



**SUPPLEMENTAL SPECIFICATIONS
FOR
EVALUATION OF LONGITUDINAL JOINT QUALITY FOR FLEXIBLE PAVING MIXTURES**

**Effective Date
June 16, 2015**

THE STANDARD SPECIFICATIONS, SERIES 2012, ARE AMENDED BY THE FOLLOWING MODIFICATIONS AND ADDITIONS. THESE ARE SUPPLEMENTAL SPECIFICATIONS AND THEY SHALL PREVAIL OVER THOSE PUBLISHED IN THE STANDARD SPECIFICATIONS.

12014.01 DESCRIPTION.

This work is evaluating in-place quality of centerline longitudinal joints on the surface wearing course for flexible paving and replaces Article 2303.03, D, 4, c, of the Standard Specifications.

12014.02 EVALUATION.

A. General Requirements.

For Class I compaction areas on the surface, longitudinal joint density lots independent from the mat will be established for mainline paving as specified in Article 12014.02, B for acceptance. Class I compaction is defined in Article 2303.03, C, 5, of the Standard Specifications. Mainline shall be considered through lanes within the traveled way including middle turn lanes. ~~These specifications only apply when the total length of eligible longitudinal joints is 12,500 feet (3750 m) or greater.~~ Sampling and testing will be for information only.

B. Sampling.

~~1. Divide the total length of surface longitudinal joints into 2500 foot (750 m) sublots. If the last subplot is less than 1000 feet (300 m), combine its length with the previous subplot. If the last subplot is 1000 feet (300 m) or more establish an additional subplot. The Engineer will randomly determine a sample location within each subplot. The joint length need not be contiguous and may include multiple joints throughout the project limits.~~

2 1. When surface paving abuts a previously placed surface course, forming a completed longitudinal joint eligible for evaluation, the Engineer will obtain and test samples according to Materials I.M. 320 and 321. Using random core locations determined for daily field voids lot (mat), the Engineer will randomly select three of these locations to be sampled for joint density. When the length of longitudinal joint is less than 3 mat sublots, the Engineer will select two subplot locations. When the length of longitudinal joint(s) is less than 2 mat sublots, joint cores will be waived.

3 2. When sampling for mat field voids is modified to include multiple days due to low production, sampling from the joint may also be modified by the Engineer.

4 3. Joints constructed with tandem pavers will be included, unless otherwise indicated in the

contract documents.

- 5 4.** For vertical joints, center joint cores on the visible seam between to the two adjacent lanes as shown in Appendix A of these specifications.
- 6 5.** For notched wedge joints, center joint cores 4 inches (100 mm) away from the visible seam in the direction of the wedge as shown in Appendix A of these specifications.
- 7 6.** Under the direction and witnessing of the Engineer, drill one 6 inch (150 mm) diameter core at each sample location as soon as possible, but no later than the day following the completion of the longitudinal joint.
- 8 7.** Do not compress, bend, or distort samples during cutting, handling, transporting, and storing. If samples are damaged, immediately obtain replacement samples, as directed by the Engineer, longitudinally from within 12 inches (300 mm) of the original sample location.
- 9 8.** Apply Article 2303.03, D, 5, c, of the Standard Specifications for post drilling operations.
- 10 9.** Report sample locations and test results on the daily plant report corresponding with the JMF used in production of the subplot(s).

C. Lot Size.

Lot size shall be the length of field voids lot where longitudinal joint(s) exist.

- ~~1. Except when the entire production of the bid item is placed in a single day, consider all sublots obtained on the first day as a separate test strip lot. If the test strip lot size is less than five, the Engineer will obtain additional samples such that the total test strip lot size is at least five.~~
- ~~2. Combine all subsequent sublots into lots of eight.~~
- ~~3. If the last lot has fewer than eight samples, combine them with the previous lot.~~

D. Excluded Areas.

1. The Engineer will not obtain samples from the following excluded areas to determine lot acceptance:
 - Joints where one side of the joint is formed by existing pavement not constructed under this contract
 - Joints where one side of the joint is not on the mainline surface.
 - Areas within 1 foot (300 mm) longitudinally of an obstruction during construction of the surface course (manholes, inlet grates, utilities, bridge structures, runout, etc.). Should a random sample location fall within 1 foot (300 mm) of such an area, the Engineer shall select an alternate nearby location away from the obstruction.
 - Small areas, such as intersections, gore areas or transitions, or anywhere the Engineer determines paving and phasing methods do not allow for consistent longitudinal joint construction.
2. Prior to paving, submit requests in writing to the Engineer for consideration of any areas to be excluded on this basis. The Engineer will make the final determination.

E. ~~Percent Within Limits~~ Joint Density.

~~Determine PWL for each lot using a lower specification limit (LSL) of 0% voids (100.0% of G_{mm}) and an upper specification limit of 10.0% voids (90% G_{mm}). PWL calculations can be found in Appendix A. Determine average joint density as a percent of average mat density per Appendix A. Mat cores and joint cores shall be collected on the same day of production for density~~

determination. Mat cores identified as outliers for field voids acceptance will not be used in average mat density calculation.

12014.03 METHOD OF MEASUREMENT AND BASIS OF PAYMENT.

Costs associated with providing joint pavement samples shall be included with the payment for Hot Mix Asphalt Pavement Samples.

APPENDIX A

A. **PWL Joint Density**

The following Excel function is used to Calculate PWL for sample size, N, as follows:

Equation 1

$$Avg\ Joint\ Density = 100 \times \frac{Avg\ Joint\ G_{mb}}{Avg\ Mat\ G_{mb}}$$

"=ROUND(100*(1-IF(MAX(0,1/2-1/2*QIU*(N^0.5/(N-1)))>1,1,MAX(0,ROUND(BETADIST(MAX(0,1/2-1/2*QIU*(N^0.5/(N-1))),N/2-1,N/2-1,0,5))),1)+ROUND(100*(1-IF(MAX(0,1/2-1/2*QIL*(N^0.5/(N-1)))>1,1,MAX(0,ROUND(BETADIST(MAX(0,1/2-1/2*QIL*(N^0.5/(N-1))),N/2-1,N/2-1,0,5))),1)-100"

Where

$N = Lot\ Size$

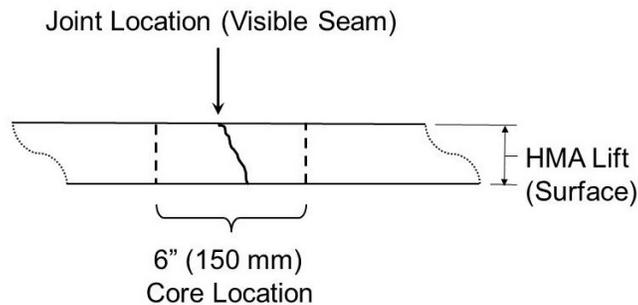
$$QIU = \frac{(Lot\ Avg\ G_{mb} - 0.90 \times Lot\ Avg\ G_{mm})}{Lot\ stdev\ G_{mb}}$$

$$QIL = \frac{(Lot\ Avg\ G_{mm} - Lot\ Avg\ G_{mb})}{Lot\ stdev\ G_{mb}}$$

Utilize the Iowa DOT HMA Chart program to determine lot payment.

B. **Coring Diagram**

(a) **Vertical Edge/Conventional (Butt) Joint**



(b) **Notched Wedge Joint**

