Designation: D 2842 – 01

Standard Test Method for Water Absorption of Rigid Cellular Plastics[1]

This standard is issued under the fixed designation D 2842; 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 determination of the water absorption of rigid cellular plastics by measuring the change in buoyant force resulting from immersion under a 5.1-cm (2-in.) head of water for the specified immersion period of 96 h.

1.2 This test method describes two procedures that may be used to measure the change in buoyant force. Procedure A should be used for materials that either experience rapid water absorption or that show an increase in volume during the exposure period, or both. Materials that do not exhibit either of these characteristics should be evaluated by Procedure B.

1.3 For specific applications, immersion periods varying from the normal 96-h test requirement shall be agreed upon between the manufacturer and the purchaser.

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

1.5 *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.*

NOTE 1—This test method and ISO 2896 are technically equivalent.

2. Referenced Documents

2.1 *ASTM Standards:*

D 3576 Test Method for Cell Size of Rigid Cellular Plastics[2]

E 96 Test Methods for Water Vapor Transmission of Materials[3]

E 691 Practice for Conducting an Interlaboratory Study to Determine the Precision of a Test Method[4]

2.2 *ISO Standard:*

ISO 2896 Cellular Plastics, Rigid—Determination of Water Absorption[5]

3. Terminology

3.1 *Definitions*—There are no terms in this test method that are new or other than dictionary definitions.

4. Summary of Test Method

4.1 The buoyant force of an object less dense than water is equal to the weight of water it displaces when submerged, less the dry weight of the object. Water absorbed into the object lowers the buoyant force by increasing the weight of the sample. By knowing the volume and initial dry weight of the sample, the initial buoyant force can be calculated or the initial buoyant force can be determined by direct measurement. The final buoyant force at the end of the immersion period is measured with an underwater weighing assembly. The difference between the initial and final buoyant force is the weight of the water absorbed per unit of specimen volume.

5. Significance and Use

5.1 The purpose of this test method is to provide a means for comparing relative water absorption tendencies between different cellular plastics. It is intended for use in specifications, product evaluation, and quality control. It is applicable to specific end-use design requirements only to the extent that the end-use conditions are similar to the immersion period (normally 96 h) and 5.1-cm (2-in.) head requirements of the test method.

NOTE 2—Studies by ASTM Subcommittee D20.22 show that some cellular plastics, particularly those with open cells or natural interstices, continue to absorb additional significant amounts of water beyond the 96-h immersion period. It was also found that water absorption of some cellular plastics is significantly higher when exposed to a greater pressure head, as might be encountered in certain underwater installations.

5.2 This test method provides a means for measuring absorption as a result of direct contact exposure to free water. Results by this test method cannot be used to compare the resistance of cellular plastics to water vapor transmission and

[1] This test method is under the jurisdiction of ASTM Committee D20 on Plastics and is the direct responsibility of Subcommittee D20.22 on Cellular Materials-Plastics and Elastomers.

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[2] *Annual Book of ASTM Standards*, Vol 08.02.

[3] *Annual Book of ASTM Standards*, Vol 04.06.

[4] *Annual Book of ASTM Standards*, Vol 14.02.

[5] Available from American National Standards Institute, 11 W. 42nd St., 13th Floor, New York, NY 10036.

***A Summary of Changes section appears at the end of this standard.**

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