Special Provision to Item 300
Asphalts, Oils, and Emulsions

Item 300, "Asphalts, Oils, and Emulsions," of the Standard Specifications, is amended with respect to the clauses cited below. No other clauses or requirements of this Item are waived or changed.

Section 300.2., "Materials." The first paragraph is voided and replaced by the following.

Provide asphalt materials that meet the stated requirements when tested in accordance with the referenced Department, AASHTO, and ASTM test methods. Use asphalt containing recycled materials only if the recycled components meet the requirements of Article 6.9, "Recycled Materials." Provide asphalt materials that the Department has preapproved for use in accordance with Tex-545-C, "Asphalt Binder Quality Program."

Inform the Department of all additives or modifiers included in the asphalt binder as part of the facility quality plan, as required by Tex-545-C, "Asphalt Binder Quality Program," and provide that information to Department personnel. The Department reserves the right to prohibit the use of any asphalt additive or modifier.

Limit the use of polyphosphoric acid to no more than 0.5% by weight of the asphalt binder.

The use of re-refined engine oil bottoms is prohibited.

Section 300.2.2., "Polymer-Modified Asphalt Cement," Table 3 is supplemented by the following:

Table 3A
Polymer-Modified Asphalt Cement Non-Tracking Tack Coat – Hot Applied

Property	Test Procedure	NT-HA	
		Min	Max
Viscosity, 275°F, cP	T 316	-	4000
Penetration, 77ºF, 100 g, 5 sec.	T 49	-	25
Softening Point, ºF	T 53	170	-
Dynamic shear, G*/sin δ, 82°C, 10 rad/s, kPa	T 315	1.0	-
Flash Point, C.O.C., ºF	T 48	425	-

Section 300.2.4., "Emulsified Asphalt," Table 7 is supplemented by the following.

Table 7A
Surface Performance-Grade Emulsified Asphalt

Grade	Test Procedure	HFRS-2(SPG xy[1])		CRS-2(SPG xy)		CHFRS-2(SPG xy)	
		Min	Max	Min	Max	Min	Max
Tests on emulsions:							
Viscosity, Saybolt Furol at 50°C, SFs[2]	T 72	150	400	150	400	150	400
Storage stability test, 24 h., %[2]	T 59		1		1		1
Demulsibility, 35 mL, 0.02 N $CaCl_2$, %	T 59	60					
Demulsibility, 35 mL, 0.8% dioctyl sodium sulfosuccinate, %	T 59			60		60	
Particle charge test	T 59			positive		positive	
Sieve test, %[2]	T 59		0.10		0.10		0.10
Residue recovery	PP 72, Procedure B						
Residue, %		65		65		65	
Tests on recovered residue:							
Residue properties		Meet the SPG in Table 17A, except the Max phase angle is 84[3]					
Solubility in trichloroethylene, %	T 44	97.5		97.5			
Float test, 60°C, sec.[4]	T 50	1,200				1,200	

1. X is the average 7-day maximum pavement surface design temperature, and y is the minimum pavement surface design temperature used in Table 17A.
2. This test requirement on representative samples is waived if successful application of the material has been achieved in the field.
3. Meet original performance properties and PAV residue requirements only
4. If float test is less than 1,200 sec. using PP 72, Procedure B, for residue recovery, then use T 59 for residue recovery.

Section 300.2.4., "Emulsified Asphalt," Table 10 is voided and replaced by the following:

