

**SECTION 02750
HOT MIX ASPHALT PAVEMENT**

PART 1 GENERAL

1.01 - Section Includes

- A. Hot Mix Asphalt (HMA) Full-Depth Pavement.
- B. HMA Base Repair and Joint Repair.
- C. HMA Overlay.
- D. HMA Curb.
- E. Fabric Reinforcement.

1.02 - Description Of Work

- A. HMA Full-Depth Pavement: includes mixing, placing, and compaction of an ACC binder, leveling, surface, or base course as pavement, pavement widening, driveway pavement, pedestrian and/or bike trails including tack coat in accordance with the Contract Documents.
- B. HMA Base Repair and Joint Repair: includes mixing, placing, and compaction of an HMA binder, leveling, or base course (base may also be Portland Cement Concrete (PCC)) for the purposes of repairing an existing roadway, including tack coat prior to resurfacing with HMA, in accordance with the Contract Documents. Work under the section also includes:
 - 1. Full depth pavement repairs to existing PCC or HMA roadways. Work may be prior to resurfacing.
 - 2. Full-depth and partial depth repairs at existing joints in PCC roadways prior to resurfacing.
- C. HMA Overlay: includes mixing, placing, and compaction of HMA for the purposes of repairing an existing pavement with an overlay, including tack coat in accordance with the Contract Documents.
- D. HMA Curb: includes mixing, placing, and compaction of HMA for the purposes of constructing curb on an HMA pavement, including tack coat in accordance with the Contract Documents.
- E. Fabric Reinforcement: includes furnishing and installing fabric reinforcement, including tack coat, in accordance with the Contract Documents.

1.03 - Submittals

- A. Submit samples and test results as set forth in the Contract Documents.
- B. Submit certificate of compliance indicating the materials incorporated into the Work comply with the Contract Documents.
- C. Submit verification of Iowa DOT certification for HMA supplier.
- D. Submit job mix test reports conforming to an Iowa DOT certified job mix.
- E. Weight receipts shall include mix type, **and/or correlate to bid item.**
- F. **Pavement smoothness testing results and certifications.**
- G. **Quality control test reports.**

1.04 - Delivery, Storage And Handling

- A. Excess HMA shall be disposed of in a manner as to not cause damage or harm to adjacent properties or public facilities. Disposal shall be in accordance with applicable local, state and federal regulations.
- B. **Aggregate Storage: Prevent contamination and intermingling of aggregate stockpiles.**

C. Classification of recycled asphalt pavement (RAP) shall be determined by Iowa DOT. Provide appropriate documentation.

1.05 - Scheduling And Conflicts

Schedule Work to minimize disruption of public streets and facilities.

1.06 - Special Requirements

- A. All Work and materials incorporated into this Project shall conform to all applicable local, state, and federal requirements.
- B. Before HMA can be placed, the road surface and air temperature must meet the following minimum temperature requirements:

- 1. For lower layers of HMA (base, intermediate and leveling course):
 - a. For 1½-inch layer, the subbase or road surface shall be a minimum of 40 degrees F.
 - b. For 2-3-inch layer, the subbase or road surface shall be a minimum of 35 degrees F.
 - c. For 3-inch or greater layer, subbase or road surface shall be 25 degrees F (min).

- 2. For all wearing course layers of HMA:

| | | | | |
|--------------------------------------|-----|----|----|----|
| Layer thickness (inches) | 3/4 | 1 | 1½ | 2 |
| Minimum road surface temp (degree F) | 60 | 50 | 45 | 40 |

- 3. For curbs, the road surface must be a minimum 40 degrees F in shaded areas.
- 4. For primer and tack coats, the road surface must be a minimum 40 degrees F.
- 5. The air temperature, including wind chill, shall be a minimum of 40 degrees F and rising for all HMA Paving.
- 6. The air temperature shall be 50 degrees F and rising unless otherwise approved by the Engineer for tack coat for reinforcing fabric.
- 7. If other weather conditions are detrimental to the placement of the HMA, the Engineer may consider those factors in determining if the conditions are suitable for the placement of ACC.
- 8. HMA shall not be placed on a wet surface.
- 9. **If use of Recycled Asphalt Pavement (RAP) is allowed in contract documents, Iowa DOT Standard Specification 2303 governs, except as modified in contract documents.**
- 10. **Use of Recycled Asphalt Shingles (RAS) is not allowed.**

