State: Nebraska	**Materials:** Re: Section 1031
Date: 2/26/2025	**Web Address:** www.dor.state.us
Flexible Pavements Engr: Robert Rea	**Contact Info:** asadullah.sahak@nebraska.gov

Nebraska		**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**	**SS-1**	**SS-1h**	**QS-1H**
EMULSIONS:									
Viscosity, Saybolt Furol seconds	25 °C (77 °F)	T59	20-100	-	20-100	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.	-
Sieve Test, % (2,3)			0.10 max.	0.10 max.	0.10 max.	0.30 max.	0.10 max.	0.10 max.	0.10 max.
Demulsibility, % (4)			60 min.	60 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, %			55 min.	63 min.	55 min.	65 min.	57 min.	57 min.	57 min.
DISTILLATION RESIDUE:									
Penetration, 25 ºC (77 °F), tenths of mm		T49	100-200	100-200	100-200	100-200	100-200	40-90	40-90
Ductility, 25 ºC (77 °F), cm		T51	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.

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. A maximum percentage of 0.30 is acceptable for samples taken at the point of use.
4. The demulsibility test shall be performed within 30 days from the date of shipment. Use 35 ml, 0.02 *N* $CaCl_2$ solution.

Nebraska		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-1h**	**CRS-2**	**CMS-1**	**CMS-1W**	**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	20-100	100-400	50-500	50-500	-	-	-
Settlement, 5 days, %			-	-	-	5 max.	5 max.	-	-	-
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.	0.50 max.	0.50 max.	0.10 max.	0.10 max.	0.10 max.
Particle Charge			Positive	Positive	Positive	-	-	Positive	Positive	Positive
Demulsibility , % (3)			40 min.	40 min.	40 min.	-	-	-	-	-
Cement Mixing Test, %			-	-	-	-	-	2.0 max.	2.0 max.	-
Coating Ability and Water Resistance	Dry Aggregate		-	-	-	-	-	-	-	-
	After Spraying		-	-	-	-	-	-	-	-
	Wet Aggregate		-	-	-	-	-	-	-	-
	After Spraying		-	-	-	-	-	-	-	-
Residue, %			60 min.	60 min.	65 min.	65 min.	65 min.	57 min.	57 min.	57 min.
Oil Distillate, volume of emulsion, %			3 max.	3 max.	3 max.	12 max.	12 max.	-	-	-
pH		T200	-	-	-	-	-	-	-	-
DISTILLATION RESIDUE:										
Penetration, 25 ºC (77 °F), tenths of mm		T49	100-250	40-90	100-250	300 min.	300 min.	100-250	40-90	40-90
Ductility, 25 ºC (77 °F), cm		T51	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.	97.0 min.	97.0 min.	97.5 min.	97.5 min.	97.5 min.
Viscosity at 82 °C (179.6 °F), Saybolt Furol seconds		T59	-	-	-	200-600 (4)	200-400 (4)	-	-	-

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. Use 35 ml of 0.8% sodium dioctyl sulfosuccinate solution.
4. Converting Kinematic Viscosity to Saybolt Furol Viscosity shall be allowed using the conversion shown in ASTM D2161. The formula of Kinematic Viscosity in centistokes multiplied by 0.477, @ 180 °F = Saybolt Furol Seconds, and shall be reported as such.

Nebraska		Table 3: Requirements for High Float Emulsified Asphalt (1)				
Property		**Test Method AASHTO (T), ASTM (D), or Other**	**Medium-Setting**			
			HFMS-2h	**HFE-150**	**HFE-300**	**HFE-1000**
EMULSIONS:						
Viscosity, Saybolt Furol seconds	25 °C (77 °F)	T59	100 min.			
	50 °C (122 °F)		-	50-400	50-400	50-400
Settlement, 5 days, %			-	5 max.	5 max.	-
Storage Stability Test, 24 hours, % (2)			1 max.	-	-	-
Sieve Test, % (2)			0.30 max.	0.10 max.	0.10 max.	-
Demulsibility , % (3)			-	-	-	-
Coating Ability and Water Resistance	Dry Aggregate		-	-	-	-
	After Spraying		-	-	-	-
	Wet Aggregate		-	-	-	-
	After Spraying		-	-	-	-
Residue, %			65 min.	65 min.	65 min.	65 min.
Oil Distillate, volume of emulsion, %			-	-	7 max.	7 max.
DISTILLATION RESIDUE:						
Penetration, 25 ºC (77 °F), tenths of mm		T49	40-90	150-250	300 min.	300 min.
Ductility, 25 ºC (77 °F), cm		T51	40 min.	-	-	-
Solubility in trichloroethylene, %		T44	97.5 min.	97.5 min.	97.5 min.	-
Viscosity by Vacuum Capillary Viscometer, 60 °C (140 °F), Poises		T316	-	-	-	20-90
Float Test at 60 °C (140 °F), seconds		T50	1200 min.	1200 min.	1200 min.	1200 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.				

