



Designation: D4355/D4355M – 21

Standard Test Method for Deterioration of Geotextiles by Exposure to Light, Moisture, and Heat in a Xenon Arc-Type Apparatus¹

This standard is issued under the fixed designation D4355/D4355M; 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 reappraisal. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reappraisal.

This standard has been approved for use by agencies of the U.S. Department of Defense.

1. Scope

1.1 This test method covers the determination of the deterioration in tensile strength of geotextiles by exposure to xenon arc radiation, moisture, and heat.

1.2 The light and water exposure apparatus employs a xenon arc light source.

1.3 The values stated in either SI units or inch-pound units are to be regarded separately as standard. The values stated in each system may not be exact equivalents; therefore, each system shall be used independently of the other. Combining values from the two systems may result in nonconformance with the standard.

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, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.5 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 *ASTM Standards:*²

[D123 Terminology Relating to Textiles](#)

[D1898 Practice for Sampling of Plastics](#) (Withdrawn 1998)³

[D4439 Terminology for Geosynthetics](#)

[D5035 Test Method for Breaking Force and Elongation of Textile Fabrics \(Strip Method\)](#)

[D6637/D6637M Test Method for Determining Tensile Properties of Geogrids by the Single or Multi-Rib Tensile Method](#)

[D6818 Test Method for Tensile Properties of Rolled Erosion Control Products](#)

[E691 Practice for Conducting an Interlaboratory Study to Determine the Precision of a Test Method](#)

[G113 Terminology Relating to Natural and Artificial Weathering Tests of Nonmetallic Materials](#)

[G141 Guide for Addressing Variability in Exposure Testing of Nonmetallic Materials](#)

[G151 Practice for Exposing Nonmetallic Materials in Accelerated Test Devices that Use Laboratory Light Sources](#)

[G155 Practice for Operating Xenon Arc Light Apparatus for Exposure of Non-Metallic Materials](#)

3. Terminology

3.1 *Definitions of Terms Specific to This Standard:*

3.1.1 *geotextile*—any permeable textile material used with foundation, soil, rock, earth, or any other geotechnical engineering-related material that is an integral part of a man-made product, structure, or system.

3.2 *Definitions:*

3.2.1 For definitions of other textile terms used in this test method, refer to Terminology [D123](#); for geotextile terms, refer to Terminology [D4439](#).

3.2.2 The definitions given in Terminology [G113](#) are applicable to this standard.

4. Summary of Test Method

4.1 Five specimens of a geotextile for the machine direction and for the cross-machine direction are exposed in a xenon arc device for each of the following times: 0 (control specimens), 150, 300, and 500 h. The exposure consists of 120-min cycles as follows: 90 min of light only at 65 ± 3 °C uninsulated black panel temperature and 50 ± 10 % relative humidity, followed by 30 min of light plus water spray. (See [Note 8](#).)

4.2 After each exposure period, the specimens are subjected to a cut or ravel strip tensile test. The average breaking strength

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.

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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 The last approved version of this historical standard is referenced on www.astm.org.