MATERIAL SPECIFICATION FOR EMULSIFIED ASPHALT

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1103.01 SCOPE

This specification covers the requirements for different types and grades of emulsified asphalt suitable for both roadway construction and as a straw mulch adhesive.

1103.01.01 Specification Significance and Use

This specification is written as a municipal-oriented specification. Municipal-oriented specifications are developed to reflect the administration, testing, and payment policies, procedures, and practices of many municipalities in Ontario.

Use of this specification or any other specification shall be as specified in the Contract Documents.

1103.01.02 Appendices Significance and Use

Appendices are not for use in provincial contracts as they are developed for municipal use, and then, only when invoked by the Owner.

Appendices are developed for the Owner's use only.

Inclusion of an appendix as part of the Contract Documents is solely at the discretion of the Owner. Appendices are not a mandatory part of this specification and only become part of the Contract Documents as the Owner invokes them.

Invoking a particular appendix does not obligate an Owner to use all available appendices. Only invoked appendices form part of the Contract Documents.

The decision to use any appendix is determined by an Owner after considering their contract requirements and their administrative, payment, and testing procedures, policies, and practices. Depending on these considerations, an Owner may not wish to invoke some or any of the available appendices.

1103.02 REFERENCES

When the Contract Documents indicate that municipal-oriented specifications are to be used and there is a municipal-oriented specification of the same number as those listed below, references within this specification to an OPSS shall be deemed to mean OPSS.MUNI, unless use of a provincial-oriented specification is specified in the Contract Documents. When there is not a corresponding municipal-oriented specification, the references below shall be considered to be the OPSS listed, unless use of a provincial-oriented specification is specified in the Contract Documents.

This specification refers to the following standards, specifications, or publications:

Ontario Provincial Standard Specifications, Material

OPSS 1153 Emulsified Asphalt Patching Material

Ontario Ministry of Transportation Publications

MTO Laboratory Testing Manual:
LS-200 Penetration of Bituminous Materials
LS-204 Solubility of Bituminous Materials in Trichloroethylene
LS-205 Ductility of Bituminous Materials
LS-207 Float of Bituminous Materials
LS-208 Elastic Recovery by Ductilometer
LS-216 Determination of Residue by Distillation of Emulsified Asphalts
LS-217 Determination of Oil Portion of Distillate in Emulsified Asphalt Primers
LS-218 Particle Charge of Emulsified Asphalt and Emulsified Asphalt Primers
LS-219 Viscosity of Emulsified Asphalts
LS-220 Demulsibility of Emulsified Asphalts
LS-221 Settlement and Storage Stability of Emulsified Asphalt

LS-222 Cement Mixing of Emulsified Asphalts
LS-223 Sieve Test for Emulsified Asphalts
LS-224 Coating for Emulsified Asphalts
LS-226 Test for High Float Emulsified Asphalt

ASTM International

D 140/D 140M -15 Standard Practice for Sampling Bituminous Materials
D 1310-14 Standard Test Method for Flash Point and Fire Point of Liquids by Tag Open-Cup Apparatus
D 2939-03 Test Methods for Emulsified Bitumens Used As Protective Coating
D 6930-10 Standard Test Method for Settlement and Storage Stability of Emulsified Asphalts

1103.03 DEFINITIONS

For the purpose of this specification, the following definitions apply:

Emulsified Asphalt means an asphalt cement mixed with water to increase the flow qualities of the asphalt cement.

1103.05 MATERIALS

1103.05.01 General

Emulsified asphalt shall be of the type and grade specified in the Contract Documents and shall be supplied from a source approved by the Owner. Under no circumstances shall the source of supply or the product be changed, or partial or total supply allocated to another supplier without prior written approval of the Owner.

1103.05.02 Physical Requirements

Emulsified asphalts shall consist of suitable paving asphalts dispersed in water and shall meet the requirements specified in Tables 1, 2, 3, 8, and 9 and Figure 1. The addition of polymers or other additives after the manufacture of an emulsified asphalt shall not be permitted.

Emulsified asphalts and polymer-modified emulsified asphalts shall be homogeneous after mixing and show no signs of separation within 14 Days of delivery.