Nebraska		Table 4: Requirements for Polymer Modified Asphalt Emulsions			
Property		**Test Method AASHTO (T), ASTM (D), or Other**	**Rapid-Setting**		
			CRS-2P (1)	**CRS-2L (2)**	**CRS-2VHL (3)**
EMULSIONS:					
Viscosity, Saybolt Furol seconds	25 °C (77 °F)	T59	-	-	-
	50 °C (122 °F)		100-400	100-400	75-300
Settlement, 5 days, %			-	-	-
Storage Stability Test, 24 hours, %			1 max. (4)	1 max. (4)	1 max.
Sieve Test, %			0.10 max. (4)	0.10 max. (4)	0.10 max. (4)
Particle Charge Test			Positive	Positive	Positive
Demulsibility, % (5)			40 min.	40 min.	40 min.
Residue by Distillation, % (6)			65 min.	65 min.	65 min.
Oil Distillate, volume of emulsion, %			-	-	3 max.
DISTILLATION RESIDUE:					
Penetration, 25 °C (77 °F), tenths of mm		T49	100-150	65-130	65-130
Ductility, 5 cm/minute, cm	4 ºC (39.2 °F)	T51	30 min.	30 min.	-
	25 ºC (77 °F)		40 min.	40 min.	40 min.
Force Ratio (f2/f1)		T300	-	-	-
Elastic Recovery, 25 ºC (77 °F), %		T301	55 min.	-	-
Softening Point, °F		T53	-	130 min.	135. min.
Polymer Solids content, %		-	2.5 min.	2.5 min.	3.0
Solubility in Trichloroethylene, %		T44	97.5 min.	- (7)	- (7)

NOTES:

1. A cationic emulsion made with base asphalt binder modified with styrene-butadiene or styrene-butadiene styrene block copolymers. All base stock asphalt must be modified before emulsification. CRS-2P shall contain no latex polymer.
2. A cationic emulsion made with base asphalt binder modified with styrene-butadiene rubber latex or polychloroprene latex. All base stock asphalt used must be modified during a co-milling emulsification process exclusively, and through the use of the latex polymers listed above only.
3. All polymer shall be added as either SBR or polychloroprene latex only, only during a co-milling emulsification process.
4. This test requirement on representative samples is waived if successful application of the material has been achieved in the field.
5. Use 35 ml of 0.8% sodium dioctyl sulfosuccinate solution.
6. Distillation will be used for residue percentage determination and all residue testing. The distillation will be taken to 350 ± 5 °F, and held for 20 minutes and otherwise in accordance with AASHTO T59.
7. The solubility of the base asphalt binder shall be greater than 99%.

Nebraska		Table 5: Requirements for Polymerized High Float Emulsified Asphalt		
Property		**Test Method AASHTO (T), ASTM (D), or Other**	**Medium-Setting**	
			HFMS-2P (1)	**HFMS-2L (2)**
EMULSIONS:				
Viscosity, Saybolt Furol seconds	25 °C (77 °F)	T59	-	-
	50 °C (122 °F)		50-400	50-400
Storage Stability Test, 24 hours, % (3)			1 max.	1 max.
Sieve Test, % (3)			0.10 max.	0.10 max.
Demulsibility, % (4)			40 min.	40 min.
Residue, % (5)			65 min.	65 min.
Oil Distillate, volume of emulsion, %			3 max.	3 max.
DISTILLATION RESIDUE:				
Penetration, 25 ºC (77 °F), tenths of mm		T49	100-200	100-200
Ductility, 25 ºC (77 °F), cm		T51	45 min.	45 min.
Elastic Recovery, 25 ºC (77 °F), %		T301	55 min.	-
Solubility in Trichloroethylene, % (6)		T44	-	-
Float Test at 60 °C (140 °F), seconds		T50	1200 min.	1200 min.

