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

This standard is issued under the fixed designation D2397/D2397M; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reappraisal. A superscript epsilon ( $\epsilon$ ) indicates an editorial change since the last revision or reappraisal.

*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.

*1.3 This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

### 2. Referenced Documents

2.1 *ASTM Standards:*<sup>2</sup>

~~D5~~~~D5~~~~D5M~~ Test Method for Penetration of Bituminous Materials

D113 Test Method for Ductility of Bituminous Materials (Withdrawn 2016)<sup>3</sup>

~~D140~~~~D140~~~~D140M~~ Practice for Sampling Bituminous Asphalt 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 Distillation of Emulsified Asphalt

D7226 Test Method for Determining the Viscosity of Emulsified Asphalts Using a Rotational Paddle Viscometer

D7402 Practice for Identifying Cationic Emulsified Asphalts

D7496 Test Method for Viscosity of Emulsified Asphalt by Saybolt Furol 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 ~~Specify the test method Table 1~~ to be used. Specify either Test Method ~~D7226~~ or ~~D7496~~.

### 4. Sampling

4.1 Samples of emulsified asphalt shall be taken in accordance with Practice ~~D140~~~~D140~~~~D140M~~.

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

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<sup>2</sup> 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.

<sup>3</sup> The last approved version of this historical standard is referenced on www.astm.org.

**TABLE 1 Requirements for Cationic Emulsified Asphalt**

Type	Rapid-Setting				Medium-Setting				Slow-Setting				Quick-Setting	
	—CRS-1		—CRS-2		GMS-2		GMS-2h		—CSS-1		—CSS-1h		GQS-1h <sup>A</sup>	
	min	max	min	max	min	max	min	max	min	max	min	max	min	max
<i>Test on emulsions:</i>														
—Viscosity, Saybolt Furol at 25°C [77°F] SFS														
—Viscosity, Saybolt Furol at 50°C [122°F] SFS	20	100	100	400	50	450	50	450	20	100	20	100	20	100
—Storage stability test, 24-h, % <sup>B</sup>		†		†		†		†		†		†		
Demulsibility, 35 mL, 0.8% dioctyl sodium sulfosuccinate, %	40	∞	40	∞										
<i>Coating ability and water resistance:</i>														
—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, % <sup>B</sup>		0-10		0-10		0-10		0-10		0-10		0-10		0-10
—Cement mixing test, %										2-0		2-0		N/A
<i>Distillation:</i>														
—Oil distillate, by volume of emulsion, %		3		3		12		12						
—Residue, %	60		65		65		65		57		57		57	
<i>Tests on residue from distillation test:</i>														
—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	

<sup>A</sup>CQS-1h is used for Quick Set Slurry Seal systems. CQS-1h emulsified asphalts shall meet the requirements outlined in Practices D3910.

<sup>B</sup>This 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		GMS-2		GMS-2h		—CSS-1		—CSS-1h		GQS-1h <sup>A</sup>		
	min	max	min	max	min	max	min	max	min	max	min	max	min	max	
<i>Test on emulsions:</i>															
—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, % <sup>B</sup>		†		†		†		†		†		†			
Demulsibility, 35 mL, 0.8% dioctyl sodium sulfosuccinate, %	40	∞	40	∞											
<i>Coating ability and water resistance:</i>															
—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, % <sup>B</sup>		0-10		0-10		0-10		0-10		0-10		0-10		0-10	
—Cement mixing test, %										2-0		2-0		N/A	
<i>Distillation:</i>															
—Oil distillate, by volume of emulsion, %		3		3		12		12							
—Residue, %	60		65		65		65		57		57		57		
<i>Tests on residue from distillation test:</i>															
—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		

