Designation: D1922 – 15

Standard Test Method for Propagation Tear Resistance of Plastic Film and Thin Sheeting by Pendulum Method[1]

This standard is issued under the fixed designation D1922; 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[2] covers the determination of the average force to propagate tearing through a specified length of plastic film or nonrigid sheeting after the tear has been started, using an Elmendorf-type tearing tester. Two specimens are cited, a rectangular type, and one with a constant radius testing length. The latter shall be the preferred or referee specimen.

1.2 Because of (*1*) difficulties in selecting uniformly identical specimens, (*2*) the varying degree of orientation in some plastic films, and (*3*) the difficulty found in testing highly extensible or highly oriented materials, or both, the reproducibility of the test results may be variable and, in some cases, not good or misleading. Provisions are made in the test method to address oblique directional tearing which may be found with some materials.

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

1.4 *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.* Specific precautionary statements are given in 13.1.

NOTE 1—Film has been arbitrarily defined as sheeting having nominal thickness not greater than 0.25 mm (0.010 in.).

NOTE 2—This standard is equivalent to ISO 6383-2.

2. Referenced Documents

2.1 *ASTM Standards:*[3]

D618 Practice for Conditioning Plastics for Testing

D689 Test Method for Internal Tearing Resistance of Paper (Withdrawn 2009)[4]

D1004 Test Method for Tear Resistance (Graves Tear) of Plastic Film and Sheeting

D4000 Classification System for Specifying Plastic Materials

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

2.2 *ISO Standard:*

ISO 6383-2 Plastics—Film and Sheeting—Determination of Tear Resistance—Part 2 Elmendorf Method[5]

3. Summary of Test Method

3.1 The force in grams required to propagate tearing across a film or sheeting specimen is measured using a precisely calibrated pendulum device. Acting by gravity, the pendulum swings through an arc, tearing the specimen from a precut slit. The specimen is held on one side by the pendulum and on the other side by a stationary member. The loss in energy by the pendulum is indicated by a pointer. The scale indication is a function of the force required to tear the specimen.

[1] This test method is under the jurisdiction of ASTM Committee D20 on Plastics and is the direct responsibility of Subcommittee D20.19 on Film, Sheeting, and Molded Products.

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[2] This test method has been adapted from TAPPI Standard Method T 414M-49, Internal Tearing Resistance of Paper. In testing certain plastic films, problems of reproducibility and interpretation of results are encountered which require special treatment to make the test method of most value. This test method is revised here specifically for use with plastic film and thin sheeting. For more complete explanation of certain aspects of the equipment, its calibration and adjustment, refer to TAPPI Standard Method T 414M-49.

The following additional references may be of interest in connection with this test method:

Painter, E. V., Chu, C. C., and Morgan, H. M., "Testing Textiles on the Elmendorf Tear Tester," *Textile Research Journal,* Vol XX, No. 6, June 1950, pp. 410–417.

Elmendorf, A., "Strength Test for Paper," *Paper,* Vol 26, April 21, 1920, p. 302.

[3] 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.

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

[5] 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**

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