

State: North Carolina	Materials: Section 1020-3 – Asphalt Emulsion
Date: 8/13/25	Web Address: www.ncdot.gov
Contact: Todd Whittington	Contact Info: twhittington@ncdot.gov

North Carolina

Table 1: Requirements for Anionic Emulsified Asphalts (1)

Property	Test Method AASHTO (T), ASTM (D), or Other	Rapid-Setting			Slow-Setting		
		RS-1	RS-1h	RS-2	SS-1	SS-1h	
EMULSIONS:							
Viscosity, Saybolt Furol seconds	25° C (77° F)	20-100			-	20-100	
		-			75-400	-	
Storage Stability Test, 24 hours, % (2)	T59	1 max.				-	
Sieve Test, % (2,3)		0.10 max.					
Demulsibility, % (4)		60 min.				-	
Cement Mixing Test, %		-				2.0 max.	-
Residue, %		55 min.	55 min. (6)	65 min.	57 min.		
DISTILLATION RESIDUE:							
Penetration, 25° C (77° F), tenths of mm		T49	90-150	50-100	90-150	90-250	40-90
Ductility, 25° C (77° F), cm	T51	40 min.					
NOTES:	<ol style="list-style-type: none"> 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 CaCl₂ solution. 5. Materials and Tests Method A-24 to determine the coating ability and water resistance using either crushed or uncrushed aggregate from a source selected by the Department. 6. Use a hot plate instead of an oven to perform the residue by evaporation. 7. The determination of coating test, oil distillate, pH, solubility of residue, ash particle charge will be made when deemed necessary. 						

North Carolina		Table 2: Requirements for Cationic Emulsified Asphalts (1)												
Property		Test Method AASHTO (T), or ASTM (D)	Rapid-Setting			Medium-Setting		Slow-Setting		Quick-Setting				
			CRS-1	CRS-1h	CRS-2	CMS-2	CMS-2h	CSS-1	CSS-1h	CQS-1h	CQS-1HLM	CQS-1HPM		
EMULSIONS:														
Viscosity, Saybolt Furol seconds	25° C (77° F)	T59	-					20-100						
	50° C (122° F)		20-100	100-400	50-450	-								
Storage Stability Test, 24 hours, % (2)			1 max.											
Sieve Test, % (2)			0.1 max.											
Particle Charge			Positive											
Demulsibility, % (3)			40 min.			-								
Cement Mixing Test, %			-					2.0 max.		-				
Coating Ability and Water Resistance	Dry Aggregate		-			Good		-						
	After Spraying		-			Fair		-						
	Wet Aggregate		-			Fair		-						
	After Spraying		-			Fair		-						
Residue, %			60 min.	65 min.			57 min.		62 min.					
Oil Distillate, volume of emulsion, %		3 max.			12 max.	12 max.	-							
DISTILLATION RESIDUE:														
Penetration, 25° C (77° F), tenths of mm		T49	90-150	40-90	90-150	90-250	40-90	90-250	40-90		-			
Ductility, 25° C (77° F), cm		T51	40 min.						-					
Solubility in trichloroethylene, %		T44	-											
Softening Point, ° F			-								135 min.			
NOTES:		<ol style="list-style-type: none"> 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. 												

Table 3: Requirements for High Float Emulsified Asphalt (1)

Property	Test Method AASHTO (T), ASTM (D), or Other	Medium-Setting	
		HFMS-1	HFMS-2
EMULSIONS:			
Viscosity, Saybolt Furol seconds	25° C (77° F)	20-100	100 min.
Storage Stability Test, 24 hours, %	(2)	1 max.	
Sieve Test, %	(2,3)	0.10 max.	
Coating Ability and Water Resistance (6)	Dry Aggregate	Good	
	After Spraying	Fair	
	Wet Aggregate	Fair	
	After Spraying	Fair	
Residue, %		55 min.	65 min.
DISTILLATION RESIDUE:			
Penetration, 25° C (77° F), tenths of mm	T49	90-250	
Ductility, 25° C (77° F), cm	T51	40 min.	
Float Test at 60° C (140° F), seconds	T50	1200 min.	
NOTES:	<ol style="list-style-type: none"> 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 CaCl₂ solution. 5. N-propyl bromide may also be used for HFRS-2. 6. Materials and Tests Method A-24 to determine the coating ability and water resistance using either crushed or uncrushed aggregate from a source selected by the Department. 7. Use a hot plate instead of an oven to perform the residue by evaporation. 8. The determination of coating test, oil distillate, pH, solubility of residue, ash particle charge will be made when deemed necessary. 		

Table 4: Requirements for Polymer Modified Asphalt Emulsions

Property	Test Method AASHTO (T), ASTM (D), or Other	Rapid-Setting	
		CRS-2P	CRS-2L
EMULSIONS:			
Viscosity, Saybolt Furol seconds	T59	50 °C (122 °F)	100-400
Storage Stability Test, 24 hours, %			1 max.
Sieve Test, %			0.15 max.
Residue by Distillation, %			65 min.
RESIDUE:			
Elastic Recovery, 25 °C (77 °F), %	T301		60 min.
Softening Point (Ring and Ball), °F	T53		110 min.
NOTES:	1. Polymer Content may be analyzed, if deemed necessary.		

North Carolina		Table 5: Requirements for Polymer Modified Emulsion Membrane	
Property		Test Method AASHTO (T), ASTM (D), or Other	Emulsion Membrane
EMULSIONS:			
Viscosity, Saybolt Furol seconds	25 °C (77 °F)	T59	20-100
Storage Stability Test, 24 hours, %	(1)		1 max.
Sieve Test, %			0.10 max.
Demulsibility, %			60 min.
Residue by Distillation, %	(2)		63 min.
Oil Distillate, volume of emulsion, %			2.0 max.
RESIDUE:			
Penetration, 25 °C (77 °F), tenths of mm		T49	60-150
Elastic Recovery, 25 °C (77 °F), %		T301	60 min.
Solubility in Trichloroethylene, %	(3)	T44	97.5 min.
NOTES:	<ol style="list-style-type: none"> After standing undisturbed for 24 hours, the surface shall show no white, milky colored substance, but shall be a smooth homogeneous color throughout. AASHTO T59 with modifications to include a 400 °F ± 10 °F maximum temperature to be held for 15 minutes. ASTM D5546 may be substituted where polymers block the filter in Method D2042. 		