

KALKASKA COUNTY ROAD COMMISSION

SPECIFICATIONS for CHIP SEAL

2020

Description. This work consists of preparing the pavement surface and providing and placing a single chip seal.

Materials. Provide materials in accordance with the following:

All Course Aggregate shall be in accordance with Section 902 of MDOT's 2012 Standard Specifications for Construction

All Asphalt Emulsion shall be in accordance with Section 904 of MDOT's 2012 Standard Specifications for Construction

Construction.

- A. **Equipment.** Provide equipment, in accordance with section 505 of MDOT's 2012 Standard Specifications for Construction and the following, capable of producing and placing a product meeting the requirements of this section.
1. **Pressure Distributor.** Provide a pressure distributor with a computerized application rate and speed control, capable of maintaining the asphalt emulsion at the temperature required by the contract. Ensure the control has a radar ground-sensing device that controls the application rate regardless of the ground speed and spray bar width. Ensure the spray bar nozzles produce a uniform, triple-lap application fan spray, with instantaneous shutoff and no dripping. Ensure each pressure distributor can maintain the required application rate within ± 0.015 gallons per square yard for each load.
 2. **Chip Spreader.** Provide a self-propelled chip spreader equipped with a computerized spread control, pneumatic tires and a screen to remove oversized material.
 3. **Compacting Equipment.** Provide at least three self-propelled pneumatic-tired rollers, each weighing at least 8 tons.
 4. **Brooms.** Provide motorized brooming equipment, capable of cleaning the road surface before treatment and removing loose particles after treatment. Provide pick-up sweepers to clean road surfaces adjacent to lawns or roadways with curb and gutter.
 5. **Lights on Equipment.** Equip self-propelled equipment with at least one Road Commission-approved, flashing, rotating or oscillating amber light, visible in every direction. Equip chip spreaders with one light on each side of the spreader.
- B. **Pre-production Meeting.** Before beginning work, conduct an on-site pre-production meeting with the Project Manager to discuss the following:
1. Review of the work schedule;
 2. Examination of the traffic control plan;
 3. Review of equipment calibration and adjustments;
 4. Inspection of conditions of materials and equipment, including transport units;

5. Submission of the mix design including JMF and a “Design for Intended Yield,” containing the aggregate gradation. LA Abrasion Resistance, loose unit weight and application rate for asphalt emulsion and aggregate;
6. Submission of test results for flat and elongated ratio. Collect samples from one of the following locations:
 - a. The shipping face of the stockpile at the production source, or
 - b. The job site stockpile;
7. Discussion of the Quality Control (QC) plan; and
8. Designation of the Contractor’s authorized representative.

C. Weather and Seasonal Limitations.

1. **Weather Limitations.** Place the chip seal when pavement and ambient temperatures are at least 55° F. Do not place chip seal if air temperatures are forecast below 40° F within 24 hours of completing placement. Do not apply chip seals in foggy or rainy weather or if the existing pavement temperature is equal to or greater than 130° F.
2. **Single Chip Seals Seasonal Limitations.** Place single chip seals in accordance with the following:
 - a. From May 15 to September 1;

D. Placement Operation.

1. **Signing.** Post signs along the roadway reading “Loose Gravel,” FHWA (W8-7), and mount a 35 mph speed plaque below the sign. Place the signs at no greater ½ mile intervals throughout the length of the project.
2. **Dust Control.** During normal traffic operations, wet broom or lightly fog seal the roadway to control dust, as required by the Engineer. If dusty conditions continue, pre coat the aggregate. Pre-coat the aggregate with 0.75 percent, by mass, residual asphalt.

The Contractor may perform pre-coating in a weight-batch type, continuous mixing type or drum-type hot mix plant, using PG 64-22 asphalt binder or CSS-1h emulsion.

