

Specification For Rejuvenator Fog Seal 4240

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1 DESCRIPTION

- 1.1 The Work shall consist of material supply and construction of a Rejuvenator Fog Seal that includes applying emulsified asphalt binder to a prepared surface followed by Scrubbing in a light application of blotter sand.

2 DEFINITIONS

- 2.1 Binder is asphalt emulsion material as described in Section 4240.4.1.
- 2.2 Rejuvenator Fog Seal is a light surface treatment that includes the application of a specialized Binder designed to rejuvenate an existing pavement, followed by an application of blotter sand.
- 2.3 Scrubbing is the process of using a broom to apply pressure to the blotter sand to achieve greater adherence of the sand to the existing roadway and a more even surface texture by embedding the sand into fine cracks and surface voids.
- 2.4 Sweeping is the removal of all loose aggregate and debris from the roadway.
- 2.5 Business Day is any weekday excluding statutory Holidays and the provincial government's Floating Holiday.

3 CONTRACTOR OBLIGATIONS

3.1 The Contractor shall be responsible for:

- 3.1.1 the selection, supply and quality of all materials required to complete the Work;
- 3.1.2 developing and adhering to the Quality Control Plan; and
- 3.1.3 ensuring conformance to all dust control and loose aggregate requirements.

3.2 The Contractor shall advise the Engineer in writing at least five (5) Business Days prior to:

- 3.2.1 the start of any on-site construction activities and associated sampling, testing, and inspections; and
- 3.2.2 the start of any repairs.

4 MATERIALS

4.1 Binder

- 4.1.1 The Contractor shall use a restorative asphalt emulsion with rejuvenating characteristics as indicated by a high maltene composition. The type of restorative asphalt emulsion permitted for use will be as specified in the Special Provisions.
- 4.1.2 The Contractor shall provide the Engineer with a submittal from the manufacturer of the restorative asphalt emulsion that outlines any requirements and recommendations for the use of the approved product. The manufacturer submittal shall be submitted at least one week prior to the pre-construction meeting and shall include, at a minimum, the following information:
 - 4.1.2.1 product name, manufacturer, and contact information;
 - 4.1.2.2 material properties and specifications;
 - 4.1.2.3 storage and handling requirements;
 - 4.1.2.4 maximum dilution ratio; and

4.1.2.5 product storage and application temperature limits.

4.1.3 The Contractor shall dilute the asphalt emulsion in the presence of the Engineer or supplier at a ratio of 2 parts emulsion to 1 part water unless otherwise recommended by the supplier. The oil shall be placed first. The water shall be potable, and the source of the water shall be approved by the Engineer.

4.1.3.1 The final diluted product shall be a fluid, homogeneous mixture that does not plug distributor nozzles.

4.1.4 The Contractor shall follow the supplier's recommended procedures for storing and handling the asphalt emulsion.

4.1.5 The asphalt emulsion, both undiluted and diluted, shall be maintained within the storage and application temperature limits included in the manufacturer submittal.

4.1.5.1 In addition, the asphalt emulsion shall be maintained within $\pm 10^{\circ}\text{C}$ of the temperature of the asphalt emulsion at the time the distributor was calibrated.

4.1.6 The Contractor shall provide the Engineer with a copy of all the weigh bills from the supplier, and with records of all restorative asphalt emulsion received and/or returned on a daily basis.

4.2 Aggregate

4.2.1 Blotter sand shall be composed of sound, hard and durable particles of sand free from organic or other deleterious material.

4.2.2 The blotter sand shall comply with the requirements listed in table 4240.4.2.T1:

TABLE 4240.4.2.T1

Sieve Designation	Percent By Weight Passing Canadian Metric Sieve Series
	Blotter sand
12.5 mm	100
9.0 mm	90 – 100
5.0 mm	70 – 100
2.0 mm	30 – 90
900 µm	15 – 75
400 µm	10 – 40
Plasticity Index	0 – 6.0

5 EQUIPMENT

5.1 General

5.1.1 All equipment shall be maintained in good working condition at all times.

5.2 Binder Distributor

5.2.1 The Contractor shall supply a self-powered pressure asphalt distributor which shall:

5.2.1.1 be capable of maintaining a uniform speed and be equipped with a device that measures the truck speed in metres per minute and distance travelled in metres;

