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# Standard Performance Specification for Coal Tar Pitch Emulsion Pavement Sealer Mix Formulations Containing Mineral Aggregates and Optional Polymeric Admixtures<sup>1</sup>

This standard is issued under the fixed designation D 4866; 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.

<sup>ε1</sup> NOTE—Editorial changes were made throughout in January 1997.

## 1. Scope

1.1 This performance specification covers mixtures of emulsified coal-tar pitch (mineral colloid type), mineral aggregates, and optional polymeric admixtures that are used as a weather-protective and straight aliphatic hydrocarbon resistant coatings over bituminous pavements of airports, parking areas, and driveways.

1.2 The following safety hazards statement applies 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:

D 466 Test Methods for Films Deposited from Bituminous Emulsions<sup>2</sup>

D 2939 Test Methods for Emulsified Bitumens Used as Protective Coatings<sup>2</sup>

D 3699 Specification for Kerosine<sup>3</sup>

### 2.2 Federal Specification:

RP-355e Pitch, Coal Tar Emulsion (Coating for Bituminous Pavements)<sup>4</sup>

## 3. Materials

3.1 Ratios of component materials that make up the mixture to be tested, as well as detailed specifications for the mineral aggregate and optional polymeric admixture shall be as agreed upon between the purchaser and the seller.

3.2 The base coal-tar emulsion shall meet the requirements of Federal Specification RP-355e.

3.3 The mineral aggregate shall be either a natural or manufactured product composed of clean, hard, durable, uncoated particles, free from dirt, organic matter, and other objectionable substances.

3.4 The optional polymeric admixture shall be any polymer or mixtures thereof, with added compounding ingredients of such nature and quality that will allow the admixture to be compatible with and enhance the performance of mineral aggregate modified coal-tar emulsion pavement sealers.

3.5 The water used in mixing shall be potable and free from harmful soluble salts. The temperature of the water shall be at least 50°F (10°C).

## 4. Physical Requirements

4.1 The mixture as applied shall be of uniform consistency and suitable for application to properly prepared or primed surfaces at a rate of 1.0 to 2.5 gal/100 ft<sup>2</sup> (0.4 to 1.0 L/m<sup>2</sup>) without appreciable drainage on inclines up to 0.8 % (0.1 in./ft).

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, etc., until the emulsion has dried.

NOTE 2—When these materials are applied in commercial quantities the purchaser or inspector should observe the mixing to ensure that after each step no coagulation or separation of the ingredients occurs and that the mix has a good application consistency. When possible, a small batch should be mixed and observed prior to the onset of major work.

4.2 The mixture shall conform to the physical properties prescribed in Table 1.

## 5. Sampling

5.1 Sample in accordance with Test Methods D 2939.

## 6. Test Methods

6.1 *Redispersibility*—The product (coal-tar emulsion/aggregate/water/optional admixture) shall be of a uniform consistency without settlement or segregation in storage to the extent that it can be readily dispersed and applied to the pavement.

6.2 *Drying Time*—Test Methods D 2939, section on Firm Set except test after drying for 8 h.

6.3 *Resistance to Heat*—Test Method D 2939, section on

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<sup>2</sup> Annual Book of ASTM Standards, Vol 04.04.

<sup>3</sup> Annual Book of ASTM Standards, Vol 05.03.

<sup>4</sup> Available from General Services Administration, Regional Offices. GSA DC-8911502595.

**TABLE 1 Physical Properties of Mixtures of Emulsified Coal-Tar Pitch, Mineral Aggregates, and Optional Polymeric Admixtures**

Property	Characteristic
Drying time, firm set:	8 h, max
Resistance to heat:	No blistering, sagging, or slipping
Resistance to kerosene:	No penetration or loss of adhesion
Resistance to water:	No blistering, loss of adhesion, or tendency to reemulsify
Flexibility:	No flaking, cracking, or loss of adhesion to the metal; small hairline surface cracks that do not extend to the metal may be ignored

Heat Test at  $80 \pm 3^\circ\text{C}$  ( $176 \pm 5^\circ\text{F}$ ) for 2 h.

