

State of Illinois  
Department of Transportation  
Bureau of Materials  
Springfield

POLICY MEMORANDUM

Revised: January 21, 2020

4-08.2

This Policy Memorandum supersedes number 4-08.1 dated July 9, 2013

TO: REGIONAL ENGINEERS AND HIGHWAY BUREAU CHIEFS

SUBJECT: APPROVAL OF HOT-MIX ASPHALT PLANTS AND EQUIPMENT

**1.0 SCOPE**

This policy governs the approval of **Hot-Mix Asphalt (HMA) Plants** for both prequalification and production purposes.

**2.0 REFERENCES**

- 2.1 *Standard Specifications for Road and Bridge Construction*, edition current at the time of the advertisement for bids, Illinois Department of Transportation
- 2.2 *Supplemental Specifications and Recurring Special Provisions*, edition current at the time of the advertisement for bids, Illinois Department of Transportation
- 2.3 Prequalification Rules (Manual), Illinois Department of Transportation
- 2.4 "The Fundamentals of the Operation and Maintenance of the Exhaust Gas System in a Hot Mix Asphalt Facility", IS-52, National Asphalt Pavement Association
- 2.5 "The Uniform Burner Rating Method for Aggregate Dryers", IS-76, National Asphalt Pavement Association
- 2.6 Illinois-Modified AASHTO T 11 (Washed Gradations)
- 2.7 Illinois-Modified AASHTO T 2 (Aggregate Sampling)
- 2.8 Illinois-Modified AASHTO T 27 (Sieve Analysis)
- 2.9 Illinois-Modified AASHTO T 30 (Sieve Analysis of Extracted Aggregate)
- 2.10 Illinois-Modified AASHTO T 164 (Extraction Method)
- 2.11 Illinois-Modified AASHTO T 308 (Ignition Oven Method)

### 3.0 DEFINITIONS

**BUREAU** - Central Bureau of Materials (CBM), Illinois Department of Transportation.

**CONTRACTOR** – The individual, firm, partnership, joint venture, or corporation contracting with the **Department** for performance of prescribed work.

**High ESAL and Low ESAL APPROVAL** – Successful completion of an evaluation process administered by the **Bureau** to determine the capability of an **HMA plant** to produce consistent mix within the **Department's** specifications. This approval is a prerequisite to production of High ESAL or Low ESAL mixtures for the **Department**. It may be conducted concurrent with the start of a contract. It is not a prerequisite for initial Prequalification. (Section 7 of this Policy describes the procedure in detail.)

**DEPARTMENT** – Illinois Department of Transportation (IDOT), including its **Districts** and Central Bureau offices.

**DISTRICT** - District office, Illinois Department of Transportation.

**ENGINEER** – Chief Engineer of the Department of Transportation of the State of Illinois, or authorized representative as defined in Section 101 of the Standard Specifications.

**EQUIPMENT FACTOR** - A Prequalification factor that is a measure of the annual dollar value of production capacity for selected equipment and plant facilities. For **HMA Plants**, the Work Category and **Production Rating** are used to determine the **Equipment Factor**.

**HOT-MIX ASPHALT (HMA) PLANT** - A plant intended to produce High ESAL or Low ESAL mixtures for the **Department**. For the purposes of Prequalification, an **HMA Plant** includes equipment specified in the **Department's** Prequalification Rules and the *Standard Specifications for Road and Bridge Construction*.

**POSITIVE DUST CONTROL EQUIPMENT (PDCE)** - **PDCE** shall consist of a system that is an integral part of the production process. The system shall accurately weigh all of the secondary dust collected in the baghouse, transfer the material to a storage silo, accurately weigh the required amount of fines to be returned from the storage silo, and transfer them back to the mixture. The positive dust control weighing devices shall have an accuracy of 0.5 percent of the actual weight of material. The system shall be capable of automatically monitoring the dust collection process and adjusting the amount of asphalt cement added to the mixture. The entire system shall be interlocked with the plant controls to respond to production rate changes, start up, and shut down situations. The weighing process shall be displayed and recorded in 0.1 units. The **PDCE** shall be capable of accurately wasting dust without having any adverse effects on the mixture.

**PREQUALIFICATION APPROVAL STATUS** - A rating process established by the **Department** which requires all prospective bidders to obtain a Certificate of Eligibility prior to being considered for issuance of bidding proposal forms and plans for any contract awarded by the **Department**, as well as contracts awarded by local agencies requiring approval of award by the **Department**.

