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AMERICAN SOCIETY FOR TESTING AND MATERIALS
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Standard Specification for Emulsified Asphalt Adhesive for Adhering Roof Insulation[1]

This standard is issued under the fixed designation D 3747; 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 covers emulsified asphalt adhesive for use in adhering preformed roof insulation to steel roof decks with inclines up to 33 %. When applied as a continuous film over an acceptable deck surface, the emulsion functions as both an adhesive and a vapor retarder.

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

1.3 The following precautionary caveat pertains only to the test method portion, Section 5, 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:*

C 208 Specification for Cellulosic Fiber Insulating Board[2]
D 244 Test Methods for Emulsified Asphalts[3]
D 312 Specification for Asphalt Used in Roofing[4]
D 2939 Test Methods for Emulsified Bitumens Used as Protective Coatings[4]
E 96 Test Methods for Water Vapor Transmission of Materials[2]

3. Classification

3.1 *Type I*—Suitable for use at temperatures above 40°F (4°C).

3.2 *Type II*—Suitable for use at temperatures above 20°F (−7°C).

4. Physical Requirements

4.1 The emulsion shall be homogeneous. There shall be no separation of water or coagulation of the asphalt base, and no settling or packing in the container that cannot be overcome by hand stirring at temperatures above 50°F (10°C).

4.2 The consistency of the emulsion shall permit application at a rate of 2 to 2½ gal/100 ft^2 (0.8 to 1.0 L/m^2) with a brush, long-napped roller, or spray at the minimum temperature for each type. For the application of a continuous film, a spray application is recommended.

4.3 The material shall conform to the physical properties prescribed in Table 1.

5. Sampling and Test Methods

5.1 Sample the material and determine the properties enumerated in this specification in accordance with Test Methods D 2939.

5.2 *Water Vapor Permeance*—Test Methods E 96, Procedure E. Prepare specimen in accordance with Test Methods E 96, except for the following modifications:

5.2.1 *Specimen Preparation*—On a silicone-treated sheet of aluminum foil,[5] cast a film of the emulsified asphalt at the rate of 2 to 2½ gal/100 ft^2 (0.8 to 1.0 L/m^2) using a draw bar and suitable template. Allow to dry at room temperature for 24 h. After drying, remove the specimen from the silicone-treated aluminum foil and trim to a suitable diameter to fit the test dish.

5.2.2 *Test Cell Assembly*—Fill the test dish with desiccant as prescribed and insert a circular wire grid of 10 by 10 to 16 by 16-mesh (1.18 to 2.00-mm) openings and equal to the size of the specimen under test. Lay the test specimen on the grid and seal as prescribed.

NOTE 1—The specimen may be dusted with talc to facilitate handling.

5.3 *Adhesive Strength*:

5.3.1 *Scope*—This method covers a simple procedure to determine if the cured adhesive strength is adequate.

5.3.2 *Apparatus and Materials*:

5.3.2.1 *Ring Stand*, 9 in. (225 mm) high with 5-in. (125-mm) diameter ring.

5.3.2.2 *Sheet Metal*, 18 gage (1.27 mm) thick cold-rolled steel, 6 by 6 in. (150 by 150 mm). Steel shall be clean and free of rust and oil.

5.3.2.3 *Metal Insulation Hanger*, [6] with perforated plate 2 by 2 in. (50 by 50 mm) and wire spindle approximately 1 in. (25 mm) long.

5.3.2.4 *Mass*, 5.0 lb (2.3 kg).

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[1] This specification is under the jurisdiction of ASTM Committee D-8 on Roofing, Waterproofing, and Bituminous Materials and is the direct responsibility of Subcommittee D08.09 on Bituminous Emulsions.

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[2] *Annual Book of ASTM Standards*, Vol 04.06.

[3] *Annual Book of ASTM Standards*, Vol 04.03.

[4] *Annual Book of ASTM Standards*, Vol 04.04.

[5] Available from Daubert Chemical Co., 4700 South Central Ave., Chicago, IL 60638.

[6] Gemco Insulation Hanger Model IH-F can be obtained from Goodloe E. Moore Inc., P.O. Box 846, Danville, IL 61832.

TABLE 1 Physical Properties of Emulsified Asphalt Adhesives

Property	Type I		Type II	
	min	max	min	max
Density, lb/gal (kg/m^3)	8.25 (988)	...	8.35 (1000)	...
Residue by evaporation, %	50	55	50	55
Ash content of residue, %	3.5	...	3.5	...
Heat test results		no blistering, sagging, or slipping		
Adhesive strength		no loss of bond		no loss of bond
Water vapor permeance,[A] grain/ft^2·h·in. Hg (ng/Pa·s·m^2)	...	1.0 (57)	...	1.0 (57)
Freezing resistance	...	...		remains homogeneous

[A] The requirement for water vapor permeance is pertinent only for those instances where the adhesive will also be used as a vapor retarder.

5.3.2.5 *Preformed Roof Insulating Board*, conforming to the requirements of Specification C 208, any thickness, 2 by 2 in. (50 by 50 mm).

5.3.2.6 *Asphalt*, conforming to the requirements of Specification D 312, Type IV.

5.3.3 *Procedure*:

5.3.3.1 Form the metal pin of the metal insulation hanger[6] into a hook that will position a suspended mass in the center of the sample. Adhere the metal insulation hanger to the top surface of the roof insulation with molten asphalt.

5.3.3.2 Mark off an area 2 by 2 in. (50 by 50 mm) in the center of the sheet metal square and apply 2.0 g of emulsion uniformly to this area.

5.3.3.3 Immediately bring the bottom surface of the roof insulation into intimate contact with the emulsion-coated surface of the sheet metal, using slight pressure to ensure uniform embedment, and allow to cure for 24 h at room temperature (72 ± 3°F (22 ± 2°C)).

5.3.3.4 Turn the assembly upside down and place it on the ring stand so that the ring supports the sheet metal square, and the insulation and hanger are suspended below.

5.3.3.5 Attach the mass to the hanger and allow it to remain suspended in this manner for 2 h. Examine the sample for loss of bond.

5.4 *Freezing Resistance*—Test Methods D 244, Freezing Test, shall be used for measuring this property.

6. Inspection

6.1 Inspection of the material shall be agreed upon between the purchaser and the supplier as part of the purchase contract.

7. Rejection and Rehearing

7.1 Material that fails to conform to the requirements of this specification may be rejected. Rejection should be reported to the producer or supplier promptly and in writing. In case of dissatisfaction with the results of the test, the producer or supplier may make claim for a rehearing.

8. Packaging and Marking

8.1 Emulsion shall be packaged to permit acceptance by the carrier for transportation and to afford adequate protection from the normal hazards of handling and shipping.