

1203 - EMULSIFIED ASPHALT

SECTION 1203

EMULSIFIED ASPHALT

1203.1 DESCRIPTION

This specification covers emulsified asphalt used for asphalt mixes, surface sealing, microsurfacing and tack coats.

1203.2 REQUIREMENTS

a. General. Provide emulsified asphalt that is an intimate, homogenous mixture of base asphalt and emulsifying agent held suspended in water. Certain emulsified asphalt grades may contain petroleum distillates.

The grade of material is designated in the Contract Documents. The KDOT reserves the right to change the grade and class as necessary due to aggregate type, road surface or weather conditions. Make the required change after being notified in writing by the KDOT.

Provide emulsified asphalt that remains homogenous and stable during transportation, storage and distribution. Material that performs unsatisfactorily in any of the above situations will be rejected even if the material passes all laboratory tests.

b. Chemical and Physical Requirements. Provide emulsified asphalt that complies with TABLES 1203-1, 1203-2 and 1203-3.

TABLE 1203-1: SPECIFICATIONS FOR ANIONIC EMULSIFIED ASPHALT										
	RS-1H		SS-1H		MS-1		ST-1P		SS-1HP	
	Min.	Max.	Min.	Min.	Max.	Max.	Min.	Max.	Min.	Max.
Viscosity, Saybolt Furol										
At 77°F, sec.	----	----	10	100	----	----	10	75	10	75
At 122°F, sec.	75	300	----	----	100	400	----	----	----	----
Residue by Distillation, (% by Mass).....	65	----	57	----	65	----	55	60	57	----
Oil Distillate, (% by Volume)...	----	----	----	----	----	8	----	----	----	----
Storage Stability, %	----	1	----	1	----	1	----	1	----	----
Demulsibility:										
35 ml of 0.02 N CaCl ₂ , % . .	60	----	----	----	----	----	5	----	----	----
50 ml of 0.1 N CaCl ₂ , % . . .	----	----	----	----	75	----	----	----	----	----
Sieve Test, % Retained.	----	0.50	----	0.50	----	0.50	----	----	----	0.1
Tests on Distillation										
Penetration, 77°F, 100g, 5 sec.	75	150	75	125	300	----	75	150	75	150
Solubility, %	97.5	----	97.5	----	97.5	----	----	----	----	----
Ductility, 77°F, mm.	800	----	800	----	----	----	----	----	----	----
Ductility, 39°F, mm	----	----	----	----	----	----	10	35	10	35
Elastic Recovery @ 50°F, 20 cm elongation, %	----	----	----	----	----	----	25	----	25	----

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TABLE 1203-2: SPECIFICATIONS FOR CATIONIC EMULSIFIED ASPHALT								
	CRS-1H		CSS-1H		CMS-1		CSS-Special	
	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
Viscosity, Saybolt-Furol:								
At 77°F, sec.	----	----	10	60	----	----	----	----
At 122°F, sec.	75	300	----	----	100	400	----	----
Residue by Distillation, (% by Mass).....	65	----	57	----	65	----	64.0	66.0
Oil Distillate, (% by Volume).	----	3	----	----	----	8	----	0.5
Storage Stability, %	----	1	----	1	----	1	----	----
Sieve Test, % Retained.	----	0.50	----	0.50	----	0.50	----	0.1
Particle Charge.	Positive		Positive (A)		Positive		----	
Tests on Distillation Residue:								
Penetration, 77°F, 100g, 5 sec	75	150	50	100	300	----	(B)	(B)
Solubility, %	97.5	----	97.5	----	97.5	----	----	----
Ductility, 77°F, mm.	800	----	800	----	----	----	----	----
Viscosity, Saybolt-Furol, 180°F, sec.	----	----	----	----	300	700	----	----

(A) Current of the particle charge may need to be more than 8 mA.

(B) Determined by the producer.