**PREQUALIFICATION SECTION** – The section within the Bureau of Construction of the **Department** responsible for determining responsibility, financial ratings, **Work Ratings** and the issuance of bidding proposals.

**PRODUCTION RATING** - A nominal **Production Rating** for an **HMA Plant**. It is calculated by the **Bureau** and is one factor used to determine the Prequalification **Equipment Factor**. It is also the maximum field production rate approved for **Department** work. (Section 5 of this Policy describes this rating in detail.)

**WORK RATING** - A dollar value of work of a particular category of construction that an applicant can perform with his/her organization and equipment in one construction season.

#### 4.0 GENERAL

##### 4.1 Prequalification.

4.1.1 Prior to Prequalification, the **Contractor** shall complete a plant survey on forms furnished by the **Department**. The **Contractor** shall submit the forms to the **District** in which the plant is located or the nearest **District** if the plant is located out-of-state. The **District** shall forward the submittal to the **Bureau**.

4.1.2 During the Prequalification process, each **HMA Plant** will be evaluated by the **Bureau**. The **Bureau** will determine the **Production Rating** used in determining the **Contractor's Work Rating**.

4.1.3 The **Bureau** will evaluate the submittal and conduct investigations as necessary.

4.1.4 The **Bureau** will provide the **Production Rating** to the **Prequalification Section**. The **Production Rating** will be used by the **Prequalification Section** to establish a **Work Rating** for the **Contractor** according to the Prequalification Rules.

4.1.5 An **HMA Plant** will be evaluated for a single owner only. The prequalification rating for a leased plant will apply to a single **Contractor** only.

4.2 **Plant Approval for High ESAL and Low ESAL Mixtures.** **HMA Plants** intending to produce High ESAL and/or Low ESAL for the **Department** shall be evaluated by the **Department** for **High ESAL and Low ESAL Approval** as specified herein.

4.3 **Re-approval.** All plants will be re-surveyed for consideration for continued approval every 5 years. The **Department** will notify the **Contractor** to resubmit the survey forms.

4.4 **Plant Modifications.** The **Bureau** shall be notified of all plant modifications for previously approved HMA plants. The **Bureau** together with the **District** will evaluate the modification and the **Bureau** will determine whether the plant will need to repeat the High ESAL and Low ESAL approval process.

4.5 **Revocation of Plant Approval.** If the **Department** determines the **HMA Plant** is unable to consistently produce HMA within the specification tolerances as defined in the contract, the **Prequalification Approval Status** may be revoked by the **Bureau** which would require the **Contractor** to repeat the plant approval process. The **Bureau** will notify the **Prequalification Section** of any and all plant approval revocations.

- 4.6 **Reinstatement Process.** If the **HMA Plant** approval is revoked, the **Contractor** shall provide the **Bureau** a written plan of corrective action. Once the **Bureau** reviews and finds the plan acceptable, the plant approval process may begin. If the **Bureau** requires the installation of the **Positive Dust Control Equipment (PDCE)**, the installation shall comply with the definition above. If **PDCE** or any other plant modifications are required, the equipment shall be installed and/or modifications made prior to the production of any HMA for the **Department**. With approval of the **Bureau**, the installation may be performed prior to the start of the next construction season. The **Bureau** may stipulate operational conditions or restrictions on the plant until all required modifications are completed.

## 5.0 PRODUCTION RATES

All **HMA Plants** will be evaluated by the **Bureau** and assigned a nominal **Production Rating**. **Production Ratings** will be based on this policy and the industry standards, as applicable, in the referenced NAPA publications (NAPA Procedure). **Production Ratings** will be given in tons (metric tons) of HMA mixture per hour.

- 5.1 **Assumed Criteria.** Ratings will be based on the conventions described in the referenced NAPA publications. Variables included in the NAPA algorithm are assigned the following values:

- 5.1.1 Assumed gas flow velocity of 1,000 feet (300 meters) per minute for all dryers.
- 5.1.2 Radius is calculated at the exhaust end chamber of the dryer.
- 5.1.3 Assume 147 ft<sup>3</sup> (4.2 m<sup>3</sup>) per minute of air required per ton (metric ton) of aggregate.
- 5.1.4 HMA mixture is assumed to contain 5% asphalt binder.
- 5.1.5 Combined aggregate contains 5% moisture.