PART 2 PRODUCTS

2.01 - HMA Pavement

- A. Materials shall comply with Iowa DOT Standard Specification 2303.02, including current Supplemental Specifications for Hot Mix Asphalt (HMA).
- B. Unless otherwise noted on the Contract Documents, the following HMA mixtures shall be used:
 - 1. For base/intermediate courses and base repairs: HMA 1M B ¾ or HMA 1M B ½
 - 2. For leveling courses: HMA 1M S ¾ or **HMA 1M I ½**
 - 3. For joint repair, surface courses and walks/trails: HMA 1M S ½

4. For HMA Curb: HMA 300K S-I ¾. Approximately 15 pounds of powdered asphalt shall be added to the mixture for each 100 pounds of asphalt cement incorporated in the mixture. The powdered asphalt shall be solid or hard asphalt, or gilsonite, finely crushed.

C. The Engineer may approve the incorporation of additional mineral filler.

2.02 - Bituminous Materials

- A. Performance Grade Asphalt: Performance grade asphalt PG 58-28, PG 64-28 or PG 70-28, in accordance with the Iowa DOT Standard Specifications, including Supplemental Specifications.
- B. Tack Coat.
 1. Emulsified asphalt grade SS-1, SS-1H, CSS-1 or CSS-1H.
 2. Emulsified asphalt shall be diluted with an equal volume of water by the manufacturer. Each shipment shall include a certified statement specifying the rate of dilution.
 3. **Provide Engineer application rate for diluted emulsified asphalt required to achieve undiluted application rate.**
 4. Mixing of CSS and SS grades will not be allowed.
 5. RC-70 and RC-T may be used after October 1, **at Contractor's option.**

Prime Coat. : Grade MC-70 as specified in the Iowa DOT Standard Specifications.

2.03 - Aggregate for HMA

Aggregate for HMA shall meet the requirements of Iowa DOT Standard Specification **4127 Type B (Primary)** with the following requirements.

- A. Aggregate with a minimum of 70 percent crushed stone particles.
- B. Of material delivered to the drier, not less than 25 percent of portion passing No. 4 sieve shall be particles from natural sand.
- C. **Unless specified otherwise in contract documents, friction requirements do not apply.**

2.04 - Equipment

- A. All equipment used in the Completion of the Work specified herein shall comply with Iowa DOT Standard Specification Section **2303.03**.
- B. Pavers shall be equipped with a receiving hopper having sufficient capacity for a uniform spreading operation. The hopper shall be equipped with a distribution system to place the mixture uniformly in front of the screed.
- C. Bituminous pavers shall be equipped with automatic grade and slope controls. The automatic control system must maintain the screed or strike-off in a constant position relative to profile and cross slope references. While operating automatically it shall be possible to manually override the automatic controls. The references shall be such that control of the screed or strike-off position is reasonably independent of irregularities in the underlying surface and of spreader operations. When paving in widths exceeding the manufacturer's recommendations for use of the automatic slope control, a grade reference system shall be used on both sides of the paver.
- D. The screed or strike-off assembly shall effectively produce a finished surface of the required evenness and texture without tearing, shoving, or gouging the mixture. Screeds or strike-off assemblies shall extend the full width of the course being laid and shall impart initial compaction thereon. The paver shall be capable of being operated at forward speeds consistent with satisfactory laying of the mixture. Automatic screed controls will not be required on sections of Projects where service road connections or intersections and other conditions interfere with their efficient operation.

