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: D8117 – 21

Standard Test Method for Oxidative Induction Time of Polyolefin Geosynthetics by Differential Scanning Calorimetry[1]

This standard is issued under the fixed designation D8117; 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 test method covers a procedure for the determination of the oxidative induction time (OIT) of polyolefin geosynthetics using differential scanning calorimetry.

1.2 The focus of the test is on geomembranes, but geogrids, geonets, geotextiles, and other polyolefin-related geosynthetics are also suitable for such evaluation.

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

NOTE 1—This standard and ISO 11357-6 2013 address the same subject matter, but differ in technical content.

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, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.5 *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]

D4439 Terminology for Geosynthetics

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

E473 Terminology Relating to Thermal Analysis and Rheology

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

E967 Test Method for Temperature Calibration of Differential Scanning Calorimeters and Differential Thermal Analyzers

3. Terminology

3.1 *Definitions:*

3.1.1 For definitions of terms applying to thermal analysis, refer to Terminology E473.

3.1.2 For definitions of terms related to geosynthetics, refer to Terminology D4439.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *oxidative induction time*—a relative measure of a material's resistance to oxidative decomposition; it is determined by the thermoanalytical measurement of the time interval to onset of exothermic oxidation of a material at a specified temperature in an oxygen atmosphere.

3.3 *Abbreviations:*

3.3.1 *HDPE*—high-density polyethylene.

3.3.2 *LDPE*—low-density polyethylene.

3.3.3 *LLDPE*—linear low-density polyethylene.

3.3.4 *OIT*—oxidative induction time.

4. Summary of Test Method

4.1 The sample to be tested is heated at a constant rate in an inert gaseous environment (nitrogen). When the specified temperature has been reached, the atmosphere is changed to oxygen maintained at the same flow rate. The specimen is then held at constant temperature until the oxidative reaction is displayed on the thermal curve. The OIT is determined from the data recorded during the isothermal period. The time interval from when the oxygen flow is first initiated to the oxidative reaction is referred to as the induction period.

4.1.1 The end of the induction period is signaled by an abrupt increase in the specimen's evolved heat or temperature and will be recorded as an exothermic event by a differential scanning calorimeter (DSC).

4.2 The test is conducted in open aluminum pans.

5. Significance and Use

5.1 The OIT is a qualitative assessment of the level (or degree) of stabilization of the material tested. This test has the

[1] This test method 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.

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