



Designation: C1916 – 21

Standard Specification for Flexible Protective Jackets Made of Modified Asphalt/Butyl Rubber for Use over Thermal Insulation¹

This standard is issued under the fixed designation C1916; 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

1.1 This specification addresses flexible protective jackets, made of a modified asphalt or butyl rubber sealing compound, for use over thermal insulation. The sealing compound is covered with an outer surface material. Typical applications are insulated ducts, pipe, and equipment. These materials shall be used only for outdoor or direct burial applications.

1.2 The jacket materials covered by this specification have an allowed exposure temperature range, after installation, from -25°F to 284°F (-32°C to 140°C).

1.3 This specification does not address installation methods of this jacketing material.

1.4 The values stated in inch-pound units are to be regarded as standard. The values given in parentheses are mathematical conversions to SI units that are provided for information only and are not considered standard.

1.5 *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.*

1.6 *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

C168 Terminology Relating to Thermal Insulation

C1263 Test Method for Thermal Integrity of Flexible Water Vapor Retarders

C1371 Test Method for Determination of Emittance of Materials Near Room Temperature Using Portable Emis-someters

D882 Test Method for Tensile Properties of Thin Plastic Sheet

D883 Terminology Relating to Plastics

D1000 Test Methods for Pressure-Sensitive Adhesive-Coated Tapes Used for Electrical and Electronic Applications

E96 Test Methods for Water Vapor Transmission of Materials

E154 Test Methods for Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs, on Walls, or as Ground Cover

G154 Practice for Operating Fluorescent Ultraviolet (UV) Lamp Apparatus for Exposure of Nonmetallic Materials

G155 Practice for Operating Xenon Arc Lamp Apparatus for Exposure of Materials

3. Terminology

3.1 Definitions in Terminology C168 apply to terms used in this specification.

3.2 Definitions:

3.2.1 *flexible protective jacket, n*—a thin, flexible sealing compound, covered with an outer surface material, intended for use as a jacket over thermal insulation on pipe, duct, or equipment.

4. Materials and Manufacture

4.1 This flexible protective jacket consists of a sealing compound composed of one of the following: (1) rubber modified asphalt, (2) amorphous polyolefin (APO) modified asphalt, or (3) butyl or polyisobutylene rubber, each covered with some outer surface material.

4.2 The sealing compound is covered with an outer surface material consisting of one of the following: (1) polymer film, (2) bare aluminum foil, (3) polymer coated aluminum foil, or (4) polymer / aluminum foil / polymer (poly / aluminum / poly) laminate.

4.3 There is no additional adhesive material applied to the inside surface of this jacket. However, there is a release paper or plastic (liner) which adheres to the compound by virtue of

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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.

the tackiness of that material. The release paper or plastic film (liner) is a disposable material, normally removed during installation. It must first be removed for all performance tests.

5. Classification

5.1 Classification of this jacketing is based on three factors that determine its Type, Grade, Class, and Material Thickness. Type differentiates the sealing method (Type I and II), Grade differentiates the outer surface material (Grade 1 through 4), and Class differentiates the sealing compound material (Class A, B, or C).

5.1.1 Sealing Method:

5.1.1.1 Type I: Self-Sealing

5.1.1.2 Type II: Heat Activated (sometimes referred to as “torch applied”)

5.1.2 Outer Surface Material:

5.1.2.1 Grade 1: Polymer film only

5.1.2.2 Grade 2: Aluminum foil / Polymer film laminate

5.1.2.3 Grade 3: Polymer film / coated aluminum foil laminate

5.1.2.4 Grade 4: Polymer film / Aluminum foil / Polymer film laminate

5.1.3 Sealing Compound Material:

5.1.3.1 Class A: Rubber modified asphalt compound

5.1.3.2 Class B: Amorphous polyolefin (APO) modified asphalt compound

5.1.3.3 Class C: Butyl or polyisobutylene (PIB) compound

5.1.4 Composite Material Thickness, minimum:

5.1.4.1 Thickness 1: 0.026 in. (0.66 mm)

5.1.4.2 Thickness 2: 0.043 in. (1.1 mm)

5.1.4.3 Thickness 3: 0.066 in. (1.687 mm)

5.1.4.4 Thickness 4: 0.120 in. (3 mm)

6. Physical and Performance Characteristics

6.1 For Type I materials, Grade 2 and 3 materials only, measure and report the total hemispherical emittance of the outer surface. For other materials, there is no requirement to measure and report outer surface emittance.

6.2 See **Table 1** for physical and performance requirements.

7. Typical Sizes and Forms

7.1 Flexible protective jackets are supplied in varying thicknesses, lengths and widths to suit specification and application parameters based on user needs. Typical minimum

TABLE 1 Physical and Performance Requirements

Type	Grade	Outer Surface Material	Class	Sealing Compound	Thick.	Thickness, min. in. (mm)	Exposure temp range ⁴ °F (°C)	UV Stable?	Permeance, max. perms (ng/Pa-s-m ²)	Tensile strength, min. lbf/in. width (N/cm width)	Elongation, percent min.	Puncture resistance, min. lbf (N)	Lap adhesion, min. lbf/in. width (N/cm width)
Test Method							C1263	G154 or G155	E96, Procedure A	D1000 or D882	D1000 or D883	D1000 or E154	D1000
I Self-sealing	1	Polymer Sheet	A	Rubber Modified Asphalt	T1	0.026 (0.67)	-4 to +160 (-20 to +71)	No	0.05 (2.9)	15 (26)	200	40 (178)	5 (8.8)
					T2	0.043 (1.1)	-4 to +167 (-20 to +75)	No	0.03 (1.7)	15 (26)	30	40 (178)	5 (8.8)
			B	APO Modified Asphalt	T2	0.043 (1.1)	-25 to +140 (-32 to +60)	No	0.03 (1.7)	100 (173)	5	165 (740)	1.7 (3.0)
					T3	0.066 (1.7)	-25 to +170 (-32 to +77)	No	0.03 (1.7)	90 (156)	5	197 (882)	1.7 (3.0)
	2	Aluminum Foil/ Polymer Sheet Laminate	A	Rubber Modified Asphalt	T2	0.043 (1.1)	-25 to +160 (-32 to +71)	Yes	0.01 (0.58)	18 (32)	30	15 (67)	18 (32)
	3	Polymer Sheet/ Coated Aluminum Foil Laminate	A	Rubber Modified Asphalt	T1	0.026 (0.67)	-4 to +167 (-20 to +75)	Yes	0.005 (0.05)	18 (32)	30	15 (67)	12 (21)
			B	Modified Asphalt	T2	0.043 (1.1)	-4 to +167 (-20 to +75)	Yes	0.005 (0.05)	30 (53)	30	96.3 (432)	12 (21)
			C	Butyl or PIB	T2	0.043 (1.1)	-4 to +167 (-20 to +75)	Yes	0.005 (0.05)	30 (53)	30	96.3 (432)	12 (21)
	4	Polymer Sheet/ Aluminum Foil/ Polymer Sheet Laminate	A	Rubber Modified Asphalt	T2	0.043 (1.1)	-4 to +167 (-20 to +75)	No	0.00 (0)	15 (26)	10	40 (178)	5 (8.8)
			C	Butyl or PIB	T2	0.043 (1.1)	-22 to +284 (-30 to +140)	No	0.00 (0)	30 (52)	30	15 (67)	5 (8.8)
II Heat Activated	1	Polymer Sheet	B	APO Modified Asphalt	T4	0.120 (3.0)	-20 to +190 (-7 to +88)	No	0.02 (1.1)	90 (156)	5	90 (403)	12 (21)