1103.05.03 Straw Mulch Adhesive

Emulsified asphalt used as a straw mulch adhesive shall be a specially refined petroleum asphalt emulsified in water, of fluid consistency designed for cold spray applications, containing neither petroleum solvents nor other components toxic to plant life, and shall be according to Table 1.

1103.05.04 Shipping

The material shall be shipped in clean containers. Containers that are being reused shall be inspected and cleaned, if required, prior to loading to ensure there is no contamination.

When shipping is by tank truck or railway tank car, the material shall arrive at the destination at a temperature at least 5 °C higher than the minimum spraying temperature specified in Table 4 and not more than the maximum spraying temperature specified in Table 4.

1103.08 QUALITY ASSURANCE

1103.08.01 Compliance

Emulsified asphalts shall be according to Tables 1, 2, 3, 8, and 9 and Figure 1 for the particular type and grade when tested according to the test methods designated in the tables.

1103.08.02 Inspection

The Owner may inspect shipping containers for cleanliness at any time.

1103.08.03 Sampling

Representative samples of material being supplied may be taken, if specified in the Contract Documents, according to ASTM D 140 from either the supplier's plant or any shipment in the presence of the Contract Administrator. Sample material taken prior to delivery shall be at no extra cost to the Owner.

1103.08.04 Testing

Samples may be tested by the Owner according to the tests listed in material requirement tables.

1103.08.05 Rejection

Failure of any sample to conform to any of the material requirements shall be cause for rejection of the material. Rejected materials shall be replaced at no extra cost to the Owner.

1103.09 OWNER PURCHASE OF MATERIAL

Asphalt emulsion shall be measured by mass in tonnes as specified in the purchasing order. The tare of the hauling vehicle shall be determined for each load.

Payment at the price specified in the purchasing order shall be for the supply of the emulsified asphalt delivered to the destination on the date and time specified.

The cost of all testing, except that performed in the Owner’s laboratory, shall be included in the price.

TABLE 1
Anionic Emulsified Asphalts

Requirements	Type	Rapid Setting				Medium Setting				Slow Setting						Test Method
	Grade	RS-1		RS-2		MS-1		MS-2		SS-1		SS-1H		Straw Mulch Adhesive		
		Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	
Tests on Emulsion																
Viscosity, Saybolt Furol Seconds : at 25 °C at 50 °C		20 --	100 --	-- 75	-- 300	20 --	60 --	-- 35	-- 400	20 --	60 --	20 --	60 --	17 --	40 --	LS-219
Residue by Distillation, % by Mass		55	--	60	--	55	--	65	--	55	--	55	--	55	--	LS-216
Settlement, %, 5 Days 7 Days		-- --	3 --	-- --	3 --	-- --	3 --	-- --	3 --	-- --	5 --	-- --	5 --	-- --	-- 5	LS-221
Demulsibility, % 35 ml, 0.02 N $CaCl_2$ 50 ml, 0.1 N $CaCl_2$		60 --	-- --	60 --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- 2.0	LS-220
Oil Portion of Distillate, % by Volume/Mass		--	--	--	--	--	--	--	10	--	--	--	--	--	--	LS-217
Sieve Text, % by Mass		--	0.1	--	0.1	--	0.1	--	0.1	--	0.1	--	0.1	--	0.1	LS-223
Cement Mixing Test, % by Mass		--	--	--	--	--	--	--	--	--	2.0	--	2.0	--	--	LS-222
Particle Charge		NEGATIVE OR NEUTRAL														LS-218
Coating Ability and Water Resistance, %, Note 1		--	--	--	--	80	--	80	--	80	--	80	--	--	--	LS-224
Fire Resistance		--	--	--	--	--	--	--	--	--	--	--	--	PASS		Note 2
Tests on Residue																
Penetration (at 25 °C, 100 g, 5 s), 0.1 mm		100	200	100	200	100	200	100	250	100	200	40	100	100	200	LS-200
Ductility (at 25 °C, 5 cm/min), cm		60	--	60	--	40	--	40	--	40	--	40	--	40	--	LS-205
Solubility in Trichloroethylene, % by Mass		97.5	--	97.5	--	97.5	--	97.5	--	97.5	--	97.5	--	97.5	--	LS-204

Notes:

1. This requirement does not apply for tack coat or joint painting emulsified asphalts.

2. There shall be no flash or flare-up when the flame of a bunsen burner is held in contact with the surface of the material, as received, for a period of 10 seconds.

