

The Direct Tension Test (AASHTO T 314) of M 320 is not a Specification requirement.

The recycling agent used to rejuvenate the recovered asphalt from recycled asphalt pavement (RAP) and reclaimed asphalt shingles (RAS) shall meet the specifications in Table 1:

Table 1

Test	ASTM Test Method	RA 1		RA 2		RA 25	
		Min.	Max.	Min.	Max.	Min.	Max.
Viscosity @ 140°F cSt	D2170 or D2171	50	150	200	800	1000	4000
Flashpoint COC, °F	D92	400		400		400	
Saturates, Wt. %	D2007		30		30		30
Specific Gravity	D70 or D2198	Report		Report		Report	
Tests on Residue from RTFC	D2872						
Viscosity Ratio ¹			3		3		3
Mass Change ± %			4		4		4

¹Viscosity Ratio = RTFC Viscosity @ 140°F, cSt
Original Viscosity @ 140°F, cSt

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9-02.1(6) Cationic Emulsified Asphalt

Cationic Emulsified Asphalt Table

Grade	Type AASHTO Test Method	Rapid Setting				Medium Setting				Slow Setting					
		CRS-1		CRS-2		CMS-2S		CMS-2		CMS-2h		CSS-1		CSS-1h	
		Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
Tests on Emulsified Asphalts:															
Viscosity SFS @ 77°F (25°C)	T 59											20	100	20	100
Viscosity SFS @ 122°F (50°C)	T 59	20	100	150	400	50	450	50	450	50	450				
Storage stability test 1 day %	T 59		1		1		1		1		1		1		1
Demulsibility 35 ml															
0.8% sodium dioctyl sulfosuccinate, % ^a	T 59	40		40											
Particle charge test	T 59	Pos		Pos		Pos		Pos		Pos		Pos ^b		Pos ^b	
Sieve Test, %	T 59		0.10		0.10		0.10		0.10		0.10		0.10		0.10
Cement mixing test, %	T 59												2.0		2.0
Distillation:															
Oil distillate by vol. of emulsions %	T 59		3	1.5	3		20		12		12				
Residue, %	T 59	60		65		60		65		65		57		57	
Tests on Residue From Distillation Tests:															
Penetration, 77°F (25°C)	T 49	100	250	100	250	100	250	100	250	40	90	100	250	40	90
Ductility, 77°F (25°C) 5 cm/min., cm	T 51	40		40		40		40		40		40		40	
Solubility in trichloroethylene, %	T 44	97.5		97.5		97.5		97.5		97.5		97.5		97.5	

^aThe demulsibility test shall be made within 30 days from date of shipment.

^bIf the particle charge test for CSS-1 and CSS-1h is inconclusive, material having a maximum pH value of 6.7 will be acceptable.

9-02.1(6)A Polymerized Cationic Emulsified Asphalt CRS-2P

CRS-2P shall be a polymerized cationic emulsified asphalt. The polymer shall be milled into the asphalt or emulsion during the manufacturing of the emulsified asphalt. CRS-2P shall meet the following requirements:

	AASHTO Test Method	Specifications	
		Minimum	Maximum
Viscosity @122°F, SFS	T 59	100	400
Storage Stability 1 day %	T 59		1
Demulsibility 35 ml. 0.8% Dioctyl Sodium Sulfosuccinate	T 59	40	
Particle Charge	T 59	positive	
Sieve Test %	T 59		0.30
Distillation			
Oil distillate by vol. of emulsion %	T 59 ¹	0	3
Residue	T 59 ¹	65	
Tests on the Residue From Distillation			
Penetration @77°F	T 49	100	250
Elastic Recovery %	T 301 ²	50	

¹Distillation modified to use 300 grams of emulsified asphalt heated to 350°F ± 9°F and maintained for 20 minutes.

²The residue material for T 301 shall come from the modified distillation per note 1.

9-02.1(7) Vacant**9-02.1(8) Flexible Bituminous Pavement Marker Adhesive**

Flexible bituminous pavement marker adhesive is a hot melt thermoplastic bituminous material used for bonding raised pavement markers and recessed pavement markers to the pavement.

The adhesive material shall conform to the following requirements when prepared in accordance with WSDOT [SOP 318](#) in the WSDOT *Materials Manual* M 46-01:

Property	Test Method	Requirement
Penetration, 77°F, 100g, 5 sec, dmm	AASHTO T 49	30 Max.
Softening Point, F	AASHTO T 53	200 Min.
Rotational Thermosel Viscosity, cP, #27 spindle, 20 RPM, 400°F	AASHTO T 316	5000 Max.
Ductility, 77°F, 5 cm/minute, cm	AASHTO T 51	15 Min.
Ductility, 39.2°F, 1 cm/minute, cm	AASHTO T 51	5 Min.
Flexibility, 1", 20°F, 90 deg. Bend, 10 sec., 1/8" × 1" × 6" specimen	ASTM D3111 ¹	Pass
Bond Pull-Off Strength	WSDOT T 426	Greater than 50 psi

¹Flexibility test is modified by bending specimen through an arc of 90 degrees at a uniform rate in 10 seconds over a 1-inch diameter mandrel.

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