

Moisture Study

A newsletter on moisture-related issues with concrete slabs.

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Moisture testing is neither difficult nor expensive, unless not done.

Moisture

Floor Failure

Bio Hazards

Lawsuits

Down Time

Evaluation

Testing

Prevention

Specifying Moisture Tests to Save a Livelihood

This article hopes to help the architect or specifier further explain to their clients the urgency of a moisture testing program that will safeguard everyone from a potentially costly failure. This is not a technical article on testing, please refer to our library for that.

The term "moisture test" is really kind of strange if you think about it. We aren't *testing* to see if moisture is there, we *know* it is there. But we need to *measure* moisture levels along with the pH values to determine if it will meet the specs.

People probably call it a "test" because it often feels like you are going to the doctors hoping the lab results are negative. In our case, hoping the slab is in spec. It's often more of an emotional test than a scientific one. Hence the reason why architects need to really understand this issue. It can be frustrating to many.

Since all slabs emit some volume of moisture that may effect the flooring there is a lot at risk. Never allow anybody other than the owner, decide what to do with the results of the moisture tests. They need to clearly understand the risks and decide what to do.

About 10 years ago the floor covering community produced a white-paper about moisture. Albeit eloquent, it simply implies, "We didn't make the slab, cannot control the drying, cannot control building conditions, and don't have the problem with moisture- your slab does. Don't make us responsible to test your slab, call a pro to test it. Then call us to come do our job."

The history of failures has taught America that if they leave this issue up to others, liability fights will just continue. The only way to reduce the risk for owners is to specify a comprehensive moisture program conducted by qualified personnel.

By specifying the testing clearly, completely, concisely and correctly, you are acknowledging that moisture (and high pH) are factors of concrete's nature and that it is not the result of errors, omissions, or defects in materials or workmanship.

There are three different kinds of tests that are easy to specify.

Two of these test methods are used to get a meaningful estimate of moisture potential. These are the calcium chloride test (ASTM F1869) and the internal relative humidity probe or "insitu" test (ASTM F2170).

The calcium chloride vapor emission test (VET) works by measuring the volume of moisture vapor exiting the slab surface as a function of time. The insitu test works by measuring the internal relative humidity as an estimate of overall slab dryness.

In recent years the VET has been getting some bad publicity by the insitu supporters, in that they do not correlate. Of course not. They are measuring two entirely different aspects of moisture and one test is not better or more accurate than the other.

The insitu test knows how much water is behind the proverbial dam but doesn't know how much water is leaking through a crack. The VET knows how much water is leaking through the crack but cannot know how much is behind the dam. They *can't* correlate.

With the insitu test, there is an assumption that there is a perfect vapor barrier under the slab (stop laughing). Therefore, when the slab is new and wetter at the bottom than at the top, moisture is not equally distributed. Once covered with flooring and with no new moisture able to get into the slab, moisture redistributes equally.

To estimate what a floor surface might expect before it is installed, the insitu test is taken at a depth of 40% of the slab's thickness. That should tell us what the surface RH will be like when moisture redistributes. A result of 75% RH is considered safe to floor.

The VET is taken from the surface and is expressed as pounds. A vapor emission rate of 8.3 pounds for example, means that for every 1,000 square foot area of slab, one gallon's worth of water is evaporating from it in 24 hours time. A rate of 3 to 5 pounds is the uppermost limit of floor coverings and cement top coats as well.

Knowing the potential for moisture to emit (internal RH) and knowing the volume to which it is emitting (vapor emission rate), are two of the three types of tests that must be conducted.

The third measurement is the surface pH. Concrete has a naturally high pH of 12 or more, but adhesives can only withstand up to a pH of 9 or 10 at best. Failure of adhesives (flooring) is a chemical incompatibility, brought about by excessive moisture.

Specifications for moisture and pH testing can be found in the data sheets of almost every floor covering product. We can also help you review your moisture testing program as specified, to ensure that your firm and your clients have the right stuff.

Our company makes its living producing products for properly sealing the slab. Our desire is to see the construction industry stop experiencing costly failures. As the owner, I have seen the same scenario for 20 years. Most all failures I have seen are the result of misunderstanding the problem or being unable to communicate the importance of it to the owner. I have never met an owner yet who would not spend a small amount now to avoid spending much more later, once they have a fair understanding of the issue.