



Standard Specification for Emulsified Refined Coal-Tar (Ready to Use, Commercial Grade)¹

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1. Scope

1.1 This specification covers mineral-colloid-stabilized, emulsified refined coal tar suitable for use as a weather-protective and petroleum (aliphatic) solvent resistant coating. This product is typically applied to commercial lots and other low speed bituminous concrete pavements suitable for protection.

1.2 *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:

- C 136 Test Method for Sieve Analysis of Fine and Coarse Aggregates²
- C 142 Test Method for Clay Lumps and Friable Particles in Aggregates²
- D 140 Practice for Sampling Bituminous Materials³
- D 490 Specification for Road Tar³
- D 2939 Test Methods for Emulsified Bitumens Used as Protective Coatings⁴
- D 3423 Practice for Application of Emulsified Coal Tar Pitch (Mineral Colloid Type)⁴
- D 5727 Specification for Emulsified Refined Coal Tar (Mineral Colloid Type)⁴

3. Terminology

3.1 The refined coal tar emulsion mixed at the contractor's yard or at the job site shall meet the requirements of Specification D 5727. Mixture Types I and II (see Appendix A of Practice D 3423 for standard definition of terms) are described below:

3.1.1 *Type I material*—a mixture of refined coal tar emulsion meeting Specification D 5727, water, and aggregate.

3.1.2 *Type II material*—a mixture of refined coal tar emulsion meeting Specification D 5727, water, aggregate, and additive.

4. Classification

4.1 This specification is designed to give specifying authorities the information necessary to ensure that the appropriate base refined coal tar emulsion mixtures are specified for protecting bituminous concrete pavements where fuel resistance is required.

4.2 Normal aggregate loadings for Type I materials should range from 0.360 to 0.600 kg/L (3 to 5 lb/gal). Type II materials can have slightly higher loadings of aggregate; however, aggregate loadings in excess of 0.720 kg/L (6 lb/gal) are strongly discouraged.

NOTE 1—Several researchers have shown that high aggregate loadings result in a lack of fuel resistance as determined by the Resistance to Kerosene test according to Test Methods D 2939. Poor adhesion may also occur with high sand loadings.

5. Materials and Manufacture

5.1 *Base Refined Coal Tar Emulsion*—This emulsion shall be made using binders prepared from a high temperature refined coal tar conforming to the requirements of Specification D 490 for RT11 or higher. The use of oil and water gas tar is not allowed. The base refined coal tar emulsion shall be in accordance with all requirements of Specification D 5727.

5.2 *Aggregate*—The aggregate shall be either a natural or manufactured (boiler slag has been used successfully) angular aggregate composed of clean, hard, durable particles free of clay and other objectionable material when tested in accordance with Test Method C 142. (Boiler slag has been used successfully.)

NOTE 2—It is recommended that this aggregate meet the gradation given in Table 1, when tested in accordance with Test Method C 136.

5.3 *Additive*—In the case of Type II material, the additive shall be approved by the base refined coal tar emulsion manufacturer.

6. Performance Requirements

6.1 *Type I Composition*—The refined coal tar emulsion seal coat shall consist of a mixture of refined coal tar emulsion, water, and aggregate and be proportioned within the ranges as

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² *Annual Book of ASTM Standards*, Vol 04.02.

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

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

TABLE 1 Gradation of Aggregates^A

Sieve Size	Percent Passing		
	Course	Medium	Fine
1.18 mm (No. 16)	100	100	100
0.850 mm (No. 20)	85-100	98-100	100
0.600 mm (No. 30)	25-85	85-100	98-100
0.425 mm (No. 40)	5-25	25-85	85-100
0.300 mm (No. 50)	2-10	5-25	25-85
0.212 mm (No. 70)	--	2-10	5-25
0.150 mm (No. 100)	0-2	0-4	2-10
0.106 mm (No. 140)	--	0-2	0-2

^A Table 1 allows three choices of aggregate gradation. In either case, the refined coal tar emulsion manufacturer shall give written approval for the aggregate used in the mix design.

shown in Table 2. The composition shall have written approval of the refined coal tar emulsion manufacturer.

6.2 Type II Composition—The refined coal tar emulsion slurry seal coat shall consist of a mixture of refined coal tar emulsion, water, aggregate, and additive and be proportioned within the ranges as shown in Table 3. The composition shall have written approval of the local coal tar emulsion manufacturer.

6.3 Mixture Testing—Prior to application, the contractor shall submit samples of component materials for the proposed mix in accordance with the terms of the agreement between the contractor and owner/related parties. The samples shall be blended according to selected proportions as given in the appropriate table, either Table 2 or Table 3, and tested for conformance with Table 4 requirements, for the appropriate type of mixture. The samples shall be tested by a laboratory designated by the owner/related parties.

6.3.1 Aggregate Verification Test—Periodic samples of mixture being applied at the job site shall be taken for mix design verification in accordance with Test Methods D 2939. In order to verify that the proper amount of aggregate specified in Tables 2 and 3 is contained in the mixture, samples of mixture being applied at the job site shall be taken for aggregate content verification in accordance with Test Methods D 2939.

6.4 The manufacturer shall approve the refined coal tar emulsion as to the specific composition numbers to be used in the mix design.

7. Other Requirements

7.1 Both mixture types shall be of suitable consistency for application by brush, squeegee, roller, or suitable spray equipment without heating and shall bond to properly prepared damp or primed surfaces.

TABLE 2 Type I—Composition of Mixture per 100 gal of Refined Coal Tar Emulsion

Application	Refined Coal Tar Emulsion, L (gal)	Water, L (gal)	Aggregate, mg (lb)
First and Second Seal Coat	100 (100)	25-30 (25-30)	36-60 (300-500)

TABLE 3 Type II—Composition of Mixture per 100 gal of Refined Coal Tar Emulsion

Application	Refined Coal Tar Emulsion, L (gal)	Water, L (gal)	Additive, L (gal)	Aggregate, mg (lb)
First and Second Seal Coat	100 (100)	25-70 (25-70)	2-6 (2-6)	36-72 (300-600)

TABLE 4 Physical Requirements for Emulsified Refined Coal Tar Mixture Tested According to Test Methods D 2939

Property ^A	Type I Characteristics		Type II Characteristics	
	min	max	min	max
Uniformity	Pass		Pass	
Residue by evaporation, %	50		40	
Water Content, %		50		60
Aggregate Content, %	17	32	16	34
Ash Content, percent	60	70	60	73
Drying Time, firm set, h	8		8	
Resistance to kerosene	Pass		Pass	
Resistance to water	Pass		Pass	
Flexibility	No flaking, cracking through to the substrate, or loss of adhesion to the substrate			

^A See Test Methods D 2939.

7.2 The mixture, after stirring to homogeneity, shall be suitable for application by the selected method in single coats without appreciable drainage on inclines up to 0.8 %.

7.3 The mixture shall conform to the physical properties prescribed in Table 4. When the mixture fails any of the given requirements, it shall be reformulated and retested for compliance.

8. Sampling

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

9. Inspection

9.1 Inspection of material shall be made as agreed upon between the purchaser and the manufacturer.

10. Packaging and Package 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/ supplier, ASTM designation as well as the type or grade of the product, production code, or lot number. If the shipment is by bulk tanker load, the before mentioned information shall be so noted on the bill of lading.

11. Keywords

11.1 bituminous pavement sealer; emulsified coal tar; mineral colloid

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