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FEATURE STORY

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Getting serious with _____ crack isolation membranes

by Tom Duvé, CEO
National Applied Construction Products

DUCT TAPE MAY HAVE 1001 USES.

COVERING CRACKS SHOULD NOT BE ONE OF THEM.

According to the 2006 TCNA Handbook, the purpose of a crack isolation membrane is to “act to isolate the tile or stone from minor in-plane substrate cracking.” Long before 2006, crack isolation membranes were used in various forms and systems. The 1960’s and 1970’s saw the development of dry-set mortars and a dramatic increase in the popularity of large format tiles. Consequently tile failures increased proportionally. Various products and systems were employed to combat stress cracking and tile de-lamination caused by reflective cracking. Reflective cracking develops when the structural properties of the substrate are dissimilar to those of the thin, rigid tile bonded to it. Thermal and structural movements are also factors. Felt (roofing) paper, scribing paper (back of linoleum), metal lath and duct tape were some of the products employed to combat these failures.

The idea was simple, isolate the crack from the tile and if you’re lucky (and perhaps psychic), the tile won’t fail. You’ve heard it said before: “I’ve used duct tape on cracks for years and I’ve never had a tile failure”. Even under the best of circumstances, setting 12x12 tiles over a 2-inch strip of duct tape is never a good idea because the tile is fixed on both sides of the

Some self-adhering, sheet-applied membrane systems allow tile to be set immediately, reducing down time.

tape rendering the tape useless – unless of course you think that having a 2-inch wide bond breaker underneath the tile is a good thing.

IS IT ANTI-FRACTURE, CRACK ISOLATION OR CRACK SUPPRESSION?

There have been several names given to these systems over the past 20 + years. The first dedicated thin-bed membrane was developed in the early 80's by a company called Terraflow Systems, Inc. They produced the industry's first thin-bed sheet membrane which they dubbed an "Anti-Fracture Membrane." Shortly thereafter came National Applied Construction Products (NAC Products) Elastomeric Crack Bridging Membrane, and Noble's CIS Membrane. By the early 90's, companies like Protecto-Wrap, Laticrete, MAPEI, Bostik, Custom Building Products and TEC all had their own favorite description for their competing product.



MMSA TO THE RESCUE

When this all started over 20 years ago, there were no standards for crack isolation membranes. Performance specifications were what the manufacturer printed on the data sheet. Today there is a proliferation of sheet, trowel-down and liquid-applied membranes.

Since it had become difficult to choose which crack isolation membrane to use, the Materials & Methods Standards Association (MMSA) was created "to establish standards of quality and performance materials and methods for installation and use in the ceramic tile and dimensional stone industries." The organization is made up of manufacturers of tile and tile installation products. Along with developing many ANSI standards for the tile industry, it was assigned the task of organizing and developing ANSI standards for this new breed of installation product. This was no simple task. They evaluated liquids, trowel-down, glue-down and peel-and-stick membranes to come up with the existing specification. I don't remember how long it took to develop the standard – my guess is five or six years – but the committee prevailed. In 2005, the ANSI Committee approved the new standard for CRACK ISOLATION MEMBRANES, ANSI A118.12

STANDARD VS. HIGH PERFORMANCE

The importance of meeting the new A118.12 Crack Isolation Standard can't be emphasized enough. It is critical for the long term success of the tile installation. Outside testing facilities, like the Tile Council of North America (TCNA) laboratories, are impartial and usually the best way to get honest results for materials in question.

After prepping and priming the floor, this crack isolation membrane is simply rolled out and pressed into place.



Because of the complexity of the product, the A118.12 test is comprised of several tests.

- **4.0 Test for Material Properties** (fungus & microorganism resistance): Does it support mold growth? Be careful of membranes that attract and retain moisture.
- **5.0 Test for System Performance** (shear strength): Seven day wet and dry, 28 day, 12 week and 100 day water emersion. What is the shear strength of the membrane under long term use and water emersion? All that is required to pass is 50 psi. Will it be used for exterior applications?
- **5.1.6 Shear Strength After Accelerated Aging** (Does it withstand the temperatures of 150 degrees Fahrenheit for 28 days and meet a minimum of 50 psi?): Critical if used for exterior applications and in warm climates.

- **5.2 Point Load Test:** (After a 28 day cure to a tile assembly, can the membrane withstand a 1,000-lb. load from a 2-inch diameter probe?): Great to know when placing a tree planter in a mall or setting a refrigerator on a newly tiled floor.
- **5.3 Robinson Floor Test:** From what I can tell, this test is optional although extremely important. "Extra Heavy Duty" is the highest rating, "Residential" the lowest. This test is necessary for classifying the composite system when used in shopping malls, airports, factories, schools, homes, etc. It represents the live load resistance of rolling wheels on tile assemblies.
- **5.4 System Crack Resistance Test:** Can the membrane bridge crack movement? You would think that this is basic since that's what crack isolation membranes are all about. This test is simply a tile/membrane assembly bonded to a device that opens up to 1/48 inch. It has two classifications. If the assembly passes the 1/416 inch mark but breaks before reaching 1/48 inch, it is classified as "standard performance." If the assembly reaches the 1/48 inch mark without failing, it is considered "high performance."

SHEET, LIQUID OR TROWEL-APPLIED MEMBRANE

Choosing the make-up of a product is a matter of price, product preference and comfort level. If you are undecided, this may help. As manufacturers of both liquid and sheet membranes, NAC Products sees advantages in both systems.

For heavy duty applications and open areas I like sheet membranes. They are consistent throughout, have controlled thickness and give you a fresh new surface to work on. Self-adhering or peel-and-stick membranes speed and reduce downtime, making these products hard to beat. But using a peel and stick membrane in a small room can be frustrating. It can take on the characteristics of fly paper, especially when it gets hot.

On the other hand, liquid or trowel-down systems also have their advantages. If you have time for the liquid or trowel-down system to cure, using them in large rooms will work as well. Some trowel-applied systems double as both a setting material and as a crack suppression system. Showers, bathrooms, smaller rooms and areas in which one cannot easily maneuver suit these systems well. Also, many cuts and corners make the liquid/trowel down systems advantageous over sheet membranes. Whatever system you choose, make sure the product meets industry standards.

NOT JUST FOR CRACKS


There is a misconception that crack isolation membranes were developed just to cover cracks. The inventors of the membrane, Terraflow Systems Inc., developed the material to cover entire floors. Mall developers, educational facilities, hotels and commercial facilities have specified use over entire floors to prevent failures due to live and dead loads, thermal movement and expansion/contraction. During renovation, new expansion joints can be designed to fit the modular size of the tile rather than cutting the tile to meet the existing expansion joints. Variations of these products can also function as sound abatement, vapor/mold barriers and waterproofing.

Tests to meet ANSI A118.12 show a membrane's ability to stand up to extreme heat which is relevant to exterior applications in warmer climates.



Today's crack isolation membranes do more than bridge cracks; they expand the use of ceramic tile by providing a crack-free surface for new tile applications.

Tom Duvé is the president and CEO of National Applied Construction Products, Inc. (aka NAC Products, Inc.). Founded in 1983, NAC Products, Inc. pioneered anti-fracture membranes in the United States and invented self-adhering, sheet-applied crack isolation technology. For more information, visit www.nacproducts.com.

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