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# Standard Specification for ~~Prefabricated Asphalt Reservoir, Pond, Canal, and Ditch Liner (Exposed Type)~~Prefabricated Bituminous Geomembrane Used as Canal and Ditch Liner (Exposed Type)[1]

This standard is issued under the fixed designation D 2643; 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

~~1.1This specification covers prefabricated asphalt liner sheets intended for installation in accordance with Practice D3745 to provide a continuous, exposed lining for reservoirs, ponds, canals, and ditches.~~

1.1 This specification covers prefabricated bituminous geomembranes intended to provide a continuous, exposed lining for canals and ditches.

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

~~1.3The following precautionary caveat pertains only to the test method portion, Section 8, of this specification:~~

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]

~~D994Specification for Preformed Expansion Joint Filler for Concrete (Bituminous Type)~~ 1204 Test Method for Linear Dimensional Changes of Nonrigid Thermoplastic Sheeting or Film at Elevated Temperature

~~D1079Terminology Relating to Roofing, Waterproofing, and Bituminous Materials~~ 4354 Practice for Sampling of Geosynthetics for Testing

~~D2172Test Methods for Quantitative Extraction of Bitumen from Bituminous Paving Mixtures~~ 4439 Terminology for Geosynthetics

~~D3745Practice for Installation of Prefabricated Asphalt Reservoir, Pond, Canal, and Ditch Liner (Exposed Type)~~ 4798 Practice for Accelerated Weathering Test Conditions and Procedures for Bituminous Materials (Xenon-Arc Method)

D 4833 Test Method for Index Puncture Resistance of Geomembranes and Related Products

D 5147 Test Methods for Sampling and Testing Modified Bituminous Sheet Material

D 5199 Test Method for Measuring the Nominal Thickness of Geosynthetics

D 5261 Test Method for Measuring Mass per Unit Area of Geotextiles

D 5884 Test Method for Determining Tearing Strength of Internally Reinforced Geomembranes

D 6455 Guide for the Selection of Test Methods for Prefabricated Bituminous Geomembranes (PBGM)

D 7275 Test Method for Tensile Properties of Bituminous Geomembranes (BGM)

~~E154Test Methods for Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs, on Walls, and as Ground Cover~~ 96/E 96M Test Methods for Water Vapor Transmission of Materials

## 3. Terminology

3.1 *Definitions*—~~Refer to Terminology D1079 for definitions of terms used in this specification.~~ — For definitions of terms related to geosynthetics, refer to Terminology D 4439.

3.2 *Definitions:*

3.2.1 *prefabricated bituminous geomembrane*, *n*—a material fabricated in a plant and consisting principally of a geotextile saturated and coated with an oxidized or an elastomeric modified bitumen blend incorporating a filler.

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[1] This specification 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.

3.2.2 *mineral stabilizer*, *n*—a fine, water-insoluble inorganic material, used as a filler material in the bitumen of a prefabricated bituminous geomembrane.

3.3 *Definitions of Terms Specific to This Standard:*

3.3.1 *selvage*, *n*—the edge portion of a prefabricated bituminous geomembrane that is parallel to the machine direction.

## 4. Materials and Manufacture

4.1The liner sheets shall consist of layers of asphalt mastic between asphalt-saturated felts, mats, or fabrics, and shall be coated on both sides and covered with a material to prevent the finished sheets from sticking together during storage and shipment.

4.2The mastic shall consist of asphalt, mineral fillers, and reinforcing fibers of any type.

4.3The felts, mats, or fabrics shall be organic or glass fiber, and shall be impregnated with a hot asphaltic saturant.

4.4The coating shall be a hot-applied asphalt material permitted to be compounded with a mineral stabilizer.

4.5The material or treatment applied to prevent the finished sheets from sticking together shall be such that it can be removed at the installation site, or its presence will not interfere with bonding of joint sealant.

## 5.*Physical Requirements* Physical Requirements

5.1The liner sheets shall conform to the requirements prescribed in Classifications

4.1 Prefabricated bituminous geomembranes covered by this specification shall be classified as Type I, Type II, and Type III. Distinction between those types is related to the requirements found in Table 1.

