



Standard Practice for Deterioration of Geotextiles from Outdoor Exposure¹

This standard is issued under the fixed designation D 5970; 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 evaluating the deterioration in tensile strength and strain after outdoor exposure.

1.2 The deterioration is assessed as a reduction in strength and strain at failure from the unexposed geotextile.

1.3 The specific location of the light and weather exposure is made on the basis of a site specific decision between the parties involved.

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

1.5 *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 5035 Test Method for Breaking Strength and Elongation of Textile Fabrics (Strip Method)²

3. Terminology

3.1 *Definitions:*

3.1.1 *geotextile*—a permeable geosynthetic comprised solely of textiles.

3.1.2 *strain at failure*—the strain of the geotextile at the elongation corresponding to the failure strength. It is expressed as elongation over original gage length.

3.1.3 *strength*—the maximum, or ultimate, stress that a material can withstand. For geotextiles, expressed in units of force per unit width.

3.1.4 *Discussion*—In some geotextiles, after reaching maximum stress, there is a lesser strength that retained. This lesser strength is referred to as the ultimate strength of the geotextile.

3.1.5 *ultraviolet degradation*—the photochemical change induced by exposure to ultraviolet radiation that results in deterioration of the performance characteristics of the polymeric structure.

4. Summary of Test Method

4.1 Geotextile coupons are attached to a test frame oriented 45° from the horizontal and facing due South at designated location for exposure times of 1, 2, 4, 8, 12, and 18 months. Exposure shall begin so as to ensure that material is exposed during the maximum intensity of ultraviolet light of the year. On the continental United States this shall be mid-June.

4.1.1 Unexposed control coupons shall be retained for testing.

4.2 After each exposure time the appropriate coupons are brought into a laboratory for strength determination. The results of these tests are compared to the strength determined for the unexposed coupons. The user may be interested in exposure times other than specified in this test method. These times should be noted in reporting the results.

4.3 The results are presented in the form of various plots.

5. Significance and Use

5.1 Artificial exposure tests or outdoor exposure tests at one location may not be applicable to a project site at another location. This test method evaluates geotextiles under site specific atmospheric conditions over an 18 month period. A degradation curve based on strength, elongation, or modulus, or all of these, may be developed for the geotextile being evaluated.

5.2 This test method can be used for comparative testing of the degradation of geotextiles.

5.3 This test method is considered to be a performance test and as such the responsibility for its performance rests with the specifying or purchasing agency.

NOTE 1—The intent of this procedure is to provide the user of this test method and geotextiles a standard by which to evaluate ultraviolet degradation at a specific site in terms of expected life, not in terms of incident radiation and temperature. If desired, the user may want to have the necessary measurement and recording equipment at each site to do this. However, the expense of doing so at each site may be prohibitive. Therefore, this is not a specific requirement of this test method.

6. Apparatus

6.1 The frame for holding the coupons during the exposure phase of this test consists of a wooden frame (for example, a sheet of exterior plywood) suitably braced so that it resides at a 45° angle with the horizontal.

¹ This practice is under the jurisdiction of ASTM Committee D-35 on Geosynthetics and is the direct responsibility of Subcommittee D35.02 on Endurance Properties.

Current edition approved May 10, 1996. Published December 1996.

² *Annual Book of ASTM Standards*, Vol 07.02.