Table 10
Polymer-Modified Cationic Emulsified Asphalt

Property	Test Procedure	Type-Grade													
		Rapid-Setting								Medium-Setting				Slow-Setting	
		CRS-2P		CHFRS-2P		CRS-2TR		CMS-1P[3]		CMS-2P[3]		CSS-1P	
		Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
Viscosity, Saybolt Furol	T 72												
77°F, sec.		–	–	–	–	--	--	10	100	–	–	20	100
122°F, sec.		150	400	100	400	150	500	–	–	50	400	–	–
Sieve test, %	T 59	–	0.1	–	0.1	--	0.1	–	0.1	–	0.1	–	0.1
Demulsibility, 35 ml of 0.8% sodium dioctyl sulfosuccinate, %	T 59	70	–	60	–	40	--	–	–	–	–	–	–
Storage stability, 1 day, %	T 59	–	1	–	1	--	1	–	1	–	1	–	1
Breaking index, g	Tex-542-C	–	–	–	–	--	--	–	–	–	–	–	–
Particle charge	T 59	Positive		Positive		Positive		Positive		Positive		Positive	
Distillation test[1]:	T 59												
Residue by distillation, % by weight		65	–	65	–	65	--	30	–	60	–	62	–
Oil distillate, % by volume of emulsion		–	0.5	–	0.5	--	3	–	0.5	–	0.5	–	0.5
Tests on residue from distillation:													
Polymer content, wt. % (solids basis)	Tex-533-C	3.0	–	3.0	–	5.0[7]	--	–	–	–	–	3.0	–
Penetration, 77°F, 100 g, 5 sec.	T 49	90	150	80	130	90	150	30	–	30	–	55	90
Viscosity, 140°F, poise	T 202	1,300	–	1,300	–	1,000	--	–	-	–	-	–	–
Solubility in trichloroethylene, %	T 44	97.0	–	95.0	–	98	--	–	–	–	–	97.0	–
Softening point, °F	T 53	–	–	130	–	--	--	–	–	–	–	135	–
Ductility, 77°F, 5 cm/min., cm	T 51	–	–	–	–	40	--	–	–	–	–	70	–
Float test, 140°F, sec.	T 50	–	–	1,800	–	--	--	–	–	–	–		
Ductility,[2] 39.2°F, 5 cm/min., cm	T 51	50	–	–	–	--	--	–	–	–	–	–	–
Elastic recovery,[2] 50°F, %	Tex-539-C	55	–	55	–	--	--	-	–	-	–	–	–
Tests on residue from evaporative recovery:	R 78, Procedure B												
Nonrecoverable creep compliance of residue, 3.2 kPa, 52°C, kPa^{-1}	T 350							-	2.0	-	4.0		
Tests on rejuvenating agent:													
Viscosity, 140°F, cSt	T 201	–	–	–	–	--	--	50	175	50	175	–	–
Flash point, C.O.C., °F	T 48	–	–	–	–	--	--	380	–	380	–	–	–
Saturates, % by weight	D 2007	–	–	–	–	--	--	–	30	–	30	–	–
Solubility in n-pentane, % by weight	D 2007	–	–	–	–	--	--	99	–	99	–	–	–
Tests on rejuvenating agent after TFO or RTFO:	T 240 or T 179												
Weight Change, %		–	–	–	–	--	--	–	6.5	–	6.5	–	–
Viscosity Ratio		–	–	–	–	--	--	–	3.0	–	3.0	–	–
Tests on latex[4]:													
Tensile strength, die C dumbbell, psi	D 412[5]	–	–	–	–	--	--	800	–	800	–	–	–
Change in mass after immersion in rejuvenating agent, %	D 471	–	–	–	–	--	--	–	40[6]	–	40[6]	–	–

1. Exception to T 59: Bring the temperature on the lower thermometer slowly to 350°F (±0°F). Maintain at this temperature for 20 min. Complete total distillation in 60 min. (±5 min.) from the first application of heat.
2. CRS-2P must meet one of either the ductility or elastic recovery requirements.
3. With all precertification samples of CMS-1P or CMS-2P, submit certified test reports showing that the rejuvenating agent and latex meet the stated requirements. Submit samples of these raw materials if requested by the Engineer.
4. Preparation of latex specimens: Use any substrate and recovery method which produces specimens of uniform dimensions and which delivers enough material to achieve desired residual thickness.
5. Cut samples for tensile strength determination using a crosshead speed of 20 in./min.
6. Specimen must remain intact after exposure and removal of excess rejuvenating agent.
7. Modifier type is tire rubber.

Section 300.2.4., "Emulsified Asphalt", is supplemented by the following:

Emulsified Asphalt. Provide emulsified asphalt that is homogeneous, does not separate after thorough mixing, and meets the requirements for the specified type and grade in Tables 7, 8, 9, 10 and 10A.

Table 10A
Non-Tracking Tack Coat Emulsion

Property	Test Procedure	Hard Residue NT-HRE		Regular Residue NT-RRE	
		Min	Max	Min	Max
Viscosity, Saybolt Furol, 77º F,sec	T 72	15	--	15	--
Storage stability, 1 Day, %	T 59	--	1	--	1
Settlement, 5-day, %	T 59	2	5	2	5
Sieve test, %	T 59	--	0.30	--	0.30
Distillation test:[1]	T 59				
Residue by distillation, % by wt.		50	--	50	--
Oil distillate, by volume of emulsion		--	1.0	--	1.0
Test on residue from distillation:					
Penetration, 77ºF, 100 g, 5 sec.	T 49	--	20	20	60
Solubility in trichloroethylene, %	T 44	97.5	--	97.5	--
Softening point, ºF	T 53	150		150	
Dynamic shear, G*/sin(δ), 82°C, 10 rad/s, kPa	T 315	1.0	--	1.0	--

1. Exception to AASHTO T-59: Bring the temperature on the lower thermometer slowly to 350ºF ± 10ºF. Maintain at this temperature for 20 min. Complete total distillation in 60 ± 5 min. from first application of heat.

