



CONSTRUCTION SPECIFICATION FOR TACK COATING AND JOINT PAINTING

TABLE OF CONTENTS

308.01	SCOPE
308.02	REFERENCES
308.03	DEFINITIONS
308.04	DESIGN AND SUBMISSION REQUIREMENTS
308.05	MATERIALS
308.06	EQUIPMENT
308.07	CONSTRUCTION
308.08	QUALITY ASSURANCE
308.09	MEASUREMENT FOR PAYMENT
308.10	BASIS OF PAYMENT

APPENDICES

308-A	Commentary
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308.01 SCOPE

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

308.01.01 Specification Significance and Use

This specification is written as a provincial-oriented specification. Provincial-oriented specifications are developed to reflect the administration, testing, and payment policies, procedures, and practices of the Ontario Ministry of Transportation.

Use of this specification or any other specification shall be according to the Contract Documents.

308.01.02 Appendices Significance and Use

Appendices are not a mandatory part of this specification unless invoked by the Owner.

Appendix 308-A is a commentary appendix to provide designers with information on the use of this specification in a Contract.

308.02 REFERENCES

When the Contract Documents indicate that provincial-oriented specifications are to be used and there is a provincial-oriented specification of the same number as those listed below, references within this specification to an OPSS shall be deemed to mean OPSS.PROV, unless use of a municipal-oriented specification is specified in the Contract Documents. When there is not a corresponding provincial-oriented specification, the references below shall be considered to be to the OPSS listed, unless use of a municipal-oriented specification is specified in the Contract Documents.

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

Ontario Provincial Standard Specifications, Construction

OPSS 313 Hot Mix Asphalt - End Result

Ontario Provincial Standard Specifications, Material

OPSS 1103 Emulsified Asphalt

Ministry of Transportation Publications

MTO Laboratory Testing Manual:

LS-200 Penetration of Bituminous Materials

LS-216 Residue by Distillation

ASTM International

D 3665 Standard Practice for Random Sampling of Construction Materials

American Association of State Highway and Transportation Officials (AASHTO)

T 40 Sampling Bituminous Materials

308.03 DEFINITIONS

For the purpose of this specification, the following definitions apply:

Binder Course means a HMA course between a surface course and either a granular base course or stabilized base course, an existing pavement, or another HMA binder course.

Hot Mix Asphalt (HMA) means hot mixed, hot laid asphaltic concrete. The terms are used interchangeably. HMA may include recycled or specialty mixes.

Independent Laboratory means as defined in OPSS 313.

Joint means a vertical contact between a new HMA pavement course and any HMA pavement or any rigid object that exists at the time the new HMA is laid.

Lot means a specific quantity of material or a specific amount of construction.

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

Quality Assurance (QA) means a system or series of activities carried out by the Owner to ensure that materials received from the Contractor meet the requirements specified in the Contract Documents.

Quality Control (QC) means a system or series of activities carried out by the Contractor to ensure that materials supplied to the Owner meet the requirements specified in the Contract Documents.

Surface Course means the HMA wearing course of any flexible or composite pavement.

308.04 DESIGN AND SUBMISSION REQUIREMENTS

308.04.01 Submission Requirements

At least 14 Days prior to the first use of tack coat or joint painting material on the Contract, the Contractor shall submit documentation to the Contract Administrator identifying the proposed supplier and applicator of the product. With this, the Contractor shall submit test results demonstrating that the undiluted product meets the requirements of the Contract and provide material safety data sheets and any other information for the safe handling and storage of the product.

At least 14 Days prior to the use of the product, documentation confirming the laboratory's participation in the MTO correlation program for emulsion testing shall be provided to the Contract Administrator. Participation in an equivalent alternate correlation program shall be considered. Details of such correlation programs shall be submitted to the Contract Administrator for consideration.

Proposals for the use of alternative tack coat and joint painting material shall be submitted in writing to the Contract Administrator at least 14 Days prior to the intended use of the alternate product.

The Contractor's proposal shall include the following:

- a) The reason for the use of the alternate material
- b) Material safety data sheet and any other information for the safe handling, transportation and storage of the product
- c) Testing protocols to be used in confirming the properties of the material
- d) Typical test results
- e) Required application rates
- f) Cost implications for the use of the alternate product.

