



Standard Test Methods for Determination of the Water Absorption Coefficient by Partial Immersion¹

This standard is issued under the fixed designation C1794; 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 defines a procedure to determine the water absorption coefficient of a material by partial submersion. The scope is to evaluate the rate of absorption of water due to capillary forces for building materials in contact with normal or driving rain above grade. The procedure is typically suitable mainly for masonry material, plaster, or a coating in combination with a substrate; but it can also be used for insulation materials. This test method is designed to be used only on homogeneous materials and does not apply to materials that are composites or non-homogeneous (for example, Faced Rigid Closed-cell Insulation). It is not within the scope of this standard to determine liquid uptake phenomena in below-grade applications. The water absorption coefficient is mainly used as an input datum for numerical simulation of the combined heat and moisture transport in building envelopes for design and forensic investigation purposes.

1.2 The values stated in either SI units or inch-pound units are to be regarded separately as standard. The values stated in each system may not be exact equivalents; therefore, each system shall be used independently of the other. Combining values from the two systems may result in non-conformance with the standard. However, derived results can be converted from one system to the other using appropriate conversion factors (see Table 1).

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.*

2. Referenced Documents

2.1 ASTM Standards:²

C168 Terminology Relating to Thermal Insulation

¹ This test method is under the jurisdiction of ASTM Committee C16 on Thermal Insulation and is the direct responsibility of Subcommittee C16.33 on Insulation Finishes and Moisture.

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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.

2.2 Other Standards:³

ISO 9346 Hygrothermal performance of buildings and building materials—Physical quantities for mass transfer—Vocabulary

ISO 15148 Determination of water absorption coefficient by partial immersion

3. Terminology

3.1 *Definitions of Terms*—For definitions associated with thermal insulation issues refer to Terminology C168. For definitions associated with water absorption refer to the terms and definitions given in ISO 9346.

3.2 Definitions of Terms Specific to This Standard:

3.2.1 *homogeneous material, n*—materials, which properties are uniform on a macroscopic scale.

3.2.2 *water absorption coefficient, n*—mass of water absorbed by a test specimen per face area and per square root of time (see Eq 2).

3.3 *Symbols and Units*—the Symbols and Units shown in Table 2 are used.

4. Summary of Test Method and Use

4.1 Water absorption by partial submersion will be calculated by measuring the change in weight of the specimen in a situation when the bottom surface is in contact with liquid water within a time range of at least 24 h. Liquid water that is only adsorbed on the surface shall not be taken into account and shall be removed before weighing, for example, by blotting with a sponge.

4.2 The purpose of this test is to derive reliable data on the capillary water uptake of building materials in appropriate units using a simple apparatus. These data can also be used as material properties for hygrothermal simulation of the building envelope for design and forensic purposes.

5. Significance and Use

5.1 The purpose of these tests is to obtain, by means of simple apparatus, reliable and easy to determine values of

³ Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036, <http://www.ansi.org>.