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CONSTRUCTION SPECIFICATION FOR CRACK SEALING

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CONSTRUCTION SPECIFICATION FOR CRACK SEALING

840. 1 SCOPE

This Specification covers requirements for sealing transverse and longitudinal cracks in bituminous pavement.

1.1 Pre-Construction Meeting

The Contractor shall attend a pre-construction meeting with the Contract Administrator, at a mutually agreed upon date, to discuss the project and requirements. The meeting shall be initiated by the Contractor and be held in advance of commencing any Work. Topics to be discussed will include, but not limited to, the type and quantity of equipment to be used, sequence of Work, traffic control, and materials to be used.

840. 2 DEFINITIONS

Appeals: Request from Contractor for retesting of material property or attribute for the purpose of resolving disagreement on acceptance test results and pay adjustments.

Clean and Seal: A process in which an existing (un-routed) crack in a pavement is prepared by blowing out debris with compressed air, heating the crack faces with hot-compressed air lance and filled with an approved sealant.

Rout and Seal: A process in which a pavement router is used to create a reservoir, which is centered over an existing crack, the routed crack is prepared by blowing out debris with compressed air and heating the crack faces with hot-compressed air lance and the reservoir is filled with an approved sealant.

Overband: Sealant that extends past the crack or rout edges on the adjacent bituminous pavement surface.

Pavement Edge: Outside edge of a bituminous pavement meeting the gravel shoulder or concrete barrier.

Quality Assurance: Testing and inspection performed by the Contract Administrator for material properties and the quality of placement and workmanship for Acceptance.

Quality Control: Testing and inspection performed by the Contractor to monitor the properties of the materials and the quality of placement and workmanship.

Reject: Unacceptable material for use in the project and/or unacceptable quality of placement or workmanship.

Lot: A day's production of at least 1500 linear metres of crack sealing. If a day's production is less than 1500 linear metres, it will be added to the production of subsequent day(s) until the quantity accumulates to a minimum of 1500 linear metres to make up a Lot. If the last day's production is less than 1500 linear metres of crack, it will be added to the previous Lot.

840. 3 MATERIALS

3.1 Crack Sealant

The Contractor shall supply and apply hot pour crack sealant from a pre-approved Supplier and meet the current material specifications as outlined in the "Grading and Surfacing Approved Products List" at <http://www.gov.mb.ca/mit/mateng/product.html>.

The crack sealant shall be clearly marked with the following information:

- Batch Numbers
- Name and mailing address of crack sealant supplier and manufacturer
- Name of crack sealant product to be supplied

The Contractor shall provide the following information from the Manufacturer to the Contract Administrator at least five (5) Business Days prior to the placement of sealant:

- Test results in accordance with *APL 103-1 Material Specification for Hot Pour Crack Sealant* for each batch of crack sealant used on the Contract.
- Maximum Safe Heating Temperature (MSHT)
- Allowable storage time and temperature after initial heating
- Allowable reheating criteria
- Application temperature range
- Safety Data Sheets for each product

840. 4 EQUIPMENT

4.1 General

The Contractor shall provide all equipment necessary for completion of the Work.

The equipment may be subject to inspection and acceptance by the Contract Administrator before Work is to commence. Equipment required for this Work shall be in satisfactory working condition and maintained for the duration of the Work.

4.2 Heating Kettle

The melting kettle shall consist of a double jacketed oil bath kettle with continuous agitation equipment to prevent localized variations in temperature. The kettle shall be equipped with two calibrated thermometers to monitor the temperature of the crack sealant and the temperature of the heat transfer oil.

4.3 Routers

The pavement routers shall be self-propelled and capable of producing the specified rout cross-section without damaging the surrounding pavement. It shall be capable of cutting the cracks to the required dimensions in a single pass.

4.4 Air Compressor

The air compressor shall be equipped with water and oil traps and must produce sufficient air volume and pressure to remove all debris from the cracks and all adjacent road surfaces.

4.5 Hot-Compressed Air Lance

The hot compressed air lance shall be capable of providing a continuous hot, high pressure air stream with no flame at the exit nozzle.

4.6 Application Equipment

The application equipment shall be capable of regulating the application of the sealant directly to the road by hose and wand.

