Designation: ~~D6389 – 99 (Reapproved 2012)~~ D6389 – 99 (Reapproved 2016)

Standard Practice for Tests to Evaluate the Chemical Resistance of Geotextiles to Liquids[1]

This standard is issued under the fixed designation D6389; 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 describes the procedures used for testing geotextiles for chemical resistance to liquids.

1.2 This practice describes test methods for measuring changes in planar dimensions, tensile properties, and other optional physical, mechanical, and hydraulic properties caused by immersion in test liquids which may be representative of anticipated end-use conditions. This practice may be used to assess the extent to which a product's as-manufactured properties are affected by such immersion.

1.3 This practice is intended to be used in conjunction with either Practices D5322 or D5496. The scope of this practice is limited to testing and reporting procedures for unexposed and exposed geotextile samples.

1.4 Evaluation or interpretation of test data is beyond the scope of this practice.

1.5 *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.* For specific warning statements, see Section 7.

2. Referenced Documents

2.1 *ASTM Standards:*[2]

D123 Terminology Relating to Textiles
D1238 Test Method for Melt Flow Rates of Thermoplastics by Extrusion Plastometer
D3895 Test Method for Oxidative-Induction Time of Polyolefins by Differential Scanning Calorimetry
D4439 Terminology for Geosynthetics
D4491 Test Methods for Water Permeability of Geotextiles by Permittivity
D4533 Test Method for Trapezoid Tearing Strength of Geotextiles
D4595 Test Method for Tensile Properties of Geotextiles by the Wide-Width Strip Method
D4603 Test Method for Determining Inherent Viscosity of Poly(Ethylene Terephthalate) (PET) by Glass Capillary Viscometer
D4632 Test Method for Grab Breaking Load and Elongation of Geotextiles
D4716 Test Method for Determining the (In-plane) Flow Rate per Unit Width and Hydraulic Transmissivity of a Geosynthetic Using a Constant Head
D4751 Test Method for Determining Apparent Opening Size of a Geotextile
D4833 Test Method for Index Puncture Resistance of Geomembranes and Related Products
D5199 Test Method for Measuring the Nominal Thickness of Geosynthetics
D5261 Test Method for Measuring Mass per Unit Area of Geotextiles
D5322 Practice for Laboratory Immersion Procedures for Evaluating the Chemical Resistance of Geosynthetics to Liquids
D5496 Practice for In Field Immersion Testing of Geosynthetics
D5747 Practice for Tests to Evaluate the Chemical Resistance of Geomembranes to Liquids
D5885 Test Method for Oxidative Induction Time of Polyolefin Geosynthetics by High-Pressure Differential Scanning Calorimetry

[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.

Current edition approved ~~July 1, 2012~~June 1, 2016. Published ~~July 2012~~June 2016. Orginally approved in 1999. Last previous edition approved in ~~2005~~2012 as ~~D6389–99(2005).~~D6389–99(2012). DOI: ~~10.1520/D6389-99R12.~~10.1520/D6389-99R16.

[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. Terminology

3.1 *Definitions:*

3.1.1 *chemical resistance, n—for geosynthetics*, the extent to which a material or product retains its as-manufactured physical and chemical characteristics when subjected to immersion or contact with a foreign substance (see Practice D5747).

3.1.2 *geosynthetic, n*—a planar product manufactured from polymeric material used with foundation soil, rock, earth, or any other geotechnical engineering related material as an integral part of a manmade project, structure, or system (see Terminology D4439).

3.1.3 *geotextile, n*—any permeable textile used with foundation, soil, rock, earth, or any other geotechnical material as an integral part of manmade product, structure, or system (see Terminology D4439).

3.1.4 For definitions of other terms used in this practice, refer to Terminologies D123 and D4439.

4. Summary of Practice

4.1 This practice defines test methods and procedures for evaluating the resistance of geotextiles to liquid exposure by monitoring physical and chemical properties of geotextiles specimens immersed in a test liquid. The physical condition of the geotextile is monitored as a function of cumulative exposure time by means of dimensional measurements and physical property tests.

5. Significance and Use

5.1 This practice provides a test procedure for determining the resistance of a geotextile with a liquid waste, leachate, or chemical. This practice should be used in the absence of other specifications required for the particular situation being addressed.

5.2 The specification of test procedures in this practice is intended to serve as a guide for those wishing to compare or investigate the chemical resistance of a geotextile to a potentially harsh chemical environment.

5.3 This practice is for the chemical resistance assessment of geotextiles and is written in parallel to similar standard practices for geomembranes, geogrids, geonets, and geopipes. Each standard is to be considered individually for the geosynthetic under investigation and collectively for all geosynthetics exposed to the potentially harsh chemical environment under consideration.

6. Apparatus

6.1 *Analytical Balance,* capable of weighing accurately to 0.001 g.

6.2 *Measuring Equipment,* such as scales or calipers, suitable for determining dimensions of geotextiles.

6.3 All other required equipment is specified in Section 2. Refer to the appropriate standards for a description of the apparatus necessary to perform each test.

7. Hazards

NOTE 1—**Warning:** The solutions used in this practice may contain hazardous chemicals. Appropriate precautions must be taken when handling hazardous waste, chemicals, and the immersion solutions. Protective equipment suitable for the chemicals being used must be worn by all personnel handling or exposed to the chemicals. Particular care should be taken when opening storage vessels at elevated temperatures due to the increased volatility of organics and the increased activity of acids and bases. Care also must be taken to prevent the spilling of hazardous materials, and provisions must be made to clean up any accidental spills that occur.

7.1 Before carrying out any test, safety precautions and disposal procedures for hazardous waste, chemicals, or immersion liquids, and any contaminated geotextile materials should be identified and implemented to provide full protection to all personnel and to comply with applicable disposal regulations.

8. Sampling[3]

8.1 Determine the number of the test specimens according to the requirements of the property monitoring test and the number of test intervals.

8.2 Cut individual test specimens randomly in the roll and in the cross directions along the length of the roll of geotextile, staying at least 150 mm away from the selvage.

8.3 Mix or shuffle specimens in a random fashion, keeping the roll and cross roll specimens separate. From the shuffled specimens, select specimens for assignment to unexposed (baseline) testing and for immersion in the test liquid for testing after exposure.

9. Conditioning

9.1 *Conditioning*—Samples must be conditioned at a temperature of 21±2°C (70±4°F) and a relative humidity between 50 and 70 % for a period not less than 40 h prior to weighing or baseline testing and immersion, or a combination thereof.

[3] Unlike some other geosynthetics, such as geomembranes, geotextile test specimens are cut directly from the roll before immersion, not from already-immersed coupons.