4.2 Prefabricated bituminous geomembranes covered by this specification, regardless of their type indicated in section 4.1, shall also be classified using the following grades, essentially governed by their minimal installation temperature:

4.2.1 *Grade 1*—For installation at ambient temperatures of 5 °C (40 °F) and above.

4.2.2 *Grade 2*— For installation at ambient temperatures of -25 °C (-13 °F) and above.

## 5. Materials and Manufacture

5.1 The prefabricated bituminous geomembranes shall consist of a geotextile, impregnated and coated with bitumen. They shall be packaged in the form of rolls.

5.2 The bitumen shall consist of oxidized or elastomeric modified asphalt incorporating a mineral stabilizer.



**TABLE 1 PhysicalRequirements o f Asphalor Bit Luminous Geomembr Shanes Used as Exposed Lining for Canals and Ditches**

| WatePr absorpertion, max, %y | Standard | Type I | Type II | Type III |
|---|---|---|---|---|
| Thickness, min | D 5199 | 3.0.130 in.) | 3.8 mm (0.150 in.) | 4.5 mm (0.175 in.) |
| Thickness, min | D 5199 | 3.3 mm (0.130 in.) | 3.8 mm (0.150 in.) | 4.5 mm (0.175 in.) |
| Mass percent ofasphalt, min, % | 61 | 3.5.72 lb/ft$^2$) | 4.0 kg/m$^2$ (0.82 lb/ft$^2$) | 5.0 kg/m$^2$ (1.02 lb/ft$^2$) |
| Mass per Unit Area, min | D 5261 | 3.5 kg/m$^2$ (0.72 lb/ft$^2$) | 4.0 kg/m$^2$ (0.82 lb/ft$^2$) | 5.0 kg/m$^2$ (1.02 lb/ft$^2$) |
| Resistance to decay | D 7275 | 8 kN/m (45.7 lbf/in.) | 12 kN/m (68.5 lbf/in.) | 16 kN/m (91.4 lbf/in.) |
| Tensile Strength at break, machine and cross-machine directions, min | D 7275 | 8 kN/m (45.7 lbf/in.) | 12 kN/m (68.5 lbf/in.) | 16 kN/m (91.4 lbf/in.) |
| Elongation at break, machine and cross-machine directions, min | D 7275 | 50 % | 50 % | 50 % |
| Tear Strength, machine and cross-machine directions, min | D 5884 | 500 N (112 lbf) | 550 N (124 lbf) | no effect |
| Tear Strength, machine and cross-machine directions, min | D 5884 | 500 N (112 lbf) | 550 N (124 lbf) | 600 N (135 lbf) |
| Flexibility | D 4833 | 350 N (79 lbf) | 450 N (101 lbf) | no cracking or rupture |
| Index Puncture Resistance, min | D 4833 | 350 N (79 lbf) | 450 N (101 lbf) | 550 N (124 lbf) |
| Brittleness | | | | |
| Low Temperature Flexibility before weathering, machine and cross-machine directions | D 5147 Section 11 | | Grade 1 must pass 5 °C (40 °F) Grade 2 must pass –25 °C (–13 °F) | |
| no cracking orshatterings | D 5147 Section 11 | | Grade 1 must pass 15 °C (59 °F) Grade 2 must pass –15 °C (–5°F) | |
| Low Temperature Flexibility after weathering, machine and cross-machine directions | D 5147 Section 11 | | Grade 1 must pass 15 °C (59 °F) Grade 2 must pass –15 °C (–5°F) | |
| Heat distortion | | | | |
| Dimensional Stability, machine and cross-machine directions, max | D 1204 | | 0.5 % | |
| no bulging ormastic fle | E 96/E96M, Methowd B | | 5.7 ng/Pa·s·m2$^2$ (0.1 perm) | |
| Water Vapor Permeance | E 96/E96M, Method B | | 5.7 ng/Pa·s·m2$^2$ (0.1 perm) | |