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3.24 CHIP SEAL COAT**3.24.1 GENERAL**

Chip Seal Coat shall consist of a wearing course composed of processed aggregates held in place by an asphalt binder, spread and rolled on a prepared surface to the lines and dimensions shown on the plans or as designated by the Consultant.

3.24.2 MATERIALS**3.24.2.1 Aggregate**

The Contractor shall produce crushed aggregate in accordance with Specification 3.2, Aggregate Production and Stockpiling for the designation and class of material specified. The Contractor shall supply aggregate materials in accordance with Specification 5.2, Supply of Aggregate and haul aggregate in accordance with Specification 4.5, Hauling.

3.24.2.2 Temporary Markers

The Contractor shall supply temporary, reflectorized, centerline markings in accordance with the Alberta Transportation Products List. Temporary markings shall be applied on the centreline of the roadway immediately before applying the asphalt binder. Markers shall be placed at 25 m intervals on tangent sections and at 15 m intervals on curves and shall remain in place.

3.24.2.3 Asphalt

The Contractor shall supply a cationic, rapid set asphalt binder in accordance with Specification 5.7, Supply of Asphalt.

3.24.2.4 Water

The Contractor shall supply all water required for washing the aggregate.

3.24.2.5 Line Painting Materials

The Contractor shall supply all line painting materials in accordance with Specification 5.20, Supply of Line Painting Materials.

3.24.3 TESTING**3.24.3.1 Quality Control Testing**

Quality control and quality control testing are the responsibility of the Contractor throughout every stage of the Work from the crushing and production of aggregates to the final accepted product. The Contractor shall provide and pay for equipment and qualified personnel to perform all field testing necessary to determine and monitor the characteristics of the materials produced and incorporated into the Work, and the final product produced.

3.24.3.2 Testing by the Consultant

The Consultant may from time to time take samples, and carry out testing and inspection of materials incorporated or being incorporated into the Work. Tests performed by the Consultant will not be considered to be quality control tests. The Contractor shall cooperate with the Consultant for such sampling, testing and inspection. Such testing and inspection shall not relieve the Contractor from any obligation to perform all the Work strictly in accordance with the requirements of the Contract.

The Contractor shall provide, at his own expense, such stands, sampling devices and other facilities as the Consultant may require to safely obtain representative samples of the item being produced.

3.24.4 EQUIPMENT

The following equipment shall be used:

- (i) A self-powered pressure asphalt distributor meeting the requirements as listed in Specification 3.19, Prime, Tack and Fog Coats.
- (ii) A self-propelled aggregate spreader capable of spreading the aggregate uniformly at the specified rate in one application over the full width of the asphalt applied. The spreader shall be capable of controlling and adjusting the width and rate of spread. The spreader shall be equipped with the necessary devices to enable it to be attached securely to the aggregate haul truck while in the process of dumping the aggregates into the spreader.
- (iii) A minimum of two self-propelled pneumatic rollers, each with a minimum static weight of 9 tonnes. The rollers shall be capable of reversing direction without causing backlash or damage to the Chip Seal Coat.
- (iv) A minimum of three power sweepers in working condition prior to the start of seal coat activities. Two of the brooms shall be dedicated to sweeping Chip Seal Coat placed that same day. A third broom shall be used for brooming loose chips on Chip Seal Coat placed in previous days. All power sweepers shall be equipped with a minimum of one yellow rotating warning light.
- (v) The Contractor shall supply pilot vehicles for convoying traffic. The pilot vehicles shall have sufficient accompanying personnel to provide convoy services on a 24 hour a day availability. The standard number of pilot vehicles to be provided shall be two for two lane highways and four for multi-lane highways or as specified in the special provisions. Additional vehicles may be required as determined by the Consultant at the time of construction. All pilot vehicles shall be equipped as follows:
 - A two way radio for communication.
 - An overhead revolving beacon with an amber lens a minimum of 180 mm high and 180 mm wide. The beacon shall be mounted on the top of the vehicle fully visible to traffic approaching from both the front and rear.
 - A sequential arrowboard meeting the requirements as shown in Specification 1.2 General.
 - The arrowboard shall be controlled from a console located in the vehicle cab.
 - The arrowboard display shall be visible to traffic approaching the rear of the trucks.

- Additional pilot vehicles beyond the standard number specified, may be exempt from including a sequential arrowboard with the approval of the Consultant.

