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Standard Test Methods for Coated Fabrics Used for Oil Spill Control and Storage¹

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1. Scope

1.1 These test methods cover laboratory-conducted performance tests for coated fabrics used in spill control barriers or in temporary storage devices.

1.2 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard.

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

- D86 Test Method for Distillation of Petroleum Products and Liquid Fuels at Atmospheric Pressure
- D93 Test Methods for Flash Point by Pensky-Martens Closed Cup Tester
- D97 Test Method for Pour Point of Petroleum Products
- D129 Test Method for Sulfur in Petroleum Products (General High Pressure Decomposition Device Method)
- D130 Test Method for Corrosiveness to Copper from Petroleum Products by Copper Strip Test
- D287 Test Method for API Gravity of Crude Petroleum and Petroleum Products (Hydrometer/Method)
- D445 Test Method for Kinematic Viscosity of Transparent

and Opaque Liquids (and Calculation of Dynamic Viscosity)

- D482 Test Method for Ash from Petroleum Products
- D524 Test Method for Ramsbottom Carbon Residue of Petroleum Products
- D543 Practices for Evaluating the Resistance of Plastics to Chemical Reagents
- D613 Test Method for Cetane Number of Diesel Fuel Oil
- D664 Test Method for Acid Number of Petroleum Products by Potentiometric Titration
- D751 Test Methods for Coated Fabrics
- D975 Specification for Diesel Fuel
- D1149 Test Methods for Rubber Deterioration—Cracking in an Ozone Controlled Environment
- D1266 Test Method for Sulfur in Petroleum Products (Lamp Method)
- D1298 Test Method for Density, Relative Density, or API Gravity of Crude Petroleum and Liquid Petroleum Products by Hydrometer Method
- D1319 Test Method for Hydrocarbon Types in Liquid Petroleum Products by Fluorescent Indicator Adsorption
- D1796 Test Method for Water and Sediment in Fuel Oils by the Centrifuge Method (Laboratory Procedure)
- D2425 Test Method for Hydrocarbon Types in Middle Distillates by Mass Spectrometry
- D2500 Test Method for Cloud Point of Petroleum Products and Liquid Fuels
- D2644 Tolerances for Yarns Spun on the Woolen System
- D3117 Test Method for Wax Appearance Point of Distillate Fuels (Withdrawn 2010)³
- D3884 Guide for Abrasion Resistance of Textile Fabrics (Rotary Platform Abrader Method)
- G26 Practice for Operating Light-Exposure Apparatus (Xenon-Arc Type) With and Without Water for Exposure of Nonmetallic Materials (Discontinued 2001) (Withdrawn 2000)³

2.2 Federal Standard:

Fed. Std. No. 191A Textile Test Methods⁴

¹ These test methods are under the jurisdiction of ASTM Committee F20 on Hazardous Substances and Oil Spill Response and are the direct responsibility of Subcommittee F20.11 on Control.

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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 The last approved version of this historical standard is referenced on www.astm.org.

⁴ Available from DLA Document Services, Building 4/D, 700 Robbins Ave., Philadelphia, PA 19111-5094, <http://quicksearch.dla.mil>.

3. Significance and Use

3.1 Membrane materials are subjected to these tests in order to provide data that reasonably relate to membrane response under the actual conditions of spill control barrier or storage device use.

3.2 Although these test methods provide data on individual performance of membrane materials, all combinations of actual conditions of spill control barrier or storage device use are not simulated in this sequence of tests.

4. Base Line Tests

4.1 *Number of Specimens*—Subject specimens of spill control membrane materials to the tests prescribed in 4.2 – 4.11. Perform all tests in the direction of both the warp and fill of the fabric. The number of specimens to be tested are as specified in the procedures referenced in 4.2 – 4.11.

4.2 *Mass and Thickness*—Test Methods D751.

4.3 *Tensile Strength and Elongation at Break*—Test Methods D751 for Breaking Strength, Procedure A—Grab Test Method.

4.4 *Tear Strength*—Test Methods D751 for Tearing Strength, Procedure B—Tongue Tear Method. If standard sample does not achieve true tear or if the fabric design requires roping to achieve high tear, sample size may be enlarged in order to achieve cord breakage, but all other procedures must be maintained. Such sample size change must be recorded in test results.

4.5 *Adhesion*—Test Methods D751 after five days at 70 °C in water.

4.6 *Puncture Resistance*—Test Methods D751.

4.7 *Abrasion Resistance*—Test Method D3884, using 1 kg weight for abrasion.

4.8 *Seam Strength*—Test Methods D751. Perform test with seam orientation as in device design.

4.9 *Seam Adhesion*—Repeat adhesion test (see 4.5) for specimens containing a seam.

4.10 *Blocking Resistance*—Test Methods D751.

4.11 *Mildew*—Fed. Std. No. 191A, Method 5762 (Mixed Cidal Spore Test).

5. Weather and Petroleum Sample Tests Related to Base Line Tests

5.1 *Specimen Preparation*—Subject samples of spill control barrier or storage device membrane material to the following preparations: weather resistance to be followed by resistance to petroleum products:

5.1.1 *Weather Resistance*—Practice G26, Test Method 2 (also referred to as Test Method B—Alternate Exposure to Light and Darkness and Intermittent Exposure to Water Spray), using deionized water and a 7000 W xenon burner tube, 500 h exposure.

5.1.2 *Resistance to Petroleum Products*—Practices D543, with 96 h exposure to Diesel Fuel Grade No. 2, as prescribed in Specification D975 and further meeting the specifications shown in Table 1 (Note). Conduct tests at ambient temperature.

5.2 *Weather and Petroleum Sample Tests*—Perform each of the following tests within 1 h of the termination of the test in 5.1.2.

5.2.1 *Tensile Strength*—Same as base line test (4.3).

5.2.2 *Tear Strength*—Same as base line test (4.4).

5.2.3 *Adhesion*—Same as base line test (4.5).

5.2.4 *Puncture Resistance*—Same as base line test (4.6).

5.2.5 *Abrasion Resistance*—Same as base line test (4.7).

5.2.6 *Seam Strength*—Same as base line test (4.8).

5.2.7 *Seam Adhesion*—Same as base line test (4.9).

5.2.8 *Blocking Resistance*—Same as base line test (4.10).

5.2.9 *Low Temperature Resistance*—Fed. Std. No. 191A, Method 5874, 2 h soak at –29 °C with a 2.5 kg mandrel roller weight. Visually examine specimen and report signs of cracking or flaking. Do not perform hydrostatic resistance test.

5.2.10 *Ozone Resistance*—Test Method D1149. Material is classified as ozone-resistant if no cracking is evident after seven days.

6. Precision and Bias

6.1 The precision and bias of test measurements are addressed in each individual test method cited in Sections 3 – 5.

7. Keywords

7.1 barrier; coated fabrics; membrane materials; membranes; oil spill; spill control; storage devices; temporary storage devices