Section 300.2.5., "Specialty Emulsions." The first sentence is voided and replaced with the following:

Specialty emulsions may be either asphalt-based or resin-based and must meet the requirements of Table 11 or Table 11A.

Section 300.2.5., "Specialty Emulsions," is supplemented by the following:

Table 11A
Hard Residue Surface Sealant

Property	Test Procedure	Min	Max
Viscosity, Krebs unit, 77ºF, Krebs units	D 562	45	75
Softening point, ºF	T 53[1]	250	--
Uniformity	D 2939	Pass[2]	
Resistance to heat	D 2939	Pass[3]	
Resistance to water	D 2939	Pass[4]	
Wet flow, mm	D 2939	--	0
Resistance to Kerosene (optional)[5]	D 2939	Pass[6]	
Ultraviolet exposure, UVA-340, 0.77 W/m^2, 50°C chamber, 8 hours UV lamp, 5 min spray, 3 hr. 55 min. condensation, 1,000 hr. total exposure[7]	G 154	Pass[8]	
Abrasion loss, 1.6 mm thickness, liquid only, %	ISSA TB-100	--	1.0
Residue by evaporation, % by weight	D 2939	33	--
Tests on residue from evaporation: Penetration, 77ºF, 100 g, 5 sec. Flash point, Cleveland open cup, °F	 T 49 T 48	 15 500	 30
Tests on base asphalt before emulsification Solubility in trichloroethylene, %	 T 44	 98	 --

1. Cure the emulsion in the softening point ring in a 200°F ± 5°F oven for 2 hr.
2. Product must be homogenous and show no separation or coagulation that cannot be overcome by moderate stirring.
3. No sagging or slippage of film beyond the initial reference line.
4. No blistering or re-emulsification.
5. Recommended for airport applications or where fuel resistance is desired.
6. No absorption of Kerosene into the clay tile past the sealer film. Note sealer surface condition and loss of adhesion.
7. Other exposure cycles with similar levels of irradiation and conditions may be used with Department approval.
8. No cracking, chipping, surface distortion, or loss of adhesion. No color fading or lightening.

Section 300.2.10., "Performance-Graded Binders," Table 17 is voided and replaced by the following:

Table 17
Performance-Graded Binders

Property and Test Method	Performance Grade																		
	PG 58			PG 64				PG 70				PG 76				PG 82		
	-22	-28	-34	-16	-22	-28	-34	-16	-22	-28	-34	-16	-22	-28	-34	-16	-22	-28
Average 7-day max pavement design temperature, °C[1]	58			64				70				76				82		
Min pavement design temperature, °C[1]	-22	-28	-34	-16	-22	-28	-34	-16	-22	-28	-34	-16	-22	-28	-34	-16	-22	-28
Original Binder																		
Flash point, T 48, Min, °C	230																	
Viscosity, T 316[2, 3]: Max, 3.0 Pa·s, test temperature, °C	135																	
Dynamic shear, T 315[4]: G*/sin(δ), Min, 1.00 kPa, Max, 2.00 kPa[7], Test temperature @ 10 rad/sec., °C	58			64				70				76				82		
Elastic recovery, D6084, 50°F, % Min[8]	–	–	30	–	–	30	50	–	30	50	60	30	50	60	70	50	60	70
Rolling Thin-Film Oven (Tex-541-C)																		
Mass loss, Tex-541-C, Max, %	1.0																	
Dynamic shear, T 315: G*/sin(δ), Min, 2.20 kPa, Max, 5.00 kPa[7], Test temperature @ 10 rad/sec., °C	58			64				70				76				82		
MSCR, T350, Recovery, 0.1 kPa, High Temperature, % Min[8]	-	-	20	-	-	20	30	-	20	30	40	20	30	40	50	30	40	50
Pressure Aging Vessel (PAV) Residue (R 28)																		
PAV aging temperature, °C	100																	
Dynamic shear, T 315: G*/sin(δ), Max, 5000 kPa Test temperature @ 10 rad/sec., °C	25	22	19	28	25	22	19	28	25	22	19	28	25	22	19	28	25	22
Creep stiffness, T 313[5, 6]: *S*, max, 300 MPa, *m*-value, min, 0.300 Test temperature @ 60 sec., °C	-12	-18	-24	-6	-12	-18	-24	-6	-12	-18	-24	-6	-12	-18	-24	-6	-12	-18
Direct tension, T 314[6]: Failure strain, min, 1.0% Test temperature @ 1.0 mm/min., °C	-12	-18	-24	-6	-12	-18	-24	-6	-12	-18	-24	-6	-12	-18	-24	-6	-12	-18

