

EMMET COUNTY ROAD COMMISSION  
SPECIAL PROVISION  
FOR  
**ACCEPTANCE OF HMA MIXTURE ON TOWNSHIP PROJECTS**

ECRC: BAG

01/27/2021

**a. Description**

This Special Provision provides acceptance-testing requirements for use on this project. The HMA mixture shall be provided to meet the requirements of the standard specifications for construction except where modified herein. The HMA mixture quality assurance and acceptance shall conform to Section 501 of the 2012 Michigan Department of Transportation Standard Specifications for Construction except where modified herein. The MDOT HMA Production Manual, current edition, applies to this work.

**b. Submittals**

The following items shall be submitted to the Engineer before payment will be issued.

1. Job Mix Formula (MDOT Form 1911) for the project for review and approval by the Engineer. The Contractor shall not place any HMA without an approved JMF.
  - i. Fine Aggregate Angularity
  - ii. RAP Tiering based on JMF values
  - iii. Fines to Asphalt Ratio (based on Effective Asphalt Content)
  - iv. Soft Particle Percentage of each JMF Aggregate Type
2. Quality Control Plan.
3. A copy of all Contractor Quality Control Tests submitted within 7 working days of project completion.
4. A copy of the Bill of Lading or Delivery Ticket for the Asphalt Binder for the project. The Bill of Lading must include the type of material that was previously hauled in the delivery tank.

**c. Materials**

Aggregates, mineral filler (if required), and asphalt binder shall be combined as necessary to produce a mixture proportioned within the master gradation limits and meeting the uniformity tolerances listed in Table 1 and the quality assurance testing tolerances in Table 2 of this special provision. The master gradation range is to be used for establishing mix design only. Topsoil, clay or loam shall not be added to aggregates used in plant produced HMA mixtures.

The maximum Percentage of Soft Particles for any HMA mixture shall be 5%.

**Table A: HMA MIXTURE TARGETS AND PARAMETERS**

HMA Mix Type	VMA Min. on any give Test (a.c)	VMA Target (c)	Asphalt Binder Content Minimum JMF	Asphalt Binder Content Min. on any given test (a)	Fines to Asphalt Ratio Max. on JMF (b)
4E1	14.0	Based on mix design parameters, the contractor shall establish & state their VMA Target on the mix design JMF, and shall adhere to the VMA Min.	5.80	5.50	1.10
5E1	15.0		6.10	5.80	1.10
Ultra-thin	15.5		6.00	5.70	1.20
a. The HMA parameter minimum is per any given QC/QA test, regardless of Tolerances listed in Table 2 of this Special Provision. b. Value based on Pbe (Effective Asphalt Percent) for each given mix and JMF c. VMA values are based on the Gsb (Bulk Specific Gravity) of the given HMA mixture not the Gse (Effective Specific Gravity).					

**Table B: HMA Mixture Targets and Parameters Cont'd (Ultra-Thin)**

Superpave Air Voids (%)	4.5
Superpave Gyration	35
Fine Aggregate Angularity (Min.)	40.0
Percent Crush (Min. %)	50.0
Aggregate Wear Index (AWI)	220
<b>Sieve Size</b>	<b>Total % Passing</b>
1/2 inch	100
3/8 inch	99-100
No. 4	75-95
No. 8	55-75
No.30	25-45
No. 200	3-8

d. **Asphalt Binder**

Liquid Asphalt binder shall be a Performance Graded (PG) binder as specified in the bid documents and/or approved by the Road Commission.

e. **Air Voids**

Design air voids will be 4.0% and shall be regressed to 3.0% in production by the addition of virgin liquid asphalt (4E1 and 5E1).

f. **Recycled Asphalt Materials**

Recycled Asphalt Pavement (RAP) is allowed in the HMA mixtures subject to the following requirements. The method for determining the binder grade in HMA mixtures incorporating RAP is divided into two categories designated Tier 1 and Tier 2. Each tier has a range of percentages that represent the contribution of the RAP toward total binder replacement. Binder replacement will be determined by weight. ***The use of Reclaimed Asphalt Pavement (RAP) shall be limited to Tier 1 (0% to 17%) RAP binder by weight of the total binder in the Ultra-Thin mixture, which will also use a PG 58-34 binder.***

**Recycle Asphalt Shingles (RAS) are not allowed in the HMA mixture.**

**Tier 1 - 0.0% to 17.0% RAP binder by weight of the total binder in the mixture**

No binder grade adjustment is required to compensate for the stiffness of the asphalt binder in the RAP.

