

## 310 MUNI CONSTRUCTION SPECIFICATION FOR HOT MIX ASPHALT

### 310.02 References

OPSS 308 PROV Tack Coat and Joint Painting

### 310.03 Definitions

Add in the following:

**Field Adjustment to the Job Mix Formula (JMF)** means a change in the target gradation, asphalt cement content, or both of a mix, within specified limits without a redesign of the HMA, resulting in a revised JMF.

**Mix Properties** means the AC content, gradation, air voids and the VMA.

**Mid-Lane Segregation** means a continuous or discontinuous longitudinal “streak”, typically no greater than 300 mm in width located anywhere across the width of the lane.

**Segregation** means a condition of the pavement characterized by areas with comparatively coarser or finer texture than that of the surrounding pavement, with severity.

- a) Slight Segregation – a pavement matrix is in place between the coarse aggregate particles; however, there are slightly more coarse aggregate particles in comparison with the surrounding acceptable mix.
- b) Medium Segregation – the pavement matrix has significantly more coarse aggregate particles than the surrounding acceptable mat and usually exhibits some lack of surface matrix.
- c) Severe Segregation – the pavement appears very coarse, with coarse aggregate particles against coarse aggregate particles and the pavement has little to no matrix.

**Voids** means air voids and voids in mineral aggregate (VMA).

### 310.05.01 Hot Mix Asphalt (HMA)

Add in the following:

The HMA mix design shall conform to the physical requirements of a road with an AADT>5000.

All PGAC 64-34 HMA shall include 4% to 5% Polymer.

### 310.07.05.01.01 General

Delete in its entirety and replace with the following:

The Contractor shall obtain samples according to OPSS 1101 MUNI.

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#### **310.07.05.01.04            Delivery**

Add the following:

The Owner or the Owners designate shall deliver the QA and Referee Samples to the appropriate laboratory in a condition that is suitable for testing.

The Quality Assurance laboratory will be determined by the Owner.

#### **310.07.05.02.03            Labelling**

Delete in its entirety.

Add the following:

Where not specified or not included on the sample data sheet, samples shall be delivered with a transmittal form identifying the following information:

- a) Contract number;
- b) Name of contractor;
- c) Name of contract administrator;
- d) Quantity and type of sample (when a sample consists of more than one item, each item shall be individually identified);
- e) Date sampled;
- f) Date shipped;
- g) Sample, lot and subplot number;
- h) Sample location; and
- i) Asphalt type.

#### **310.07.05.02.05            Delivery**

Add the following:

The Owner or the Owners designate shall deliver the QA and Referee Samples to the approved laboratory in a condition that is suitable for testing.

The Quality Assurance laboratory will be determined by the Owner.

### **310.07.06.02                      Operational Constraints**

Add in the following:

The HMA surface course shall not be placed after September 30 without written permission from the General Manager.

Surface Asphalt shall not be placed until all restoration or deficiency work has been completed to the satisfaction of the General Manager, and with written approval issued.

Warm Mix Asphalt may be used as a substitute for Hot Mix Asphalt at any time. All asphalt placed after September 30<sup>th</sup> shall be Warm Mix Asphalt. Appendix 310-C shall be invoked for Warm Mix Asphalt.

### **310.07.14                      Surface Appearance**

Delete in its entirety and add in the following:

Each course after final compaction shall be of uniform texture and shall be free of defects such as segregation, fat spots, oil spills, and roller marks. Defective areas shall be removed and replaced with HMA of the same type and compacted to the satisfaction of the Contract Administrator.

If the Contractor's actions fail to prevent continued medium or severe segregation regardless of cause, the Contract Administrator may instruct the Contractor to cease paving until the problem has been corrected.

From the time that the Contractor receives notification of midlane segregation, the Contractor shall be allowed a maximum of 100 tonnes of mix to be placed on the Contract, in order to demonstrate the effectiveness of any repairs and adjustments that have been made to a defective paver. The Contractor shall demonstrate his repairs or adjustments or both to the Contract Administrator. If the Contractor is unable to eliminate midlane segregation to the satisfaction of the Contract Administrator by making repairs or adjustments to the paver within the allowable 100 tonnes of HMA, then the Contractor shall discontinue the use of that paver.

