

The following will now form part of the Special Provisions of the contract and amends the applicable information contained in the original contract tendering documents.

STRESS ABSORBING MEMBRANE INTERLAYER (SAMI)

1 SCOPE

This specification covers the requirements for the application of bituminous binder, fiberglass strands, and aggregate for a single surface treatment with Stress Absorbing Membrane Interlayer (SAMI). The SAMI application will be applied to a clean surface and shall be overlaid with Hot Mix asphalt pavement as noted elsewhere in this contract.

2 DEFINITIONS

Stress Absorbing Membrane Interlayer (SAMI) - The application of binder and fibreglass on the existing asphalt surface, followed by initial cover aggregate and an asphalt overlay.

3 DESIGN REQUIREMENTS

The Contractor shall design the type of asphalt binder, fiber and aggregate, and their application rates to ensure satisfactory performance on the roadway. The Contractor shall follow a recognized surface treatment with SAMI design methodology, and submit this information to the Contract Administrator, a minimum of two weeks prior to the start of the SAMI operations. The material shall be placed only after the Contract Administrator reviews the design information and verifies that it meets the specified requirements.

Upon completion of the work the Contractor shall submit a Certificate of Conformance stating compliance with the design and application rates for binder, fibre and aggregate. In addition to the Certificate, supporting documentation shall be provided as necessary to demonstrate compliance. An Engineer shall affix his or her seal and signature to the Certificate of Conformance verifying that the work was carried out in accordance with the contract requirements.

4 MATERIAL REQUIREMENTS

4.1 Asphalt Binder

The asphalt binder shall be rapid setting polymer modified.

Prior to the commencement of the work, the Contractor shall issue a Certificate of Conformance that the material complies with OPSS 1103, as determined by an accredited laboratory in Ontario's inter-laboratory correlation program. An accredited laboratory shall be one that maintains a satisfactory rating from the MTO Emulsion Correlation Program.

4.2 Aggregates

The physical and gradation requirements of the aggregate application shall be equivalent to those of Class 5 aggregate as indicated in Table(s) 2 and 3.

Prior to the commencement of the work, the Contractor shall issue a Certificate of Conformance that the material complies with the physical and gradation requirements as noted above, as determined by an accredited laboratory. An accredited laboratory conducting tests for LS-601 and LS-602 shall be one that holds a valid certificate from the Canadian Council of Independent Laboratories (CCIL) as Type C. Testing for LS-601 and LS-602 shall be conducted by qualified laboratory staff who hold a valid certificate from CCIL in aggregate testing. An acceptable laboratory conducting tests for physical properties or consensus properties shall be one that holds a certificate from CCIL as Type D for the applicable test methods and also participates in the annual MTO Proficiency Sample Testing Program.

Aggregates containing slags are not permitted for use in a SAMI application.

4.3 Fibreglass

The Contractor shall supply the name of the fibreglass supplier, and certify its acceptability for use in the SAMI, which includes verification that any reused or recyclable material/component is acceptable for such use. This information shall be provided to the Contract Administrator with the mix design information.

4.4 Submission Requirements

Representative samples of the materials to be used in the work shall be provided to the Contract Administrator following submission of the Certificates of Conformance. These representative samples shall be provided a minimum of one week prior to start of the SAMI operation.

The samples shall be labelled with the contract number, material type, material source and date of sampling.

Each material sample shall be packaged separately and the samples shall be in containers which are clean, closed and will not rupture when lifted and handled. Each filled sample container shall have a maximum mass of 30 kg.

The minimum sample quantities are: emulsified asphalt 4 liters evenly split between two containers, each aggregate 25 kg, and any other material samples to be used in the job-mix-formulae in a quantity large enough to allow confirmation of the design.

5 EQUIPMENT

5.1 Binder/Fibreglass Distributor

The binder/fibreglass distributor shall be designed and manufactured to spray binder, and cut and distribute fibreglass on the road surface. The binder/fibreglass distributor shall be capable of applying binder and fibreglass at the specified rates in the SAMI design, and in a continuous and uniform manner both longitudinally and transversely for a full lane width (maximum of 4.0m).

The binder/fibreglass distributor shall be capable of spraying approximately half of the required binder from a primary set of nozzles and the remaining half from a secondary set of nozzles. The fibreglass strands are to be cut into uniform lengths of 50 to 100 mm, and pneumatically blown into place between the two layers of binder.