6.4 *Resistance to Kerosine*—Test Methods D 466 except apply the mixture in two coats and use kerosine in testing applied film.

NOTE 3—The film thickness and procedures specified are useful only for determining the performance of the coating under testing relative to previously acceptable standards and are not meant to duplicate actual specified field application rates and performance.

6.4.1 Apply mixture in two coats using a brass mask 1.6 mm ( $\frac{1}{16}$  in.) in thickness for the first coat and 3.2 mm ( $\frac{1}{8}$  in.) for the second coat. Leave the mask in place for the 96-h drying time. After removing the first mask, position the second mask carefully around the first coat before pouring the second. Doctor the second coat even with the top of the mask using a spatula or other straight edge.

6.4.2 Cure each coat for 96 h in agitated air at  $25 \pm 1^\circ\text{C}$  ( $77 \pm 2^\circ\text{F}$ ) and at  $50 \pm 10\%$  relative humidity.

6.4.3 After curing, affix metal ring to surface of coating. Because of the textured surface of the coating, the ring must be sealed to the dry second coat with a silicone rubber sealant.

6.4.4 Fill the metal ring with kerosine. The kerosine shall comply with Specification D 3699. Expose the coating to kerosine for 24 h before evaluating. Remove the kerosine from the ring and blot dry and immediately examine the film for

softness and loss of adhesion. Immediately after this film examination, break the tile in half exposing that part of the tile whose film was subjected to the kerosine. No evidence of leakage of the kerosine, loss of adhesion, or discoloration of the tile shall be visible.

6.5 *Resistance to Water*—Prepare a cured film panel as described in 6.4.1 and 6.4.2. Test the cured film as described in 6.4.3 and 6.4.4 but using distilled water in place of kerosine. After 24 h of exposure to water, check for reemulsification. Remove the water, break the tile, and immediately check for blistering and loss of adhesion.

NOTE 4—The film thickness and procedures specified are useful only for determining the performance of the coating under test relative to previously acceptable standards and are not meant to duplicate actual specified field application rates and performance.

6.6 *Flexibility*—Use the same test panel that was used for the heat test (6.3). After the removal from the oven, condition the test panel in air at  $25 \pm 2^\circ\text{C}$  for 1 h and then bend it through an arc of  $180^\circ$ , over a 1-in. (25.4-mm) mandrel, in approximately 2 s, with the metal next to the mandrel when the bend is made. Immediately after bending, while the panel is still over the mandrel, examine the coating by normal vision for cracking, flaking, and loss of adhesion. Ignore small, hairline surface cracks that do not extend to the metal.

## 7. Inspection

7.1 Inspection of component materials shall be made as agreed upon between the purchaser and the seller as part of the purchase contract.

## 8. Rejection and Resubmittal

8.1 Failure to conform to any of the requirements prescribed in this specification shall constitute grounds for rejection. In case of rejection, the supplier shall have the right to reinspect the rejected shipment and resubmit the lot after removal of those packages not conforming to the specified requirements.

## APPENDIX

### (Nonmandatory Information)

#### X1. INTRODUCTION

X1.1 Coal-tar emulsions have historically been used as sealants for asphalt pavements to protect them against water, petroleum derivatives, and weather. Since the mid-1960's the use of mineral aggregates with sealer has become more and more popular as a method of repairing minor surface imperfections while at the same time increasing durability and skid resistance. The performance of aggregate/pavement sealer mixtures has also been enhanced with the use of polymeric admixtures.

X1.2 Sealants prepared in this manner, however, have not been trouble free. Failures have occurred due to deficiencies in

one or more of the following characteristics: fuel resistance, adhesion to substrate, weatherability, and flexibility of the applied film.

X1.3 This specification has been developed to minimize failures of this type. It specifies that coatings modified with mineral aggregates, with or without polymeric admixtures, meet the minimum performance requirements of coal-tar pitch emulsion pavement sealer as specified in Federal Specification RP-355e.

**NOTICE: This standard has either been superseded and replaced by a new version or discontinued. Contact ASTM International (www.astm.org) for the latest information.**



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