

State: Wyoming	Materials: Re: Section 804-Emulsified Asphalt
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Wyoming		Table 1: Requirements for Anionic Emulsified Asphalts (1)								
Property		Test Method AASHTO (T), ASTM (D), or Other	Rapid-Setting		Medium-Setting			Slow-Setting		Quick-Setting
			RS-1	RS-2	MS-1	MS-2	MS-2h	SS-1	SS-1h	QS-1H
EMULSIONS:										
Viscosity, Saybolt Furol seconds	25° C (77° F)	T59	20-100	-	20-100	100 min.	100 min.	20-100	20-100	20-100
	50° C (122° F)		-	75-400	-	-	-	-	-	-
Settlement, 5 days, %			-	-	-	-	-	-	-	-
Storage Stability Test, 24 hours, % (2)			1 max.	1 max.	1 max.	1 max.	1 max.	1 max.	1 max.	1 max.
Sieve Test, % (2)			0.10 max.	0.10 max.	0.10 max.	0.10 max.	0.10 max.	0.10 max.	0.10 max.	0.10 max.
Demulsibility, % (3)			60 min.	60 min.	-	-	-	-	-	-
Cement Mixing Test, %			-	-	-	-	-	2.0 max.	2.0 max.	-
Coating Ability and Water Resistance	Dry Aggregate		-	-	Good	Good	Good	-	-	-
	After Spraying		-	-	Fair	Fair	Fair	-	-	-
	Wet Aggregate		-	-	Fair	Fair	Fair	-	-	-
	After Spraying		-	-	Fair	Fair	Fair	-	-	-
Residue, %			55 min.	63 min.	55 min.	65 min.	65 min.	57 min.	57 min.	57 min.
DISTILLATION RESIDUE:										
Penetration, 25° C (77° F), tenths of mm		T49	100-200	100-200	100-200	100-200	40-90	100-200	40-90	40-90
Ductility, 25° C (77° F), cm		T51	40 min.	40 min.	40 min.	40 min.	40 min.	40 min.	40 min.	40 min.
Solubility in trichloroethylene or n-propyl bromide, %		T44	97.5 min.	97.5 min.	97.5 min.	97.5 min.	97.5 min.	97.5 min.	97.5 min.	97.5 min.
NOTES:		1. Refer to R5 for typical applications. 2. This test requirement on representative samples is waived if successful application of the material has been achieved in the field. 3. The demulsibility test shall be performed within 30 days from the date of shipment. Use 35 ml, 0.02 N CaCl ₂ solution.								

Wyoming		Table 2: Requirements for Cationic Emulsified Asphalts (1)								
Property		Test Method AASHTO (T), ASTM (D), or Other	Rapid-Setting		Medium-Setting			Slow-Setting		Quick-Setting
			CRS-1	CRS-2	CMS-2	CMS-2h	CMS-2S	CSS-1	CSS-1h	CQS-1h
EMULSIONS:										
Viscosity, Saybolt Furol seconds	25° C (77° F)	T59	-	-	-	-	-	20-100	20-100	20-100
	50° C (122° F)		20-100	100-400	50-450	50-450	50-450	-	-	-
Settlement, 5 days, %			-	-	-	-	-	-	-	-
Storage Stability Test, 24 hours, %			1 max.	1 max.	1 max.	1 max.	-	1 max.	1 max.	1 max.
Sieve Test, %			0.10 max.	0.10 max.	0.10 max.	0.10 max.	-	0.10 max.	0.10 max.	0.10 max.
Particle Charge			Positive	Positive	Positive	Positive	-	Positive	Positive	Positive
Demulsibility, % (2)			40 min.	40 min.	-	-	-	-	-	-
Cement Mixing Test, %			-	-	-	-	-	2.0 max.	2.0 max.	-
Coating Ability and Water Resistance	Dry Aggregate		-	-	Good	Good	-	-	-	-
	After Spraying		-	-	Fair	Fair	-	-	-	-
	Wet Aggregate		-	-	Fair	Fair	-	-	-	-
	After Spraying		-	-	Fair	Fair	-	-	-	-
Residue, %			60 min.	65 min.	65 min.	65 min.	60 min.	57 min.	57 min.	57 min.
Oil Distillate, volume of emulsion, %			3 max.	3 max.	12 max.	12 max.	5 min. 15 max.	-	-	-
pH			T200	-	-	-	-	-	-	-
DISTILLATION RESIDUE:										
Penetration, 25° C (77° F), tenths of mm		T49	100-250	100-250	100-250	40-90	150 min.	100-250	40-90	40-90
Ductility, 25° C (77° F), cm		T51	40 min.	40 min.	40 min.	40 min.	-	40 min.	40 min.	40 min.
Solubility in trichloroethylene, %		T44	97.5 min.	97.5 min.	97.5 min.	97.5 min.	97.5 min.	97.5 min.	97.5 min.	97.5 min.
NOTES:		1. Refer to R5 for typical applications. 2. Use 35 ml of 0.8% sodium dioctyl sulfosuccinate solution.								