TABLE 2
Cationic Emulsified Asphalts

Requirements	Type	Rapid Setting				Medium Setting				Slow Setting				Slurry Seal		Test Method
	Grade	CRS-1		CRS-2		CMS-2		CMS-2H		CSS-1		CSS-1H		CSS-H		
		Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	
Tests on Emulsion																
Viscosity, Saybolt Furol Seconds : at 25 °C at 50 °C		-- 50	-- 150	-- 100	-- 400	-- 50	-- 400	-- 50	-- 400	20 --	100 --	20 --	100 --	20 --	100 --	LS-219
Residue by Distillation, % by Mass		62	--	67	--	65	--	65	--	57	--	57	--	57	--	LS-216
Settlement, %, 5 Days		--	5	--	5	--	5	--	5	--	5	--	5	--	5	LS-221
Demulsibility, % 35 ml, 0.8% Dioctyl Sodium Sulfosuccinate Solution		40	--	40	--	--	--	--	--	--	--	--	--	--	--	LS-220
Oil Portion of Distillate, % by Volume/Mass		--	3	--	3	--	10	--	10	--	5	--	5	--	--	LS-217
Sieve Text, % by Mass		--	0.1	--	0.1	--	0.1	--	0.1	--	0.1	--	0.1	--	0.1	LS-223
Cement Mixing Test, % by Mass		--	--	--	--	--	--	--	--	--	2.0	--	2.0	--	--	LS-222
Particle Charge		POSITIVE														LS-218
Coating Ability and Water Resistance, %		--	--	--	--	80	--	80	--	80	--	80	--	--	--	LS-224
Tests on Residue																
Penetration (at 25 °C, 100 g, 5 s), 0.1 mm		100	250	100	250	100	250	40	125	100	250	40	125	40	125	LS-200
Ductility (at 25 °C, 5 cm/min), cm		60	--	60	--	60	--	40	--	60	--	40	--	40	--	LS-205
Solubility in Trichloroethylene, % by Mass		97.5	--	97.5	--	97.5	--	97.5	--	97.5	--	97.5	--	97.5	--	LS-204

TABLE 3
High Float Emulsified Asphalts

Requirements	Type	High Float														Test Method
	Grade	HFRS-2		HFMS-2(ON)		HF-100S		HF-150S		HF-250S		HF-150M		HF-1000M		
		Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	
Tests on Emulsion																
Viscosity, Saybolt Furol Seconds at 50 °C		75	400	50	300	35	150	35	150	35	150	50	--	50	--	LS-219
Residue by Distillation, % by Mass		63	--	62	--	62	--	62	--	62	--	62	--	65	--	LS-226 LS-216
Demulsibility, % 35 ml 0.02 N $CaCl_2$ 50 ml 0.10 N $CaCl_2$ 50 ml 0.02 N $CaCl_2$		60 -- --	-- -- --	-- -- 40	-- -- --	-- 75 --	-- -- --	-- 75 --	-- -- --	-- -- --	-- -- --	-- -- --	-- -- --	-- -- --	-- -- --	LS-220
Oil Portion of Distillate, % by Volume/Mass		--	--	0.5	3	0.5	4	0.5	4	1	6	1	6	1	7	LS-217
Sieve Text, % by Mass		--	0.10	--	0.10	--	0.10	--	0.10	--	0.10	--	0.10	--	0.10	LS-223
Particle Charge		--		Negative		--		--		--		--		--		LS-218
Coating Ability and Water Resistance, %		--		90	--	90	--	90	--	90	--	Note 1		Note 1		LS-224
Storage Stability Test, 24 h, % by Mass		--	1.0	--	1.5	--	1.5	--	1.5	--	1.5	--	1.5	--	1.5	ASTM D 6930
Tests on Residue																
Penetration (at 25 °C, 100 g, 5 s), 0.1 mm		100	200	90	200	100	175	150	250	250	500	150	--	--	--	LS-226 LS-200
Ductility (at 25 °C, 5 cm/min), cm		40	--	--	--	--	--	--	--	--	--	--	--	--	--	LS-205
Solubility in Trichloroethylene, % by Mass		97.5	--	97.5	--	97.5	--	97.5	--	97.5	--	97.5	--	97.5	--	LS-204
Float Test at 60 °C, s		1200	--	1200	--	1200	--	1200	--	1200	--	1200	--	1200	--	LS-226 LS-207
Apparent Viscosity (at 60 °C), Pa·s		--	--	--	--	Requirements outlined on Figure 1						10	80 (Note 2)	2	8 (Note 2)	LS-226

