

Permeation, Crack Isolation and How They Impact Waterproofing Choices

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I call Las Vegas the Petri dish of waterproofing because Las Vegas has more hotel rooms (over 160K) than any city in the country. With demanding, fast-track construction schedules and streaks of stubborn “wild west” independence, what winds up in shower pans and wet areas sometimes can resemble a lab experiment gone awry.

The demand for luxurious, durable, and safe showers, spas, and wet areas spawned twin challenges to hotel and casino owners. The “durability challenge” forced hotel/casino owners to get creative in their mission to eliminate failing shower pans and wet areas. The “safety challenge” tasked these owners with banishing the threat of microbial growth – aka mold -- in stud-wall cavities and other areas of the guest environment.

A small army of forensic experts, waterproofing consultants, and risk-mitigation attorneys, hired by the hotel owners, turned their attention to the challenges outlined above in 2004-2005. They first focused on movement concerns and the impact on waterproofing longevity.

It came as no surprise that the areas around the drain, the pan-to-wall plane transition movement joint, and saw-cut, cold joints areas had higher incidences of failure if the waterproof membrane could not tolerate these movement forces.

Membranes Meeting High-performance Standards to the Rescue!

In the end, job-site variables, varying levels of installer competence, and independent, third-party product test results were all factored into the solution path: waterproof membranes that met the ANSI A118.12 high-performance standard were less prone to failure in these areas of movement concern. ANSI A118.12 high performance means the membrane and tile can withstand 1/8” of movement before failure of the system. There are products from various manufacturers that meet this requirement. Architects ensured these performance metrics would be maintained by requiring all performance/test data on any product be conducted by independent, third party testing agencies.

This evolution in specifications for waterproofing/crack isolation is not a closed or proprietary specification solution. There are numerous Division 9 allied-product manufacturers who can supply this type of waterproof membrane. Also this evolution of high-performance waterproof/crack isolation membranes does not marginalize or discredit waterproof membranes that meet the standard level of 1/16” of movement before failure. These products have offered decades and millions of square feet of successful waterproofing/crack isolation. With the advent of an objective testing method of ANSI A118.12 to quantify membrane performance, and with the ever-more-demanding owner/client wanting take every precaution, there is an undeniable move in Division 9 specifications towards referencing this ANSI standard as an objective benchmark of waterproofing/crack isolation performance.

Permeation

As we touched on earlier in our discussion, permeation (i.e. steam), has become another important performance metric to take into account when selecting the waterproof membrane for your project. Those of us with a few years in the tile industry will recall when installations consisted of a loose-laid shower pan, floated walls, cement backer-board, and unfortunately -- in some areas of the county -- green board. Back then there seemed to be a lot fewer concerns or evidence of mold making its way

back into stud-wall cavities or other areas of the home. Houses back in the day were able to breathe, and showers of that time were a lot more utilitarian, as were the attitudes about how much time was spent there.

Construction methods, shower design and technology, and our own evolving attitudes about the duration and frequency showering have resulted in a lot more steam in the shower. How much steam? Well, those same Las Vegas casino/hotel owners who tasked their waterproofing army with finding a solution to movement concerns in waterproofing also set out to identify the critical path towards stopping vapor migration penetrating areas outside the shower.

Their findings can be distilled down to this: hospitality showers, locker rooms, health clubs, university student gang showers, and hospitals can generate so much steam with the frequent and long nature of these showers that they are in reality mini steamroom environments. The upsurge in mold remediation cases and situations where steam had migrated into stud-wall cavities and living spaces was the result of the perfect storm of changing construction methods, which gave us tighter, less-breathable buildings and showers. At the same time our culture has been trained to view showering as an experience, an escape, to be savored -- not rushed. Consider a resort hotel, with a family of four, and the time they will spend in that shower. It is no wonder that seemingly overnight, there seemed to be a tidal wave of vapor-migration/mold issues. The images scattered throughout this article, courtesy of Charles Nolan, Millers Flooring America, Lafayette, Ind., show the kinds of failures that result from when low permeation waterproofing membranes are not included in steam and wet-area installations.

Treat Steamroom Conditions with Steamroom Engineered Products

Again, the solution was -- and is -- elegantly simple: if you are faced with a waterproofing/vapor-permeation condition which exhibits a steamroom level of steam/vapor, specify and install a waterproof membrane which is suitable for steamroom applications. In this area, do not waiver. The only membranes to be specified and installed, if you are going to address the mini steamroom conditions noted earlier, are membranes which comply with ASTM E-96. There are more than a few instances in which a tile contractor assumed his favorite shower pan membrane could rise to the occasion of stopping vapor migration, and alas it could not -- and it did not -- achieve that goal. In my own travels I have seen a waterproof membrane used on the shower walls in a four-star hotel, and when the walls were peeled back after three-and-a-half years, there was black mold nestled in the stud-wall cavities.

This solution is also not closed, or proprietary: there are a number of waterproof membranes, available from a variety of manufacturers, which can meet the requirements of ASTM E-96. But at the risk of sounding redundant: INDEPENDENT THIRD PARTY TESTING is the ONLY way one can be assured a product's claims are legitimate. There are a number of quite reputable manufacturers who rely on their company's marketing department or their own in-house tests to suffice. Architects and specification writers may employ language in their documents that *requires* all testing to be third party ONLY. The performance requirements of waterproofing in wet areas and showers have become more demanding as construction methods have changed, coupled with lifestyle changes that place more demands on the shower environment and wet areas. There always will be a good/better/best option for waterproofing, crack isolation, and permeation, but in the space provided here we have made note of best practices with regard to ANSI A118.12 and ASTM E-96 and how they provide an effective pathway to superior performance.

Noble Company, founded in 1946, manufactures premium-quality sheet membranes and shower elements for tile installation, including waterproofing membranes, linear drains, niches/benches, pre-slopes, shower bases, adhesives and sealants for the plumbing and tile industries; engineered antifreeze/heat transfer fluids and accessories for heating/cooling and freeze protection for fire sprinkler systems. The company is headquartered in Spring Lake, Mich., with manufacturing facilities there and in Baton Rouge, La. www.noblecompany.com.

There are FIVE C Nolen images that accompany this article. No captions – I reference them in the body of the article.