

HOT MIX ASPHALT (HMA) PAVEMENT

PART 1-GENERAL

1.1 Description of Work

All HMA construction shall be in accordance with the Iowa Department of Transportation (IDOT) Standard Specifications for Highway and Bridge Construction except as modified herein.

1.2 Submittals

- A. Prepare and submit the Job Mix Formula (JMF) test reports for each mixture to the Engineer for approval prior to HMA production.
- B. Submit samples and Quality Control test results as set forth in the Contract Documents.
- C. Upon request, the Contractor shall provide material certifications to the Engineer.
- D. Submit verification of Iowa D.O.T. certification for HMA supplier.
- E. Weight receipts shall include mix size and type.

1.3 Substitutions

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

1.4 Scheduling and Conflicts

- A. Construction Sequence:
 - 1. Attend a preconstruction meeting as required by the Engineer.
 - 2. Submit a plan for construction sequence and schedule prior to commencing construction.
- B. Conform to Local, State, and Federal Requirements.

1.5 Delivery, Storage, Handling, and Salvaging

- A. Aggregate Storage: Prevent contamination and intermingling per Iowa DOT Standard Specifications Section 2303.
- B. Salvaged or Reclaimed Materials: If approved by the Jurisdiction, use Recycled Asphalt Pavement (RAP) per Iowa DOT Standard Specifications Section 2303. Classification of RAP will be as certified by the Iowa DOT.
- C. Disposal: Excess HMA shall be disposed of in a manner that does not cause damage or harm to adjacent properties or public facilities. Disposal shall be in accordance with applicable local, state and federal regulations.

1.6 Special Requirements

Before HMA can be placed, the road surface temperature must meet the requirements as stated in Iowa DOT Standard Specifications Section 2303. HMA shall not be placed on a wet surface.

1.7 Restrictions on Operations

- A. The Contractor shall not operate equipment with metal tracks, metal bucket blades, or metal motor patrol blades directly on new pavement or pavement not scheduled for repair.
- B. The Contractor shall not unload soil or granular materials for storage onto new pavement. Any part of the pavement or its appurtenances damaged by the Contractor's negligence, traffic or other causes prior to final acceptance shall be repaired or replaced at the Contractor's expense, except when the cause of the damage is due to circumstances which are beyond the Contractor's control.

1.8 Measurement for Payment

- A. HMA Pavement: Measurement and payment shall be according to the Contract Documents.
 1. Asphalt Binder- Payment for all binder shall be considered incidental to the HMA mixture and shall not be paid for separately.
 2. Tack Coat- Payment for tack coat and sand shall be considered incidental to the HMA mixture and shall not be paid for separately.
 3. Pavement Smoothness- The costs of correcting drainage problems, pavement smoothness and associated traffic control shall be considered incidental to the cost of HMA mixture. No pavement smoothness incentives will be provided.
- B. Quality Control: Incidental to HMA mixture.

PART 2-PRODUCTS

2.1 HMA Materials

- A. Materials shall comply with Iowa DOT Standard Specification Section 2303 and current Supplemental Specifications for Hot Mix Asphalt (HMA).
- B. The Engineer may approve the substitution of any mixture which meets requirements for a higher mixture than specified in the contract documents at no additional cost to the City.

2.2 Bituminous Materials

- A. Performance Grade Asphalt in accordance with the Iowa D.O.T. Standard Specifications Section 2303 and current Supplemental Specifications shall be used for this program. Properties for all binders shall conform to AASHTO MP1.
- B. Tack Coat:
 1. A tack coat shall be applied prior to each lift in accordance with Iowa D.O.T. Standard Specifications Section 2303. The tack coat shall be spread at an undiluted rate of 0.05 to 0.07 gallons per square yard. Tack coat shall be emulsified asphalt grade SS-1, SS-1H, CSS-1, CSS-1H or approved equal. ***If the emulsion is diluted, it shall be done by the manufacturer.*** Each shipment shall include a certified statement specifying the rate of dilution. The Contractor shall provide the Engineer with the new application rate required to achieve the specified undiluted application rate. RC-70 and MC-70 may also be used after October 1, at the Contractor's option.

2. The vertical face of exposed, longitudinal joints shall be tacked as a separate operation, before the adjoining lift is placed, at an undiluted rate of 0.10 to 0.15 gallons per square yard.
3. An additional tack coat shall be placed prior to each lift in the following areas:
 - Two feet (2') from the face of curb and curbs or handrails of bridges.
 - All runouts (feathering) and fillets, including depressed areas around drainage inlets.

If tacked surface remains at the end of the day, the Contractor shall apply sand to the area to prevent the tack coat from becoming a nuisance to motorists, bicyclists and pedestrians.

