



Standard Specification for Emulsified Asphalt¹

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

1. Scope

1.1 This specification covers thirteen grades of emulsified asphalt for use in pavement construction in the manner designated.

1.2 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard.

2. Referenced Documents

2.1 *ASTM Standards*:²

D140 Practice for Sampling Bituminous Materials

D244 Test Methods and Practices for Emulsified Asphalts

D3910 Practices for Design, Testing, and Construction of Slurry Seal

D6930 Test Method for Settlement and Storage Stability of Emulsified Asphalts

D6933 Test Method for Oversized Particles in Emulsified Asphalts (Sieve Test)

D6935 Test Method for Determining Cement Mixing of Emulsified Asphalt

D6936 Test Method for Determining Demulsibility of Emulsified Asphalt

D6997 Test Method for Distillation of Emulsified Asphalt

D7496 Test Method for Viscosity of Emulsified Asphalt by Saybolt Furol Viscometer

D7553 Test Method for Solubility of Asphalt Materials in N-Propyl Bromide

D2042 Test Method for Solubility of Asphalt Materials in Trichloroethylene

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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. Requirements

3.1 The emulsified asphalt shall be tested within 14 days of delivery. The emulsified asphalt shall be homogeneous after thorough mixing provided separation has not been caused by freezing. Emulsified asphalts separated by freezing shall not be tested.

3.2 Emulsified asphalt shall conform to the requirements prescribed in Table 1.

4. Sampling

4.1 Samples of emulsified asphalt shall be taken in accordance with Practice D140.

4.2 Samples shall be stored in clean, airtight sealed containers as specified in Practice D140 at a temperature of not less than 4°C until tested.

5. Test Methods

5.1 The properties of the emulsified asphalts given in Table 1 shall be determined in accordance with the following ASTM test methods:

5.1.1 Viscosity—Test Method D7496.

5.1.2 Storage Stability—Test Method D6930.

5.1.3 Demulsibility—Test Method D6936.

5.1.4 Coating Ability and Water Resistance—Test Methods D244.

5.1.5 Cement Mixing—Test Methods D6935.

5.1.6 Sieve Test—Test Method D6933, except use distilled water in all wetting and washing operations in place of the nonionic surfactant solution (1 %).

5.1.7 Distillation—Test Method D6997.

5.1.8 Tests on Residue from Distillation—Test Methods D244.

6. Keywords

6.1 emulsion; emulsified asphalt; high float; medium setting; rapid setting; slow setting

TABLE 1 Requirements for Emulsified Asphalt

NOTE 1—QS-1H emulsions shall meet the requirements outlined in Practices D3910 .

NOTE 2—QS-1h is used for Quick Set Slurry Seal systems.

Type	Rapid-Setting						Medium-Setting							
	RS-1		RS-2		HFRS-2		MS-1		MS-2		MS-2h			
	min	max	min	max	min	max	min	max	min	max	min	max		
Tests on emulsions:														
Viscosity, Saybolt Furol at 25°C, SFS	20	100	...	...	...	...	20	100	100	...	100	...		
Viscosity, Saybolt Furol at 50°C, SFS	...	...	75	400	75	400	...	...	...	...	...	...		
Storage stability test, 24-h, % ^A	...	1	...	1	...	1	...	1	...	1	...	1		
Demulsibility, 35 ml, 0.02 <i>N</i> CaCl ₂ , %	60	...	60	...	60	...	...	...	...	...	...	...		
Coating ability and water resistance:														
Coating, dry aggregate	...		...		...		good		good		good			
Coating, after spraying	...		...		...		fair		fair		fair			
Coating, wet aggregate	...		...		...		fair		fair		fair			
Coating, after spraying	...		...		...		fair		fair		fair			
Cement mixing test, %	...	...	...	...	...	...	...	...	...	...	...	...		
Sieve test, % ^A	...	0.10	...	0.10	...	0.10	...	0.10	...	0.10	...	0.10		
Residue by distillation, %	55	...	63	...	63	...	55	...	65	...	65	...		
Oil distillate by volume of emulsion, %	...	...	...	...	...	...	...	...	...	...	...	...		
Tests on residue from distillation test:														
Penetration, 25°C, 100g, 5 s	100	200	100	200	100	200	100	200	100	200	40	90		
Ductility, 25°C, 5 cm/min, cm	40	...	40	...	40	...	40	...	40	...	40	...		
Solubility in trichloroethylene, or n-propyl bromide %	97.5	...	97.5	...	97.5	...	97.5	...	97.5	...	97.5	...		
Float test, 60°C, s	...	...	...	...	1200	...	...	...	...	...	...	...		
Type	Medium-Setting						Slow-Setting						Quick Setting	
	HFMS-1		HFMS-2		HFMS-2h		HFMS-2s		SS-1		SS-1h		QS-1H	
	min	max	min	max	min	max	min	max	min	max	min	max	min	max
Tests on emulsions:														
Viscosity, Saybolt Furol at 25°C, SFS	20	100	100	...	100	...	50	...	20	100	20	100	20	100
Viscosity, Saybolt Furol at 50°C, SFS	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Storage stability test, 24-h, % ^A	...	1	...	1	...	1	...	1	...	1	...	1	...	...
Demulsibility, 35 ml, 0.02 <i>N</i> CaCl ₂ , %	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Coating ability and water resistance:														
Coating, dry aggregate	good		good		good		good		...		...			
Coating, after spraying	fair		fair		fair		fair		...		...			
Coating, wet aggregate	fair		fair		fair		fair		...		...			
Coating, after spraying	fair		fair		fair		fair		...		...			
Cement mixing test, %	...	...	...	...	...	...	...	...	...	2.0	...	2.0	N/A	
Sieve test, % ^A	...	0.10	...	0.10	...	0.10	...	0.10	...	0.10	...	0.10	0.10	
Residue by distillation, %	55	...	65	...	65	...	65	...	57	...	57	...	57	
Oil distillate by volume of emulsion, %	...	...	...	...	...	...	1	7	...	...	...	...	...	
Tests on residue from distillation test:														
Penetration, 25°C, 100 g, 5 s	100	200	100	200	40	90	200	...	100	200	40	90	40	90
Ductility, 25°C, 5 cm/min, cm	40	...	40	...	40	...	40	...	40	...	40	...	40	...
Solubility in trichloroethylene, %	97.5	...	97.5	...	97.5	...	97.5	...	97.5	...	97.5	...	97.5	...
Float test, 60°C, s	1200	...	1200	...	1200	...	1200	...	...	...	...	...	...	...

^A This test requirement on representative samples is waived if successful application of the material has been achieved in the field.

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