The defective areas shall be repaired as described elsewhere in this specification.

### **310.07.16                      Field Adjustments to Job Mix Formula**

The Contractor shall be permitted to adjust the JMF to more closely reflect the mix being produced. The number of field adjustments to the JMF shall be limited to three for each mix design submitted, one prior to the start of production and a maximum of two during production. Field adjustments to the JMF shall be limited in scope such that the net impact of all field adjustments to the JMF does not exceed any of the maximum field adjustment to the JMF in OPSS 1150, Table 8 in comparison to the original JMF submitted under the current mix design.

JMF adjustments shall only be accepted within 24 hours of the placement of the specified mix type being completed. The adjusted JMF shall be submitted in writing on a form supplied by the City. Upon receipt of the JMF adjustment submission, the City shall give a written confirmation of receipt of the adjusted JMF. Within one (1) Business Day of receipt of the JMF adjustment, the City shall give written notice confirming conformance to the contract requirement or advising of any non-conformance. The revised JMF is issued and the previous lot, if requested by the Contractor as part of the written submission for a JMF change. If the request is not made, the revised JMF shall only apply to the mix subsequent to the receipt of the revised JMF.

## **310.08 Quality Assurance**

Delete in its entirety and add the following:

### **310.08.01 General**

Acceptance of the HMA shall be based on the following:

- a) Asphalt Cement Physical Properties;
- b) Mix Properties and Compaction;
- c) Surface Tolerance;
- d) Surface Appearance;
- e) Surface Smoothness;
- f) Geometrics;
- g) Tack Coat and Joint Painting Application Rate.

All samples shall be obtained by the Contractor in the presence of the Owner or Owner's designate. Notwithstanding, the Owner may take samples for its own purposes at any time from any location. The Contractor shall furnish all reasonable assistance to the City and shall require its subcontractors and suppliers to do the same.

The Owner is responsible for conducting QA testing for all HMA aggregates, asphalt cement, and compaction to meet the requirements of the Contract Documents. QA HMA testing shall be conducted at a frequency specified in Table 6 or in the Contract Documents.

All QA testing shall be completed in a certified laboratory that is CCIL Type B and C certified or AMRL accredited, or equivalent. Testing of the samples shall be conducted under the direction and constant supervision of technicians certified to perform the QA tests.

### **310.08.02 Asphalt Cement Physical Properties**

The AC shall be accepted as per OPSS.MUNI.1101, November 2016.

A minimum of one sample shall be taken for each type of PGAC used.

### **310.08.03 Mix Properties and Compaction**

#### **310.08.03.01 Mix Properties**

##### **310.08.03.01.02 Acceptance Testing**

Aggregate gradation and asphalt cement content testing shall be according to LS-282 and LS-292.

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### **310.08.03.01.03 Basis of Acceptance**

The production air voids for all HMA mixes shall be evaluated according to OPSS Table 9.

Acceptance of hot mix aggregates and asphalt cement shall be according to OPSS 1003 and OPSS 1101 respectively. Aggregate gradation and asphalt cement content results for HMA samples shall meet the JMF tolerance requirements as specified in OPSS 310, Table 7.

### **310.08.03.01.04 Referee Testing**

Should the Contractor disagree with the results of QA testing, the Contractor may request, in writing, that the referee sample be analyzed by a independent third party firm within 5 business days of receipt of results. The results of the referee testing shall be used to determine acceptance of material and/or payment reduction factors.

### **310.08.03.02 Compaction**

#### **310.08.03.02.01 Acceptance Testing**

Nuclear density test gauge results shall be used to assess in-place compaction and shall be conducted randomly at a minimum frequency of every 100 m per lane or 150 m<sup>2</sup>.

Percent compaction shall be determined by comparing the nuclear density in situ Bulk Relative Density (BRD) according to LS-262 to the average plant produced HMA Maximum Relative Density (MRD) according to LS-264.

#### **310.08.03.02.02 Basis of Acceptance**

Compaction testing of the placed HMA shall meet the requirements specified in OPSS 310, Table 10.

When compaction test results do not meet the minimum percent compaction as specified in Table 10, the HMA shall be deemed rejectable and the Contractor shall be notified in writing. The affected area of HMA pavement shall be removed and replaced with acceptable HMA pavement according to the repair clause in this specification.

