



Designation: D 173 – 97**b**03

Standard Specification for Bitumen-Saturated Cotton Fabrics Used in Roofing and Waterproofing¹

This standard is issued under the fixed designation D 173; 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.

This standard has been approved for use by agencies of the Department of Defense. This standard replaces Federal Specification SS-C-450.

1. Scope

1.1 This specification covers woven cotton fabrics saturated with either asphalt or coal-tar pitch intended to be used with asphalts conforming to Specifications D 312 or D 449, coal-tar pitches conforming to Specification D 450, or appropriate solvent bearing bituminous materials in the construction of roofing and waterproofing systems.

1.1.1 Asphalt-saturated cotton fabric shall be used with asphalt base plying cement; typical ones are mopping asphalts conforming to Specifications D 312 or D 449 or appropriate solvent bearing asphaltic compounds.

1.1.2 Coal-tar-saturated cotton fabric shall be used with coal-tar based plying cements; a typical one is coal-tar pitch conforming to Specification D 450 or appropriate solvent bearing coal-tar compounds.

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

¹ This specification is under the jurisdiction of ASTM Committee D-8 D08 on Roofing, Waterproofing, Roofing and Bituminous Materials Waterproofing and is the direct responsibility of Subcommittee D08.04 on Felts and Fabrics for Bituminous Roofing and Waterproofing Fabrics.

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2. Referenced Documents

2.1 ASTM Standards:²

- D 146 Test Methods for Sampling and Testing Bitumen-Saturated Felts and Woven Fabrics for Roofing and Waterproofing
- D 312 Specification for Asphalt Used in Roofing
- D 449 Specification for Asphalt Used in Dampproofing and Waterproofing
- D 450 Specification for Coal-Tar Pitch Used in Roofing, Dampproofing, and Waterproofing
- D 1079 Terminology Relating to Roofing, Waterproofing, and Bituminous Materials
- D 3775 Test Methods for Fabric Count of Woven Fabric

3. Terminology

- 3.1 *Definitions*—For definitions of terms used in this specification, refer to Terminology D 1079.

4. Materials and Manufacture

4.1 In the process of manufacture, the dry cotton fabric shall be thoroughly and uniformly saturated with bitumen. This shall be accomplished by passing the fabric through the saturant or by spraying with saturant, calendaring in the presence of heat, and then cooling before winding on a core.

- 4.2 If fabric with a selvage is used, the selvage shall not be more than 16 mm (5/8-in. (16 mm) in.) wide.

4.3 The fabric shall be woven entirely from cotton fibers, but customary sizing materials not exceeding 8 % by weight of the moisture-free cotton shall be permitted to be used.

5. Physical Properties

5.1 The material shall conform to the physical requirements prescribed in Table 1 and the dimensions and masses prescribed in Table 2.

5.2 The finished product shall not crack nor be so sticky as to cause tearing or other damage upon being unrolled at temperatures between -50 10 and +40°F (10 60°C (50 and 60°C). 140°F).

6. Workmanship, Finish, and Appearance

6.1 The meshes of the fabric shall not be completely closed or sealed by the process of saturation. There shall be sufficient porosity maintained to allow successive moppings of the plying cement to seep through.

6.2 The surface of the fabric shall not be coated or covered with talc or other substances that would tend to interfere with adhesion between the fabric and the plying cement. The use of silica or wood flour is permissible.

- 6.3 The surface shall be uniformly smooth and free of irregularities, folds, or knots.

- 6.4 The finished material shall be free of visible external defects such as ragged or untrue edges, breaks, rents, or cracks.

7. Sampling and Test Methods

- 7.1 Sample the material and determine compliance with these specifications in accordance with Test Methods D 146.

7.2 Determine the pliability of the saturated fabric at -32°F (-0°C) 0°C (32°F) by bending over a 1/16-in. (1.6 mm) 1.6-mm (1/16-in.) diameter mandrel through an arc of 180° in one direction and then through 360° in the opposite direction.

- 7.3 Determine the thread count in accordance with Test Method D 3775.

8. Inspection

- 8.1 *Inspection*—Inspection shall be in accordance with the requirements of this specification.

