INTERNATIONAL

Designation: ~~D4811/D4811M – 06 (Reapproved 2013)$^{\varepsilon 1}$~~ D4811/D4811M – 16

Standard Specification for Nonvulcanized (Uncured) Rubber Sheet Used as Roof Flashing[1]

This standard is issued under the fixed designation D4811/D4811M; 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.

~~ε[1] NOTE—Units information was editorially corrected in November 2013.~~

1. Scope

1.1 This specification covers nonvulcanized (uncured) rubber sheet made of EPDM (ethylene-propylene-diene terpolymer) or CR (polychloroprene) intended for use as watertight roof flashing exposed to the weather.

1.2 The tests and property limits used to characterize these flashing materials are specific for each classification and are minimum values to make the product fit for its intended purpose.

1.3 The values stated in either SI units or inch-pound units are to be regarded separately as standard. The values stated in each system may not be exact equivalents; therefore, each system shall be used independently of the other. Combining values from the two systems may result in non-conformance with the standard.

1.4 In-place roof system design criteria, such as fire resistance, field seaming strength, material compatibility, and uplift resistance, among others, are beyond the scope of this specification.

1.5 The following precautionary caveat pertains to the test methods portion only, Section 8, of this specification: *This standard may involve hazardous materials, operations, and equipment. This standard does not purport to address the safety concerns 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]

D412 Test Methods for Vulcanized Rubber and Thermoplastic Elastomers—Tension
D471 Test Method for Rubber Property—Effect of Liquids
D518 Test Method for Rubber Deterioration—Surface Cracking (Withdrawn 2007)[3]
D573 Test Method for Rubber—Deterioration in an Air Oven
D624 Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomers
D1079 Terminology Relating to Roofing and Waterproofing
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
D2137 Test Methods for Rubber Property—Brittleness Point of Flexible Polymers and Coated Fabrics
D3182 Practice for Rubber—Materials, Equipment, and Procedures for Mixing Standard Compounds and Preparing Standard Vulcanized Sheets
G151 Practice for Exposing Nonmetallic Materials in Accelerated Test Devices that Use Laboratory Light Sources
G154 Practice for Operating Fluorescent Ultraviolet (UV) Lamp Apparatus for Exposure of Nonmetallic Materials
G155 Practice for Operating Xenon Arc Light Apparatus for Exposure of Non-Metallic Materials

[1] This specification is under the jurisdiction of ASTM Committee D08 on Roofing and Waterproofing and is the direct responsibility of Subcommittee D08.18 on Nonbituminous Organic Roof Coverings.

Current edition approved ~~Nov. 1, 2013~~Aug. 1, 2016. Published ~~November 2013~~August 2016. Originally approved in 1990. Last previous edition approved in ~~2006~~2013 as ~~D4811 – 06.~~D4811/D4811M – 06 (2013)$^{\varepsilon 1}$. DOI: ~~10.1520/D4811_D4811M-06R13E01.~~10.1520/D4811_D4811M-16.

[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.

3. Classification

3.1 The following types are used to identify the principal polymer components of the flashing material (see Note 1):
3.1.1 *Type I*—Ethylene-Propylene-Diene Terpolymer (EPDM).
3.1.2 *Type II*—Chloroprene Polymer (CR).

NOTE 1—For definitions of polymer types, see Practice D1418. For definitions of terms related to roofing, see Terminology D1079.

3.2 The following classes describe the ability to vulcanize on the roof:
3.2.1 Class V—Vulcanizing.
3.2.2 Class NV—Nonvulcanizing.

NOTE 2—Class V compounds continue to vulcanize (that is, cure) after emplacement on the roof. Class NV indicates non-vulcanizable compounds.

4. Materials and Manufacture

4.1 The flashing material shall be formulated from the appropriate polymer type and other compounding ingredients. The principal polymer in the flashing material shall be one of those listed in 3.1 and greater than 95% of the total polymer.

4.2 The flashing material shall be capable of being bonded to itself, to the roofing membrane, and to substrate for making watertight field splices and repairs. The manufacturer or fabricator shall recommend suitable bonding methods and materials.

5. Physical Property Requirements

5.1 Class V flashing material shall conform to the physical property requirements prescribed in Table 1 and Table 2. Class NV flashing material shall conform to the physical property requirements prescribed in Table 1.

5.2 Other requirements shall be agreed upon between the purchaser and the supplier as part of the purchase contract.

6. Dimensions and Permissible Variations

6.1 The width and length shall be agreed upon between the purchaser and the supplier as part of the purchase contract.
6.1.1 The width and length tolerance shall be +3 % and −0 %.

6.2 Sheet thicknesses greater than minimum shall be agreed upon between the purchaser and the supplier as part of the purchase contract.
6.2.1 The thickness tolerance shall be +15 % and −10 % of the specified thickness, but in no case shall the thickness be less than the minimum listed in Table 1.

7. Workmanship, Finish, and Appearance

7.1 The flashing material shall be visually free of pinholes, particles of foreign matter, undispersed raw materials, or other manufacturing defects that might affect serviceability.

7.2 If the number of irregularities appear excessive on a sheet (or portion thereof), then its rejection should be negotiated between involved parties.

