



Designation: D 977 – 03

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.

2. Referenced Documents

2.1 ASTM Standards:

D 140 Practice for Sampling Bituminous Materials²

D 244 Test Methods for Emulsified Asphalts²

D 3910 Practices for Design, Testing, and Construction of Slurry Seal²

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 D 140.

4.2 Samples shall be stored in clean, airtight sealed containers as specified in Practice D 140 at a temperature of not less than 4°C (39.2°F) until tested.

5. Test Methods

5.1 The properties of the emulsified asphalts given in Table 1 shall be determined in accordance with Test Methods D 244.

6. Keywords

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

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² *Annual Book of ASTM Standards*, Vol 04.03.



TABLE 1 Requirements for Emulsified Asphalt

NOTE 1—QS-1H emulsions shall meet the requirements outlined in Practices D 3910 .
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	
Grade	min	max	min	max	min	max	min	max	min	max	min	max
<i>Tests on emulsions:</i>												
Viscosity, Saybolt Furol at 25°C (77°F), SFS	20	100	...	...	...	...	20	100	100	...	100	...
Viscosity, Saybolt Furol at 50°C (122°F), SFS	...	...	75	400	75	400	...	...	...	...	...	...
Storage stability test, 24-h, % ^A	...	1	...	1	...	1	...	1	...	1	...	1
Demulsibility, 35 ml, 0.02 N CaCl ₂ , %	60	...	60	...	60	...	...	...	...	...	...	...
<i>Coating ability and water resistance:</i>												
Coating, dry aggregate	...	...	...	...	...	...	good	good	good	good	good	good
Coating, after spraying	...	...	...	...	...	...	fair	fair	fair	fair	fair	fair
Coating, wet aggregate	...	...	...	...	...	...	fair	fair	fair	fair	fair	fair
Coating, after spraying	...	...	...	...	...	...	fair	fair	fair	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	...
<i>Oil distillate by volume of emulsion, %</i>												
<i>Tests on residue from distillation test:</i>												
Penetration, 25°C (77°F), 100g, 5 s	100	200	100	200	100	200	100	200	100	200	40	90
Ductility, 25°C (77°F), 5 cm/min, cm	40	...	40	...	40	...	40	...	40	...	40	...
Solubility in trichloroethylene, %	97.5	...	97.5	...	97.5	...	97.5	...	97.5	...	97.5	...
Float test, 60°C (140°F), s	...	...	...	...	1200	...	...	...	...	...	...	...
Type	Medium-Setting						Slow-Setting					
	HFMS-1		HFMS-2		HFMS-2h		HFMS-2s		SS-1		SS-1h	
Grade	min	max	min	max	min	max	min	max	min	max	min	max
<i>Tests on emulsions:</i>												
Viscosity, Saybolt Furol at 25°C (77°F), SFS	20	100	100	...	100	...	50	...	20	100	20	100
Viscosity, Saybolt Furol at 50°C (122°F), SFS	...	...	...	...	...	...	...	...	...	...	...	...
Storage stability test, 24-h, % ^A	...	1	...	1	...	1	...	1	...	1	...	1
Demulsibility, 35 ml, 0.02 N CaCl ₂ , %	...	...	...	...	...	...	...	...	...	...	...	...
<i>Coating ability and water resistance:</i>												
Coating, dry aggregate	good	good	good	good	good	good	good	good	...	...	...	...
Coating, after spraying	fair	fair	fair	fair	fair	fair	fair	fair	...	...	...	...
Coating, wet aggregate	fair	fair	fair	fair	fair	fair	fair	fair	...	...	...	...
Coating, after spraying	fair	fair	fair	fair	fair	fair	fair	fair	...	...	...	...
Cement mixing test, %	...	...	...	...	...	...	...	...	2.0	2.0	2.0	N/A
Sieve test, % ^A	...	0.10	...	0.10	...	0.10	...	0.10	...	0.10	...	0.10
Residue by distillation, %	55	...	65	...	65	...	65	...	57	...	57	...
<i>Oil distillate by volume of emulsion, %</i>												
<i>Tests on residue from distillation test:</i>												
Penetration, 25°C (77°F), 100 g, 5 s	100	200	100	200	40	90	200	...	100	200	40	90
Ductility, 25°C (77°F), 5 cm/min, cm	40	...	40	...	40	...	40	...	40	...	40	...
Solubility in trichloroethylene, %	97.5	...	97.5	...	97.5	...	97.5	...	97.5	...	97.5	...
Float test, 60°C (140°F), 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.