



Designation: D4594 – 96(Reapproved 2009)

Standard Test Method for Effects of Temperature on Stability of Geotextiles¹

This standard is issued under the fixed designation D4594; 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 provides a procedure for determining the effects of climatic temperature on the tensile strength and elongation properties of geotextiles.

1.2 The effect of temperature on the stability of geotextiles is reported as the change in tensile strength and elongation between tests performed as directed in Test Method D5035, in the standard atmosphere for testing textiles, and tests performed under conditions at which the geotextile is expected to perform in the field.

1.3 The values stated in SI units are to be regarded as the standard. The values stated in inch-pound units 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 and health practices and determine the applicability of regulatory limitations prior to use. See 7.1.1-7.1.3.*

2. Referenced Documents

2.1 *ASTM Standards:*²

D76 Specification for Tensile Testing Machines for Textiles

D123 Terminology Relating to Textiles

D4354 Practice for Sampling of Geosynthetics for Testing

D4439 Terminology for Geosynthetics

D5035 Test Method for Breaking Force and Elongation of Textile Fabrics (Strip Method)

3. Terminology

3.1 *Definitions:*

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

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, 2009. Published July 2009. Originally approved in 1986. Last previous edition approved in 2003 as D4594 – 96 (2003). DOI: 10.1520/D4594-96R09.

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.

3.1.2 *temperature stability, n*—for a geotextile, the percent change in tensile strength or in percent elongation as measured at a specified temperature and compared to values obtained at the standard conditions for testing geotextiles.

3.2 For definitions of other terms used in this test method, refer to Terminology D123 and Terminology D4439.

4. Summary of Test Method

4.1 Specimens of a geotextile are conditioned at selected temperatures in an environmental chamber attached to a tensile testing machine. While maintaining these temperatures, 2 in. cut or ravel strip tensile tests are performed as directed in Test Method D5035. The same tests are conducted as control under the standard laboratory test conditions. Tensile strength and percent elongation properties obtained at various test temperatures are recorded. Changes in strength characteristics due to the effects of temperature are determined.

4.2 The temperatures used for conditioning and testing the geotextiles are the temperatures at which the geotextile will perform or are typically exposed to in the field.

5. Significance and Use

5.1 This test method is used for evaluating the relative effects of temperature on geotextiles manufactured from different polymers, by a different manufacturing process, or both.

5.2 During shipping and storage, the geotextile may be exposed to abnormal temperatures. The fabric could be tested at these temperatures to determine the detrimental effects of these conditions on the strength properties.

5.3 This test method may also be used to evaluate the cyclic effects of temperature (freeze-thaw), that is, samples can be conditioned to below normal temperatures (below freezing) and then to above normal temperatures (elevated temperatures) for a given number of cycles. Strength characteristics can be determined after these cyclic exposures.

5.4 Most nonwoven, woven, and composite fabric can be tested by this method. Modification of the techniques is likely to be necessary for any fabric having a strength in excess of 179 kg/cm (1000 lb/in.) width. This test method is not recommended for knitted fabrics.

5.5 This test method is an index test method and is not recommended for acceptance testing of commercial shipments,