Membranes can also smooth irregular surfaces and reduce impact sound transmission.



CUSTOM[®]

TILE INSTALLATION SYSTEMS



There are many reasons for using a membrane in a ceramic or stone tile project. Membranes are commonly used to prevent cracks in the substrate from migrating into the tile.



An increasing number of membranes fulfill more than one role in the tile assembly. This paper will explore the uses for these versatile, multipurpose membranes.

Today, membranes are used in almost all ceramic and natural stone tile installations. The Tile Council of North America (TCNA) recommends the use of membranes in nearly every tile installation that involves wet areas or suspended floors. The American National Standards Institute (ANSI) lists performance standards for waterproof membranes (A118.10), crack isolation membranes (A118.12) and sound control (A118.13).

Choosing a Membrane

However, just meeting the ANSI requirements for these critical areas does not address all the needs involved when selecting a membrane for a specific application. Every jobsite is different. In some cases, two or three of these attributes may be required in the same area. Installers may have a preference on the type of membrane and how it is installed. Even the type of tile may dictate the type of membrane that will be used under it.

In most cases, the use of a membrane will extend the life of a tile installation. Many manufacturers, including CUSTOM, recognize this advantage and will extend the length of their warranties when an appropriate membrane is included in the installation. To obtain the maximum warranty length, it is important to select a membrane manufacturer that offers all the products needed for the installation.

The tile installations products manufacturer has developed products to work together, from substrate treatment, to the grout used to fill the joints between the tiles -- and beyond. Using a full system of products designed to work together will assure the maximum warranty length from the manufacturer. Be sure to keep in mind that the manufacturer selected should be one with a reputation for both product quality and customer support.

The next step is determining the best membrane or membranes for a particular job; here are some questions to ask. A simple matrix of product features is provided for reference at the end of this paper.

- Q. Is a seamless waterproofing membrane and vapor barrier required?
- A. If so, use a liquid-applied membrane that meets the waterproofing requirements of ANSI A118.10 and also has a low permeability rating. Liquid membranes can be easier to install where there are a number of changes in plane or corners to be treated.
- Q. What degree of crack isolation is needed based on the condition of the substrate and the type of tile?
- A. ANSI A118.12 provides two levels of crack isolation, one for cracks less than 1/16", and one for higher performance with crack movement up to 1/8". Membranes are available to isolate tiles from crack movement in the concrete slab up to 3/8".



Some membranes provide a waterproofing barrier in addition to crack isolation.



Q. Will the job need a membrane that provides both a moisture barrier and crack protection?

A. Multi-purpose membranes that will control moisture movement and protect the tiles from cracks in the substrate are offered in both liquid-applied and sheet-applied formats.

Q. Is impact sound reduction needed on a multi-story project?

A. Many multi-family structures benefit from sound insulation in the floor. Owners typically require that the floor is constructed to achieve an Impact Insulation Class (IIC) of 50 dB or higher.

Q. Will a large format tile assembly be installed on a suspended (above grade) floor?

A. The TCNA Handbook of Ceramic Tile Installation recommends including a crack isolation membrane in the tile assembly when installing large format tile on suspended floors. These tiles, with any side longer than 15", should be set with a polymer-modified dry-set cement mortar designed for use with large and heavy tiles.

Q. Is a heavy commercial or extra heavy duty service rating required?

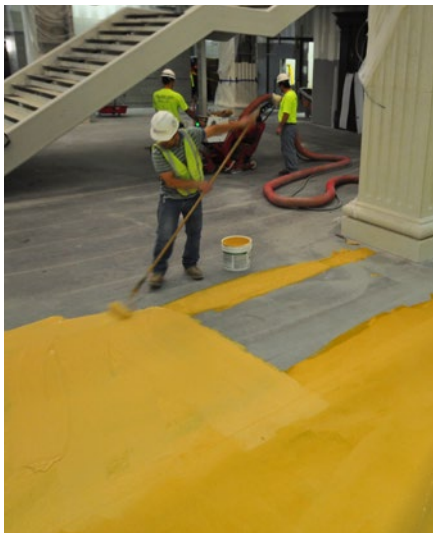
A. Where is the tile being installed? Is it in a residence or a commercial site with heavy traffic? The TCNA Handbook can help determine the service rating required; then it is important to use a membrane suitable for that service rating.

In addition to selecting a membrane based on its performance and ability to solve a problem, it is necessary to choose one based on installation method. There are two main categories of multi-purpose membranes to choose from: liquid-applied and sheet-applied. Each method has distinct advantages and some limitations; membranes should be carefully selected to achieve optimum performance.

Liquid-Applied Membranes

Liquid membranes are easy to install, requiring only paint rollers, brushes or airless spray equipment. There are no primers or additional layers of mortar involved and transitions are seamless.

When applying liquid membranes, it is crucial to carefully follow the instructions to achieve proper coverage. The wet film thickness or square footage rate of the application must be continuously monitored throughout the installation. This is especially important when ANSI standards must be met as a part of the tile assembly.



The performance of the membrane is dependent on correct, continuous coverage.

The performance of the membrane is dependent on correct, continuous coverage, and if the application is too thin, it may fail. Brushing, rolling and spraying can leave voids or pinholes in the film that will allow water to penetrate to the substrate. If waterproofing is the goal, a second coat must be applied to ensure that all voids are filled before installing tile.

It is also important that each coat of a liquid membrane is fully dry before proceeding with the next. This must be understood by installers when using this type of membrane, which may require 2-3 coats with dry time in between. Depending on climate conditions, such as temperature and humidity, drying time on some liquids can be quite extensive.

