
HOT MIX ASPHALT PAVEMENT**PART 1 - GENERAL****1.01 SECTION INCLUDES**

- A. Hot Mix Asphalt (HMA) Pavement
- B. Base Widening

1.02 DESCRIPTION OF WORK

- A. Includes the requirements for the following: HMA base widening and construction of HMA surface, intermediate, and base courses placed upon a prepared subgrade, subbase, base, or pavement.
- B. Conform to Iowa DOT Section 2303 for construction of HMA pavement and base widening, except as modified herein.
 - 1. Provide Quality Management – Asphalt (QM-A) for bid items with HMA quantities exceeding 1,000 tons. Provide quality control for bid items with HMA quantities of 1,000 tons or less according to Section 7020, 3.05.
 - 2. Refer to Table 1 for gyratory mixture design criteria. Note – this table was copied from the SUDAS Design Standards Section 5D-1.

1.03 SUBMITTALS

- A. HMA Mix Design: Prepare and submit the Job Mix Formula (JMF) to the Engineer for approval prior to HMA production.
- B. Quality Control Test Results
- C. Pavement Smoothness Results: Submit all testing and certifications according to Section 7020, 3.04.
- D. Material Certifications: Upon request, the Contractor will provide material certifications to the Engineer.
- E. HMA Certification: Submit HMA certifications for all bid items with HMA quantities of 1,000 tons or less, according to Section 7020, 3.05.
- F. Weight receipts should include mix size and type and/or correlate to the bid item.

1.04 SUBSTITUTIONS

- A. Use only materials conforming to these specifications unless permitted otherwise by Engineer.
- B. Obtain Engineer approval for all substitutions prior to use.

Table 1: SUDAS HMA Mixture Design Criteria
(derived from Iowa DOT Materials I.M. 510)

Mix Designation	Gyratory Density			VFA	Film Thickness	Filler: Binder	Friction ²			Aggregate ³					
	$N_{ini} - N_{des} - N_{max}$	Initial % G_{mm} (max)	Design % G_{mm} (target)				Maximum % G_{mm} (max)	Type 4 (min)	Type 3 (min)	Type 2 (min)	Quality Type	Crush (min)	FAA (min)	Sand Equiv. (min)	
HMA 100K S-I	7 - 68 - 104	92.5 - 97.0 - 98.5	75-85	8.0-13.0	0.6-1.4						A ¹	60 ¹	---	40	
HMA 100K B											B	45	---		
HMA 300K S-I	7 - 68 - 104	92.0 - 96.5 - 98.0	70-80	8.0-13.0	0.6-1.4						A ¹	60 ¹	---	40	
HMA 300K B											B	45	---		
HMA 1M S L-4	7 - 76 - 117	90.5 - 96.0 - 98.0	65-78	8.0-15.0	0.6-1.4	50					A	75 ¹	40	40	
HMA 1M S											A ¹	60 ¹	---		
HMA 1M I											B	45	---		
HMA 1M B	7 - 68 - 104	92.0 - 96.5 - 98.0	70-80	8.0-15.0	0.6-1.4	50					B	45	---		
HMA 3M S L-4															
HMA 3M S L-3	7 - 86 - 134	89.5 - 96.0 - 98.0	65-78	8.0-15.0	0.6-1.4	50	80	45	(30)		A	75	40	40	
HMA 3M S															60
HMA 3M I															45
HMA 3M B	7 - 76 - 117	90.5 - 96.5 - 98.0	65-78								B	45			
HMA 10M S L-3	8 - 96 - 152	89.0 - 96.0 - 98.0	65-78	8.0-15.0	0.6-1.4	80	45	(30)			A	75	43	45	
HMA 10M I															B
HMA 10M B	7 - 86 - 134	89.5 - 96.0 - 98.0	65-78								B	75	40		

For mix design levels exceeding 10M ESALs, see Iowa DOT I.M. 510.

¹ Requirements differing from I.M. 510; for surface and intermediate mixes, aggregate quality improved from B to A and percent crushed aggregate increased by 15%.

