

AMENDMENT TO OPSS 313, APRIL 2021

Special Provision No. BITU0026

Regression Method

313.01 SCOPE

~~The first paragraph of~~ Section 313.01 of OPSS 313 is ~~deleted~~amended by deleting the first paragraph in its entirety and replaced with the following:

This specification covers the requirements for the placement, compaction, and acceptance of hot mix asphalt (HMA), for projects where the job mix formula has been adjusted for production using the regression method.

~~313.02~~ **REFERENCES**

~~Section 313.02 of OPSS 313 is amended by the addition of the following:~~

ASTM International

~~D7313-20 Standard Test Method for Determining Fracture Energy of Asphalt Mixtures Using the Disk-Shaped Compact Tension Geometry~~

American Association of State Highway and Transportation Officials (AASHTO)

~~T 324-19 Standard Method of Test for Hamburg Wheel Track Testing of Compacted Asphalt Mixtures~~

~~TP 124-20 Standard Method of Test for Determining the Fracture Potential of Asphalt Mixtures Using the Illinois Flexibility Index Test (I-FIT)~~

313.03 DEFINITIONS

Section 313.03 of OPSS 313 is amended by the addition of the following:

Regressed AC Content means the AC content corresponding to 3.5% air voids, determined by the regression method.

Regression Method means the mix design asphalt cement (AC) content, selected at 4.0% air voids, is increased for production purposes to an amount that will correspond to 3.5% air voids, taken from the air voids versus AC content plot in the submitted mix design.

~~313.07~~ **CONSTRUCTION**

~~313.07.07~~ **Placing Hot Mix Asphalt**

~~313.07.07.02~~ **Paving**

~~313.07.07.02.02~~ **Paving in Echelon**

~~The first paragraph of Clause 313.07.07.02.02 of OPSS 313 is deleted in its entirety and replaced with the following:~~

~~For the purpose of laying levelling, binder and surface courses as required under this Contract, paving in echelon [~~* Designer Fill In, See Notes to Designer~~] for [~~** Designer Fill In, See Notes to Designer~~].~~

~~[*** Designer Option, See Notes to Designer]~~

~~313.07.09 Sampling~~

~~313.07.09.03 Hot Mix Asphalt Mix Properties~~

~~Clause 313.07.09.03 of OPSS 313 is amended by the addition of the following:~~

~~Samples of the loose mix and pavement cores shall be obtained from select sublots according to Table 2 for mix performance testing. The sublots are to be randomly selected by the Contract Administrator from the sublots identified for mix properties. The loose mix shall be taken from the paver and the pavement cores shall be taken within one Day of paving from the same location where the loose mix was collected. The pavement cores shall be taken along the mid lane at 1.0 m spacing and shall consist of the top two layers of asphalt. Requirements for filling the sample holes shall be according to Compaction Clause. These samples shall be designated for QA testing for mix performance tests according to Table 4. A complete sample data sheet shall accompany the samples. The data sheet shall also identify corresponding mix properties lot/sublot number, GPS coordinates of sample locations, and that the samples are for mix performance testing. Mix performance testing are required for information only.~~

~~[*** Designer Option, See Notes to Designer]~~

313.08 QUALITY ASSURANCE

313.08.01 Acceptance Criteria

313.08.01.02 Mix Properties and Compaction

313.08.01.02.03 Basis of Acceptance

Clause 313.08.01.02.03 of OPSS 313 is amended by the addition of the following:

Any subplot with air voids less than or equal to 1.5% shall be considered rejectable. When a lot contains any subplot that is deemed rejectable due to the air voids, the lot ~~is~~shall be rejected until the subplot has been repaired and re-evaluated as acceptable.