Notes:

1. Follow LS-224, except that the mixture of aggregate 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 1 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.

2. Viscosity limits (at 60 °C at 1.0 s^{-1}) shown for mixing grades are tentative. Supplier to advise purchaser before delivery, if limits cannot be met.

TABLE 4
Temperature for Spraying and Mixing Emulsified Asphalts, °C

Grade	Spraying		Mixing	
	Minimum	**Maximum**	**Minimum**	**Maximum**
RS-1, RS-1P	30 (Note 1) 20 (Note 2)	70 70	-- --	-- --
RS-2, RS-2P	60 (Note 1)	80	--	--
MS-1	--	--	30	70
MS-2	--	--	30	70
SS-1	20	70	20	70
SS-1H	20	70	20	70
HFRS-2	60	80	--	--
HFMS-2(ON), HFMS-2P(ON)	60	80	--	--
HF-100S, HF-100SP	60	80	--	--
HF-150S, HF-150SP	60	80	--	--
HF-250S	60	80	--	--
HF-150M, HF-150MP	--	--	40	80
HF-1000M	--	--	40	75
CRS-1, CRS-1P	60	80	--	--
CRS-2, CRS-2P	60	80	--	--
CMS-2	--	--	30	70
CMS-2H	--	--	30	70
CSS-1	--	--	30	70
CSS-1H	--	--	30	70
CSS-H (Slurry)	--	--	20	35
Emulsified Asphalt Primer	Manufacturer's Requirements		--	--

Notes:

1. For surface treatment.

2. For other uses.

TABLE 5
Minimum Apparent Viscosity, HF-100S

Penetration at 25 °C 0.1 mm	Minimum Apparent Viscosity at 60 °C, Pa·s at 0.5 s^{-1}	Penetration at 25 °C 0.1 mm	Minimum Apparent Viscosity at 60 °C, Pa·s at 0.5 s^{-1}	Penetration at 25 °C 0.1 mm	Minimum Apparent Viscosity at 60 °C, Pa·s at 0.5 s^{-1}
75	1428	117	823	159	563
76	1405	118	815	160	559
77	1382	119	806	161	554
78	1360	120	798	162	550
79	1339	121	790	163	546
80	1318	122	782	164	542
81	1298	123	774	165	538
82	1279	124	766	166	534
83	1260	125	759	167	530
84	1241	126	751	168	526
85	1223	127	744	169	522
86	1205	128	737	170	518
87	1188	129	729	171	515
88	1172	130	723	172	511
89	1155	131	716	173	507
90	1139	132	709	174	504
91	1124	133	702	175	500
92	1109	134	696	176	496
93	1094	135	690	177	493
94	1080	136	683	178	490
95	1066	137	677	179	486
96	1052	138	671	180	483
97	1038	139	665	181	480
98	1025	140	659	182	476
99	1013	141	653	183	473
100	1000	142	648	184	470
101	988	143	642	185	467
102	976	144	637	186	464
103	964	145	631	187	461
104	953	146	626	188	458
105	941	147	621	189	455
106	930	148	615	190	452
107	920	149	610	191	449
108	909	150	605	192	446
109	899	151	600	193	443
110	889	152	595	194	440
111	879	153	591	195	437
112	869	154	586	196	435
113	860	155	581	197	432
114	850	156	576	198	429
115	841	157	572	199	426
116	832	158	567	200	424

Notes:

A. This table is based on the apparent viscosity of 1000 Pa·s at 0.5 s^{-1} at 100 penetration, and 500 Pa·s at 0.5 s^{-1} at 175 penetration.