² See Iowa DOT Standard Specification 2303.02

³ Flat & Elongated 10% maximum at a 5:1 ratio

1.05 DELIVERY, STORAGE, HANDLING, AND SALVAGING

- A. Aggregate Storage:** Prevent contamination and intermingling per Iowa DOT Section 2303.
- B. Salvaged or Reclaimed Materials:** Use Recycled Asphalt Pavement (RAP) per Iowa DOT Section 2303.
- C. Disposal:** Dispose of excess HMA according to applicable local, state, and federal regulations in a manner that does not cause damage or harm to adjacent properties or public facilities.

1.06 SCHEDULING AND CONFLICTS

Follow the General Provisions (Requirements) and Covenants, as well as the following:

Complete elements of the work that can affect line and grade in advance of other open cut construction unless noted on plans.

1.07 RESTRICTIONS ON OPERATIONS**A. Safety Fence for Pavement:**

1. At the end of each day's construction and at all side streets, the Contractor shall erect and maintain such barriers and fencing as are necessary to protect the pavement from damage.
2. Intermediate safety fences may be required for the purpose of opening the pavement for access to a side road, side street, or entrance.

B. Repair of Pavement:

1. The Contractor shall protect the new pavement and its appurtenances from traffic, both public and that caused by the Contractor's operation. This includes the erection and maintenance of warning signs, lights, barricades, watchmen to direct traffic, and pavement bridges or crossovers.
2. Any part of the pavement damaged by traffic or other causes occurring prior to final acceptance of the pavement shall be repaired or replaced at the Contractor's expense, except when the cause of the damage is due to circumstances beyond the Contractor's control.
3. The Contractor shall not operate equipment with metal tracks, metal bucket blades, or metal motor patrol blades directly on new paving. The Contractor shall not unload soil or granular materials, including base rock for storage and future reloading directly onto new paving.

C. Utilities Protection: The Contractor shall not start work until all utilities are located.

1. **Repairs:** When the Contractor disrupts or breaks known utilities of the Jurisdiction or privately owned utilities, such utilities shall be repaired at the Contractor's expense. Unnecessary delays in making repairs will cause the Engineer to have such repairs made and the cost thereof deducted from the monies due to the Contractor.
2. **Drains, Pipe, Tiles:** Existing subsurface groundwater and stormwater drains, pipe, and tiles, which are disrupted or broken by reason of the construction, shall be connected to the storm sewer or another adequate outlet if storm sewer is not available. Should no outlet be readily available, the Engineer will determine a suitable solution.

1.07 RESTRICTIONS ON OPERATIONS (Continued)

- 3. Water Stop Boxes and Services:** The adjustment of stems and castings and/or repair of those broken or damaged by the Contractor shall be at the Contractor's expense. Relocation of stop boxes and services will be by bid items.

1.08 MEASUREMENT FOR PAYMENT

- A. HMA Pavement:** Measurement and payment will be according to Iowa DOT Section 2303, except as modified below:
 - 1. Asphalt Binder:** Incidental to HMA mixture.
 - 2. Pavement Smoothness:**
 - a. Local Streets and Minor Collectors: The costs of correcting the smoothness and associated traffic control are incidental to the cost of pavement. No pavement smoothness incentives will be provided.
 - b. Non-Primary Arterials and Major Collectors: The cost of correcting the smoothness and associated traffic control is incidental to the cost of pavement. Price reductions imposed for noncompliance with the specifications will follow schedule B of Iowa DOT Section 2316. Pavement smoothness incentives will not be provided unless specified in the contract documents.
 - c. Primary Roads: The cost of correcting the smoothness and associated traffic control is incidental to the cost of pavement. Price reductions imposed for noncompliance with the specifications will follow schedule A of Iowa DOT Section 2316. Pavement smoothness incentives will be provided unless otherwise specified in the contract documents.
- B. Base Widening:**
 1. Base widening will be paid as required for HMA pavement.
 2. See Section 2010 for excavation, subgrade preparation, and subbase construction.
- C. Safety Fence for Pavement:** Incidental to HMA pavement and base widening.
- D. Quality Control:** Incidental to HMA pavement and base widening.
- E. Pavement Removal:** Pavement removal will be measured and paid by square yards removed. Unit price includes, but is not limited to, removal and disposal of pavement.

