



Standard Test Method for Strip Tensile Properties of Reinforced Geomembranes¹

This standard is issued under the fixed designation D 7003; 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 is used to measure the strip tensile properties of reinforced geomembranes.

1.2 The values stated in SI units are to be regarded as standard. The values given in parentheses are for information only.

1.3 *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:*²

D 76 Specification for Tensile Testing Machines for Textiles

D 4354 Practice for Sampling of Geosynthetics

D 4439 Terminology for Geosynthetics

3. Terminology

3.1 *Definitions*—Definitions of terms applying to this test method appear in Terminology D 4439.

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

3.1.2 *reinforced geomembrane, n*—a geomembrane internally reinforced with a textile.

3.1.3 *yarn, n*—a generic term for a continuous strand of textile fibers, filaments or material in a form suitable for knitting, weaving or otherwise intertwining to form a textile fabric.

4. Significance and Use

4.1 This method evaluates strip tensile properties of reinforced geomembranes for the purposes of quality control, quality assurance and research. In order to evaluate the full contribution of the reinforcement, testing is performed parallel

to the directions of reinforcement. This method is an index test and is not intended for design purposes.

5. Apparatus

5.1 *Tensile Testing Machine*—Constant Rate of Extension (CRE) equipment meeting the requirements of Specification D 76. The load cell shall be accurate to within $\pm 1\%$ of the applied force. The drive mechanism shall be able to control the rate of extension to within $\pm 1\%$ of the targeted rate.

5.2 *Grips*—One of the grips must be self aligning to compensate for uneven distribution of force across the specimen. The clamping force and the clamp surfaces shall hold the specimen firmly without causing damage. The clamps shall be capable of gripping a 25 mm (1 in.) by 25 mm (1 in.) area. This can be accomplished by either using 25 mm (1 in.) square clamp faces or by using clamps with dimensions of 25 mm (1 in.) by greater than 25 mm (1 in.) and crossing the clamps in the grips so that only a 25 mm (1 in.) by 25 mm (1 in.) area is gripped.

5.3 *Recording Mechanism*—The testing machine shall be equipped with equipment capable of producing a hard copy of the force versus displacement curve. Electronic data acquisition with printer capabilities or direct recording devices are acceptable.

6. Sampling and Test Specs and Units

6.1 *Lot Sample*—For the lot sample, take rolls of geomembrane per the applicable project specification, or as agreed upon between purchaser and supplier. Unless otherwise specified, refer to Practice D 4354.

6.2 *Laboratory Sample*—For the laboratory sample, take a full-width swatch approximately 1 m (3 ft) long by roll width for each roll in the lot sample. Take a sample that will exclude material from the outer wrap of the roll or the inner wrap around the core. In the case where the sample is taken at the production site, material from the outer wrap may be used if it is undamaged.

6.3 *Test Specimens*—Prepare five specimens with the length of the specimen parallel to the machine direction (MD) and five specimens with the length parallel to the transverse direction (TD) for materials with the reinforcement running in those directions. If the reinforcement is aligned in any direction other than the machine or transverse directions, specimens shall be cut parallel to those directions and so noted in the report. Cut

¹ This test method is under the jurisdiction of ASTM Committee D35 on Geosynthetics and is the direct responsibility of Subcommittee D35.10 on Geomembranes.

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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.