The Contract Administrator shall review this proposal and shall respond in writing within 7 Days of receiving it, either accepting the use of the alternate product or not accepting its use with rationale. The alternate product shall not be used until the Contract Administrator has granted permission in writing.

308.05 MATERIALS

308.05.01 Tack Coat and Joint Painting Material

Tack coat and joint painting material shall consist of SS-1 emulsified asphalt diluted with an equal volume of water. The undiluted material shall be according to OPSS 1103.

308.06 EQUIPMENT

308.06.01 Tack Coat Distributors

For main lane paving, tack coat shall be applied using self-propelled or tow-along pressure distributors capable of applying the product at the specified rate and in a continuous and uniform manner both longitudinally and transversely for the full lane width. The distributors shall be equipped with a volume-metering device of sufficient sensitivity to measure the quantity of tack coat dispensed, measurable to within four or five litres.

The use of a hand held pressure applicator is acceptable for tack coating protection board and small irregularly shaped areas such as tapers.

308.06.02 Joint Painting Distributors

A hand held pressure applicator shall be used for joint painting.

308.07 CONSTRUCTION

308.07.01 Application of Tack Coat

Surfaces to be tack coated shall be free of standing water and contamination, such as mud, loose aggregate or debris. Protection board shall be dry and clean when the tack coat is applied.

Tack coat shall be placed sufficiently ahead of the paving operation to allow for curing. Paving and construction equipment shall not be permitted onto the tack coat until it has broken and set. Tack coat shall be applied ahead of the paver to accommodate not more than 2 hours of production of HMA. Hot mix 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.

Tack coat shall be applied to the following:

- a) Protection board
- b) Existing pavement surfaces including, but not limited to, hot mix and Portland cement concrete
- c) Milled pavement surfaces
- d) Expanded asphalt surface
- e) Cold-in-place recycled surfaces
- f) The surface of all binder courses

308.07.01.01 Tack Coat Rate of Application

The diluted emulsion shall be applied at the rate of 0.35 kg/m² to all existing pavement surfaces, milled pavement surfaces, expanded asphalt surfaces, and any binder course surface that has been left open to traffic over at least one winter. For cold-in-place recycled surfaces and new surfaces that have been paved in the same calendar year, the rate of application shall be 0.20 kg/m². The rate of application on protection board shall be 0.50 kg/m².

308.07.02 Application of Joint Painting

Faces at which joints are made shall be painted with a thin, uniform, and continuous coating of joint painting material to the satisfaction of the Contract Administrator. The joint between pavement lanes paved in echelon is not required to be joint painted.

308.08 QUALITY ASSURANCE

308.08.01 General

The Contract Administrator shall determine the acceptability of tack coat and joint painting.

All visually defective material 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 finished work.

308.08.01.01 Basis of Product Acceptance

Acceptance of tack coat product shall be based on quality control (QC) test results submitted by the Contractor, subject to the conditions specified herein. The Contractor shall designate the QC laboratory and be responsible for testing to ensure that all materials meet specifications. The Owner may conduct quality assurance (QA) testing to assess test results supplied by the Contractor by testing all or any number of replicate samples. Testing by a third party referee laboratory is available when there is significant difference in test results generated by the QC and QA laboratories.

For acceptance purposes, a minimum of one test for Residue by Distillation, percent by mass in accordance with LS-216 and one Penetration Test on the residue in accordance with LS-200 shall be performed by the QC Laboratory on the diluted product for each subplot of tack coat. Test results shall be submitted to the Contract Administrator within 7 Days of sampling.

308.08.01.02 Laboratory Proficiency

The laboratory conducting the QC testing shall participate successfully in the MTO correlation program for emulsion testing prior to and during the time of paving.

308.08.01.03 Samples for Testing

Samples for testing shall be representative of the material being used and shall be obtained at the paving site in accordance with AASHTO T 40 and ASTM D 3665. QC samples obtained for acceptance purposes, and those taken for the Owner's QA testing and for referee testing shall be obtained at the paving site. All required samples for acceptance, QA, and referee purposes shall be acquired at the same time in locations selected by the Contract Administrator.

