



Proper Surface Preparation and Tile Installation in Steam Rooms and Steam Showers

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If you're lucky, you know how relaxing it is to spend some time in a steam shower, steam room or sauna, where heat penetrates the muscles and soothes away tension. These installations are more popular than ever, raising important questions about the best building methods. In this white paper, we will explore critical things you need to know when planning and installing tile in a steam shower.



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TILE INSTALLATION SYSTEMS



When surfaces are properly prepared and the tile is carefully installed, steam shower tile assemblies will hold up for years.

The terms regarding a sauna or steam facility are often used interchangeably, but there is a big difference. Saunas radiate a dry heat, and are generally kept at a temperature between 160 and 200 degrees Fahrenheit by heating rocks in the room. Water can be poured on the rocks to create steam, but it only raises the humidity a few percentage points. As you can imagine, ceramic tile cannot be installed on the surfaces inside a sauna; it would be too hot to stand or sit on the tile. The interior of a sauna is typically covered with wood.

On the other hand, steam rooms and showers use a steam generator to inject steam into the room. The temperature is kept around 110 degrees Fahrenheit, but it feels much hotter because the humidity stays at 100%. Wood finishes could not hold up very long in this type of hot and humid environment. Ceramic tile is the preferred covering material for these applications. When surfaces are properly prepared and the tile is carefully installed, steam shower tile assemblies will hold up for years.

Construction Methods

The Tile Council of North America (TCNA) classifies steam rooms and showers as either Res4 (residential intermittent use) or Com4 (commercial continuous use) for environmental exposure. TCNA recommends installing ceramic tile in steam rooms and showers per details SR613 and SR614 in residential units and SR613 for commercial applications. Both details use a sloped mortar bed for the floor; the difference is in the wall construction. SR613 should be followed if the walls are masonry or concrete, whereas SR614 is followed if the wall construction is wood or steel stud construction. While both methods recommend the installation of a ¾" to 1-½" thick reinforced mortar bed on the walls, SR614 offers the option of installing an approved cement backerboard on the walls in place of the mortar bed.

It is important to insulate all walls and ceilings before installing the mortar bed or backerboard substrates. The insulation not only keeps the heat in the steam room or shower, it also helps prevent condensation in the wall cavity. Water condensation in the cavity can lead to fungal growth or damage to the structure. The TCNA method details how to attach the mortar bed through rigid foam insulation on masonry and concrete surfaces. The insulation is generally installed between the studs of framed walls and ceilings. Then, either a mortar bed or backerboard is attached to the studs and installed over the insulation.

Waterproofing and Vapor-proofing

Before installing the mortar bed or cement backerboard, the installer must decide on a waterproofing membrane. TCNA detail SR613 and SR614 both show the need for a surface mounted waterproofing membrane on floors, walls and ceiling. If the permeability rating of the selected membrane is greater than 0.5 perms, a secondary vapor barrier must be installed behind the mortar bed or backerboard on the walls and ceiling.

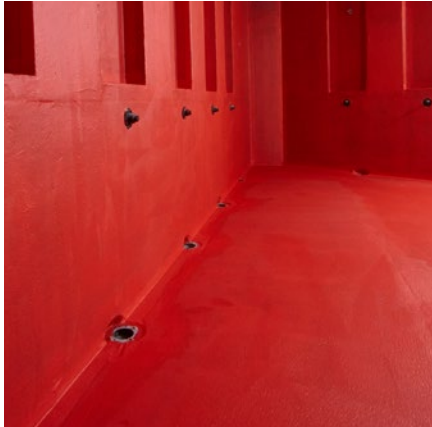
CUSTOM's RedGuard® Liquid Waterproofing and Crack Isolation Membrane is a ready-to-use, liquid-applied, elastomeric membrane that creates a continuous waterproofing barrier with outstanding adhesion. RedGuard has a permeability rating of 0.35 when applied to a dry film thickness of 30 mils. When a continuous film of RedGuard is applied to walls, floors and ceilings, it is not necessary to install a secondary vapor barrier. RedGuard is the first liquid-applied membrane to exceed industry standards for a low perm moisture vapor barrier appropriate for continuous use Com4 steam showers.

RedGuard® Liquid Waterproofing and Crack Isolation Membrane bonds directly to clean metal drains, PVC, stainless steel and ABS drain assemblies. RedGuard meets the requirements of ANSI A118.10, is IAPMO listed and also meets Uniform Plumbing Code specifications for use as a shower pan liner. This membrane is ideal for steam rooms or showers because



Technical White Paper

LIQUID-APPLIED MEMBRANES



RedGard is the first liquid-applied membrane to exceed industry standards for a low perm moisture vapor barrier.

waterproofing in these spaces must be complete and monolithic. Unlike sheet-applied membranes, there are no cuts or folds to be made to fit into corners with bonding mortar. RedGard liquid can be rolled, troweled or sprayed on the surface for maximum efficiency and coats all surfaces and transitions with a continuous film.

