



Designation: D5083 – 10^ε¹

Standard Test Method for Tensile Properties of Reinforced Thermosetting Plastics Using Straight-Sided Specimens¹

This standard is issued under the fixed designation D5083; 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 reappraisal. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reappraisal.

^ε¹ NOTE—Editorially corrected Fig. 1 in February 2015.

1. Scope*

1.1 This test method covers the determination of the tensile properties of thermosetting reinforced plastics using test specimens of uniform nominal width when tested under defined conditions of pretreatment, temperature, humidity, and testing-machine speed.

NOTE 1—Experience with this test method to date has been limited to glass-reinforced thermosets. Applicability to other materials remains to be determined.

1.2 This test method can be used for testing materials of any thickness up to 14 mm (0.55 in.).

NOTE 2—This test method is not intended to cover precise physical procedures. It is recognized that the constant-rate-of-crosshead-movement type of test leaves much to be desired from a theoretical standpoint, that wide differences may exist between rate-of-crosshead movement and rate of strain between gage marks on the specimen, and that the testing speeds specified disguise important effects characteristic of materials in the plastic state. Further, it is realized that variations in the thicknesses of test specimens that are permitted by these procedures, produce variations in the surface-volume ratios of such specimens, and that these variations may influence the test results. Hence, where directly comparable results are desired, all samples should be of equal thickness. Special additional tests should be used where more precise physical data are needed.

NOTE 3—Use of this test method for testing materials of thicknesses greater than 14 mm (0.55 in.) is not recommended. Reducing the thickness by machining may be acceptable for materials of uniform reinforcement amount and direction, but is generally not recommended.

1.3 Test data obtained by this test method is relevant and appropriate for use in engineering design.

1.4 The values stated in SI units are to be regarded as standard. The inch-pound units given in parentheses are for information only.

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 appro-*

priate safety and health practices and determine the applicability of regulatory limitations prior to use.

NOTE 4—This test method is technically equivalent to ISO 527-4 except as noted below:

(a) This test method does not include testing of the Type I dogbone shaped specimen described in ISO 527-4. Testing of this type of specimen, primarily used for reinforced and un-reinforced thermoplastic materials, is described in Test Method D638.

(b) The thickness of test specimens in this test method includes the 2 mm to 10 mm thickness range of ISO 527-4, but expands the allowable test thickness to 14 mm.

NOTE 5—For tensile properties of resin-matrix composites reinforced with oriented continuous or discontinuous high modulus $> 20\text{-Gpa}$ ($> 3.0 \times 10^6\text{-psi}$) fibers, tests shall be made in accordance with Test Method D3039/D3039M or ISO 527 Part 5.

2. Referenced Documents

2.1 ASTM Standards:²

- D618 Practice for Conditioning Plastics for Testing
- D638 Test Method for Tensile Properties of Plastics
- D883 Terminology Relating to Plastics
- D3039/D3039M Test Method for Tensile Properties of Polymer Matrix Composite Materials
- D4000 Classification System for Specifying Plastic Materials
- D5947 Test Methods for Physical Dimensions of Solid Plastics Specimens
- E4 Practices for Force Verification of Testing Machines
- E83 Practice for Verification and Classification of Extensometer Systems
- E691 Practice for Conducting an Interlaboratory Study to Determine the Precision of a Test Method

2.2 ISO Standard:³

- ISO 527 Plastics—Determination of Tensile Properties—Part 1: General Principles

¹ This test method is under the jurisdiction of ASTM Committee D20 on Plastics and is the direct responsibility of Subcommittee D20.10 on Mechanical Properties.

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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.

³ Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036, <http://www.ansi.org>.

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