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## Moisture & Mold Issues Relevant to Installation of Ceramic and Stone Tile

Waterproofing wet areas under ceramic and stone tile has become increasingly important with the growth of mold related litigation. This article should provide readers with information about mold and the prevention of conditions necessary for mold to grow.

Mold is a microscopic fungus that generally appears on the surface of organic materials in warm, damp conditions. Mold needs moisture, a food source and a place in order to grow. Most buildings provide ample food sources and space. Moisture must be controlled in order to prevent mold from thriving.

There are over 1,000 types of mold in the United States. Some species can be harmful to humans, but mold is important to our ecosystem. Among other things, mold cleans forests by digesting leaves, wood, plants, and other items. It's also used to make cheese and medicines (like Penicillin). However, the same properties that make mold useful outside can be destructive to building interiors by decomposing materials like wood, paper, carpet, etc.



A great deal of information has been published about toxic mold, which can create health problems such as asthma, allergies, sinusitis, and other respiratory problems. Among the most harmful mold species are three that have been dubbed the "three wicked sisters". They include the Penicillium, Aspergillus and Stachybotrys Chartarism (a.k.a. Stachybotrus Atra), a black mold that grows on water logged building materials.

Eliminating mold is not a realistic objective. Mold spores are hardy, extremely small and can survive in a variety of conditions. It is said that 250,000 spores will fit on the head of a pin. Eliminating the leaks that provide moisture will help

stem the growth.

Mold has become more problematic in recent years. This is due, in part at least, to products that do not allow buildings to breathe. Without proper ventilation, such buildings can offer an environment that is a potential breeding ground for mold.

Mold related litigation has increased exponentially. By 2003 over 10,000 cases had been filed. A jury awarded a family in Texas \$32 Million, and there have been numerous other large dollar awards.

Frustration with mold infestation caused the owners of a home in Oregon to burn the structure to the ground. Uncertain science and an army of excited attorneys have instilled enough fear to cause many insurance companies to exclude mold-related damages from policies.

Experts agree that eliminating leaks and the resulting moisture is key to effectively stemming the growth of mold. This is particularly true for wet areas like showers. A leak in a shower pan can create an ideal environment for mold: moisture, a warm, dark area and wood or other organic material as a food source.

Waterproofing custom tiled showers can be accomplished with two waterproofing methods. Showers can be made watertight with a “shower pan”, which is loose laid under a mortar bed. This method has been used for several decades and there are ASTM standards that shower pans should meet. ASTM D 4068 is the applicable standard for waterproofing sheet membrane made from Chlorinated Polyethylene (CPE). ASTM 4551 is the standard for waterproofing made from PVC.

Regardless of the composition of the membrane, when a “pan” is installed below the mortar bed, water can penetrate the mortar bed. If the amount of moisture is sufficient, the bed can become saturated. A proper slope under the shower pan (1/4-inch/foot to a clamping ring drain) is an essential part of the waterproofing.

The alternative to the loose laid method is a thin-bed method with a bondable, load bearing, waterproofing membrane. The membrane is generally installed over a sloped, cementitious substrate. The thin-bed method positions the waterproofing above the sloped mortar and will eliminate problems related to saturation of the base below the membrane. An ANSI standard has been written for thin-bed waterproofing membranes. Thin-bed products should meet ANSI A118.10.

Building codes require that shower receptors be waterproofed. Even when there are no code requirements, knowledgeable specifiers are waterproofing drying areas in baths and shower walls. Waterproofing these areas helps protect cavities from moisture. Consider potential risk, budget, etc., in evaluating what areas should be waterproofed.

There are a several different types of membranes available for waterproofing wet areas under ceramic and stone tile. The most common types are either sheet membranes or liquid applied membranes.

Sheet membranes offer advantages in terms of strength and uniformity. Quality and thickness of sheet membranes are controlled during the manufacturing process. The strength of sheet membranes enables them to bridge movement joints and maintains the waterproof integrity of a system. In order to be bondable a sheet membrane is generally a composite made from a membrane with fiber laminated to both sides. The fiber provides a bondable surface so that the membrane can be adhered to a vertical or horizontal substrate. Tile can be adhered directly to the other side of the composite.

An installer creates liquid applied membranes. The process includes applying one or more layers of liquid to get a required thickness. The integrity of the waterproofing is dependent on the technique of the installers.



Liquid applied or troweled membranes are generally cost effective and can be the best choice for projects with many angles and/or shapes.

Sheet membranes can be made from a variety of products. Certain polymers like Chlorinated Polyethylene (CPE) offer outstanding properties for waterproofing applications. It will not rot, crack or deteriorate and it will last for decades. It is not affected by variations in temperature or a broad range of chemical compounds. Even caustic drain cleaners do not harm the membrane.



Some products used in composite sheets have definite limitations. For example, bituminous (peel and stick) waterproofing products can be susceptible to attack by the solvents used in stone sealers.

Specifiers should also insure that waterproofing products meet building code requirements. For example, shower receptor waterproofing generally requires a plumbing inspector's approval. Most municipal inspectors rely on a Uniform Plumbing Code (UPC) file number. Since regulations and codes vary by area, it is prudent to check the status of products you intend to use with local building code officials.

Eliminating leaks is essential to minimizing risk from mold-related issues. There are a variety of materials used for waterproofing. Selecting products with proven performance and resistance to a broad range of chemical compounds will help reduce risk of leaks and failures. In addition, products should meet appropriate standards and be acceptable to building code officials. Whether the installation is on a floor or wall, thin-bed methods place the membrane directly under the tile, which can help to minimize, saturated mortar beds or backer boards. Installations should be flood tested before the membrane is covered.

NobleSeal® TS, a thin sheet membrane produced by **The Noble Company**, is ideal for these applications. TS can be bonded to common subfloors with a latex modified thin-set mortar. **NobleSeal TS** can also be bonded to suitable shower walls (e.g. cementitious backer unit, concrete block, etc.) with a latex-modified thin-set. Tile can be bonded directly to the TS. The system can waterproof the floor, walls and even the ceiling if desired.



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