



Standard Test Method for Brittleness Temperature of Plastic Sheeting by Impact¹

This standard is issued under the fixed designation D1790; 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.

This standard has been approved for use by agencies of the U.S. Department of Defense.

1. Scope*

1.1 This test method covers the determination of that temperature at which plastic sheeting 1.00 mm (0.040 in.) or less in thickness exhibits a brittle failure under specified impact conditions.

1.2 The values stated in SI units are to be regarded as the standard. The values given in parentheses are for information only.

NOTE 1—This test method was developed jointly with the Society of the Plastics Industry, primarily for use with plasticized vinyl sheetings. Its applicability to other plastic sheetings must be verified by the user.

1.3 *This standard does not purport to address 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 8570 address the same subject matter, but differ in technical content.

2. Referenced Documents

2.1 ASTM Standards:²

[D618 Practice for Conditioning Plastics for Testing](#)

[D883 Terminology Relating to Plastics](#)

[D5947 Test Methods for Physical Dimensions of Solid Plastics Specimens](#)

[D6988 Guide for Determination of Thickness of Plastic Film Test Specimens](#)

[E691 Practice for Conducting an Interlaboratory Study to Determine the Precision of a Test Method](#)

¹ This test method is under the jurisdiction of ASTM Committee [D20](#) on Plastics and is the direct responsibility of Subcommittee [D20.30](#) on Thermal Properties.

Current edition approved Oct. 1, 2014. Published October 2014. Originally approved in 1960. Last previous edition approved in 2008 as D1790 - 08. DOI: 10.1520/D1790-14.

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.

2.2 ISO Standard:

[ISO 8570 Plastics—Film and Sheeting—Determination of Cold-Crack Temperature³](#)

3. Terminology

3.1 Definitions:

3.1.1 *brittleness temperature*, T_b —that temperature, derived statistically, where 80 % of the specimens would probably pass 95 % of the time when a stated minimum number are tested by this test method. The 80 %-passing value is determined by plotting the data on probability graph paper, as described in [9.1](#).

3.1.2 *General*—Definitions of terms applying to this test method appear in Terminology [D883](#).

4. Significance and Use

4.1 Data obtained by this test method have been used to predict the behavior of plastic sheeting at low temperatures only if the conditions of deformation are similar to those specified in this test method. This test method is useful for specification testing and for comparative purposes, but does not necessarily determine the lowest use temperature for a particular plastic.

4.2 It has been demonstrated that on calendered sheeting the brittleness temperature is sensitive to the direction of fold. It has also been demonstrated that the brittleness temperature is sensitive to the direction of sampling. Therefore, it is imperative that the procedure for taking specimens and folding be followed explicitly.

5. Apparatus

5.1 *Cold Conditioning Chamber*, at least 450 by 450 by 450 mm (18 by 18 by 18 in.). Means (automatic or manual) shall be provided for controlling the temperature of the chamber to within $\pm 2^\circ\text{C}$ of the desired value.

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