



# Standard Specification for Aluminum Pigmented Emulsified Asphalt Used as a Protective Coating for Roofing<sup>1</sup>

This standard is issued under the fixed designation D 6848; 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 ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

## 1. Scope

1.1 This specification covers aluminum pigmented emulsified asphalt suitable for application as a protective coating for built-up roofs and other exposed surfaces by brush, roller, or spray application. The surfaces to which this product is applied are expected to have positive drainage as the coating is not anticipated for use where ponding conditions exist. The product is suitable for use on sheet metal, and smooth or granule surfaced emulsion, conventional BUR, and modified bitumen systems.

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

1.3 The user is cautioned that aluminum pigmented emulsified asphalt may generate a reaction resulting in the evolution of hydrogen gas. Use caution when opening containers.

1.4 *This standard may involve hazardous materials, operations, and equipment. 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 requirements prior to use.*

## 2. Referenced Documents

### 2.1 ASTM Standards:

- B 209 Specification for Aluminum and Aluminum-Alloy Sheet and Plate<sup>2</sup>
- D 562 Test Method for Consistency of Paints Measuring Krebs Unit (KU) Viscosity Using a Stormer-Type Viscometer<sup>3</sup>
- D 2824 Specification for Aluminum-Pigmented Asphalt Roof Coatings, Nonfibered, Asbestos Fibered, and Fibered Without Asbestos<sup>4</sup>

D 2939 Test Methods for Emulsified Bitumens Used as Protective Coatings<sup>4</sup>

D 6356 Test Method for Hydrogen Gas Generation of Aluminum Emulsified Asphalt Used as a Protective Coating for Roofing

G 154 Practice for Operating Fluorescent Light Apparatus for UV Exposure of Nonmetallic Materials<sup>5</sup>

## 3. Classification

3.1 Aluminum pigmented emulsified asphalt covered by this specification are of the general types such as:

- 3.1.1 *Type I Non-fibered*, containing no fiber.
- 3.1.2 *Type II Fibered*, containing asbestos fiber.
- 3.1.3 *Type III Fibered*, containing no asbestos fiber.

## 4. Physical Requirements

4.1 *Uniformity*—After a thoroughly stirred sample has stood for 72 h at room temperature  $23.9 \pm 1.7^\circ\text{C}$  ( $75 \pm 3.0^\circ\text{F}$ ) the aluminum emulsion shall be of smooth, uniform consistency without separation of settlement in storage to the extent that it cannot be readily dispersed by moderate stirring.

4.2 *Consistency*—The aluminum emulsion shall be of suitable consistency for application above freezing by brush, roller, or suitable spray equipment without thinning with water or heating, and shall bond to either damp or dry surfaces to produce a film in which the aluminum pigment forms a bright reflective surface when applied according to manufacturers' recommendations.

4.3 Application of the aluminum emulsion shall be between 10 and  $37.8^\circ\text{C}$  (50 and  $100^\circ\text{F}$ ) surface temperature. At temperatures above  $37.8^\circ\text{C}$  ( $100^\circ\text{F}$ ), a fine water mist to aid cooling of the roof surface to be coated prior to application is recommended. The amount of water applied to the surface should be sufficient for dampening without any glistening surface water.

4.4 The aluminum emulsion shall conform to the additional requirements prescribed in Tables 1 and 2.

<sup>1</sup> This specification is under the jurisdiction of ASTM Committee D08 on Roofing and Waterproofing and is the direct responsibility of Subcommittee D08.09 on Bituminous Emulsions.

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<sup>2</sup> *Annual Book of ASTM Standards*, Vol 02.02.

<sup>3</sup> *Annual Book of ASTM Standards*, Vol 06.01.

<sup>4</sup> *Annual Book of ASTM Standards*, Vol 04.04.

<sup>5</sup> *Annual Book of ASTM Standards*, Vol 14.04.

**TABLE 1 Performance Requirements of Aluminum Emulsified Asphalt**

NOTE—There are a variety of ways of dealing with gassing as measured by Test Method D 6356. For this reason, it is impractical to state a limit. The test method is important to point out the concern and to have a standard method to compare products and formulas.

Property	All Types	
	Min	Max
Reflectance, initial, % (Section 6, 6.1)	50	...
Reflectance, 500 h, % retained (Section 9, 9.1)	90	...
Drying Time, h (Section 6, 6.2)	...	48
Resistance to Water (Section 6, 6.3)	No blistering, no reemulsification	
Accelerated Weathering	No cracking, sagging, sliding, loss of adhesion, blistering	

**TABLE 2 Composition Requirements**

Property	All Types	
	Min	Max
Weight per U.S. gal, lb (Section 6, 6.4)	8.4	10.0
Weight per L, g (Section 6, 6.4)	1008	1200
Residue by Evaporation, mass % (Section 6, 6.6)	25	...
Water Content, % (Section 6, 6.7)	...	75
Consistency, 25°C (77°F), Krebs units (ku) (Section 6, 6.5)	50	125

## 5. Sampling

5.1 Sample the material in accordance with Test Methods D 2939.

## 6. Test Methods

6.1 *Reflectance*—Specification D 2824, Section 8, (8.6).

6.2 *Drying Time*—Test Methods D 2939, Section 13.

6.3 *Resistance to Water*—Test Methods D 2939, Section 15, except use in 0.38 mm (0.015 in.) wet film thickness for Type I, and 0.51 mm (0.020 in.) wet film thickness for Type II and Type III coatings.

6.4 *Weight per U.S. gal, lb*—Test Methods D 2939, Section 7.

6.5 *Consistency*—Determine the consistency in accordance with Test Method D 562, Procedure A and Procedure B.

