
SEAL COAT

PART 1 GENERAL

- 1.01 OTHER CONTRACT DOCUMENTS The General Conditions of the Contract, General Requirements, and Supplemental Conditions attached hereto shall apply to and be part of this Section.
- 1.02 DESCRIPTION OF WORK The Work described herein shall be for the supply and installation of an asphalt surface treatment on an existing granular base course or asphalt pavement.
- 1.03 RELATED WORK
Section 02303 Granular Base Course
Section 02510 Asphalt Concrete Pavement
Section 02576 Crack Sealing
Section 02514 Concrete Construction
- 1.04 CLASSIFICATION OF WORK Seal Coat shall be classified on the basis of the aggregate gradation as shown in Part 2.02 of this Section. Unless specified otherwise in Section 01001 Supplemental Conditions, shown on the Drawings or directed by the Engineer, aggregate shall be Class A.
- 1.05 SUBMITTALS
The Contractor shall submit to the Engineer, a minimum of fourteen (14) calendar days prior to the start of any Work, a schedule outlining the sequence for placement of Seal Coat on each roadway/street listed in Section 01001 Supplemental Conditions and/or shown on the Drawings.

The Contractor shall provide notice to the Engineer of the source or sources of supply of all Products and materials to be incorporated into the Work a minimum of fourteen (14) calendar days prior to commencing the Work or incorporating such Products and materials into the Work. The source of Product and material supply shall not be changed without the prior approval of the Engineer. Any material of a quality or nature not suitable for its intended use will be rejected. The Engineer reserves the right to prohibit the use of material from any source where, in his opinion, the character of the material or the method of manufacture is such as to make improbable the furnishing of material conforming to the requirements of this Section.

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1.06 QUALITY
ASSURANCE

The analysis and approval of materials by the City will not relieve the Contractor from his duty to produce an acceptable product as stated in this Section.

During the processing of aggregate, the Engineer will make a minimum of one gradation analysis, to applicable ASTM (C136) standard test method, for every 200 tonnes of processed aggregate to be incorporated into the Work. If the aggregate fails to comply with Part 2.02 of this Section on any two (2) consecutive tests, the material shall be stockpiled separately and may be incorporated with the approved processed aggregate if approved by the Engineer. If the aggregate fails to comply with Part 2.02 of this Section on any two (2) consecutive tests while incorporating the material into the Work at the Site, delivery of all material shall be terminated until the Contractor has provided the Engineer with sufficient evidence that the aggregate again conforms to the requirements of this Section.

Changes in the source of aggregate supply or aggregate gradation during the Work will not be permitted without the approval of the Engineer. In the event that, by authorization of the Engineer, changes are made during the progress of the Work, each different kind of material shall be entirely used in the Seal Coat operations or otherwise disposed of before the use of another material from an alternative source is used.

The Contractor shall supply all equipment, materials and labour necessary to calibrate the asphalt binder distributor and the aggregate spreader. All calibrations shall be made with the approved job materials and prior to incorporating any material into the Work. Calibration of the bituminous distributor shall be in accordance with ASTM D 2995.

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PART 2 PRODUCTS

2.01 ASPHALT BINDER

Unless specified otherwise in Section 01001 Supplemental Conditions, shown on the Drawings or directed by the Engineer, the asphalt binder shall be as follows;

For Class A aggregates the asphalt binder shall be a cationic rapid set emulsion CRS-2 or approved equal.

For Class B aggregates the asphalt binder shall be a high float anionic emulsion HF-100S or approved equal. The anionic emulsion shall include an anti strip additive specifically formulated to improve the coating and adhesive properties of the asphalt binder.

The Contractor shall store and maintain the asphalt binder in a manner and at a temperature as recommended by the manufacturer of the asphalt binder

Prior to the use of any asphalt binder in the Work, the Contractor shall provide the Engineer with a certificate of analysis from the manufacturer of the asphalt binder which clearly indicates that the asphalt binder conforms to this Section.

