



Standard Test Method for Determination of Ply Adhesion Strength of Reinforced Geomembranes¹

This standard is issued under the fixed designation D 6636; 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 method is used to measure the adhesion strength (180 degree peel) between plies of reinforced geomembranes such as internally-reinforced geomembranes and coated fabrics.

1.2 This method is not intended for determining the strength of geomembrane seams or for determining the ply adhesion strength of geocomposite components (such as nonwoven geotextile bonded to geomembrane, or geotextile bonded to drainage core).

1.3 The values in SI units are the standard. The values provided in inch-pound units are for information only.

1.4 *This standard may involve hazardous materials, operations and equipment. 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 76 Specification for Tensile Testing Machines for Textiles²

D 4354 Sampling of Geosynthetics for Testing³

D 4439 Terminology for Geosynthetics³

3. Terminology

3.1 *Definitions:*

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

3.1.2 *geocomposite, n*—a multi component product at least one of which is a geosynthetic.

3.1.3 *geomembrane, n*—an essentially impermeable geosynthetic composed of one or more synthetic sheets.

3.1.3.1 *Discussion*—In geotechnical engineering, essentially impermeable means that no measurable liquid flows through a geosynthetic when tested in accordance with D 4491.

3.1.4 *ply adhesion, n*—bond between layers of a laminated material.

3.1.5 *ply adhesion strength, n*—force per unit width required to cause separation in peel between layers of a laminated material.

3.1.6 *reinforced geomembrane, n*—a geomembrane internally reinforced with a textile.

3.1.7 *selvage, n*—an edge or edging which differs from the main part of a geosynthetic.

4. Summary of Test Method

4.1 The plies of the reinforced geomembrane are first partially peeled apart by hand for a distance of 25 to 50 mm (1-2 inches) to allow clamping of the specimen in the grips of the tensile machine. The plies are then separated at an angle of 180 degrees at a constant rate of extension and the cross-head movement and force are recorded.

5. Significance and Use

5.1 This method is an index test and measures the force required to separate individual plies of a reinforced geomembrane. The acceptable value of adhesion will vary for different types of products. However for a particular type of product, minimum values of ply adhesion can be determined and agreed to by producer and consumer, and both can monitor to assure compliance with the agreed-upon value.

5.2 *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. Competent statistical assistance is recommended for the investigation of this difference. As a minimum, the two parties should take a group of test specimens which are from the same lot of material as those type in question and which are as homogeneous as possible. The test specimens should then be randomly assigned in equal numbers to each laboratory for testing. The average results from the two laboratories should be compared using Student's t-test for unpaired data and an

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 *Annual Book of ASTM Standards*, Vol 07.01.

³ *Annual Book of ASTM Standards*, Vol 04.13.