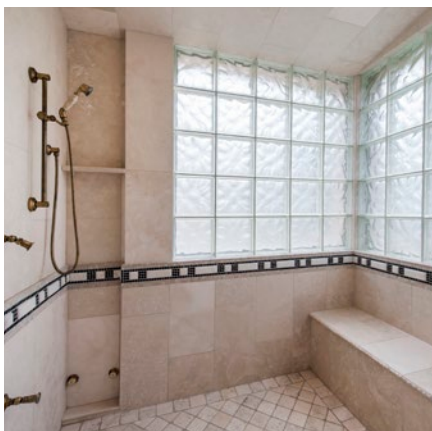
To achieve the proper permeability rating, the dry film thickness must be 30 mils. CUSTOM recommends a minimum of two coats for waterproofing; the second coat also fills any imperfections that may exist in the coverage. By applying the RedGard at a rate of 50 square feet per gallon for each coat, two coats will achieve a dry film thickness of 30 mils. RedGard Liquid Waterproofing and Crack Isolation Membrane is dry when it changes from pink to a deep red color. The floor can be flood tested after the second coat has thoroughly dried.

Drainage

The type of drain will dictate the construction of the floor. Both SR613 and SR614 assume the use of a clamp-style drain. If a traditional PVC shower pan liner is installed beneath the mortar bed, it is clamped to the drain before the mortar bed is placed over the shower pan liner. Surface waterproofing is preferred, as it keeps excessive moisture out of the mortar bed. This reduces the static weight of the steam room or shower and prevents fungal growth.

TCNA B421 should be followed for surface waterproofing the floor with a membrane like RedGard liquid. This detail shows how to install the mortar bed, keep the weep holes clear and tie the membrane into the clamp-style drain. If the chosen drain has an integrated bonding flange, then TCNA B422 details the installation of the mortar bed and waterproofing. Other types of drains are not detailed in the TCNA Handbook and their installation in a steam room or shower should be discussed with the manufacturer.

It is important when constructing a steam shower that the floor and ceiling are properly sloped to manage water and condensation movement to the drains. It is recommended that the ceiling is sloped 2" per foot to the wall to permit condensation to flow down the wall and not drip on the occupants. As with any shower bed, the floor should be sloped 1/4" per foot to the drain to evacuate water from the shower head as well as condensation.



Movement Joints

Movement joints are vitally important in a tiled steam room or shower. There is a considerable amount of movement in the tile finish and installation materials as the temperature changes in the room. Sealed slip joints must be installed at all changes of plane, such as wall and ceiling, to accommodate any differential movement. Soft joints should be placed around drains and at all penetrations. Depending on the size of the steam room or shower, it may be necessary to install generic movement joints every 8-10 feet in all directions. CUSTOM's Commercial 100% Silicone Sealant remains permanently flexible and meets the need for an ASTM C920 rated elastomeric sealant.

Choosing and setting the tile

It is important that the ceramic tile selected for installation in steam rooms and showers meets the requirements of ANSI A137.1 and is specified by the manufacturer to be used in this environment. TCNA does not recommend the installation of natural stone tile in steam rooms and showers. Natural stone can deform when exposed to high humidity, and this is even more pronounced at elevated temperatures. If you choose to install natural stone tile in a steam room or shower, be sure to consult the manufacturer for proper installation.

All tile in a steam room or shower should be installed with a dry-set cement mortar meeting the requirements of ANSI A118.15. The mortar should be





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applied using the thin-set method directly to the waterproofing membrane. It is best to have the waterproofing membrane installed as close as possible to the ceramic tile. This will reduce the volume of material that remains wet between uses.

CUSTOM's MegaLite® Ultimate Crack Prevention Mortar and ProLite® Premium Large Format Tile Mortar exceed the requirements of ANSI A118.15. Both are ideal for today's larger and heavier tile and appropriate for steam shower conditions. The mortar should be applied with the properly size notched trowel to achieve at least 95% coverage to the back of the tile. Back buttering the tile may be necessary to achieve this coverage rate. If a faster set is desired, MegaLite Rapid Setting Mortar can be used to allow grouting in as little as 3 hours.

Installing the Right Grout

All tile in a steam room or shower must be grouted with either a cement-based grout or a 100% epoxy-based grout. CUSTOM recommends Prism® Color Consistent Grout. Prism is a high performance, hydraulic cement grout that meets the requirements of ANSI A118.7. It is fast setting and cures to a uniform color. As with all cement-based grouts, it is best to seal the grout to ensure that the desired aesthetics last for the life of the installation. Aqua Mix® Sealer's Choice® Gold penetrating sealer is ideal for this purpose and will not give off harmful chemicals when exposed to high humidity and temperature. CEG-Lite™ 100% Solids Commercial Epoxy Grout is an excellent alternative to cement grout. CEG-Lite will resist staining without the need for routine sealing of the grout.

The completed tile assembly in a steam room or shower should be allowed to fully cure before turning on the steam generator for the first time. It is optimum to wait 14 days after grouting before turning on the water flow and steam generator, particularly if epoxy grout has been used.

With proper planning, installation and maintenance – including using cleaners and sealers from Aqua Mix - the project owners and their guests can enjoy the soothing relief from time spent in a steam room or shower for years to come.



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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