2.02 AGGREGATE

The Contractor shall handle and stockpile all aggregate materials as described in Part 3.01 of Section 02303 Granular Base Course.

The aggregates shall be clean, washed, uncoated, hard, durable, normal density particles of crushed rock, crushed stone, crushed gravel, natural sand or manufactured sand. The aggregates shall be free of deleterious material including but not restricted to organic matter, sod, roots, clay, silt, loam, thin, elongated (length in excess of 4 times width) or laminated particles, soft or flaking particles, shale, ironstone, alkali, mica, weathered gneiss or pyrite

The aggregate shall conform to the following gradation;

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Seal Coat Aggregate	Percent Passing Sieve (by mass)	
	Class A Aggregate	Class B Aggregate
Sieve Size		
12.7 mm	100%	100%
9.5 mm	100%	90 – 100%
6.3 mm	40 – 70%	–
4.75 mm	0 – 15%	35 – 65%
2.0 mm	0 – 5%	15 – 40%
425 um	–	0 – 15%
75um	0 – 1%	0 – 3%
minimum crush count	60%	60%
maximum deleterious	5%	5%
maximum Los Angeles abrasion Loss	30%	30%

The deleterious percentage is the percentage by mass of total dry aggregate particles retained on the 4.75 millimetre sieve and each coarser sieve which are determined by the Engineer to be a deleterious material.

The crush count is the percentage by mass of total dry aggregate of the blended aggregate particles retained on the 4.75 millimetre sieve and each coarser sieve which are not deleterious and have least one or more freshly fractured face.

The Los Angeles abrasion loss test will be performed according to ASTM Standard C131 test procedures. Gradation analysis will be performed according to ASTM Standard C136 test procedures.

The moisture content of the aggregate at the time of application shall be between 1 and 3 percent (1% - 3%).

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2.03 ASPHALT
DISTRIBUTOR

The asphalt distributor shall be a self powered pressure asphalt distributor designed and capable of distributing the asphalt binder at a readily determined and controlled rate of between 0.23 litres per square metre and 9.05 litres per square metre within a pressure range of 135 kiloPascals to 520 kiloPascals all in a uniform double coverage spray, without atomization, over the entire section to be sealed. The allowable variation from the required rate of application shall not be more than plus or minus 5 percent (5%).

The distributor equipment shall include a separate power unit or hydrostatic drive for the asphalt pump, a tachometer, full-circulation spray bars complete with adjustable nozzles, pressure gauges located on the spray bar, volume measuring devices, a tank equipped to agitate, circulate and thoroughly heat the asphalt to between 60 degrees Celsius and 85 degrees Celsius, an accurate thermometer for recording the temperature of tank contents, and a hand-held hose attachment suitable for applying binder manually to areas inaccessible to or missed by the distributor.

The distributor shall have a normal width of application of not less than 3.6 metres with provision for the application of a lesser width when required. The spray bar shall be shut off instantaneously at each construction joint to ensure a straight line and the full application of asphalt binder up to the joint. If requested by the Engineer the Contractor shall supply and insert a drip pan under the nozzles when the distributor is idle.

2.04 AGGREGATE
SPREADER

The aggregate spreader shall be a self propelled mechanical type mounted on pneumatic tired wheels located to operate on the freshly applied aggregate. The aggregate spreader shall be capable of distributing the aggregate at a uniform rate over the full width of the surface to be sealed in a single-pass and with the application sharply defined at the edges. The aggregate spreader shall be capable of controlling and adjusting the width and rate of aggregate application.

The aggregate spreader shall be equipped with a mechanism to enable it to be securely attached to the aggregate haul truck while in the process of receiving aggregate into the spreader hopper. No spillage of the aggregate shall be allowed between the truck and the spreader.

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PART 3 EXECUTION

3.01 SITE CONDITIONS

Placement of Seal Coat shall be limited to daylight hours between June 01st and August 15th.

