

The constant evolution and advancement of uncoupling membranes

Uncoupling membranes have evolved significantly over the last 30 years

by Dale Kempster, technical director of Schluter-Systems Canada

In 1987, a new product category was launched in the North American tile industry called an “uncoupling membrane.” The product, an orange membrane, was made of polyethylene ribbed in one direction and had a polypropylene mesh heat-bonded on the underside. This product was only $\frac{3}{16}$ inch thick (4.5 mm) and 3 feet, 3 inches (1 m) wide and only weighed 45 lbs (20.4 kg) for a 323-square-foot (30 square meter) roll.

In what was a surprising development at the time, one of the most popular uses of this very flexible and non-rigid membrane was over plywood substrates, including over a single layer of plywood. In 1999, the first detail for a “proprietary membrane” with a double layer of wood subfloor on 24 inches (600 mm) o.c. joist spacing was introduced to the TCNA *Handbook* (Detail F147). Only two years later in 2001, a second detail was added to the handbook for going over a single layer plywood floor on 19.2 inches (480 mm) o.c. joists with an “uncoupling system” and there was no reference to the manufacturer under limitations. The term “uncoupling” was substituted for “proprietary membrane” and a definition was added to the Prologue indicating “Uncoupling Systems: A system that separates the finished surface from the substrate to allow the independent movement between the two and prevent the transfer of stresses to the tiled surfaces.” Those who attend-



The first uncoupling membrane launched in North America in 1987 and included a series of ribs running in a single direction. Photos courtesy of Schluter-Systems

ed that meeting in Clemson, SC, will remember that this was the year that the TCNA technical committee decided to remove any proprietary names from the handbook. This was also the year when the section for “Floors Sound Rated” was removed.

Around 2006-2007, the definition changed to “Uncoupling membrane: A

plastic membrane system geometrically configured to provide air space between the tile and the substrate to allow independent movement between the two and limit the transfer of the stresses.” This new definition was created by an ad hoc committee of the TCNA *Handbook*; their directive was to create a definition that describes a “Ditra-like” product.



The primary purpose of uncoupling membranes is to prevent the transfer of stresses to the tiled surfaces. Proper membrane installation relieves this primary cause of cracks in tiles and grout.

The last detail added to the TCNA *Handbook* for uncoupling was in 2007 for “Young Concrete” (Detail F128). The concern with young/green concrete is that the concrete slab contains large amounts of residual moisture that still need to be released from the concrete. This release of moisture can affect the curing of the mortar and the grout, and in the case of many crack isolation/waterproofing membranes, especially those membranes that are flat, they have limited resistance to pressure from moisture as there is nowhere for the moisture to be released. This release of moisture in turn creates pressure which can cause the membrane to bubble or de-bond from the concrete slab. The TCNA manual calls out that an uncoupling membrane must have free space or empty cavities on the underside of the membrane which inherently allows for moisture/vapor release and eventually equalization.

The next addition to uncoupling’s presence in the TCNA *Handbook* was the

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addition to the definition in the prologue in 2014. “The uncoupling membrane must achieve 50 PSI or greater shear bond strength in seven days per the test method in ANSI A 118.12 Section 5.1.3.” This addition was in response to the concerns conveyed by labor and some forensic consultants that there were certain so called “Uncoupling Membranes” that were failing to the extent of several millions of dollars for repair and damages. The main failure was identified to be the bond between the substrate (the majority being plywood) and the underside of the membrane where the fleece/mesh or other material had delaminated. Until an ANSI standard was created for uncoupling, this requirement was a reasonable stop-gap to identify those membranes that were not performing.

The look of uncoupling has changed over the years, but the basic criterion has remained the same; a configured membrane with open air space to allow for independent movement between the

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tile and the substrate. Some of the newest additions to the uncoupling category now incorporate a floor warming system and even an optional integrated sound control and thermal break (for quicker heating reaction time).

The need for an ANSI standard has become greater than ever before in North America with the proliferation of new uncoupling membranes that have emerged in the market recently. The good news is that the Materials and Methods Standards Association (MMSA) has had a subcommittee that has been working on developing a standard for several years and a draft standard has been prepared and will be presented at the next Total Solutions Plus conference this year in Washington, DC, which runs from November 4 to 7.

Most of the details in the TCNA *Handbook*, which were identified earlier, will be part of the testing criterion. In addition, “Point Loading” and “Fungus/microorganism resistance” will be included. Two additional testing criteria that are being worked on are vapor transmission and shears, evaluating the stress/strain relationship between uncoupling membranes and other membranes

