

<b>State:</b> California	<b>Specification:</b> Section 94-Asphaltic Emulsions (starting on page 1019)
<b>Date:</b> 10/30/2025	<b>Web Address:</b> <a href="https://dot.ca.gov/-/media/dot-media/programs/design/documents/2024_stdspeca11y.pdf">https://dot.ca.gov/-/media/dot-media/programs/design/documents/2024_stdspeca11y.pdf</a>
<b>Contact:</b> Steve J. Lee	<b>Contact Info:</b> steve.j.lee@dot.ca.gov

California		Table 1: Requirements for Anionic Emulsified Asphalts		
Property		Test Method AASHTO (T), ASTM (D), or Other	Slow-Setting	
			SS-1	SS-1h
<b>EMULSIONS:</b>				
Viscosity, Saybolt Furol seconds	25 °C (77 °F)	T59	20-100	20-100
	50 °C (122 °F)		-	-
Settlement, 5 days, %				
Storage Stability Test, 1 day, %			1 max.	1 max.
Sieve Test, %			0.10 max.	0.10 max.
Demulsibility, %			-	-
Cement Mixing Test, %			2.0 max.	2.0 max.
Coating Ability and Water Resistance	Dry Aggregate		-	-
	After Spraying		-	-
	Wet Aggregate		-	-
	After Spraying		-	-
Residue from distillation or evaporation test, %			57 min. (1)	57 min. (1)
Oil Distillate, volume of emulsion, %			-	-
<b>RESIDUE:</b>				
Penetration, 25 °C (77 °F), tenths of mm		T49	100-200	40-90
Ductility, 25 °C (77 °F), (min, mm)		T51	400	
Solubility in trichloroethylene, %		T44	97.5 min.	
<b>NOTES:</b>		1. Distillation is the defining test if there is a conflict with evaporation.		

California		Table 2: Requirements for Cationic Emulsified Asphalts					
Property	Test Method AASHTO (T), ASTM (D), or Other	Rapid-Setting				Slow-Setting	
		CRS-1	CRS-1h	CRS-2	CRS-2h	CSS-1	CSS-1h
<b>EMULSIONS:</b>							
Viscosity, Saybolt Furol seconds	25 °C (77 °F)	-	-			20-100	20-100
	50 °C (122 °F)	20-100	20-100	100-400	100-400		
Settlement, 5 days, %	T59	-					
Storage Stability Test, 1 day, %		1 max.					
Sieve Test, %		0.10 max.					
Particle Charge		Positive					
Demulsibility, % (2)		40 min.	40 min.	40 min.	40 min.	-	-
Cement Mixing Test, %		-	-			2.0 max.	2.0 max.
Residue from distillation or evaporation, % (1)	60 min.	60 min.	65 min.	65 min.	57 min.	57 min.	
Oil Distillate, volume of emulsion, %		-					
pH	T200	-					
<b>RESIDUE:</b>							
Penetration, 25 °C (77 °F), tenths of mm	T49	100-250 (3)	40-90	100-250	40-90	100-250	40-90
Ductility, 25 °C (77 °F), mm	T51	400 min.					
Solubility in trichloroethylene, %	T44	97.5 min.					
<b>NOTES:</b>	<ol style="list-style-type: none"> <li>1. Must comply with a pH requirement of 6.7 maximum (ASTM E 70) if the particle charge test result is inconclusive.</li> <li>2. The demulsibility test must be made within 30 days from date of shipment. Use 35 ml of 0.8% sodium dioctyl sulfosuccinate solution.</li> <li>3. A harder base asphalt in compliance with the paving asphalt specifications may be specified if the test requirements on the residue from distillation are waived.</li> </ol>						

