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.

Designation: D6416/D6416M – 16$^{\varepsilon 1}$

Standard Test Method for Two-Dimensional Flexural Properties of Simply Supported Sandwich Composite Plates Subjected to a Distributed Load[1]

This standard is issued under the fixed designation D6416/D6416M; 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.

ε[1] NOTE—Editorial corrections were made to the adjunct information in April 2021.

1. Scope

1.1 This test method determines the two-dimensional flexural properties of sandwich composite plates subjected to a distributed load. The test fixture uses a relatively large square panel sample which is simply supported all around and has the distributed load provided by a water-filled bladder. This type of loading differs from the procedure of Test Method C393, where concentrated loads induce one-dimensional, simple bending in beam specimens.

1.2 This test method is applicable to composite structures of the sandwich type which involve a relatively thick layer of core material bonded on both faces with an adhesive to thin-face sheets composed of a denser, higher-modulus material, typically, a polymer matrix reinforced with high-modulus fibers.

1.3 The values stated in either SI units or inch-pound units are to be regarded separately as standard. Within the text the inch-pound units are shown in brackets. The values stated in each system are not exact equivalents; therefore, each system must be used independently of the other. Combining values from the two systems may result in nonconformance with the standard.

1.4 *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.*

1.5 *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.*

2. Referenced Documents

2.1 *ASTM Standards:*[2]

C365/C365M Test Method for Flatwise Compressive Properties of Sandwich Cores

C393 Test Method for Core Shear Properties of Sandwich Constructions by Beam Flexure

D792 Test Methods for Density and Specific Gravity (Relative Density) of Plastics by Displacement

D2584 Test Method for Ignition Loss of Cured Reinforced Resins

D2734 Test Methods for Void Content of Reinforced Plastics

D3171 Test Methods for Constituent Content of Composite Materials

D3878 Terminology for Composite Materials

E4 Practices for Force Verification of Testing Machines

E6 Terminology Relating to Methods of Mechanical Testing

E251 Test Methods for Performance Characteristics of Metallic Bonded Resistance Strain Gages

E1237 Guide for Installing Bonded Resistance Strain Gages

2.2 *ASTM Adjunct:*

Sandwich Plate Test Fixture and Hydromat Pressure Bladder, ASTM D6416/D6416M[3]

3. Terminology

3.1 Terminology D3878 defines terms relating to high-modulus fibers and their composites, as well as terms relating to sandwich constructions. Terminology E6 defines terms relating to mechanical testing. In the event of a conflict

[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.

Current edition approved April 1, 2016. Published April 2016. Originally approved in 1999. Last previous edition approved in 2012 as D6416/D6416M – 01(2012). DOI: 10.1520/D6416_D6416M-16E01.

[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] Detailed drawings for the fabrication of the 500–mm test fixture and pressure bladder shown in Fig. 3 and Fig. 4 are available from ASTM Headquarters, www.astm.org. Order Adjunct No. ADJD6416-E-PDF.

Copyright © ASTM International, 100 Barr Harbor Drive, PO Box C700, West Conshohocken, PA 19428-2959. United States