



Designation: D2397/D2397M – 13

## 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 reapproval. A superscript epsilon ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

*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:*<sup>2</sup>

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 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 [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 *Distillation*—Test Method [D6997](#).

5.1.9 *Tests on Residue from Distillation*—Test Methods [D5](#), [D113](#), [D2042](#), and [D7553](#).

<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](http://www.astm.org), or contact ASTM Customer Service at [service@astm.org](mailto:service@astm.org). For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.



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	CSS-1h	CSS-1h	CSS-1h	CSS-1h	CSS-1h <sup>A</sup>	CSS-1h <sup>A</sup>
Grade	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	50	450	20	100	20	100	20	100	20	100
Viscosity, Saybolt Furol at 50°C [122°F] SFS												
Storage stability test, 24-h, % <sup>B</sup>	1	1	1	1	1	1	1	1	1	1	1	1
Demulsibility, 35 mL, 0.8 % dioctyl sodium sulfosuccinate, %	40	...	40	...	40	...	40	...	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	positive	positive	positive	positive	positive
Sieve test, % <sup>B</sup>	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
Cement mixing test, %												
Distillation:												
Oil distillate, by volume of emulsion, %	60	3	65	12	57	12	57	57	57	57	57	57
Residue, %												
Tests on residue from distillation test:												
Penetration, 25°C [77°F], 100 g, 5 s	100	250	100	90	100	250	100	250	100	250	100	250
Ductility, 25°C [77°F], 5 cm/min, cm	40	40	40	40	40	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	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.