



**CONSTRUCTION SPECIFICATION FOR
ROUTING AND SEALING CRACKS IN HOT MIX ASPHALT PAVEMENT**

TABLE OF CONTENTS

341.01	SCOPE
341.02	REFERENCES
341.03	DEFINITIONS – Not Used
341.04	DESIGN AND SUBMISSION REQUIREMENTS
341.05	MATERIALS
341.06	EQUIPMENT
341.07	CONSTRUCTION
341.08	QUALITY ASSURANCE
341.09	MEASUREMENT FOR PAYMENT
341.10	BASIS OF PAYMENT

APPENDICES

341-A	Commentary
--------------	-------------------

341.01 SCOPE

This specification covers the work of routing existing cracks up to 20 mm in width and cleaning and sealing routed and unrouted cracks in hot mix asphalt pavements with hot poured rubberized asphalt sealant compound.

341.01.01 Specification Significance and Use

This specification has been developed for use in municipal-oriented Contracts. The administration, testing, and payment policies, procedures, and practices reflected in this specification correspond to those used by many municipalities in Ontario.

Use of this specification or any other specification shall be according to the Contract Documents.

341.01.02 Appendices Significance and Use

Appendices 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.

341.02 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 Specification, Material

OPSS 1212 Hot Poured Rubberized Asphalt Joint Sealing Compound

Ministry of Transportation, Ontario, Publication

SP-024 Manual for Condition Rating of Flexible Pavements - Distress Manifestations

341.04 DESIGN AND SUBMISSION REQUIREMENTS

341.04.01 Submission Requirements

The Contract Administrator shall be provided with the following data at least five Business Days prior to placement of sealant:

- a) The sealant information from the manufacturer shall include:
 - i. Batch numbers.
 - ii. Test results shall be according to OPSS 1212 from each batch on samples that have been subjected to both one heating cycle and two heating cycles.
 - iii. Application recommendations.

- iv. Recommended heating time and temperature.
 - v. Allowable storage time and temperature after initial heating.
 - vi. Allowable reheating criteria.
 - vii. Application temperature range.
- b) Storage location of sealant pucks.

341.05 MATERIALS

341.05.01 Crack Sealant

Crack sealant shall be hot poured rubberized asphalt sealant according to OPSS 1212.

341.06 EQUIPMENT

341.06.01 Router

All routing equipment shall consist of mechanical routers capable of continually creating well-defined right-angled routs and keeping the rout centreline within 8 mm of the centre of the crack and providing a rout width of 40 to 50 mm and a depth of not less than 8 mm. For surfaces that are to be overlaid with hot mix as part of the Contract, rout geometry of 20 x 20 mm shall be used. Such capability shall be demonstrated to the Contract Administrator prior to its use.

When it cannot be demonstrated to the satisfaction of the Contract Administrator that a router is capable of maintaining the specified dimensions and shape of the rout, then as many cutters in the router's cutting head shall be adjusted or replaced as necessary, until the dimensions and shape of the rout again meets the specification requirements.

341.06.02 Heating Kettle

The heating kettle for joint sealant compound shall be a double boiler oil heat transfer type with built in agitator and equipped with thermometers to measure the temperature of both heat transfer oil and the sealing compound. The heating kettle shall be equipped with a spigot.

The heating kettle shall have automatic thermo controls that will prevent overheating of the sealant.

341.06.03 Hot Compressed Air Lance

The hot compressed air lance shall have a discharge air temperature of approximately 500 °C ± 100 °C and an air velocity greater than 1,000 m/s.

341.07 CONSTRUCTION

341.07.01 General

Cracks shall be routed, cleaned, and sealed or cleaned and sealed as specified in the Contract Documents.

The router and cutter heads shall be maintained, operated, and replaced as required to prevent the shattering of aggregate along the sides and bottom of the rout.

341.07.02 Crack Routing

Cracks up to 20 mm in width shall be routed to the dimensions as specified in the Contract Documents.