**Tier 2- 18.0% to 27.0% RAP binder by weight of the total binder in the mixture**

The required asphalt binder grade must be at least one grade lower for the low temperature than the design binder grade required for the specific project mixture. For example, if the design binder grade for the mixture type is 58-28, the required grade for the binder in the HMA mixture containing >17.0% RAP would need to be a 58-34.

g. **Construction**

After the Job Mix Formula is established, the aggregate gradation of the HMA mixture furnished for the work shall be maintained within the Range 1 uniformity tolerance limits permitted for the job-mix-formula specified in Table 1. However, if deviations are predominantly either below or above the job-mix-formula, the Engineer may order alterations in the plant to bring the mixture to the job-mix-formula. If

two consecutive aggregate gradations on one sieve as determined by the field tests are outside Range 1 but within Range 2 tolerance limits, the Contractor shall suspend all operations. Contract time will continue during these times when the plant is down. Before resuming any production, the Contractor shall propose, for the Engineer's approval, all necessary alterations to the materials or plant so that the job-mix-formula can be maintained. The Engineer, after evaluating for effects on AWI and mix design, properties, will approve or disapprove such alterations.

Random liquid asphalt binder samples will be taken by the Engineer or Consultant. The Engineer reserves the right to test any or all samples taken.

The crushed particle content of the aggregate used in the HMA mixture shall not be more than 10 percentage points above or below the crushed particle content used in the job-mix-formula nor less than the minimum specified for the aggregate in the project documents.

**Quality assurance and acceptance testing will be as follows:**

**1. Asphalt Mixture Sampling**

Acceptance sampling and testing will be performed by the Engineer using the sampling method and testing option selected by the Engineer. Each day of production, random samples will be obtained for each mix type. Acceptance testing will be performed at a frequency specified by the Engineer.

For each given day of production, if the daily mix tonnage per HMA mix type is under 500 tons, the Engineer reserves the right to test one sample and obtain a second sample for future testing if necessary. If the daily mix tonnage per HMA mix type is over 500 tons, The Engineer reserves the right to test one sample. If the first sample meets the Range 1 tolerances in Table 1 and Table 2, the Engineer can obtain a second sample and perform any of the following actions:

- a) Perform Full Quality Assurance testing
- b) Perform Volumetric Testing Only (Ignition or Extraction AC/Gmm, Air Voids, VMA)
- c) Retain custody of the sample for future testing if necessary

**2. Asphalt Binder Sampling**

The Contractor shall obtain the asphalt binder sample, correctly label the sample container, and complete a Sample Identification (Bituminous Material Form 1923B). The form must be filled out correctly and completely, and signed before the sample is given to the Engineer. The daily asphalt binder sample must be taken from a sampling spigot located on the pipeline supplying asphalt binder to the plant, in a position between the asphalt binder pump and the point where the asphalt binder enters the mixture. Personnel safety is critical in selecting the position of the sampling spigot. Give the binder sample and completed Form 1923B to the Engineer.

Daily Asphalt Binder Samples are to be in 1 pint (16 ounce), slip top, seamless ointment tin. The tin must be at least three quarters full. All containers must be labeled in a legible format with the following information.

- a) Project Name
- b) Binder Grade
- c.) Binder Supplier certificate number
- d) Supplier name, city and state
- e) Date sampled
- f.) Mix Type

The Engineer may request to witness the sampling of the asphalt binder upon visit to the HMA plant. The Engineer will complete the 1923B for the witness sample. The witness sample will be recorded as the daily asphalt binder sample. Any other asphalt binder samples from that same day will be discarded.