- E. The HMA mixture shall be transported in clean, metal-bottom vehicles, free from kerosene and other solvents

2.05 - Fabric Reinforcement

A. Grade Fabric.

- 1. Non-woven polypropylene grade fabric shall be a paving grade fabric currently approved by the Iowa DOT for asphaltic resurfacing.
- 2. Allowable products include Phillips "Petromat" or an approved equal.
- 3. Grade Control Fabrics shall have the following properties:

| Property | Value | Test Method |
|--|------------|-------------|
| Grab Strength, dry, minimum average value in either principal direction | 90 lbs | ASTM D4632 |
| Elongation, dry, minimum average value either principal direction | 20 percent | ASTM D4632 |
| Grab Strength after 400°F for 3 hrs (a), minimum average value in either principal direction | 75 lbs | ASTM D4632 |

(a) Applies only when asphalt temperatures exceeding 300°F are anticipated.

B. Crack Control Fabric.

- 1. Non-woven polypropylene crack-control fabric shall consist of a rubberized asphalt membrane bonded to a coated non-woven fabric designed to inhibit surface moisture intrusion into pavement base structures. Fabric roll widths shall be as noted in the plans.
- 2. Allowable products include Phillips "Petrotac" or an approved equal.
- 3. Crack-control fabrics shall have the following properties:

| Property | Value | Test Method |
|---|---|---------------------|
| Grab Tensile (lb) | 245 | ASTM D4632/Iowa 913 |
| Elongation | 80 percent | ASTM D4632/Iowa 913 |
| Strip Tensile, Modified (lb/inch) | 50 minimum | ASTM D882 |
| Puncture Resistance (lb) | 200 minimum | ASTM E154 |
| Permeance (perms) | 0.10 maximum | ASTM E96, Method B |
| Pliability, 1/4-Inch (Modified) Mandrel, 180° Bend @ -25° F | No cracks in fabric or rubberized asphalt | ASTM D146 |

- C. Ensure asphalt absorption is sufficient to produce a good bond between the overlay and the overlaid surface when a tack coat of 0.20 gallon to 0.25 gallon of asphalt cement per square yard is used. Fabrics such as fiberglass, which do not lend themselves to testing by some of the previously specified methods, may be approved by the Engineer.
- D. Uncut paving grade asphalt cements (AC, AR or penetration grade) shall be used as tack coat for the fabric reinforcement. The grade of material will be dependent on availability and the time of year and shall be subject to prior approval by the Engineer.

2.06 - Use of Recycled Materials (if allowed in contract documents)

- A. **Iowa DOT Standard Specification 2303.02.C applies.**
- B. **Use only classified RAP.**

PART 3 EXECUTION

3.01 - General

- A. The Engineer 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 Section 01200.
- C. If Work is to occur within existing public rights-of-way, the Contractor shall be required to obtain all necessary permits and shall be responsible for all applicable fees.
- D. The surface of each layer shall be cleaned by the Contractor and kept free from foreign matter when each succeeding layer is placed.
- E. All contacting HMA surfaces including curb and gutter sections, shall be coated with tack coat.
- F. Tack Coat Application
 - 1. **Limit length of application to minimize inconvenience to public.**
 - 2. **On overlay projects, apply additional tack coat in following areas:**
 - a. **Within 2 feet of curb faces, culvert headwalls and curbs or handrails of bridges.**
 - b. **All runoffs and fillets, including depressed areas around drainage inlets.**
- G. No HMA pavement shall be placed unless the existing road and air temperatures, as specified in Paragraph 1.06, are satisfied.
- H. Side forms, when used, shall be coated with a suitable form oil prior to commencing the paving operation.
- I. 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.
- J. All utility fixtures in the paved area shall be adjusted to conform to the final adjacent finished surface, in accordance with Contract Documents and Section 02600, where applicable.
- K. Traffic shall be permitted on the newly finished surface only when sufficient time lapses to prevent damage to the surface and/or curb from vehicles on it, as determined by the Engineer. Any damaged HMA pavement shall be repaired or replaced by the Contractor, as determined by the Engineer.

