



Specifications For Manufactured Materials

Section: EMULSIFIED ASPHALT

Subject: HIGH FLOAT SEALING GRADES

1. PRODUCT DESCRIPTION

1.1 Description

The specification for high float sealing grade (HFSG) emulsified asphalt applies to liquid asphaltic materials in the form of homogeneous aqueous emulsions of the anionic type. HFSG emulsified asphalts are specified by the following grades; HF100S, HF150S, HF250S, HF350S.

1.2 Composition/Characteristics

High float emulsified asphalt shall consist of asphalt cements dispersed in an aqueous phase and may contain a light petroleum distillate. The residual bitumen has non-Newtonian flow characteristics and exhibits resistance to flow regardless of penetration of the residual bitumen.

1.3 Application/Use

The HFSG emulsified asphalt described herein shall be suitable for use as outlined in Table 1 - Principal Uses of Asphalt Materials of the National Standard of Canada CAN/CGSB-16.6-M89, PRINCIPAL USES AND TERMINOLOGY FOR ASPHALT MATERIALS FOR ROAD PURPOSES.

1.4 Method of Production

Emulsified asphalt is a dispersion of asphalt cement suspended in water effected through the use of mechanical energy, thermal energy and the use of emulsifiers to maintain the dispersion.

If the supplier elects to incorporate non-traditional material components such as crude oil, waste products or by products of other industrial and manufacturing processes in the HFSG emulsified asphalt, the Province must be advised in writing before any material is supplied.

1.5 Definitions

Asphalt Cement: A dark brown to black solid or semi-solid cementitious material which gradually liquifies when heated. One type of bitumen that is obtained as residue in refining crude oil.

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Bitumen: Any mixture of hydrocarbons of natural or pyrogenous origin or both which is completely soluble in carbon disulphide.

Emulsified Asphalt: A mixture of asphalt cement with or without petroleum solvent and water containing an emulsifying agent, which maintains the asphalt cement globules in suspension. The water is the continuous phase and the asphalt cement globules are the discontinuous phase.

Residual Bitumen: The residual material which remains after the distillation of an emulsified asphalt as described by the test methods referenced in this specification.

2. PRODUCT SPECIFICATION

2.1 General Requirements

2.1.1 **Uniformity**

All grades of high float sealing grade emulsified asphalt described herein shall be free of contamination and shall be homogeneous and uniform in character throughout.

2.1.2 **Delivery**

The specified material shall be delivered in accordance with the Department's Specifications for Manufactured Materials (SMM) 104 General Provisions for Asphalt Supply Contracts.

2.1.3 **Prequalification Samples**

First time suppliers of products described in the specification shall comply with the prequalification requirements described in SMM 104.

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2.2 Material Characteristics and Properties

TABLE 1

Requirements of High Float Sealing Grade Emulsified Asphalt

GRADE	HF-100S		HF-150S		HF-250S		HF-350S		TEST METHOD
	Min	Max	Min	Max	Min	Max	Min	Max	
PROPERTY									(Note 3)
Residue by Distillation, (% by mass)	62	-*	62	-*	62	-*	65	-*	CAN2-16.5-M84 Par. 6.2.1
Oil Portion of Distillate, (% by volume)	1.0	4.0	1.0	4.0	1.0	6.0	1.5	6.0	ASTM D244 CAN2-16.5-M84 Par. 6.2.1.3
Viscosity (SF) @50° C, (s)	30	150	30	150	35	150	75	400	ASTM D244
Sieve Test, Retained on 1000 um sieve, (% by mass)	-	0.1	-	0.1	-	0.1	-	0.1	CAN2-16.5-M84 Par. 6.2.2
Coating Test (see notes)	Note 1	Note 1	Note 1	Note 1	Note 1	Note 1	Note 2	Note 2	ASTM D244, Notes 1 & 2
Storage Stability Test, 24 h, (% by mass)	-	1.5	-	1.5	-	1.5	-	1.5	ASTM D244
Demulsibility, 50 ml, 5.55 g/L, CaCl ₂ , (% by mass)	75	-	75	-	65	-	65	-	ASTM D244

Tests on Residue

Penetration @ 25° C, 100g, 5 s (0.1 mm)	90	150	150	250	250	450	350	750	CAN2-16.5-M84 Par. 6.2.4
Apparent Viscosity at 60° C, (Pa.s)	Requirements outlined on the chart beneath								CAN2-16.5-M84 Par. 6.2.5, ASTM 2171
Figure 1	Figure 1	Figure 1	Figure 1	Figure 1	Figure 1	Figure 1	Figure 1	Figure 1	
Float Test @ 60° C, (s)	1200	-	1200	-	1200	-	1200	-	CAN2-16.5-M84 Par. 6.2.6
Solubility in Trichloroethylene(% by weight)	97.5	-	97.5	-	97.5	-	97.5	-	ASTM D2042

NOTE 1: Follow ASTM D244, except that the mixture of limestone and emulsified asphalt shall be capable of being mixed vigorously for 5 min, at the end of which period the stone shall be thoroughly and uniformly coated. The mixture shall then be completely immersed in tap water and the water poured off. The stone shall then not be less than 90% coated.