### 5.2 Exceptions to NAPA Procedure.

- 5.2.1 The **Contractor** may request a temporary increase in **Production Rating** if the incoming aggregate contains less than 5% moisture. The **Contractor** shall (1) provide moisture analysis of the aggregate stockpiles, (2) demonstrate to the **Engineer** that increased production does not affect the quality of the HMA mix, and (3) provide testing requested by the **Engineer** during the analysis and production.
- 5.2.2 The **Contractor** may request a permanent modification to the **Production Rating** if the design of the plant is not consistent with the schematics and standards contained in the NAPA Procedure. The **Contractor** shall provide the Manufacturer's certification and all calculations supporting the exception. For plants modified by the **Contractor**, the **Contractor** shall provide engineering justification for any request.
- 5.2.3 For all exceptions, the responsibility for supporting data rests with the **Contractor**. The **Department** may reject requests that, in the sole opinion of the **Engineer**, are not adequately supported.

5.3 **Other Limiting Factors.** The NAPA Procedure may not be applicable in all cases. The plant may include equipment that restricts production capacity below that calculated by the NAPA Procedure. In these instances, the **Bureau** will calculate the **Production Rating** based on these restrictions. The **Department** will provide the **Contractor** with written notification of any such determination, along with the calculations used to determine the **Production Rating**. Examples follow:

5.3.1 Sand Screens – Criteria.

5.3.1.1 Maximum production rate =  $R = 1.5$  tons per hour per ft<sup>2</sup> of 1/8-inch screen (15 metric tons per hour per m<sup>2</sup> of 3.2 mm screen).

5.3.1.2 Sand is 1/3 of aggregate blend.

5.3.1.3 Total aggregate rate = sand screen area x R x 3

5.3.2 Pugmill – Criteria.

5.3.2.1 Capacity based on charts supplied by manufacturer, or

5.3.2.2 Alternate formula: Capacity = Net volume below centerline of shaft x 1.15 x 100 lbs/ft<sup>3</sup> (1,600 kg/m<sup>3</sup>).

5.3.2.3 Conversion factor from lbs/batch to tons per hour [TPH] = 0.0325 (kg/batch to metric tons per hour = 0.065). This equation assumes 65 batches per hour.

5.3.3 Aggregate Scale/Hopper Capacities.

5.3.4 Asphalt Binder Scale/Bucket Capacities.

5.3.5 The **Contractor** may request a recalculation of the **Production Rating** when plant modifications change the conditions on which the Limiting Factor was calculated.

## 6.0 HIGH ESAL AND LOW ESAL APPROVAL

The following will be used to evaluate the consistency of mixtures produced by **HMA Plants** seeking approval to produce High ESAL and Low ESAL mixtures. This includes the sampling, testing, and acceptance requirements for an accelerated gradation and asphalt binder content testing program. It allows for rapid and early determination of reliable target values for gradation and asphalt content.

6.1 The test shall be performed on a High ESAL IL-19.0 binder mix prior to use of the plant for binder production. It may be conducted concurrent with the start of a contract. It may be carried over into an additional contract only with the approval of the **Bureau**.

6.2 The **Contractor** shall proportion the binder mixture to meet the job mix formula (JMF). The **Engineer** may consent to the use of a High ESAL surface mixture for the test if binder is not included in the initial project. If the evaluation is performed on a surface mixture, a restriction of “Surface Mixture Only” approval will apply. An additional evaluation on a binder mixture will be required in order for full **High ESAL and Low ESAL Approval** to be granted.