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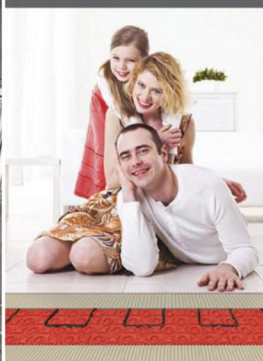
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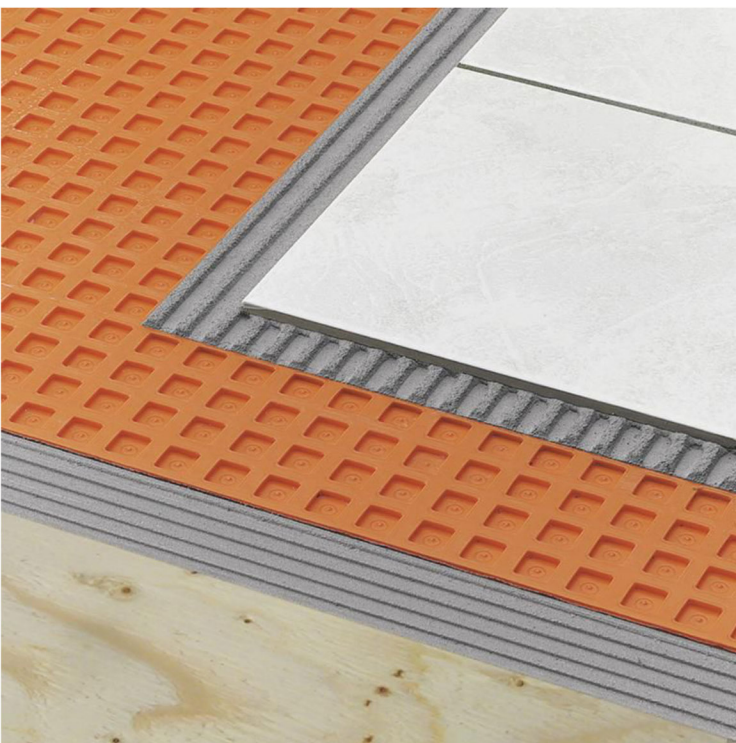


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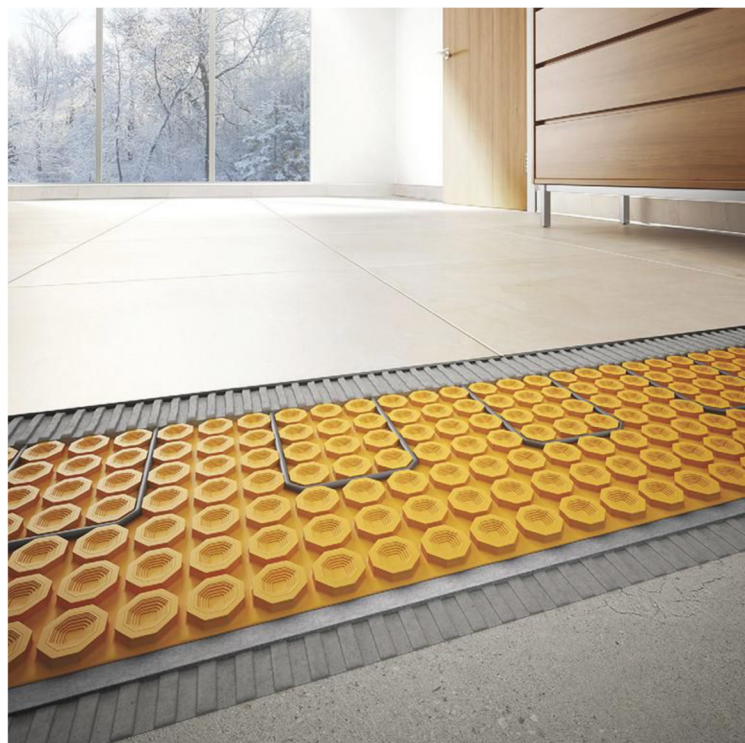


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The first TCNA detail on uncoupling for “proprietary membrane” with double layer of wood subfloor on 24-inch joist spacing was introduced in 1999.



Recent massive consumer demand for floor warming systems in tiled floors has spurred the development of uncoupling membranes that incorporate floor warming into the same layer as the membrane.

which are flat. This testing has been an international effort which has provided some promising results.

In addition to the MMSA subcommittee working on an uncoupling standard, the International Organization for Standardization (ISO) has established WG 11 “Uncoupling Membranes for Ceramic Tile Installation” under the auspices of TC-189 (Technical Committee for Ceramic Tile). Some of the same participants are in both committees so there has been very good communication and collaboration to ultimately achieve the best standards for both organizations. Other areas that are being pursued by the ISO group are “Tensile” and “Compression” testing.

Another organization abroad that has been working on uncoupling is the The Tile Association (TTA), based in the UK, which has published a technical paper called, “The Installation and Use of Uncoupling Membranes for Internal Floor Tiling,” which can be found on

their website at www.tiles.org.uk/services/technical-publications/.

The catalyst for this technical report was that, similar to North America, there were many failures that were occurring with products that were being called “uncoupling” products.

Another group that is working on a technical report on uncoupling is Eurofen (‘Fen’ = Tile, Screed and Natural Stone) which is a group of experts from the German tile industry. A test report from this group is expected in the near future.

In summary, uncoupling membranes have come a long way since the introduction of the very first membrane in 1987. The use of these membranes has proliferated and they can be used over a huge array of substrates and conditions that has allowed the tile industry to complete successful installations in some of the most challenging situations. The performance standards for uncoupling have been a long time coming, but to create a standard that is suitable for a product that

works more off of physics than chemistry is not an easy or simple task. **TILE**

About the Author



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CSC, CTC, TTMAC, is the Technical Director of Schluter-Systems (Canada), and has been with the company for 30 years. He is currently vice president of the

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and Standards Association (MMSA) in the U.S. Kempster co-chairs the Specifications and Technical Research Committee and is chair of the Terrazzo, Tile, and Marble Association of Canada’s (TTMAC) 09 30 00 Tile Installation Manual. He is the current chair of the Canadian Advisory Committee for the International Standards Organization (ISO [TC189]), as well as the Convenor of ISO TC 189 WG 11, which is creating a Standard for Uncoupling membranes for Tile Installations.