NOTE 2: Follow ASTM D244, except that the mixture of limestone and emulsified asphalt shall be mixed vigorously for 5 min, then allowed to stand for 3 hours, after which the mixture shall be capable of being mixed an additional 5 min. The mixture shall then be rinsed twice with approximately its own volume of tap water, without showing appreciable loss of bituminous film. After the second mixing the aggregate shall be at least 90% coated.

NOTE 3: Reference to ASTM Test Procedures shall be from the most recently approved version of the test procedure available at the time of supply contract award.

* Upper limit on % residue is governed by the viscosity limits.



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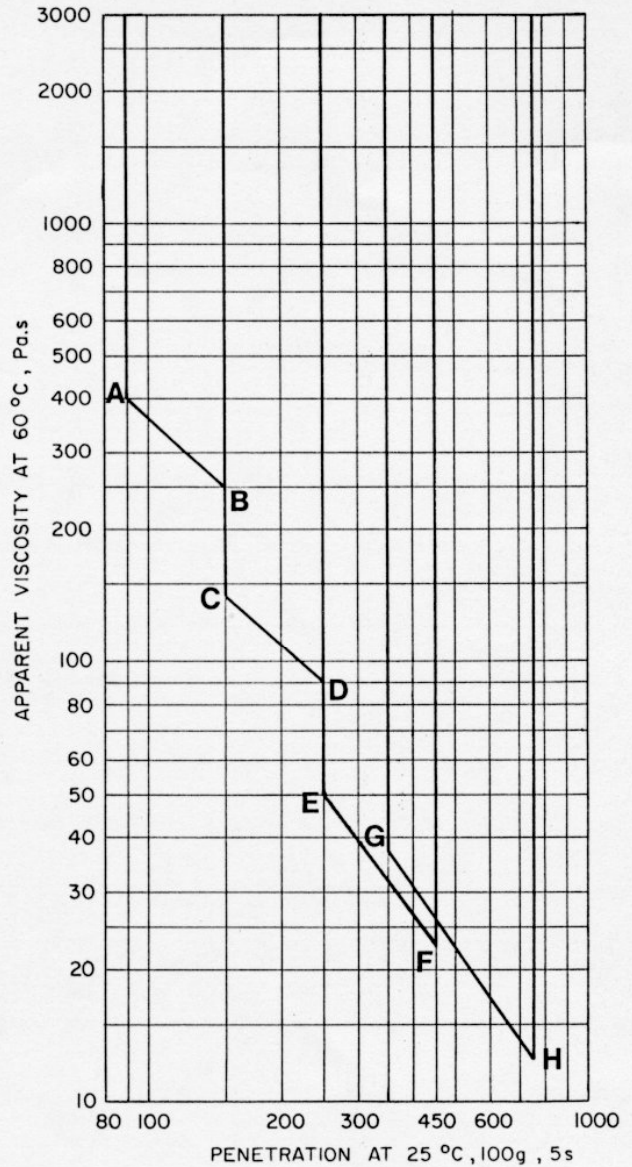
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FIGURE 1: VISCOSITY REQUIREMENTS FOR
DISTILLATION RESIDUES FROM
HIGH-FLOAT SEALING GRADE
EMULSIFIED ASPHALTS

Viscosity shall be within the graphic regions
above the line designated by specified
letters, and between penetration limits
contained in vertical lines extending upwards
from those points

Viscosity value shall be reported at $0.5s^{-1}$ for
grades HF-100S and HF-150S and at $1.0s^{-1}$ for
grades HF-250S and HF-350S



GRADE of HF EMULSIFIED ASPHALT	HF-100S	HF-150S	HF-250S	HF-350S
	A, B	C, D	E, F	G, H

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3. QUALITY ASSURANCE

3.1 Samples

Samples will be in accordance with Standard Testing Procedure (STP) 102 Sampling Asphalt Materials.

3.2 Testing

3.2.1 Sample Preparation

Sample preparation for all high float sealing grade emulsified asphalts shall be in accordance with the American Society for Testing and Materials (ASTM) D244 Standard Test Methods and Practices for Emulsified Asphalts, with the following qualifications:

- a) Once the sample has reached the specified temperature of $50 + 3^{\circ}$ C, it shall be removed from the heat source within 24 hours, mixed and individual test samples poured; and
- b) Mixing shall be by hand stirring until the sample is homogenous in character, taking care to ensure that air is not being entrained into the emulsion during mixing.

3.2.2 Pay Reduction Tests

The Province has the option to do any one or more of the tests listed in Table 1 on any of the samples obtained by it. Pay reductions will be based on results of the tests performed.