#### **310.08.03.02.03 Referee Testing**

In the case of a dispute, the Contractor or the Owner may request that a coring and testing program be undertaken to verify compaction percentage of the mix.

The cores shall be provided to the Owner to be tested using a mutually agreed upon third party referee laboratory. Density testing of the cores shall be in accordance with LS-287. Percent compaction shall be determined by comparing the core BRD according to LS-262 to the average MRD according to LS-264 of the plant produced HMA.

When compaction results from core densities do not meet the minimum percent compaction specified in OPSS 310, Table 10, the HMA pavement shall be removed and replaced with acceptable HMA pavement.

### **310.08.03.03 Repairs**

Repairs shall be full lane or full shoulder width with the exception of localized repairs in binder asphalt only as determined by the City. The material and construction of the repairs shall meet the requirements as specified in the contract documents.

The limits and type of repair shall be subject to the approval of the General Manager and shall be approved prior to the repair being carried out.

The Contractor may elect to carry out repairs in lieu of accepting a payment adjustment, if the lot is not rejectable and the total payment factor of the lot is less than 0.940.

When a lot has been deemed rejectable, it shall be subject to removal and replacement. The Contractor shall be responsible to determine the areas of asphalt that are to be repaired to a minimum length, as specified in the contract document and a full lane or full shoulder width.

The Contractor shall be responsible for determining the limits of the repair. A sketch shall be submitted, identifying the proposed locations of the repairs with clearly labeled area, for review at least 5 business days prior to the intended start of the repair.

Prior to the repair, the Contractor shall take slab samples for testing of mix properties outside of the proposed repair area within 1 m of the limits. A QC, QA and referee sample shall be taken at each sample location.

If the proposed repair limits coincides with the beginning of a subplot that has been determined as acceptable, samples are not required at this location. The repair will match the beginning of the acceptable subplot.

Once the Contractor confirms the repair area, the QA samples, and if required, the referee samples will be tested to confirm the material to remain in the subplot proposed for repair is acceptable. In that time the Contractor shall not be permitted to take additional samples or cores.

If the material is deemed rejectable, the proposed limits of the repair area shall be extended to the satisfaction of the General Manager, and the sampling and testing repeated.

The repair area shall incorporate all sample locations.

The repair area shall be tested as per OPSS Table 7, 9 and 10 according to the frequency in OPSS Table 6. If required, a payment adjustment will be applied as per GSSS 310.10.01 Basis of Payment.

If applicable, the unrepaired sublots combined with the remainder of the repaired subplot shall comprise one lot and shall be assessed. If there are only one or two sublots and the quantity provides for multiple lots, these sublots shall be included as part of the previous or next lot.

#### **310.08.04                      Surface Tolerance Acceptance**

##### **310.08.04.01                Basis of Acceptance**

The surface tolerances of any pavement surface shall be such that when tested with a 3 m straight edge placed anywhere, including the edge of pavement, in any direction of the surface, except across the crown or drainage gutters, there shall not be a gap between the bottom of the straight edge and the surface of the pavement:

- a) greater than 6 mm for all binder courses, leveling courses and padding, or
- b) greater than 3 mm for all surface courses.

The Contractor shall provide all traffic control, as required, for the Owner to conduct surface tolerance measurements.

#### **310.08.04.02 Repairs**

Repairs shall be full lane or full shoulder width with the exception of localized repairs in binder asphalt only as determined by the City. The material and construction of the repairs shall meet the requirements as specified in the contract documents.

The limits and type of repair shall be subject to the approval of the City and shall be approved prior to the repair being carried out.

All areas not meeting the surface tolerance requirements shall be repaired by diamond grinding to a maximum of 5 mm or removed and replaced.

#### **310.08.05 Surface Appearance Acceptance**

##### **310.08.05.01 Basis of Acceptance**

HMA deemed by visual appearance to have flushing, bleeding, segregation, fat spot, surface damage, chatter, or surface contamination but not limited to these, shall be considered deficient material or work.

The Contractor shall provide traffic control for all surface appearance assessments. Deficient material, mixture, and work shall be removed and replaced or repaired or assessed a payment reduction.

