



Standard Test Method for Water Migration in Honeycomb Core Materials¹

This standard is issued under the fixed designation F1645/F1645M; 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 water migration in honeycomb core materials.

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.

1.2.1 Within the text the inch-pound units are shown in brackets.

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

D2711/C2711M Test Method for Density of Sandwich Core Materials

D883 Terminology Relating to Plastics

D3878 Terminology for Composite Materials

D5229/D5229M Test Method for Moisture Absorption Properties and Equilibrium Conditioning of Polymer Matrix Composite Materials

E122 Practice for Calculating Sample Size to Estimate, With Specified Precision, the Average for a Characteristic of a Lot or Process

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

E456 Terminology Relating to Quality and Statistics

¹ This test method is under the jurisdiction of ASTM Committee D30 on Composite Materials and is the direct responsibility of Subcommittee D30.09 on Sandwich Construction.

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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. Terminology

3.1 *Definitions*—Terminology D3878 defines terms relating to high-modulus fibers and their composites, as well as terms relating to structural sandwich constructions. Terminology D883 defines terms relating to plastics. Terminology E456 and Practice E177 define terms relating to statistics. In the event of a conflict between terms, Terminology D3878 shall have precedence over the other terminologies.

3.2 Symbols:

CV	=	coefficient of variation statistic of a sample population for a given property (in percent),
S_{n-1}	=	standard deviation statistic of a sample population for a given property,
x_1	=	test result for an individual specimen from the sample population for a given property,
$\bar{x}$	=	mean or average (estimate of mean) of a sample population for a given property,
V_c	=	volume of water necessary to fill one core cell,
V_f	=	volume of water transfused,
W_c	=	mass of specimen after filling the primary cell with water,
W_f	=	mass of specimen after water transfusion, and
W_i	=	mass of specimen after conditioning, prior to water introduction.

4. Summary of Test Method

4.1 This test method consists of bonding a honeycomb core material to transparent facings using a water-resistant adhesive, drilling an access hole through one facing to an individual core cell, filling the cell with water, subjecting the filled cell to a constant hydrostatic pressure by maintaining a specified water column height, then measuring the amount of water transferred into the honeycomb core specimen (primarily due to diffusion through the cell walls) within a 24-h period. The amount of water transferred is presented as an approximate number of honeycomb core cells filled with water.

5. Significance and Use

5.1 Water permeability is a fundamental physical property that can be used in conjunction with other properties to characterize honeycomb sandwich core materials. Migration testing can be used to characterize and compare the relative permeability of honeycomb core materials to water.