TABLES:

~~Tables 2, 4, and Table 5 inof OPSS 313 areis deleted in theirits entirety and replaced with the following:~~

TABLE 2
Sample Size and Frequency

Material	Sample Size	Frequency of Sampling
SMA mixes, Superpave 9.5, 12.5, 12.5FC 1, 12.5FC 2, and 19.0 (Note 1)	20 to 30 kg or 30 to 40 kg (Note 2)	Every subplot
Superpave 25.0 and 37.5 (Note 1)	25 to 35 kg or 35 to 45 kg (Note 2)	Every subplot
HMA mixes for mix performance testing by QA laboratory (for information) Pavement cores (at the same location as the above loose samples) for mix performance testing by QA laboratory— for information	80 kg per subplot 12 cores of 150 mm diameter per subplot	Three sublots per mix type, randomly selected by the Contract Administrator
HMA Compaction Cores	150 to 200 mm diameter	Every mix properties subplot
HMA Thickness Cores	50 mm diameter	Every thickness subplot
HMA Aggregates for Density Testing	Coarse aggregate — 10 kg Fine aggregate — 5 kg RAP — 5 kg	First sample to be taken at least 10 Days prior to producing first HMA lot; second sample at 15,000 tonnes; thereafter every 20,000 tonnes or when new samples requested
SMA mixes for draindown testing	3 to 5 kg	Once per lot
WMA for moisture sensitivity testing (Note 1)	50 kg	3 sublots per mix type
<p>Notes:</p> <ol style="list-style-type: none"> 1. Each material sample receptacle shall have a maximum mass of 30 kg. For ease of handling, especially when the larger sample size is required, splitting of material at the paving site is permitted such that a sample is contained in a maximum of two receptacles whose total mass does not exceed the maximum specified above. Once delivered to testing laboratories, combining of the material from the two receptacles is only mandatory if a single receptacle contains insufficient material to carry out the full suite of tests required. 2. The larger sample size shall be applicable when samples are designated for testing to the maximum number of gyrations. The frequency of the larger samples shall be one per lot, as designated by the Contract Administrator. 		

**TABLE 4
Testing Requirements**

Properties and Attributes	Testing Method	Calculations, Values, and Results Required
Mix Properties		
AC Content and Aggregate Gradation for mix samples	LS-282, or LS-292	% AC, % passing DLS sieve, 4.75 mm sieve, 75 µm sieve
Volumetric Properties		
Laboratory Compaction to: i.— Design number of gyrations (N_{des}) ii.— Maximum number of gyrations (N_{max}) Maximum Theoretical Specific Gravity (G_{mm})	AASHTO T-166 using the same laboratory compaction protocol as was used in mix design. (Note 1) AASHTO T-312, LS-264 Superpave Mixes only: in addition to compacting all samples to the design number of gyrations, one sample from each lot of HMA shall be compacted to the maximum number of gyrations. Bulk Relative Density for mix samples, BRD_m	BRD_m BRD at N_{des} BRD at N_{ini} BRD at N_{max} G_{mm} $\% G_{mm} @ N_{ini}$ $\% G_{mm} @ N_{des}$ $\% G_{mm} @ N_{max}$
Voids in Mineral Aggregate (VMA)	LS-604, LS-605, LS-266 (Note 2) G_{sb} —combined bulk relative density of blended coarse and blended fine aggregates	G_{sb} VMA
Voids Filled with Asphalt (VFA)	AASHTO R-35	VFA
Air voids for mix (V_a)	LS-265	V_a
Dust to Binder Ratio (D_p) for Superpave mixes	AASHTO R-35	D_p
Compaction		
Compaction and Thickness of Cores	BRD_c —Bulk Relative Density for core samples, LS-262 (Note 1) $MRD_m = G_{mm}$ (Maximum Relative Density for loose mix samples, LS-264) $\% \text{ Compaction} = (100 \times BRD_c / MRD_m)$	Thickness of Core $\% \text{ Compaction}$
Lift Thickness		
Thickness of Cores	LS-294	Lift Thickness
SMA Mix Properties		
Draindown for mix	LS-310	$\% \text{ Draindown}$
WMA Mix Properties		
WMA Moisture Sensitivity	AASHTO T-283 including Table 1	TSR Visual Stripping Rating
Mix Performance Tests		
Flexibility Index (FI)	AASHTO TP-124	As per REPORT section of AASHTO TP-124
Disk Shaped Compact Tension (DCT)	ASTM D-7313	As per Report section of ASTM D-7313
Hamburg Wheel Track (HWT)	AASHTO T-324	As per REPORT section of AASHTO T-324