Wyoming		Table 3: Requirements for High Float Emulsified Asphalt (1)					
Property		Test Method AASHTO (T), ASTM (D), or Other	Rapid-Setting	Medium-Setting			
			HFRS-2	HFMS-1	HFMS-2	HFMS-2h	HFMS-2s
EMULSIONS:							
Viscosity, Saybolt Furol seconds	25° C (77° F)	T59	-	20-100	100 min.	100 min.	50 min.
	50° C (122° F)		75-400	-	-	-	-
Storage Stability Test, 24 hours, %			1 max.	1 max.	1 max.	1 max.	1 max.
Sieve Test, %			0.10 max.	0.10 max.	0.10 max.	0.10 max.	0.10 max.
Demulsibility, % (2)			60 min.	-	-	-	-
Coating Ability and Water Resistance	Dry Aggregate		-	Good	Good	Good	Good
	After Spraying		-	Fair	Fair	Fair	Fair
	Wet Aggregate		-	Fair	Fair	Fair	Fair
	After Spraying		-	Fair	Fair	Fair	Fair
Residue, %			63 min.	55 min.	65 min.	65 min.	65 min.
Oil Distillate, volume of emulsion, %			-	-	-	-	1-7
DISTILLATION RESIDUE:							
Penetration, 25° C (77° F), tenths of mm		T49	100-200	100-200	100-200	40-90	200 min.
Ductility, 25° C (77° F), cm		T51	40 min.	40 min.	40 min.	40 min.	40 min.
Solubility in trichloroethylene, % (4)		T44	97.5 min.	97.5 min.	97.5 min.	97.5 min.	97.5 min.
Float Test at 60° C (140° F), seconds		T50	1200 min.	1200 min.	1200 min.	1200 min.	1200 min.
NOTES:		<ol style="list-style-type: none"> 1. Refer to R5 for typical applications. 2. The demulsibility test shall be performed within 30 days from the date of shipment. Use 35 ml, 0.02 N CaCl₂ solution. 3. Modify and perform the AASHTO T59 distillation procedure in accordance with the manufacturer's recommendations. 4. N-propyl bromide may also be used for HFRS-2. 					

Wyoming		Table 4: Requirements for Polymer Modified Asphalt Emulsions					
Property		Test Method AASHTO (T), ASTM (D), or Other	Rapid-Setting		Medium-Setting	Slow-Setting	Quick-Setting
			CRS-2P	CRS-2L	CMS-2P	CSS-1HP	CQS-1HP
EMULSIONS:							
Viscosity, Saybolt Furol Seconds, range	25 °C (77 °F)	T59	-	-	-	20-100	20-100
	50 °C (122 °F)		100-400	100-400	100-400	-	-
Settlement, 5 days, %			-	-	-	-	-
Storage Stability Test, 24 hours, %			1.0 max.	1.0 max.	1.0 max.	1.0 max.	-
Sieve Test, %			0.10 max.	0.10 max.	0.10 max.	0.10 max.	0.10 max.
Particle Charge Test			-	-	-	-	-
Demulsibility, % (1)			40 min.	40 min.	-	-	-
Ash Content, %			-	-	-	-	-
Residue by Distillation, % (2)		T59	65 min.	65 min.	65 min.	65 min.	65 min.
Oil Distillate, volume of emulsion, %			3 max.	3 max.	3 max.	-	-
DISTILLATION RESIDUE:							
Penetration, 25 °C (77 °F), tenths of mm		T49	90-200	90-200	90-200	40-90	40-90
Ductility, cm	4 °C (39.2 °F)	T51	40 min.	40 min.	40 min.	-	-
	25 °C (77 °F)		-	-	-	40 min.	40 min.
Elastic Recovery, 4 °C (39.2 °F), % (3)		T301	50 min.	50 min.	50 min.	-	-
Solubility in trichloroethylene, %		T44	97.5 min.	97.5 min.	97.5 min.	97.5 min.	97.5 min.
Softening Point, °C (°F)		T53	-	-	-	57 (135) min.	57 (135) min
NOTES:		<ol style="list-style-type: none"> Use 35 ml (0.74 pt.) 0.8% sodium dioctyl sulfosuccinate solution. Modify and perform the AASHTO T59 distillation procedure in accordance with the manufacturer's recommendations. Sever specimen immediately after elongation. 					