3. **Loose Stone.** During normal traffic operations, damage to motorist’ vehicles due to loose stone picked up off the surface is unsatisfactory. Broom or fog seal the roadway until the condition is eliminated.
4. **Bleeding or Tracking.** During normal traffic operations, bleeding or moderate tracking is unsatisfactory. Sand and sweep the roadway to eliminate bleeding or moderate tracking. If sanding and sweeping do not eliminate bleeding or moderate tracking, apply, roll and broom a heated aggregate with the physical properties specified in Table 902-8 of MDOT’s 2012 Standard Specifications for Construction.
5. **Preparing Pavement Surface.** Prepare the pavement surface to receive the chip seal. Clean pavements requiring treatment with a motorized power broom to clean cracks and other areas inaccessible by power broom. Use pick-up sweepers adjacent to lawns or roadways with curb and gutter.
6. **Protecting Utility Castings and Raised Pavement Markers.** Before beginning the chip seal operation, protect utility castings and raised pavement markers using tarpaper or other Road Commission-approved materials. Remove the protective coverings before sweeping and opening to the traffic.
7. **Equipment Operation.** Operate vehicles and equipment involved in the chip sealing as close together as possible. Spread the aggregate to cover the asphalt emulsion within 30 seconds of application. Do not allow the chip spreader to trail the emulsion distributor by more than 150 feet.

8. **Longitudinal Construction Joints.**

- a. **Longitudinal Construction Joints in Single Chip Seal.** Where corrugations are not present, construct longitudinal construction joints in single chip seal to coincide with the painted lane lines or at the outside edge of the shoulder except where the corrugations are present. Where corrugations are present, construct joints at the outside edge of the far side of the corrugation on the first pass.

9. **Rolling.** Roll the aggregate after spreading. Allow no more than 2 minutes between the spreading of aggregate and completion of initial rolling. Use the rollers in a longitudinal direction at a speed no greater than 5 mph. Ensure each roller travels over the aggregate three times with the final pass in the direction of the chip spreader.

10. **Sweeping after Placement.** After chip seal placement, use the sweeping equipment specified in subsection 505.03.A.4 of MDOT's 2012 Standard Specifications for Construction to perform an initial sweep of the construction traffic control zone before opening to traffic. Allow a minimum waiting period of 30 minutes between application of the chip seal and initial sweeping.

Additional sweeping to remove loose stones after opening to traffic will be required as determined by the Engineer. The Contractor may use an arrow board, in bar mode, pulled behind a vehicle trailing the sweeping equipment. Conduct sweeping so loose aggregate does not migrate back onto the pavement. Use a pick-up sweeper to remove loose aggregate adjacent to lawns, curbs or intersections.

11. **Cure Time and Repairs.** Do not allow traffic on the new surface until it cures, to prevent pickup by vehicle tires. Repair traffic damage to the new chip seal surface at no additional cost to the Road Commission.

Readjust the spray bar and nozzles if longitudinal grooves or ridges in the surface cause asymmetric appearance.

- E. **Application Rates.** Apply the asphalt emulsion or Multi Grade Asphalt followed immediately by a uniform application of coarse aggregate.

Notify the Engineer immediately if the coarse aggregate gradation or the existing pavement surface conditions, necessitate an adjustment to the JMF target rate. Document the new JMF rates by stationing.

1. **Asphalt Emulsion.** Apply asphalt emulsion from 0.39 gallons per square yard to 0.46 gallons per square yard. Apply the asphalt emulsion at a temperature from 170° F to 190° F.
2. **Multi Grade Asphalt (CM-90).** Apply multi grade asphalt at a target of 0.30 gallons per square yard with a minimum rate of 0.29 gallons per square yard.

If the target rate is not the optimum rate due to the gradation of the coarse aggregate or the existing surface conditions of the pavement, the Contractor shall notify the Road Commission inspector prior to application. Upon approval of changes by the Road Commission, the Contractor shall document the new JMF rate(s) by locations. All truck demurrage will be the responsibility of the Contractor.

3. **Coarse Aggregate.** Apply coarse aggregate from 17 pounds per square yard to 24 pounds per square yard.