6.6 *Residue by Evaporation*—Determine residue by evaporation in accordance with Test Methods D 2939, Section 8.

6.7 *Water Content*—Determine water content in accordance with Test Methods D 2939, Section 11.

6.8 *Hydrogen Gas Generation*—Determine gas generation in accordance with Test Method D 6356.

6.9 *Accelerated Weathering*—Practice G 154.

### 6.9.1 Procedure:

6.9.1.1 Thoroughly stir the sample to homogeneity. Clean the aluminum panels with industrial grade 1,1,1 trichloroethane or xylol solvent prior to preparation of test specimens. Prepare two (2) test specimens by spreading with a spatula through masks centered over two (2) metal, aluminum, or aluminum

alloy panels as described in Table 2 of Specification B 209 under alloy 3003-H14.<sup>6</sup> Doctor off the excess level with a flat scraper. The mask shall have openings 63.5 by 104.8 mm (2½ by 4¼ in.). The wet film thickness of non-fibrated coating shall be 0.38 mm (0.015 in.) and fibrated coating shall be 0.51 mm (0.020 in.). Allow specimens to dry 48 h at room temperature of 23.9 ± 1.7°C (75.0 ± 3.0°F).

6.9.1.2 Measure the initial percent luminous reflectance of each panel, Specification D 2824, Section 8, (8.6).

6.9.1.3 Place the coated panels under accelerated weathering test immediately after reflectance measurements.

6.9.1.4 Specimens should always be placed in the fluorescent ultraviolet (UV) and condensation test apparatus chamber during the UV cycle.

## 7. Apparatus<sup>7</sup>

7.1 *Operating Light and Water Exposure Apparatus*, (Fluorescent UV-Condensation Type) for Exposure of Nonmetallic Materials as described in Section 6 of Practice G 154. Unless otherwise specified, the lamps shall be UV-B lamps with a peak emission at 313 nm and a spectral energy distribution as shown in Fig. 1 of Practice G 154.

7.2 *Calibration and Standardization*, Practice G 154, Section 8.

7.3 *Procedure*, Practice G 154, Section 9.

7.4 *Test Conditions*—Unless otherwise specified, the apparatus shall be operated 7 days each week, two cycles per day, according to the following schedule. Each cycle shall consist of:

Exposure Type	Hours	Exposure Temperature
Ultra Violet (UV)	8	60 ± 1.7°C (140.0 ± 3°F)
Condensation	4	50 ± 1.7°C (122.0 ± 3°F)

## 8. Accelerated Weathering and Evaluation of Test Results

8.1 Inspect specimens at the end of a daily cycle during the UV period when the panels are thoroughly dry.

8.2 Periodically during and at the conclusion of 500 h, visually inspect specimens to determine physical changes. Accelerated weathering reflectance at 500 h shall be as prescribed in Table 1.

8.2.1 Repeat reflectance measurement 6.9.1.2.

8.3 *Accelerated Weathering Failures:*

8.3.1 *Cracking*—At no time during the exposure cycles shall the film exhibit surface cracking as determined by viewing the weathered area through a microscope at 40× magnification.<sup>8</sup>

8.3.2 *Sagging/Sliding*—At no time during the exposure cycles shall the film show any signs of sagging or sliding beyond the exposed area of the drawdown.

<sup>6</sup> Alloys available from Atlas Electric Devices Company, 4114 North Ravenswood Avenue, Chicago, IL 60613, and Q-Panel Company, 26200 First St., Cleveland, OH 44145 have been found satisfactory for this purpose.

<sup>7</sup> Apparatus and lamps from Q-Panel Co., 26200 First St., Cleveland, OH, 44145 and Atlas Electric Devices Co., 4114, N. Ravenswood Ave., Chicago, IL 60613 have been found satisfactory.

<sup>8</sup> Bausch & Lomb Stereo Zoom 6 Microscope Model SVB-08 with .67 to 40× magnification available from Datco Inc., P.O. Box 4368, Clearwater, FL 33518, has been found satisfactory for this purpose.

8.3.3 *Loss of Adhesion*—Adhesion to the aluminum panels shall be maintained at 100 % during the exposure cycles.

8.3.4 *Blistering*—At no time during the exposure cycles shall the film exhibit development of blistering.

8.3.5 *Loss of Reflectance*—At the conclusion of 500 h exposure, the cured film shall maintain 90 % of initial reflectance.

## 9. Calculation

9.1 Calculate the 500 h % reflectance retained as follows:

$$500 \text{ h, \% reflectance retained} = \frac{A}{B} \times 100 \quad (1)$$

where:

$A$  = reflectance at 500 h, and

$B$  = initial reflectance.

## 10. Report

10.1 Designate the failure end point of the specimens as the exposure hours where cracking, sagging, sliding, loss of adhesion, blistering, or loss of more than 10 % of initial reflectance first occurred.

## 11. Inspection

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

## 12. Rejection and Re-Submittal

12.1 Failure to conform to any of the requirements prescribed in this specification may constitute grounds for rejection. In the case of rejection, the seller shall have the right to re-inspect the rejected material and resubmit the lot after removal of those packages not conforming to the requirements.

## 13. Packaging and Marking

13.1 Aluminum emulsion shall be suitably packaged to permit acceptance by the carrier and to afford adequate protection from the normal hazards of handling and shipment.

13.2 Each container shall be plainly marked with the name and brand of the manufacturer or supplier, the type of product, and the manufacturer's production code or lot number.

13.3 Each container shall be marked to indicate that the produce was manufactured to meet Test Method D 6848.

## 14. Keywords

14.1 aluminum pigmented; aluminum pigmented emulsified asphalt; aluminum pigmented roof coating; asphalt; emulsified; roof coating

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