

The following changes are made to the Project Special Provisions:

1. Subsection **00745.00 Scope** - Add the following paragraph to the end of this section:

The Contractor, at their option, may use Warm Mix Asphalt Concrete (WMAC) as a substitute for HMAC on the wearing course and all base course lifts. WMAC will be subject to all requirements for HMAC in Section 00745, except as modified below.

2. Subsection **00745.02 Definitions** – This subsection is added after subsection 00745.00:

00745.02 Definitions - Add the following paragraph to this section.

Warm Mix Asphalt Concrete (WMAC) – An asphalt concrete mix following all requirements of HMAC, except that through use of approved additives or processes it is mixed, placed and compacted at lower temperatures.

Add the following bullet to the definition of Lot Size

- A new lot will be established for WMAC technology

3. Subsection **00745.11(d) WMAC Asphalt Cement Additives** - This subsection is added after subsection 00745.11(b):

Add the following to the end of this section

- (d) WMAC Asphalt Cement Additives** – If WMAC is proposed for use in this contract, only Warm Mix Asphalt Concrete (WMAC) additives or processes listed on the approved list below shall be used unless otherwise approved by the Engineer.

WMAC Technology	Process Type	Supplier
LEA-CO	Foaming Process	Advanced Concepts Engineering Co.
Eco-Foam II	Foaming Process	AESCO/Madsen
Redi-Set WMX	Chemical Additive	Akzo Nobel Surfactants, Inc.
CECABASE RT	Chemical Additive	Arkema Group
Aspha-Min (Synthetic Zeolite)	Foaming Process	Aspha-Min
Double Barrel Green System	Foaming Process	Astec Industries
Green Machine	Foaming Process	Gencor Industries
HGrant Warm Mix System	Foaming Process	Herman Grant Company
Qualitherm	Chemical Additive	Iterchimica
Aquablack Warm Mix	Foaming Process	Maxam Equipment Inc.

Asphalt		
Low Emission Asphalt	Chemical Additive	McConnaughay Technologies
Evotherm	Chemical Additive	MeadWestvaco Asphalt Innovations
Meeker Warm Mix	Foaming Process	Meeker Equipment Corp. Inc.
Advera (Synthetic Zeolite)	Foaming Process	PQ Corporation
Sasobit	Organic Additive	Sasol Wax Americas, Inc.
Shell Thiopave	Chemical Additive	Shell
Accu-Shear Dual Warm-Mix Additive System	Foaming Process	Stainsteel
Tri-Mix Warm Mix Injection	Foaming Process	Tarmac Inc.
Warm Mix Asphalt System	Foaming Process	Terex Roadbuilding

If WMAC is proposed for use in this contract, the Contractor shall submit the proposed WMAC technology to be used and a plan for its implementation at the pre-construction conference.

Comply with the manufacturer's recommendations for incorporating additives and WMAC technologies into the mix. Comply with manufacturer's recommendations regarding receiving, storage, and delivery of the additives.

4. Subsection 00745.13 Job Mix Formula (JMF) Requirements - This subsection is added after subsection 00745.11(d) WMAC Asphalt Cement Additives:

00745.13 Job Mix Formula (JMF) Requirements – Add the following after the paragraph ending with “. . . JMF requirements of 00745.13(b) are met.”

A separate JMF will be issued for WMAC. If WMAC is used on this contract provide the following information in addition to the requirements listed:

- 1) WMAC technology and/or WMAC additives information.
- 2) WMAC technology manufacturer's established recommendations of usage.
- 3) WMAC technology manufacturer's established target rate for water and/or additives, the acceptable variation for production, and documentation showing the impact of excessive production variation.
- 4) WMAC technology material safety data sheets (MSDS) if applicable.
- 5) Temperature range for mixing.
- 6) Temperature range for compacting.
- 7) Asphalt binder performance grade test data of the asphalt binder and chemical additive at the manufacturer's recommended dosage rate.
(Note: this does not apply to foaming technology)

- 8) WMAC mixture performance test results per 00745.13(c). (Note: this testing will be done on production mix for foaming technology on specimens compacted at WMA compaction temperatures)
- 9) Recycled asphalt shingles cannot be used in WMA mixes with minimum compaction temperatures less than 260 degrees Fahrenheit.

