



Designation: D6272 – 17

Standard Test Method for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials by Four-Point Bending¹

This standard is issued under the fixed designation D6272; 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 unreinforced and reinforced plastics, including high-modulus composites and electrical insulating materials in the form of rectangular bars molded directly or cut from sheets, plates, or molded shapes. These test methods are generally applicable to rigid and semirigid materials. However, flexural strength cannot be determined for those materials that do not break or that do not fail in the outer fibers. This test method utilizes a four point loading system applied to a simply supported beam.

1.2 This test method describes two procedures (Procedure A and Procedure B), the selection of which depends on the behavior of the sample to be tested as explained below:

1.2.1 *Procedure A*, designed principally for materials that break at comparatively small deflections. It shall be used for measurement of flexural properties, particularly flexural modulus, unless the material specification states otherwise.

1.2.2 *Procedure B*, designed particularly for those materials that undergo large deflections during testing. It is suitable for measurement of flexural strength.

1.3 Comparative tests are permitted to be run according to 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 test method is similar to ISO 14125, Method B. However, ISO 14125, Method B specifies only a load span of $\frac{1}{3}$ the support span whereas D6272 also permits a load span of $\frac{1}{2}$ the support

span. For this reason and other differences in technical content, exercise extreme care if attempting to compare results between the two test methods.

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

D883 Terminology Relating to Plastics

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 14125 (Method B) Fibre-Reinforced Plastic Composites—Determination of Flexural Properties

3. Terminology

3.1 Definitions:

3.1.1 Definitions of terms applying to these test methods appear in Terminology D883 and Annex A2 of Test Method D638.

4. Summary of Test Method

4.1 A bar of rectangular cross section rests on two supports and is loaded at two points (by means of two loading noses), each an equal distance from the adjacent support point. The distance between the loading noses (the load span) is either one third or one half of the support span (see Fig. 1). A support

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