

January 2, 2001

317-232-5080

**Memorandum 01-01**

To: District Directors Toll Road Operations Engineer  
District Materials and Tests Engineers District Construction Engineers  
Area Engineers Project Engineers/Supervisors

From: Timothy D. Bertram, Chief  
Contracts and Construction Division

Subject: Density and Moisture Controls on HMA Mixtures

Effective immediately, the density and moisture controls for all QC/QA HMA and moisture control for HMA mixtures will be changed to reflect specification changes. The moisture control from the roadway for both QC/QA HMA and HMA mixtures is being revised from being required on all mixtures to being required on surface mixtures only. This will eliminate the need to obtain and analyze moisture samples from the roadway for all base and intermediate mixtures.

For QC/QA HMA with density control, quality assurance adjustments will be revised to the following table:

**1. Mainline ESAL Equal To or Greater Than 1,000,000.**

Pay Adjustments – Percent	Percentages are based on % MSG
submitted to the Materials and Tests Division for disposition	≥ 97.0
1.0 points for each 0.1 % above 96.0	96.1 - 96.9
100	92.0 - 96.0
0.2 points for each 0.1 % below 92.0	91.0 - 91.9
2.0 + 0.4 points for each 0.1 % below 91.0	90.0 - 90.9
6.0 + 1.0 points for each 0.1 % below 90.0	88.0 - 89.9 See Note 1
submitted to the Materials and Tests Division for disposition	≤ 87.9 See Note 1

Note 1: If two consecutive lots fall within this range, the Contractor shall stop production of the mix, identify an action plan to address the deficiencies, and submit an addendum to the QCP.

The revision eliminates the set of tolerances for thinner intermediate lifts currently in the specifications. All lifts, regardless of thickness, must meet the same density requirements and

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will have quality assurance adjustments according to this revision. The Maximum Specific Gravity used for calculating density will be the Maximum Specific Gravity determined from the mixture acceptance sample. No additional sampling will be taken to determine the Maximum Specific Gravity for density calculations.

Lift thickness for all HMA courses have been revised so that no lift should be less than two times the maximum particle size of a mixture as shown on the DMF/JMF. Designers are being directed to design mats so that the minimum of 2 times and the maximum of 4 times tolerance will be a true construction tolerance.

To summarize the changes being authorized in this memorandum:

- Moisture testing from the roadway is no longer required for base and intermediate mixtures,
- Density quality assurance adjustments will be made utilizing one set of tolerances for all QC/QA mixtures with density control,
- Lift thickness of any course is revised to a minimum of 2 times and a maximum of 4 times the maximum particle size as shown on the DMF/JMF.

This memorandum is the Project Engineer/Supervisor's authorization to make this change. Sections of the specification changes are attached for reference. This is to apply to all contracts regardless of the letting date.

TDB:RLY:rly

cc: FHWA  
Materials and Test Division  
ICI  
APAI  
CEI

SECTION 401, BEGIN LINE 144, DELETE AND INSERT AS FOLLOWS:

**401.09 Acceptance of Mixtures.** Acceptance of mixtures for binder content, coarse aggregate angularity and gradation for each lot will be ~~determined on the basis of extraction, coarse aggregate angularity and gradation~~ based on tests performed by the Engineer. Acceptance testing for surface mixtures will include tests for moisture content. The Engineer will randomly select the location(s) within each subplot for sampling in accordance with the ITM 802.

150 ~~One random Two samples~~ One sample from each random location shall be obtained from each subplot from the pavement in accordance with ITM 580. ~~The~~ For surface mixtures, a second sample shall be obtained in accordance with ITM 580 ~~located from the random sample~~ by offsetting 0.3 m (1 ft) transversely from the random sample towards the center of the mat and will be used for the moisture sample. The test results of the sublots will be averaged and shall meet

SECTION 401, LINE 180, INSERT AS FOLLOWS:

Single test values and averages will be reported to the nearest 0.1% except moisture will be reported to the nearest 0.01%. Rounding will be in accordance with ASTM E 29 using the rounding method.

SECTION 401, BEGIN LINE 257, DELETE AND INSERT AS FOLLOWS:

The finished ~~depth~~ thickness of any course shall be a minimum of ~~1.5~~ two times and a maximum of ~~three~~ four times the maximum particle as shown on the DMF.