5. Subsection **00745.16 HMAC Production QC/QA** - This subsection is added after subsection **00745.14 Tolerance and Limits**:

00745.16 HMAC Production QC/QA: Replace the subsection title with **HMAC & WMAC Production QC/QA**.

6. Subsection **00745.16(b-1-a) General** – Replace the first paragraph with the following:

a. General - Prior to beginning production and placement of any WMAC:

1. Perform MDV tests on HMAC as required at start-up according to 00745.16(b-1-c).
2. Two consecutive running averages of four MDV test results from testing of HMAC shall be within the limits of 00745.16(b-1-a).

Perform MDV testing on projects with Level 2, Level 3, or Level 4 dense graded HMAC or WMAC. Perform MDV tests on every subplot and as required at start up according to 00745.16(b-1-c) and the MFTP. Perform gradation and asphalt content testing with each MDV test. Calculate the following values for each MDV test.

7. Subsection **00745.16(b-1-c) MDV Requirements at Start-up** - The paragraph that begins with the words "Perform MDV testing at the start-up..." is replaced with the following:

Perform MDV testing at the start-up of the HMAC JMF production according to the following process:

8. Subsection **00745.16(b-4) MDV for WMAC** - This subsection is added after subsection **00745.16(b-3) MDV for Open Graded HMAC**:

00745.16(b-4) MDV for WMAC – Perform MDV testing on WMAC per the requirements of 00745.16(b-1-a). Continued production and placement of WMAC will be allowed at the discretion of the Engineer.

9. Subsection **00745.21 HMAC Mixing Plant** - This subsection is added after subsection **00745.16(b-4) MDV for WMAC**:

00745.21 HMAC Mixing Plant – Add the following to the end of this section:

(g) WMAC Mixing Production - Modify the asphalt mixing plant as required by the manufacturer to introduce the WMAC technology. Plant modifications may include additional plant instrumentation, the installation of asphalt binder foaming systems and/or WMAC additive delivery systems, tuning the plant burner and adjusting the flights in order to operate at lower production temperatures and/or reduced tonnage. Document the integration of plant controls and interlocks.

10. Subsection **00745.43(b) Heating Temperatures** – This subsection is added after subsection **00745.40 Season and Temperature Limitations**:

00745.43(b) Heating Temperatures - Add the following table:

WMAC Temperature, °F	
Grading	Minimum Behind Paver
Dense	215

11. Subsection **00745.49(a-1) Temperature** - This subsection is added after subsection **00745.48(b) Depositing**:

00745.49(a-1) Temperature – Add the following after the first sentence in the first paragraph.

For WMAC, complete breakdown and intermediate compaction before the WMAC temperature drops below 160°F.

12. Subsection **00745.49(b-2-b) Core Correlation of Nuclear Gauge Readings** - This subsection is added after subsection **00745.49(b-1) General**:

00745.49(b-2-b) Core Correlation of Nuclear Gauge Readings – Replace this section with the following:

b. Core Correlation of Nuclear Gauge Readings - Perform core correlation of nuclear gauge readings on the HMAC wearing course and the WMAC wearing course.

Apply correlation factors to all nuclear gauge readings for all dense graded mixtures placed on the Project. Cut the required cores and patch the core holes with dense graded HMAC or WMAC. Determine the core correlation factor according to WAQTC TM 8 and ODOT TM 327.

New correlations are required if the aggregate source or the asphalt cement source changes. Perform additional core correlation of nuclear gauge readings for each lift when requested by the Engineer or Contractor. The party requesting the core correlation pays the costs of coring and lab testing of the

cores. The party performing nuclear gauge testing pays the costs of the nuclear gauge testing.