



Designation: D7106/D7106M – 05 (Reapproved 2023)

# Standard Guide for Selection of Test Methods for Ethylene Propylene Diene Terpolymer (EPDM) Geomembranes<sup>1</sup>

This standard is issued under the fixed designation D7106/D7106M; 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 ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

## 1. Scope

1.1 This guide covers and provides recommendations for the selection of appropriate test methods for Ethylene Propylene Diene Terpolymer (EPDM) geomembranes used in geotechnical and geoenvironmental applications.

1.2 This guide includes test methods for three different types of EPDM geomembranes including: scrim-reinforced membranes, composite membranes, and smooth, nonreinforced membranes.

1.3 The test methods are divided into three categories including manufacturing quality control, optional performance tests, and seam testing.

1.4 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.

1.5 *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.*

1.6 *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:<sup>2</sup>

<sup>1</sup> This guide 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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<sup>2</sup> 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.

- D297 Test Methods for Rubber Products—Chemical Analysis
- D413 Test Methods for Rubber Property—Adhesion to Flexible Substrate
- D471 Test Method for Rubber Property—Effect of Liquids
- D618 Practice for Conditioning Plastics for Testing
- D882 Test Method for Tensile Properties of Thin Plastic Sheeting
- D1004 Test Method for Tear Resistance (Graves Tear) of Plastic Film and Sheeting
- D1149 Test Methods for Rubber Deterioration—Cracking in an Ozone Controlled Environment
- D1204 Test Method for Linear Dimensional Changes of Nonrigid Thermoplastic Sheeting or Film at Elevated Temperature
- D1418 Practice for Rubber and Rubber Latices—Nomenclature
- D1434 Test Method for Determining Gas Permeability Characteristics of Plastic Film and Sheeting
- D2137 Test Methods for Rubber Property—Brittleness Point of Flexible Polymers and Coated Fabrics
- D2240 Test Method for Rubber Property—Durometer Hardness
- D4355/D4355M Test Method for Deterioration of Geotextiles by Exposure to Light, Moisture, and Heat in a Xenon Arc-Type Apparatus
- D4437/D4437M Practice for Nondestructive Testing (NDT) for Determining the Integrity of Seams Used in Joining Flexible Polymeric Sheet Geomembranes
- D4439 Terminology for Geosynthetics
- D4637/D4637M Specification for EPDM Sheet Used in Single-Ply Roof Membrane
- D4833/D4833M Test Method for Index Puncture Resistance of Geomembranes and Related Products
- D5199 Test Method for Measuring the Nominal Thickness of Geosynthetics
- D5321/D5321M Test Method for Determining the Shear Strength of Soil-Geosynthetic and Geosynthetic-Geosynthetic Interfaces by Direct Shear
- D5514/D5514M Test Method for Large-Scale Hydrostatic Puncture Testing of Geosynthetics

- [D5617 Test Method for Multi-Axial Tension Test for Geosynthetics](#)
- [D5721 Practice for Air-Oven Aging of Polyolefin Geomembranes](#)
- [D5747/D5747M Practice for Tests to Evaluate the Chemical Resistance of Geomembranes to Liquids](#)
- [D5884/D5884M Test Method for Determining Tearing Strength of Internally Reinforced Geomembranes](#)
- [D7004/D7004M Test Method for Grab Tensile Properties of Reinforced Geomembranes](#)
- [E96/E96M Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials](#)

### 3. Terminology

#### 3.1 Definitions:

3.1.1 *composite membrane, n*—factory-laminated nonwoven geotextile and EPDM.

3.1.2 *EPDM, n*—terpolymer of ethylene, propylene, and diene with the residual unsaturated portion of the diene in the side chain. **D1418**

3.1.3 For definitions of other geosynthetic terms used in this guide, refer to Terminology **D4439**.

### 4. Significance and Use

4.1 This standard provides guidance to obtain data that is the most representative of the material's characteristics and performance. To properly evaluate EPDM, tests should be performed in accordance with specific test methods and procedures.

### 5. Test Methods

5.1 The recommended test methods for EPDM sheet are listed in tables under the following categories:

**Table 1:** Test Methods for Manufacturing Quality Control of EPDM Sheet

**Table 2:** Performance Test Methods for EPDM Sheet

**Table 3:** Test Methods for Seams of EPDM Sheet

### 6. Keywords

6.1 EPDM; geomembrane; sheet

**TABLE 1 Test Methods for Manufacturing Quality Control of EPDM Sheet**

Test Title	Sheet Type			Conditions
	Reinforced	Composite	Smooth Nonreinforced	
General:				
Terminology	D4439	D4439	D4439	
Conditioning	D618	D618	D618	
Physical Properties:				
Thickness	D5199	D5199	D5199	
Thickness of Coating over Scrim	D4637/D4637M	D4637/D4637M		Optical Method, Annex A1
Density	D297	D297	D297	
Durometer Hardness	D2240 <sup>A</sup>	D2240 <sup>A</sup>	D2240	Shore A
Mechanical Properties:				
Ultimate Tensile Strength and Elongation			D882	Strip width = 25 mm [1.0 in.]; Strain rate 500 mm [≈20 in.]/min
Breaking Strength	D7004/D7004M	D7004/D7004M		Grab Test Method
Tear Resistance			D1004	
Tear Strength	D5884/D5884M	D5884/D5884M		
Puncture Strength	D4833/D4833M	D4833/D4833M	D4833/D4833M	
Ply Adhesion	D413			
Fabric Adhesion	D413			

<sup>A</sup> Test specimens should be prepared from the coating compound, vulcanized in a similar manner to the scrim-reinforced and composite products.