The minimum quantity of each of the QA and referee samples shall be 1 litre. The Contractor shall obtain, package and transport all QA and referee samples to the Owner's designated QA laboratory. Only new containers shall be used for sampling purposes. QA and referee samples shall be delivered at the same time, in a condition suitable for testing, and within 2 Business Days of sampling.

308.08.01.04 Lot and Sublot Sizes

The entire quantity of tack coat used on the Contract shall be divided into one to three lots with one lot for each specified application rate. The lots shall be divided into sublots typically comprising the quantity used to cover an area of 40,000 m². The Contract Administrator in consultation with the Contractor shall determine the actual sublot sizes. A sublot may be terminated at the Contractor Administrator's option when hot mix placement for the Contract ceases for a period of 20 Days.

308.08.01.05 Quality Assurance Testing

QA testing may be carried out by the Owner for the purposes of ensuring that the materials used in the work are according to the quality specified in the Contract Documents, and for assessing the QC test results generated by the Contractor. If the QA test result for any sample indicates a result of less than 25.0% Residue by Distillation in accordance with LS-216 and the QC results for the same sublot is higher, the results shall be deemed to disagree, and the QA test result shall be used for acceptance purposes. The Contract Administrator shall advise the Contractor of the test results and may arrange for additional testing.

308.08.01.06 Product Acceptance

Tack coat product acceptance is based on the results of the Residue by Distillation test according to LS-216 on the diluted product for each sublot, as well as the weighted mean of all such tests. The weighted mean for the product percent residue (WM_{pro}) shall be calculated using the equation:

$$WM_{pro} = [(PR_1 \times A_1) + (PR_2 \times A_2) + \dots + (PR_n \times A_n)] / [A_1 + A_2 \dots + A_n]$$

Where:

- PR_n = Percent Residue for sublot n
- A_n = the area of sublot n
- n = the number of sublots

The percent residue by distillation for each sublot shall not be less than 20% for the result to be included in the calculation of the weighted mean. Sublots with percent residue less than 27.5% shall be accepted into the work, with a payment reduction.

308.08.01.07 Referee Testing

Testing by an independent laboratory is available for any sublot of tack coat when there is disagreement in the test results generated by the QC and QA laboratories, as defined in the Quality Assurance Testing clause.

Referee testing may only be invoked if the Contractor has taken and delivered all referee samples in a condition suitable for testing. Moreover, referee testing shall be permitted only if it is invoked within 2 Business Days of the Contractor receiving the test results for the sublot in question.

If referee testing is requested, the referee laboratory shall be designated by the Contract Administrator from a list maintained by the Owner for this purpose. The Contract Administrator shall arrange for the transfer to the referee laboratory of all referee samples to be tested.

The results of the referee testing shall be binding on both parties and shall be used in the calculation of the payment factor. The cost of the referee testing, including sample delivery, shall be borne by the Contractor unless the testing confirms total conformance of the material sample to Contract specifications, in which case the costs shall be borne by the Owner.

308.08.01.08.01 Acceptance of Tack Coat Application Rate

The acceptance of tack coat application rate shall be based on quantity calculations supplied by the Contractor. For each subplot of tack coat and on a daily basis, the Contractor shall submit to the Contract Administrator a summary which includes, as a minimum, the total area tack coated and the quantity of tack coat used, and the resulting mean application rate. The actual product quantity used shall be determined by the Contractor using the equipment on the pressure distributors. Dipstick measurements or electronic printouts shall be acceptable for this purpose. When requested, such measurements shall be carried out in the presence of the Contract Administrator. The quantity summaries and the resulting application rate shall be submitted to the Contract Administrator within 7 Days of the date of application.

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 Owner. 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.

