

Concrete In-Situ Relative Humidity and pH Testing (01450)

Part 1 – General

1.01 Section Includes

- A. Provide in-situ concrete relative humidity and surface pH testing to all concrete specified to be covered with floor coverings or resinous coatings. Includes concrete placed below, on and above grade. Testing shall take place after allowing concrete to dry for a minimum of 28 days. Testing is to be scheduled no less than 1 and no more than 6 weeks prior to scheduled flooring installation.

1.02 Related Sections

- A. Section 09620 - Specialty Flooring
- B. Section 09640 - Wood Flooring
- C. Section 09650 - Resilient Flooring
- D. Section 09660 - Static Control Flooring
- E. Section 09670 - Fluid Applied Flooring
- F. Section 09680 - Carpet

1.03 References

- A. ASTM F2170-19 – Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using In-Situ Probes
- B. ASTM F710-19 – Standard Practice for Preparing Concrete Floors and Other Monolithic Floors to Receive Resilient Flooring.

1.04 Submittals

- A. Report all test results in chart form listing test dates, time, depth of test well, in-situ temperature, relative humidity and pH levels.
- B. List test locations on chart and show same on 8 ½ x 11 site map (when such map is made available to testing agency).
- C. Deliver results in duplicate for distribution to Architect and General Contractor.

1.05 Quality Assurance

- A. Digital “Reader” and calibrated relative humidity sensors
 - 1. Factory-calibrated “Smart Sensors” using Touch-n-Sense™ technology.
 - 2. NIST-traceable factory calibration
- B. Wide range pH paper, and distilled or de-ionized water.
- C. Electronic digital pH meter with "Dual Slope" three-point automatic calibration and manual temperature compensation.

Part 2 – Products

2.01 - Manufacturers

- A. Rapid RH[®] relative humidity and temperature sensor kit as manufactured by Wagner Meters (800) 933-3506, or equal.
- B. pH test paper as manufactured by Micro Essential Laboratory, or equal.
- C. Electronic digital pH meter as manufactured by Wagner Meters (800) 933-3506, or equal.

Part 3 – Execution

3.01– Quantification of Relative Humidity at 40% of Concrete Thickness

- A. The test site should be maintained at the same temperature and humidity conditions as those anticipated during normal occupancy. These temperature and humidity levels should be maintained for 48 hours prior and during test period. When a building is not under HVAC control, a recording hygrometer or data logger shall be in place recording conditions during the test period. A transcript of this information must be included with the test report.
- B. The number of in-situ relative humidity test sites is determined by the square footage of the facility. The minimum number of tests to be placed is equal to 3 in the first 1,000 sq.ft. and 1 per each additional 1,000 square feet.
- C. Determine the thickness of the concrete slab, typically from construction documents.
- D. Utilizing a roto-hammer, drill test holes to a depth equal to 40% of the concrete thickness*, i.e., 2” deep for a 5” thick slab, or 1 ½” deep for a 4” thick slab. Hole diameter shall not exceed outside diameter of the probe by more than 0.04”. Drilling operation must be dry.
- E. Vacuum and brush all concrete dust from test hole.
- F. Insert a relative humidity probe (sensor) to the full depth of test hole. Place cap over probe.
- G. Permit the test site to acclimate, or equilibrate for 24 hours prior to taking relative humidity readings.
- H. Remove the cap and insert the cylindrical reading device to obtain reading from the in-situ probe.
- I. Read and record temperature and relative humidity at the test site.

* Elevated structural slab (not poured in pans) should be tested at a depth equal to 20% of its thickness.

3.02 Quantifying pH level.

- A. At or near the relative humidity test site, perform pH test.
 1. Using wide range pH paper, and distilled or de-ionized water:
 - a. Place several drops of distilled and/or de-ionized water onto the concrete surface to form a puddle approximately 1" in diameter.
 - b. Allow the water to set for approximately 60 seconds.
 - c. Dip the pH paper into the water and remove immediately, compare color to chart provided by paper supplier to determine pH reading.
 - d. Record and report results.
 2. Using electronic digital pH meter:
 - a. Clean the area of concrete to be tested.
 - b. Place several drops of distilled or deionized water on the concrete surface, forming a puddle approximately 1" in diameter.
 - c. Allow water to sit for 60 seconds prior to testing.
 - d. Place pH electrode into puddle for 10 seconds.
 - e. Record pH reading on meter's digital display.
 - f. Compare this reading with the specific flooring and/or adhesive manufacturer's installation guidelines to determine if the pH level is acceptable for their products.
 - g. Record and report results.

End of Section