5.2.1.2 have a minimum Binder capacity of 4 500 litres;

5.2.1.3 have a heating system capable of applying even heat and maintaining the Binder at a temperature within the temperature limits recommended in the manufacturer submittal;

5.2.1.4 have a device capable of measuring the Binder temperature in the tank;

5.2.1.5 have a positive displacement asphalt pump with separate power unit or hydrostatic drive;

- 5.2.1.6 be equipped with a gauge that measures spray bar pressure;
- 5.2.1.7 have a spray bar that is capable of being maintained at a constant height throughout the entire operation;
- 5.2.1.8 have an adjustable length spray bar on which the nozzles on any portion may be closed off;
- 5.2.1.9 have a spray bar that has been provided with a positive shutoff to prevent leaking;
- 5.2.1.10 have spray bar nozzles that are of the same manufacture, type and size and are in good working condition. When lower Binder application rates are determined necessary, smaller nozzles shall be inserted in the spray bar where the emulsified asphalt rate is reduced;
- 5.2.1.11 have a device capable of measuring spray nozzle angle; and
- 5.2.1.12 have nozzles that have been positioned at an angle of 15 to 30 degrees from the horizontal of the spray bar in accordance with the manufacturer's recommendation.
 - 5.2.1.12.1 all nozzles shall spray a full fan except for the right and left edge nozzles; and
 - 5.2.1.12.2 the right and left edge nozzle shall be adjusted to a half fan such that the spray stays to the inside of the spray bar.

5.3 Aggregate Spreader

- 5.3.1 The Contractor shall supply an aggregate spreader capable of spreading the blotter sand at a uniform rate in one application over the full width of the applied Binder.
- 5.3.2 Aggregate spreaders shall be equipped with controls for adjusting width and rate of spread.

5.4 Cleaning and Calibration of Equipment

- 5.4.1 All of the tanks, lines and nozzles for any storage unit and the Binder distributor shall be thoroughly flushed and cleaned prior to use on this Contract.

- 5.4.2 The Contractor shall provide the Engineer with a certificate of calibration for the Binder distributor and aggregate spreader which was performed in the year construction is to be carried out. The calibrations shall conform to ASTM methodologies D2995 and D5624 and shall be verified by a Professional Engineer. Certificates of calibration shall be provided to the Engineer prior to starting the Work.
- 5.4.3 At the start of each Project section, the Contractor shall verify the Binder and blotter sand application rates in accordance with the requirements for Seal Coat Aggregate From The Roadway (STP 105-1) and Distributor Application Rate (STP 203-20).
- 5.4.4 The Contractor shall recalibrate the equipment if deemed necessary by the Engineer.

5.5 Scrub Broom

- 5.5.1 The Contractor shall supply a scrub broom with positive means of controlling vertical pressure to drag or push over the applied blotter sand to even out the sand and embed it into fine cracks and surface voids to achieve greater adherence and an even surface texture.
- 5.5.2 The scrub broom shall have the following features, unless a written authorization for alternate features has been received from the Engineer:
 - 5.5.2.1 rigid frame with adjustable downward pressure control capable of maintaining uniform pressure across the blotter sand. It must be equipped with a means of raising and lowering the broom at desired points. The weight of the broom assembly shall be such that it does not squeegee the Binder off the roadway surface; and
 - 5.5.2.2 adjustable brush heads for optimized blotter sand spread and distribution.

5.6 Power Brooms

- 5.6.1 The Contractor shall supply sufficient mechanically operated, rotary-type power brooms to meet the specified Sweeping requirements. The brooms shall be equipped with the following:

- 5.6.1.1 a broom wider than the width of the power unit when the broom is mounted in front of the power unit;
- 5.6.1.2 a flashing or rotating amber light with not less than 55 W halogen bulbs and mounted not less than 2.5 metres above the ground surface; and
- 5.6.1.3 devices that enable the operator to control the action of the broom from the towing unit for a pull type power broom.

