



Standard Test Method for Flexural Properties of Continuous Fiber-Reinforced Advanced Ceramic Composites¹

This standard is issued under the fixed designation C1341; 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 flexural properties of continuous fiber-reinforced ceramic composites in the form of rectangular bars formed directly or cut from sheets, plates, or molded shapes. Three test geometries are described as follows:

1.1.1 *Test Geometry I*—A three-point loading system utilizing center point force application on a simply supported beam.

1.1.2 *Test Geometry IIA*—A four-point loading system utilizing two force application points equally spaced from their adjacent support points with a distance between force application points of one half of the support span.

1.1.3 *Test Geometry IIB*—A four-point loading system utilizing two force application points equally spaced from their adjacent support points with a distance between force application points of one third of the support span.

1.2 This test method applies primarily to all advanced ceramic matrix composites with continuous fiber reinforcement: uni-directional (1-D), bi-directional (2-D), tri-directional (3-D), and other continuous fiber architectures. In addition, this test method may also be used with glass (amorphous) matrix composites with continuous fiber reinforcement. However, flexural strength cannot be determined for those materials that do not break or fail by tension or compression in the outer fibers. This test method does not directly address discontinuous fiber-reinforced, whisker-reinforced, or particulate-reinforced ceramics. Those types of ceramic matrix composites are better tested in flexure using Test Methods C1161 and C1211.

1.3 Tests can be performed at ambient temperatures or at elevated temperatures. At elevated temperatures, a suitable furnace is necessary for heating and holding the test specimens at the desired testing temperatures.

1.4 This test method includes the following:

Scope	Section
	1

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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1.5 The values stated in SI units are to be regarded as the standard in accordance with IEEE/ASTM SI 10.

1.6 *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.*

2. Referenced Documents

2.1 ASTM Standards:²

- C1145 Terminology of Advanced Ceramics
- C1161 Test Method for Flexural Strength of Advanced Ceramics at Ambient Temperature
- C1211 Test Method for Flexural Strength of Advanced Ceramics at Elevated Temperatures
- C1239 Practice for Reporting Uniaxial Strength Data and Estimating Weibull Distribution Parameters for Advanced Ceramics

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.

*A Summary of Changes section appears at the end of this standard