TABLE 6
Minimum Apparent Viscosity, HF-150S

Penetration at 25 °C 0.1 mm	Minimum Apparent Viscosity at 60 °C, Pa·s at 0.5 s^{-1}	Penetration at 25 °C 0.1 mm	Minimum Apparent Viscosity at 60 °C, Pa·s at 0.5 s^{-1}	Penetration at 25 °C 0.1 mm	Minimum Apparent Viscosity at 60 °C, Pa·s at 0.5 s^{-1}
125	164	155	136	200 - 201	109
126	163	156 - 157	135	202 - 203	108
127	162	158	134	204 - 205	107
128	161	159	133	206 - 208	106
129	160	160 - 161	132	209 - 210	105
130	158	162	131	211 - 212	104
131	157	163 - 164	130	213 - 215	103
132	156	165	129	216 - 217	102
133	155	166 - 167	128	218 - 220	101
134	154	168	127	221 - 222	100
135	153	169 - 170	126	223 - 225	99
136	152	171	125	226 - 227	98
137	151	172 - 173	124	228 - 230	97
138 - 139	150	174 - 175	123	231 - 233	96
140	149	176	122	234 - 236	95
141	148	177 - 178	121	237 - 239	94
142	147	179 - 180	120	240 - 242	93
143	146	181	119	243 - 245	92
144	145	182 - 183	118	246 - 248	91
145	144	184 - 185	117	249 - 251	90
146	143	186 - 187	116	252 - 254	89
147 - 148	142	188 - 189	115	255 - 258	88
149	141	190 - 191	114	259 - 261	87
150	140	192 - 193	113	262 - 265	86
151	139	194 - 195	112	266 - 268	85
152 - 153	138	196 - 197	111	269 - 272	84
154	137	198 - 199	110	273 - 275	83

Notes:

A. This table is based on the apparent viscosity of 140 Pa·s at 0.5 s^{-1} at 150 penetration, and 90 Pa·s at 0.5 s^{-1} at 250 penetration.

TABLE 7
Minimum Apparent Viscosity, HF-250S

Penetration at 25 °C 0.1 mm	Minimum Apparent Viscosity at 60 °C, Pa·s at 1.0 s^{-1}	Penetration at 25 °C 0.1 mm	Minimum Apparent Viscosity at 60 °C, Pa·s at 1.0 s^{-1}
225 - 227	57	311 - 317	37
228 - 231	56	318 - 323	36
232 - 234	55	324 - 331	35
235 - 237	54	332 - 338	34
238 - 240	53	339 - 346	33
241 - 244	52	347 - 354	32
245 - 248	51	355 - 363	31
249 - 251	50	364 - 372	30
252 - 255	49	373 - 382	29
256 - 259	48	383 - 392	28
260 - 264	47	393 - 404	27
265 - 268	46	405 - 416	26
269 - 273	45	417 - 428	25
274 - 277	44	429 - 442	24
278 - 282	43	443 - 457	23
283 - 287	42	458 - 473	22
288 - 293	41	474 - 490	21
294 - 298	40	491 - 509	20
299 - 304	39	510 - 525	19
305 - 310	38		

Notes:

A. This table is based on the apparent viscosity of 50 Pa·s at 1.0 s^{-1} at 250 penetration, and 20 Pa·s at 1.0 s^{-1} at 500 penetration.

