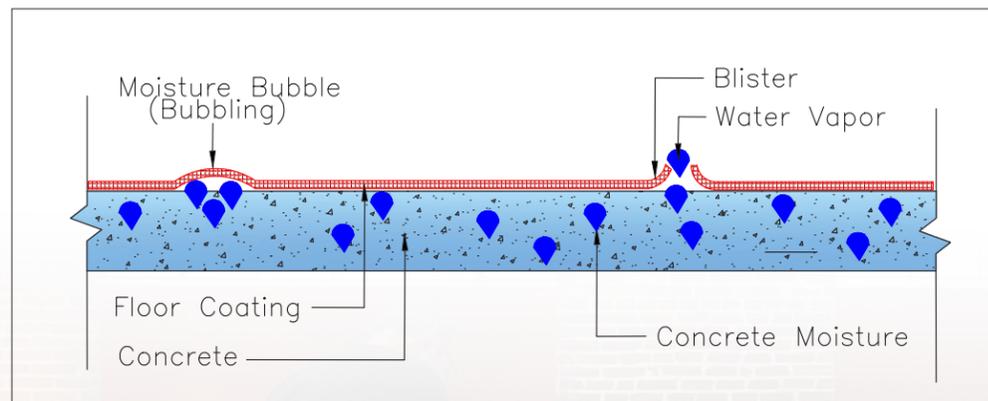


MOISTURE IN CONCRETE

Moisture in concrete is a contributing factor and often the culprit for many failures of floor coverings and coatings. Concrete by its nature is a porous material and allows for the passage of moisture and water vapor through it. Moisture can be present in concrete from many sources including residual water from the mix, a high water table or missing vapor barrier under the slab. When coated or sealed this moisture becomes trapped and can cause bubbling, craters or delamination of the coating if not properly addressed. It is therefore a best practice to always test for the presence of moisture in the concrete prior to coating or sealing.



Below are explanations of three of the most common moisture tests you may encounter, how to perform them and the strengths and weaknesses of each.

MOISTURE IN CONCRETE CONTINUED

ASTM D 4263 – Plastic Sheet Test Method

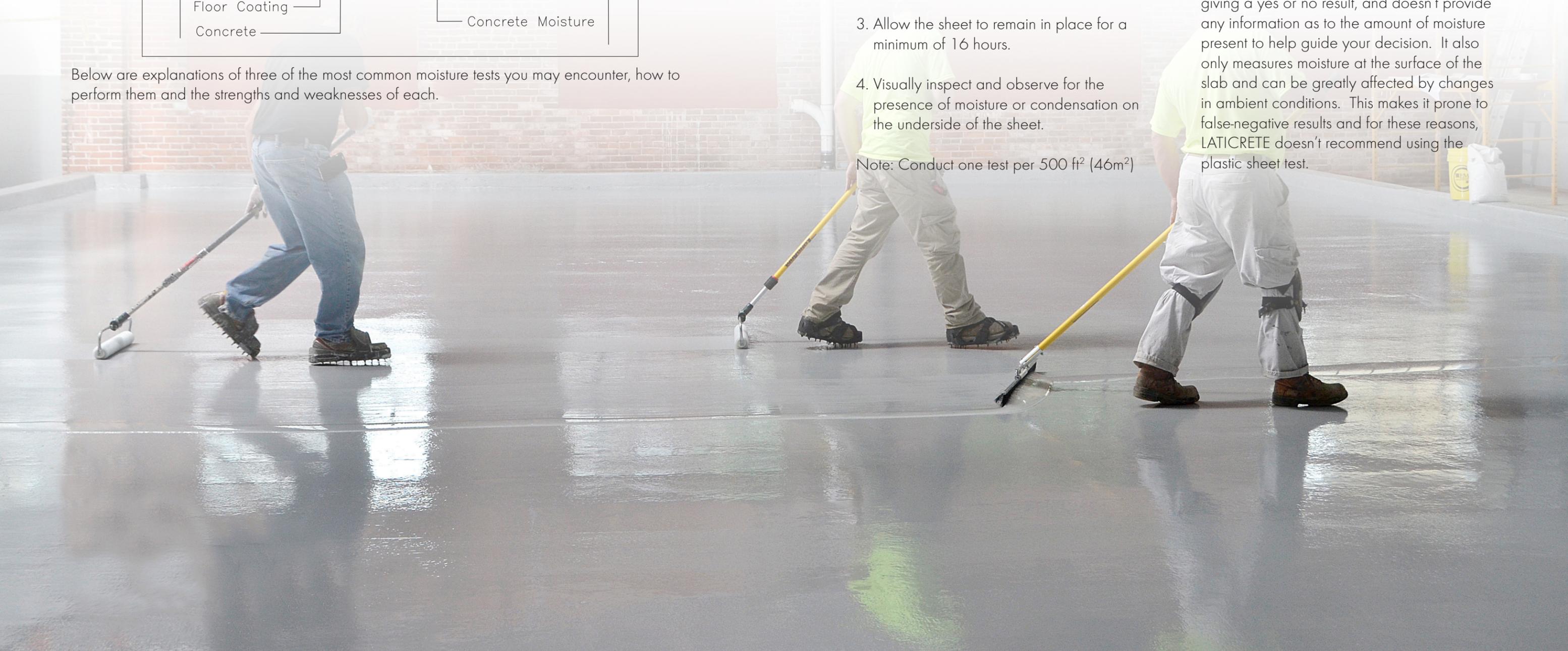
The Plastic Sheet Test Method is a qualitative test for the presence of moisture in the slab by taping a plastic sheet and observing the presence of condensation.



