



Designation: **D 6221 – 9800**

Standard Specification for Reinforced Bituminous Flashing Sheets for Roofing and Waterproofing¹

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1. Scope

1.1 This specification covers factory prepared reinforced bituminous sheet used in flashing. The bitumen used may be asphalt, coal-tar pitch, or polymer modified bitumen. The reinforcement may include any one or a combination of organic (wood fiber), polyester, or glass fiber felts, woven fabrics, or thermoplastic films. Fine mineral powders, granules, or metal foils may be used as surfacing.

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

1.3 The following precautionary statement pertains only to the test method portion, Section 7, of this specification: *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:*

D 228 Test Methods for Asphalt Roll Roofing, Cap Sheets, and Shingles²

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

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- D 751 Test Methods for Coated Fabrics³
- D 1079 Terminology Relating to Roofing, Waterproofing, and Bituminous Materials²
- D 2523 Practice for Testing Load-Strain Properties of Roofing Membranes²
- D 3746 Test Method for Impact Resistance of Bituminous Roofing Systems²
- D 5601 Test Method for Tearing Resistance of Roofing and Waterproofing Materials and Membranes²
- D 5683 Test Method for Flexibility of Roofing and Waterproofing Materials and Membranes²
- D 5869 Practice for Dark Oven Heat Exposure of Bituminous Materials²

3. Terminology

3.1 Definitions:

3.1.1 See Terminology D 1079 for terms relating to roofing or waterproofing.

4. Classification

- 4.1 *Type 1*—Heavy, thick flashing sheets.
- 4.2 *Type 2*—Light weight, thin flashing sheets

5. Significance and Use

5.1 The criteria listed in this specification are based on round robin testing of materials that, if correctly installed, can be used as the primary material for flashing membranes. The manufacturer’s installation recommendations must be followed in every case.

5.2 Compliance with the criteria in this specification is believed to be necessary for satisfactory performance, but the linkage has not been established between performance and these criteria.

6. Physical Properties

6.1 Conform to criteria in Table 1.

6.2 The mean mass, thickness, load at break, and elongation at break shall not change more than 10 % from the expected variance after heat conditioning.

7. Sampling and Test Methods

7.1 Comply with Test Methods D 228 for sampling.

7.2 Use the following test methods to test the samples:

7.2.1 *Mass*—See Test Methods D 228.

7.2.2 *Thickness*—See Test Methods D 751.

7.2.3 *Load-Strain Properties*—See Practice D 2523 except as noted herein: test five ~~1~~ 25 × 6 in. (25 × 150 mm (1 × 6 in.) strips in both the length and width of the roll, using a ~~4 in. (100 mm)~~ 100 mm (4 in.) jaw gap, and separate the jaws at ~~2 in./min. (0.85 mm/s)~~ 0.85 mm/s (2 in./min.). Record maximum load and elongation at maximum load.

7.2.4 *Impact Resistance*—See Test Method 3746, test with each sample loose laid on a nominal ~~1 in. (25 mm)~~ 25 mm (1 in.) thick fiberboard insulation.

7.2.5 *Tear Strength*— See Test Method D 5601.

7.2.6 *Flexibility*— See Test Method D 5683.

² Annual Book of ASTM Standards, Vol 04.04.

³ Annual Book of ASTM Standards, Vol 09.02.

TABLE 1 Physical Properties

Property	Type 1	Type 2
Mass, lb/100 ft ² (kg/m ²), min	70 (3.4)	35 (1.7)
Mass, kg/m ² (lb/100 ft ²), min	3.4 (70)	1.7 (35)
Thickness, in. (mm), min	0.130 (3.3)	0.025 (0.6)
Thickness, mm (in.), min	3.3 (0.130)	0.6 (0.025)
Breaking load, lbf/in. (kN/m), minimum at 73.4°F	55 (9.6)	55 (9.6)
Breaking load, kN/m (lbf/in.), minimum at 73.4°F	9.6 (55)	9.6 (55)
Elongation at break, min % at 73.4°F	10	3
Mean tear resistance, lbf (N), minimum at 73.4°F	6	2
Mean tear resistance, N (lbf), minimum at 73.4°F	6	2
Peak tear resistance, lbf (N), minimum at 73.4°F	8	5
Peak tear resistance, N (lbf), minimum at 73.4°F	8	5
Flexibility, mandrel diameter, in. (mm), no cracks	0.375 (10)	0.625 (16)
Flexibility, mandrel diameter, mm (in.), no cracks	10 (0.375)	16 (0.625)
Impact resistance, % without breaks	75	50