3.02 - Preparation

- A. HMA paving shall not commence until subbase has been prepared as set forth in Section 02100. HMA shall not be placed if subbase is excessively wet, or has a moisture content greater than 2 percent above the optimum moisture content, or if temperature requirements of Paragraph 1.06 in this section are not met.
- B. The Contractor is responsible for maintenance of completed subgrade **and/or subbase**. If rutting or any other damage occurs to the subgrade **and/or subbase** for any reason, repair immediately. Such repair will include, if necessary, scarifying subgrade to a depth of 8 inches, aerating, and recompacting.

- C. Before placing the surface course, clean the underlying base or intermediate course of all loose and foreign material by sweeping with power sweeps equipped with blowers or hand brooms, if necessary. Whenever the surface course is not placed within 24 hours of the underlying base or intermediate course, or the underlying base or intermediate course is determined not to be clean by the Engineer, a tack coat shall be applied to such underlying course as directed and at a rate specified by this section.
- D. Remove spalling and scaling material, old patch and joint material, debris, and all other loose material that can be removed by hand tools, such as picks or air blast. Use mechanical hammers when required by the Engineer. On concrete and bituminous surfaces, remove all existing bituminous patch materials that are unstable to the degree that they have distorted under traffic or contain fractures or spalled particles. Bituminous seal coats, or other bituminous layers that may not be as well cured or may be flushed at the surface, but that lack sufficient thickness to cause instability to themselves or the new resurfacing, may be allowed to remain in place. Clean cracks with a width that exceeds $\frac{3}{4}$ inch to a depth of at least 1 inch, and to a depth up to 3 inches if the material is readily removable. At the time the resurfacing is spread, the entire base shall be made free of foreign material by scrapers, air hoses, or brooming, as necessary.
- E. All material removed from the pavement shall remain the property of the Contractor and be removed in accordance with the General Conditions. The Contractor shall remove, by blading, such portions of the earth shoulder that would interfere with placement of base, binder, or surface courses.
- F. The Contractor shall mow grass on the shoulder, as required, or otherwise prepare that surface, when a guide string line reference is to be positioned on the adjacent shoulder.

3.03 - Delivery

- A. Protect HMA with adequate covers while in transit. No batches shall be delivered within 1 hour of sundown or before sunrise, unless otherwise permitted by the Engineer.
- B. Deliver HMA to the site in such quantities as to insure continuous paving before the preceding batch or batches have cooled. Before delivery is commenced, the underlying course shall be thoroughly dry and air temperature shall be not less than 40 degrees F., unless otherwise approved by the Engineer.
- C. Control all handling and manipulation of the HMA from the mixer to the final spread on the road to maintain a uniform composition and minimize segregation of coarser particles to the extent that it cannot be visibly observed in the compacted surface.
- D. **Keep production temperature of HMA mixtures between 225°F and 330 °F.** Do not discharge HMA **into paver hopper** when its temperature is less than 245 degrees F for a nominal layer thickness of 1½ inches or less and 225 degrees F for a nominal layer thickness of more than 1½ inches.
- E. Mixture temperature shall be sufficient to allow for the specified compaction and density to be attained.
- F. Keep the paver hopper sufficiently full at all times to prevent nonuniform flow of the mixture through the control gate or channel leading to the augers and screed. Paver wings shall not be dumped until the end of a days production. This material is to be wasted unless use is approved by the Engineer.
- G. Except for an unavoidable delay or breakdown, delivery of hot HMA to any individual spreading unit shall be continuous and uniform and at a rate sufficient to provide as continuous an operation of the spreading unit as practical.
- H. While operating on the road surface, use of kerosene, distillate, other petroleum fractions, or other solvents, for cleaning hand tools or for spraying the paver hopper will not be permitted. Containers of cleaning solution shall not be carried on or near the paver. When a solvent is used, the paver shall not be used for at least 5 hours after this cleaning. Hand tools shall be kept clean. The Contractor shall be responsible for collecting and removing all cleaning materials and

cleaning residue from the Project and plant site. The cleaning material and residue shall become the property of the Contractor.