1. Prepare and profile a 2' x 2' section of the floor.
2. Duct tape an 18" x 18" (45 x 45 cm) 4 mil (0.1 mm) Polyethylene sheet to the floor sealing around the edges.
3. Allow the sheet to remain in place for a minimum of 16 hours.
4. Visually inspect and observe for the presence of moisture or condensation on the underside of the sheet.

Note: Conduct one test per 500 ft² (46m²)

While the plastic sheet tests is an easy and economical method for evaluating moisture, it has many shortcomings. The largest of these is that the test is qualitative in nature, only giving a yes or no result, and doesn't provide any information as to the amount of moisture present to help guide your decision. It also only measures moisture at the surface of the slab and can be greatly affected by changes in ambient conditions. This makes it prone to false-negative results and for these reasons, LATICRETE doesn't recommend using the plastic sheet test.



ASTM F 1869 – Calcium Chloride Test Method

The Calcium Chloride Test Method is a quantitative test that measures the amount of moisture emitted by measuring the change in weight of a calibrated calcium chloride test kit. Results are given in pounds per 1000 ft² which corresponds to the weight of water vapor emitted in 24 hours over a 1000 ft² area.

1. Prepare and profile a 20" x 20" (50 x 50 cm) section of the floor.
2. Wait a minimum of 24 hours after profiling to perform the test.
3. Record the start weight of the calcium chloride test kit.
4. Seal the transparent cover of the test kit to the floor.
5. Allow the kit to sit for 60 – 72 hours.
6. Record the end weight of the calcium chloride test kit.
7. Calculate the moisture emitted by the slab.

Note: Conduct three tests per 1000 ft² (100 m²) and one additional test per each additional 1000 ft² (100 m²) thereafter



Calcium chloride tests remain relatively popular due to their simplicity and easy accessibility. Results are more accurate than the plastic sheet test and give a qualitative measurement of the moisture in the slab. Since the test can only be used once, over time continued testing can become expensive. Also, similar to the plastic sheet test, the calcium chloride test only measures moisture at the surface of the slab and can both over and under estimate the moisture content as ambient conditions change. Rule of thumb is to add a dedicated moisture mitigation product if measurements are >3 lbs per 1000 ft² in a 24-hour period.

ASTM F 2170 – Relative Humidity Using In-situ Probes Test Method

The In-situ Probe Test Method is a quantitative test that utilizes in-situ probes to measure the relative humidity (RH) in the concrete slab given as a percentage.

1. Allow slab to condition to the service temperature and relative humidity of the air for a minimum of 48 hours prior to beginning to conduct testing.
2. Based on slab conditions, determine the appropriate depth for probe holes.

Drying Condition	Drill-to Depth from Top of Slab
Slab drying from top only	40% of slab thickness
Slab drying from top and bottom	20% of slab thickness
Fluted metal deck (Composite)	40% of max. slab thickness

3. Drill holes to required depth and insert liner per manufacturers instructions.
4. Allow 24 hours to pass to achieve moisture equilibrium within the hole.
5. Measure moisture content using in-situ probes per manufacturers instructions recording.

Note: Conduct three tests per 1000 ft² (100 m²) and one additional test per each additional 1000 ft² (100 m²) thereafter. One test should be located within 3 ft (1 m) of each exterior wall.



The In-situ Probe test Method is the most accurate test of the three tests outlined. It is the only test that accounts for the moisture within the slab and not just moisture at the surface. Initial cost of the equipment can be prohibitive, but the test equipment can be re-used for years if it's well maintained and calibrated.

LATICRETE recommends the use of in-situ probes to test for the presence of moisture in concrete slabs prior to coating or sealing. Any slab with a moisture content greater than 75% relative humidity should use a dedicated moisture mitigation product such as VAPOR BAN ER or SPARTACOTE™ Moisture Vapor Barrier as a prime (base) coat.