Standard Practice for: **Approval of Hot Applied Joint & Crack Sealant for Bituminous Pavements**

1.0 Scope

This standard practice governs the process for evaluating the performance of hot-applied sealant based on satisfactory laboratory testing and field performance. Sealants that meet both laboratory and field requirements will be added to the Manitoba Infrastructure (MI's) list of approved products and Suppliers.

2.0 Sealant Approval Process

Suppliers shall submit:

- A materials specification sheet (lab test results showing the sealant meets all materials specifications as outlined in Section 2.1)
- Sealant samples for laboratory testing as per ASTM D5329. (minimum 2 samples)
- Sealant to apply in a field test section (minimum 500 metre long section)

All material submitted must be accompanied by a Materials Safety Data Sheet (MSDS).

Lab testing and field evaluation will be performed by MI and/or a designated test lab.

2.1 Laboratory Testing

The sealant shall meet the following requirements:

Physical Requirement	Test Method	Specification
Cone Penetration @ 25ºC, dmm	ASTM D5329	110 min - 150 max
Flow @ 25ºC, mm	ASTM D5329	3 mm max
Bond @ -29ºC, 12.7 mm specimen, 200% extension	ASTM D5329	Pass 3 cycles
Resilience @ 25ºC	ASTM D5329	60% min
Asphalt Compatibility	ASTM D5329	Pass all requirements
Cone Penetration at -17.8ºC, dmm	ASTM D5329	> 40
The hot-applied sealant shall be self-levelling, and should not flow or track at high pavement temperatures.		

2.2 Field Performance Evaluation and Requirements

In addition to laboratory tests, all sealants will be evaluated for performance under field conditions. As part of the approval process, two failure modes will be evaluated; bond failure and tensile failure.

2.2.1 Bond Failure

Bond failure is when the sealant material has lost bond with the vertical faces of the routed cross-section but does not include where the face of the rout sidewall has pulled away from the pavement.

Before evaluating this failure, it will be visually verified that the routed cross-section is as specified and that both vertical faces of the filled cross-section were freshly cut by the router.

2.2.2 Tensile Failure

Tensile failure occurs when the material is adequately bonded to the vertical faces of the routed cross-section but the sealant itself tears apart under the tensile strain as the crack opens.

Failure is defined as cracking or tearing completely through the sealant depth. The tension cracks in the sealant should not be just surface cracks (where weathering tends to crack the surface) but should progress completely through the material.

The failure for performance is based on the total length of transverse cracks only, as longitudinal cracks are not subject to the same level of strain.

Failure Type	% of Total Transverse Length	
	After 1 Winter	**After 2 Winters**
Loss of Bond one face		
Loss of Bond 2 faces		
Complete loss of bond		
Tensile Stress Failure in Sealant		
Total Allowable Failures (combined length)	7%	10%

3.0 Pavement Selection and Test Section Location

The bituminous pavement selected for applying the sealant will be a highway approximately 2-5 years old. For each sealant, the test section will be approximately 500 metre long

4.0 Sealant Application

Application of the sealant will be performed by MI or designate according to the Construction Specification for Crack Sealing (No. 840).

4.1 Clean and Seal

The cracks shall not be overfilled and the appearance of the finished seal shall present a neat fine line. The following photographs shall be used as reference.

Figure 1- Clean and Seal

Figure 2 - Clean and Seal

4.2 Rout and Seal

The sealant shall be struck off with a squeegee to form the specified dimensions of the finished seal as shown in Figure 3.

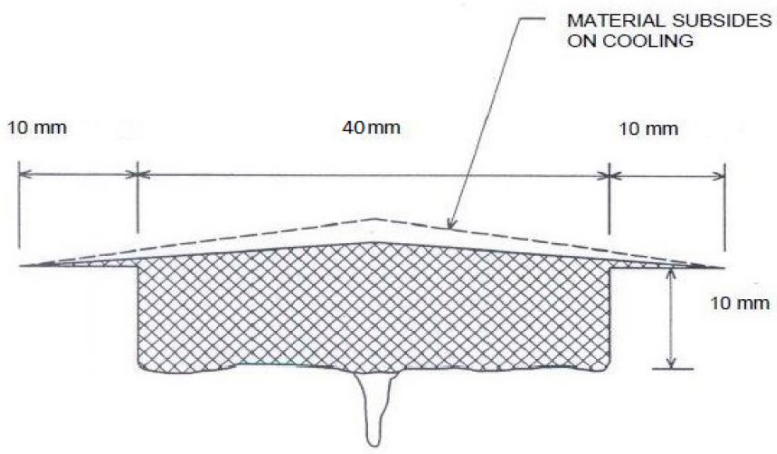

Figure 3 - Rout and Seal Configuration

5.0 Field Information

The following factors relating to field application will be recorded:

- Date and time
- Air Temperature
- Pavement Temperature
- Sealant Temperature
- Total length of transverse cracks sealed
- Total length of longitudinal cracks sealed
- Comments regarding the ease of sealant application

6.0 Field Performance Evaluation

A field performance evaluation will be conducted between January and late March of each year. The following information will be collected for evaluation:

- Length of longitudinal cracks sealed
- Length of transverse cracks sealed
- Length of bond loss on one side
- Length of bond loss on 2 sides
- Length of tensile failure

Conditional approval after year one may be considered, based on failure below 7%. The test section will be evaluated a minimum of two years for final approval

A report of the results will be prepared by MI and will be provided to the sealant suppliers each evaluation year.