



Standard Specification for Emulsified Coal-Tar Pitch (Mineral Colloid Type)¹

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This standard has been approved for use by agencies of the Department of Defense.

^{e1} NOTE—Editorial changes were made throughout in December 2004.

1. Scope

1.1 This specification covers mineral-colloid-stabilized, emulsified coal-tar pitch suitable for use as a weather-protective and aliphatic-solvent resistant coating over bituminous pavements of airports, parking areas, and driveways.

1.2 The values stated in SI (metric) units are to be regarded as the standard.

1.3 The following precautionary caveat pertains only to the test method portion, Section 6, 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:²

D 140 Practice for Sampling Bituminous Materials

D 490 Specification for Road Tar

D 529 Practice for Enclosed Carbon-Arc Exposures of Bituminous Materials

D 2939 Test Methods for Emulsified Bitumens Used as Protective Coatings

D 3699 Specification for Kerosene

2.2 Federal Specification:³

VV-K-211 Kerosene

¹ 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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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 Obsolete. Previously available from Standardization Documents Order Desk, Bldg. 4 Section D, 700 Robbins Ave. Philadelphia, PA 19111-5094, Attn: NPODS.

3. Materials and Manufacture

3.1 The emulsion shall be made using tars having viscosities of RT-11 or higher. The tars shall conform to the requirements of Specification D 490.

3.2 Mineral filler (mineral colloids) shall consist of finely ground clay, silica, or other inert inorganic materials. (**Warning**—Bentonitic or highly expansive clays may cause drying and shrinkage problems, which may affect the durability of the pavement sealer.)

3.3 When specified, the emulsion shall be fortified with antifreeze.

4. Physical Requirements

4.1 The emulsion shall be of suitable consistency for application by brush, squeegee, roller, or suitable spray equipment. The material shall be used as received. It shall not be diluted with water or thinned by heating. It shall bond firmly to properly prepared damp or primed surfaces.

NOTE 1—Pavement and ambient temperature should be not less than 7°C (45°F) at the time of application and for at least 12 h thereafter, with no precipitation of rain, snow, and so forth, until the emulsion has dried.

4.2 The product shall be of smooth, uniform consistency without settlement or segregation in storage to the extent that it cannot be readily dispersed by ordinary stirring.

4.3 The material, after stirring to homogeneity, shall be suitable for application by the selected method in single coats of approximately 0.3 to 0.4 L/m² ($\frac{3}{4}$ to 1 gal/100 ft²) without appreciable drainage on inclines up to 0.8 % (0.1 in./ft).

4.4 The material shall conform to the physical properties prescribed in Table 1 prior to fortification with antifreeze.

5. Sampling

5.1 Sample in accordance with Practice D 140 and Test Methods D 2939.

TABLE 1 Physical Properties of Emulsified Coal-Tar Pitch (Mineral Colloid Type)

Property	Characteristics	
	Min	Max
Wet film continuity	Smooth, nongranular film.	
Resistance to freezing (when specified)	Shall return to a homogeneous consistency when stirred.	
Density at 25°C (77°F), kg/m ³	1150	...
Volatiles, %	...	63
Residue by evaporation, %	37	...
Resistance to volatilization, residue weight loss, %	...	15
Solubility of residue in CS ₂ , %	25	...
Ash content of residue, %	30	40
Flammability	Shall show no tendency to flash or ignite.	
Drying time, firm set, h	...	8
Resistance to heat	No blistering, sagging, or slipping.	
Resistance to kerosine	No loss of adhesion. No softening of the film.	
Resistance to water	No loss of adhesion.	
Resistance to impact before and after accelerated weathering	No chipping, flaking, cracking, or loss of adhesion extending more than 6.4 mm (¼ in.) beyond periphery of impact.	

6. Test Methods

6.1 *Wet Film Continuity*—Using a spatula, spread the wet emulsion to a thin film on a sheet of standard 67.7-g/m² (18-lb) mimeograph paper. As the emulsion is drawn out to a smear, it shall show a uniformly smooth nongranular consistency, free of coarse particles.

6.2 *Resistance to Freezing (when specified)*—Expose a representative specimen of the emulsion to a temperature of –18°C (0°F) for 24 h; then warm the specimen to 25°C (77°F) in an environment not exceeding 38°C (100°F) and stir thoroughly.

