

SECTION 118

ASPHALT MATERIAL

118.1 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 to the Engineer 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.

The company or jobber furnishing asphalt materials shall furnish two copies of a Certificate of Compliance for each tank car, truck tank or other individual conveyance.

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 to the Engineer for each load of asphalt cement or cutback asphalt, on 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 of 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 based on 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](#)).

118.2 SPECIFIC REQUIREMENTS

- A. Rapid curing cutback asphalt shall conform to the requirements of AASHTO M81.
- B. Medium curing cutback asphalt shall conform to the requirements of AASHTO M82.
- C. Slow curing cutback 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 asphalt material specified shall conform to the requirements shown in Table 1.

Table 1

REQUIREMENT	SC-70		SC-250		SC-800		SC-3000	
	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.
Kinematic viscosity @ 60C (140F) (See Note 1) centistokes	70	140	250	500	800	1600	3000	6000
Flash Point (Cleveland open cut) Degrees C / (F)	66 150	---	79 175	---	93 200	---	107 225	---
Water Percent:	---	0.5	---	0.5	---	0.5	---	0.5
Asphalt residue of 100 pen., % by Weight	50	---	60	---	70	---	80	---
Ductility of 100 pen., residue @ 25C (77F), 5 cm per min., cm	100	---	100	---	100	---	100	---
Solubility in Trichloroethylene, %:	99.0	---	99.0	---	99.0	---	99.0	---
Distillation Test: Total distillate To 360C (680F), % by volume	10	30	4	20	2	12	---	5
Tests on residue from distillation: Kinematic viscosity at 60C (140F) Stokes	4	70	8	100	20	160	40	350

Spot Test (See Note 2) with:

Standard naphtha	Negative for all grades
Naphtha xylene solvent, % xylene	Negative for all grades
Heptane xylene solvent, % xylene	Negative for all grades

Footnotes

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

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

- 2) 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. Sampling and Testing

Sampling	SD 301
Water	AASHTO T 55
Flash Point	AASHTO T 48
Kinematic Viscosity	AASHTO T 201

Saybolt Furol Viscosity	AASHTO T 72
Residue of Specified Penetration	SD 310
Ductility	AASHTO T 51
Solubility in Trichloroethylene	AASHTO T 44
Distillation	AASHTO T 78

- E. Performance graded asphalt cement binder shall be used for all pavement within the City of Rapid City street right of way unless another binder is approved by the Engineer and is specified in the detailed specifications. Mainline street and intersection pavement shall utilize PG64-28 graded asphalt binder. Sidewalks, low traffic driveways, or areas where significant hand working is required may utilize PG64-22 or PG58-28 binders.

Performance Graded Asphalt Cement Binder shall conform to AASHTO Performance Graded Binder Specifications (MPI) and the Combined Stare Binder Group Method of Acceptance for Asphalt Binders.

Permissible modifiers for the Specific SHRP Performance Graded Asphalt Binder are Styrene-Butadiene Rubber (SBR) or Styrene-Butadiene-Styrene Rubber. Certified test results for the asphalt binder and modifier shall be provided for each load shipped to the project. The modifier shall be added at an approved blending plant.

The Contractor shall provide a Job-Mix Formula to the Engineer with supporting mix design data prior to production. The Engineer may require field adjustment of the asphalt binder content.

- F. Penetration Graded or Viscosity Graded Asphalt Cement Binder, where specified in the Detailed Specifications in lieu of Performance Graded Asphalt Binder shall conform to the requirements of AASHTO M 20 and AASHTO M 226 respectively.

When a penetration-graded asphalt cement is specified, the Contractor may furnish the comparable viscosity graded asphalt cement as set forth in the following table:

AASHTO M 226		AASHTO M 20	
AC - 2.5	for	200-300	
AC - 5	for	120-50	
AC - 10	for	85-100	
AC - 20	for	60-70	

The Certificate of Compliance for the asphalt cement furnished shall indicate by grade designation which grading specification (AASHTO \geq M 20 or AASHTO M 226) the material is certified to meet.

In the event asphalt cement is furnished simultaneously from sources to meet different grading specifications, the Engineer may require separate storage and use of the material from a source if viscosity characteristics of the two materials are not compatible at the same mixing temperature.