TABLE 1203-3: SPECIFICATIONS FOR EMULSION BONDING LIQUID		
	EBL	
	Min.	Max.
Tests on Emulsion:		
Viscosity, Saybolt-Furol @ 122°F, sec	25	125
Storage Stability Test ¹ , 24 h, %		1
Sieve Test ² , % Retained		0.05
Residue by Distillation ³ , %	63	
Oil Distillate by Distillation, %		2
Demulsibility, % (35 ml, 0.02 N CaCl ₂) (Anionic Version)	60	
Demulsibility, % (35 ml, 0.8% Dioctyl Sulfosuccinate) (Cationic Version)		
Tests on Distillation Residue:	Min.	Max.
Penetration, 77°F, 100g, 5 sec	90	150
Solubility in Organic Solvent ⁴ , %	97.5	
Elastic Recovery ⁵ , %	60	

¹ After standing undisturbed for 24 hours, the surface shall show no white, milky colored substance, but shall be a smooth homogeneous color throughout.

² The sieve test is waived if successful application of the material has been achieved in the field.

³ AASHTO T 59 with modifications to include a 400 ± 10°F maximum temperature to be held for a period of 20 minutes.

⁴ The organic solvent shall be approved by the Engineer as suitable. The test may be waived by the Engineer.

⁵ Elastic recovery, AASHTO T 301, 50°F, 20 cm elongation, 5 minute hold, % min., run on Distillation Residue.

c. Mixing Grade Emulsions. Formulate mixing emulsions (MS-1 and CMS-1) for use with regional aggregate types. In general, these will be crushed limestone and/or dolomite with sand for the eastern section of the state and sand-gravel with mineral filler for the central and western sections. Formulate emulsions for use by both windrow and plant mixing methods and for either damp or dry aggregates. Provide an emulsion formulated for the intended end use if these conditions cannot be met by a single formulation. Provide an emulsion that enables material in a stockpile to easily be removed at temperatures as low as 39°F for an extended period of time after mixing.

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d. Modified Emulsions, RS-1HP, CRS-1HP and CSS-1HM.

(1) Provide anionic emulsified asphalt (RS-1H) that complies with **TABLE 1203-1** or cationic emulsified asphalt (CRS-1H or CSS-1H) that complies with **TABLE 1203-2**.

(2) Provide a modified emulsion that contains a minimum of 3.0 percent polymer solids by weight of asphalt. RS-1HP and CRS-1HP will have an Elastic Recovery@ 50°F, 20 cm elongation of 60% minimum. CSS-1HM will have a Vacuum Viscosity of 7100 poise minimum.

(3) Provide material that shows no evidence of a white substance on the surface after standing for 24 hours.

(4) For use in Microsurfacing. Formulate the modified emulsified asphalt so that if the paving mixture is applied at a thickness of 1 inch, and the relative humidity is not more than 50 percent with the ambient air temperature at least 75°F, it will cure sufficiently so rolling traffic can be allowed on the pavement in 1 hour with no damage to the surface. It must show no separation after mixing.

If the Contractor's storage tanks are equipped with a mechanical propeller type agitation device, and the entire contents of the tank are thoroughly mixed before each day's use, the requirement for satisfactory compliance with the 5 day settlement test will be waived.

1203.3 TEST METHODS

a. Test in accordance with the applicable provisions of AASHTO T 44, T 49, T 51, and T 59.

b. When testing modified emulsions, test the Elastic Recovery using AASHTO T 301. In addition, modify the distillation procedure of AASHTO T 59 as follows:

“Slowly bring the temperature of the lower thermometer to $350 \pm 9^\circ\text{F}$ and maintain for 20 minutes. Complete the distillation in 60 ± 15 minutes from the first application of heat.”

1203.4 PREQUALIFICATION

Prequalify material under this specification according to **SECTION 1201**.

1203.5 BASIS OF ACCEPTANCE

See applicable requirements under **SECTION 1201**.