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.

Designation: D1693 – 15$^{\varepsilon 1}$

Standard Test Method for Environmental Stress-Cracking of Ethylene Plastics[1]

This standard is issued under the fixed designation D1693; 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.

ε[1] NOTE—Adjunct footnote was editorially corrected in August 2020.

1. Scope*

1.1 This test method covers the determination of the susceptibility of ethylene plastics, as defined in Terminology D883, to environmental stress-cracking when subjected to the conditions herein specified. Under certain conditions of stress and in the presence of environments such as soaps, wetting agents, oils, or detergents, ethylene plastics may exhibit mechanical failure by cracking.

1.2 The values stated in SI units are to be regarded as 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, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

NOTE 1—There is no known ISO equivalent to this standard.

1.4 *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.*

2. Referenced Documents

2.1 *ASTM Standards:*[2]

D618 Practice for Conditioning Plastics for Testing

D883 Terminology Relating to Plastics

D1204 Test Method for Linear Dimensional Changes of Nonrigid Thermoplastic Sheeting or Film at Elevated Temperature

D1248 Specification for Polyethylene Plastics Extrusion Materials for Wire and Cable

D3350 Specification for Polyethylene Plastics Pipe and Fittings Materials

D4703 Practice for Compression Molding Thermoplastic Materials into Test Specimens, Plaques, or Sheets

D4976 Specification for Polyethylene Plastics Molding and Extrusion Materials

E691 Practice for Conducting an Interlaboratory Study to Determine the Precision of a Test Method

2.2 *ASTM Adjuncts:*

Apparatus Drawings and Blueprints[3]

3. Terminology

3.1 *Definitions:*

3.1.1 *stress-crack, n*—an external or internal rupture in a plastic caused by tensile stresses less than its short-time mechanical strength.

3.1.1.1 *Discussion*—The development of such cracks is frequently accelerated by the environment to which the plastic is exposed. The stresses which cause cracking may be present internally or externally, or may be a combination of these stresses. The appearance of a network of fine cracks is called crazing.

3.1.2 *stress-crack failure, n*—for purposes of this test method, any crack visible to an observer with normal eyesight shall be interpreted as a failure of the entire specimen (**1**).[4] Extension of the controlled imperfection shall not be construed as a failure. The appearance of more than one crack in a single specimen shall be construed as a single failure.

3.1.2.1 *Discussion*—Cracks generally develop at the controlled imperfection and run to the outer edge of the specimen approximately at right angles to it (**2**). The cracks need not extend completely through the specimen to constitute failure.

[1] This test method is under the jurisdiction of ASTM Committee D20 on Plastics and is the direct responsibility of Subcommittee D20.15 on Thermoplastic Materials.

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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] Detailed drawings of the apparatus are available from ASTM Headquarters. Request ADJD169302, ADJD169303, or ADJD169304. For a complete set of all drawings, request ADJD1693CS.

[4] The boldface numbers in parentheses refer to the list of references at the end of this test method.

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

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