



Designation: D4885 – 01 (Reapproved 2023)

Standard Test Method for Determining Performance Strength of Geomembranes by the Wide Strip Tensile Method¹

This standard is issued under the fixed designation D4885; 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 the determination of the performance strength of synthetic geomembranes by subjecting wide strips of material to tensile loading.

1.2 This test method covers the measurement of tensile strength and elongation of geomembranes and includes directions for calculating initial modulus, offset modulus, secant modulus, and breaking toughness.

1.3 The basic distinctions between this test method and other methods measuring tensile strength of geomembranes are the width of the specimens tested and the speed of applied force. The greater width of the specimens specified in this test method minimizes the contraction edge effect (necking) which occurs in many geosynthetics and provides a closer relationship to actual material behavior in service. The slower speed of applied strain also provides a closer relationship to actual material behavior in service.

1.4 As a performance test, this method will be used relatively infrequently, and to test large lots of material. This test method is not intended for routine quality control testing of geomembranes.

1.5 The values stated in SI units are to be regarded as standard. The values given in parentheses are for information only.

1.6 *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.*

1.7 *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.*

¹ This test method is under the jurisdiction of ASTM Committee D35 on Geosynthetics and is the direct responsibility of Subcommittee D35.10 on Geomembranes.

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2. Referenced Documents

2.1 ASTM Standards:²

D76/D76M Specification for Tensile Testing Machines for Textiles

D123 Terminology Relating to Textiles

D751 Test Methods for Coated Fabrics

D882 Test Method for Tensile Properties of Thin Plastic Sheeting

D1593 Specification for Nonrigid Vinyl Chloride Plastic Film and Sheeting

D1909 Standard Tables of Commercial Moisture Regains and Commercial Allowances for Textile Fibers

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

D4439 Terminology for Geosynthetics

3. Terminology

3.1 Definitions:

3.1.1 *atmosphere for testing geomembranes, n*—air maintained at a relative humidity of 50 to 70 % and a temperature of $21 \pm 2^\circ\text{C}$ ($70 \pm 4^\circ\text{F}$).

3.1.1.1 *Discussion*—Within the range of 50 to 70 % relative humidity, moisture content is not expected to affect the tensile properties of geomembrane materials. In addition, geotextile standard test methods restrict the range of relative humidity to $65 \pm 5\%$, while geomembrane standard test methods restrict the range of relative humidity to $55 \pm 5\%$. The restricted range in this test method is made broader to reduce the need for testing laboratories to change laboratory conditions, and considering the lack of expected effect of moisture on geomembranes. The user should consult Table D1909 to resolve questions regarding moisture regains of textile fibers, especially if the user is testing a new or unknown material.

3.1.2 *breaking force, (F), J, n*—the force at failure.

3.1.3 *breaking toughness, T, (FL⁻¹), Jm⁻², n*—for geosynthetics, the actual work per unit volume of a material corresponding to the breaking force.

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.