A hand held squeegee following the application of the crack sealant to achieve the final profile is required.

840. 5 CONSTRUCTION

5.1 General

The Contractor shall seal transverse cracks for the entire road width, including the paved shoulders.

The Contractor shall seal longitudinal (include meander) cracks for the entire length of each crack, including the portion(s) that is extended into the paved shoulders.

The Contractor shall seal the centreline cracks for the entire length of each crack.

The full length of transverse, longitudinal and centreline cracks including the rout, where applicable, shall be cleaned of dust and debris prior to filling with sealant.

Fuel, sealant, asphalt and any other spills associated with the Contractor’s operation shall be cleaned up to the satisfaction of the Department at the Contractor’s expense.

5.2 Selection of Crack Treatment

The Contractor shall select the appropriate crack treatment based on type and width of cracks as specified in Table 5.1, unless otherwise approved by the Contract Administrator.

The Contractor shall use the Long Term Pavement Performance (LTPP) program manual to identify different types of cracks.

Table 5.1 Selection of Crack Treatment

Type of Crack	Width of Crack	Treatment
Transverse	≤19mm	Rout and Seal
	>19mm	Clean and Seal
Longitudinal	N/A	Clean and Seal
Centreline	≤19mm	Rout and Seal
	>19mm	Clean and Seal
Alligator	N/A	No Treatment
Block	N/A	No Treatment

Notes:

- 1) Transverse cracks shall not be routed if less than 10m apart
- 2) Cracks less than 3mm in width shall not be routed or sealed
- 3) Cracks in excess of 25mm in width shall not be sealed

5.3 Sealant Preparation

The sealant shall be melted slowly with constant agitation until it is in a lump-free and free-flowing state. The manufacturer’s maximum safe heating temperature shall not be exceeded.

The temperature of the sealant shall be recorded hourly and made available to the Contract Administrator upon request.

5.4 Routing

The Contractor shall not rout more cracks than can be sealed prior to shutting down operations in each day. All routed cracks must be sealed on the same day they are routed.

The routing of transverse (include skewed transverse) cracks shall start from the outside edge and then progress to the center of the pavement.

Two or more cracks shall not be joined by routing through pavement that is not cracked.

Applicable cracks shall be routed to a width of 40mm and a depth of 10mm, keeping each crack as the center of the routing profile.

5.5 Cleaning

Prior to the application of sealant, the road surface and cracks shall be cleaned of all loose materials and debris with compressed air. Moisture shall also be removed from the crack with hot compressed air lance until the pavement is dry, but not charred.

5.6 Application of Sealant

The sealant shall be applied immediately after the cleaning operation using a hose and wand fitted with the proper sized tip. The tip shall be placed to the bottom of the crack to ensure uniform application without the formation of entrapped air.

If an alternative sealant configuration is not specified, the Contractor shall meet the overband requirements. Recessed and flush fill configuration may be specified, if an overlay or surface treatment is expected within the year of sealing the cracks.

Clean and Seal

The sealant shall be struck off with a squeegee to form the specified dimensions of the finished seal as shown on the drawings in *MEB8-10 Approval of Joint and Crack Sealant for Asphalt Pavements*. The cracks shall not be overfilled and the appearance of the finished seal shall present a neat fine line.

Rout and Seal

The sealant shall be struck off with a squeegee to form the specified dimensions of the finished seal as shown on the drawings in *MEB8-10 Approval of Joint and Crack Sealant for Asphalt Pavements*.

5.7 Weather limitations

Routing and/or sealing shall not be permitted in the following conditions:

- air temperature is below 10°C
- water is migrating from pavement base into the routs and/or cracks
- the pavement surface temperature is above 50°C
- visibility is less than 700 metres
- during periods of precipitation

If precipitation occurs before the sealant has properly cured, the Contractor shall remove and replace the affected crack sealant.

5.8 Traffic Control

Traffic shall be kept off sealed cracks until the sealant has properly cured and will not be damaged or pulled out by traffic.

At locations such as intersections, where traffic control is not practical, the Contractor shall prevent tracking by applying blotter sand to the sealant.

