

Case 14-06 “Preservative seal for Asphalt” Section 718

The case involves adding an additional product “TRMSS” and modifying and updating Table 718-1. The old version had tests in the wrong column for the wrong product.

Changes to the table type **C** involve discarding the Krebs viscosity and replacing it with a Brookfield viscosity.

Changes to the notes at the end of Table 718-1 were cleaned up with the revisions. The ASTM tests were updated and checked for accuracy.

Improper notes and asterisk were removed from the table.

Type “E” is added to section 334 “Preservative seal for Asphalt Concrete”

PRESERVATIVE SEAL and SEALCOATING FOR ASPHALT CONCRETE

718.1 GENERAL

Asphalt Concrete preservative seal shall be one of the following types or equal, with typical application rates. Sealcoating material shall meet the requirements of section 718.3

TYPE A - Asphalt rejuvenating agent shall be an emulsion composed of a petroleum resin oil base uniformly emulsified with water. Each supplier must submit a certified statement from the asphalt rejuvenator manufacturer showing that the asphalt rejuvenating emulsion conforms to the required physical and chemical requirements. They also must provide documentation of tests that determine the acceptable range of application of the product. Typical application rates are 0.07 to 0.18 gallons per square yard.

TYPE B - Petroleum Hydrocarbon emulsion. Applied at 0.05 to 0.20 gallons per square yard, diluted.

TYPE C - Tire modified surface sealer (TRMSS) or equal not diluted, and applied at a rate of 0.10 to 0.20 gallons per square yard.

TYPE D - Acrylic polymer modified emulsion Diluted to the manufacture's recommendation and applied at a rate of 0.08 to 0.20 gallons per square yard.

TYPE E - Polymer modified rejuvenating emulsion. (PMRE) Diluted to the manufacture's recommendation and applied at a rate of 0.08 to 0.20 gallons per square yard.

718.2 TEST METHODS AND REQUIREMENTS PRESERVATIVE SEAL

Preservative seal for asphalt concrete material, shall meet type A, B, C, D or E on Table [718-1](#) by certification from the manufacturer.

Tests shall be performed by AMRL accredited laboratory, accredited in the specified test being performed.

TABLE 718-1						
PRESERVATIVE SEAL SPECIFICATIONS						
Properties	Method	Type-A	Type-B	Type-C	Type-D	Type-E
Saybolt Viscosity @77°F (sfs)	ASTM D244	15-40	25-150	200-2000 Cp <small>(Note 1)</small>	15-40	50-150
Sieve test %	ASTM D244	0.1 max	0.1 max	0.1 max	0.1 max	0.1 max
Storage Stability, 24 hours, %	ASTM D244					1.0 max
Settlement test, 5 days, %	ASTM D244		2.0 max		5.0 max	
Test on residue by:		ASTM D244 Evaporation To 138°C	ASTM D244 Evaporation To 138°C	ASTM D244 Evaporation To 138°C	ASTM D244 Evaporation To 138°C	ASTM D244 Distillation To 177°C
Residue Content, %	ASTM D244	60 min	62 min	30 min	53 min	65 min
Oil Distillate, % by volume	ASTM D244					0.5 max
Flash point <small>(Note 2)</small> °F	ASTM D92	400°F	450°F	450°F	450°F	
Softening point, °F	ASTM D5			140 min.	130 min	
Viscosity <small>(Note 3)</small> , 60C, Poise	ASTM D2171					5000 max
Elastic Recovery <small>(Note 4)</small> , 10C, %	AASHTO T301					50 min

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PRESERVATIVE SEAL SPECIFICATIONS