6 CONSTRUCTION

6.1 Rejuvenator Fog Seal Limitations

- 6.1.1 The Contractor shall adhere to the following time and weather limitations:
 - 6.1.1.1 application of the Rejuvenator Fog Seal shall be only during daylight hours from June 1st to August 31st inclusive;
 - 6.1.1.2 the ambient temperature shall be at least 10°C and rising;
 - 6.1.1.3 pavement surface temperatures shall be below 50°C;
 - 6.1.1.4 the road surface shall be dry;
 - 6.1.1.5 suspend operations when the weather is misty, rainy, or if rain is impending;
 - 6.1.1.6 the Binder shall be applied the same day it was diluted, unless authorized by the Engineer; and
 - 6.1.1.7 the Contractor shall follow all the manufacturer's temperature and application recommendations unless directed otherwise by the Engineer.

6.2 Calibration of Binder and Aggregate Application Rates

- 6.2.1 Prior to applying Binder, the Contractor shall complete a minimum of two test patches on the pavement to be sealed for each Project section in the presence of the Engineer. The test patches shall be completed in accordance with the following:

- 6.2.1.1 the Contractor's representative responsible for constructing and evaluating the test patches shall have prior experience in conducting this work;
- 6.2.1.2 the same aggregate source shall be used for test patches and construction of the Rejuvenator Fog Seal;
- 6.2.1.3 each test patch shall measure 3 metres transverse by 1 metre longitudinal and be centered on the road centerline, or as recommended by the manufacturer; and
- 6.2.1.4 the test patches shall be completed using different application rates of Binder ranging from approximately 0.35 L/m² to 0.60 L/m².
- 6.2.1.5 A known weight of blotter sand shall be applied evenly across the test patch to determine the optimum blotter sand application rate for each Binder application rate.
- 6.2.2 A minimum of two days following the construction of the test patches, the Engineer and the Contractor shall jointly evaluate the test patches, at which time the Contractor will submit optimum Binder and blotter sand application rates for the Rejuvenator Fog Seal to the Engineer for approval.
 - 6.2.2.1 The optimum blotter sand application rate for the Work shall be between 4 and 6 kg/m².

6.3 Preparation of Existing Surface

- 6.3.1 The Contractor shall ensure the following is completed prior to fog sealing.
 - 6.3.1.1 The surface is swept clean of dust, loose aggregate, mud, and excess moisture.

6.4 Application of Binder

- 6.4.1 Binder shall not be applied to the roadway until a written authorization to seal has been provided by the Engineer.
 - 6.4.1.1 The authorization to seal will be valid for 24 hours.

- 6.4.1.2 A separate authorization to seal will be required for any portion of the designated kilometre range of roadway included in the authorization to seal that remains incomplete after the 24 hours has elapsed.
- 6.4.2 The Contractor shall apply the Binder within ± 5 percent of the optimum application rate approved by the Engineer.
- 6.4.3 The Binder application shall be started on a strip of building paper each time the distributor starts spraying unless the Contractor can demonstrate to the Engineer that an acceptable joint can be obtained without building paper. The paper shall be removed and disposed of following the Binder application.
- 6.4.4 The spray pattern shall provide a minimum triple lap coverage.
- 6.4.5 The Contractor shall remove any splattered Binder from structures, wheel guards, curbs, guardrail, and other roadway appurtenances.
- 6.4.6 Binder shall not be spilled, sprayed, or tracked on completed sections of Rejuvenator Fog Seal.
- 6.4.7 The Binder shall be left to cure, undisturbed, until the emulsified asphalt breaks and has penetrated in all required areas, as determined by the Engineer.
- 6.5 Delivering Aggregate to the Road
 - 6.5.1 Hauling blotter sand shall be carried out in accordance with Specification 2405 For Haul On The Basis Of The Kilometre.
 - 6.5.2 Vehicles used to haul blotter sand shall be equipped with clean metal boxes.
 - 6.5.3 Trucks shall not travel on the sealed and blotted surface until scrubbing is completed.
 - 6.5.4 Trucks shall refrain from sharp turning movements and sudden stops and starts on the freshly sealed surface.
- 6.6 Application of Aggregate

6.6.1 The blotter sand may be applied as soon as the emulsified asphalt has broken and penetrated in all design areas, as determined by the Engineer.

6.6.2 The blotter sand application shall be according to the following:

6.6.2.1 The Binder should be visible through the blotter sand immediately upon application and before scrubbing.

6.6.2.2 The blotter sand shall be placed uniformly on the fog seal to aid in preventing tracking of the emulsified asphalt.

