SAVE MY ROAD

Modified Chip Seal

Sample Construction Specification Guideline

This sample construction specification guideline is provided solely for informational purposes only and is not intended to replace suitable planning, design, or professional consultation after careful consideration of the facts and circumstances of the particular project. Consequently, Ergon Asphalt & Emulsions, Inc., its affiliates, and their respective agents, directors, officers, and employees shall have no liability for any claims, damages, losses, demands, suits, and/or judgments in any way arising out of or caused by: (i) any use of this sample construction specification guideline, or (ii) the accuracy or content of the information contained herein. This sample construction guideline is provided AS IS, without warranty, and is subject to change without notice. Any person using this sample construction specification guideline assumes all risk of use and is advised to engage appropriate professionals, formulate a comprehensive project plan, and adhere to all applicable instructions, warnings, and safety precautions.

1. Scope

The scope of this sample construction specification guideline is limited and intended to provide general information regarding the design, component material specification, application, inspection, measurement, and payment of a Modified Chip Seal.

2. Description

A Modified Chip Seal is one or more applications of an asphalt emulsion each followed by an application of aggregate for the purpose of extending the service life of a flexible pavement structure. A Modified Chip Seal is recommended on pavement in relatively good condition to prevent or correct distresses such as raveling, oxidation, loss of friction, and top-down cracking less than 0.25 inches (0.64 cm) in width.

3. Materials

3.1 Asphalt Emulsion

The asphalt emulsion shall be designated CRS-2P and shall meet the requirements of AASHTO M316. Asphalt emulsion delivered to the project shall be accompanied by a laboratory Certificate of Analysis and any other certifications as deemed necessary or advisable.

3.2 Aggregate

The aggregate shall be washed, hard, durable, clean rock such as granite, slag, limestone, or other high-quality aggregate and free from coatings or deleterious material. All of the aggregate shall be crushed with 100% fractured faces. The aggregate shall have maximum loss of 35% when tested with the LA Abrasion procedure as defined by AASHTO T96. The maximum amount of flat and elongated aggregate with a ratio of 3:1 shall not exceed 18% as determined by ASTM D4791. Only one source of aggregate shall be used and shall conform to one of the following gradations.

SAVE MY ROAD

Sieve Sizes	Course — 1/2" Max	Medium — 3/8" Max	Medium Fine — 5/16" Max	Fine — 1/4" Max
3/4"	100	-	-	-
1/2"	95-100	100	-	-
3/8"	0-15	95-100	100	100
No. 4	0-10	0-15	0-50	60-85
No. 8	0-3	0-3	0-15	0-25
No. 16	-	-	0-3	0-3
No. 30	-	-	-	-
No. 200	0-1	0-1	0-2	0-2

4. Mix Design

A mix design shall be performed using the Modified Kearby Method or other design method as approved by the agency. The design shall be completed at a qualified laboratory using materials representing those to be used on the project and submitted by the contractor at least five days prior to the start of the project. The design shall indicate the target asphalt emulsion application rate at various pavement conditions including average daily traffic and surface texture.

5. Equipment

5.1 Asphalt Distributor

The distributor shall be self-powered and capable of providing a uniform application rate of asphalt binder varying from 0.05-1.00 gal/yd^2 (0.23-4.5 L/m^2) over a variable width up to 16 feet (4.88 m) in a single pass, include computerized application controls, and be capable of heating material to 160°F (71.1°C). Nozzles on the distributor bar shall be fully operational and of the size suggested by the manufacturer to apply the intended application rate.

5.2 Aggregate Spreader

The aggregate spreader shall be self-propelled and supported by at least four tires on two axles capable of providing a uniform application rate of aggregate from 5-50 lb/yd^2 (2.7-27.1 kg/m^2) over a variable width up to 16 feet (4.88 m) in a single pass. The uniformity of this machine shall not vary by more than 1 lb/yd^2 (0.54 kg/m^2). The aggregate spreader shall be equipped with the means of applying the aggregate to the surface with computerized application controls so that the required amount of material will be deposited uniformly over the full width of the bituminous material.