- G. Emulsified asphalt shall conform to the specification requirements of AASHTO M 140. When SS-1h Emulsified Asphalt is specified, the penetration of the residue from distillation shall be from 40 to 115 penetration and, when specified for tack or flush seal coat, the cement mixing test requirement is waived.
- H. Cationic Emulsified Asphalt shall conform to the specification requirements of AASHTO M 208. When CSS-1h is specified, the penetration of the residue from distillation shall be from 40 to 115 penetration and, when specified for tack or flush seal coat, the cement mixing test requirement is waived.
- I. Petroleum Resin-Oil Base Emulsion shall conform to the following requirements:

TEST	LIMITS		TEST METHOD
	MIN.	MAX.	
Saybolt-Furol Viscosity (at 77 deg. F. (second))	15	40	AASHTO T 59
Residue Percent	60		AASHTO T 59 (1)
Miscibility	No Coagulation		AASHTO T 59 (2)
Sieve Test		10	AASHTO T 59 (3)
Particle Charge	Positive		
Tests on Residue Kinematic Viscosity (at 140 deg. F.) centistokes	100	200	AASHTO T 201
Asphaltene Percent		75	ASTM D 2007
Maltenes Dist. Ratio	0.3	50	ASTM D 2007 (4)

PC + A1

S + A2

Footnotes

- (1) T 59 residue by evaporation test for percent residue is made by heating a 50-gram sample to 300° until foaming ceases, then immediately cooling sample and calculating results.
- (2) Test procedure identical with T 59, except Normal Calcium Chloride solution shall be used in place of distilled water.
- (3) Test procedure identical with T 59, except distilled water shall be used in place of 2% Sodium Oleate solution.

(4) In the Maltenes Distribution Ratio Test by ASTM D 2007:

PC = Polar Compounds A1 = First Acidaffins
A2 = Second Acidaffins S = Saturates

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

- J. Petroleum Resin-Oil Base Emulsion (Diluted) shall be diluted with potable water in the ratio of approximately two parts emulsion to one part water by volume.

The petroleum Resin-Oil Base Emulsion, prior to dilution, shall conform to the requirements of "G" above.

The diluted emulsion shall meet the following requirements:

TEST	LIMITS		TEST METHOD
	MIN.	MAX.	
Residue Percent	40		AASHTO T 59(1)
Sieve Test		10	AASHTO T 59(3)
Tests on Residue Kinematic Viscosity (at 140 deg. F.)			AASHTO T 201
centistokes	100	200	

See Paragraph I for Footnotes.

- K. "High Float" Emulsified Asphalt shall conform to the following requirements:

TABLE 1

TEST	GRADE AE150S		GRADE AE200S		GRADE AE300	
	MAX.	MIN.	MIN.	MAX.	MIN.	MAX.
Viscosity (Saybolt Furol) (at 122°F (50°C) Sec.)	35	150	35	150	35	500
Sieve Test – Percent		.30		.30		.30
Oil Portion Dist. (% by Volume)	.5	3	1	6		8
Residue by Dist. (% by Weight)	62		62		65	
Tests on Residue From Distillation Float Test (at 140°F (60°C) sec.)	1200		1200		1200	
Penetration (at 77°F, 100 q. 5 sec. – 0.1mm)	140	225	250		300	
Solubility in Trichloroethylene (%)	97.5		97.5		97.5	
Ductility (at 77°F, (25°C), 5 cm/min. – cm)	40		40		40	

The properties of the Emulsified Asphalt shall be determined in accordance with AASHTO T 59.

Float test properties on the residue from distillation shall be determined in accordance with AASHTO T 50.

118.3 TEST REPRODUCIBILITY TOLERANCE

Test results which fall outside the specifications limits for a particular test but within the reproducibility tolerance as set forth below, will be acceptable:

<u>TEST</u>	CUTBACK ASPHALT	<u>TOLERANCE*</u>
Flash Point		
Tag Open Cup		
(Av. of three tests).....		4°F
Cleveland Open Cup.....		15°F
Viscosity		
Kinematic, 140° F		
(to 3000 CS).....		1.5%
Kinematic, 140° F		
(above 3000 CS).....		4.5%
Saybolt-Furol.....		4.5%
Distillation		
Distillate % by vol.		
(up to 347° F).....		1.8% pts.
Distillate % by vol.		
(above 347° F).....		1.0% pt.
Residue % by vol.....		1.0% pt.
Test on Residue		
Penetration.....		8%
Solubility in CH ₃ CCl ₃		0.13% pt.
EMULSIFIED ASPHALTS		
Distillation		
Residue by % vol.....		1.0% pt.
Test on Residue		
Penetration (100 or more).....		15 pen pts.
Penetration (less than 100).....		8 pen pts.
ASPHALT CEMENT		
Penetration, 77° F		
(Less than 50).....		2 pen pts.
Penetration, 77° F (50 or above).....		4%
Flash Point		
Cleveland Open Cup.....		15° F

Pensky-Marten's Closed Cup (below 220° F).....	3° F
Pensky-Marten's Closed Cup (above 220° F).....	13° F
Viscosity	
Kinematic, 275° F	4.4%
Absolute, 140° F	5.0%
Solubility in Ch ₃ CCl ₃	0.13% pt.
Thin-Film Test	
Loss on Heating.....	20%
% of Original.....	4% pts.

* When tolerances are expressed in terms of percent, the allowable deviation is calculated as the indicated percentage of the upper or lower specification limit, whichever is applicable.

**118.4 METHOD OF MEASUREMENT &
118.5 BASIS OF PAYMENT**

Asphalt material will be measured and paid for in accordance with the various asphalt construction items.

END OF SECTION