

## **Determining Moisture Content of Unvented Elevated Concrete Slabs Through Field Testing**

The allowable moisture content of concrete prior to the application of sealant or coating materials is 5% or less via the internal humidity test (ASTM F2170) or 5lbs/1000ft<sup>2</sup>/24hrs via the calcium chloride test (ASTM F1869) when applying to unvented concrete slabs with possible vapor drive. Three common methods (one qualitative and two quantitative) for determining moisture content are described below. Pecora requires at least one quantitative test method to be performed and documented prior to coating installation.

**Be aware that concrete moisture mitigation will be required if the below-mentioned requirements are not met. Consult Pecora Technical Service with any questions or concerns regarding the published requirements and possible resolutions.**

### **ASTM D4263 Standard Test Method for Indicating Moisture in Concrete by the Plastic Sheet Method (Qualitative / Rubber Mat Test)**

The rubber mat test is intended to measure concrete surface boundary moisture only and is not intended to determine internal concrete moisture content. This is considered a qualitative test method and is typically conducted the day of coating installation.

- **Purpose:** Capillary moisture in concrete is detrimental to the adhesion and performance of polyurethane deck coatings which cannot tolerate moisture on or within the surface boundary.
- **Materials:** 4 mil (minimum) polyethylene sheet or rubber mat 2" duct tape.
- **Conditions:** Test when surface and ambient temperatures are within the recommended application temperature for the coating system.
- **Procedure:** Tape polyethylene sheet or rubber mat approximately 12"x 12" to the deck surface making certain all edges are sealed. Allow the polyethylene sheet or rubber mat to remain in place for 16 hours (minimum). After 16 hours, remove the polyethylene sheet or rubber mat and observe the underside of the mat and the concrete surface. Slight amounts of moisture are normal and are to be expected. ***Beads of water indicate the concrete is too wet for moisture sensitive coatings to be applied and quantitative testing for internal moisture content should be completed using one of the methods noted below.***

### **ASTM F2170 Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes**

- **Quantitative** test method to determine relative humidity as measured inside a drilled hole.
- **Requirement: Maximum 75-80% internal RH considered acceptable for floor coatings**
- Comparable to ~ 5% moisture level

If the concrete is at 5.0% moisture content, it will neither absorb nor desorb moisture if the air above it is 70° F (21° C) and 75% RH. Therefore, if the air inside the box measures less than 75%, it can be assumed that the moisture content of the concrete is less than 5%.

**Sensor availability:**

Wagner Electronic Products, Inc. · <https://www.wagnermeters.com/>



**Wagner RH Meter  
(models may vary)**

### **ASTM F1869 Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride**

- **Quantitative** test method where moisture vapor emission rate is measured and determined over 24hrs via calcium chloride
- Unit of measure: Pounds per 1000ft<sup>2</sup> over a 24hr period (lbs/1000ft<sup>2</sup>/24hr)
- **Requirement: Maximum 5lbs/1000ft<sup>2</sup>/24hrs allowed prior to floor coating application**

**Test Method Summary & Procedure:**

On-site temperature and humidity must be controlled at least 48 hours prior to testing at a setting between 65-85°F and 40-60% relative humidity (RH). The slab must be clean and free of any contaminants. The test method noted below may slightly vary. Refer to the test kit instructions for specific guidelines.

1. Prepare three test sites for the first 1,000 sq. ft. Add one test site for each additional 1,000 sq. ft.
2. Set the tape sealed plastic dish on the scale and record its weight in grams, date and time of the test.
3. Carefully remove the tape along the edge of the dish, invert the lid under the dish and then stick the tape along the side of the dish to keep it safe. Be very careful not to spill any of the calcium chloride.
4. Place the dish on the slab away from cracks and joints. Be sure the calcium chloride inside is level. Remove the white paper on the dome and place the dome over the dish.
5. Firmly press the gasket under the flanges of the dome to seat the outer flanges of the dome to the slab and the gasket inside the edge of the dome. Place your hand over the dome and apply pressure, making sure there are no leaks in the gasket.
6. Place a safety cone over the dome and allow the test kit to remain undisturbed for 60-72 hr.
7. Cut open the dome and carefully remove the dish. Replace the lid and re-seal it with the blue tape.
8. Weigh the dish on the same scale, recording the ending weight in grams, the date and time on the dish lid.
9. Calculate the Moisture Vapor Emission Rate in pounds per 1000ft<sup>2</sup> over a 24hr period per the instructions included with the test kit.

