

Commentary on Watertightness and Waterproofing of Shotcrete

By James Scott

Over the recent years, the idea of waterproofing has taken a more prominent role in the construction of higher-end pools and other watershapes—and the debate on this topic seems to be on the increase. Most of us in the pool industry are at least peripherally aware of a broad debate as to whether waterproofing should be used, and in what situations.

From my observation, this issue is due to the increasing demand and interest in the higher-end swimming pool—what features can be incorporated, as well as architectural elements that can be achieved. Clearly, many pools are no longer just the typical single body of water with a simple ceramic waterline tile band and marble plaster finish. Many forces continue to act on the industry, such as development of product lines; increased availability of automation; huge building booms; information availability; and, most significantly, proliferation of ideas through **houzz.com** and similar websites, along with world travel.

In many ways, the swimming pool industry is still a young industry. The residential pool industry in the United States is particularly “young” in that it has been largely unregulated, and the barrier to entry has been low. Critically, architects and landscape architects are particularly ignorant of swimming pools and how they are built. Therefore, unregulated pool builders drive construction practices and techniques. As competition increases, prices are driven down and ultimately quality suffers. There is not a natural checks-and-balances system between the architect and builder.

Not only are pool builders experimenting with new materials, products, and techniques but multinational companies are also marketing their products to the pool industry and thus are “experimenting” via the builder’s use. If you put all of this history and set of factors together, it’s easy to see how shotcrete installation can suffer and how “waterproofing” has become appealing.

Of note have been the changes and about-faces in some manufacturer’s directions for the use of their product in swimming pool construction

(submerged conditions). If you keep your ear to the ground, it appears that these changes come after there has been a large failure, or series of smaller failures. It has caused the providers to look more closely at what is happening between the marriage of their product to the substrate or other products.

It does not mean that these waterproofing products do not work per se. What it does point out is that there is a huge volume of chemically based products being used in partnership with other chemicals or cementitious-based products without years of practical field experience. And, many times, these products are underlayments for expensive finish materials, such as tile and stone.

Ultimately, we can divide the use of waterproofing into two (non-mutually exclusive) situations. The first occurs when tile (or similar) is used for the interior finish. The second follows when a shotcreted pool or vessel is not shot well, and is not watertight (refer to Fig. 1 and 2).

In the tile industry, waterproofing is an integral part of the industry standards.¹ In fact, two types of waterproofing are separately referred to as cementitious and membrane. Even if the pool is already watertight or even waterproof from a cementitious standpoint, the waterproof membrane is sometimes still used to act as an anti-fracture layer for glass or other fragile tiles. It is important to note that many waterproofing products, applied to the inside of the pool, do not act as waterproofing for negative hydrostatic pressure (that is, water penetrating from outside the pool shell).

It is still widely misunderstood that a plaster interior finish will act as a “sealing coat” or waterproofing, which is fundamentally untrue. A properly shotcreted shell needs to supply the watertight properties for the pool.

The ASA Pool and Recreational Shotcrete Committee speaks to watertightness in Position Statement #4.² “Watertightness of the shotcrete material is a crucial durability and serviceability property of any properly constructed water-holding shotcrete structure. Shotcrete placement that allows water to pass through the concrete of

Pool & Recreational Shotcrete Corner



Fig. 1: A spa with a purple-colored waterproof membrane, undergoing a flood test prior to tile installation



Fig. 2: A pool with shadowing of the reinforcing bar cage, indicating a non-watertight situation

a pool shell is a sign of flawed material or placement techniques. A definition of watertightness is: impermeable to a measurable flow of water.”

When a pool shell is not watertight, sometimes the builder will look to waterproofing materials to overcome the deficiency. This is an unfortunate situation, as the deficiency within that shotcrete structure can cause a failure of the waterproofing material itself. Ultimately, it always comes back to the fact that a watertight vessel is a more stable and accepting substrate for whatever one wants to achieve, and much less prone to problems and future repairs.

References

1. Tile Council of North America, “TCNA Handbook for Ceramic, Glass, and Stone Tile Installation,” Anderson, SC, 2015, 445 pp.
2. American Shotcrete Association, 2014, “Position Statement #4: Watertight Shotcrete for Swimming Pools,” Farmington Hills, MI, http://www.shotcrete.org/media/pdf/ASA-PositionPaper_PoolRec_4.pdf. (last accessed Sept. 29, 2015)



James Scott is a third-generation Watershape Designer and Builder who has worked in the swimming pool and landscape industries for 39 years. He received his BS in business and accounting from Southern Methodist University, Dallas, TX. Through Group Works LLC, Scott has aligned himself with Genesis 3 and other organizations that focus on continuing education and increasing higher standards in the watershape industry. He is a Platinum Member of Genesis 3 and a certified member of the Society of Watershape Designers. Scott is also an APSP-Certified Professional Builder and an ASA member and has trained with the Portland Cement Association. Scott and Group Works LLC have been featured in regional and national publications.