Seal Coat shall only be placed under the following conditions;

- When the atmospheric temperature at the Site is a minimum of 10 degrees Celsius and rising, in the shade.
- The temperature of the surface to be seal coated is a minimum of 20 degrees Celsius; and
- The weather is not misty or rainy; and
- Precipitation is not a threat at the Site within twelve (12) hours as forecast by Environment Canada; and
- The relative humidity is less than 75 percent (75%); and
- Wind conditions are such that a uniform binder coverage can be achieved; and
- All curb and roadway repairs have been completed to the satisfaction of the Engineer; and
- There is sufficient equipment, trucks, and aggregate at the Site to allow the application of Seal Coat to proceed without interruption.

3.02 SURFACE REPAIRS

The Contractor shall complete all Surface Repairs as follows;

- Cracks greater than 25 millimetres in width shall be routed and sealed or filled as described in Section 02576 Bituminous Crack Seal.
- Pothole or surface breaks less than 150 millimetres in greatest width shall be cleaned of debris and filled with asphalt.
- Areas requiring removal of existing asphalt/base material and or the application of an asphalt levelling course shall be marked by the Engineer and repaired as described in Section 01001 Supplemental Conditions and Section 02510 Plant Mixed Bituminous Pavement.
- Concrete curb and gutter sections requiring removal and replacement shall be marked by the Engineer and repaired as described in Section 01001 Supplemental Conditions and Section 02514 Concrete Construction.

Surface Repairs for which no price or prices or provisions for payment are included in the Schedule of Unit Prices shall be considered incidental to the supply and installation of Seal Coat.

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3.03 SURFACE
PREPARATION

Immediately prior to the application of the asphalt binder, the Contractor shall remove all loose material, dirt, sand, clay, dust or other objectionable materials from the full width of the existing pavement surface to be treated, including the outer edges of the pavement, with a rotary power sweeper and/or a water flushing truck. All depressions not reached by the power sweeping or flushing shall be cleaned by hand sweeping. Paint firmly bonded to the surface that has the chalk removed may remain. Material removed from the surface shall not be mixed with the cover aggregate.

3.04 APPLICATION OF
ASPHALT BINDER

The Contractor shall cover and seal all street appurtenances, manholes covers, valve covers, catch basin lids, survey monuments and other street hardware with building paper, plastic sheeting or other approved material prior to the application of asphalt binder.

The Contractor shall not apply asphalt binder until all pavement repairs and surface preparations have been completed as stated in Parts 3.02 and 3.03 of this Section, the pavement surface is clean, dry and the Engineer has authorized the Work to proceed.

If directed by the Engineer, the Contractor shall prior to the application of binder, or at a transverse joint, spread building paper on the existing pavement surface for a sufficient distance back from the limits of the application to enable the flow through the spray bar to be started and stopped on the paper so when the exposed surface is reached, the spray shall be full and uniform. Immediately following the application of asphalt binder the building paper shall be removed and disposed of in a manner approved by the Engineer.

The Contractor shall determine the rate of application of the asphalt binder taking into consideration the aggregate properties and the structural and absorbency properties of the existing road surface at each Site. The rate of application of asphalt binder shall not exceed 2.0 litres per square metre for Class A aggregates or 1.5 litres per square metre for Class B aggregates unless otherwise approved by the Engineer.

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The Contractor shall slowly heat and maintain the asphalt binder within the application temperature range recommended by the asphalt binder manufacturer. The Contractor shall uniformly apply the asphalt binder with a double lap spray in a single pass of the distributor over the entire surface to be seal coated to the limits as shown and the Drawings or as set out on the Site by the Engineer. The speed of the asphalt distributor shall be governed by the speed of the aggregate spreader, and at no time shall the asphalt distributor be more than 30 metres ahead of the aggregate spreader. All areas missed by the distributor shall be promptly covered with binder material. The Contractor shall not apply more asphalt binder on an area than can be covered with aggregate in a single pass of the aggregate spreader and compacted as described in Parts 3.05 and 3.07 of this Section.

