



Designation: D 977 – 9803

## Standard Specification for Emulsified Asphalt<sup>1</sup>

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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:*

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<sup>1</sup> This specification is under the jurisdiction of ASTM Committee ~~D-4~~ D04 on Road and Paving Materials and is the direct responsibility of Subcommittee D04.41 on Emulsified Asphalt Specifications.

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D 140 Practice for Sampling Bituminous Materials<sup>2</sup>

D 244 Test Methods for Emulsified Asphalts<sup>2</sup>

D 3910 Practices for Design, Testing, and Construction of Slurry Seal<sup>2</sup>

### 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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<sup>2</sup> 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 D 3910 Standard Practices for Design, Testing and Construction of Slurry Seal.

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 77°F (25°C), s	20	100	...	...	...	...	20	100	100	...	100	...			
Viscosity, Saybolt Furol at 122°F (50°C), s	...	...	75	400	75	400	...	...	...	...	...	...			
Storage stability test, 24-h, % <sup>A</sup>	...	1	...	1	...	1	...	1	...	1	...	1			
Demulsibility, 35 ml, 0.02 N CaCl <sub>2</sub> , %	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, % <sup>A</sup>	...	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, %	...	...	...	...	...	...	...	...	...	...	...	...			
<i>Tests on residue from distillation test:</i>															
Penetration, 77°F (25°C), 100g, 5 s	100	200	100	200	100	200	100	200	100	200	40	90			
Ductility, 77°F, (25°C), 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, 140°F (60°C), s	...	...	...	...	1200	...	...	...	...	...	...	...			
Type	Medium-Setting						Slow-Setting						Quick Setting		
Grade	HFMS-1		HFMS-2		HFMS-2h		HFMS-2s		SS-1		SS-1h		QS-1H		
Grade	min	max	min	max	min	max	min	max	min	max	min	max	min	max	
<i>Tests on emulsions:</i>															
Viscosity, Saybolt Furol at 77°F (25°C), s	20	100	100	...	100	...	50	...	20	100	20	100	20	100	
Viscosity, Saybolt Furol at 122°F (50°C), s	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
Storage stability test, 24-h, % <sup>A</sup>	...	1	...	1	...	1	...	1	...	1	...	1	...	...	
Demulsibility, 35 ml, 0.02 N CaCl <sub>2</sub> , %	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
<i>Coating ability and water resistance:</i>															
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, % <sup>A</sup>	...	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	...	...	...	...	...	...	
<i>Tests on residue from distillation test:</i>															
Penetration, 77°F (25°C), 100 g, 5 s	100	200	100	200	40	90	200	...	100	200	40	90	40	90	
Ductility, 77°F, (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, 140°F (60°C), s	1200	...	1200	...	1200	...	1200	...	...	...	...	...	...	...	

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



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