2.3 Aggregate for HMA

Aggregate for HMA shall meet the requirements of Iowa D.O.T. Standard Specifications Section 4126 with the following requirements.

1. Class 1 aggregate with a minimum percent crushed stone particles as noted in Table 1 above.
2. Of material delivered to the drier, not less than 25 percent (25%) of portion passing No. 4 sieve shall be particles from natural sand.

2.4 Equipment

All equipment used in the construction of HMA pavement shall comply with the Iowa D.O.T. Standard Specification Section 2001 and current Supplemental Specifications.

PART 3-CONSTRUCTION

3.1 General

Construction of HMA pavement shall conform to Iowa D.O.T. Specifications Section 2303 with the following considerations:

- A. The Engineer or his representative shall have the authority to shut down paving operations if weather conditions do not allow for proper placement of HMA pavement.
- B. No HMA paving of any type shall commence until traffic control is in place in accordance with an approved Traffic Control Plan.
- C. Place the HMA mixture in the number of lifts required to produce the specified thickness. Do not allow the compacted thickness of the top lift to exceed two inches (2”).
- D. HMA placement shall begin along the outer lanes on a crowned section or the high side of a section with a one-direction slope.
- E. No HMA pavement shall be placed unless the existing road and air temperature requirements are satisfied.
- F. The Contractor shall adjust fixtures to conform to the proposed finished surface within the area to be paved. The outside of the fixture shall be cleaned to base of pavement before commencing the paving operation. The fixture shall be boxed out if required by the Contract Documents.
- G. All utility fixtures in the paved area shall be adjusted to conform to the final adjacent finished surface.

- H. Traffic shall be permitted on the newly finished surface only when sufficient time lapses to prevent damage to the surface from vehicles on it, as determined by the Engineer or his representative. Any damaged HMA pavement shall be repaired or replaced by the Contractor, as determined by the Engineer at the Contractor's expense.
- I. The length of the lane to be laid in one (1) pass of the paving machine must be short enough to enable the mixture to retain sufficient heat to bind properly to the abutting lane on each side.
- J. On four (4) lane roads, HMA shall be placed in four (4) strips having a minimum width of eleven feet (11'), where applicable.
- K. Succeeding layers of leveling, strengthening, base, intermediate, or surface courses shall not be placed until the previously placed layer is completed for the full width of pavement.
- L. Additional compensation will not be paid for areas which require manual placement of the asphalt. The unit price per ton shall include both mainline machine pours and hand poured areas.

3.2 Compaction

- A. Each layer shall be promptly and thoroughly compacted per Iowa D.O.T. Standard Specifications. Mechanical tampers shall be used for areas inaccessible to the rollers. The overall rolling procedure and compactive effort shall produce a surface free of ridges, marks, or bumps and shall be subject to approval of the Engineer. For all rollers, the initial contact with the hot mixture shall be made by the vibratory steel roller. This roller may be placed in the non-vibratory mode for some streets due to old infrastructure under the pavement. The use of the vibratory roller will be at the discretion of the Engineer or Chief Construction Inspector. Each reverse trip shall lap all but 4 to 6 inches of the previous track. When reversing direction, the initial roller shall stop at an angle with the longitudinal direction. Start rolling as soon as the material will carry the roller without undue displacement beginning at the low side of the crown and working toward the high side. Roller shall be operated continuously at a speed not to exceed three (3) miles per hour. A sufficient number of rollers shall be furnished on the work to adequately handle the output of the plant.
- B. Following the initial rolling with a vibratory steel roller, the layer shall be given an intermediate rolling with a pneumatic tired roller (skirted to retain heat), and before the temperature falls below 225 degrees F. The intermediate roller shall cover the entire area not less than six (6) times.
- C. Final Rolling: Final rolling is defined as the last roller to remove surface marks or irregularities. A minimum five foot (5') diameter steel drum, finish roller shall be used to smooth out all marks in the surface. A vibratory roller in the non-vibratory mode may be used as a finish roller. Do not use pneumatic-tired or vibratory rollers in the vibratory mode as the finish roller.
- D. Roll longitudinal joints smooth and even at the time of construction. Except on longitudinal joints and super-elevated curves, roll in a longitudinal direction starting at the edge and working toward the center. The rolling at each pass shall overlap the previous pass by ½ the width of the rear wheel of the roller and each pass shall be of slightly different length. When reversing direction, the initial roller shall stop at an angle with the longitudinal direction.