3.04 - Placement of HMA

- A. Whenever practicable, spread all HMA by a finishing machine. Irregular areas may be spread by hand methods. Spread the HMA uniformly to the desired depth with hot shovels and rakes. After spreading, smooth the HMA carefully to remove all segregated coarse aggregate and rake marks. Use rakes and lutes designed for use on asphalt mixtures for hand spreading and smoothing.
- B. Evenly spread, screed and finish the HMA top course, using suitable power equipment to form uniformly even and dense asphalt concrete pavement of the required thickness after compaction. Place the mixture in strips having a minimum width of 12 feet, where applicable.
- C. Unless noted otherwise in Contract Documents, maximum compacted thickness of HMA courses shall be as follows:
 - 1. Base course: 4 inches per lift.
 - 2. Intermediate and/or leveling course: 2 inches per lift.
 - 3. Surface course: 2 inches per lift

D. Unless noted otherwise in contract documents, minimum lift thickness shall be as follows:

| Design Mix Size (in) | Minimum Lift Thickness (in) |
|----------------------|-----------------------------|
| 3/8 | 1 |
| 1/2 | 1 1/2 |
| 3/4 | 2 |
| 1 | 3 |

- E. Placing Leveling Courses.
 - 1. The Contract Documents will show the thickness of the courses to be placed. Depressions or low areas more than 1 inch below the bottom of the intended elevation of the course shall be brought to the elevation of the bottom of the course by placement of preliminary leveling courses of the same mixture specified for the base or intermediate course.
 - 2. When the depth of leveling or strengthening course is more than 2 inches, place in approximately equal layers not exceeding 2 inches thickness to plan depth.
 - 3. When the width of any leveling layer is 8 feet or more, spread the layer by a finishing machine. When placing the mixture, the forward speed of the finishing machine shall be slowed as necessary to provide the least amount of stopping. Other widths and irregular areas may be spread by hand methods.
 - 4. When leveling or intermediate courses must be feather edged, the coarser aggregate shall be raked out and not incorporated. Leveling and intermediate courses shall be compacted.
 - 5. A succeeding layer may be placed as soon as final rolling or tamping on the initial layer is completed. (At any location, not more than 2 successive layers shall be placed in any one working day).
- F. Weather Limitations: HMA mixtures shall be placed when the combination of laydown and base surface temperatures are within the limits shown in the following table and in Paragraph 1.06, when the weather is not rainy nor foggy, and when the roadbed is in a satisfactory condition. In case of sudden rain, the placing of mixture then in transit from the plant, if laid at proper temperature and if the roadbed is free from pools of water, may be permitted by the Engineer.

Such permission shall in no way relax the requirements for quality and smoothness of finished surface.

| MINIMUM LAYDOWN TEMPERATURE (°F) | | | | | | |
|----------------------------------|----------------------------------|-----|-----|-----|-----|-----|
| Base Temp (degrees F) | Pavement Lift Thickness (inches) | | | | | |
| | ½ | ¾ | 1 | 1 ½ | 2 | 3 |
| 25 – 30 | --- | --- | --- | --- | --- | 285 |
| 33 – 40 | --- | --- | --- | 305 | 295 | 280 |
| 41 – 50 | --- | --- | 310 | 300 | 285 | 275 |
| 51 - 60 | --- | 310 | 300 | 295 | 280 | 270 |
| 61 – 70 | 310 | 300 | 290 | 285 | 275 | 265 |
| 71 – 80 | 300 | 290 | 285 | 280 | 270 | 265 |
| 81 – 90 | 290 | 280 | 275 | 270 | 265 | 260 |
| 91+ | 280 | 275 | 270 | 265 | 260 | 255 |

