



Designation: D 746 – 98<sup>€1</sup>

## Standard Test Method for Brittleness Temperature of Plastics and Elastomers by Impact<sup>1</sup>

This standard is issued under the fixed designation D 746; 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 (€) indicates an editorial change since the last revision or reapproval.

€<sup>1</sup> NOTE—Editorially corrected 8.1.2 and 8.2.2 in April 2002.

### 1. Scope\*

1.1 This test method covers the determination of the temperature at which plastics and elastomers exhibit brittle failure under specified impact conditions. Two routine inspection and acceptance procedures are also provided.

NOTE 1—When testing rubbers for impact brittleness use Test Methods D 2137.

1.2 The values stated in SI units are to be regarded as the standard.

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.*

NOTE 2—This test method and ISO 974-1980 (E) are technically equivalent when using the Type B fixture and the Type III specimen, however, the minimum number of specimens that are required to be tested may be significantly different when using this test method. The ISO method requires that a minimum of 100 specimens be tested.

### 2. Referenced Documents

#### 2.1 ASTM Standards:

D 618 Practice for Conditioning Plastics and Electrical Insulating Materials for Testing<sup>2</sup>

D 832 Practice for Rubber Conditioning for Low-Temperature Testing<sup>3</sup>

D 883 Terminology Relating to Plastics<sup>2</sup>

D 1898 Practice for Sampling of Plastics<sup>2</sup>

D 2137 Test Methods for Rubber Property—Brittleness Point of Flexible Polymers and Coated Fabrics<sup>3</sup>

E 77 Test Method for the Inspection and Verification of Thermometers<sup>4</sup>

E 220 Test Method for Calibration of Thermocouples by Comparison Techniques<sup>4</sup>

E 644 Test Methods for Testing Industrial Resistance Thermometers<sup>4</sup>

E 1137 Specification for Industrial Platinum Resistance Thermometers<sup>4</sup>

#### 2.2 ISO Standard:

ISO 974-1980 (E) Plastics—Determination of the Brittleness Temperature by Impact<sup>5</sup>

### 3. Terminology

3.1 *General*—The definitions of plastics used in this test method are in accordance with Test Method D 883 unless otherwise specified.

3.2 *brittleness temperature*—that temperature, estimated statistically, at which 50 % of the specimens would probably fail.

### 4. Summary of Test Method

4.1 To determine the brittleness temperature, specimens are secured to a specimen holder with a torque wrench. The specimen holder is immersed in a bath containing a heat-transfer medium that is cooled. The specimens are struck at a specified linear speed and then examined. The brittleness temperature is defined as the temperature at which 50 % of the specimens fail.

### 5. Significance and Use

5.1 This test method establishes the temperature at which 50 % of the specimens tested fail when subjected to the conditions specified herein. The test provides for the evaluation of long-time effects such as crystallization, or those that may be introduced by low-temperature incompatibility of plasticizers in the material under test. Plastics and elastomers are used in many applications requiring low-temperature flexing with or without impact. Data obtained by this test method may be used to predict the behavior of plastic and elastomeric materials at

<sup>1</sup> This test method is under the jurisdiction of ASTM Committee D-20 on Plastics and is the direct responsibility of Subcommittee D20.30 on Thermal Properties (Section D20.30.07).

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<sup>2</sup> Annual Book of ASTM Standards, Vol 08.01.

<sup>3</sup> Annual Book of ASTM Standards, Vol 09.01.

<sup>4</sup> Annual Book of ASTM Standards, Vol 14.03.

<sup>5</sup> ISO Standards Handbook 21, Vol 1. ISO Standards are available through American National Standards Institute, 11 W. 42nd St., 13th Floor, New York, NY 10036.

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