The Contractor shall not apply asphalt binder in the gutter of a concrete curb and gutter section unless directed otherwise by the Engineer. The Contractor shall take all necessary precautions to ensure that buildings, structures, vehicles, manhole covers, inlet grates, trees, wheel guards, curbs, guard rails and other roadway appurtenances or surfaces are not spattered or coated with asphalt binder. Asphalt shall not be spilled, sprayed, or tracked on completed sections of the seal coat. The Contractor shall promptly remove all spattering and over spray caused by his operations

**3.05 APPLICATION OF
AGGREGATE**

The Contractor shall deposit the dry or surface damp aggregate on the asphalt binder immediately following the application of the asphalt binder and prior to the time at which the emulsion 'breaks'. The Contractor shall determine the rate of application of the aggregate taking into consideration the asphalt binder and aggregate properties. The depth of aggregate shall not exceed the thickness equal to the maximum nominal aggregate size of the gradation shown in Part 2.02 of this Section. The rate of application of aggregate shall not exceed 13 kilograms per square metre for Class A aggregate or 20 kilograms per square metre for Class B aggregate, unless otherwise approved by the Engineer.

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The Contractor shall uniformly deposit the aggregate in a single pass of the spreader over the full width of the exposed uncured asphalt binder. The tires of the trucks and aggregate spreader shall not contact the exposed asphalt binder. The ground speed of the aggregate spreader shall be governed by the ground speed of the asphalt distributor and at no time shall the aggregate spreader be more than 30 metres behind the asphalt distributor. The aggregate spreader shall be operated at a speed which shall not cause the stones to roll over after contacting the asphalt binder.

The completed aggregate surface shall be free of piles, ridges, depressions or laps. Areas having non-uniform coverage shall be corrected, prior to rolling, by removing any excess material and/or spreading additional material to/from the deficient areas.

3.06 JOINTS

The Contractor shall place longitudinal joints coincident with the line between designated traffic lanes or as marked by the Engineer

Each joint shall have from 100 millimetres to 150 millimetres of asphalt binder left uncovered with aggregate to allow for an overlap of asphalt binder and aggregate when the adjacent surface is seal coated. When asphalt binder is applied to the adjacent surface, the binder shall be applied such that half the spray fan from the end nozzle overlaps onto the exposed asphalt coated longitudinal edge.

Transverse joints shall have no more than 6 millimetres difference in elevation across the joint as measured with a 2 meter straight edge.

3.07 ROLLING

The Contractor shall roll the seal coat surface immediately following placement of the aggregate and prior to the time at which the emulsion 'breaks'.

The Contractor shall thoroughly embed the aggregate into the asphalt binder with a minimum of two self-propelled smooth tread pneumatic-tired rollers ('wobbly wheel' rollers shall not be used). The rollers shall have a total compacting width of not less than 1.5 metres and a minimum contact pressure of 275 kiloPascals. The mass of any roller shall not be so great as to cause excessive crushing of the aggregate particles.

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Rolling shall begin at the outer edge of the aggregate cover and proceed in a longitudinal direction working towards the centre. Each pass shall overlap the previous pass by one half the width of the roller. The line of rolling shall not be suddenly changed or reversed. Each roller shall proceed at a speed which does not cause pick up or dislodging of aggregate particles. The Contractor shall continue to roll the seal coat until the aggregate is firmly embedded in the asphalt as approved by the Engineer.

If the road surface is subject to a sudden rain during the seal coat operation. The Contractor shall perform additional rolling to preserve the seal.

3.08 SWEEPING

The Contractor shall remove and dispose of all the loose unbonded aggregate from the seal coat, curb, gutter, sidewalks, boulevards and adjacent shoulders using a rotary or pickup power broom with light pressure. The power broom bristles shall be fibre or nylon only (steel tined bristles shall not be used). Sweeping shall be performed a minimum of three (3) times as follows:

- First Sweeping: Not less than one (1) day nor more than three (3) days after rolling is completed and the aggregate has bonded to the asphalt binder, the seal coat shall be swept. The Contractor may delay the first sweeping with the prior approval of the Engineer. If the Contractor is unable to sweep the seal coat within the time stated above, the Engineer may order the application of asphalt binder and aggregate be stopped until the sweeping has been completed to the satisfaction of the Engineer.
- Second Sweeping: Between seven (7) and fourteen (14) days following the first sweeping the seal coat shall be swept.
- Third Sweeping: Prior to the final acceptance of the Work the seal coat shall be swept.