NOTES:

1. All base stock asphalt binder used must be modified prior to emulsification with styrene-butadiene or styrene-butadiene styrene block copolymers. HFMS-2P shall contain no latex polymer.
2. The asphalt cement shall be polymerized with a total minimum of 3.0% polymer solids by weight of the asphalt cement. The polymers can be exclusively latex, or any combination of SB, SBS, SBR, or polychloroprene latex. The polymerization process shall be at least partly SBR or polychloroprene latex, and the latex is only allowed to be added during a co-milling emulsification process.
3. This test requirement on representative samples is waived if successful application of the material has been achieved in the field.
4. Use 50 mL of 0.1 N $CaCl_2$ solution.
5. The distillation will be taken to 350 ± 5 °F, and held for 20 minutes and otherwise in accordance with AASHTO T59.
6. The solubility of the base asphalt binder shall be greater than 99%.

Nebraska		Table 6: Requirements for Micro-Surfacing Emulsions	
Property		**Test Method AASHTO (T), ASTM (D), or Other**	**CQS-1h (1)**
EMULSIONS:			
Viscosity, Saybolt Furol Seconds	25 °C (77 °F)	T59	20-100
	50 °C (122 °F)		-
Settlement, 24 hours, %			1.0 max.
Storage Stability Test, 24 hours, %			1 max.
Sieve, %			0.10 max.
Particle Charge			Positive
Residue, % (2)			62 min.
Oil Distillate, volume of emulsion, %			-
RESIDUE FROM EVAPORATION:			
Penetration, 25 °C (77 °F), tenths of mm		T49	40-90
Ductility, 25 °C (77 °F), cm		T51	-
Softening Point, °F		T53	135 min.
Absolute Viscosity, 60 °C, MilliPascal-Seconds		T316	800,000 min.
NOTES:		1. The emulsion shall contain a minimum 3% polymer solids by weight of asphalt. The polymer shall be milled or blended into the asphalt or emulsifier prior to the emulsification process. 2. The distillation temperature for this test should be held at 350 °F for 20 minutes. Higher temperatures may cause the polymers to break down. The residue shall be stirred to insure a homogeneous material before taken out of the still.	

Nebraska		Table 7: Emulsified Polymer Modified Asphalt Rejuvenating Agent for Hot-in-Place Recycling	
Property		**Test Method AASHTO (T), ASTM (D), or Other**	**ARA (1)**
EMULSIONS:			
Viscosity, Saybolt Furol Seconds	25 °C (77 °F)	T59	15-100
	50 °C (122 °F)		-
Storage Stability Test, 24 hours, % (2)			1 max.
Sieve, %			0.10 max.
Residue, % (3)			60 min.
Oil Distillate, volume of emulsion, %			2 max.
RESIDUE FROM EVAPORATION:			
Penetration, 4 °C (39.2 °F), tenths of mm		T49	50-150
Asphaltenes, %		D4124 or D6560	25 max.
Elastic Recovery, 4 °C (39.2 °F)		T301	60% min.
NOTES:		1. Emulsified Polymer Modified Asphalt Rejuvenating Agent for use in Hot-In-Place recycling of bituminous pavements shall be modified with a minimum of 1.5% styrene-butadiene solution polymer and shall not contain any used oils that have not been refined or re-processed. 2. In addition to AASHTO T59, upon examination of the test cylinder, and after standing undisturbed for 24 hours, the surface shall show no appreciable whiter, milky colored substance and shall be a homogeneous brown color throughout. 3. AASHTO T59 shall be modified to maintain a 350 °F ± 5 °F maximum temperature for 20 minutes.	

Nebraska		Table 8: Polymer Modified Emulsion Membrane		
Property		**Test Method AASHTO (T), ASTM (D), or Other**	**Anionic**	**Cationic**
			PEM-1	**CPEM-1**
EMULSIONS:				
Viscosity, Saybolt Furol Seconds	25 °C (77 °F)	T59	-	-
	50 °C (122 °F)		25-125	25-125
Storage Stability Test, 24 hours, %			1 max.	1 max.
Sieve, %			0.30 max.	0.30 max.
Demulsibility, %			60 min. (1)	60 min. (2)
Residue, %			63 min.	63 min.
Oil Distillate, volume of emulsion, %			2 max.	2 max.
RESIDUE FROM EVAPORATION:				
Penetration, 25 °C (39.2 °F), tenths of mm		T49	90-150	90-150
Elastic Recovery, 25 ºC (77 °F), %		T301	60 min.	60 min.
NOTES:		1. Use 35 mL of 0.2 N $CaCl_2$ solution. 2. Use 35 ml of 0.8% sodium dioctyl sulfosuccinate solution.		