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

California		Table 3: Requirements for Quick-Setting Asphaltic Emulsions				
Property	Test Method AASHTO (T), ASTM (D), or Other	Anionic		Cationic		
		QS-1	QS-1h	CQS-1	CQS-1h	
<b>EMULSIONS:</b>						
Viscosity, Saybolt Furol seconds	25 °C (77 °F)	T59	-	-	-	-
	50 °C (122 °F)		15-90	15-90	15-90	15-90
Storage Stability Test, 24 hours, %			1 max.	1 max.	1 max.	1 max.
Sieve Test, %			0.30 max.	0.30 max.	0.30 max.	0.30 max.
Particle Charge Test (1)			-	-	Positive	Positive
Residue by distillation or evaporation, % (2)			57 min.			
<b>RESIDUE:</b>						
Penetration, 25 °C (77 °F), tenths of mm		T49	100-200	40-90	100-200	40-90
Ductility, 25 °C (77 °F), mm		T51	400 min.			
Solubility in trichloroethylene, %		T44	97 min.			
<b>NOTES:</b>		1. If the result of the Particle Charge Test is inconclusive, the asphaltic emulsion must be tested for pH under ASTM E 70. Grade QS-1h asphaltic emulsion must have a minimum pH of 7.3. Grade CQS-1h asphaltic emulsion must have a maximum pH of 6.7. 2. Distillation is the defining test if there is a conflict with evaporation.				

California		Table 4: Requirements for Polymer Modified Asphaltic Emulsions				
Property	Test Method AASHTO (T), ASTM (D), or Other	Cationic				
		PMCQS-1h	MSE	PMCRS-2	PMCRS-2h	
<b>EMULSIONS:</b>						
Viscosity, Saybolt Furol seconds	25 °C (77 °F)	T59	15-90	15-90	-	-
	50 °C (122 °F)		-	-	100-400	100-400
Storage Stability Test, 24 hours, %	1 max.		1 max.	1 max.	1 max.	
Sieve Test, %	0.30 max.		0.30 max.	0.30 max.	0.30 max.	
Particle Charge Test (3)	Positive		Positive	Positive	Positive	
Demulsibility, %	-		-	40 min. (2)	40 min. (2)	
Residue by Evaporation or Distillation, % (5)	T59		60 min.	62 min.	65 min.	65 min.
<b>RESIDUE:</b>						
Penetration, 4 °C, tenths of mm	T49	-	-	6 min.	6 min.	
Penetration, 25 °C (77 °F), tenths of mm	T49	40-90	40-90	100-200	40-90	
Ductility, 25 °C (77 °F), mm	T51	400 min.	-	400 min.	400 min.	
Softening Point (min, °C)	T53	-	57	57	57	
Torsional Recovery, %	California Test 332	18 min.	20 min.	20 min.	20 min.	
-or- Elastic Recovery, 25°C (min, %) (4)	T301	60	65	65	65	
<b>NOTES:</b>	<ol style="list-style-type: none"> <li>Use 35 ml, 0.02 N CaCl<sub>2</sub> solution.</li> <li>Use 35 ml of 0.8% sodium dioctyl sulfosuccinate solution.</li> <li>If the result of the Particle Charge Test is inconclusive, the asphaltic emulsion must be tested for pH under ASTM E 70. Grade QS-1h asphaltic emulsion must have a minimum pH of 7.3. Grade CQS-1h asphaltic emulsion must have a maximum pH of 6.7.</li> <li>Elastic Recovery is the defining test if there is a conflict with torsional recovery.</li> <li>Distillation temperature of 350 °F).</li> </ol>					

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

Table 5: Requirements for Cationic Emulsified Recycling Agent

Property		Test Method AASHTO (T), ASTM (D), or Other	Emulsified Recycling Agent
<b>EMULSIONS:</b>			
Sieve Test, max. %		T59	0.10
Particle Charge Test (1)			Positive
Residue by Evaporation or Distillation, % (2)			63 min.
<b>RESIDUE:</b>			
Penetration, 25 °C (77 °F), tenths of mm		T49	40-120
Ductility, 25 °C (77 °F), mm		T51	400 min.
Creep Stiffness	Test temp.	T313	-12
	S-value, MPa		300 max.
	M-Value		0.300 min.
<b>NOTES:</b>		1. Must comply with a pH requirement of 6.7 maximum (ASTM E 70) if the particle charge test result is inconclusive. 2. Distillation is the defining test if there is a conflict with evaporation. Distillation temperature of 350 °F.	