Tack coat application results shall be analyzed by the Contract Administrator using the results for each subplot, as well as the weighted mean of all such results. For calculation purposes, the maximum value of the application rate for any subplot shall be the specified rate for that lot. The weighted mean for the application rate (WM_{app}) shall be calculated for each lot using the following equation:

$$WM_{app} = [(AR_1 \times A_1) + (AR_2 \times A_2) + \dots + (AR_n \times A_n)] / [A_1 + A_2 + \dots + A_n]$$

Where:

- AR_n = means the Application Rate for subplot n
- A_n = means the area of subplot n
- n = the number of sublots

For lots in which the application rate is specified at 0.50 kg/m^2 , the application rate for each subplot shall not be less than 0.30 kg/m^2 for the result to be included in the calculation of the weighted mean. Sublots with an application rate of less than 0.30 kg/m^2 shall be rejected.

For lots in which the application rate is specified at 0.35 kg/m^2 , the application rate for each subplot shall not be less than 0.20 kg/m^2 for the result to be included in the calculation of the weighted mean. Sublots with an application rate of less than 0.20 kg/m^2 shall be rejected.

For lots in which the application rate is specified at 0.20 kg/m^2 , the application rate for each subplot shall not be less than 0.15 kg/m^2 for the result to be included in the calculation of the weighted mean. Sublots with an application rate of less than 0.15 kg/m^2 shall be rejected.

308.08.01.08.02 Acceptance of Joint Painting Application Rate

The joint painting shall provide a thin, uniform, and continuous coating to the satisfaction of the Contract Administrator.

308.09 MEASUREMENT FOR PAYMENT

308.09.01 Plan Quantity Payment

308.09.01.01 Tack Coat

Measurement shall be by Plan Quantity Payment by area in square metres.

308.10 BASIS OF PAYMENT

308.10.01 Tack Coat

308.10.01.01 Tack Coat - Item

Payment at the Contract price for the above tender item shall be full compensation for all labour, Equipment, and Materials to do the work, except that payment for joint painting shall be made under the appropriate hot mix tender item.

Payment for tack coating of concrete surfaces completed in association with bridge deck waterproofing shall be included in the bridge deck-waterproofing item. Payment for tack coating of the protection board shall be paid under the tack coat item.

The payment reduction for each lot of tack coat shall be calculated using the equation:

Payment Reduction = Total area tack coated x Price x 0.5 [2.00 - (Product Payment Factor + Application Rate Payment Factor)]

The price shall be the tender item price for the specified product, or the negotiated price of the alternate product if the Owner accepted the use of that product.

For lots in which the application rate is specified at 0.50 kg/m², no payment shall be made for sublots with an application rate of less than 0.30 kg/m². Payment for the remaining sublots in the lot shall be based on the lot's calculated weighted mean for the application rate and the application rate payment factor determined from Table 2.

For lots in which the application rate is specified at 0.35 kg/m², no payment shall be made for sublots with an application rate of less than 0.20 kg/m². Payment for the remaining sublots in the lot shall be based on the lot's calculated weighted mean for the application rate and the application rate payment factor determined from Table 2.

For lots in which the application rate is specified at 0.20 kg/m², no payment shall be made for sublots with an application rate of less than 0.15 kg/m². Payment for the remaining sublots in the lot shall be based on the lot's calculated weighted mean for the application rate and the application rate payment factor determined from Table 2.

No payment shall be made for sublots with percent residue less than 20%. The results for the remaining sublots in the lot shall be analyzed for the weighted mean for the product percent residue and the product quality payment factor determined from Table 1.

TABLE 1
Product Quality Payment Factors

% Residue - Weighted Lot Mean	Product Quality Payment Factor
≥ 27.5	1.00
20.0 - 27.4	0.75

TABLE 2
Application Rate Payment Factors

Specified Rate: 0.50 kg/m² Weighted Lot Mean	Specified Rate: 0.35 kg/m² Weighted Lot Mean	Specified Rate: 0.20 kg/m² Weighted Lot Mean	Application Rate Payment Factor
≥ 0.45	≥ 0.30	≥ 0.18	1.00
0.30 - 0.44	0.20 - 0.29	0.15 - 0.17	0.75

Appendix 308-A, Commentary for OPSS.PROV 308, April 2007

Note: This appendix does not form part of the standard specification. It is intended to provide information to the designer on the use of this specification in the Contract.

Designer Action/Considerations

No information provided here.

Related Ontario Provincial Standard Drawings

No information provided here.