- G. Unless otherwise permitted by the Engineer, in curbed areas the placing shall begin along the outer lanes on a crowned section or on the high side of a section with a one-direction slope.
- H. 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.
- I. 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 joint shall be cut and trimmed back to expose an unsealed or granular surface for the full depth of the course. The exposed edge of the joint shall then be painted with a thin coat of hot asphalt cement and fresh mixture shall be raked against the joint, tamped and rolled. Hot smoothing irons may be used to seal the joints, at the discretion of the Engineer.
- J. The joints between existing asphalt concrete pavement, if any, and asphalt concrete pavement to be furnished and installed under this Contract shall be cut, painted and rolled or sealed in a similar manner.
- K. The offset distance between longitudinal joints in succeeding courses of full depth HMA paving shall be not more than 6 inches or less than 3 inches. Transverse construction joints in succeeding courses shall be separated by not less than 6 feet. The spreading of hot mixtures 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. At transverse joints, the cold mixture of the layer shall be sawed to a straight line at right angles to the centerline so that a full thickness, a true surface, and a vertical edge will be provided.
- L. In the event the paving machine encounters the problem of mechanical failure of the automatic controls, suspend Work until both the grade and slope controls are in working order.
- M. The speed of the finishing machine used shall be such that the number of required stops is minimized.

3.05 - Reference System

- A. The reference system may be either string line or ski type on all Work except new or stage construction.
- B. On new or stage construction, a string line grade reference system shall be used for longitudinal grade control on the first lift of paving except that if a previously placed strip of pavement or other

suitable grade reference, such as concrete gutter or a similar item, has been placed to a specified line, grade and cross section and is to adjoin the strip to be placed. The previously placed pavement or other suitable reference may serve as longitudinal grade control reference for the new strip by utilizing a ski or joint matching shoe. Grade reference system for subsequent lifts of paving shall be ski type.

- C. Establish the string line reference system; furnish all materials, equipment, labor and incidentals required to construct the string line reference system as described herein and maintain it as long as it is needed. Complete the string line reference system advance of construction to avoid any delay or interruption of laying the pavement. The string line reference system shall consist of suitable wire supported by approved devices compatible with the type of automatic paver control system used. The string line and supports shall be capable of maintaining the line and grade designated by the plans at the point of support while withstanding the tensioning necessary to prevent sag in excess of $\frac{1}{4}$ inch between supports spaced 50 feet apart. Additional supports shall then be installed to provide a minimum spacing of 25 feet (less if directed by Engineer) between same to remove any apparent deviation of the string line from theoretical grade.

3.06 - Compaction

- A. Compact all HMA lifts to produce a surface free of ridges, marks, or bumps, subject to the approval of the Engineer. Promptly and thoroughly compact each lift. For all rollers, the initial contact with the hot mixture shall be made by the vibratory steel roller roll. 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. Roller shall be operated continuously at a speed not to exceed 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, and before the temperature falls below 225 degrees F. The intermediate roller shall cover the entire area not less than 6 times.
- C. Final Rolling: Final rolling is defined as the last roller to remove surface marks or irregularities. A 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 $\frac{1}{2}$ 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 his 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. Compaction Requirements
 - 1. **For all roadways, use Class I compaction per Iowa DOT Standard Specification 2303.03.**
 - 2. **Use Class II compaction for paved shoulders, temporary surfaces and other situations where Class I compaction is not specified.**

3.07 - HMA Base Repair and Joint Repair

A. General

The Work shall be conducted on only one lane at a time unless the road is closed. Unless the road is closed, traffic shall be permitted to use the pavement during construction operations. Conduct all operations to create a minimum of inconvenience to traffic. Adjust work schedule so all excavating, backfilling, compacting, and finishing of each patch will be completed in one day for two lane roads. For roads with multiple lanes in each direction, the Work area may include one lane in each direction or as allowed by the traffic control details. If unforeseen conditions result in excavated sections being left overnight, provide sufficient flaggers, **barricades, signage and channelizing devices** to warn and direct traffic from the time construction operations stop until they resume.

B. Base Repair

1. On two-way roadways, do not disturb pavement for full- or partial depth repair patches or surface patches unless the patch can be completed before the end of the working day.
2. When specified in the Contract Documents, full- or partial depth repair patches may be PCC, HMA, or a combination. Repair PCC base per Section 02700, Paragraph 3.03 prior to HMA overlay.
3. For HMA repair patches, the final surface of the patch shall be level with, or not more than approximately $\frac{1}{4}$ inch above surrounding pavement.
4. PCC repair patches shall be cured according to mix type in Section 2700, prior to resurfacing with HMA. Tack the patch area and edges before covering with HMA.
5. Heavy equipment shall not be used adjacent to new concrete until the curing is completed.

