



Standard Test Method for Determining the Compressive Properties of Polymer Matrix Composite Laminates Using a Combined Loading Compression (CLC) Test Fixture¹

This standard is issued under the fixed designation D 6641/D 6641M; 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 (€) indicates an editorial change since the last revision or reapproval.

€¹ NOTE—The designation, D 6641/D 6641M, was editorially corrected to be a dual standard in December 2001.

1. Scope

1.1 This test method establishes a procedure for determining the compressive strength and stiffness properties of polymer matrix composite materials using a combined loading compression (CLC) (1)² or comparable test fixture. This test method is applicable to general flat laminates that are balanced and symmetric and contain at least one 0° ply. The standard specimen is untabbed, and, thus, for strength determination, the laminate is limited to a maximum of 50 % 0° plies, or equivalent (see 6.4).

1.2 The compressive force is introduced into the specimen by combined end- and shear-loading. In comparison, Test Method D 3410/D 3410M is a pure shear-loading compression test method and Test Method D 695 is a pure end-loading test method.

1.3 Unidirectional (0° ply orientation) composites can be tested to determine unidirectional composite modulus and Poisson's ratio, but not compressive strength.

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 D 3410/D 3410M, D 5467, and D 695.

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 applica-*

bility of regulatory limitations prior to use.

2. Referenced Documents

2.1 ASTM Standards:

- D 695 Test Method for Compressive Properties of Rigid Plastics³
- D 883 Terminology Relating to Plastics³
- D 3410/D 3410M Test Method for Compressive Properties of Polymer Matrix Composite Materials with Unsupported Gage Section by Shear Loading⁴
- D 3878 Terminology for Composite Materials⁴
- D 5467 Test Method for Compressive Properties of Unidirectional Polymer Matrix Composites Using a Sandwich Beam⁴
- D 5687/D 5687M Guide for Preparation of Flat Composite Panels with Processing Guidelines for Specimen Preparation⁴
- E 4 Practices for Force Verification of Testing Machines⁵
- E 6 Terminology Relating to Methods of Mechanical Testing⁵
- E 122 Practice for Calculating Sample Size to Estimate, with a Specified Tolerable Error, the Average for a Characteristic of a Lot or Process⁶
- E 132 Test Method for Poisson's Ratio at Room Temperature⁵
- E 177 Practice for Use of the Terms Precision and Bias in ASTM Test Methods⁶
- E 456 Terminology Relating to Quality and Statistics⁶
- E 1309 Guide for Identification of Fiber-Reinforced Polymer Matrix Composite Materials in Databases⁴
- E 1434 Guide for Recording Mechanical Test Data of Fiber-Reinforced Composite Materials in Databases⁴
- E 1471 Guide for Identification of Fibers, Fillers, and Core Materials in Computerized Material Property Databases⁴

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 March 10, 2001. Published May 2001.

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

³ *Annual Book of ASTM Standards*, Vol 08.01.

⁴ *Annual Book of ASTM Standards*, Vol 15.03.

⁵ *Annual Book of ASTM Standards*, Vol 03.01.

⁶ *Annual Book of ASTM Standards*, Vol 14.02.