##### **310.08.05.02 Referee Testing**

###### **310.08.05.02.01 General**

The Contractor will have a maximum of 5 business days to submit a written challenge to any surface appearance assessment completed by the City. If required, a second visual assessment will be conducted by an agreed-upon third party. The results of the second visual assessment shall be binding on both the City and the Contractor.

###### **310.08.05.02.02 Segregation**

The written challenge shall include a list of dimensions and the Contractor's assessment of the severity of each disputed area for the City to consider the challenge. Should the written challenge not be submitted as described, the challenge will not be considered.

##### **310.08.05.03 Repairs**

###### **310.08.05.03.01 General**

Repairs shall be full lane or full shoulder width with the exception of localized repairs in binder asphalt only as determined by the City. The material and construction of the repairs shall meet the requirements as specified in the contract documents.

The limits and type of repair shall be subject to the approval of the City and shall be approved prior to the repair being carried out.

### **310.08.05.03.02 Segregation**

Other Segregation shall be addressed in according to the following:

- Slightly segregated mix shall be accepted into the work;
- Medium segregation in the levelling courses or binder courses with a thickness of greater than 40 mm shall be accepted into the work;
- Medium segregation in the surface course shall be repaired;
- Severely segregated mix in any lift shall be removed and replaced.

Should any segregated areas deteriorate to a greater severity level, the City may reassess these areas at any time.

### **310.08.06 Acceptance Criteria for Surface Smoothness**

The acceptance of surface smoothness shall be as described elsewhere in this specification.

### **310.08.07 Geometrics Acceptance**

Random spot checks will be taken by the City to confirm the width of all asphalt courses for acceptance. For binder asphalt, this assessment will occur and acceptance shall be issued in writing prior to placement of the next lift of asphalt.

The width of each lift shall be deemed acceptable based on the following:

- i) The outside edges and pavement shoulders are parallel to the centerline and visually uniform;
- ii) The width across all adjacent lanes from the outside edge to outside edge is not less than the sum of the specified lane widths;
- iii) The width of the paved shoulders is not less than the paved shoulder width as specified in the contract documents.

### **310.08.08 Acceptance of Tack Coat and Joint Painting Application Rate**

Tack coat application shall be visually uniform. Areas of insufficient or non-uniform tack coat coverage shall be re-sprayed. When 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.

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

The acceptance of Tack Coat shall be in accordance to OPSS 308 PROV.

### **310.10 Basis of Payment**

- 310.10.01**
- Hot Mix HL ("type") – Item**
  - Hot Mix HL ("type") Patching – Item**
  - Heavy Duty Binder Course Mix – Item**
  - Medium Duty Binder Course Mix – Item**
  - Dense Friction Course Mix – Item**
  - Superpave ("type") – Item**
  - Superpave ("type") Patching – Item**
  - SMA – Item**

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Add the following:

Payment at the Contract price for the above tender items shall include full compensation for the HMA quantities used for temporary ramping, the removal of HMA used for temporary ramping and the applicable payment adjustments.

The Contractor shall perform all repairs at no cost to the City.

#### **310.10.04                      Payment Adjustment**

When QA test results show that the HMA does not meet the requirements of this specification, the City shall notify the Contractor that the HMA represented by the test results may be accepted with a payment adjustment.

##### **310.10.04.01                      Mix Properties**

Should the samples produce a result in the Borderline ranges as defined by OPSS Table 7 and Table 9, a 0.1% payment reduction will be applied to the item unit price for each 0.1% that the sample deviates from the Acceptable Range for each requirement as defined by Table 7 and Table 9.

##### **310.10.04.02                      Changes in the Asphalt Cement Price Index**

Appendix 310-B shall be invoked when the tender item for a separate mix is greater than 500 tonnes. Payment adjustment shall be applied unless the Contractor opts out by notifying the Owner in writing within 5 business days of receiving permission to start work. Once the Contractor has opted out of the payment adjustments based on index, the Contractor will not be permitted to opt back in.

#### **310.10.05                      Referee Testing**

If the referee sample results in a change to the payment factor of more than 1%, the Owner shall pay the costs of the referee testing. Otherwise, the Contractor shall pay all referee testing costs.