Crack seal construction work shall not be carried out simultaneously on both travelled lanes.

Sealant damaged by the Contractor or traffic shall be removed and replaced.

840. 6 QUALITY CONTROL

6.1 General

The Contractor shall ensure that the material and the constructed Work meet Contract requirements.

Standard equipment and qualified personnel shall be used by the Contractor to perform the inspection and sampling required by the Contract.

The Contractor shall document the Work on a Daily Production Report and submit a signed copy to the Contract Administrator at the end of each day.

The Daily Production Report shall include the following:

- Highway number, control section, lane
- Date, ambient air temperature (°C) at the beginning of the shift, mid-day and end of the shift
- Hourly kettle temperature during production
- Beginning and ending locations for the day, including lane and direction
- The amount of material used for the day in kilograms
- Unique or atypical situations that may affect the placement or performance of the sealed crack.

840. 7 QUALITY ASSURANCE

7.1 General

The Contract Administrator will conduct Quality Assurance testing and inspection of hot pour crack sealant.

The Contract Administrator may test for any property outlined in the Contract. The Contractor will be provided with results from the completed tests.

The Contractor shall supply all required bags/containers for sampling. The Contract Administrator will provide the tags/labels.

Quality Assurance testing and inspection will be performed at no cost to the Contractor.

The inability of the Contract Administrator to provide Quality Assurance test results shall not relieve the Contractor of their obligation to remedy any defect.

7.2 Quality Assurance Testing and Inspection

Sampling and Quality Assurance testing will be carried out in accordance with the following:

7.2.1 Sealant Quality

The Contractor shall obtain one sample of unheated, as delivered, sealant for each Lot, in the presence of the Contract Administrator, of approximately 5 kg. The sample will be used for Quality Assurance and prospective Appeal testing.

Sealant samples and sampling shall be at no cost to the Department as it will be considered incidental to the Work.

The Sealant will be tested as per ASTM D5329 and it shall conform to *APL103-1 Materials Specification for Hot Pour Joint and Crack Sealant*.

The Contract Administrator will label the sampling container with the following information:

- Contract number
- Trade name of sealant
- Manufacturer
- Lot number
- The GPS location where the sample was taken
- The temperature of the sealant when the sample was taken, and
- Weather conditions (ambient temperature, precipitation, wind)

7.2.2 Sealant Temperature

The Contract Administrator will verify the temperature of the sealant in the kettle and at the wand to ensure the Contractor is following the manufacturer's recommendation.

7.2.3 Deficiencies

Each lane-km, including the shoulder, shall be inspected for deficiencies.

Deficiencies include, but are not limited to, deviation in rout and/or seal cross-section, sealant debonding, deviation in rout path, entrained air and damage by traffic.

The Contract Administrator will provide the Contractor with the locations of the visually identified deficiencies.

840. 8 APPEALS

8.1 General

Appeals for sealant quality will be considered by the Contract Administrator if the Contractor can demonstrate that Quality Assurance test results are different from the Quality Control test results.

Quality Control test results for a Lot which are provided to the Contract Administrator subsequent to the Contractor's receipt of the Quality Assurance test results for that Lot will not be considered for an Appeal.

The Contractor shall serve notice of Appeal to the Contract Administrator, in writing, within five (5) days of receipt of the applicable Quality Assurance test results. Samples collected and retained for Appeal testing will be discarded if notice of Appeal is not requested within the allotted time period.

The Contractor shall bear all costs of Appeal testing, unless the new test results indicate an improvement to the pay adjusted unit price by 2.5% or more or otherwise specified in the contract. The cost for Appeal testing will be based on the price that Manitoba pays to its Service Provider for the Appeal test in question (including tax) plus 10% for administration.

Appeal testing will be done by a 3rd party laboratory retained by the Contract Administrator. The Appeal testing Service Provider will be selected on the basis of competitively tendered lowest qualified price that is not in a conflict of interest with the Contractor or Manitoba.

The Appeal test results shall replace the appealed Quality Assurance test results and be used to calculate the final pay adjustment.

The Contract Administrator will not be responsible for any delays, including but not limited to, Contractor's downtime or other costs as a result of the Appeal.

