Designation: D2397/D2397M – 20

Standard Specification for Cationic Emulsified Asphalt[1]

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 (ε) 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 are not necessarily exact equivalents; therefore, to ensure conformance with the standard, each system shall be used independently of the other, and values from the two systems shall not be combined.

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:*[2]

D5/D5M Test Method for Penetration of Bituminous Materials
D113 Test Method for Ductility of Asphalt Materials
D140/D140M Practice for Sampling 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
D8078 Test Method for Ash Content of Asphalt and Emulsified Asphalt Residues

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. Specify the test method 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/D140M.

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 shall be determined in accordance with the following ASTM standards:

5.1.1 *Viscosity*—Test Method D7496 or D7226 for Table 1.
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*—Practice D7402.

[1] 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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[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.

TABLE 1 Requirements for Cationic Emulsified Asphalt

NOTE 1—CQS-1h emulsions shall meet the requirements outlined in Practices D3910.

NOTE 2—CQS-1h is used for quick-set slurry seal systems.

NOTE 3—For viscosity, specify either Test Method D7226 or D7496.

NOTE 4—Specify either ash content (Test Method D8078) or solubility (Test Method D2042 or D7553).

Type	Rapid-Setting				Medium-Setting				Slow-Setting				Quick-Setting	
	CRS-1		CRS-2		CMS-2		CMS-2h		CSS-1		CSS-1h		CQS-1h	
Grade	min	max	min	max	min	max	min	max	min	max	min	max	min	max
Tests on Emulsified Asphalts:														
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						
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, %[A]		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, %[A]		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	
Ash content, %	. . .	1.0	. . .	1.0	. . .	1.0	. . .	1.0	. . .	1.0	. . .	1.0	. . .	1.0
Solubility in trichloroethylene, %	97.5		97.5		97.5		97.5		97.5		97.5		97.5	

[A] This test requirement on representative samples is waived if successful application of the material has been achieved in the field.