- E. Roller wheels shall be kept clean in a manner approved by the Engineer. Exercise care that the roller remains on the asphalt concrete. Any foreign materials incorporated in the surface shall be cause for rejection of the pavement and its replacement by the Contractor, at their own expense.
 - 1. Any pavement that becomes loose, broken, or mixed with dirt, or which is any way defective, shall be removed and replaced with fresh hot material.
 - 2. The courses along curbs, walls and other places, not accessible to the roller, shall be thoroughly compacted with hand or mechanical tampers.
- F. Prior to the start of surface course placement, the Contractor shall construct a 100-yard test strip for the purpose of evaluating properties of the HMA mixtures and for identifying an effective roller pattern. Procedures and documentation to be followed during construction of the test strip shall allow the Engineer and the Contractor to verify mixture design and effectiveness of compaction procedures.
- G. Compact each layer to a minimum of 92% of theoretical maximum density (G_{mm}). Do not exceed 8% average air void level for roadway density specimens.

3.3 Joints, Fillets and Runouts

- A. Longitudinal joints shall be constructed directly above the longitudinal joint in the existing pavement. The spreading of HMA along longitudinal joints shall be adjusted to secure complete joint closure and full compression of the mixture with a smooth surface and joint after compaction. A lap of one inch (1") at the longitudinal joint is recommended. Longitudinal joint density shall be performed at each quality control density test location. Longitudinal joint testing shall be located at two inches (2") off each pavement edge when testing is performed by a density gauge and six inches (6") off each pavement edge when pavement cores are taken. Documentation shall be provided as to whether the joint was confined or unconfined.
- B. At the end of each day's operations, or when paving is interrupted for a sufficient length of time to allow the mixture to cool below 150 degrees F, a temporary joint shall be made. When paving operations are resumed, the joints (both longitudinal and transverse) shall be cut vertically and trimmed back to expose an unsealed edge the depth of the adjacent course. The exposed edge of the joint shall then be tack coated and fresh mixture shall be raked against the joint, tamped and rolled.
- C. Rake out coarse aggregate prior to shaping and compaction of fillets and runouts.

3.4 Surface Requirements and Pavement Smoothness

- A. It is the Contractor's responsibility to ensure the finished pavement exhibits positive drainage, without any standing water. Pavements shall be checked with a ten foot (10') straight edge, provided by the Contractor, and placed parallel to the centerline. The straight edge shall be run as part of the paving operation to allow deficient areas to be corrected while the pavement is still warm, if possible. Finished areas showing high/ low spots of more than ¼ of an inch in ten feet (10') shall be removed and replaced to the satisfaction of the Engineer. Grinding will not be allowed.
- B. If finished surface courses are damaged during adjacent milling operations, the City reserves the right to require the contractor to full depth sawcut the affected areas at no additional cost.

3.5 Quality Control Program

The Contractor shall provide quality control for bid items with HMA quantities per Iowa D.O.T. Specifications and as follows:

- A. **Mix Design- Job Mix Formula (JMF):** The JMF for each mixture shall be the responsibility of the Contractor and shall be prepared by personnel who are Iowa D.O.T. certified in bituminous mix design. The Contractor shall submit the JMF (Form 956) and complete test results for approval at least two (2) weeks prior to HMA production. The Contractor will not be required to submit loose mixtures and individual samples for approval of the design.

A mix design that was performed within one (1) year of the letting date will be acceptable for review. The Engineer may require the Contractor to perform gyratory mix design verification at the recommended asphalt binder content prior to approval.

Any delays caused by not allowing sufficient time for the testing of materials will not entitle the Contractor to additional compensation.

- B. **Plant Production:** The Contractor shall perform the sampling and testing to provide the quality control of the mixture during plant production. The calibration and certification of the HMA production plant for the JMF shall be current and not more than twelve (12) months old with documentation provided to the Engineer. The plant shall maintain an asphalt binder log to track when the binder was delivered. The HMA delivery tickets shall identify the JMF.
- C. **Construction:** Take density measurements of the compacted mixture, except for Class II compaction. Use the field quality control laboratory compaction for field density control as specified in Iowa D.O.T. 2303. The Engineer shall only accept the density of the compacted layer based on cores. Take density measurements of the compacted mixture no later than the next working day following placement and compaction. The quality index for density will not apply to the project. When cores are taken, the Contractor shall fill them with Set-45 within twenty four (24) hours after they are taken.
- D. **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 day. Sampling and testing of loose HMA is only required for mechanically placed mixture. All sampling and testing procedures will follow the Iowa D.O.T. Specifications and I.M.'s using certified technicians and qualified testing equipment. 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.
- E. **Certification:** Provide a certification for the production of any mixture in which the requirements in this section for small quantities are applied. Place the test results and certification statement on an approved HMA Plant Report (Form 800241). The Daily HMA Plant Report for certified HMA shall 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 this contract. The certified HMA was produced with certified asphalt binder and approved aggregates as specified in the approved mix design.”