The Engineer reserves the right to, at any time, order the Contractor to sweep the seal coated surface should persons or property be subject to unsafe conditions or damage as a result of loose seal coat aggregate remaining at the Site.

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The Contractor shall remove and disposed of the surplus aggregate in a manner satisfactory to the Engineer and at no time shall he stockpile aggregate sweepings within the roadway right of way.

3.09 DUST CONTROL

The Contractor shall prevent dust from blowing onto adjacent properties.

3.10 TRAFFIC CONTROL

Traffic Control for the class of road to be seal coated shall be in accordance with the latest edition of the City of Brandon 'Temporary Traffic Control Manual', as described in Section 01570 Traffic Control and Section 01001 Supplemental Conditions.

The Contractor shall be responsible for traffic control and shall supply and maintain all required barricades, signs, traffic control person(s), as requested by the Engineer. When traffic cannot be detoured, traffic shall be directed through the Site in a manner that provides maximum safety for the workers and the least disruption to the Work. Speeds shall be restricted to a maximum of twenty (20) kilometres per hour for twenty four (24) hours and shall then be restricted to a maximum of forty (40) kilometres per hour until the Engineer approves the termination of traffic control.

Vehicular traffic or construction equipment shall not travel over uncovered surfaces of fresh asphalt binder. No vehicular traffic shall be permitted on the sealed road surface until after all rolling has been completed and the bituminous material has cured sufficiently to prevent dislodging of the aggregate particles by normal traffic operations. Prior to opening any seal coated roadway to traffic, the Contractor shall post the roadway with a minimum of two (2) 'Loose Gravel' temporary traffic warning signs. The signs shall be removed from the Site only upon the prior approval of the Engineer.

3.11 CLEAN-UP

The Contractor shall maintain the Site as described in Section 01710 Cleanup. The Contractor shall, following sweeping of the seal coat surface and prior to opening the roadway to any vehicular traffic, remove the masking material from all street appurtenances, manholes covers, valve covers, catch basin lids, survey monuments and other street hardware covered as stated in Part 3.03 of this Section. Any street appurtenance, manhole

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cover, manhole, valve cover, catch basin lid, catch basin, survey monument, curb face, concrete gutter section, shoulder, or boulevard which contains bonded or loose seal coat material shall have the material removed and the surface cleaned to the satisfaction of the Engineer.

**3.12 COMPLETION OF
THE WORK**

Substantial Completion of the Work will be issued when all roadways have been seal coated, all hardware has been uncovered and all sealed coated surfaces have been swept and the Work has been inspected and accepted by the Engineer. The opening of any seal coated roadway to vehicular traffic shall not constitute acceptance of the Work by the City and the Contractor shall remain solely responsible for the care and the maintenance of the Work until final completion of the Work has been issued by the City.

Final Completion of the Work will be issued when the following requirements have been completed as certified by the Engineer;

- All products supplied and incorporated into the Work are as specified in this Section; and
- The maximum aggregate size of the gradation as shown in Part 2.02 of this Section have a minimum of seventy percent (70%) of their nominal height embedded into the asphalt binder; and
- A minimum of ninety nine percent (99%) aggregate coverage has been obtained on any one seal coat surface, with no single bare area greater than 0.01 square metre in any one square metre; and
- The surface of the seal has a uniform appearance, even texture, is thoroughly embedded, free of ruts, depressions, streaking, bleeding, ravelling or other irregularities and all longitudinal and transverse joints appear neat and uniform without build-up; and
- All clean up has been completed as stated in this Section

END OF SECTION