TABLE 8
Polymer-Modified Emulsified Asphalts

Requirements	Type	Anionic				Cationic				High Float								Test Method
	Grade	RS-1P		RS-2P		CRS-1P		CRS-2P		HFMS-2P(ON)		HF-100SP		HF-150SP		HF-150MP		
		Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	
Tests on Emulsion																		
Viscosity, Saybolt Furol Seconds: at 25 °C		20	100	--	--	--	--	--	--	--	--	--	--	--	--	--	--	LS-219
at 50 °C		--	--	75	300	25	150	75	400	50	300	35	150	35	150	50	--	
Residue by Distillation to 204.4 °C, % by Mass		55	--	60	--	62	--	65	--	62	--	62	--	62	--	62	--	LS-216 LS-226
Settlement, 24 h, % by Mass		--	1	--	1	--	1	--	1	--	--	--	--	--	--	--	--	LS-221
Demulsibility, %																		
35 ml, 0.02 N $CaCl_2$		60	--	60	--	--	--	--	--	--	--	--	--	--	--	--	--	
35 ml, 0.8% Dioctyl Sodium Sulfo-Succinate Solution		--	--	--	--	40	--	40	--	--	--	--	--	--	--	--	--	LS-220
50 ml 0.10 N $CaCl_2$		--	--	--	--	--	--	--	--	--	--	75	--	75	--	--	--	
50 ml 0.02 N $CaCl_2$		--	--	--	--	--	--	--	--	40	--	--	--	--	--	--	--	
Oil Portion of Distillate, % by Volume/Mass		--	--	--	--	--	--	--	--	0.5	3	0.5	4	0.5	4	1	6	LS-217
Sieve Text, % by Mass		--	0.20	--	0.20	--	0.20	--	0.20	--	0.10	--	0.10	--	0.10	--	0.10	LS-223
Particle Charge		Negative or Neutral				Positive				Negative		--		--		--		LS-218
Coating Ability and Water Resistance, %		--		--		--		--		90	--	90	--	90	--	Note 1		LS-224
Storage Stability, 24 h, % by Mass		--	--	--	--	--	--	--	--	--	--	--	1.5	--	1.5	--	1.5	ASTM D 6930
Tests on Residue																		
Penetration (at 25 °C, 100 g, 5 s), 0.1 mm		100	200	100	200	100	250	100	250	90	200	90	150	150	250	150	250	LS-200 LS-226
Solubility in Trichloroethylene, % by Mass (Note 2)		97.5	--	97.5	--	97.5	--	97.5	--	97.5	---	97.5	--	97.5	--	97.5	--	LS-204
Float Test at 60 °C, s		--	--	--	--	--	--	--	--	1200	--	1200	--	1200	--	1200	--	LS-226 LS-207
Ash Content, % by Mass of Residue (Note 2)		--	1.0	--	1.0	--	1.0	--	1.0	--	1.0	--	1.0	--	1.0	--	1.0	ASTM D 2939
Elastic Recovery (at 10 °C), %		55	--	55	--	55	--	55	--	55	--	55	--	50	--	50	--	LS-208
Force Ductility at 800% Elongation, 5 cm/min. Pull Rate at 4 °C, kg		0.5	--	0.5	--	0.5	--	0.5	--	0.5	--	0.5	--	--	--	--	--	LS-205

Notes:

1. Follow LS-224, except that the mixture of aggregate 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 1 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.

2. The ash content shall be determined when the manufacturer indicates that the polymer additive is not soluble in trichloroethylene.

TABLE 9
Emulsified Asphalt Primer

Requirements	Min.	Max.	Test Method
Viscosity, Saybolt Furol Seconds at 50 °C	35	150	LS-219
Residue by Distillation to 260 °C, % by Mass	40	--	LS-216
Oil Portion of Distillate, % by Volume/Mass	10	30	LS-217 (Note 1)
Particle Charge	Neutral		LS-218 (Note 2)
Flash Point, Tag Open Cup, °C	45	--	ASTM D 1310
Storage Stability, 24 h	No visible separation		ASTM D 6930 (Note 3)
Tests on Residue			
Penetration (at 25 °C, 100 g, 5 s), 0.1 mm	100	300	LS-200
Ductility (at 25 °C, 5 cm/min), cm (Note 4)	100	--	LS-205
Solubility in Trichloroethylene, % by Mass	97.5	--	LS-204

Notes:

1. Since the total distillate exceeds 100 ml, follow LS-217 with the following modification:

   Prior to reaching 100 ml of distillate, carefully replace the first 100 ml graduated cylinder with a second one. After the distillation is complete, determine the volume of oil distillate in both cylinders and record the sum. Calculate the oil portion of the distillate as a percentage of the original weight of primer:

   $$\% \text{ Oil} = \frac{\text{Total Volume of oil distillate, ml} \times 100}{\text{200 g primer}}$$

