890.1 GENERAL REQUIREMENTS

Transporting conveyances for asphalt material shall be free of contaminating material. A record of material hauled the previous load in truck transport tanks shall be furnished as a prerequisite to loading. A determination shall be made if the previously hauled material is compatible with the material to be loaded or if cleaning of the tank is required to prevent contamination.

All sampling shall be performed in accordance with SD 301.

If the material is to be used prior to testing by the Department, the company or jobber furnishing asphalt materials shall furnish for each tank car, truck tank, or other individual conveyance, two copies of a certificate of compliance. The certificates shall show all information contained on Form DOT-62 and a properly executed certification statement.

Temperatures to provide kinematic viscosities of 300 centistokes and 150 centistokes for mixing application and 200 centistokes and 50 centistokes for spray application shall be furnished with each load of asphalt cement, performance graded asphalt binder or cut-back asphalt on or along with the certificate of compliance.

Upon presentation of a certificate of compliance, the Engineer may permit incorporation into the work the asphalt material covered by the certificate. Permission by the Engineer to use asphalt material shall not be construed as an acceptance of the material. Acceptance of asphalt material will be based on test results from the samples obtained.

Asphalt material tested and accepted for use on a project and transferred by the Contractor to another project, may be accepted for use in the terminating project on the basis of the test results of the originating project. The Contractor must request and receive from the Engineer of the originating project, prior to transfer, a letter of transfer covering the material. (DOT-70)

890.2 SPECIFIC REQUIREMENTS

A. Rapid Curing Cut-back Asphalt shall conform to AASHTO M 81.

B. Medium Curing Cut-back Asphalt shall conform to AASHTO M 82.

C. Slow Curing Cut-back Asphalt shall conform to the following requirements.

1. The oil shall be uniform in appearance and consistency and shall show no foaming when heated to the application temperature. The residue of specified penetration shall be smooth and homogeneous in appearance.

2. The grade of liquid asphaltic material specified shall conform to the requirements shown in the following table.

		SC-70		SC-250		SC-800		SC-3000	
REQUIREMENT	TEST METHOD	Min	Max	Min	Max	Min	Max	Min	Max
Kinematic Viscosity at 140ºF (60º C) (see Note 1) Centistokes	AASHTO T 201	70	140	250	500	800	1600	3000	6000
Flash Point (see Note 2) degrees º F (º C)	AASHTO T 79	150 (66)	---	175 (79)	---	200 (93)	---	225 (107)	---
Asphalt Residue of 100 pen., percent by weight	SD 310	50	---	60	---	70	---	80	---
Ductility of 100 pen., residue @77º F (25º C), 5 cm. Per min., cm	AASHTO T 51	100	---	100	---	100	---	100	---
Solubility in Trichlorethylene, percent	AASHTO T 44	99.0	---	99.0	---	99.0	---	99.0	---
Spot Test (See Note 3)	AASHTO T 102	Negative for all grades							

Note 1: As an alternative, Saybolt-Furol viscosities may be specified as follows:

Grade SC-70	Furol viscosity at 50º C	60 to 120 sec.
Grade SC-250	Furol viscosity at 60º C	125 to 250 sec.
Grade SC-800	Furol viscosity at 82.2º C	100 to 200 sec.
Grade SC-3000	Furol viscosity at 82.2º C	300 to 600 sec.

Note 2: If flash point is anticipated to be above 200ºF (93.3ºC) test shall be performed in accordance with AASHTO T 48.

Note 3: The use of the spot test is optional. When specified, the Engineer shall indicate whether the standard naphtha solvent, the naphtha xylene solvent or the heptane xylene solvent will be used in determining compliance with the requirement and in the case of xylene solvent, the percentage of xylene to be used.

D. Performance Graded Asphalt Binder shall conform to AASHTO Performance Graded Binder Specifications M320 and the Combined State Binder Group Method of Acceptance for Asphalt Binders available from the SD DOT Bituminous Engineer.

The asphalt binder shall, if necessary, be blended at the terminal with permissible additives styrene-butadiene styrene (SBS) or styrene-butadiene rubber (SBR) necessary to meet the specifications. The type of modifier supplied shall be listed on the certificate of compliance. Air blown asphalts, acid modifiers, and other modifiers will not be allowed.

SHRP Performance Graded Asphalt Binders PG 58-34, PG 64-28, PG 64-34, PG 70-28 and PG 70-34 shall also meet the following requirements:

Test	Specification	Test Method
Elastic Recovery, RTFO Residue, 77º F (25º C), %	Min 60	AASHTO T301

E. Emulsified Asphalt shall conform to AASHTO M 140 with the following exceptions. When SS-1h emulsified asphalt is specified for tack or flush seal coat, the cement mixing test requirement is waived. The sieve test requirement on representative samples will be waived unless requested by the Engineer.