Wyoming		Table 5: Requirements for Polymer Modified High Float Emulsified Asphalt		
Property		Test Method AASHTO (T), ASTM (D), or Other	Rapid-Setting	Medium-Setting
			HFRS-2P	HFMS-2P
EMULSIONS:				
Viscosity, Saybolt Furol seconds	25 °C (77 °F)	T59	-	-
	50 °C (122 °F)		50-450	100-400
Storage Stability Test, 24 hours, %			1.0 max.	1.0 max.
Sieve Test, %			0.10 max.	0.10 max.
Demulsibility, % (1)			40 min.	20-80
Residue, % (2)			65 min.	65 min.
Oil Distillate, volume of emulsion, %			3 max.	3 max.
DISTILLATION RESIDUE:				
Penetration, 25 °C (77 °F), tenths of mm		T49	70-150	90-200
Ductility, cm	4 °C (39.2 °F)	T51	-	40 min.
	25 °C (77 °F)		75 min.	-
Elastic Recovery, % (3)	4 °C (39.2 °F)	T301	-	50 min.
	25 °C (77 °F)		55 min.	-
Solubility in trichloroethylene, %		T44	97.5 min.	97.5 min.
Float Test at 60 °C (140 °F), seconds		T50	1200 min.	1200 min.
NOTES:		1. Use 35 ml (0.74 pt.) 0.02 N CaCl ₂ solution for HFRS-2P and 50 ml (0.11 pt.) 0.10 N CaCl ₂ solution for HFMS-2P. 2. Modify and perform the AASHTO T59 distillation procedure in accordance with the manufacturer's recommendations. 3. Sever specimen immediately after elongation.		

Wyoming		Table 6: Requirements for Emulsified Recycling Agents				
Property		Test Method AASHTO (T), ASTM (D), or Other	ER-1	ER-2	ER-3	RA1+
EMULSIONS:						
Viscosity, Saybolt Furol seconds	25 °C (77 °F)	T59/D244 (1)	-	-	-	15-40
	50 °C (122 °F)		100 max.	20-450	20-450	-
Storage Stability Test, 24 hours, %		T59/D6930 (1)	1.5 max.	1.5 max.	1.5 max.	-
Miscibility, coagulation (2)		T59	-	-	-	None
Sieve Test, %		T59/D6933 (1)	0.10 max.	0.10 max.	0.10 max.	0.10 max. (3)
Particle Charge		T59	-	-	-	Pass
Residue, %		T59/D6997 (1)	65 min.	65 min.	65 min.	60-65 (4)
Dilution		-	Report	-	-	-
Specific Gravity		D70	Report (5)	Report	Report	-
Compatibility (6)		Varies	Report	Report	Report	-
Flash Point, °C (°F)		T48	-	-	-	218 (424) min
DISTILLATION/EVAPORATION RESIDUE:						
Kinematic Viscosity, 60 °C, mm ² /s		T201/D2170 (1)	50-200	-	-	100-200
Saturates, %		D2007	30 max.	30 max.	30 max.	-
Solubility in trichloroethylene, %		D2042	97.5 min.	97.5 min.	97.5 min.	-
RTFO RESIDUE (7):						
Penetration, 4 °C (39.2 °F), tenths of mm (8)		D5	-	75-200	5-75	-
Weight Change, %		D2872	4 max.	4 max.	4 max.	-
NOTES:		<ol style="list-style-type: none"> 1. Use AASHTO (T) specifications for RA1+. 2. The test procedure is T59; use 0.02 N CaCl₂ solution in place of distilled water. 3. The test procedure is T59; use distilled water in place of 2 % sodium oleate solution. 4. The AASHTO T59 modified evaporation test for percent residue consists of heating a 1.61 oz. (50 g) sample to 300 °F (148 °C) until foaming stops; cool immediately and calculate results. 5. ER-1 shall be certified for dilution with potable water. 6. This specification allows a variety of emulsions, including high-float and cationic emulsions. The engineer should take the steps necessary to keep incompatible materials from co-mingling in tanks or other vessels. It would be prudent to have the chemical nature (float test for high float emulsions, particle charge test for cationic emulsions, or other tests as necessary) certified by the supplier. 7. RTFO shall be the standard. When approved by the engineer, the Thin Film Oven Test (D1754) may be substituted for compliance testing. 8. 50 g, 5 seconds. 				

To ensure the most accurate and current information, the specific agency should be contacted.

Wyoming		Table 7: Requirements for Emulsified Prime Coat		
Property		Test Method AASHTO (T), ASTM (D), or Other	AEP	PEP
EMULSIONS:				
Viscosity, Saybolt Furol seconds	25 °C (77 °F)	T59	-	-
	50 °C (122 °F)		20-150	10-120
Storage Stability Test, 24 hours, %			-	-
Sieve Test, %			-	-
Demulsibility, %			-	-
Residue, % (1)			65 min.	60 min.
Oil Distillate, volume of emulsion, %			2-7	2 max.
DISTILLATION RESIDUE:				
Penetration, 25 °C (77 °F), tenths of mm		T49	100-200	30-250
Ductility, cm	4 °C (39.2 °F)	T51	-	-
	25 °C (77 °F)		-	-
Elastic Recovery, %	4 °C (39.2 °F)	T301	-	-
	25 °C (77 °F)		-	-
Solubility in trichloroethylene, %		T44	97.5 min.	97.5 min.
Float Test at 60 °C (140 °F), seconds		T50	-	-
NOTES:		1. Modify and perform the AASHTO T59 distillation procedure in accordance with the manufacturer's recommendations.		