



Designation: D7004/D7004M – 03 (Reapproved 2021)

Standard Test Method for Grab Tensile Properties of Reinforced Geomembranes¹

This standard is issued under the fixed designation D7004/D7004M; 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 grab tensile properties of reinforced geomembranes.

1.2 The values stated in either SI units or inch-pound units are to be regarded separately as standard. The values stated in each system are not necessarily exact equivalents; therefore, to ensure conformance with the standard, each system shall be used independently of the other, and values from the two systems shall not be combined.

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

1.4 *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

D76/D76M Specification for Tensile Testing Machines for Textiles

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 Definitions of terms applying to this test method appear in Terminology D4439.

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.

3.1.2 *atmosphere for testing geosynthetics, n*—air maintained at a relative humidity between 50 to 70 % and a temperature of 21 ± 2 °C [70 ± 4 °F].

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

3.1.4 *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 test method evaluates grab 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 test 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 D76/D76M. The load cell shall be accurate to within ± 1 % of the applied force. The drive mechanism shall be able to control the rate of extension to within ± 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, Test Specimens, and Test Units

6.1 *Lot Sample*—For the lot sample, take rolls of geomembrane per the applicable project specification, or as agreed