NOTE 2—In any test utilizing an oven, the oven to be used shall be a gravity convection type. The internal dimensions of the oven shall be not less than 305 by 305 by 305 mm (12 by 12 by 12 in.).

6.3 *Density at 25°C (77°F)*—See Section 7 on Weight per Gallon in Test Methods D 2939, except express the density in kg/m³.

6.4 *Volatiles*—Determine by the difference between residue (6.5) and 100 %.

6.5 *Residue*—Test Methods D 2939, Section 8 on Residue by Evaporation.

6.6 *Resistance to Volatilization*—Weigh a representative specimen from the residue determination (6.5) and then expose it for 30 min in a 270°C (518°F) oven. Weigh the specimen again after cooling and calculate the percent weight loss.

6.7 *Solubility of Residue in CS₂*—Test Methods D 2939, Section 24 on Solubility of Residue in Carbon Disulfide.

6.8 *Ash of Residue*—Test Methods D 2939, Section 10 on Ash Content.

6.9 *Flammability*—Test Methods D 2939, Section 12 on Flash Point.

6.10 *Drying Time*—Test Methods D 2939, Section 13 on Drying Time, except test after drying for 8 h.

6.11 *Resistance to Heat*—Test Methods D 2939, Section 14 on Resistance to Heat, 80 ± 3°C (176 ± 5°F) for 2 h.

6.12 *Resistance to Kerosine*—Test Methods D 2939, except apply the emulsion in two coats and use kerosine in testing applied film.

6.12.1 Apply the material in two coats using a brass mask 1.6 mm (¼ in.) in thickness for the first coat and a 3.2-mm (⅛-in.) brass mask with the same rectangular opening as the

first mask for the second coat, so that the cured film has a minimum thickness of 1.6 mm (0.06 in.). Leave the mask for the first coat in place during the drying period and remove it before the second mask is positioned for the final coating application.

6.12.2 Cure each coat for 96 h in agitated air at 25 ± 1°C (77 ± 2°F) and 50 ± 10 % relative humidity.

6.12.3 After completion of curing, fill the metal ring, pressed into, but not through, the coating, with kerosine (see Section 25 on Resistance to Kerosine in Test Methods D 2939). The kerosine shall be in accordance with Specification D 3699. Expose the coating to kerosine for 24 h before evaluation. Remove the kerosine from the metal ring before examining the film for adhesion.

6.13 *Resistance to Water*—Test the cured coating film, prepared as in 6.12, in accordance with 15.2 of Test Methods D 2939, but using distilled water.

6.14 *Resistance to Impact:*

6.14.1 Prepare the specimens used in this test by coating metal plates 75 by 225 by 3 mm (3 by 9 by ⅛ in.) in size. Degrease the metal with a suitable solvent, such as trichloroethylene; then polish with steel wool. Protect the reverse side of the panel against corrosion.

6.14.2 Apply the emulsion with a doctor blade set at a thickness of 1.6 mm (¼ in.) to the prepared surface and allow to dry as described in 6.12.2.

6.14.3 Then place each specimen, coating uppermost, on a solid horizontal base, and subject it to the impact of a 0.9-kg (2-lb) steel ball dropped from a height of 2.4 m (8 ft). Conduct the test at 25 ± 1°C (77 ± 2°F). Examine the coating immediately for evidence of chipping, cracking, or loss of adhesion to the metal.

6.15 *Resistance to Impact after Accelerated Weathering:*

6.15.1 Prepare the specimens used in this test in accordance with 6.14; then subject them to 25 cycles of cycle B as described in Test Method D 529.

6.15.2 At the completion of the accelerated weathering period, subject each specimen to the impact test as described in 6.14.3.

NOTE 3—Instead of testing after accelerated weathering, the supplier

may furnish a certification showing three years satisfactory field performance.

7. Retest and Rejection

7.1 If the results of any test do not conform to the requirements of this specification, retesting to determine conformity may be performed as agreed upon between the purchaser and the seller.

8. Inspection

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

9. Certification

9.1 Upon request of the purchaser in the contract or order, a manufacturer's certification that the material was manufactured

and tested in accordance with this specification together with a report of the test results shall be furnished at the time of shipment.

10. Packaging and Marking

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

10.2 Each package shall be plainly marked with the name and brand of the manufacturer or distributor as well as the type or grade of the product. Each package should also contain the manufacturer's production code or lot number.

11. Keywords

11.1 coal tar pitch; emulsified; mineral colloid; tar

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