	AE150S		AE150L		AE200S		AE300	
	Min	Max	Min	Max	Min	Max	Min	Max
TESTS ON EMULSIONS:								
Viscosity, Saybolt Furol at 122ºF (50ºC), s	35	150	35	150	35	150	35	150
Sieve test, %		0.30		0.30		0.30		0.30
Oil Portion, %	0.5	3			1	6		8
Residue by distillation, %	62		65 (see Note 1)		62		65	
TESTS ON RESIDUE FROM DISTILLATION TESTS								
Penetration, 77ºF (25ºC), 100 g, 5s	140	225	140	225	250		300	
Ductility, 77ºF (25ºC), 5 cm/min, cm	40		30		40		40	
Solubility in trichloroethylene, %	97.5		97.5		97.5		97.5	
Float test, 140ºF (60ºC), s	1200		1200		1200		1200	

Note 1: Distillation as described in T 59 with the following modifications: Material shall be brought to a temperature of 350ºF ± 10ºF (175ºC ± 5ºC) for a period of 20 minutes. Total time to distill, including the 20-minute hold period, shall not exceed 60 minutes.

F. Cationic Emulsified Asphalt shall conform to AASHTO M 208 with the following exceptions. When CSS-1h is specified for tack or flush seal coat, the cement mixing test requirement is waived. The sieve test shall have a maximum percentage of 0.30 for samples taken at point of use. The sieve test requirement on representative samples will be waived unless requested by the Engineer. The demulsibility test shall be made within 30 days from the date of shipment.

G. Polymer Modified Emulsified Asphalt shall conform to AASHTO M 140, with the following exceptions. The sieve test requirement on representative samples will be waived unless requested by the engineer.

	HFMS-2P		HFRS-2P		CRS-2P	
	Min	**Max**	**Min**	**Max**	**Min**	**Max**
TESTS ON EMULSIONS:						
Viscosity, Saybolt Furol @ 122ºF (50ºC)	50	400	50	400	100	400
Storage Stability Test (see Note 1)	Passes		Passes		Passes	
Cure Test (see Note 2)	Passes		Passes		Passes	
Classification test					Passes	
Particle charge test					Positive	
Sieve (%)		0.1		0.1		0.30
Demulsibility 50ml 0.10 N $CaCl_2$, %	40					
Demulsibility 50ml 0.02 N $CaCl_2$, %			30			
Demulsibility 35ml 0.8% Sodium dioctylsulfosucinate, %					40	
Oil Distillate by Volume of Emulsion,% (see Note 3)		3.0		3.0		1.0
Residue by Distillation, %	65		65		65	
TESTS ON RESIDUE FROM DISTILLATION TESTS:						
Penetration @ 77ºF (25ºC)	100	200	100	200	100	150
Ductility @ 39ºF (4ºC) 5cm/min., cm	30		30		30	
Softening Point (R&B) Deg. F	100		100		100	
Elastic Recovery @ 50ºF (10ºC)	55		55		55	
Float Test @ 140ºF (60ºC), sec	1200		1200			
Solubility in trichloroethylene, %					97.5	

Note 1: Storage Stability: In addition to requirement of AASHTO T-59, on examination of the test cylinder after the emulsion has been standing undisturbed for 24 hours, the surface shall show no white, milky covered substance but shall be a homogenous brown color throughout.

Note 2: The cure test is performed as follows: Pour approximately 1 gram of (HFMS-2P or HFRS-2P) emulsion onto a metal surface (lid of a 3 oz. Ointment tin). Allow the test sample to cure at temperatures of at least 80ºF under a heat light for 4 hours. The outdoor sunlight may be used as a testing site. After the 4-hour curing period, the (HFMS-2P or HFRS-2P) emulsion shall show no tackiness or tendency to stick to the fingers when pressed.

Note 3: The distillation test for CRS-2P emulsion shall be in accordance with AASHTO T 59, 8-12 except that the distillation temperature shall be what the emulsion manufacturer recommends.

H. Petroleum Resin-Oil Base Emulsion shall conform to the following requirements:

TEST	LIMITS		TEST METHOD
	MIN	MAX	
TESTS ON EMULSIONS:			
Saybolt-Furol viscosity at 77º F (25º C) (seconds)	15	40	AASHTO T 59
Miscibility	No coagulation		AASHTO T 59(see Note 1)
Sieve Test		.30	AASHTO T 59(see Note 2)
Partial Charge	Positive		
Residue Percent	60		AASHTO T 59(see Note 3)
TESTS ON RESIDUE FROM DISTILLATION TESTS:			
Kinematic Viscosity at 140º F (60º C) (centistokes)	100	200	AASHTO T 201

Note 1: Test procedure identical with T 59, except Normal Calcium Chloride solution shall be used in place of distilled water.

Note 2: Test procedure identical with T 59, except distilled water shall be used in place of two percent Sodium Oleate solution.

Note 3: T 59 residue by evaporation test for percent residue is made by heating a 50 gram sample to 300º F (149º C) until foaming ceases, then immediately cooled and results calculated.

The material shall have the capability of increasing the ductility and penetration of the asphalt binder in an asphalt concrete surface when applied at the specified rate.

Diluted Petroleum Resin-Oil Based Emulsion shall be diluted with potable water in the ratio of approximately two parts emulsion to one part water by volume. The diluted emulsion shall have a minimum Residue Percent of 40.