- 6.3 The **Bureau** will designate the plant as either Type 1 or Type 2 prior to the start of the **High ESAL and Low ESAL Approval** process.
- 6.3.1 Type 1 Plants are defined as those which have a prequalification rating of 250 tons (180 metric tons) per hour or greater of mixture.
- 6.3.2 Type 2 Plants are defined as those which have a prequalification rating of less than 250 tons (180 metric tons) per hour of mixture.
- 6.4 **Procedure.** Test production specifications are as follows:
- 6.4.1 Lot Sizes.
- 6.4.1.1 Plant Type 1. The quantity shall be 5,000 tons (4,500 metric tons) of approved JMF mixture. The evaluation will include 5 lots of approximately 1,000 tons (900 metric tons) each. Each of the 5 lots will be further divided into 5 sublots (for a total of 25 tests).
- 6.4.1.2 Plant Type 2. The quantity shall be 3,000 tons (4,500 metric tons) of approved JMF mixture. The evaluation will include 5 lots of approximately 600 tons (545 metric tons) each. Each of the 5 lots will be further divided into 5 sublots (for a total of 25 tests).
- 6.4.2 The procedure will be run over a period of not less than 3 production days.
- 6.4.3 No more than 2 lots in any day may be included in the evaluation (to allow for lab testing between days).
- 6.4.4 One lot may be produced before the start of this evaluation process to determine preliminary target values. With approval of the **Engineer**, this lot may be used to establish preliminary target values and rolling patterns per the specified start-up procedures.
- 6.4.5 The **Contractor** will not be required to cease production between lots. Mixture produced between lots will be evaluated according to the contract specifications.
- 6.5 **Sampling.** Sampling shall follow the referenced methods:
- 6.5.1 HMA Mixture. The **Contractor** shall take random samples, with back up splits reserved for the **Department's** use, from each subplot (25 total) from randomly selected trucks. Approximate sample size shall be  $\pm 2,000$  g for binder mixtures and  $\pm 1,000$  g for surface mixtures.
- 6.6 **Testing.**
- 6.6.1 Following the referenced test methods, the **Contractor** shall perform gradation and asphalt binder content analysis for each subplot. Testing will be performed on each hot-mix asphalt sample. Asphalt binder content (AC) control limits and limits on control sieves will be as follows:

## Specification Control Limits

PARAMETER	CONTROL LIMIT (INDIVIDUAL TEST)	CONTROL LIMIT (MOVING AVERAGE OF 4)
% Passing		
12.5 mm (1/2 inch)	± 6%	± 4%
4.75 mm (No. 4)	± 5%	± 4%
2.36 mm ( No. 8)	± 5%	± 3%
600 µm (No. 30)	± 4%	± 2.5%
75 µm (No. 200)	± 1.5%	± 1.0%
Asphalt Binder Content	± 0.3%	± 0.2%

6.6.2 Results for each test will be evaluated for conformance with the specified control limits. Note: "Moving average" is the average of the results of the current test and the previous 3 individual tests (4 total).

The **Department** will test a minimum of one sample per lot for verification purposes.

6.7 **Adjustments.** On the basis of visual analysis and test results, the **Contractor** may make plant adjustments to improve consistency of the mix. The **Engineer** will cooperate and assist in this effort when requested.

6.8 **Acceptance.** The **Bureau** may approve the plant for normal production when the evaluation shows that the plant can produce mixture that consistently complies with the project specifications. This will generally be defined as when the moving average of each test (all sieves and asphalt binder content) for a single lot remains within the specified moving average control limits. Each successive lot should also show improving and consistent results. However, the individual test results will also be evaluated for consistency. The final two lots will have no individual test results outside the individual control limits.

6.9 **Non-compliance.**

6.9.1 In the case of non-compliance, the **Bureau** may authorize the production of one or more additional lots for testing. Before any such additional production, the **Bureau** will require the **Contractor** to submit a plan of corrective action for approval. The **Contractor** shall demonstrate contract compliance of all material produced.

6.9.2 The **Contractor** shall be responsible for performing all additional testing beyond the 25 tests included in this procedure, and providing back up samples for use by the **Department**. No additional HMA mixture shall be produced for **Department** contracts until all testing is completed.

- 6.9.3 The **Engineer** may direct or carry out any other corrective action available through the Standard Specifications or other contract documents.
- 6.9.4 Repeating Plant Approval Process. A **Contractor** failing to produce consistent mixture as defined herein may only continue producing mix if the plant approval process is repeated. In order to repeat the approval process the **Contractor** shall provide a written plan of corrective action to the **Bureau**. Permission to repeat the plant approval process will only be granted if the **Bureau** finds the plan of corrective action to be acceptable
- 6.9.5 Plant Deficiencies. If the **Bureau** determines that the plant, as configured, is not capable of meeting the conditions for plant approval, the installation of **Positive Dust Control Equipment** or other modifications may be required. Approval and scheduling shall proceed per section 4.6 above.
- 6.10 **Compensation.** The **Contractor** shall be responsible for all costs, including additional laboratory testing due to non-compliance. These costs will be considered as included in the contract unit price for the HMA item involved.

## 7.0 CLOSING NOTICE

Archived versions of this policy memorandum may be examined by contacting the **Bureau**.

The current Bureau Chief of Materials has approved this policy memorandum. Signed documents are on file with the **Bureau**.