840. 9 ACCEPTANCE CRITERIA

9.1 General

The acceptance of the finished product with unit payment or Pay Adjustment shall be based on the following criteria from the Quality Assurance testing and inspection:

- a) Sealant Quality
- b) Sealant Temperature
- c) Deficiencies

If the acceptance test results on a Lot fall in rejection, corrective actions will apply.

9.2 Sealant Quality

Unless otherwise specified, the sealant shall conform to the latest Specification for crack sealant on the APL.

The Contract Administrator will notify the Contractor of out-of-specification test results.

9.2.1 Pay Adjustment for Sealant Quality

If any of the samples does not meet the required physical properties as listed on the APL, the Contract Administrator may accept the material into the Work at a reduced payment to the Unit Price. The Unit Price of sealant will be subject to a 20 percent price reduction for each out of specification property.

If all six (6) physical properties are out of the specification, the Contractor shall remove and replace the sealant at no additional cost to the Department.

9.3 Sealant Temperature

The sealant temperature shall not exceed the manufacturer's specified safe heating temperature and it shall not be applied at temperature below the manufacturer's recommended application temperature.

If the measured heating temperatures of the sealant exceeds 10°C above the manufacturer's specified safe heating temperature, the sealant material in use will be rejected. The Contractor shall dispose of the overheated and rejected materials in an environmentally safe method.

9.4 Deficiencies

Each of the listed deficiencies in Table 9.1 are subject to corrective action.

A repair proposal shall be submitted to the Contract Administrator for all corrective actions. Repairs shall not commence until approved by the Contract Administrator.

Table 9.1 Deficiencies

Categories	Deficiencies
Rout	<ul style="list-style-type: none"> • Width less than 36mm • Depth less than 8mm • Missed routing (missed crack)
Sealant/Seal	<ul style="list-style-type: none"> • Imbedded foreign material • Entrained air (bubbles) • Debonding from the edge of rout or crack • Sealant subsided by more than 1mm below the pavement surface profile after cooling where flush fill and overband requirements apply. • Sealant subsided by more than 7mm below the pavement surface profile where recessed seal requirement applies. • Excess sealant above the pavement profile after cooling. • Overband is less than 5mm or more than 15mm from rout or crack edges. • Damaged by traffic

9.4.1 Pay Adjustment for Deficiencies

The Contract Administrator may allow the Contractor to accept pay adjustments in lieu of repair. In that case, the pay adjustment will be calculated in accordance with the following equation:

$$Payment\ Reduction = (0.5 \times UPrs \times Lrs) + (0.5 \times UPcl \times Lcl)$$

Where:

UPrs = Unit Price of Rout and Seal

UPcl = Unit Price of Clean and Seal.

Lrs = Total length in linear metres of measured rout and seal cracks with deficiencies and left unrepaired.

Lcl = Total length in linear metres of measured clean and seal cracks with deficiencies and left unrepaired.

840. 10 METHOD OF MEASUREMENT

10.1 Rout and Seal

“Rout and Seal” work will be measured in lineal meter. Payment will be based on measurements, taken by the Contract Administrator, of the actual lineal meters constructed in the field.

The removal, disposal, and/or replacement of any sealant, which do not meet the Contract requirements, shall be at no additional cost to the Department.

Repairs or work deemed necessary will not be paid as extra and will be considered incidental to the Contract unit price of “Rout and Seal”.

10.2 Clean and Seal

“Clean and Seal” work will be measured in lineal meter. Payment will be based on measurements, taken by the Contract Administrator, of the actual lineal meters constructed in the field.

Repairs or work deemed necessary will not be paid as extra and will be considered incidental to

the contract unit price of "Clean and Seal".

The removal, disposal, and/or replacement of any sealant, which do not meet the Contract requirements, shall be at no additional cost to the Department.

840. 11 BASIS FOR PAYMENT

The Unit Price per lineal meter for "Rout and Seal" will be payment in full for all operations necessary or incidental thereto.

The Unit Price per lineal meter for "Clean and Seal" will be payment in full for all operations necessary or incidental thereto.

Where pay adjustments are made, deductions will be made as a lump sum separately from the Unit Price.