1. Pavement temperatures are estimated from air temperatures using an algorithm contained in a Department-supplied computer program, may be provided by the Department, or by following the procedures outlined in AASHTO MP 2 and PP 28.
2. This requirement may be waived at the Department's discretion if the supplier warrants that the asphalt binder can be adequately pumped, mixed, and compacted at temperatures that meet all applicable safety, environmental, and constructability requirements. At test temperatures where the binder is a Newtonian fluid, any suitable standard means of viscosity measurement may be used, including capillary (T 201 or T 202) or rotational viscometry (T 316).
3. Viscosity at 135°C is an indicator of mixing and compaction temperatures that can be expected in the lab and field. High values may indicate high mixing and compaction temperatures. Additionally, significant variation can occur from batch to batch. Contractors should be aware that variation could significantly impact their mixing and compaction operations. Contractors are therefore responsible for addressing any constructability issues that may arise.
4. For quality control of unmodified asphalt binder production, measurement of the viscosity of the original asphalt binder may be substituted for dynamic shear measurements of G*/sin(δ) at test temperatures where the asphalt is a Newtonian fluid. Any suitable standard means of viscosity measurement may be used, including capillary (T 201 or T 202) or rotational viscometry (T 316).
5. Silicone beam molds, as described in AASHTO TP 1-93, are acceptable for use.
6. If creep stiffness is below 300 MPa, direct tension test is not required. If creep stiffness is between 300 and 600 MPa, the direct tension failure strain requirement can be used instead of the creep stiffness requirement. The m-value requirement must be satisfied in both cases.
7. Maximum values for unaged and RTFO aged dynamic shear apply only to materials used as substitute binders, as described in specification items, 340, 341, and 344.
8. Elastic Recovery (ASTM D6084) is not required unless MSCR (ASTM 315) is less than the minimum % recovery. Elastic Recovery shall be used for the acceptance criteria in this instance.

Section 300.2.10., "Performance-Graded Binders," is supplemented by the following.

Table 17A
Surface Performance Grade (SPG) Specification

Surface Performance Grade	SPG 67				SPG 73				SPG 79			
	-13	-19	-25	-31	-13	-19	-25	-31	-13	-19	-25	-31
Average 7-day Max pavement surface design temperature[1], °C	< 67				< 73				< 79			
Min pavement surface design temperature[1], °C	> -13	> -19	> -25	> -31	> -13	> -19	> -25	> -31	> -13	> -19	> -25	> -31
Original Binder												
Flash point temp, T 48, Min, °C	230											
Viscosity, T 316[2]: Max 0.15 Pa*s, test temp., °C	205											
Original Performance Properties												
Dynamic Shear, T 315: G*/sinδ, Min 0.65 kPa, Test temp @ 10 rad/s, °C	67				73				79			
Phase angle[3] (δ), Max, @ temp. where G*/sinδ = 0.65 kPa	–	80	80	80	80	80	80	80	80	80	80	80
Pressure Aging Vessel (PAV) Residue (R 28)												
PAV aging temperature, °C	100				100				100			
Creep stiffness, T 313: S, Max 500 MPa, Test temp. @ 8 sec., °C	-13	-19	-25	-31	-13	-19	-25	-31	-13	-19	-25	-31

1. Temperatures are at the surface of the pavement structure. These may be determined from experience or may be estimated using equations developed by SHRP or LTPP, but modified to represent surface temperatures. Surface-grade high temperatures are generally 3°C to 4°C greater than those determined for Superpave PG binders.
2. The referee method will be AASHTO T 316 using a #21 spindle at 50 r/min, however alternate methods may be used for routine testing and quality assurance.
3. Phase angle is determined at the temperature where G*/sin δ =0.65 kPa. For routine testing and quality assurance, the phase angle can be interpolated from testing at two temperatures, one above and one below where G*/sin δ=0.65 kPa.