



Designation: D 3410/D 3410M – 95

Standard Test Method for Compressive Properties of Polymer Matrix Composite Materials with Unsupported Gage Section by Shear Loading¹

This standard is issued under the fixed designation D 3410/D 3410M; 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.

This standard has been approved for use by agencies of the Department of Defense.

1. Scope

1.1 This test method determines the in-plane compressive properties of polymer matrix composite materials reinforced by high-modulus fibers. The composite material forms are limited to continuous-fiber or discontinuous-fiber reinforced composites for which the elastic properties are specially orthotropic with respect to the test direction. This test procedure introduces the compressive load into the specimen through shear at wedge grip interfaces. This type of load transfer differs from the procedure in Test Method D 5467 where compressive load is transmitted into the specimen by subjecting a honeycomb core sandwich beam with thin skins to four-point bending, or Test Method D 695 where compressive load is transmitted into the specimen by end-loading.

1.2 This procedure is applicable primarily to laminates made from prepreg or similar product forms. Other product forms may require deviations from the test method.

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.*

1.4 The values stated in either SI units or inch-pound units are to be regarded separately as standard. Within the text the inch-pounds 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 compressive properties of resin-matrix composites may be found in Test Methods D 5467 and D 695.

2. Referenced Documents

2.1 ASTM Standards:

- D 695 Test Method for Compressive Properties of Rigid Plastics²
- D 792 Test Method for Density and Specific Gravity (Relative Density) of Plastics by Displacement²
- D 883 Terminology Relating to Plastics²
- D 2584 Test Method for Ignition Loss of Cured Reinforced Resins³
- D 2734 Test Methods for Void Content of Reinforced Plastics³
- D 3171 Test Method for Fiber Content of Resin-Matrix Composites by Matrix Digestion⁴
- D 3878 Terminology of High-Modulus Reinforced Fibers and Their Composites⁴
- D 5229/D 5229M Test Method for Moisture Absorption Properties and Equilibrium Conditioning of Polymer Matrix Composite Materials⁴
- D 5379/D 5379M Test Method for Shear Properties of Composite Materials by the V-Notched Beam Method⁴
- D 5467 Test Method for Compressive Properties of Unidirectional Polymer Matrix Composites Using a Sandwich Beam⁴
- E 4 Practices for Force Verification of Testing Machines⁵
- E 6 Terminology Relating to Methods of Mechanical Testing⁵
- E 83 Practice for Verification and Classification of Extensometers⁵
- E 111 Test Method for Young's Modulus, Tangent Modulus, and Chord Modulus⁵
- E 122 Practice for Choice of Sample Size to Estimate a Measure of Quality for 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 251 Test Methods for Performance Characteristics of Metallic Bonded Resistance Strain Gages⁵

¹ This specification is under the jurisdiction of ASTM Committee D-30 on Composite Materials and is the direct responsibility of Subcommittee D30.04 on Lamina and Laminate Test Methods.

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² Annual Book of ASTM Standards, Vol 08.01.

³ Annual Book of ASTM Standards, Vol 08.02.

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.