



Standard Test Method for Tensile Properties of Geotextiles by the Wide-Width Strip Method¹

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1. Scope

1.1 This test method covers the measurement of tensile properties of geotextiles using a wide-width strip specimen tensile method. This test method is applicable to most geotextiles that include woven fabrics, nonwoven fabrics, layered fabrics, knit fabrics, and felts that are used for geotextile application.

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

1.3 Procedures for measuring the tensile properties of both conditioned and wet geotextiles by the wide-width strip method are included.

1.4 The basic distinction between this test method and other methods for measuring strip tensile properties is the width of the specimen. This width, by contrast, is greater than the length of the specimen. Some fabrics used in geotextile applications have a tendency to contract (neck down) under a force in the gage length area. The greater width of the specimen specified in this test method minimizes the contraction effect of those fabrics and provides a closer relationship to expected geotextile behavior in the field and a standard comparison.

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.*

2. Referenced Documents

2.1 ASTM Standards:

D 76 Specification for Tensile Testing Machines for Textiles²

D 123 Terminology Relating to Textiles²

D 579 Specification for Greige Woven Glass Fabrics²

D 1776 Practice for Conditioning Textiles for Testing²

D 2905 Practice for Statements on Number of Specimens for Textiles²

¹ This test method is under the jurisdiction of ASTM Committee D35 on Geosynthetics and is the direct responsibility of Subcommittee D35.01 on Mechanical Properties.

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² *Annual Book of ASTM Standards*, Vol 07.01.

D 4439 Terminology for Geosynthetics³

3. Terminology

3.1 *atmosphere for testing geotextiles, n.*—air maintained at a relative humidity of $65 \pm 5\%$ and a temperature of $21 \pm 2^\circ\text{C}$ ($70 \pm 4^\circ\text{F}$).

3.2 *breaking toughness, T, (FL⁻¹), Jm⁻², n.*—for geotextiles, the actual work-to-break per unit surface area of material.

3.2.1 *Discussion*—Breaking toughness is proportional to the area under the force – elongation curve from the origin to the breaking point (see also work-to-break). Breaking toughness is calculated from work-to-break, gage length, and width of a specimen.

3.3 *corresponding force, F_c, n.*—the force associated with a specific elongation on the force-per-unit-width strain curve. (Syn. load at specified elongation, LASE.)

3.4 *geotechnical engineering, n.*—the engineering application of geotechnics.

3.5 *geotechnics, n.*—the application of scientific methods and engineering principles to the acquisition, interpretation, and use of knowledge of materials of the earth's crust to the solution of engineering problems.

3.5.1 *Discussion*—Geotechnics embraces the fields of soil mechanics, rock mechanics, and many of the engineering aspects of geology, geophysics, hydrology, and related sciences.

3.6 *geotextile, n.*—any permeable textile material used with foundation, soil, rock, earth, or any other geotechnical engineering related material, as an integral part of a man-made project, structure, or system.

3.7 *initial tensile modulus, J_i, (FL⁻¹), Nm⁻¹, n.*—for geotextiles, the ratio of the change in tensile force per unit width to a change in strain (slope) of the initial portion of a force per unit width strain curve.

3.8 *offset tensile modulus, J_o, (FL⁻¹), Nm⁻¹, n.*—for geotextiles, the ratio of the change in force per unit width to a change in strain (slope) below the proportional limit point and above the tangent point on the force – elongation curve.

3.9 *proportional limit, n.*—the greatest stress which a material is capable of sustaining without any deviation from proportionality of stress to strain (Hooke's law).

3.10 *secant tensile modulus, J_{sec} (FL⁻¹), Nm⁻¹, n.*—for

³ *Annual Book of ASTM Standards*, Vol 04.09.