PART 2 - PRODUCTS

2.01 HMA MATERIALS

Per Iowa DOT Section 2303, with the following exception:

Follow the procedure outlined in Iowa DOT Materials I.M. 510 for HMA mixture designs, except replace Table 1, HMA Mixture Design Criteria with the SUDAS HMA Mixture Design Criteria (Table 1) in Section 7020, 1.02.

PART 3 - EXECUTION**3.01 HMA PAVEMENT**

Construct according to Iowa DOT Section 2303 and the following:

A. Tack Coats: Apply tack coats according to Iowa DOT Section 2303 and the following:

1. If the emulsion is diluted, it shall be done by the manufacturer and certified. The Contractor will provide the Engineer with the new application rate required to achieve the specified undiluted application rate.
2. On overlay projects, apply an additional tack coat prior to each lift in the following areas, if required by the Engineer:
 - a. Within 2 feet of the face of curbs, headwalls of culverts, and curbs or handrails of bridges.
 - b. All runouts and fillets, including depressed areas around drainage inlets

B. Fillets and Runouts: Rake out coarse aggregate prior to shaping and compaction of fillets and runouts.**3.02 BASE WIDENING****A. Conditions:**

1. **Resurfacing over Concrete Base Widening:** When the existing pavement is HMA material over concrete pavement, saw or mill the old asphalt to the full depth of the proposed resurfacing or to depth of sound material producing a reasonable vertical line a distance not to exceed 6 inches in from the edge of the old concrete.
2. **HMA Base Widening:** Apply a tack coat to the vertical edge of the old pavement at a rate of 0.10 to 0.15 gallon per square yard according to Iowa DOT Section 2303. No waiting period will be required before placing the widening.

B. Preparation of Subgrade:

1. Cut the width of the trench for the widening at least 6 inches greater than the base width of the widening shown in the contract documents. If widening roadways with open ditches, provide ditches or drains from the widening trench at frequent intervals to allow drainage to side ditches.
2. Treat subgrade or subbase, if specified, according to Section 2010.
3. Bring the subgrade to an elevation and cross-section such that, after being compacted to a minimum of 95% of maximum Standard Proctor Density, the surface will be at the required elevation.
4. Remove material, other than sand, that will not readily compact. Replace with material that will readily compact and roll that portion of the subgrade again. Use an appropriate roller meeting the requirements of Iowa DOT Article 2001.05.
5. While constructing subgrade, maintain the soil in a condition sufficiently moist to facilitate compaction.
6. Check the finished subgrade with a template supported on the surface of the adjacent pavement. Clean the edge of the old pavement.

3.02 BASE WIDENING (Continued)**C. Construction:**

1. Place the HMA mixture in the number of lifts required to produce the required thickness. The compacted thickness of the top lift shall not exceed 2 inches.
2. The maximum compacted thickness of lower lifts may exceed 3 inches if the thicker lifts demonstrate satisfactory compaction.
3. Do not place HMA on the surface of the existing pavement, and immediately remove any spilled base material.
4. Ensure that, after compaction, the constructed width conforms to the required width.
5. Promptly and thoroughly compact each lift to the density specified in Iowa DOT Section 2303 for Class IC compaction.
6. Place succeeding lifts of HMA material as soon as the previous lift has been compacted.
7. Obtain the lab density for that day's HMA paving from an Iowa DOT-approved testing lab and based on the JMF design criteria.
8. Take density samples from the compacted material and test according to Iowa DOT Section 2303. Randomly locate samples transversely in the area 6 inches from the base being widened to 6 inches from the outside edge of a given pass of the placing equipment. Notify the Jurisdiction the day prior to coring and testing to give the Jurisdiction the opportunity to witness coring and testing.
9. When the contract for base widening does not include resurfacing, construct the final surface of widening flush with, or no more than 1/8 inch below, the surface of the old pavement.
10. Do not open the widening to traffic until it has cooled sufficiently to support the traffic without displacement or movement.

