



Designation: F2170 – 16b

Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes¹

This standard is issued under the fixed designation F2170; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This test method covers the quantitative determination of percent relative humidity in concrete slabs for field or laboratory tests.

1.2 The values stated in inch-pound units are to be regarded as standard. The values given in parentheses are mathematical conversions to SI units that are provided for information only and are not considered standard.

1.3 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

Specific warnings are given in Section 7, 10.3.2, and 10.4.4.

2. Referenced Documents

2.1 *ASTM Standards:*²

E104 Practice for Maintaining Constant Relative Humidity by Means of Aqueous Solutions

E177 Practice for Use of the Terms Precision and Bias in ASTM Test Methods

F710 Practice for Preparing Concrete Floors to Receive Resilient Flooring

3. Terminology

3.1 *Definitions:*

3.1.1 *relative humidity, n*—ratio of the amount of water vapor actually in the air compared to the amount of water vapor required for saturation at that particular temperature and pressure, expressed as a percentage.

¹ This test method is under the jurisdiction of ASTM Committee F06 on Resilient Floor Coverings and is the direct responsibility of Subcommittee F06.40 on Practices.

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² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

3.1.2 *service temperature and relative humidity, n*—average ambient air temperature and relative humidity that typically will be found in a building's occupied spaces during normal use.

4. Summary of Test Method

4.1 This test method comprises two procedures for forming holes in concrete into which a relative humidity probe is placed. Procedure A for hardened concrete involves drilling a cylindrical hole in concrete with a rotary hammerdrill, then placing a hollow sleeve to line the hole. Procedure B is an alternative procedure for fresh concrete, which involves forming a cylindrical hole in concrete by placing a hollow cylindrical tube in the formwork, then placing and consolidating concrete around the tube. The liner or tube permits measurement of RH at a specific, well-defined depth in the concrete.

4.2 Methods of probe calibration and factors affecting equilibration are described in Section 8.

5. Significance and Use

5.1 Excessive moisture in floor slabs after floor covering has been installed can cause floor covering system failures such as debonding, peaking and deterioration of finish flooring and coatings and microbial growth.

5.2 Manufacturers of such systems generally require moisture testing to be performed before installation on concrete. Internal relative humidity testing is one such method.

5.3 Moisture test results indicate the moisture condition of the slab only at the time of the test and in the specific locations tested.

6. Apparatus

6.1 *Hole Liner*, made of plastic or non-corroding metal. The liner shall have the shape of a hollow right circular cylinder and shall be between 0.37 to 0.75-in. (10 to 20 mm) outside diameter.

6.1.1 The liner shall have a solid sidewall that is open only at the bottom and at the top. Slots, holes, or other penetrations in the sidewall of the liner are not permitted. Two or more deformable circumferential fins located around the exterior circumference near the bottom of the liner shall be provided to