



Standard Test Method for Determining Tearing Strength of Internally Reinforced Geomembranes¹

This standard is issued under the fixed designation D 5884; 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 uniform procedure for determining the tear strength of flexible geomembranes internally reinforced with a textile, using the tongue tear method.

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

1.3 *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:

D 4354 Practice for Sampling of Geosynthetics for Testing²

D 4439 Terminology for Geosynthetics²

D 4533 Test Method for Trapezoid Tearing Strength of Geotextiles

3. Terminology

3.1 Definitions of Terms Specific to This Standard:

3.1.1 *atmosphere for testing geosynthetics, n*—air maintained at a relative humidity between 50 to 70 % and a temperature of $21 \pm 2^\circ\text{C}$ ($70 \pm 4^\circ\text{F}$). (See Terminology D 4439.)

3.1.2 *geomembrane, n*—an essentially impermeable geosynthetic composed of one or more synthetic sheets. (See Terminology D 4439.)

3.1.3 *reinforced geomembrane*—a geomembrane internally reinforced with a textile.

3.1.4 *tearing strength, (F, (F), kN), n*—the force required either to start or to continue or propagate a tear in a fabric under specified conditions. (See Terminology D 4439 and Test Method D 4533.)

4. Summary of Test Method

4.1 The tensile tear strength of a membrane in both machine

and cross-machine directions is determined by measuring the maximum load when cut specimens of specific dimensions are tested to failure, by tearing, at a fixed testing displacement rate.

5. Significance and Use

5.1 Since tear resistance may be affected to a large degree by mechanical fibering of the membrane under stress, as well as by stress distribution, strain rate, and size of specimen, the results obtained in a tear resistance test can only be regarded as a measure of the resistance under the conditions of that particular test and not necessarily as having any direct relation to service value. This test method measures the force required to tear a reinforced geomembrane along a reasonably defined course such as that the tear propagates across the width of the specimen. The values may vary between types of reinforcement used within a geomembrane.

5.2 The tongue tear method is useful for estimating the relative tear resistance of different reinforcing textiles or different directions in the same reinforcing textiles.

5.3 *Disputes*—In case of a dispute arising from differences in reported test results when using this test method for acceptance testing of commercial shipments, the purchaser and the supplier should conduct comparative tests to determine if there is a statistical difference between their laboratories.⁹⁹

6. Apparatus

6.1 The machine shall consist of three main parts:

6.1.1 *Straining Mechanism*—A machine wherein the specimen is held between the two clamps and strained by a uniform movement of the pulling clamp shall be used. Unless otherwise specified in the material specification, the machine shall be adjusted so that the pulling clamp shall have a uniform speed of 5 ± 0.2 mm/s (12 ± 0.5 in./min).

6.1.2 *Clamps for Holding Specimen*—The clamps for holding a reinforced flexible geomembrane specimen shall have metallic gripping surfaces sufficiently smooth, flat, and parallel as to prevent the test specimen from slipping or moving between the gripping surfaces when held under the pressure normal to operation. The dimension of all gripping surfaces shall measure 25 by 50 mm (1 by 2 in.) or more with the long dimension perpendicular to this direction of application of the load. All edges that might cause a cutting action shall be rounded to a radius of not over 0.4 mm ($1/64$ in.). The design of the clamp shall be such that one gripping surface shall be an

¹ This test method is under the jurisdiction of ASTM Committee D-35 on Geosynthetics and is the direct responsibility of Subcommittee D35.10 on Geomembranes.

Current edition approved Jan. 10, 1999. Published May 1999. Originally published as D5884-95. Last previous edition D5884-95

² *Annual Book of ASTM Standards*, Vol 04.09.