All other cracks up to 20 mm in width discovered at the time of routing shall be routed with the exception of any alligator and map cracking as described in SP-024.

The routing of all transverse and skewed cracks shall be terminated within 25 mm of the pavement edge.

Two or more cracks shall not be joined by routing through uncracked pavement or routed in areas where a crack does not exist.

Cracks greater than 20 mm in width do not require routing.

341.07.03 Sealant Preparation

The sealant compound shall be melted slowly with constant agitation until it is in a lump-free, free-flowing state, within the temperature range recommended by the manufacturer for application.

Temperature gauges for both the heating oil and sealant on the kettle melter shall be properly calibrated at all times.

At the start of each day, the heating kettle is to be completely empty, clean and free of any residual material, prior to it being charged. The initial charge of the kettle with sealant shall be carried out in the presence of the Contract Administrator at a location acceptable to both the Contract Administrator and the Contractor.

The temperature of the sealant shall be monitored and recorded with the applicable date and time. The temperature records shall be made available to the Contract Administrator upon request.

341.07.04 Cleaning of Routed and Unrouted Cracks

Immediately prior to placing the sealant compound, all routed and unrouted cracks shall be cleaned and dried using a hot compressed air lance.

Before sealant application, all loose debris from the routing and cleaning operation shall be completely removed from the road surface. All moisture, debris, and loose fractured aggregate shall be removed from the routed and unrouted cracks immediately prior to the time the sealant compound is being placed.

341.07.05 Placing Sealant

Immediately following the cleaning of routed and unrouted cracks, the sealant compound shall be placed using either a manual pouring cone filled from a spigot located on the heating kettle itself, or by using a hose and wand fitted with the proper sized tip that allows the sealant to be pumped directly from the heating kettle into the routed or unrouted crack. The tip of the cone or wand shall be placed to the bottom of the crack to ensure uniform application.

For pavements that are to be overlaid with hot mix, all routed and unrouted cracks shall be filled with sealant so that, upon complete cooling, the top of the sealant is 4 to 6 mm below the adjacent pavement surface.

For all other pavements, all routed and unrouted cracks shall be filled with sealant so that, upon complete cooling, the sealant is no more than 1 mm below the adjacent pavement surface.

A squeegee, with its bottom edge trimmed to form the specified dimensions of the finished sealant surface after cooling, shall be used to strike off the sealant after it is poured into the routed or unrouted crack. The sealant shall be struck off starting from the low side and working towards the high side of the pavement surface.

In order to maintain the sealant surface dimensions, the sealant shall be topped up and struck off again prior to being dusted.

Sealant compound damaged by construction traffic or the Contractor's operation shall be replaced.

341.07.06 Sealant Dusting

Where traffic is to be maintained during crack sealing, the surface of the sealant shall be dusted with Portland cement or alternative materials acceptable to the Contract Administrator prior to allowing traffic on the sealed areas.

341.07.07 Management of Excess Material

Management of excess material shall be according to the Contract Documents.

341.08 QUALITY ASSURANCE

341.08.01 Sampling and Testing Sealant

The Contract Administrator may require a sample of the sealant puck, approximately 4 litres in volume, from one or more batches of sealant. Such samples shall be placed in properly labelled suitable containers and submitted to the Contract Administrator.

At least once each hour, the temperature of the sealant shall be independently checked by the Contract Administrator. If the Contract Administrator finds that the temperature of the sealant is not within the manufacturer's recommended range, then all of the sealant that has been placed since the last acceptable temperature verified by the Contract Administrator shall be removed. Any sealant that is rejected shall be replaced with acceptable material.

During the process of placing, the Contract Administrator may require samples of the sealant directly from the heating kettle. A minimum of three 4-litre samples shall be taken from the heating kettle spigot at points when approximately 1/4, 1/2, and 3/4 of the proposed volume has been placed on the Contract. Additional samples may be requested by the Contract Administrator. All samples shall be placed in a properly labelled triple tight metal container.

