



Designation: D5397 – 20

Standard Test Method for Evaluation of Stress Crack Resistance of Polyolefin Geomembranes Using Notched Constant Tensile Load Test¹

This standard is issued under the fixed designation D5397; 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 is used to develop test data from which the susceptibility of polyolefin geomembrane sheet material to stress cracking under a constant tensile load condition and an accelerated environmental condition can be evaluated.

1.2 This test method measures the failure time associated with a given test specimen at a specified tensile load level. Results from a series of such tests utilizing a range of load levels can be used to construct a stress-time plot on a log-log axis.

1.3 The values stated in SI units are to be regarded as the standard. The inch-pound units given in parentheses are provided for information only.

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

D883 Terminology Relating to Plastics

D4354 Practice for Sampling of Geosynthetics and Rolled Erosion Control Products (RECPs) for Testing

D4439 Terminology for Geosynthetics

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

D5199 Test Method for Measuring the Nominal Thickness of Geosynthetics

D6693/D6693M Test Method for Determining Tensile Properties of Nonreinforced Polyethylene and Nonreinforced Flexible Polypropylene Geomembranes

3. Terminology

3.1 Definitions:

3.1.1 *actual thickness, n*—individual measurement per Test Method D5199, on a specimen tab.

3.1.2 *average thickness, n*—result of Test Method D5199 testing, that is, average of ten specimens.

3.1.3 *geomembrane, n*—very low permeability synthetic membrane liners or barriers used with any geotechnical engineering-related material so as to control fluid migration in a man-made project, structure, or system.

3.1.4 *ligament, n*—the portion of geomembrane that remains uncut under the notch.

3.1.5 *ligament thickness, n*—length of the ligament measured from the bottom of the notch to the edge of the specimen in a direction perpendicular to the plane of the test specimen.

3.1.6 *multi-component geomembrane, n*—a geomembrane that includes multiple layers of different nature.

3.1.7 *nominal thickness, n*—the thickness specified without regard of tolerance.

3.1.8 *notch, n*—cut made using a specified tool in prescribed conditions.

3.1.9 *slow crack growth, n*—type of fracture mechanism characterized by the stable growth of a crack with little deformation in the material.

3.1.10 *smooth geomembrane, n*—a geomembrane that does not present any surface texture.

3.1.10.1 *Discussion*—A geomembrane can be smooth on one side but textured on the other side.

3.2 For definitions of other terms relating to geotextiles and geomembranes used in this standard, refer to Terminologies D4439 and D883.

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.

Current edition approved June 1, 2020. Published June 2020. Originally approved in 1993. Last previous edition approved in 2019 as D5397 – 19a. DOI: 10.1520/D5397-20.

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.