The Engineer may request a copy of the MDOT Binder Certification Documents. These copies must be presented to the Engineer when the respective daily binder samples and the 1923B forms are picked up at the plant. The Engineer will review these documents and communicate any problems that may arise.

### 3. Mixture Testing

Mixture samples will be tested to verify gradation, binder content and volumetric properties per Table 1 and Table 2 listed below.

If the Engineer elects not to perform Quality Assurance testing on a given day or a given project, the Contractor is still required to perform testing in accordance with Table 1 and Table 2 below. The Contractor's Quality Control test results shall be sent to the Engineer within 2 working days of each day's productions for a given HMA mixture.

**TABLE 1: Quality Assurance / Control Tolerance Limits for HMA Mixtures**

PARAMETER	TOP AND LEVELING COURSE	
	Action Limits (Range 1)	Suspension Limits (Range 2)
% Passing the #8 and Larger Sieves	+/- 5.0%	+/- 8.0%
% Passing #30 Sieve	+/- 4.0%	+/- 6.0%
% Passing #200 Sieve	+/- 1.0%	+/- 2.0%

**TABLE 2: Quality Assurance / Control Testing Tolerances (±) from the JMF or Target Values**

Parameter	Double Tests per Lot (c)	Lot Average
Binder Content (a)	0.30% (a)	0.50% (a)
Maximum Specific Gravity (G <sub>mm</sub> )	0.013	0.020
Voids in Mineral Aggregate VMA (a,b)	0.75% (a, b)	0.80%
Air Voids (c)	0.60%	0.90%
Fines to Effective Asphalt Ratio	0.65-1.20	0.60-1.25
a) Refer to minimum parameters in Table A of this special provision. B) These given limits are (+/-) from given targets in Table A of this special provision. c) Limits are (+/-) from JMF/Target Value listed in Section e. of this special provision.		

### 4. Density

Pavement density will be measured by the Engineer, with a Nuclear Density Gauge, using the G<sub>MM</sub> from the JMF for the density control target. The in-place density of the HMA mixture shall be at least 92.0% of the density control target. In place density will be calculated by averaging four QA density tests locations. Tests will not be taken within 12 inches of the pavement edges or joints.

h. **Rejected Mixtures**

**1. Gradation**

Action Limits - A range of values established in Table 1 - Uniformity Tolerance Limits for HMA Mixtures that, if exceeded on two consecutive tests, Contractor is required to take corrective action to bring the mixture produced onto conformance with the specifications.

Suspension Limits – Range of values established in Table 1 – Quality Assurance / Control Tolerance Limits for HMA Mixtures that, if exceeded on a single test, Contractor is required to suspend operations and determine, document, and correct the cause before resuming production. Prior to resuming production, the Engineer must be notified of the findings and approve corrective action prior to resuming production.

**2. Asphalt Binder**

If a liquid asphalt binder sample does not meet the required specification, the mix produced from the point of the last liquid asphalt binder sample meeting specification to the failed sample shall be considered defective and shall be replaced at the sole expense of the contractor.

**3. Volumetric Properties**

The acceptable tolerances for Binder Content, Gmm, VMA, Air Voids, and Fines to Pbe are listed in Table 2 above. Any HMA Mixture produced outside of these tolerances or any HMA Mixture that does not meet the requirements listed in the sub notes of Table 2 above will be subject to a negative adjustment or rejected. The resulting penalty will be a negative adjustment of 10% to 50% or remove / replace, to be determined by the Engineer.

**4. Pavement Density**

A negative 10% adjustment in the HMA Mixture contract price will be imposed if the pavement density (average of all gauge readings) is less than 92%, but equal to or greater than 91% or if 2 or more readings are less than 91%.

A negative 25% adjustment in the HMA Mixture contract unit price will be imposed if the pavement density (average of all gauge readings) is less than 91% but equal to or greater than 90%; or if 2 or more readings are less than 90%.

If the average density is less than 90%, the Contractor shall remove and replace the pavement at no cost to the Owner.