



Designation: D7774 – 17

Standard Test Method for Flexural Fatigue Properties of Plastics¹

This standard is issued under the fixed designation D7774; 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 dynamic full reversed fatigue properties of plastics in flexure. This method is applicable to rigid and semi-rigid plastics. Stress and strain levels are below the proportional limit of the material where the strains and stresses are relatively elastic. Three-point or four-point bending systems are used to determine these properties.

1.2 This test method can be used with two procedures:

1.2.1 *Procedure A*, designed for materials that use three-point loading systems to determine flexural strength. Three-point loading system is used for this procedure.

1.2.2 *Procedure B*, designed for materials that use four-point loading systems to determine flexural strength. Four-point loading system is used for this procedure.

1.3 Comparative tests can be run in accordance with either procedure, provided that the procedure is found satisfactory for the material being tested.

1.4 The values stated in SI units are to be regarded as the standard. The values provided 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 1—This standard and ISO 13003 address the same subject matter, but differ in technical content and results cannot be directly compared between the two test methods.

1.6 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

¹ This test method is under the jurisdiction of ASTM Committee D20 on Plastics and is the direct responsibility of Subcommittee D20.10.24 on Fracture and Fatigue.

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2. Referenced Documents

2.1 ASTM Standards:²

- D618 Practice for Conditioning Plastics for Testing
- D638 Test Method for Tensile Properties of Plastics
- D790 Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials
- D792 Test Methods for Density and Specific Gravity (Relative Density) of Plastics by Displacement
- D883 Terminology Relating to Plastics
- D1505 Test Method for Density of Plastics by the Density-Gradient Technique
- D2839 Practice for Use of a Melt Index Strand for Determining Density of Polyethylene
- D3479/D3479M Test Method for Tension-Tension Fatigue of Polymer Matrix Composite Materials
- D4883 Test Method for Density of Polyethylene by the Ultrasound Technique (Withdrawn 2017)³
- D5947 Test Methods for Physical Dimensions of Solid Plastics Specimens
- D6272 Test Method for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials by Four-Point Bending
- E4 Practices for Force Verification of Testing Machines
- E83 Practice for Verification and Classification of Extensometer Systems
- E1942 Guide for Evaluating Data Acquisition Systems Used in Cyclic Fatigue and Fracture Mechanics Testing

2.2 ISO Standard:

- ISO 13003 Fibre-Reinforced Plastics—Determination of Fatigue Properties Under Cyclic Loading Conditions⁴

3. Terminology

3.1 *Definitions*—Definitions applying to this test method appear in Terminology D883.

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 The last approved version of this historical standard is referenced on www.astm.org.

⁴ 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