

AMENDMENT TO OPSS 313, APRIL 2021

Special Provision No. BITU0028

Additional Requirements for Acceptance of Recovered Asphalt Cement (RAC)

313.01 _____ SCOPE

Section 313.01 of OPSS 313 is amended by deleting the first paragraph in its entirety and replacing it with the following:

This specification covers the requirements for the placement, compaction, and acceptance of hot mix asphalt (HMA), for projects where, as an additional requirement, recovered asphalt cement (RAC) is specified to be tested for acceptance.

313.02 _____ REFERENCES

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

Ontario Ministry of Transportation Publications:

MTO Laboratory Testing Manual:

LS-284 Recovery of Asphalt from Solution by Rotary Evaporator

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:~~

~~Recovered Asphalt Cement (RAC) means as defined in the Contract Documents.~~

~~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 the 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 is required for information only.~~

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

Subsection 313.07.09 of OPSS 313 is amended by the addition of the following clause:

313.07.09.0708 Hot Mix Asphalt for Recovered Asphalt Cement Testing

Samples of HMA shall be obtained at the paver for RAC testing. Samples shall be appropriately labelled with the Contract number, highway number, Region~~region~~, HMA lot number, HMA subplot number, corresponding ~~Performance Graded Asphalt Cement~~performance graded asphalt cement (PGAC) lot number, mix type, lift number, station, ~~and~~ date and time of sampling.

The Contract Administrator shall advise the Contractor of each random sample location. A set of two samples shall be taken as per Table 22B. One of these samples shall be for Quality Assurance (QA) testing and the other shall be for referee testing. Samples for QA and referee testing shall be obtained concurrently. When the mass of the sample does not meet the requirements of Table 22B, the sample shall be discarded and a new one taken immediately.

313.08 _____ QUALITY ASSURANCE

313.08.01 _____ Acceptance Criteria

Subsection 313.08.01 of OPSS 313 is amended by the addition of the following:

~~h)~~ Recovered Asphalt Cement Physical Requirements

Subsection 313.08.01 of OPSS 313 is amended by the addition of the following clause:

313.08.01.0809

Recovered Asphalt Cement Physical Requirements

The Contract Administrator shall determine the acceptability of the RAC according to requirements specified in the Contract Documents.

The Contract Administrator shall determine the size and location of the lots, after discussion with the Contractor and before HMA production for the tender item starts. Generally, the lots for RAC shall be the same as those for PGAC testing.

TABLES:

OPSS 313 ~~Tables 2 and 4 are deleted in their entirety and replaced with~~ is amended by the addition of the following tables:

TABLE 22B
RAC 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
SMA mixes, Superpave 9.5, 12.5, 12.5FC 1, 12.5FC 2, and 19.0 for RAC Testing	20 kg	Every RAC lot
HMA mixes for mix performance testing by QA laboratory (for information)	80 kg per subplot	Three sublots per mix type, randomly selected by the Contract Administrator
Pavement cores (at the same location as the above loose samples) for mix performance testing by QA laboratory for information	12 cores of 150 mm diameter per subplot	
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, 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

Notes:

- ~~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 44B
RAC 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	AASHTO T 305	$\% \text{ Draindown}$
WMA Mix Properties		
WMA Moisture Sensitivity	AASHTO T 283 including Table 1	TSR Visual Stripping Rating
Extraction and Recovery of Asphalt Cement		
Extraction and Recovery of Asphalt Cement from Loose Asphalt Mix	LS-284	RAC shall be tested for acceptance as specified in the Contract Documents
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 sublot using the BRD_m for the sublot, and the G_{sb} of the most recent QA samples, 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.~~

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 BITU0027 for projects where RAC will be tested for acceptance in addition to PGAC, in consultation with the Regional Geotechnical section and EMO Bituminous ~~section,~~ in place of SSP 103F03Section.

CUSTODIAN: ~~Heather Bell,~~ EMO - Bituminous.