F. **Documentation**

1. **Daily Report.** Submit a daily report to the Engineer with the following information:

- a. Control section (if applicable)
- b. Project number (if applicable)
- c. County
- d. Route

- e. Date
- f. Detailed weather information
- g. Pavement temperature
- h. Asphalt emulsion application temperature
- i. Beginning and ending stations (placement and brooming)
- j. Notification of mix designs change
- k. Aggregate gradation and moisture content (at least one per day); and
- l. Signature of the Contractor's authorized representative

2. **Miscellaneous.** Document the following as required:

- a. Load tickets for coarse aggregates and asphalt emulsion; and
- b. Changes in the design for intended yield.

G. **Quality Control (QC).** If the Engineer identifies conditions that cause an unsatisfactory chip seal, immediately stop production and begin corrective action, at no additional cost to the Road Commission. Maintain QC measures until the Engineer accepts the work.

1. **Quality Control Plan.** Provide and follow a plan to maintain QC for production and construction processes, as required. Provide the Engineer a copy of the QC plan for review and approval, prior to the pre-production meeting.

Establish and maintain an effective QC plan. Ensure the QC plan, details procedures, and organization to produce the required single, double and shoulder chip seal operations. Comply with the Engineer-approved QC plan for the duration of the project and allow the Engineer access to in-progress work for Assurance review and testing.

Ensure the QC plan addresses at least the following:

- a. Materials;
- b. Sampling and testing methods to determine compliance with material specifications;
- c. Equipment;
- d. Calibration method to determine compliance with the application rates;
- e. Procedures for pavement cleaning and preparation;
- f. Controls implemented to ensure the chip seal material cures or sets up before opening to traffic;
- g. Proposed procedure for monitoring initial acceptance requirements;
- h. Dust control;
- i. Bleeding;
- j. Rough joints;
- k. Surface patterns;
- l. Procedures to ensure that both the initial and final sweeping are completed in a manner that prevents damage to vehicles; and
- m. An action plan, demonstrating how the chip seal operation will be adjusted for adverse environmental conditions.

2. **QC Sampling and Testing.** Perform the following minimum QC tests during chip seal and placement.
- a. **Coarse Aggregate.** Determine the actual application rate by placing a tarp over 1 square yard of pavement, applying coarse aggregate to the pavement in a production run, retrieving the aggregate placed on the tarp and weighing the coarse aggregate. Place coarse aggregate within. Collect one sample from the project aggregate stockpile each day of production, and perform a sieve analysis. Ensure sieve analysis results meet the requirements of Table 902-7 of MDOT’s 2012 Standard Specifications for Construction and fall within the quality control tolerances of Table 505-1 to substantiate the design for intended yield.

Table 505-1 Chip Seal Quality Control Tolerances	
Parameter	Tolerance
3/8 in sieve	-5.0%
No. 4 sieve	+5.0%
Aggregate Application rate	±pound per square yard of the required JMF application rate
Emulsion Application Rate	±gallon per square yard of the JMF target rate

- b. **Emulsion or Multi Grade.** Determine the actual application rate using a 1,000-foot yield check. Apply the asphalt emulsion or multi grade asphalt within.

H. **Acceptance.**

1. **Field Inspection Acceptance.** Upon completion of work, schedule an inspection with the Engineer. The Engineer will note deficiencies, including areas exhibiting adhesion failure, cohesion failure, excessive stone, loss of stone or other factors the Engineer identifies as unacceptable.
2. **Delayed Acceptance.** At least 30 days after placing the single chip seal, the Engineer, with the Contractor, will inspect the project the project for surface flushing, surface patterns or loss of stone. If the Engineer determines the work includes these deficiencies, correct the work within 7 working days of the review, or by an agreed upon date, as approved by the Engineer, and at no additional cost to the Road Commission.

Measurement and Payment.

Pay Item	Pay Unit
Seal, Single Chip.....	LS, Per Road

- A. **Seal, Single Chip.** The Unit price for Seal, Single Chip includes the cost of placing a single application of asphalt emulsion or multi grade asphalt and coarse aggregate to a pavement and the accompanying shoulders, and material sampling and testing, surface preparation, brooming and documentation.