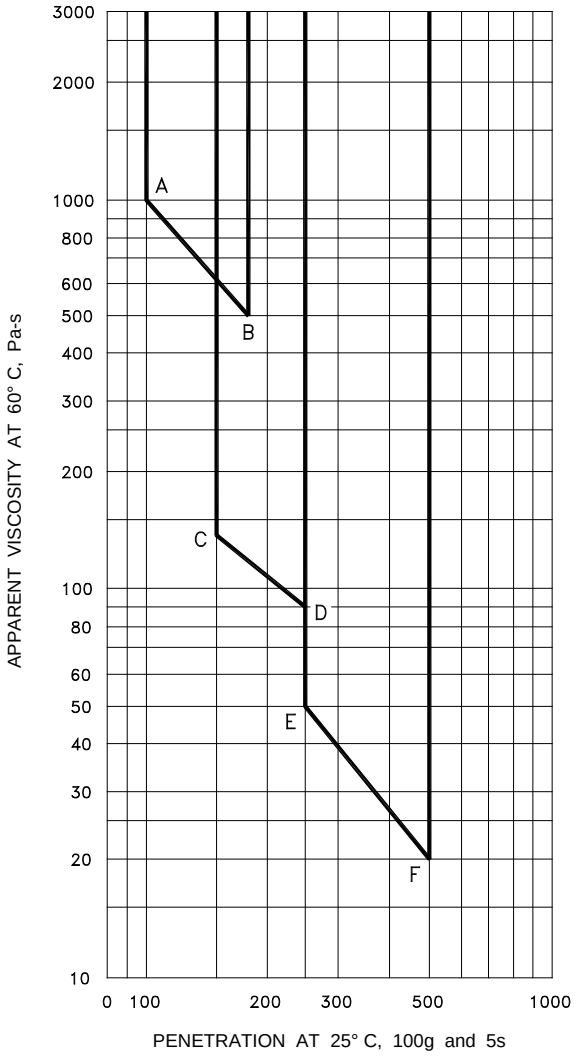
2. Follow LS-218 with the modification that the asphalt does not deposit due to an electrical charge on either the anode (positive electrode) or the cathode (negative electrode). Equal adherence to both electrodes due to the viscous nature of the material is not considered deposition.

3. Follow ASTM D 6930 except storage stability shall be based on visual separation of 500 ml representative sample in the glass cylinder after 24 hours.

4. If the ductility at 25 °C is less than 100 cm, the material shall be acceptable if its ductility at 15 °C is more than 100 cm.

Figure 1

VISCOSITY REQUIREMENTS FOR DISTILLATION RESIDUES FROM HIGH FLOAT EMULSIFIED ASPHALT



Notes:

A. Grade of high float emulsified asphalt: HF-100S - A, B
HF-150S - C, D
HF-250S - E, F

B. Viscosity shall be above the extrapolated line* designated by specified letters and between penetration limits contained in vertical lines extending upwards from these points.
* See Tables 5, 6, and 7 for acceptable values.

C. Viscosity value shall be reported at the shear rate:
0.5 s^{-1} for grades HF-100S and HF-150S
1.0 s^{-1} for grade HF-250S

Appendix 1103-A, Commentary for OPSS.MUNI 1103, November 2016
FOR USE WHILE DESIGNING MUNICIPAL CONTRACTS

Note: This is a non-mandatory Commentary Appendix intended to provide information to a designer, during the design stage of a contract, on the use of the OPS specification in a municipal contract. This appendix does not form part of the standard specification. Actions and considerations discussed in this appendix are for information purposes only and do not supersede an Owner's design decisions and methodology.

Designer Action/Considerations

The designer should specify the following in the Contract Documents:

- Type and grade of asphalt emulsion. (1103.05.01)

- Requirements for quality assurance sampling. (1103.08.03)

The designer should ensure that the General Conditions of Contract and the 100 Series General Specifications are included in the Contract Documents.

Related Ontario Provincial Standard Drawings

No information provided here.