The Contractor shall cease Chip Seal Coat application if any equipment integral to either the compaction, sweeping or traffic accommodation operations is not available or is not in good working order, as determined by the Consultant.

3.24.5 CONSTRUCTION

3.24.5.1 **General**

Chip Seal Coat application shall be performed prior to August 15 and during daylight hours only.

The extent of surface preparation required and the method of application of the Chip Seal Coat including application rates for the asphalt binder and the processed aggregate shall be determined by the Contractor.

The Contractor shall also determine the amount of compaction required based on consideration of compaction equipment, atmospheric conditions and acceptance requirements.

3.24.5.2 **Application Areas**

Unless otherwise specified or shown on the plans, the Contractor shall not apply seal coat to roadway shoulders or to bridge decks.

The Contractor shall apply seal coat as follows:

- (i) To each through travel lane to the widths shown on the Contract Plan, regardless of the widths shown on the intersection plans.
- (ii) At intersections, to all parallel lanes and their respective tapers, in general conformance with the drawing entitled "Seal Coat Applications at Intersections" (CB6-3.23M1 or CB6-3.23M2 as applicable), or as shown on the shaded intersection plans if provided.
- (iii) To all passing and climbing lanes and their respective tapers.
- (iv) Application on bridge decks where required will generally be from curb face to curb face.

3.24.5.3 **Protection of Bridge Structures**

The Contractor shall not operate vibratory rollers in vibratory mode on any bridge deck.

The Contractor shall ensure that bridge expansion joints, drains, curbs and appurtenances are protected from asphalt and/or chip contamination.

In addition to being responsible for the cleanup of any contaminated areas, the Contractor is advised that many bridge components and materials are affected by cleanup and any costs for repair of damaged structures will be charged to the Contractor.

3.24.5.4 Rolling and Brooming

Immediately after spreading, the chips shall be rolled.

No traffic shall be allowed on freshly placed Chip Seal Coat until rolling has been completed.

After rolling and initial set of the binder, the driving lanes and paved shoulders shall be broomed to remove any loose chips. Any brooming activities performed during days following chip application shall be referred to as "subsequent brooming".

The Contractor shall continue to broom the driving lanes and paved shoulders to remove any loose chips when required, and as often as required, during a two week period following the initial application or as directed by the Consultant.

All highway-to-highway junctions and all junctions of paved highways with municipal roads shall be swept clear of loose chips.

The Contractor shall use a pickup broom for all brooming in urban and other areas where loose chips cannot be swept onto sideslopes or onto ditches.

Brooming operations that are against traffic flow shall only be carried out if the Contractor has implemented proper traffic accommodation operations.

On all highways, brooming operations done during hours of darkness shall be accompanied with a trailing arrow board capable of operating in hazard mode where applicable.

3.24.5.5 Speed Restrictions

For "subsequent brooming" activities within the driving lanes, the posted speed restriction shall be 50 km per hour. In all cases, the total length of roadway under 50 km per hour speed restriction, including application activities and subsequent brooming activities, shall not exceed 20 kilometres.

3.24.5.6 Traffic Accommodation and Signing

The Contractor shall erect and maintain temporary construction signs in accordance with Drawings TCS-B-1.17A or TCS-B-1.17B as shown in the Traffic Accommodation in Work Zones manual.

A Traffic Accommodation Strategy as outlined in Specification 7.1, Temporary Construction Signing will be required for all phases of construction including subsequent brooming and line painting activities. The signing strategy shall be developed based upon the requirements of Drawing TCS-B-1.17A or TCS-B-1.17B as appropriate.

3.24.5.6.1 Traffic Convoy

Traffic convoy by pilot vehicles not exceeding 50 km per hour shall be used on all Chip Seal Coat projects. On two lane highways, traffic convoy shall be initiated at the commencement of Chip Seal Coat application.

On divided highways, traffic convoy shall commence after rolling is complete.

Traffic convoy may be required for subsequent brooming activities depending upon site specific traffic conditions such as length of work zone, available site distances, traffic volumes, etc. Notwithstanding the previous, traffic convoy will be required whenever the length of subsequent brooming activities within the driving lanes is greater than 5 kilometres.

On all highways, traffic convoy shall continue until second brooming of the Chip Seal Coat is complete and the speed restriction has been increased to 80 km per hour or as otherwise directed by the Consultant.

3.24.6 PAINTED ROADWAY LINES AND PAVEMENT MESSAGES

The Contractor shall paint all roadway lines and pavement messages for the areas receiving Chip Seal Coat in accordance with Specifications 7.2, Painted Roadway Lines and 7.3, Painted Pavement Messages.