Table 4 Notes:

- ~~1. For all gyratory compacted specimens and cores of SMA mixes and Superpave mixes, if the per cent water absorbed by the specimen is found to exceed 2% by volume, as described in AASHTO T 166, then the bulk relative density shall be determined using either LS 306 or ASTM D 6752.~~
- ~~2. Calculate to two decimal places for each subplot using the BRD_m for the subplot, and the G_{s,b} of the most recent QA sample, as specified in the Contract Documents, to provide a lot mean VMA to two decimal places.~~
- ~~3. The rounding off procedure, for all values, shall be according to LS 100.~~

**TABLE 5
Specification Limits for HMA Acceptance Attributes**

Attributes	HMA Type	Lower Limit (LL) %	Upper Limit (UL) %
AC Content	All HMA types	JMF - 0.40 (Notes 1 and 2)	JMF + 0.50 (Note 2)
Designated Large Sieve	All HMA types	JMF - 5.0	JMF + 5.0
4.75 mm Sieve	All HMA types	JMF - 5.0	JMF + 5.0
75 µm Sieve	All HMA types	JMF - 2.0	JMF + 2.0
Air Voids	All HMA types	2.0	5.0
Pavement Compaction	Superpave 37.5, 25.0, 19.0,12.5, 9.5 and 12.5FC 1	92.0	97.0
	Superpave 12.5FC 2	92.0	98.0
	SMA	93.0	98.0

Notes:

1. When a JMF change results in a decrease in the design AC content, the lower limit (LL) shall be set at the revised JMF minus 0.3% for all lots to which the JMF change applies.
2. When regression method is used, substitute JMF AC content with regressed AC content for calculation of PWL for mix acceptance.

NOTES TO DESIGNER:

~~* **Designer Fill-In**~~

~~Insert phrase A, B, or C as recommended by the Regional Operations Office.~~

- ~~A. shall not be used~~
- ~~B. shall be used~~
- ~~C. may be used, at the Contractor's option~~

~~** **Designer Fill-In**~~

~~Regional Operations Office to recommend wording to be inserted such as “whole Contract”, or Contract specific limits, lanes mix type or staging which will describe portion of Contract for which the paving in echelon option selected above applies.~~

~~*** Designer Option~~

~~When partial paving of the full pavement width is not permitted, insert amended Clause 313.07.07.02.05 as stated below (If partial paving is permitted, disregard Designer Option):~~

~~313.07.07.02.05 Partial Paving of Full Pavement Width~~

~~Clause 313.07.07.02.05 of OPSS 313 is deleted in its entirety and replaced with the following:~~

~~Partial paving of the full pavement width is not permitted.~~

~~*** Designer Option~~

~~When required, and in consultation with the Regional Geotechnical Section, insert the following and fill in the additional areas by station that are to be exempt from Lift Thickness testing including, but not limited to areas that may require more or less thickness to match existing surfaces or roadside features and areas requiring hand work and entrances. If not required, disregard Designer Option.~~

~~313.07.09.06 Lift Thickness~~

~~The second paragraph of Clause 313.07.09.06 of OPSS 313 is amended by the addition of the following:~~

- ~~d) The following additional stations and/or roadways:~~
- ~~i. [Fill In applicable areas.]~~
 - ~~ii. [Fill In applicable areas.]~~

WARRANT: Always with BITU0025 for projects where the job mix formula needs to be adjusted for production using regression method, in consultation with the Regional Geotechnical Section and Bituminous Section, ~~in place of SSP 103F03.~~

CUSTODIAN: ~~Sayed Tabib~~Imran Bashir, EMO - Bituminous.