SECTION 401, BEGIN LINE 507, DELETE AND INSERT AS FOLLOWS:

(b) **Density.** When the density of the lot is outside the allowable tolerances, adjustment points will be assessed as follows:

**1. Mainline ESAL Equal To or Greater Than 10,000,000.**

Pay Adjustments – Percent	For Thickness of Base & Intermediate $\geq 37.5$ mm (1.5 in.) and all Surfaces Mixes	For Thickness of Intermediate Mixes $< 37.5$ mm (1.5 in.)
Percentages are based on % MSG		
submitted to the Materials and Tests Division for disposition	$\geq 97.0$	$\geq 97.0$
1.0 points for each 0.1 % above 96.0	96.0 – 96.9	96.0 – 96.9
100	92.0 – 95.9	91.0 – 95.9
0.05 points for each 0.1 % below 92.0/91.0	91.0 – 91.9	90.0 – 90.9
0.5 + 0.4 points for each 0.1 % below 91.0/90.0	90.0 – 90.9	89.0 – 89.9
4.5 + 1.0 points for each 0.1 % below 90.0/89.0	88.0 – 89.9 See Note 1	87.0 – 88.9 See Note 1
submitted to the Materials and Tests Division for disposition	$\leq 87.9$ See Note 1	$\leq 86.9$ See Note 1

Note 1: If two consecutive lots fall within this range, the Contractor shall stop production of the mix, identify an action plan to address the deficiencies, and submit an addendum to the QCP.

**1. Mainline ESAL Equal To or Greater Than 1,000,000.**

Pay Adjustments – Percent	Percentages are based on % MSG
submitted to the Materials and Tests Division for disposition	$\geq 97.0$
1.0 points for each 0.1 % above 96.0	96.1 - 96.9
100	92.0 - 96.0
0.2 points for each 0.1 % below 92.0	91.0 - 91.9
2.0 + 0.4 points for each 0.1 % below 91.0	90.0 - 90.9
6.0 + 1.0 points for each 0.1 % below 90.0	88.0 - 89.9 See Note 1
submitted to the Materials and Tests Division for disposition	$\leq 87.9$ See Note 1

Note 1: If two consecutive lots fall within this range, the Contractor shall stop production of the mix, identify an action plan to address the deficiencies, and submit an addendum to the QCP.

SECTION 401, BEGIN LINE 305, INSERT AS FOLLOWS:

from a confined edge or 150 mm (6 in.) from a non-confined edge or the course being placed. The maximum specific gravity will be determined from the sample obtained in 401.09.

SECTION 402, DELETE LINES 89 THROUGH 106 and INSERT AS FOLLOWS:

**402.06 Acceptance of Mixtures.**

**(a) Mainline and Shoulders.** Samples of the HMA shall be obtained where deemed necessary. Acceptance of the mixtures for binder content, coarse aggregate angularity, and gradation will be based on tests performed by the Engineer. Acceptance testing for surface mixtures will include tests for moisture content. Sampling and testing will be performed by the Engineer in accordance with the Frequency Manual.

One sample from each random location shall be obtained from the pavement in accordance with ITM 580. For surface mixtures, a second sample shall be obtained to determine moisture content. This second sample shall be taken in accordance with ITM 580 by offsetting 0.3m (1 ft) transversely from the random sample towards the center of the mat.

When mixtures in accordance with 401.08 are supplied as allowed in 402.03, gradation acceptances will be based on the following:

ACCEPTANCE TOLERANCE FOR MIXTURES (%)									
MIXTURE	SIEVE SIZE								
	*37.5 mm	*25.0 mm	*19.0 mm	*12.5 mm	*9.5 mm	*4.75 mm	2.36 mm	600 Fm	75 Fm
Base							10.0	6.0	2.0
Intermediate							10.0	6.0	2.0
Surface							8.0	4.0	2.0

\* The acceptance tolerance for this sieve shall be the applicable composition limits specified in 401.05.

Single test values and averages will be reported to the nearest 0.1% except moisture will be reported to the nearest 0.01%. Rounding will be in accordance with ASTM E 29 using the rounding method.

Gradation test results which are outside the composition limits will be considered and adjudicated as a failed material in accordance with normal Department practice as listed in 105.03.

Coarse aggregate angularity test results which are below the minimum requirements in 904.02 will be considered and adjudicated as a failed material in accordance with normal Department practice as listed in 105.03.

Binder content test results which are more than " 0.5% from the JMF will be considered as a failed material and adjudicated in accordance with normal Department practice as listed in 105.03.

**(b) Wedge and Leveling and Rumble Strips.** Sampling, testing, and acceptance of the material will be in accordance with 402.06(a) unless mixtures in accordance with 401.08 are supplied as allowed in 402.03. When mixtures in accordance with 401.08 are supplied, all applicable requirements of 401.02 shall be met.

Acceptance of mixtures in accordance with 401.08 will be on the basis of a type D certification in accordance with 916.02(d). The test results shown on the certification shall be the quality control tests representing the material supplied. The testing frequency for the 401.08 mixtures shall be in accordance with ITM 582.