All painted roadway lines and painted pavement messages applied to the Chip Seal Coat surface shall be applied twice at the full application rate for each application. The second application shall be completed after the Contractor's final brooming. On two lane highways the second application will be from the opposite direction of the initial application.

All edge lines shall be painted completely off the seal coat and will only require one paint application.

In all cases, the roadway shall not be posted at gazetted highway speeds until all work including line painting has been completed. The maximum length of roadway posted at less than gazetted highway speeds shall not exceed 30 km.

3.24.7 REQUIREMENTS FOR ACCEPTANCE

Requirements for the acceptance of the completed Chip Seal Coat include the following:

- (i) Materials shall meet all specified requirements;
- (ii) A minimum of 99% chip coverage shall be obtained with no single bare area greater than 0.01 m² in any one square metre;
- (iii) There shall be no streaking or ravelling;
- (iv) The finished surface shall have a uniform, even texture;
- (v) No over-rich or bleeding areas shall be evident;
- (vi) No loose chips shall be evident; and
- (vii) All existing pavement markings have been preserved or replaced in accordance with Specifications 7.2, Painted Roadway Lines and 7.3, Painted Pavement Messages.

Work that does not meet the foregoing requirements shall be repaired or reconstructed to the satisfaction of the Consultant.

3.24.8 COMPLETION OF LINE PAINTING

The Contractor shall complete the replacement of roadway lines within five days of completing the placing of the chip seal on each individual roadway. Failure to meet this requirement will result in a penalty of \$900.00 per day for each calendar day delay in completing the painting. The Department may extend the time allowed to complete the painting up to a maximum of ten days providing:

- (i) The Contractor submits a written request to the Consultant accompanied by a detailed proposed line painting schedule.
- (ii) The reason for the request, stated in the request, is one of the following:
 - (a) The chip seal coat requires additional curing time and subsequent brooming work prior to painting the traffic markings, or
 - (b) The work site is not available to the Contractor through no fault of the Contractor, or
 - (c) The Consultant suspends the Work and standby payments are due in accordance with Specification 1.2, General, or
 - (d) There is a delay resulting from an order of a court, or from strikes or lock-outs, or
 - (e) The traffic markings cannot be painted for reasons of inclement weather, or conditions resulting from inclement weather.

3.24.9 MEASUREMENT AND PAYMENT

The amount of Chip Seal Coat or Chip Seal Coat - Bridge Decks considered for acceptance will be based upon the estimated quantities as shown in the unit price schedule. Generally, a variance in these quantities will only be considered when the scope of the Work has been modified by the Department. However, the Department reserves the right to measure the Work actually constructed to confirm compliance with the design and any such measurement will become the basis for the final payment.

Payment will be made at the unit price bid per square metre for "Chip Seal Coat" or "Chip Seal Coat - Bridge Decks" as applicable. Payment will be full compensation for preparing the existing surface; protecting bridge structures where applicable, supplying and installing temporary lane markers; supplying and applying the asphalt binder; supplying, processing, hauling and placing the aggregate; brooming the finished surface; replacing and/or maintaining pavement markings; quality control; traffic accommodation and traffic convoy services using the standard number of pilot vehicles as specified.

Payment for pilot vehicle requirements, as approved by the Consultant, in excess of the standard number specified, shall be paid as Extra Work in accordance with Specification 1.2, General.

No separate payment will be made for any additional equipment, tools or labour employed to satisfy special brooming requirements.

No payment will be made for any costs incurred to rectify defective work.

3.24.9.1 Line and Pavement Message Painting

Contrary to Specifications 5.20, Supply of Line Painting Materials; 7.2, Painted Roadway Lines and 7.3, Painted Pavement Messages, no separate payment will be made for the supply of painting materials nor for replacing the lines and pavement message markings. The cost of this Work shall be included in the unit price bid for "Chip Seal Coat."

3.24.9.2 Supply of Aggregate

Contrary to Specification 5.2, Supply of Aggregate, no separate payment will be made for supplying aggregate for chip seal. However, if the Contractor supplies aggregate from a Crown source on undeeded land, operated primarily under lease or licence and for which the Department does not have a reservation, the Department will deduct \$ 0.48 per tonne from the total payments made under the Contract. The tonnage will be determined by multiplying the total square metres of chip seal work performed, by a conversion factor of 20 kilograms per square metre.