California		Table 6: Requirements for Bonded Wearing Course Asphaltic Emulsion	
Property		Test Method AASHTO (T), ASTM (D), or Other	
<b>EMULSIONS:</b>			
Viscosity, Saybolt Furol seconds	25 °C (77 °F)	T59	20-100
	50 °C (122 °F)		-
Sieve Test, %			0.05
Storage Stability Test, 1 day, %			1 max.
Particle Charge Test (1)			Positive
Residue by Evaporation or Distillation, % (2)			63 min.
<b>RESIDUE:</b>			
Penetration, 25 °C (77 °F), tenths of mm		T49	70-150
Torsional Recovery (min, %) (3)		California Test 332	40
<b>NOTES:</b>		<ol style="list-style-type: none"> <li>1. If the result of the Particle Charge Test is inconclusive, the asphaltic emulsion must be tested for pH under ASTM E 70. Grade QS-1h asphaltic emulsion must have a minimum pH of 7.3. Grade CQS-1h asphaltic emulsion must have a maximum pH of 6.7.</li> <li>2. Distillation is the defing test if there is a conflict with evaporation. Distillation temperature of 350 °F.</li> <li>3. Measure the entire arc of recovery at 25 °C.</li> </ol>	

**Table 6: Requirements for Rapid-Setting Polymer-Modified Rejuvenating Asphaltic Emulsions**

Property		Test Method AASHTO (T), ASTM (D), or Other	PMRE
<b>EMULSIONS:</b>			
Viscosity, Saybolt Furol seconds	25 °C (77 °F)	T59	-
	50 °C (122 °F)		50-350
Sieve Test, %	0.30		
Storage Stability Test, 24 hours, %	1 max.		
Particle Charge Test (1)	Positive		
Demulsibility (min, %) (5)	40		
Residue by Evaporation or Distillation, % (2)	65 min.		
Oil Distillate, % max.	0.5		
pH	ASTM E70		2.0-5.0
<b>RESIDUE:</b>			
Viscosity, at 60 °C (max, Pa-s) (4)	T202	5000	
Penetration, 4 °C, (dmm)	T49	40-70	
Elastic Recovery, 25 °C (min, %) (3)	T301	60	
<b>NOTES:</b>	<ol style="list-style-type: none"> <li>1. If the result of the Particle Charge Test is inconclusive, the asphaltic emulsion must be tested for pH under ASTM E 70. Grade QS-1h asphaltic emulsion must have a minimum pH of 7.3. Grade CQS-1h asphaltic emulsion must have a maximum pH of 6.7.</li> <li>2. Distillation is the defining test if there is a conflict with evaporation. Distillation temperature of 350 °F.</li> <li>3. Hour glass sides, pull to 20 cm, hold 5 minutes then cut, let sit 1 hour.</li> <li>4. Use an AI-200 glass capillary tube to run the test. If the viscosity is 4000 or above, use an AI 400 instead.</li> <li>5. If the product is to be diluted, demulsibility is waived.</li> </ol>		
<b>TABLE 6 CONTINUED ON NEXT PAGE →</b>			

<i>California</i>	Table 6 Continued: Requirements for Rapid-Setting Polymer-Modified Rejuvenating Asphaltic Emulsions	
Property	Test Method AASHTO (T), ASTM (D), or Other	Rejuvenating Agent Requirements
<b>TESTs ON REJUVENATING AGENT:</b>		
Viscosity, at 60 °C (cSt)	T201	50-175
Flash Point (min, °C)	T48	193
Saturate (max, % by weight)	D2007	30
Asphaltenes (max)	D2007	1.0
<b>TESTs ON REJUVENATING AGENT RTFO TEST RESIDUE:</b>		
Weight change (max, %)	T240	6.5
Viscosity Ration (max) (1)	T240	3
<b>NOTES:</b>	1. RTFO viscosity divided by the original viscosity.	