



Standard Test Methods for Determining Small-Strain Tensile Properties of Geogrids and Geotextiles by In-Air Cyclic Tension Tests¹

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1. Scope

1.1 These test methods cover the determination of small-strain tensile properties of geogrids and geotextiles by subjecting wide-width specimens to cyclic tensile loading.

1.2 These test methods (A, B, and C) allow for the determination of small-strain cyclic tensile modulus by the measurement of cyclic tensile load and elongation.

1.3 This test method is intended to provide properties for design. The test method was developed for mechanistic-empirical pavement design methods requiring input of the reinforcement tensile modulus. The use of cyclic modulus from this test method for other applications involving cyclic loading should be evaluated on a case-by-case basis.

1.4 Three test methods (A, B, and C) are provided to determine small-strain cyclic tensile modulus on geogrids and geotextiles.

1.4.1 *Test Method A*—Testing a relatively wide specimen of geogrid in cyclic tension in kN/m (lbf/ft).

1.4.2 *Test Method B*—Testing multiple layers of a relatively wide specimen of geogrid in cyclic tension in kN/m (lbf/ft).

1.4.3 *Test Method C*—Testing a relatively wide specimen of geotextile in cyclic tension in kN/m (lbf/ft).

1.5 The values stated in SI units are to be regarded as standard. The values given in parentheses are provided for information only and are not considered standard.

1.6 *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.*

¹ These test methods are under the jurisdiction of ASTM Committee D35 on Geosynthetics and are the direct responsibility of Subcommittee D35.01 on Mechanical Properties.

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2. Referenced Documents

2.1 *ASTM Standards*:²

D76 Specification for Tensile Testing Machines for Textiles

D123 Terminology Relating to Textiles

D579 Specification for Greige Woven Glass Fabrics

D4354 Practice for Sampling of Geosynthetics and Rolled Erosion Control Products(RECPs) for Testing

D4439 Terminology for Geosynthetics

3. Terminology

3.1 *Definitions*:

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

3.1.2 *corresponding force, n*—synonym for *force at specified elongation*.

3.1.3 *force at specified elongation (FASE), n*—force associated with a specific elongation on the force-elongation curve. (Synonym for *corresponding force*.)

3.1.4 *force-elongation curve, n*—in a tensile test, graphical representation of the relationship between the magnitude of an externally applied force and the change in length of the specimen in the direction of the applied force. (Synonym for *stress-strain curve*.)

3.1.5 *geogrid, n*—geosynthetic formed by a regular network of integrally connected elements with apertures greater than 6.35 mm ($\frac{1}{4}$ in.) to allow interlocking with surrounding soil, rock, earth, and other surrounding materials to primarily function as reinforcement.

3.1.6 *geosynthetic, n*—product manufactured from polymeric material used with soil, rock, earth, or other geotechnical

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.