



Designation: D 5961/D 5961M – 96

Standard Test Method for Bearing Response of Polymer Matrix Composite Laminates¹

This standard is issued under the fixed designation D 5961/D 5961M; 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 bearing response of polymer matrix composite laminates by either double shear (Procedure A) or single shear (Procedure B) tensile loading of a coupon. Standard specimen configurations using fixed values of test parameters are described for each procedure. However, when fully documented in the test report, a number of test parameters may be optionally varied. The material form is limited to high-modulus continuous-fiber or discontinuous-fiber reinforced composites for which the elastic properties are balanced and symmetric with respect to the test direction.

1.2 This test method is consistent with the recommendations of MIL-HDBK-17, which describes the desirable attributes of a bearing response 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-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.

2. Referenced Documents

2.1 ASTM Standards:

- D 792 Test Methods for Density and Specific Gravity (Relative Density) of Plastics by Displacement²
- D 883 Terminology Relating to Plastics²
- D 953 Test Method for Bearing Strength of 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 Reinforcing Fibers and Their Composites⁴
 - D 5229/D 5229M Test Method for Moisture Absorption Properties and Equilibrium Conditioning of Polymer Matrix Composite Materials⁴
 - 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 83 Practice for Verification and Classification of Extensometers⁵
 - E 122 Practice for Choice of Sample Size to Estimate a Measure of Quality for a Lot or Process⁶
 - E 177 Practice for Use of the Terms Precision and Bias in ASTM Test Methods⁶
 - E 238 Test Method for Pin-Type Bearing Test of Metallic Materials⁵
 - E 456 Terminology Relating to Quality and Statistics⁶
 - E 1309 Guide for the Identification of Composite Materials in Computerized Material Property Databases⁴
 - E 1434 Guide for Development of Standard Data Records for Computerization of Mechanical Test Data for High-Modulus Fiber-Reinforced Composite Materials⁴
 - E 1471 Guide for the Identification of Fibers, Fillers, and Core Materials in Computerized Material Property Databases⁴
- #### 2.2 Other Document:
- MIL-HDBK-17, *Polymer Matrix Composites*, Vol 1, Section 7⁷

3. Terminology

3.1 **Definitions**—Terminology D 3878 defines terms relating to high-modulus fibers and their composites. Terminology D 883 defines terms relating to plastics. Terminology E 6 defines terms relating to mechanical testing. Terminology E 456 and Practice E 177 define terms relating to statistics. In the event of a conflict between terms, Terminology D 3878

¹ This test method is under the jurisdiction of ASTM Committee D-30 on High Modulus Fibers and Their Composites and is the direct responsibility of Subcommittee D30.05 on Structural Test Methods.

Current edition approved May 10, 1996. Published July 1996.

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.

⁷ Available from Standardization Documents Order Desk, Bldg. 4 Section D, 700 Robbins Ave., Philadelphia, PA 19111-5094, Attn: NPODS.