6 CONSTRUCTION

6.1 Calibration of Equipment

Prior to the commencement of the SAMI operation, the Contractor shall submit to the Contract Administrator written confirmation that all distributors and all aggregate spreaders have been calibrated using a recognized calibration method. The confirmation shall include the supporting calibration methodology documentation, and must be signed off by the Manager who is responsible for the operation of the distributors and the aggregate spreaders. The calibration shall have been carried out within a time frame not exceeding 14 calendar days prior to the commencement of the SAMI operation.

6.2 Aggregates

The Contract Administrator reserves the right to sample the aggregates for testing purposes.

6.3 Binder

The Contract Administrator reserves the right to require the Contractor to provide additional field binder samples for testing purposes.

6.4 Fibreglass

The Contract Administrator reserves the right to sample the fibreglass for testing purposes.

6.5 Process Control

The Contractor shall conduct such process control procedures, including sampling and testing, as is necessary to ensure that all aggregates, all fibreglass strands and all asphalt binder to be used in the work conform to the requirements of the Contract. The Contractor shall determine the type and amount of process control sampling and testing to be completed.

The Contractor shall be responsible for the interpretation of the test results and the determination of any action to be taken to ensure that all materials and work conform to the requirements of the Contract.

Upon the request of the Contract Administrator, the Contractor shall supply copies of any or all test results.

6.6 Damage to Vehicles Caused by Loose Aggregate

In order to minimize the potential of public complaints and damage to property, public traffic shall only be permitted to travel on the final compacted surface of this SAMI application.

The Contractor shall ensure that there are no occurrences of damage to vehicles caused by loose aggregate while travelling through the project at the time of construction. All claims of damage of this nature shall be dealt with directly by the contractor.

The Contractor shall expedite the sweeping of any remaining aggregate from the surface of the new SAMI application.

6.7 Surface Preparation

Prior to SAMI application the tangible surface shall be thoroughly cleaned of all loose aggregate particles, dust, and other objectionable material by the use of power brooms, power blowers, power vacuums, or other means. Disposal or wasting of oversize pieces of pavement or loose aggregate material will not be permitted within the right of way.

7 QUALITY ASSURANCE

The SAMI application will be inspected by the Contract Administrator prior to surface course overlay. Acceptance of the treatment will be based on the following criteria:

The completed SAMI surface shall be free of flushing, streaking or loss of cover aggregate, including delamination, as described by the Ministry of Transportation of Ontario's Manual for Condition Rating of Surface Treated Pavement (SP-021).

Workmanship shall be inspected for the following:

- Untreated areas (missed)
- No overlap on longitudinal joints
- No overlap on construction joints

Areas requiring corrective work will be determined by the Contract Administrator. Repair needs and methods will be established based on the requirements in table 1. All corrective work shall be accomplished prior to asphalt surface overlay. The Contractor shall furnish materials, equipment and labour to make corrections at no additional cost to the Owner. The Contract Administrator shall give final approval on inspection and corrective work.

8 MEASUREMENT FOR PAYMENT

Measurement will be by Plan Quantity and may be revised by Adjusted Plan Quantity of the horizontal area in square meters of the SAMI placed.

9 BASIS OF PAYMENT

Payment at the contract price for the above tender item shall be full compensation for all labour, equipment and materials to do the work.

Repair, removal, disposal and replacement of any damaged or defective SAMI shall be completed by the Contractor at no additional cost to the owner.

Table 1

SURFACE DEFECTS	SEVERITY	DENSITY OR EXTENT (per 100 m of lane length)	REPAIR/REPLACEMENT METHOD
Workmanship	Any noted	All	Reapplication of SAMI
Loss of Cover Aggregate	slight	intermittent, frequent, or extensive	none
	moderate/severe	intermittent or frequent	patching and then a surface treatment of the affected area manually or by machine
	moderate/severe	extensive**	patching and then a surface treatment of the affected area
Flushing	slight	intermittent, frequent, or extensive	none
	moderate	intermittent***, frequent**, or extensive**	lean surface treatment of the affected area
	severe	intermittent***	removal and replacement of the SAMI over the affected area
		frequent** or extensive**	removal and replacement of the SAMI over the affected area
Streaking	slight	intermittent, frequent, or extensive	none
	moderate	intermittent***, frequent** or extensive**	Surface treatment of the affected area
	severe	intermittent***	compacted aggregate curtain or sand seal followed by surface treatment of the affected area
		frequent** or extensive**	compacted aggregate curtain or sand seal followed by surface treatment of the affected area

Notes:

1. Area of the repair or replacement shall not be less than one lane width x 50 m in length.
2. Area of the repair or replacement shall not be less than one lane width x 10 m in length. If there is less than 10 m between 2 sections in the lane designated for repair or replacement, the repair or replacement shall be continuous.
3. Descriptions of surface defects and severity are according to SP-021.

