



**MATERIAL SPECIFICATION FOR
LIQUID ASPHALT USED IN SPRAYING,
SEALING, AND PRIMING APPLICATIONS**

TABLE OF CONTENTS

1102.01	SCOPE
1102.02	REFERENCES
1102.03	DEFINITIONS
1102.04	DESIGN AND SUBMISSION REQUIREMENTS - Not Used
1102.05	MATERIALS
1102.06	EQUIPMENT - Not Used
1102.07	PRODUCTION - Not Used
1102.08	QUALITY ASSURANCE
1102.09	OWNER PURCHASE OF MATERIAL

APPENDICES

1102-A	Commentary
---------------	-------------------

1102.01 SCOPE

This specification covers the requirements for different types and grades of liquid asphalt for use in highway construction and maintenance.

1102.01.01 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.

1102.01.02 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.

1102.02 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:

Ministry of Transportation Publications

MTO Laboratory Testing Manual:

LS-200	Penetration of Bituminous Materials
LS-201	Flash Point by Cleveland Open Cup
LS-202	Kinematic Viscosity of Asphalt
LS-204	Solubility of Bituminous Materials
LS-205	Ductility of Bituminous Materials

ASTM International

D 36-14e1	Softening Point of Bitumen (Ring-and-Ball Apparatus)
D 140-15	Sampling Bituminous Materials
D 243-08	Residue of Specified Penetration
D 402-14	Distillation of Cut-back Asphaltic (Bituminous) Products
D 3143-13	Flash Point of Cut-back Asphalt with Tag Open-Cup Apparatus

1102.03 DEFINITIONS

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

Liquid Asphalt means an asphalt cement mixed with volatile materials to increase the flow qualities of the asphalt cement.

1102.05 MATERIALS

1102.05.01 General

Liquid 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 the prior approval of the Owner.

1102.05.02 Physical Requirements

Liquid asphalt shall be according to Tables 1, 2, 3, and 4.

1102.05.03 Shipment

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

When shipment 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/mixing temperature specified in Table 5 and not more than the maximum temperature specified in Table 5.

1102.08 QUALITY ASSURANCE

1102.08.01 Compliance

Liquid asphalt shall be according to Tables 1, 2, 3, and 4 for the particular grade and type when tested according to the test methods designated in the tables.

1102.08.02 Inspection

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

1102.08.03 Sampling

Representative samples of material being supplied shall 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. Samples taken prior to delivery shall be at no extra cost to the Owner.

1102.08.04 Testing

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

1102.08.05 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.

1102.09 OWNER PURCHASE OF MATERIAL

Liquid asphalt 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 liquid 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
Rapid Curing Liquid Asphalts

Grade	RC-30		RC-70		RC-250		RC-800		RC-3000		Test Method
	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	
Tests on Liquid Asphalt											
Flash Point (Tag Open Cup), °C	--	--	--	--	27	--	27	--	27	--	ASTM D 3143
Kinematic Viscosity (at 60 °C), mm ² /s	30	60	70	140	250	500	800	1600	3000	6000	LS-202
Distillation Test Distillate (% of total distillate to 360 °C)											ASTM D 402
to 190 °C	15	--	10	--	--	--	--	--	--	--	
to 225 °C	55	--	50	--	35	--	15	--	--	--	
to 260 °C	75	--	70	--	60	--	45	--	25	--	
to 316 °C	90	--	85	--	80	--	75	--	70	--	
Residue from Distillation to 360 °C, Volume, % by Difference	50	--	55	--	65	--	75	--	80	--	
Tests on Residue from Distillation											
Penetration (at 25 °C, 100 g, 5 s), 0.1 mm	80	120	80	120	80	120	80	120	80	120	LS-200
Ductility (at 25 °C, 5 cm/min), cm (Note 1)	100	--	100	--	100	--	100	--	100	--	LS-205
Solubility, % by mass (Note 2)	99.5	--	99.5	--	99.5	--	99.5	--	99.5	--	LS-204
Notes:											
1. If the ductility at 25 °C is less than 100, the material is acceptable if the ductility at 15 °C is more than 100.											
2. Using trichloroethylene as solvent.											