TABLE 1 Property Requirements for Flashing Before Vulcanization

	Type I, Class V	Type I, Class NV	Type II, Class V
Thickness, min, mm [in.]	1.4 [0.055]	1.4 [0.055]	1.4 [0.055]
Green Strength Modulus 100 % at 23°C [73°F] kPa [psi]	172-1725 [25-250]	172-1725 [25-250]	172-517 [25-75]
Elongation (Ultimate), min, %	400	400	400
Modulus 100 % at 50°C [122°F] kPa [psi]	83 [12]	83 [12]	83 [12]
Elongation (Ultimate), min, %	200	200	200
Shelf Stability:			
Modulus 100 % at 23°C [73°F], max, kPa [psi]	1725 [250]	n/a	1725 [250]
Elongation, min, %	400	n/a	400
Vulcanizability:			
Tensile Strength, min, kPa [psi]	2800 [406]	n/a	2800 [406]
Elongation, min, %	400	n/a	400
Tensile Set: min, %	80	80	80
Dimensional Stability, max, %	±10	±10	±10
Weatherability, no cracks or crazing	pass	pass	pass

TABLE 2 Property Requirements for Flashing After Vulcanization

	Type I, Class V	Type II, Class V
Vulcanization, at 160°C [320°F], min	20 ± 2	20 ± 2
Tensile Strength, min, MPa [psi]	9.0 [1305]	8.3 [1205]
Elongation, min, %	300	250
Tear Resistance, min, kN/m [lb/in.]	22 [125]	22 [125]
Brittle Point, max, °C [°F]	−45 [−49] pass	−35 [−31] pass
Tensile Set, max, %	10	10
Ozone Resistance, (7×)	no cracks	no cracks
Heat Aging, Air Oven		
Tensile Strength, min, MPa [psi]	8.3 [1205]	8.3 [1205]
Elongation, min, %	200	200
Tear Resistance (Die C), kN/m [lbf/in.], min	22 [125]	22 [125]
Water Absorption, weight change, range, %	+8, −2	+8, −2
Linear Dimension Change, max, %	±2	±2
Weatherability, no cracks or crazing	pass	pass

7.3 Edges of the sheet shall be capable of being seamed to one another and to other roofing components without fish mouthing.

8. Test Methods

8.1 *Thickness*—Test Methods D412.

8.2 *Green Strength:*

8.2.1 Test a fresh sample manufactured within one week.

8.2.2 Condition Type I material at 23 ± 2°C [73 ± 4°F] for a minimum of 1 h and a maximum of 8 h before proceeding with the testing.

8.2.3 Decrystallize Type II material by placing in a circulating air oven at 70 ± 2°C [158 ± 4°F] for 15 min. After removal from the oven, condition at 23 ± 2°C [73 ± 4°F] for a minimum of 1 h and a maximum of 8 h before proceeding with the testing.

8.2.4 After conditioning, die out a 13-mm [0.5-in.] dumbbell (Die A) and determine the modulus at 100 % extension and the ultimate elongation at 23 ± 2°C [73 ± 4°F] in accordance with Test Methods D412.

8.2.5 After conditioning, die out a 13-mm [0.5-in.] dumbbell (Die A), condition in a circulating air oven at 50 ± 2°C [122 ± 4°F] for 15 min minimum and 30 min maximum and determine the modulus at 100 % extension and the ultimate elongation at 50 ± 2°C [122 ± 4°F] in accordance with Test Methods D412.

8.3 *Shelf Stability*—Determine green strength in accordance with after 8.2 aging in a circulating air oven for 46 h at 70 ± 2°C [158 ± 4°F].

8.4 *Vulcanizability:*

8.4.1 For Type I and Type II, oven age for 166 h at 70 ± 2°C [158 ± 4°F].

8.4.2 After removal from the oven, condition the samples at 23 ± 2°C [73 ± 4°F] for a minimum of 1 h and a maximum of 8 h before proceeding with testing.

8.4.3 Test for ultimate tensile and elongation in accordance with Test Methods D412 using a 13-mm [0.5-in.] dumbbell (Die A).

8.5 *Tensile Set (see Test Methods D412):*

8.5.1 Decrystallize Type II material in accordance with 8.2.3.

8.5.2 Hold for 10 min at 23 ± 2°C [73 ± 4°F] and 200 % elongation for Table 1.

8.5.3 Hold for 10 min at 23 ± 2°C [73 ± 4°F] and 50 % elongation for Table 2.

8.6 *Dimensional Stability (see Test Method D1204):*

8.6.1 Obtain a flat specimen of 150 by 150 mm [6 by 6 in.] and age in an air circulating oven at 100 ± 2°C [212 ± 4°F] for 1 h. Cool to 23 ± 2°C [73 ± 4°F] for 1 h and measure the side of the specimen in both directions.

8.7 *Vulcanization*—Practice D3182.

8.8 *Tensile Strength*—Test Methods D412, Die C.

8.9 *Ultimate Elongation*—Test Methods D412, Die C.

8.10 *Tear Resistance*—Test Method D624, Die C.

8.11 *Brittle Point*—Test Methods D2137.

8.12 *Ozone Resistance*—Test Method D1149.

8.12.1 *Type I Material*—Test at 50 % extension, 100 MPa, 166 h at 40 ± 2°C [104 ± 4°F].

8.12.2 *Type II Material*—Test at 20 % extension, 100 MPa, 100 h at 40 ± 2°C [104 ± 4°F].