If a test result is found to fall outside of the specification limits, a second test will be done on another portion of the same sample and the results averaged to assess the pay adjustment.

Should the duplicate test results differ by more than the tolerances for repeatability stated in 3.2.4 of this specification, then the average of the two test values shall not be used and instead the test result numerically nearest the specification limit shall govern.

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3.2.3 Time Limits

Loads on which no tests are performed or where tests have not been made within four weeks of the sampling date, will be accepted without pay adjustment.

3.2.4 Interpretation of Results

The criteria for judging the acceptability of test results for each property specified herein shall be the tolerances for repeatability specified in the most recent ASTM standard test method for that property. For the following properties, testing within a lab or between two labs shall meet the following requirements.

Repeatability

Property	Unit of Measure	Within a Lab (same operator)	Range of Measurement
Oil Portion of Distillate	% by volume	0.5	0.0-0.7
Penetration on 0.1 mm Residue (25o C, 100 g, 5 s)	0.1 mm	15 35	80-200 200-500

3.3 Acceptance and Rejection

Pay reductions on HFSG emulsified asphalt which do not meet specification will be calculated as outlined in the attached form - FORM FOR DETERMINING THE PAY REDUCTION FOR HFSG EMULSIFIED ASPHALT THAT DOES NOT MEET SPECIFICATION.

4. MEASUREMENT

Measurement of HFSG emulsified asphalt will be in accordance with SMM104.

5. DELIVERY

Delivery of HFSG emulsified asphalt will be in accordance with SMM104.

6. PAYMENT

Payment for HFSG emulsified asphalt will be in accordance with SMM104 and the following:

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FORM FOR DETERMINING THE PAY REDUCTION
FOR HFSG EMULSIFIED ASPHALT THAT DOES NOT MEET SPECIFICATION

MANUFACTURER _____ LAB ADMITTANCE NO. _____

PRODUCT TYPE _____ CONTROL SECTION _____

DELIVERY SLIP NO. _____ DEPARTMENT CONTRACT NO. _____

DATE SAMPLED _____ MAINTENANCE TANK LOCATION _____

DATE TESTED _____ PROJECT MANAGER _____

ADJUSTMENT TEST	SPECIFICATION LIMITS		TEST RESULTS	NO. UNITS OUTSIDE SPEC LIMITS	MULTIPLICATION FACTOR	NO. OF POINTS
	MIN	MAX				
Residue by Distillation(% by mass)	_____	_____	_____	_____	110	_____
Oil Portion of Distillation (% by volume)	_____	_____	_____	_____	200	_____
Viscosity (SF) @ 50 ° C, (s)	_____	_____	_____	_____	(Note 1)	_____
Sieve Test,Retained on 1000µm Sieve (% by mass)	_____	_____	_____	_____	400	_____
Coating Test (%)	_____	_____	_____	_____	15	_____
Storage Stability Test, 24h(% by mass)	_____	_____	_____	_____	75	_____
Demulsibility, 50 ml, 5.55 g/l, CaCL ₂ , (% by mass)	_____	_____	_____	_____	30	_____
Penetration @ 25 ° C, 100 g, 5 s ,(0.1mm)	_____	_____	_____	_____	(Note 2)	_____
Apparent Viscosity @ 60° C, (Pa.s)	_____	_____	_____	_____	(Note 3)	_____
Float Test @ 60° C, (s)	_____	_____	_____	_____	(Note 4)	_____
Solubility in Trichloroethylene (% by weight)	_____	_____	_____	_____	65	_____
TOTAL ADJUSTMENT POINTS						_____

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Note 1

If test result < minimum Specified Value, Multiplier Factor is 35
If test result > maximum Specified Value, Multiplier Factor is 10

Note 2

HF100S Multiplier Factor is 9
HF150S Multiplier Factor is 9
HF250S Multiplier Factor is 8
HF350S Multiplier Factor is 7

Note 3

HF 100S Multiplier Factor is 5
HF 150S Multiplier Factor is 10
HF 250S Multiplier Factor is 25
HF 350S Multiplier Factor is 35

Note 4

HF 100S Multiplier Factor is 1.5
HF 150S Multiplier Factor is 1.5
HF 250S Multiplier Factor is 1.5
HF 350S Multiplier Factor is 1.0

$$\text{PAY ADJUSTMENT POINTS} = \left(\frac{\text{TOTAL ADJUSTMENT POINTS}}{100} \right)^{2.3}$$

If Pay Adjustment Points \leq 2, Pay Factor is: 1

If Pay Adjustment Points > 2, Pay Factor is: $1 - \left(\frac{\text{PAY ADJUSTMENT POINTS}}{100} \right)$

Payment = (Price/Kilogram) (Total Weight)(Pay Factor); except that, if the calculated pay adjustment points exceed 2, the pay reduction will be \$200.00 or the calculated pay reduction, whichever is greater.