5.3 Rollers

A minimum of two 10-16 ton (9.1-14.5 metric tons) self-propelled pneumatic tired rollers shall be used on the project unless otherwise requested by the agency. Tire pressure shall be specified by the manufacturer and shall not vary more than +/- 5 psi. Depending on the speed of the Chip Seal operation and the width of coverage, additional rollers may be required. At no time shall the rollers travel more than 10 mph (16.1 km/h).

5.4 Broom

Self-propelled, four-wheeled rotary mechanical brooms and/or vacuum brooms capable of operating in both forward and reverse are recommended. Brooms should be in good condition and meet applicable environmental standards.

5.5 Aggregate Handling

Standard bucket loader capable of transferring aggregate to the haul trucks is required. Standard rear discharge dump trucks of sufficient number to maintain adequate production relative to the size of the project are required.

6. Equipment Calibration

6.1 Asphalt Distributor

The distributor shall be calibrated by applying asphalt emulsion for a minimum 300-foot (91.4 m) continuous section. The amount of material distributed shall be within 5% of the intended application rate at the intended width to be used on the project and shall be verified by use of the strapping stick as supplied by the equipment manufacturer. Neither a visual gauge indicating volume nor the computer readout shall be used as a calibration method. Asphalt emulsion application rate is expressed in gal/yd^2 (L/m^2). Alternate calibration methods may be employed as approved by the agency.

6.2 Aggregate Spreader

The aggregate spreader shall be calibrated using aggregate intended to be used on the project. Place two square tarps (typically supplied with the spreader) that measure exactly 1 yd^2 (1 m^2), adjacent to each other and in front of the spreader. Allow room for the spreader to reach operating speed and discharge aggregate while passing over the tarps. Carefully collect each tarp at the corners and, using a hand-held scale (typically supplied with the spreader), determine the weight of the aggregate on each. The weight should not vary by more than 5% between tarps. Aggregate spread rate is expressed in lb/yd^2 (kg/m^2). Alternate calibration methods may be employed as approved by the agency.

7. Test Strip

Prior to the beginning of the project, the contractor may be required to perform a test strip in a suitable area such as a parking lot or staging area to assure the materials, contractor personnel, and equipment are suitable to produce a satisfactory Modified Chip Seal. The location for the test strip shall be approved by the owner. The test strip may be conducted as part of the calibration procedure and may be performed as part of the project.

8. Weather

The Modified Chip Seal shall not be placed when rain is likely prior to curing of the product or when freezing conditions are expected within 24 hours of application. Both ambient temperature and roadway surface temperature in all areas shall be minimum 50°F (10°C) and rising before beginning application.

9. Traffic Control

Prior to start of the project, a traffic control plan shall be developed to address all aspects of traffic control, including without limitation, coordination with local officials and traffic control equipment and methods. The traffic control plan is intended to promote controlled traffic flow through the project in order to protect the safety of the contractor and owner personnel, the public, and the product. The traffic control plan shall remain in place until the product has sufficiently cured to withstand traffic without damage. Any damage to the newly applied Modified Chip Seal due to construction traffic or the premature release of traffic shall be repaired to the satisfaction of the owner at the contractor's expense.

10. Surface Preparation

10.1 General

Immediately prior to applying the Modified Chip Seal, the pavement surface shall be cleared of all loose material, silt spots, vegetation, and other objectionable material. If water is used, cracks shall be allowed to dry thoroughly before applying the asphalt emulsion. Manholes, valve boxes, drop inlets, and other service entrances shall be protected from the asphalt emulsion by a suitable method. Thermoplastic and other striping should be removed or protected prior to application of the Modified Chip Seal. The owner shall approve the surface preparation prior to application of the asphalt emulsion.

10.2 Cracks

Cracks wider than 0.25 inches (0.64 cm) should be treated with an approved crack sealer 30 days prior to application of the Modified Chip Seal.