6.6.2.3 The spread rate shall be within +/- 10 percent of the blotter sand application rate approved by the Engineer.

6.6.2.3.1 In areas where the Engineer determines that the application rate has not been met, or that blotter sand coverage is insufficient, the Contractor shall adjust the approved blotter sand application rate as directed by the Engineer and reapply blotter sand at no direct expense to the Ministry.

6.6.3 No blotter sand shall be spilled from the back end of the spreader. If this occurs, the fog sealing operation shall cease until the problem is rectified.

6.7 Scrubbing

6.7.1 The Contractor shall scrub the treated surface after application of the blotter sand. During Scrubbing, the following shall apply:

6.7.1.1 the broom bristles are only allowed to lightly rest on the blotter sand to level out uneven material; and

6.7.1.2 the broom bristles must be level while Scrubbing the treated surface.

6.8 Sweeping

6.8.1 The Contractor shall Sweep the roadway and shoulders the following day after the application of the blotter sand.

6.8.2 The Contractor may be required to use water for dust abatement during the Sweeping process when directed by the Engineer. The Work shall be

in accordance with Specification 2500 For Watering with the following exceptions:

- 6.8.2.1 the Contractor shall furnish the source of water;
- 6.8.2.2 the repair, maintenance and construction of haul roads for water sources shall be in accordance with General Provision 1300.7.1.4; and
- 6.8.2.3 watering for dust abatement during the Sweeping process will be considered as a subsidiary obligation of the Contractor under this Contract.

6.9 Traffic Control

- 6.9.1 The Contractor shall not allow equipment on uncovered surfaces of fresh Binder.
- 6.9.2 The Contractor shall not allow traffic on the Rejuvenator Fog Seal until:
 - 6.9.2.1 the emulsified asphalt has completely set, as determined by the Engineer; and
 - 6.9.2.2 the blotter sand has been applied and scrubbed to the satisfaction of the Engineer.
- 6.9.3 All equipment shall use approaches to turn around.
- 6.9.4 The Contractor shall supply and operate pilot vehicles whenever a lane is closed.
- 6.9.5 The Contractor is responsible for claims of damage to vehicles until the roadways and shoulders have been swept free of loose aggregate and permanent pavement markings have been applied. If permanent pavement markings are to be applied by Ministry forces, the Contractor's responsibility ends after completion of the fog seal and placement of temporary pavement markings.

7 QUALITY CONTROL AND ASSURANCE

- 7.1 A Quality Control Plan shall be submitted at least 2 days prior to the Pre-Construction Meeting. The Quality Control Plan shall be prepared in accordance with the requirements for STP 400 Contractor Quality Control Plans

and shall define how the work will be carried out in the field, including but not limited to longitudinal joints, sweeping, transverse joints, work on bridges, calibration of equipment, etc.

- 7.2 The Contractor shall demonstrate to the Engineer satisfactory compliance of material types and properties.
- 7.3 The Contractor shall provide the Engineer reasonable access to the construction project, equipment, and all construction materials for quality assurance and sampling purposes.

8 COMPLETION AND ACCEPTANCE OF WORK

- 8.1 The Contractor shall provide the Engineer with 3 Business Days of notice following completion of Work on any site, to arrange for an inspection of that site.
- 8.2 The Rejuvenator Fog Seal will be considered acceptable after Scrubbing if:
 - 8.2.1 the finished surface has a uniform and even texture;
 - 8.2.2 there is no bleeding or flushing;
 - 8.2.3 there is no excessive Binder loss;
 - 8.2.4 there is no loose aggregate; and
 - 8.2.5 longitudinal and transverse joints are straight with no excessive overlaps.
- 8.3 Work that does not meet these requirements shall be repaired or reconstructed to the satisfaction of the Engineer at no direct expense to the Ministry.

9 MEASUREMENT

- 9.1 Restorative emulsified asphalt shall be measured in tonnes of undiluted emulsion delivered to the Project and used in the completion of the Work, based on copies of supplier weigh slips collected on-site at time of delivery.

10 PAYMENT

- 10.1 Payment for Rejuvenator Fog Seal shall be at the applicable contract unit price per tonne of undiluted restorative emulsified asphalt used on the project. The

unit price will be full compensation for completing the Work, including furnishing all materials, equipment and labour necessary to complete the Work.