7.2.7 *Heat Conditioning*—Mass, thickness, load, and elongation after 35 ± 0.25 consecutive days of heat conditioning in a forced draft oven at $158 \pm 5^\circ\text{F}$ ($70 \pm 3^\circ\text{C}$) ($158 \pm 3^\circ\text{C}$; 5°F). See Practice D 5869.

8. Calculation

8.1 Calculate the mean, estimated standard deviation, and mean variance of test values from five specimens tested before and after heat conditioning.

8.1.1 Calculate the mean “X” using:

$$X = \frac{\sum x}{n} \tag{1}$$

where:

x = individual test value, and

n = number of tests.

8.1.2 Calculate the estimated standard deviation “s” using:

$$s = \sqrt{\frac{\sum(x-X)^2}{(n-1)}} \tag{2}$$

8.1.3 Calculate the mean variance “V” using:

$$V = \frac{s^2}{n} \tag{3}$$

8.1.4 Calculate the effective degrees of freedom “f” using:

$$f = \frac{(V_b + V_a)^2}{\frac{V_b^2}{n_b + 1} + \frac{V_a^2}{n_a + 1}} - 2 \tag{4}$$

where:

V_b and V_a = the before and after heat conditioning mean variances, and

n_b and n_a = the number of specimens tested.

8.1.5 Look up the percentile of the t distribution for the degrees of freedom calculated in Table 2.

8.1.6 Calculate the expected variance “u” between the means using:

$$u = t_{0.975} \sqrt{V_b + V_a} \tag{5}$$

8.1.7 Reject the sample if the difference between the before and after heat conditioning means is more than 10 % greater than the expected variance.

9. Rejection and Resubmittal

~~9.1 Failure to conform to any of the requirements prescribed~~ Inspection

~~9.1 Inspection—Inspection shall be in this specification constitute grounds for rejection. In accordance with the ease requirements of rejection, the supplier has the right to reinspect the rejected material this specification.~~

~~9.2 Inspection Alternatives—Alternative inspection requirements shall be determined by and resubmit as agreed upon between the lot after removal of the packages not conforming to the requirements. purchaser and supplier.~~

10. Packaging Rejection and Package Marking

~~10.1 The rolls shall be securely wrapped or banded in a substantial grade~~ Resubmittal

~~10.1 Failure to Conform—Failure to conform to any of paper that completely encircles the face of the roll requirements as stated in a manner that will prevent slipping.~~

~~10.2 No roll this specification constitutes grounds for rejection.~~

~~10.2 Rejection Redress—The supplier shall contain more than two pieces; have the right to inspect the rejected materials. The supplier and no more than 3 % of the purchaser shall agree to the quantity of rolls in any lot deemed unacceptable. The supplier shall contain two pieces.~~

TABLE 2 Percentile of the t Distribution

f	$t_{0.975}$	f	$t_{0.975}$
1	12.706	6	2.447
2	4.303	7	2.365
3	3.182	8	2.306
4	2.776	9	2.262
5	2.571	10	2.228

~~10.3 Unless otherwise specified, each package shall be plainly marked with then have the manufacturer's name, brand name, ASTM designation, and right to submit the appropriate application technique. same number of new rolls as replacement.~~

11. Packaging and Package Marking

11.1 The rolls shall be securely wrapped or banded in a substantial grade of paper that completely encircles the face of the roll in a manner that will prevent slipping.

11.2 No roll shall contain more than two pieces, and no more than 3 % of the rolls in any lot shall contain two pieces.

11.3 Unless otherwise specified, each package shall be plainly marked with the manufacturer's name, brand name, ASTM designation, and the appropriate application technique.

12. Keywords

12.1 built-up; flashing for roofing; flashing for waterproofing; reinforced flashing

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