



Standard Test Method for Shear Strength of Continuous Fiber-Reinforced Advanced Ceramics at Ambient Temperatures¹

This standard is issued under the fixed designation C1292; 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 shear strength of continuous fiber-reinforced ceramic composites (CFCCs) at ambient temperature. The test methods addressed are (1) the compression of a double-notched test specimen to determine interlaminar shear strength and (2) the Iosipescu test method to determine the shear strength in any one of the material planes of laminated composites. Test specimen fabrication methods, testing modes (load or displacement control), testing rates (load rate or displacement rate), data collection, and reporting procedures are addressed.

1.2 This test method is used for testing advanced ceramic or glass matrix composites with continuous fiber reinforcement having uni-directional (1-D) or bi-directional (2-D) fiber architecture. This test method does not address composites with (3-D) fiber architecture or discontinuous fiber-reinforced, whisker-reinforced, or particulate-reinforced ceramics.

1.3 The values stated in SI units are to be regarded as the standard and are in accordance with [IEEE/ASTM SI 10](#).

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 and health practices and determine the applicability of regulatory limitations prior to use.* Specific hazard statements are given in [8.1](#) and [8.2](#).

2. Referenced Documents

2.1 ASTM Standards:²

[C1145 Terminology of Advanced Ceramics](#)

[D695 Test Method for Compressive Properties of Rigid Plastics](#)

¹ This test method is under the jurisdiction of ASTM Committee C28 on Advanced Ceramics and is the direct responsibility of Subcommittee C28.07 on Ceramic Matrix Composites.

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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.

[D3846 Test Method for In-Plane Shear Strength of Reinforced Plastics](#)

[D3878 Terminology for Composite Materials](#)

[D5379/D5379M Test Method for Shear Properties of Composite Materials by the V-Notched Beam Method](#)

[E4 Practices for Force Verification of Testing Machines](#)

[E6 Terminology Relating to Methods of Mechanical Testing](#)

[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](#)

[E337 Test Method for Measuring Humidity with a Psychrometer \(the Measurement of Wet- and Dry-Bulb Temperatures\)](#)

[E691 Practice for Conducting an Interlaboratory Study to Determine the Precision of a Test Method](#)

[IEEE/ASTM SI 10 American National Standard for Use of the International System of Units \(SI\): The Modern Metric System](#)

3. Terminology

3.1 Definitions:

3.1.1 The definitions of terms relating to shear strength testing appearing in Terminology [E6](#) apply to the terms used in this test method. The definitions of terms relating to advanced ceramics appearing in Terminology [C1145](#) apply to the terms used in this test method. The definitions of terms relating to fiber-reinforced composites appearing in Terminology [D3878](#) apply to the terms used in this test method. Additional terms used in conjunction with this test method are defined in the following.

3.1.2 *advanced ceramic*—engineered high-performance predominately nonmetallic, inorganic, ceramic material having specific functional attributes.

3.1.3 *continuous fiber-reinforced ceramic matrix composite (CFCC)*—ceramic matrix composite in which the reinforcing phase consists of a continuous fiber, continuous yarn, or a woven fabric.

3.1.4 *shear breaking force (F)*—maximum force required to fracture a shear-loaded test specimen.