Liquid-applied membranes can provide waterproofing or crack prevention for the tile assembly. Some liquid products, such as RedGuard® Waterproofing and Crack Prevention Membrane, provide both. RedGuard meets both ANSI A118.10 and A118.12, with protection against moisture and crack transmission up to 1/8", and an extra heavy duty service rating.

RedGuard is formulated for faster drying and can cure in as little as 45 minutes, but the exact timing is dependent on ambient conditions. RedGuard is also IAMPO approved as a shower pan liner and recognized by TCNA as a low-perm waterproofing membrane for continuous use steam showers. CUSTOM® 9240 Waterproofing and Anti-Fracture Membrane is a liquid, reinforced with a fabric, for applications requiring added strength and subject to extra heavy service conditions.

Sheet-applied Membranes

Sheet-applied membranes are provided on rolls and come in two major installation types. One comes with an adhesive backing and requires the application of a primer to the substrate prior to installation. The second type is installed with polymer-modified cement mortar or adhesive. It is important to become familiar with the particular membrane and how it is installed before beginning the installation project.

Sheet-applied membranes with peel-and-stick application are fast and easy, but care must be exercised to make sure the membrane is installed properly. Nearly all pressure-sensitive, adhesive-backed membranes require a primer before bonding the membrane to the surface. These primers are generally water-based polymer dispersions which are rolled or brushed on the surface, and they must be completely dry before bonding the membrane to the primer. Depending on the environmental conditions, this can take an hour or more.

It is important that the correct primer is used with the membrane. Check the manufacturer's directions to make sure you have selected the correct primer. Bare sheet-applied membranes are bonded to the substrate with a polymer-modified cement mortar or adhesive. There is no need to apply a primer or wait for the primer to dry. This type of membrane is ready for tiling shortly after it is laid into the wet cement mortar.



Technical White Paper

UNCOUPLING MEMBRANES



Sheet and liquid applied membranes are both available.



It is easier to predict the time required to install tile when using a cement mortar-bonded sheet membrane. The curing process of the cement mortar doesn't rely on the primer drying. Since the cement mortar remains workable for some time, these membranes can be easily repositioned if required. Peel-and-stick membranes are usually not repositionable. This makes it critical that the peel-and-stick membrane is placed properly the first time.

Crack Buster® Pro Crack Prevention Mat Underlayment is an asphaltic mat that isolates cracks up to 3/8". Crack Buster Pro is rated for extra heavy service and can reduce sound transmission by 18 dB. EasyMat® Tile & Stone Underlayment provides the highest level of sound reduction – up to 71 dB when used with an acoustic ceiling. EasyMat is moisture resistant and isolates cracks up to 1/4". Both products are available as a peel-and-stick mat installed after application of a primer. EasyMat also comes in mortar-installed versions, with three sizes available.

When installing membrane on a cement slab, check the moisture vapor transmission rate from the slab prior to installation of the membrane, particularly with new construction. Some peel-and-stick adhesives and their primers are sensitive to moisture vapor, and can be weakened or release from the substrate over time. Cement bonding mortars are not as sensitive to moisture vapor and can often be applied to damp or "green" concrete slabs. Most manufacturers recommend testing for moisture vapor emissions using the ASTM F1869 Calcium Chloride Test and/or the ASTM F2170 relative humidity test. Make sure that the membrane selected is suitable for the emission level measured.

Uncoupling Mats

Uncoupling mats are a unique type of membrane designed to isolate the tile assembly from the substrate when under stress. Minor movement in the substrate is separated from the tile assembly much in the same way that an un-bonded mortar bed isolates the tile. The construction of the uncoupling mat deforms and absorbs forces from the slab below. This prevents cracks in a concrete slab from propagating into the tile installation and causing cracks in the tile and grout.

It is very important to select an uncoupling mat that can be installed with polymer-modified mortars, especially when installing large format or difficult to bond tiles such as porcelain. TCNA guidelines support the use of polymer-modified mortars with today's tile.

The plastic layer in the uncoupling mat also provides waterproofing to the installation when the seams are properly treated. Since the uncoupling mat has integrated air channels beneath the plastic sheet, it helps move moisture away from the slab below.



The most important factor is that a membrane is properly utilized to assure the longevity that is expected of the tiled project.

RedGuard® Uncoupling Mat is perfect for use over suspended floors, young (green) concrete and other substrates that cannot be remedied with a more conventional membrane meeting the ANSI standards. As a polymer-modified mortar-installed mat, tiling can begin immediately with no need to wait for a liquid membrane or primer to dry.

The selection of a membrane for use in your tile installation is dependent on many factors, including location, environmental conditions and the preference of the installer. The most important factor is that a membrane is properly utilized, per manufacturer's directions, to ensure the longevity that is expected of the tiled project.

CUSTOM's Technical Services Department is available at 800-282-8786 to help determine the best membrane for any project challenge.

Name	Application	Crack Isolation	Waterproofing	Sound Reduction	Service Rating
RedGuard® Waterproofing and Crack Prevention Membrane	Liquid	X	X		Extra Heavy
CUSTOM® 9240	Liquid with fabric	X	X (floors)		Extra Heavy
Crack Buster® Pro	Peel-and-Stick	X		X	Extra Heavy
EasyMat®	Peel-and-Stick or Cement Mortar Bonded	X		X	Light Commercial
RedGuard® Uncoupling Mat	Cement Mortar Bonded	X	X (floors)		Commercial



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) and Materials & Methods Standards Association (MMSA). In these roles, he helps to determine proper tile installation methods and standards. This includes simplifying the tile installation process to save tile professionals time and money.

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