Designation: D5721 – 08

StandardPractice for Air-Oven Aging of Polyolefin Geomembranes[1]

This standard is issued under the fixed designation D5721; 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 standard. No other units of measurement are included in this 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:*[2]

D618 Practice for Conditioning Plastics for Testing
D638 Test Method for Tensile Properties of Plastics
D746 Test Method for Brittleness Temperature of Plastics and Elastomers by Impact
D1238 Test Method for Melt Flow Rates of Thermoplastics by Extrusion Plastometer
D1505 Test Method for Density of Plastics by the Density-Gradient Technique
D1525 Test Method for Vicat Softening Temperature of Plastics
D1790 Test Method for Brittleness Temperature of Plastic Sheeting by Impact
D1870 Practice for Elevated Temperature Aging Using a Tubular Oven (Withdrawn 1998)[3]
D3045 Practice for Heat Aging of Plastics Without Load
D4439 Terminology for Geosynthetics
E145 Specification for Gravity-Convection and Forced-Ventilation Ovens
F412 Terminology Relating to Plastic Piping Systems

3. Terminology

3.1 *Definitions:*

3.1.1 For definitions of general terms used in this standard, refer to Terminology D4439.

3.1.2 *aging, n*—the process of exposing materials to an environment for an interval of time.

3.1.3 *polyolefin, n*—a polymer prepared by the polymerization of an olefin(s) as the sole monomer(s). **(F412)**

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. **(D1525)**

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 D3045.

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.

4.5 Air-oven aging can be used to evaluate and compare the performance of various heat stabilizer packages.

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