

Moisture Study

A newsletter on moisture-related issues with concrete slabs.

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Concrete substrate preparation is literally a ton of work, sometimes several tons.

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When I was a kid, Earl Scheib would “paint your car for \$29.95” and when my older sister got her first hippie-van, she took it in to have them coat the old '68 Dodge in a hideous brown color.

The paint-job lasted as long as the hippie movement and then it peeled off, revealing again its previously hideous orange color.

Spray painting the car (or van) isn't that difficult of a process. But doing the body-work beforehand is absolutely everything.

The same thing is true when it comes to preparation of concrete slab surfaces to receive floor coverings, coatings or moisture control systems. Prep is critical to the success of them all.

The most common question we get asked is, “Do I have to shot blast or grind the concrete before I apply your material?” The answer always demands having to explain why you must do the body-work before painting the hippie van (with the curtain of beads that tried to hide the bed in the back).

Substrate preparation is not a simple task and requires the use of capital equipment and a great deal of know-how. It creates dust, noise and often requires a huge generator to power all of the machinery. Concrete is not like cutting butter.

Some people envision sanding the floor and vacuuming up the little bit of debris it creates. However, proper profiling can remove anywhere from a few hundred to a few thousand pounds of dust for every 1,000 square feet, depending on the substrate.

Most manufacturer's specifications regarding preparation merely say, “Remove all curing compounds, bond breakers or other contaminants before installation” which is clear enough, but does not really describe the desired outcome.

Rather than specify what to do, we developed 3 simple rules on what to expect from a properly profiled surface. These easy to understand rules made a huge difference in our applicator's comprehension of prep, and allowed them to better explain the whole purpose to their customers.

Three Characteristics of a Properly Profiled Slab

1. A properly profiled slab should be white in color. Healthy concrete is nice and white, not brownish or grayish in color.

As concrete is exposed to the atmosphere for a time, it starts to turn a shade of brown through the process of carbonation. While a very complex chemical process, basically CO_2 reacts with calcium in the slab and turns it into calcium carbonate.

The result is a brownish crust on the surface of the concrete. If that surface is disintegrating and is dusty, gluing something onto it will never last. This carbonation dust must be removed or bonding to the surface will result in failure.

If the slab is grayish in color (especially after profiling) then it may indicate a state of critical saturation. The pores of the slab are not merely filled with gas/vapor, but are liquid, meaning the slab is soaking wet. This can be an indication of water bombardment from beneath the slab, or just a very young, green concrete.

Many commercial-quality slabs specify a hard, steel trowel finish. In most cases, they double-trowel (make two passes) over the surface which produces a very hard, slick, shiny, almost blackened finish that is nearly impossible to bond anything to.

Following the standard specification of “remove all curing compounds and bond breakers” becomes that much more difficult to do with a double-pass finish. If a slab is expected to be sealed for moisture (due to the short construction schedule) we would recommend a light, single trowel finish to save time and money in the process of preparation.

2. A properly profiled slab should be highly scratch resistant. It should be nearly impossible to gouge or scratch it.

A slab that is easily scratchable after profiling, may indicate a very low cement content (or very high water/cement ratio) or may be indicative of excessive carbonation or contaminants that have not yet been fully removed.

If you swiped a screwdriver over the surface, you should not be able to gouge or scratch the surface to where it produces fines or particles of cement. At best, swiping it with a screwdriver should leave a “lead pencil” looking mark, but not carve into the slab.

The “swipe test” is a good way to quickly generalize the potential for good tensile strength. A more precise method follows ASTM D-4541 which uses a device to quantify the strength of something bonded to the surface.

3. A properly profiled slab should be absorbent to water.

If you place a droplet of water from your fingertip gently onto the slab surface, it should soak in relatively quickly. If it remains beaded up on the surface, it indicates a problem for bonding. A well profiled slab opens the surface pores for absorption, something that all materials need for anchoring.

Got questions? Please contact us for free, courteous tech support.