TABLE 2
Medium Curing Liquid Asphalts

Grade	MC-30		MC-70		MC-250		MC-800		MC-3000		Test Method
Requirements	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	
Tests on Liquid Asphalt											
Flash Point (Tag Open Cup), °C	38	--	38	--	65	--	65	--	65	--	ASTM D 3143
Kinematic Viscosity (at 60 °C), mm ² /s	30	60	70	140	250	500	800	1600	3000	6000	LS-202
Distillation Test Distillate (% of total distillate to 360 °C)											ASTM D 402
to 225 °C	--	25	--	20	--	10	--	--	--	--	
to 260 °C	40	70	20	60	15	55	--	35	--	15	
to 316 °C	75	93	65	90	60	87	45	80	15	75	
Residue from Distillation to 360 °C, Volume, % by Difference	50	--	55	--	67	--	75	--	80	--	
Tests on Residue from Distillation											
Penetration (at 25 °C, 100 g, 5 s), 0.1 mm	120	250	120	250	120	250	120	250	120	250	LS-200
Ductility (at 25 °C, 5 m/min), cm (Note 1)	100	--	100	--	100	--	100	--	100	--	LS-205
Solubility, % by mass (Note 2)	99.5	--	99.5	--	99.5	--	99.5	--	99.5	--	LS-204
Notes:											
1. If the ductility at 25 °C is less than 100, the material is acceptable if the ductility at 15 °C is more than 100.											
2. Using trichloroethylene as solvent.											

TABLE 3
Slow Curing Liquid Asphalts

Grade	SC-70		SC-250		SC-800		SC-3000		Test Method
Requirements	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	
Tests on Liquid Asphalt									
Flash Point (Cleveland Open Cup), °C.	65	--	80	--	90	--	105	--	LS-201
Kinematic Viscosity (at 60 °C), mm ² /s	70	140	250	500	800	1600	3000	6000	LS-202
Distillation Test Distillate (% of total Distillate to 360 °C)	10	30	4	20	2	12	--	5	ASTM D 402
Tests on Residue from Distillation									
Kinematic Viscosity (at 60 °C), mm ² /s	4	70	8	100	20	160	40	350	LS-202
Solubility, % by mass (Note 1)	99.5	--	99.5	--	99.5	--	99.5	--	LS-204
Asphalt Residue of Specified Penetration and Test									
Residue of 100 Penetration, %	50	--	60	--	70	--	80	--	ASTM D 243
Ductility of 100 Penetration Residue (at 25 °C, 5 cm/min), cm (Note 2)	100	--	100	--	100	--	100	--	LS-205
Notes:									
1. Using trichloroethylene as solvent.									
2. If the ductility at 25 °C is less than 100, the material is acceptable if the ductility at 15 °C is more than 100.									

TABLE 4
MTO Primer and Mixed In Place (M.I.P.)

Grade	MTO Primer		M.I.P.		Test Method
	Min.	Max.	Min.	Max.	
Tests on Liquid Asphalt					
Flash Point (Tag Open Cup), °C.	--	--	27	--	ASTM D 3143
Kinematic Viscosity (at 60 °C), mm ² /s	20	35	120	180	LS-202
Distillation Test Distillate (% of total distillate to 360 °C),					ASTM D 402
to 190 °C	20	80	10	--	
to 225 °C	40	--	20	--	
to 260 °C	70	--	40	--	
to 316 °C	85	--	--	--	
Residue from Distillation to 360 °C Volume, % by Difference	50	--	80	--	
Tests on Residue					
Penetration (at 25 °C, 100 g, 5 s), 0.1 mm	80	200	--	--	LS-200
Ductility (at 25 °C, 5 cm/min), cm (Note 1)	100	--	--	--	LS-205
Softening point, °C	--	--	21	32	ASTM D 36
Solubility, % by mass (Note 2)	99.5	--	99.5	--	LS-204
Notes:					
1. If the ductility at 25 °C is less than 100, the material is acceptable if the ductility at 15 °C is more than 100.					
2. Using trichloroethylene as solvent.					

TABLE 5
Temperature Range of Liquid Asphalts for Spraying and Mixing

Grade	Temperature, °C			
	Spraying		Mixing	
	Min.	Max.	Min.	Max.
RC-30, MC-30	30	45	25	45
RC-70, MC-70, SC-70	60	70	55	70
RC-250, MC-250, SC-250	75	90	70	90
RC-800, MC-800, SC-800	90	105	80	105
RC-3000, MC-3000, SC-3000	115	130	110	130
MTO Primer	30	45	--	--
Mixed in Place	--	--	80	105

**Appendix 1102-A, Commentary for OPSS.MUNI 1102, 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 liquid asphalt. (1102.05.01)
- Requirements for quality assurance sampling. (1102.08.03)

Typically the types of liquid asphalt listed in this specification are used for priming of granular base, granular sealing, in cold recycled mix, and in asphalt patching material.

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

None