C. Partial Depth Joint Repairs.

1. Work applies to spalled PCC and/or HMA at existing transverse or longitudinal joints, at locations identified in Contract Documents or as directed by Engineer.
2. Work shall be performed in accordance with standard details in Contract Documents.
3. Partial depth repairs shall be less than one-half of the slab thickness.

3.08 - HMA Overlay

- A. Complete all repairs to existing pavement as per the Contract Documents.
- B. If required, existing PCC slabs shall be cracked and seated as set forth in Section 02800.
- C. When required, place reinforcement fabric as set forth in the Contract Documents.
- D. Seal pavement surfaces within three feet of the joint formed at the interface of asphaltic resurfacing and existing PCC or HMA pavement with tack (up to 0.1 gallons/sq. yd.) and sand to the satisfaction of the Engineer. This item includes longitudinal joints where new paving meets existing paving within the traveled portion of the street (away from the curb and gutter). This item also includes sealing cold-joints at intersections between main line asphaltic surface and the asphaltic surface placed in the intersection returns. This requirement does not apply in areas of existing pavement repair (where the pavement thickness is not increased).
- E. Longitudinal joints for courses on resurfacing projects shall be constructed directly above the longitudinal joint in the existing pavement.

3.09 - HMA Curb

- A. Curbs shall not be placed on wet or damp surfaces.

- B. Surfaces should be **tack** coated prior to curb placement.
- C. The Contractor shall place the curbs with a machine designed for this purpose. If machine placement is not desirable, the Engineer may approve hand placement.

3.10 - Fabric Reinforcement

- A. Remove and replace fabric damaged during construction.
- B. Placement of all roadway fabrics shall be in accordance with the manufacturer's instructions and as directed. Place roadway fabrics either as grade fabric across full width of resurfacing area, or as crack control fabric on joints only.
- C. Clean the existing pavement thoroughly. The surface shall be dry and free of dust, dirt, debris and oil. Use a power broom for larger areas. Small areas may be cleaned by hand.
- D. Cracks less than 1/8 inch do not need to be filled before application of the tack coat. Fill cracks from 1/8 inch to 3/8 inch with liquid crack sealant. Fill cracks wider than 3/8 inch with a stable crack sealant. Crack sealant containing an emulsified asphalt must be approved by the Engineer.
- E. The tack coat for reinforcing fabric shall be applied as follows:
 - 1. The tack coat for reinforcing fabric will extend 3 inches beyond the fabric on all sides.
 - 2. Tack coat shall be applied between all fabric overlaps.
 - 3. Tack coat shall be applied evenly and uniform at a rate of 0.25 gallons per square yard or as specified by the fabric manufacturer.
 - 4. For large areas, the tack coat shall be applied by a distributor truck.
 - 5. Tack coat material shall be between 290° F and 325° F when applied.
- F. Reinforcing fabric for large areas will be applied using mechanical laydown equipment. The laydown equipment must support the fabric roll, adjust the tension on the fabric and broom fabric into the tack coat. The equipment will have break pawls on both ends of the fabric to balance tension on fabric edges and avoid fabric wrinkles. Hand placement of fabric will be allowed for small areas with approval of the Engineer.
- G. Take precautions to avoid wrinkles and to insure that bubbles are removed without breaking the fabric. Cut and lap fabric to provide a smooth surface when bubbles and wrinkles cannot be removed.

3.11 - Coatings

- A. Thoroughly clean surfaces to be coated of all loose pavement, oils, dirt or other foreign matter.
- B. Prime Coating.
 - 1. If primer is required, the entire exposed surface of the course to be primed and adjacent subgrade for a width of one-foot shall be made free from all loose material. Primer bitumen shall then be applied to the edge slopes of the base and adjacent one-foot of subgrade at a rate of 0.2-0.5 gallons per square yard. When this material has been absorbed and set, primer bitumen shall be applied to the entire surface of the course to be primed to the edges, and to the adjacent one-foot width of subgrade at the rate set forth in the Contract Documents.
 - 2. The primer bitumen shall be allowed to penetrate for at least 24 hours after application before traffic is permitted upon it or before the next course is placed. If it is not practical to keep traffic off, the Contractor shall apply sand to the surface.

