Designation: D 5721 – 95 (Reapproved 2002)

Standard Practice for Air-Oven Aging of Polyolefin Geomembranes[1]

This standard is issued under the fixed designation D 5721; 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 practice covers a means for estimating the resistance of polyolefin geomembranes to thermal aging in the presence of air. Only the procedure for heat exposure is specified, not the test method or specimen. The effect of heat on any particular property may be determined by selection of the appropriate test method and specimen.

1.2 This practice should be used as a guide to compare thermal aging characteristics of materials as measured by the change in some property of interest. This practice does not predict thermal aging characteristics where interactions between stress, environment, temperature, and time control failure.

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

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.*

2. Referenced Documents

2.1 *ASTM Standards:*

D 618 Practice for Conditioning Plastics and Electrical Insulating Materials for Testing[2]

D 638 Test Method for Tensile Properties of Plastics[2]

D 746 Test Method for Brittleness Temperature of Plastics and Elastomers by Impact[2]

D 1238 Test Method for Flow Rates of Thermoplastics by Extrusion Plastometer[2]

D 1505 Test Method for Density of Plastics by Density-Gradient Technique[2]

D 1525 Test Method for Vicat Softening Temperature of Plastics[2]

D 1790 Test Method for Brittleness Temperature of Plastic Film by Impact[2]

D 1822 Test Method for Tensile-Impact Energy to Break Plastics and Electrical Insulating Materials[2]

D 1870 Practice for Elevated Temperature Aging Using a Tubular Oven[2]

D 3045 Practice for Heat Aging of Plastics Without Load[3]

D 4439 Terminology for Geotextiles[4]

E 145 Specifications for Gravity—Convection and Forced—Ventilation Ovens[5]

F 412 Terminology Relating to Plastic Piping Systems[6]

F 869 Definitions of Terms Relating to Athletic Shoes and Biomechanics[7]

3. Terminology

3.1 *Definitions:*

3.1.1 *aging*, *n*—the process of exposing materials to an environment for an interval of time. **(F 869)**

3.1.2 *geomembrane*, *n*—an essentially impermeable geosynthetic composed of one or more synthetic sheets. **(D 4439)**

3.1.3 *polyolefin*, *n*—a polymer prepared by the polymerization of an olefin(s) as the sole monomer(s). **(F 412)**

3.1.4 *Vicat softening point*—the temperature at which a flat-ended needle of 1 mm^2 circular cross section will penetrate a thermoplastic specimen to a depth of 1 mm under a specified load using a selected uniform rate of temperature rise. **(D 1525)**

4. Significance and Use

4.1 Under the severe conditions of this test, the specimens undergo degradation at a rate that is a function of the thermal endurance of the geomembrane under examination.

4.2 The elevated temperature for this practice should represent conditions that are sufficiently severe to induce failure of polyolefin geomembranes within an abbreviated period of time.

4.3 The rate of change of a particular property as a function of temperature may be evaluated using the temperatures and times outlined in Practice D 3045.

4.4 Any correlation between this practice and natural life of these materials must be determined for the particular application in which the materials are to be used.

[1] This practice is under the jurisdiction of ASTM Committee D35 on Geosynthetics and is the direct responsibility of Subcommittee D35.02 on Endurance Properties.

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[2] *Annual Book of ASTM Standards*, Vol 08.01.

[3] *Annual Book of ASTM Standards*, Vol 08.02.

[4] *Annual Book of ASTM Standards*, Vol 04.13.

[5] *Annual Book of ASTM Standards*, Vol 14.02.

[6] *Annual Book of ASTM Standards*, Vol 08.04.

[7] *Annual Book of ASTM Standards*, Vol 15.07.