Properties	Method	Type-A	Type-B	Type-C	Type-D	Type-E
Test on residue by:		ASTM D244 Evaporation To 138°C	ASTM D244 Evaporation To 138°C	ASTM D244 Evaporation To 138°C	ASTM D244 Evaporation To 138°C	ASTM D244 Distillation To 177°C
Ductility, 25C, 5 cm/min, cm	ASTM D1113				20 min	
Penetration, 25C, 100g/5 sec, dmm	ASTM D5				20-80	
Penetration, 4C, 200g/60 sec, dmm	ASTM D5					20-70
Kinematic Viscosity, 140°F, cSt	ASTM D2170	100-200	1,000-9,500			
Accelerated Weathering test (Note 5)	ASTM D4799				Plant certification within 12 months	
Test on		Evaporative Residue	Evaporative Residue			Rejuvenating Agent Base
Asphaltenes, % w	ASTM D2006	1.0 max	10.0 Max.			1.0 max
Maltene Dist. Ratio (PC+A ₁)/(A ₂ +S)	ASTM D2006	0.3-0.6	0.2-1.4			
PC/S Ratio ⁴⁵ (Note 4)	ASTM D2006	0.5 min	0.5 min.			
Saturated Hydrocarbons, % (note 4)	ASTM D2006	28 max	28 max.			30 max
Kinematic Viscosity, 140°F, cSt	ASTM D2170					50-175
Flash point °F	ASTM D92					375 min
Test on residue from RTFO:	ASTM D2872					Rejuvenating Agent Base
Mass Change, %	ASTM D2872					6.5 max
Kinematic Viscosity, 140°F, cSt	ASTM D2170					Report
Kinematic Viscosity, Ratio (Note 6)						3.0 max

Notes:

1. Brookfield viscosity using spindle #27 (ASTM D4402) test temperature at 140°F. ~~Sample temperatures equilibrate the sample for a minimum of for a maximum of 20 minutes. Sample test run time a minimum maximum of 5 minutes. Sample will be in the Brookfield viscosity tube a minimum five minutes.~~
2. Flash point on residue may be waived by the engineer during production sampling and testing provided manufacturer submits results performed in the previous 12 months in compliance.
3. Viscosity in poise may be determined using AASHTO T315 by converting the Complex Dynamic Shear Viscosity to Viscosity in poise.
4. Elastic Recovery molds shall have straight sides as shown in Fig. 1 of AASHTO T301
5. Other Accelerated Weathering test procedures may be presented for acceptance by the engineer prior to project start. These results shall be provided at no additional cost to the agency.
6. Kinematic Viscosity Ratio will be determined by dividing the viscosity of the material after RTFO aging by the original viscosity.

A full set of tests shall be performed by as specified by the special provisions in the undiluted condition. These tests and any other specified will be performed at the contractor's expense.

Only residue by evaporation shall be run on diluted samples. Specification limits should be diluted rate times minimum residual value of concentrate.

Comment [RTH1]: Is this to reference both notes 4 and 5?

Comment [WR2]: Remove the "45" artifact from old MAG spec

Comment [WR3]: Remove the note 4, artifact from old MAG spec

Comment [RTH4]: Why is an AASHTO test method being referenced for an ASTM test method?

Comment [WR5]: Remove the "note4" leave in the "S" for saturates, artifact from old MAG spec.

Comment [RTH6]: Is this to reference both notes 4 and 5?

Comment [RTH7]: Why is an AASHTO test method being referenced for an ASTM test method?

Comment [RTH8]: Note 4 is referenced for test Method ASTM D2006 as well as AASHTO T301. Why is it required for the ASTM method?

Comment [WR9]: The note to remain as is, and is only for AASHTO T 301

718.3 TEST METHODS AND REQUIREMENTS SEALCOATING

Sealcoating material for asphalt concrete pavement, shall be a concentrate product “ready to use” from the manufacturer. No product dilution will be allowed at the project site during application. Sealcoating shall consist of two applications across full width of pavement surface. Edge application treatment shall also be two separate coats. Each applied coat shall be at the following minimum application rates. First coat shall be applied at a minimum application rate of 0.15 gallons per square yard, followed by a second coat applied at a minimum rate of 0.15 gallons per square yard. Application rate for each coat, above the minimum, shall be adjusted to meet the pavement surface conditions.

