

**Construction Specification for
Tack Coat**

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TS 3.20.01 SCOPE

This specification covers the requirements for the placement and acceptance of tack coating.

TS 3.20.02 REFERENCES

This specification refers to the following standards, specifications or publications:

Ontario Provincial Standard Specifications

OPSS.MUNI 1103 Material Specification for Emulsified Asphalt

Ontario Ministry of Transportation Laboratory Testing Manual

LS-200 Penetration of Bituminous Materials

LS-216 Determination of Residue by Distillation of Emulsified Asphalt

Environment and Climate Change Canada

Code of Practice for the Reduction of Volatile Organic Compound (VOC) Emissions from Cutback and Emulsified Asphalt

American Society of Testing and Materials

D 3665-07e1 Standard Practice for Random Sampling of Construction Materials

D402 / D402M Standard Test Method for Distillation of Cutback Asphalt

D6997 Standard Test Method for Distillation of Emulsified Asphalt

American Association of State Highway and Transportation Officials

R066-15 Standard Practice for Sampling Asphalt Materials

TS 3.20.03 DEFINITIONS

Clean Bond Coat is an anionic, slow-setting asphalt emulsion similar to SS-1HH that is designed for various paving and industrial uses.

Cutback Asphalt is asphalt cement whose viscosity has been reduced by the addition of a cutback solvent derived from petroleum. There are three major types of cutback asphalt based on the relative rate of evaporation of the solvent: rapid-curing, medium curing and slow-curing. Cutback asphalts can be used with cold aggregates requiring little or no heat. They are most commonly used in road mixing operations, stockpile mixes and spray applications such as prime, tack and seal coats. For the purpose of this Code, cutback asphalts also include any crude petroleum oils and road oils used for road construction and maintenance.

Emulsified Asphalt is a mixture of asphalt cement, water and an emulsifying agent. There are two major categories of emulsified asphalt: cationic and anionic. Anionic emulsions have negatively charged asphalt droplets and cationic emulsions have positively charged asphalt droplets. Certain grades of emulsified asphalt contain added petroleum diluent which permits a thicker film to adhere to the aggregate and promotes stronger bonding of the asphalt to the aggregate.

Emulsified asphalt products are used for road construction and for many specialty applications. The medium-setting grades are more commonly used for mixing with coarse aggregate for plant or road mix. The slow-setting grades are designed for maximum mixing stability and are used with dense-graded aggregate containing high fines which are used in soil stabilization, asphalt surface mixes, slurry seal applications, and tack and prime coat applications. Quick-setting grades are specialized emulsions used for quick-set slurry applications.

Ozone Season is the ground-level ozone season occurs during the warm-season months, when the days are warmer and longer. The period of May 1 through September 30 is considered the ground-level ozone season in Canada, as defined in the Ozone Annex (2000) of the Canada-United States Air Quality Agreement (1991).

Protection Board means a durable panel specifically designed to provide an interface protection barrier between the HMA and the asphalt waterproofing membrane.

SS-1 is a slow-setting anionic asphalt emulsion that is designed for various paving and industrial uses.

SS-1HH is an anionic, slow-setting asphalt emulsion that is designed for various paving and industrial uses. Its specific formulation allows for a faster curing than traditional tack coats, as well as a non-tracking, non-tacky finish.

TS 3.20.04 DESIGN AND SUBMISSION REQUIREMENTS

At least 5 Days prior to the first use of tack coat on the Contract, the Contractor shall submit documentation to the Contract Administrator identifying the proposed supplier and applicator of the product. As part of this submission, the Contractor shall submit material safety data sheets and any other information for the safe handling and storage of the product.

TS 3.20.04.01 Recording Keeping

TS 3.20.04.01.01 *Procurement Enablers of Paving Projects*

Outside of the ozone season, any emulsified asphalt can be manufactured, imported, offered for sale, sold or used for paving material for paving, construction or maintenance operations.

TS 3.20.04.01.02 *End – Users Paving Companies*

A person who uses cutback asphalt or emulsified asphalt for paving or maintenance operations should keep records of the quantity and type of asphalt product used for each year. These records should be kept for a minimum of six years.

TS 3.20.04.02 Reporting

A person who meets the conditions of section 3.1 should send reports to the Minister. The first report should be sent by March 31, 2022 and should cover the previous calendar year's activities (2021). Subsequent reports should be sent every two years by March 31 of those years and should cover activities relevant to the previous calendar year.

The report should contain the product name, type of asphalt, quantity manufactured (tonnes), quantity sold (tonnes), and VOCs contained in the asphalt (% by volume and % by weight). The report should also specify whether the product was manufactured and/or sold during the ozone season. An example report form is provided in the Appendix of the Code. This information will be used to evaluate and determine whether the objective of the Code was achieved in reducing the emissions of VOC from the asphalt sector.

