



Concrete Moisture Testing

When pouring concrete slabs, the use of large amounts of water is essential. When the concrete is in the drying stage it will release much of this water. For the installation of many floor coverings, including epoxy systems, it is critical for the concrete's moisture level to be in an acceptable range before installation. This guide will address the three testing methods used to determine the moisture vapor in concrete. Without testing, the installing contractor may have liability if a failure should occur.

Test Method 1:

Plastic Sheet Method: American Society for Testing Specification: ASTM D 4263

An 18" x 18" heavy mil plastic sheet is duct taped to the floor. The sheet is lifted after 24 hours to check for signs of moisture. However, temperature and dew point can affect this testing method. This test does not provide a calculated amount of moisture present, only that moisture is present.

Two additional tests are accepted by the flooring industry to accurately measure moisture in concrete slabs.

Test Method 2:

Calcium Chloride Test: American Society for Testing Specification: ASTM-F1869

For this test to achieve proper results, the building must be brought to the recommended installation/service conditions for at least 2 full days prior to testing.

Procedure:

The test area is ground clean using a diamond grinder. Usually a 24"x 24" area.

Wait 24 hours.

Open the Test Kit. The kit will contain a dish of anhydrous calcium chloride which is pre-weighed. Weigh and record the dish's weight. The dish is then placed on the cleaned concrete.

Place an enclosed plastic dome over the calcium chloride and seal to the floor with the self-adhesive tape.

After 60 hours, and not more than 72 hours, the dome is removed. The dish is reweighed and the weight is recorded. The weight gain is then calculated. *A chart is typically provided to aid with the calculation.* The calcium chloride is a desiccant and will absorb moisture from the concrete. This absorbed moisture will increase the weight of the calcium chloride in the dish.

The weight gain is expressed in pounds of moisture emitted from 1,000 square feet in a 24 hour period.

One test kit will be used for every 1,000 square feet since moisture can vary throughout a project area.

Most epoxy systems will require a rating of 4.0 or less to be considered acceptable.

Readings exceeding this amount should be addressed before applying any 100% solids epoxy system.

Test Kits are available from Taylor Tools. www.taylorstools.com

Test Method 3:

Relative Humidity Test

This electronic testing device has been gaining traction as the preferred testing method. This is due to the Calcium Chloride Test only measuring the moisture vapor emission in the top 1"-1 1/2" of a concrete slab. Moisture contained deeper in the slab is not measured.

Relative Humidity Test: American Society for Testing Specification: ASTM 2170

Test holes are drilled in the concrete slab at specified depths (usually 40 to 50% of the slab thickness).

Fitted liners are inserted to the bottom of the drilled holes.

The liners are capped for 72 hours before testing (This varies by manufacturer). *Some indicated only a 3% variance on readings taken the same day.*

A probe is then inserted and the reading is taken.



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Acceptable levels of relative humidity of less than 75% are usually considered desirable. *Check Product Data Sheet for limits.*

Since this reading is coming from the interior of the concrete, it will give a more accurate reading than the calcium chloride test which is on the surface of the concrete.

The readings from both the substrate and surface tests should be used to accurately determine the concrete moisture conditions.

Changing Levels of Moisture

If the on-grade concrete slab has a vapor barrier in place, the moisture levels will not rise substantially in the future. Without this, the moisture readings would simply reflect the moisture level at the time of the testing.