C. Tack Coating.

1. Tack coat application on horizontal surfaces shall be in accordance with the following:

| Material | | Spraying temperature (degrees F.) | Application Rate (gallons/sq yd) |
|-----------------------|---------------|--------------------------------------|-------------------------------------|
| Cut-back Asphalt | RC-70 | 120 – 190 | 0.02-0.06 |
| | RC-T | 85 – 150 | 0.02-0.06 |
| Emulsified Asphalt | SS-1, SS-1H | 70 – 140 | 0.04-0.12 |
| | CSS-1, CSS-1H | 70 – 140 | 0.04-0.12 |

2. Prior to paving, allow sufficient time for the tack coat to cure until it is tacky to the touch.
3. If tacked surface remains at the end of the day, apply sand to the area to prevent the tack coat from becoming a nuisance to motorists.
4. On roadways being constructed under heavy traffic, safety and convenience to the public without soiling their vehicles shall be a controlling factor when permitted by the Engineer. Tack coats at the rate required by paragraph 3.12.C.1 shall be applied immediately before spreading the HMA mixture. Waiting time for curing before spreading the mixture may be kept at a minimum, and will be subject to the Engineer’s approval. Tack application widths shall be so that approximately one-half the roadway is left open to the public traffic with no tack coat applied to it. Tack coat applications shall be strictly limited in length, to minimize inconvenience to the public. They shall be kept within the hot mixture placing Work area that is controlled by flaggers at each end, and shall be planned so that they will be covered with hot mixture when the Work area is opened to traffic at the end of the day’s Work. If the tack-coated surface becomes dirty from weather or traffic, the surface shall be thoroughly cleaned and, if necessary, retacked.
5. The vertical face of exposed, longitudinal joints shall be tacked as a separate operation, before the closing lane is placed, at a rate from 0.10 to 0.15 gallon per square yard.
6. The vertical surfaces of all fixtures, curbs, bridges, or cold mixture with which the hot mixture will come in contact shall be lightly painted or sprayed to facilitate a tight joint with the fresh mixture, as directed by the Engineer.
7. Areas of final course within 2 feet of headwalls of culverts and curbs or handrails of bridges, including depressed areas around floor drains, and feathered areas along curb and gutter lines and at side street returns shall be tacked at 0.1 gallon per square yard and also be tacked as specified above. Promptly after the sand cover is placed, the entire area shall be covered as completely as possible by two rollings with pneumatic tired equipment. Sand used for this cover will not be paid for but shall be considered incidental to other items.

3.12 - Surface Requirements

- A. The top surface of asphaltic concrete pavement shall conform to the lines and grades shown on the Contract Drawings, within a tolerance shown in paragraph D below, except that such tolerance will not be permitted in areas of pavements where closer conformance with planned grade and elevation is required for proper functioning of appurtenant structures and drainage involved. All finished concrete slabs shall exhibit positive drainage, without any standing water. The Contractor shall be required to correct areas without positive drainage, using a method approved by the Engineer.

- B. Current edition of Iowa DOT Standard Specification 2316 shall apply for pavement smoothness. Applicable schedule, and applicability of incentive/disincentive payments shall be identified in the contract documents.
- C. New pavement surfaces shall be flush with existing pavement surfaces.
- D. Grading Tolerances.
 - 1. Pavement and Curbs: ± 0.03 feet.
 - 2. Walks/Trails: ± 0.10 feet.

3.13 - Correction of Defective Work

If, during the progress of construction, it is determined by the Engineer that the subgrade, subbase, or any base course or pavement course has not been compacted and finished by the Contractor to the specified thickness or grade within allowable tolerances, the Contractor shall not proceed with any construction of any subsequent course thereon until appropriate corrective measures satisfactory to the Engineer have been completed by the Contractor, at the Contractor's cost.

END OF SECTION 02750