TS 3.20.05 MATERIALS

TS 3.20.05.01 Tack Coat Material

Tack coat shall be SS-1 or SS-1HH emulsified asphalt. The undiluted material shall be according to OPSS.MUNI 1103.

Prior to starting the work, the Contractor shall supply the Contract Administrator with material safety data sheet (MSDS) for all material to be incorporated in the work.

TS 3.20.05.02 Practices Regarding Cutback Asphalt during the Ozone Season

During the ozone season, it is recommended that cutback asphalt manufactured, imported, offered for sale, sold or used in paving material for paving, construction or maintenance operations, have a VOC content equal to or less than 0.5% by volume which evaporates at 260°C (500°F) or less, as determined by the oil portion of the distillate collected when analyzed in accordance with ASTM D402 /D402M.

TS 3.20.05.03 Practices Regarding Cutback Asphalt Outside of the Ozone Season

Outside of the ozone season, it is recommended that cutback asphalt manufactured, imported, offered for sale, sold or used in paving material for paving, construction or maintenance operations, have a VOC content equal to or less than 5% by volume which evaporates at 260°C (500°F) or less, as determined by the oil portion of the distillate collected when analyzed in accordance with ASTM D402 /D402M.

TS 3.20.05.04 Practices Regarding Emulsified Asphalt during the Ozone Season

During the ozone season, it is recommended that emulsified asphalt manufactured, imported, offered for sale, sold or used in paving material for paving, construction or maintenance operations, have a VOC content equal to or less than 3% by volume which evaporates at 260°C (500°F) or less, as determined by the oil portion of distillate collected when analyzed in accordance with ASTM D6997.

TS 3.20.05.05 Practices Regarding Emulsified Asphalt outside of the Ozone Season

Outside of the ozone season, any emulsified asphalt can be manufactured, imported, offered for sale, sold or used for paving material for paving material for paving, construction or maintenance operations.

TS 3.20.06**EQUIPMENT**

The emulsion shall be applied evenly, by means of a pressure distributor which consists of a fully insulated tank permanently and rigidly mounted on a truck or trailer provided with pneumatic tires and propelled by a power unit capable of maintaining a constant and uniform speed.

The distributor shall be provided with the following minimum equipment requirements:

- a) Hand Hose: Proper hand hose attachments to uniformly apply the tack coat to any areas unavoidably missed by the distributor.
- b) Tachometer: An approved tachometer to enable the operator to maintain the necessary speed required to ensure the specified rate of application.
- c) Power Unit: An independent, mechanically governed power unit for developing uniform pressures of from 140 to 345 kPa within the distributor tank or in the spray manifold. This unit shall include an accurate pressure gauge and a calibrated pressure pump equipped with a volume metering system. This system shall be capable of applying accurately measured quantities of bituminous materials at specified rates and pressures through the spray bars and nozzles.
- d) Meter: The Contractor shall supply means acceptable to the City to measure the volume of tack coat placed in the work. The accuracy of the metering system shall be certified by the manufacturer and this certificate shall be made available to the City upon request. The metering system shall be accompanied by documentation confirming that it was calibrated within the past 12 months by the manufacturer or its authorized representative.
- e) Heating Unit: Equipped with a heating unit to heat the emulsion asphalt at the recommended temperature. Safe storage temperature range is from 10 °C to 85 °C or according to the supplier's product data sheet.
- f) Spray Bar: Rear mounted spray bars and nozzles, set parallel to the surface to be sprayed and capable of vertical and lateral adjustment. The spray bars shall be capable of adjustment to provide a minimum spraying width of 2.5 m and a maximum spraying width of 7 m. The distributor shall be equipped with a spray bar heating device, circulating spray bars, or other suitable device to ensure a uniform viscosity and pressure of the bituminous material at each nozzle, both before and during spraying operations. Feed manifolds or spray bars shall be provided with strainers to prevent clogging of bars and nozzles. The spray bar height shall be adjusted and set at such a height that the spray fan from any nozzle overlaps the spray fan from the adjacent nozzle by 50 per cent. This adjustment shall be made and the height set when the distributor is one-half full, and shall be changed only when so permitted by the City.
- g) Nozzles: Spray bar nozzles shall be so designed and set as to ensure a uniform fan-shaped spray without atomization, overlapping on the surface to be sprayed, such that a uniformly sprayed surface will result. Spraying to clearly defined edges of the sprayed lane with no tapering off of the rate of application adjacent to the edges of the lane will be required. All spray nozzles shall be of the same manufacture, size and type, and shall be provided with valves capable of instant full opening and positive cutoff. All spray nozzles shall be set in the bar so that the nozzle slots make the same horizontal angle (15° – 30°) with the longitudinal axis of the bar.