8.2 *Inspection Alternatives*—Alternative inspection requirements shall be determined by and agreed upon between the purchaser and the supplier.

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*, Vol 04.04, volume information, refer to the standard's Document Summary page on the ASTM website.

TABLE 1 Physical Properties of Saturated Cotton Fabrics

Property	Requirement
Breaking load ^A at 70°F (21.1°C), both warp and fill directions, min, lbf/in. (kN/m)	50 (8.76)
Breaking load ^A at 21.1°C (70°F), both warp and fill directions, min, kN/m (lbf/in.)	8.76 (50)
Pliability at 32°F (0°C)	no cracking
Pliability at 0°C (32°F)	no cracking

^A Committee D-08 recognizes the advisability of including a requirement relative to the percentage elongation before rupture, but in the absence of any reliable test method, such requirement cannot be stated at the present time.

TABLE 2 Dimensions and Masses of Saturated Cotton Fabrics

	min	max
Width of roll, in. (mm)	30 (762)	38 (965)
Width of roll, mm (in.)	762 (30)	965 (38)
Gross mass per roll, lb (kg)	35 (15.9)	80 (36.3)
Gross mass per roll, kg (lb)	15.9 (35)	36.3 (80)
Mass of mandrel and wrapping — material, kg (lb)	...	2.5 (1.13)
Mass of mandrel and wrapping material, kg (lb)	...	1.13 (2.5)
Mass of detached comminuted — surfacing, lb/100 ft ² (g/m ²)	...	4.0 (49)
Mass of detached comminuted surfacing, g/m ² (g/m ²)	...	49 (1.0)
Net mass of saturated fabric, avg. — oz/yd ² (g/m ²)	40 (340)	...
Net mass of saturated fabric, avg. oz/yd ² (g/m ²)	340 (10)	...
Thread count per 10 in. (mm)		
Thread count per 25.4 mm (1 in.)		
— Warp	26 (10.2)	32 (12.6)
— Filling	24 (9.4)	32 (12.6)
Warp	10.2 (26)	12.6 (32)
Filling	9.4 (24)	12.6 (32)
Moisture, at point of manufacture, max, % ^A	...	6.0
Mass of desaturated, moisture-free fabric, avg, oz/yd ² (g/m ²)	3½ (119)	...
Mass of desaturated, moisture-free fabric, avg, g/m ² (g/m ²)	119 (3½)	...
Ash (based on mass of desaturated fabric), %	...	2.0
Mass of saturant	1.6 × (mass of desaturated, moisture-free fabric in the same area)	...
Selvage		5/8 in. (16 mm)
Selvage, mm (in.)		16 (5/8)

^A At time of manufacture—P₁ products with higher moisture content at time of installation may cause hot materials to foam, creating interply voids that may result in blisters.

9. Rejection and Resubmittal

9.1 *Failure to Conform*—Failure to conform to any of the requirements as stated in this specification constitutes grounds for rejection.

9.2 *Rejection Redress*—The supplier shall have the right to inspect the rejected materials. The supplier and the purchaser shall agree to the quantity of rolls deemed unacceptable. The supplier shall then have the right to submit the same number of new rolls as replacement.

10. Packaging and Package Marking

10.1 Unless otherwise agreed upon between the supplier and purchaser, each product package shall be plainly marked with the supplier's name, the product brand, the ASTM designation, and type of bitumen if not evident in the label name of the product.

10.2 The rolls shall be securely wrapped or banded in a manner that completely encircles the roll and will prevent slipping or unrolling.

10.3 No roll shall contain more than two pieces, and no more than 3 % of the rolls in any lot shall contain two pieces. If a roll contains a manufacturing splice, the splice shall be clearly marked.

10.4 The rolls shall be wound on mandrels or rigid hollow fiber cylinders not less than ~~2 in. (50 mm)~~ 50 mm (2 in.) in diameter, extending not more than ~~4 in. (100 mm)~~ 100 mm (4 in.) beyond the end of the rolls.

11. Keywords

11.1 bitumen-saturated; roofing and waterproofing; woven cotton fabric

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