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: D6641/D6641M – 23

Standard Test Method for Compressive Properties of Polymer Matrix Composite Materials Using a Combined Loading Compression (CLC) Test Fixture[1]

This standard is issued under the fixed designation D6641/D6641M; 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 determines the compressive strength and stiffness properties of polymer matrix composite materials using a combined loading compression (CLC) (**1**)[2] test fixture. This test method is applicable to general composites that are balanced and symmetric. The specimen may be untabbed (Procedure A) or tabbed (Procedure B), as required. One requirement for a successful test is that the specimen ends do not crush during the test. Untabbed specimens are usually suitable for use with materials of low orthotropy, for example, fabrics, chopped fiber composites, and laminates with a maximum of 50 % 0° plies, or equivalent (see 6.4). Materials of higher orthotropy, including unidirectional composites, typically require tabs.

1.2 The compressive force is introduced into the specimen by combined end- and shear-loading. In comparison, Test Method D3410/D3410M is a pure shear-loading compression test method and Test Method D695 is a pure end-loading test method.

1.3 Unidirectional (0° ply orientation) composites as well as multi-directional composite laminates, fabric composites, chopped fiber composites, and similar materials can be tested.

1.4 The values stated in either SI units or inch-pound units are to be regarded separately as standard. Within the test 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.

NOTE 1—Additional procedures for determining the compressive properties of polymer matrix composites may be found in Test Methods D3410/D3410M, D5467/D5467M, and D695.

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

1.6 *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:*[3]

D695 Test Method for Compressive Properties of Rigid Plastics

D883 Terminology Relating to Plastics

D3410/D3410M Test Method for Compressive Properties of Polymer Matrix Composite Materials with Unsupported Gage Section by Shear Loading

D3878 Terminology for Composite Materials

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

D5379/D5379M Test Method for Shear Properties of Composite Materials by the V-Notched Beam Method

D5467/D5467M Test Method for Compressive Properties of Unidirectional Polymer Matrix Composite Materials Using a Sandwich Beam

D5687/D5687M Guide for Preparation of Flat Composite Panels with Processing Guidelines for Specimen Preparation

E4 Practices for Force Calibration and Verification of Testing Machines

E6 Terminology Relating to Methods of Mechanical Testing

E122 Practice for Calculating Sample Size to Estimate, With

[1] This test method is under the jurisdiction of ASTM Committee D30 on Composite Materials and is the direct responsibility of Subcommittee D30.04 on Lamina and Laminate Test Methods.

Current edition approved Nov. 15, 2023. Published December 2023. Originally approved in 2001. Last previous edition approved in 2016 as D6641/D6641M – 16ε2. DOI: 10.1520/D6641_D6641M-23.

[2] Boldface numbers in parentheses refer to the list of references at the end of this test method.

[3] 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.

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