- h) Sampling Cock: A sampling cock shall be provided on the spray bar or connecting line, and shall be readily accessible to allow field samples of the bituminous materials to be obtained directly from the distributor.

A hand sprayer may be used for small areas provided that, the sprayer meets the requirements of a) and c), listed above and that the emulsion shall be agitated by mechanical means to provide a homogeneous mixture. Units that rely on hand operated pumps to control the pressure will not be permitted.

TS 3.20.07 CONSTRUCTION

TS 3.20.07.01 Application of Tack Coat

The asphalt base course or concrete base shall be swept clean with a power broom, or other approved equipment that shall leave a clean, dry surface, free of standing water, mud, dust, loose aggregate and other objectionable material. Protection board shall be dry and clean when tack coat is applied.

The tack coating shall form a thin, unbroken film on the asphalt base course or concrete base and be allowed to dry until it is in a proper condition of tackiness to receive the asphalt course.

Tack coat shall be applied ahead of the paver to accommodate no more than two hours of production of the hot mix. Paving and construction equipment shall not be permitted onto the tack coat until it has broken and set. Hot mix asphalt shall not be placed on tack-coated areas until the tack coat has cured to a proper condition of tackiness. Traffic shall be prevented from travelling upon the tack coat. The tack coat shall be protected from damage until covered by the asphalt surface course.

Tack coat shall be applied to the following:

- protection board
- existing pavement surfaces including hot mix and Portland cement concrete
- milled pavement surfaces.

TS 3.20.07.02 Tack Coat Rate of Application

The emulsion shall be applied at the rate indicated in Table 1.

Table 1: Application rate

Surface type	Residual rate (L/m ²)	Approximate bar rate Undiluted * (L/m ²)	Approximate bar rate Diluted 1:1 * (L/m ²)
new asphalt	0.090 – 0.200	0.150 – 0.340	0.300 – 0.680
existing asphalt	0.180 – 0.320	0.300 – 0.530	0.600 – 1.060
milled surface	0.180 – 0.360	0.300 – 0.600	0.600 – 1.200
Portland cement concrete	0.140 – 0.230	0.225 – 0.380	0.450 – 0.760

Note: *Assume undiluted emulsion is 40% water and 60% asphalt distillation residue.

TS 3.20.08 QUALITY ASSURANCE

TS 3.20.08.01 Samples for Testing

Samples for quality assurance (QA) testing shall be representative of the material being used and shall be obtained at the paving site according to AASHTO R066 and ASTM D 3665. The minimum quantity of QA samples shall be one litre. The Contractor shall obtain, package and transport all QA samples to the City's designated QA laboratory. Only new containers shall be used for sampling purposes. QA samples shall be delivered at the same time, in a condition suitable for testing, and within 2 Working Days of sampling.

Tack coat shall meet the requirements in Table 1 in OPSS.MUNI 1103.

TS 3.20.08.02 Acceptance

TS 3.20.08.02.01 *Acceptance of Tack Coat Application Rate*

The acceptance of tack coat application rate shall be based on settings determined by the Contractor of the equipment on the pressure distributors. When requested, such settings shall be verified by the Contract Administrator.

Tack coat application shall be visually uniform. Areas of insufficient or non-uniform tack coat coverage shall be re-sprayed by the Contractor at no additional cost to the City. Where tack coating is performed using hand-held devices, the visual appearance of such areas shall be consistent with the adjacent areas of machine applied material.

All visual defective materials or work shall be rejected by the Contract Administrator irrespective of any test results. Such defective material and work shall not be incorporated into the finish Work.

TS 3.20.09 MEASUREMENT FOR PAYMENT

TS 3.20.09.01 Tack Coat

Measurement of tack coat shall be by the area in square metres (m²).

TS 3.20.10 BASIS OF PAYMENT

TS 3.20.10.01 Tack Coat

Where there is no separate tender item for tack coat, payment for tack coat shall be included in the hot mix asphalt tender item.

If the application of the tack coat was necessitated through the fault of the Contractor as determined by the Contract Administrator, no payment shall be made for any labour, Equipment and Material or incidentals involved in the application of the tack coat.

Payment for tack coating completed in association with bridge deck waterproofing shall be deemed to be included in the bridge deck waterproofing item.

TS 3.20.10.02 Tack Coat – Item

Payment at the Contract Price for the above tender item shall be full compensation for all labour, Equipment and Material to do the work.

If the application of the tack coat was necessitated through the fault of the Contractor, as determined by the Contract Administrator, no payment shall be made for any labour, Equipment, Material or incidentals involved in the application of the tack coat.