Material, applied as Sealcoating, shall meet the requirements on table 718.2 by certification from the manufacturer.

Tests shall be performed by AMRL accredited laboratory.

TABLE 718.2		
SEALCOATING SPECIFICATIONS		
Properties * (note 2)	Method	Specification
Weight per Gallon, 25C, lbs/gal	ASTM D2939.07	10.0 min
Residue Content by Evaporation, %	ASTM D2939.08	50 min
Asphalt Content by Weight, %	ASTM D2939.21	17 min
Wet Track Abrasion Test ^(Note-1) , 1 hour, grams/sq. ft.	ASTM D3910	15 max
Wet Track Abrasion Test ^(Note-1) , 6 day, grams/sq. ft.	ASTM D3910	15 max

Comment [RTH10]: Why is there an asterisk?

Comment [RTH11]: Note 2 does not exist for this Table.

Comment [WR12]: The asterisk and note 2 are copied from the previous table, and should be deleted

Notes

1. Wet track abrasion patties shall be produced by two applications of sealcoat material dried to constant weight between each coat.

- End of Section -

PRESERVATIVE SEAL FOR ASPHALT CONCRETE

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Ductility, 25C, 5 cm/min, cm	ASTM D113			.	20 min	
Penetration, 25C, 100g/5 sec, dmm	ASTM D5				20-80	
Penetration, 4C, 200g/60 sec, dmm	ASTM D5					20-70
Kinematic Viscosity, 140°F, cSt	ASTM D2170	100-200	1,000-9,500			
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Notes:

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Only residue by evaporation shall be run on diluted samples. Specification limits should be diluted rate times minimum residual value of concentrate.

SECTION 334

PRESERVATIVE SEAL FOR ASPHALT CONCRETE

334.1 DESCRIPTION:

The asphalt concrete preservative seal shall be composed of an emulsified asphalt or asphalt rejuvenate, or an asphalt sealant to preserve the asphalt concrete pavement.

Preservative seals are applicable for asphalt pavements as directed on the plans, special provisions, or the Engineer.

334.2 MATERIALS:

The preservative seal shall be one of the following materials as specified by the Engineer:

<u>Type</u>	<u>Description</u>	<u>Material Conformance</u>
A	Rejuvenating emulsion	Section 718
B	Petroleum hydrocarbon emulsion	Section 718
C	“Filled” asphalt sealer such as TRMSS or equal	Section 718
D	Acrylic polymer emulsion	Section 718
E	Polymer modified rejuvenating emulsion (PMRE)	Section 718
Other	Diluted asphalt emulsion, CSS-1 or SS-1h	Section 713

334.3 CONSTRUCTION METHOD:

The material shall be approved by the Engineer in accordance to this specification. The application rates, dilution and curing shall be directed by the Engineer in accordance with this specification.

The contractor shall be responsible to clean the pavement to be treated free of trash, debris, earth or other deleterious substances present in sufficient quality to not interfere with the work to be performed.

The application rate will be based upon a typical surface condition test site with application rate trials to determine the needed rate. All application rates specified in Section [718](#) shall be a diluted 50-50 emulsified asphalt and water, except as recommended by the manufacturer for Type B and C. Any over applied seal will be sanded as directed by the Engineer. Application equipment shall be in accordance with Section [330](#).

Before opening a treated area to traffic, the surface shall be checked for slipperiness and/or tackiness. If the treated portion of the roadway must be opened to traffic prior to the disappearance of slipperiness and/or tackiness, the surface shall be sanded with a minimum of 1 ½ pounds per square yard or as directed by the Engineer. Sand Blotter shall comply with Section [333](#).

334.4 MEASUREMENT:

Preservative seal for asphalt concrete will be measured by the gallon or ton applied.

334.5 PAYMENT:

Payment will be made on the basis of the unit price bid in the proposal. Payment shall be full compensation for preservative seal complete and in place.

- End of Section -