



Designation: D 5083 – 96

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

This standard is issued under the fixed designation D 5083; 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 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 appropriate 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 when

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Note 4 was modified in this edition.

the Type 2 ISO specimen is used, except for the difference in the lengths of the specimens.

2. Referenced Documents

2.1 ASTM Standards:

D 374 Test Methods for Thickness of Solid Electrical Insulation²

D 618 Practice for Conditioning Plastics and Electrical Insulating Materials for Testing³

D 638 Test Method for Tensile Properties of Plastics³

D 883 Terminology Relating to Plastics³

D 3039 Test Method for Tensile Properties of Polymer Matrix Composite Materials⁴

D 4000 Classification System for Specifying Plastic Materials⁵

E 4 Practices for Force Verification of Testing Machines⁶

E 83 Practice for Verification and Classification of Extensometers⁶

E 691 Practice for Conducting an Interlaboratory Study to Determine the Precision of a Test Method⁷

2.2 ISO Standard:

ISO 527 Part 4 Plastics—Determination of Tensile Properties—Test Conditions for Isotropic and Orthotropic Fibre-Reinforced Plastic Composites⁸

3. Terminology

3.1 **Definitions**—Definitions of terms applying to this test method appear in Terminology D 883.

4. Significance and Use

4.1 This test method is intended primarily as a quality-control test and as a screening test for fiber-reinforced laminates. It is particularly useful when the length of the reinforcement exceeds 12.7 mm (0.5 in.). Results obtained by this procedure may differ from those obtained by Test Methods D 638 and D 3039. In the case of disagreement, values

² Annual Book of ASTM Standards, Vol 10.01.

³ Annual Book of ASTM Standards, Vol 08.01.

⁴ Annual Book of ASTM Standards, Vol 15.03.

⁵ Annual Book of ASTM Standards, Vol 08.02.

⁶ Annual Book of ASTM Standards, Vol 03.01.

⁷ Annual Book of ASTM Standards, Vol 14.02.

⁸ Available from American National Standards Institute, 11 W. 42nd St., 13th Floor, New York, NY 10036.