3.03 DEFECTS OR DEFICIENCIES**A. Repairs Required:**

1. Remove and replace, or repair, at no cost to the Jurisdiction, new HMA pavement containing cracks, deformities, deficiencies, or other defects related to the Contractor's material or workmanship. Remedy shall be determined by the Engineer. In lieu of the above negotiations, extended warranty may be approved by the Engineer.
2. Areas to be replaced will be determined by the Engineer. Complete all repairs according to Section 7040.
3. Correct pavement smoothness as directed by the Engineer. The Engineer may use Iowa DOT Section 2316 for guidance.

B. Density and Thickness Deficiencies: See Iowa DOT Section 2303.

3.04 PAVEMENT SMOOTHNESS

Meet the following requirements:

- A. Local Streets & Minor Collectors:** Check finished pavements on local and minor collectors with a 10 foot straight edge placed parallel to the centerline. Correct areas showing high spots of more than 1/4 of an inch in 10 feet per Section 7020, 3.03.
- B. Non-Primary Arterials and Major Collector Projects:** Measure pavement smoothness on non-primary arterial and major collectors by a profilograph and meet schedule B and related requirements of Iowa DOT Section 2316.
- C. Primary Road Projects:** Measure pavement smoothness by a profilograph and meet schedule A and related requirements of Iowa DOT Section 2316.

3.05 QUALITY CONTROL

- A. Provide QM-A per Iowa DOT Section 2303 for bid items with HMA quantities exceeding 1,000 tons. On locally let projects, all testing normally conducted by the Iowa DOT will be performed by the Jurisdiction or an independent testing laboratory hired by the Jurisdiction.
- B. Provide quality control for bid items with HMA quantities of 1,000 tons or less as follows:
 - 1. Mix Design: Submit for approval.
 - 2. Plant Production: Use a current calibration of the HMA production plant for the JMF no more than 12 months old. Maintain an asphalt binder log to track when the binder was delivered. Identify the JMF on the HMA delivery ticket. Use certified asphalt binder and approved aggregate sources meeting the JMF. Monitor the quality control test results and make adjustments to keep the mixture near the target JMF values.
 - 3. Construction: Take density measurements of the compacted mixture, except when Class II compaction is specified. Use the field quality control laboratory compaction for field density control as specified in Iowa DOT Section 2303. The Engineer may accept the density of the compacted layer based on cores or density gauge. The Engineer may waive density measurement provided the compaction has been thorough and effective. Take density measurements of the compacted mixture no later than the next working day following placement and compaction. For small quantities, a lot is the entire quantity of each HMA mixture bid item. The quality index for density will not apply to small quantities.
 - 4. Sampling and Testing: Material sampling and testing is for production quality control only. Acceptance of mixture is based on Contractor certification. Perform a minimum of one aggregate cold-feed and one loose HMA test per lot. Sampling and testing of loose HMA is only required for mechanically placed mixture. All sampling and testing procedures will follow the Iowa DOT Specifications and Materials I.M.s using certified technicians and qualified testing equipment. The Engineer may approve alternative sampling procedures. Take the sample between the first 100 to 200 tons of production. No split samples for agency correlation testing are required. Asphalt binder will be accepted based on the asphalt supplier's shipment certification. No binder sampling or testing is required. No material sampling or testing is required for daily HMA production of less than 100 tons on any project.

3.05 QUALITY CONTROL (Continued)

5. Certification: Provide a certification for the production of any mixture in which the requirements in this section for small quantities or are applied. Place the test results and certification statement on the Iowa DOT Daily HMA Plant Report (Form 800241). The Daily HMA Plant Report for certified HMA may be submitted at the end of the project for all certified HMA quantities, or submitted at intervals for portions of the certified quantity. Use the following certification statement:

“The certified HMA was produced in compliance with the provisions of Section 7020, 3.05 of the SUDAS Specifications. The certified HMA was produced with certified asphalt binder and approved aggregates as specified in the approved mix design.”

3.06 REMOVAL OF PAVEMENT

Comply with Iowa DOT Section 2510.

END OF SECTION