All samples submitted to the Contract Administrator shall be labelled with the following information clearly shown:

- a) Contract number.
- b) Sealant type including the manufacturer and the product designation.
- c) Manufacturer's batch number.

- d) Roadway name.
- e) Contractor and subcontractor.
- f) The station and offset in the roadway where the sample was taken.
- g) The point in the Contract at which the sample was taken (e.g., the percentage of work completed).
- h) Sampling date.
- i) Weather conditions.
- j) Persons taking the sample.

341.08.02 Deficiencies and Repairs

Where a routed crack is found to be more than 10% outside the specified rout dimension, geometry, or location, it shall be considered unacceptable and corrected by additional routing.

Where the sealant subsides in the rout by more than 1 mm below the adjacent pavement surface, the surface of the sealant shall be cleaned and topped up. Where pavements are to be overlaid, if the surface of the sealant is greater than 6 mm below the adjacent pavement surface, the surface of the sealant shall be cleaned and topped up to between 4 mm and 6 mm.

Sealant shall be removed, the routed crack rerouted at the Contract Administrator's discretion, and the rout resealed, when the sealant:

- a) contains imbedded foreign material other than dusting material,
- b) contains entrapped air bubbles,
- c) has debonded or pulled away from the routed crack, or,
- d) has been excessively heated.

341.09 MEASUREMENT FOR PAYMENT

341.09.01 Actual Measurement

341.09.01.01 Routing, Cleaning, and Sealing Cracks in Hot Mix Asphalt Pavement

Measurement for payment shall be in linear metres along the routed, cleaned, and sealed crack.

Any portion of the sealed crack where the rout migrates away from the crack shall not be included in the measurement.

341.09.01.02 Cleaning and Sealing Unrouted Cracks in Hot Mix Asphalt Pavement

Measurement for payment shall be measured in linear metres along the cleaned and sealed unrouted crack.

341.09.02 Plan Quantity Measurement

When measurement is by Plan Quantity, such measurement is based on the units shown in the clauses under Actual Measurement.

341.10 BASIS OF PAYMENT

**341.10.01 Routing, Cleaning, and Sealing Cracks in Hot Mix Asphalt Pavement - Item
Cleaning and Sealing Unrouted Cracks in Hot Mix Asphalt Pavement - Item**

Payment at the Contract price for the above tender items shall be full compensation for all labour, Equipment, and Material to do the work.

Sealant compound damaged by construction traffic or the Contractor's operation shall be replaced at no extra cost to the Owner.

Work to remove and replace sealant compound due to the sealant not being within the manufacturer's specified temperature range shall be completed at no extra cost to the Owner.

Work to remove and replace sealant compound to correct deficiencies and make repairs shall be completed at no extra cost to the Owner.

**Appendix 341-A, November 2021
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:

- The quantity of routing and sealing of cracks and the quantity of cleaning and sealing of cracks. (341.07.01)
- Rout dimensions. (341.07.01)

Consideration for cracks to be routed and sealed include:

- Transverse and skewed cracks up to 20 mm in width.
- Longitudinal cracks up to 20 mm in width that are further than 150 mm from the pavement edge.

Consideration for cracks to be sealed without routing includes longitudinal cracks in fully or partially paved shoulders, within 150 mm of the pavement edge.

The designer may specify an overfill sealant geometry for transverse and skewed cracks. If overfill is desired, the designer should specify it in the Contract Documents.

Routing and sealing is recommended for the spring and fall months when crack widths are larger and the pavement surface temperature is less than 50 °C.

The designer should identify to the Owner the need for full-time inspection of the routing and sealing operations.

A pavement condition survey is recommended to determine the extent of routing and sealing or crack cleaning and sealing required.

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

Related Ontario Provincial Standard Drawings

OPSD 508.010 Routing and Sealing Cracks Up to 20 mm in Width in Asphalt Pavement