



Standard Specification for Cationic Emulsified Asphalt¹

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

1. Scope

- 1.1 This specification covers seven grades of cationic emulsified asphalt for use in pavement construction in the manner designated.
- 1.2 The values stated in either SI units or inch-pound units are to be regarded separately as standard. The values stated in each system may not be exact equivalents; therefore, each system shall be used independently of the other. Combining values from the two systems may result in non-conformance with the standard.

2. Referenced Documents

- 2.1 *ASTM Standards*:²
 - D5 Test Method for Penetration of Bituminous Materials
 - D113 Test Method for Ductility of Bituminous Materials
 - D140 Practice for Sampling Bituminous Materials
 - D244 Test Methods and Practices for Emulsified Asphalts
 - D2042 Test Method for Solubility of Asphalt Materials in Trichloroethylene
 - 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 Disillation of Emulsified Asphalt
 - D7226 Test Method for Determining the Viscosity of Emulsified Asphalts Using a Rotational Paddle Viscometer

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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.

- D7402 Practice for Identifying Cationic Emulsified Asphalts
- D7496 Test Method for Viscosity of Emulsified Asphalt by Saybolt FuroI Viscometer
- D7553 Test Method for Solubility of Asphalt Materials in N-Propyl Bromide

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. Emulsions separated by freezing shall not be tested.
- 3.2 Emulsified asphalt shall conform to the requirements prescribed in [Table 1](#) or [Table 2](#). If no table is specified, the default is [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 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](#) or [Table 2](#) shall be determined in accordance with the following ASTM test methods:
 - 5.1.1 Viscosity—Test Method [D7496](#) for [Table 1](#) or Test Method [D7226](#) for [Table 2](#).
 - 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 Particle Charge—Test Method [D7402](#).
 - 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 Cement Mixing—Test Method [D6935](#).
 - 5.1.8 Disillation—Test Method [D6997](#).
 - 5.1.9 Tests on Residue from Disillation—Test Methods [D5](#), [D113](#), [D2042](#), and [D7553](#).

TABLE 1 Requirements for Cationic Emulsified Asphalt

Type	Rapid-Setting				Medium-Setting				Slow-Setting				Quick Setting		
	CRS-1		CRS-2		CMS-2		CMS-2h		CSS-1		CSS-1h		CQS-1h ^A		
Grade	min	max	min	max	min	max	min	max	min	max	min	max	min	max	
Test on emulsions:															
Viscosity, Saybolt Furol at 25°C [77°F] SFS										20	100	20	100	20	100
Viscosity, Saybolt Furol at 50°C [122°F] SFS	20	100	100	400	50	450	50	450							
Storage stability test, 24-h, % ^B		1		1		1		1		1		1			
Demulsibility, 35 mL, 0.8 % dioctyl sodium sulfosuccinate, %	40	...	40	...											
Coating ability and water resistance:															
Coating, dry aggregate							good								
Coating, after spraying							fair								
Coating, wet aggregate							fair								
Coating, after spraying							fair								
Particle charge test	positive		positive		positive		positive		positive		positive		positive		
Sieve test, % ^B		0.10		0.10		0.10		0.10		0.10		0.10		0.10	
Cement mixing test, %										2.0		2.0			N/A
Distillation:															
Oil distillate, by volume of emulsion, %		3		3		12		12							
Residue, %	60		65		65		65		57		57		57		
Tests on residue from distillation test:															
Penetration, 25°C [77°F], 100 g, 5 s	100	250	100	250	100	250	40	90	100	250	40	90	40	90	
Ductility, 25°C [77°F], 5 cm/min, cm	40		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		97.5		

^ACQS-1h is used for Quick Set Slurry Seal systems. CQS-1h emulsified asphalts shall meet the requirements outlined in Practices D3910.

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



TABLE 2 Requirements for Cationic Emulsified Asphalt

Type	Rapid-Setting				Medium-Setting				Slow-Setting				Quick Setting	
	CRS-1		CRS-2		CMS-2		CMS-2h		CSS-1		CSS-1h		CQS-1h ^A	
Grade	min	max	min	max	min	max	min	max	min	max	min	max	min	max
Test on emulsions:														
Viscosity, Rotational Paddle Viscometer at 25°C [77°F] mPa s									45	220	45	220	45	220
Viscosity, Rotational Paddle Viscometer at 50°C [122°F] mPa s	45	220	220	880	110	990	110	990						
Storage stability test, 24-h, % ^B		1		1		1		1		1		1		
Demulsibility, 35 mL, 0.8 % dioctyl sodium sulfosuccinate, %	40	...	40	...										
Coating ability and water resistance:														
Coating, dry aggregate					good		good							
Coating, after spraying					fair		fair							
Coating, wet aggregate					fair		fair							
Coating, after spraying					fair		fair							
Particle charge test	positive		positive		positive		positive		positive		positive		positive	
Sieve test, % ^B		0.10		0.10		0.10		0.10		0.10		0.10		0.10
Cement mixing test, %										2.0		2.0		N/A
Distillation:														
Oil distillate, by volume of emulsion, %		3		3		12		12						
Residue, %	60		65		65		65		57		57		57	
Tests on residue from distillation test:														
Penetration, 25°C [77°F], 100 g, 5 s	100	250	100	250	100	250	40	90	100	250	40	90	40	90
Ductility, 25°C [77°F], 5 cm/min, cm	40		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		97.5	

^ACQS-1h is used for Quick Set Slurry Seal systems. CQS-1h emulsified asphalts shall meet the requirements outlined in Practices D3910.

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





6. Keywords

6.1 cationic; emulsified asphalt; emulsion; medium setting; rapid setting; slow setting

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