



Designation: C1878 – 19

Standard Test Method for Surface Water Resistance of Vapor Retarders for Thermal Insulation¹

This standard is issued under the fixed designation C1878; 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 details a procedure for the determination of the surface water resistance of a vapor retarder by measurement of the quantity of water absorbed in a specified time by the service-exposed surface of a vapor retarder intended for use on thermal insulation.

1.2 This test method covers vapor retarders that are expected to withstand intermittent or occasional exposure to liquid water on the exposed side. Examples of this exposure are condensation and light rain during installation before a structure is enclosed.

1.3 This method does not cover vapor retarders intended for exposure to the elements in outdoor applications.

1.4 This method does not cover thermal insulation products that also act as vapor retarders, such as elastomeric foam and cellular glass.

1.5 In the test, the specimen is exposed to a specified volume of water over a given exposure area, with a resultant head pressure.

1.6 The test method is based on Test Method D3285 (withdrawn), the so-called “Cobb” test used for paper.

1.7 The values stated in SI units are to be regarded as standard.

1.8 *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, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.9 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

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.

Current edition approved April 1, 2019. Published May 2019. DOI: 10.1520/C1878-19.

2. Referenced Documents

2.1 ASTM Standards:²

D3285 Test Method for Water Absorptiveness of Nonfibulous Paper and Paperboard (Cobb Test) (Withdrawn 2010)³

3. Significance and Use

3.1 Vapor retarders used on thermal insulation can be exposed to liquid water in normal usage. Some cannot tolerate such exposure without suffering damage. Others are designed to withstand intermittent or occasional exposure in their intended indoor usage. Still others are intended for outdoor applications and exposure to the elements. (not covered by this standard).

3.2 This test is used to evaluate products or materials that are used where exposure to liquid water on the surfaces on an intermittent or occasional basis is possible. Such products would be expected to absorb very little water, if any, in this test.

3.3 In the test, the specimen is exposed to a specified volume of water over a given exposure area, with a resultant head pressure.

3.4 The amount of water absorbed by a specimen is measured in this test. This is used to characterize the water resistance of the specimen. The less water absorbed, the more water resistant the surface is considered to be.

4. Apparatus

4.1 *Water Absorption Apparatus*, to permit one side of the specimen to be wetted uniformly at the moment the soaking period begins, and to allow controlled rapid removal of the water from the specimen at the end of the test period.

4.1.1 A specimen holder as shown in Fig. 1 comprised of a metal ring with a machined lower face, 11.28 ± 0.02 cm inside

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 The last approved version of this historical standard is referenced on www.astm.org.

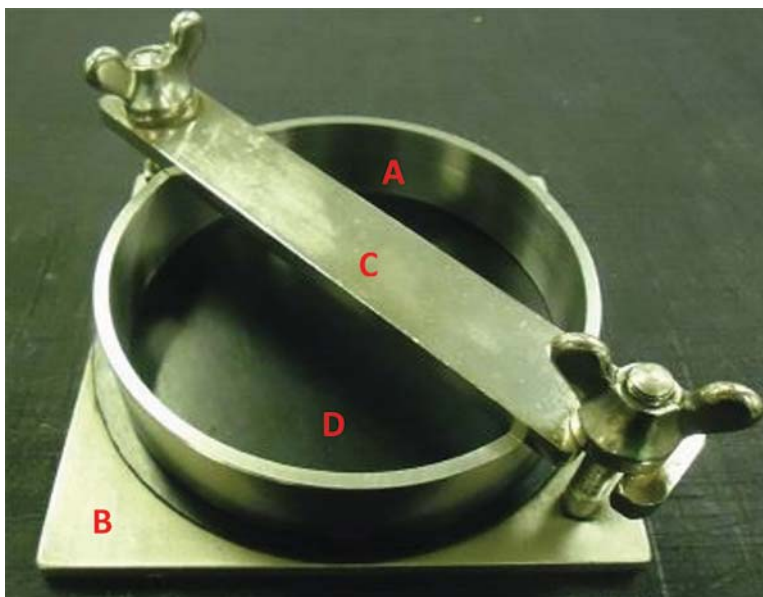


FIG. 1 Water Absorption Apparatus

diameter (creating a tested area of 100 cm²), 2.5 cm high and about 0.6 cm thick (A in photo).

4.1.2 A ring, is clamped to a flat base plate (B in photo) about 15 by 15 cm with a metal cross bar 17 by 2.5 by 0.6 cm and two wing nuts on a pair of studs (C in photo).

4.1.3 A cross bar with a hole at one end and a slot at the other to facilitate assembly and use (C in photo).

4.1.4 A smooth rubber mat, larger than the outside dimensions of the ring, onto which the specimen is clamped, is positioned on top of the base plate (D in photo).

4.1.5 All metal parts are corrosion-resistant.

NOTE 1—Dimensions provided only in metric units, as exact test area provided by ring is critical.

4.2 *Metal Roller*, having a smooth face 20 ± 1.3 cm wide and weighing 10.0 ± 0.5 kg.

4.3 *Timer*, readable in seconds.

4.4 *Graduated Cylinder*, 100 mL.

4.5 *Balance*, with an accuracy of 0.01 g, or better.

5. Reagents and Materials

5.1 *Water*, distilled or deionized.

5.2 *Paper Towel*.

6. Test Specimens

6.1 Obtain a sample of the vapor retarder of adequate size to obtain three test specimens. Cut specimens to a size slightly larger than the outside dimensions of the ring of the apparatus, about 125 by 125 mm. The test pieces shall be free of folds, wrinkles, or other defects not commonly inherent in the product.

7. Procedure

7.1 Weigh each specimen to the nearest 0.01 g.

7.2 Test the service-exposed side of the product only.

7.3 Place a dry rubber mat on the metal plate and lay a weighed specimen on it, service-exposed side up. After wiping the metal ring perfectly dry, place it upon the specimen, and fasten it firmly enough in place with the crossbar to prevent any leakage between the ring and the specimen.

NOTE 2—For materials where it is possible for leakage between the ring and the upper surface of the test specimen to occur during the test, a soft elastic nonabsorbent gasket is to be used. The gasket must have the same internal dimensions as the ring.

7.4 Use a test period of 120 ± 5 s for performing this test, spanning the time from when the water is poured in the ring until the specimen is placed on a paper towel.

7.5 Pour 100 mL of water into the ring as rapidly as possible, thus giving a head of 1 ± 0.1 cm. Start the stopwatch immediately. At 15 ± 5 s before the expiration of the test period, pour the water quickly from the ring, taking care not to drop any of the water upon the outside portion of the specimen. Promptly loosen the wing nuts, swing the crossbar out of the way while holding the ring in position by pressing it down with one hand. Carefully, but quickly, remove the ring and place the specimen with its wetted side up on a sheet of paper towel resting on a flat rigid surface.

7.6 Exactly at the end of the test period, place a second sheet of paper towel on top of the specimen and remove the surplus water by moving the roller over the sheet once in each direction without exerting additional pressure on the roller. Complete each pass of the roller in 4 to 5 s.

7.7 Fold the specimen to fit on the balance pan, with the test surface inside. Immediately reweigh it to the nearest 0.01 g.

7.8 Subtract the pre-test weight of the specimen from its final weight to obtain the weight of water absorbed.

7.9 Multiply the weight gain measurement by 100 to obtain the final result in g/m².