The calcium chloride test has been in use for seventy years, and is the most misused and misunderstood test testing procedure in the flooring industry. The calcium chloride test is used to measure the Moisture Vapor Emissions Rate (MVER) of a concrete slab. Unlike the Hygrometer probe test that measures the internal relative humidity of a slab, the calcium chloride test measures the moisture movement. There are many factors that affect the outcome of a calcium chloride test. The most important is the ambient temperature and humidity. Moisture vapor flow will travel to the warm dry environment. The warmer and drier the environment, the faster the movement, and the higher the MVER. It is estimated that 80 percent of the calcium chloride tests are inaccurate.

To examine protocol for conducting these tests, we need to complete the following to the letter:

You must select a section of concrete free of any cracks or hole that will change the natural flow of the moisture vapor emissions. **(Photo 1)** The size of the area should be at least 20" x 20". Note the residues on the concrete surface.

The surface of the concrete must be open and free of any residues that will impede the flow of moisture vapor. **(Photo 2)** The best way to prepare the concrete is to grind the surface to bare concrete with a diamond grinder. Be sure that there is nothing on the concrete when you are completed.

Photo 2

Be sure to vacuum the surface of the concrete. **(Photo 3)** Note the left half that was swept with a fine broom. The fine dust left behind will create a poor bond that will allow outside humidity to affect the outcome of your test.

Photo 3

The calcium chloride test kit is shown in **Photo 4**. The Petri dish is sealed in a vapor proof envelope and the dome has a pre-attached sealant to make placement easier. These kits are easy to place, but require attention to detail.


Photo 4

The Petri dish should be weighed within one hour of placement to insure accuracy. **(Photo 5)** Record the beginning weight on the lid of the Petri dish and one the test log along with the date, time of placement and test number.


Photo 5


Photo 6

Remove the tape from the Petri dish and place on the underside of the plastic dome. **(Photo 6)** Place the lid from the Petri dish on the underside of the Petri dish. Care must be taken not to spill any of the calcium chloride crystals. Position the Petri dish in the center beneath the plastic dome. Move the paper tape from the sealant and place the plastic dome over the exposed calcium chloride crystals. Rub the flange around the base of the plastic dome to be sure you have achieved an airtight seal. This dome must be left in place for 60-72 hours, so it is important to be out of harms way and thoroughly sealed.

After the allotted time (60-72 hours), take a knife and cut three sides of the dome to make retrieval of the Petri dish easier. **(Photo 7)** Once open, carefully pick up the Petri dish and place the lid over the exposed crystals and re-seal the Petri dish with the tape that was placed on the underside of the dome.


Photo 7

Photo 8

Re-weigh the Petri dish and calculate the weight gain. **(Photo 8)** Record the date and time of retrieval, test number and location.

You need to keep track of the following for your records:

- Location of the tests
- Test number
- Ambient room temperature
- Ambient humidity
- Start date/End date
- Start time/End time
- Exposure time (15-minute increments)
- Start weight/Ending weight
- Weight gain
- Note any unusual occurrences or damage to kit
- Results of test
- Flooring manufacturer's moisture limits for materials to be installed.

Moisture testing can be done with relative accuracy; however if one is to stray from the test methods, your test results could result in either false positives or false negatives.

The question has been asked if there is a correlation between the calcium chloride test and the hygrometer probe test? The answer is no. The calcium chloride test measures moisture movement and the hygrometer probe test measures internal slab relative humidity.

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