Table 2
Gradation Requirements - MTO Lab Test No. LS-602

MTO SIEVE DESIGNATION	PERCENTAGE PASSING BY MASS					
	Class 1 (Note 1)	Class 2	Class 3 (Note 2)	Class 4	Class 5 (Note 1)	Class 6 (Note 2)
19.0 mm	--	100	100	--	--	--
16.0 mm	--	98 - 100	96 - 100	--	--	100
13.2 mm	100	75 - 95	67 - 86	--	--	96 - 100
9.5 mm	75 - 100	50 - 80	29 - 52	100	100	50 - 73
6.7 mm	0 - 40	--	--	--	40 - 85	--
4.75 mm	0 - 10	25 - 50	0 - 10	70 - 100	5 - 25	0 - 10
2.36 mm	--	--	--	10 - 100	0 - 10	--
1.18 mm	--	10 - 40	--	5 - 90	0 - 5	--
600 µm	--	--	--	3 - 70	--	--
300 µm	--	2 - 20	--	2 - 40	--	--
150 µm	--	2 - 13	--	0 - 15	--	--
75 µm	0 - 1	2 - 7	0 - 2	0 - 7	0 - 1	0 - 2

Notes:
1. Class 1 and Class 5 aggregates shall be washed according to OPSS 1001.
2. Class 3 and Class 6 aggregates have the same gradation requirements as HL4 and HL3 coarse aggregates respectively.

MTO SIEVE DESIGNATION	PERCENTAGE PASSING BY MASS
	Modified Application
9.0 mm	--
16.0 mm	--
13.2 mm	--
9.5 mm	100
6.7 mm	90-100
4.75 mm	60-85
2.36 mm	0-20
1.18 mm	--
600 µm	--
300 µm	--
150 µm	--
75 µm	0-1

Table 3**Physical Requirements**

MTO LAB TEST	TEST NUMBER	Class 1 (Note 1)	Class 2 (Note 1)	Class 3 (Note 1)	Class 4	Class 5 (Note 1)	Class 6 (Note 1)
Loss by Washing, Pass 75 µm Sieve, % Maximum	LS-601	1.3 (Note 2)	--	1.3 (Note 2)	--	1.3 (Note 2)	1.3 (Note 2)
Absorption, % Maximum	LS-604	1.75	--	2.00	--	1.75	1.75
Magnesium Sulphate Soundness, 5 Cycles, % Maximum Loss, (Note 3)	LS-606	12	15	12	--	12	12
Percent Crushed, % Minimum	LS-607	60	60	60	--	60	60
Flat and Elongated Particles, % Maximum	LS-608	20	20	20	--	20	20
Petrographic Number, Maximum	LS-609	135	160 (Note 4)	160	--	135	145
Micro-Deval Abrasion, Coarse Aggregate, % Loss, Maximum	LS-618	17	25	17	--	17	17
Micro-Deval Abrasion, Fine Aggregate, % Loss, Maximum	LS-619	--	30	--	25	--	--
Plasticity Index, Maximum	LS- 703/704	--	0	--	0	--	--
ALTERNATIVE REQUIREMENTS TO MAGNESIUM SULPHATE SOUNDNESS - LS-606							
Unconfined Freeze- Thaw Loss, % Maximum	LS-614	6	15	6	--	6	6
OPTIONAL REQUIREMENTS							
Petrographic Examination, % Non-carbonate, Retained 4.75 mm	LS-609	(Note 5)	(Note 5)	(Note 5)	--	(Note 5)	(Note 5)
NOTES: 1. Class 1, 2, 3, 5 and 6 physical requirements noted above are for the material retained on the 4.75 mm sieve, except for lab test LS-619. 2. When quarried rock is used as a source of coarse aggregate, a maximum of 2.0% passing the 75 µm sieve shall be permitted. 3. The requirements will be waived by the Owner when the aggregate meets the alternative unconfined freeze-thaw requirements of LS-614. 4. The weighted petrographic numbers shall be the hot-mix and concrete petrographic number. 5. The aggregates for the double surface treatment shall be obtained from a source listed in the Designated Source of Materials #3.05.25, as acceptable for use as coarse aggregate in HL1, or Superpave 12.5 FC1 hot mix.							