

CONCRETE CURING COMPOUNDS: WHAT TO DO WHEN INSTALLING TILE OR A SELF-LEVELING UNDERLAYMENT

When installing tile on a new concrete slab, the first thing you should do is make sure the texture of the surface is appropriate and ask if a **curing compound** was used on the concrete. If this critical step is not taken, residue can result in a poor bond of the tile to the concrete surface. With the recognition of the advantages of applying curing compounds to freshly installed concrete, this issue is seen more frequently in the field. While floor covering installers may see the curing compound as the cause of delay and extra work to remove, use of these products helps produce stronger and more stable concrete structures.

So what are concrete curing compounds?

The American Concrete Institute (ACI) 308 Committee defines a curing compound or evaporation reducers as, "...solutions of organic chemicals in water that are capable of producing a monomolecular film over the bleed water layer that rises to the top surface of concrete. If present in sufficient concentration, these chemicals form an effective film that reduces the rate of evaporation of the bleed water from the concrete surface. Evaporation reducers can be sprayed onto freshly placed concrete to reduce the risk of shrinkage when the evaporation rate equals or exceeds the bleeding rate."

Sodium silicate solutions should not be confused with curing compounds or evaporation reducers for improving the cure of the concrete. Silicates do not provide the two primary functions required of a concrete curing compound: they do not form a continuous film on the concrete surface and they do not retain moisture to promote proper cement hydration. Concrete strength and durability can be negatively affected if a silicate solution is used as a curing compound on freshly placed concrete.

Silicates are designed to densify the surface of a well-cured concrete slab, but should not be mistaken as a suitable option for curing new concrete. If a floor covering installer encounters a concrete slab that has been treated with a silicate material, they should check for absorbency with water droplets on the surface. If the droplets do not penetrate the concrete, the surface should be shot blasted or ground to open up the surface of the concrete to receive a cement tile mortar or underlayment.

What is the ceramic tile industry position on curing compounds?

The ceramic tile industry unanimously states that curing compounds should be removed from the surface before ceramic tile is installed. In ANSI A108.02 of the ceramic tile standard in section 4.1.1 it states, "All surfaces shall be structurally sound, clean, dry and free of oily or waxy films and all foreign matter. Concrete surfaces shall be free of from oil, **curing compounds**, laitance and cracks." It is also mentioned in section 3.2.1.1 of ANSI A108.01 to "Properly cure slab without using **liquid curing compounds** or other coatings."

The Tile Council of North America (TCNA) Handbook was written by leaders in the ceramic tile industry and is used by tile contractors and specification writers as a guide for proper installation of ceramic tile. It states in its various methods, "For concrete slabs: slab is to be well cured, dimensionally stable, and free of cracks, waxy or oily films, and **curing compounds**."

Nowhere in the TCNA Handbook or the ANSI standard for ceramic tile does it imply that you may install ceramic tile directly to a concrete surface that has been treated with any curing compounds. The concrete surface is to be tested for water acceptance by placing a few drops of water on the surface and observing the water's penetration into the concrete slab. If the water beads up, the surface must first be properly prepared to accept the installation of tile.

American Society for Testing and Materials (ASTM) published test method F3191-16 Field Determination of Substrate Water Absorption for Substrates to Receive Resilient Flooring that outlines specific steps for the water test. If it appears dusty, it must be cleaned of any loose material.

Ensuring a strong bond

To ensure a successful installation with well bonded cement underlayments and ceramic tile, Custom Building Products recommends mechanically abrading concrete that has been treated with curing compounds prior to applying primers, membranes or cement-based products.

This includes the removal of dissipating curing compounds. Despite the name, they are not safe to



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install underlayment or ceramic tile over. Dissipating curing agents rely on UV and abrasion by traffic to be adequately removed. Many areas in a building will not receive a sufficient amount of UV from sunlight to

Break down the coating and traffic patterns may be insufficient to breakdown and remove the coating. Further, the curing agent may have been applied at different rates over the concrete, adding additional variability.

Mock up vs. mechanical abrasion

For installations where a curing compound of any kind has been used on the concrete, the owner can decide to proceed at his own risk and accept liability for the surface conditions. First, the floor covering installer should build a mock up and perform tensile tests onsite to evaluate bond results to support removal of the curing compound before proceeding with an underlayment or ceramic tile installation. If doing a mock up on the existing surface, it is wise to select a worst case scenario or test several areas.

Since the mock up assembly should cure a minimum of 7 days and ideally 28 days before performing the tensile test, it may be more cost effective to shot blast the concrete slab and remove all curing compounds that way. Abrading away any curing compound on the surface of the concrete will assure a good bond with the use of a suitable cement underlayment or thin set mortar.

If you suspect that the concrete surface that you are about to bond an underlayment or tile to has been treated with a curing compound, rely on the experience of the many industry leaders and installers involved with the ANSI and TCNA Handbook committees and prepare the surface before the installation of the flooring. It is not worth the risk that the bond of the mortar or underlayment to the concrete may fail and the floor covering will need to be replaced.

Excessive moisture is another challenge that is encountered when tiling over a new slab.

For information about moisture testing of concrete slabs, or mitigating moisture vapor emission from young concrete prior to the installation of tile or other floor coverings, contact the CUSTOM Technical Services Department at **800.282.8786**.

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