



Designation: D6693/D6693M – 20 (Reapproved 2024)

Standard Test Method for Determining Tensile Properties of Nonreinforced Polyethylene and Nonreinforced Flexible Polypropylene Geomembranes¹

This standard is issued under the fixed designation D6693/D6693M; 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 the determination of the tensile properties of nonreinforced geomembranes in the form of standard dumbbell-shaped test specimens when tested under defined conditions of pretreatment, temperature, and machine speed.

1.2 This test method can be used for testing materials thickness between 0.25 mm [0.010 in.] and 6.3 mm [0.25 in.].

NOTE 1—This test method is not intended to precisely measure physical properties of a geomembrane for design purposes. This is an “index test” intended to be used for quality control and specification conformance purposes. The constant rate of crosshead movement of this test lacks accuracy from a theoretical standpoint, since crosshead movement as opposed to actual strain is used. A wide difference may exist between the rate of crosshead movement and the rate of strain in particular areas of the specimen since the specimen does not have a uniform width or cross-sectional area. This may disguise important effects or characteristics of these materials in the plastic state. Use of an extensometer, not included in this test, would more accurately measure strain and strain rate but would still have limitations for some geomembranes. Further, it is realized that variations in the thicknesses of test specimens, as permitted by this test method, produce variations in the surface-volume ratios of such specimens, and that these variations may influence the test results. Hence, where directly comparable results are desired, all samples should be of equal thickness. Special additional tests should be used where more precise physical data are needed. Test Method D4885 is a suitable performance test for many applications.

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 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.

1.4 *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 appro-*

priate 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

- D374/D374M Test Methods for Thickness of Solid Electrical Insulation
- D412 Test Methods for Vulcanized Rubber and Thermoplastic Elastomers—Tension
- D638 Test Method for Tensile Properties of Plastics
- D4000 Classification System for Specifying Plastic Materials
- D4439 Terminology for Geosynthetics
- D4885 Test Method for Determining Performance Strength of Geomembranes by the Wide Strip Tensile Method
- D5199 Test Method for Measuring the Nominal Thickness of Geosynthetics
- D5994/D5994M Test Method for Measuring Core Thickness of Textured Geomembranes
- E4 Practices for Force Calibration and Verification of Testing Machines
- E691 Practice for Conducting an Interlaboratory Study to Determine the Precision of a Test Method
- E2586 Practice for Calculating and Using Basic Statistics

3. Terminology

3.1 *Definitions*—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 www.astm.org/contact. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.