10.3 Patching

Prior to application, all failed pavement sections should be removed and patched using accepted best practices. The perimeter of excavated areas should be milled or saw cut to form a neat vertical face. Unstable areas of sub-grade should be backfilled with well-graded and compacted aggregate and filled flush with the pavement surface with an appropriate asphalt aggregate mixture. Patching should be completed 30 days prior to application of the Modified Chip Seal. Patches may require an individual application of asphalt emulsion prior to the full-width application.

SAVE MY ROAD

11. Application

11.1 Asphalt Emulsion

The asphalt emulsion shall be applied by means of a pressure distributor. Application shall be a uniform, continuous, full-coverage spread, and under such pressure as to thoroughly coat the surface at the specified rate. The temperature of the asphalt emulsion during application shall be maintained between 140°F-180°F (60°C-82.2°C). All nozzles within the intended width of spray shall be free of clogs and operating properly, applying a full fan of asphalt emulsion to the pavement. At any time the nozzles are not functioning properly, application is to be stopped immediately and repairs made to the equipment. The width of the emulsion application shall be no greater than the width of the aggregate spreader except where additional passes are required, then the emulsion shall be four inches beyond the aggregate spread at a 50% application rate. At no time shall the emulsion be allowed to break, chill, set up, harden, or otherwise impair the aggregate retention before the aggregate has been properly applied and rolled.

11.2 Aggregate

The aggregate shall be spread evenly onto the asphalt emulsion as soon as possible and within two minutes, within 10% of the application rate specified in the mix design. Spreading shall be accomplished in such a manner that the tires of the trucks and aggregate spreader do not contact the newly applied asphalt emulsion. The width of the aggregate spreader shall be equal to the width of the emulsion spread, except where additional passes are required. Areas that are deficient in aggregate shall be covered immediately with additional material.

11.3 Rolling

Initial rolling shall begin immediately after the application of aggregate. Rollers shall work in tandem and complete a minimum of three passes with a sufficient overlap. Should the rolling operation be delayed, the aggregate and emulsion application shall be halted until the operation regains proper sequencing and timing. The maximum speed of the rolling operations shall be 10 mph (16.1 km/h).

11.4 Traffic

Within 24 hours of curing, excess aggregate shall be swept from the roadway and adjacent areas. High-traffic areas may require sweeping prior to release of traffic control. A minimum of four hours is required for the Modified Chip Seal to retain aggregate in normal conditions. Sweeping shall be delayed if damage to the seal occurs as a result of the broom operation.

12. Material Storage and Handling

12.1 Asphalt Emulsion

Asphalt emulsion stored on the job site must be agitated and heated using the distributor prior to use. Stored emulsion shall be inspected by the contractor for suitability prior to use on the project. The contractor shall comply with all material handling, storage, and safety requirements outlined in any applicable SDS or other product label.

12.2 Aggregate

Aggregate intended for use on the project shall be maintained in such manner as to protect it from contamination by debris and excess moisture. Large or oversized particles shall be removed from the aggregate by screening or other acceptable method prior to use on the project.

13. Inspection

Assure all equipment operations are functional. The nozzles shall be clean and producing a consistent fan of material, providing full and complete coverage of material across the asphalt surface with no overlap or excessive material. Assure the aggregate is evenly applied within design target and with no bare spots. Assure emulsion is within the required temperature range prior to application. Assure aggregate is not extremely wet or dusty. Assure the Modified Chip Seal is sufficiently cured prior to brooming. Document job progress reporting, including weather conditions, material test results, application rates, quantities used, the location of any areas of concern, and reason for concern. Assure traffic control measures are in place and are adequate to satisfy all safety and product requirements.

14. Measurement

The Modified Chip Seal shall be measured in square yards (square meters) covered.

15. Payment

Payment shall be in consideration of all materials, tools, labor, and other items as necessary to complete the project as required by the plans. The Modified Chip Seal shall be paid for by one of the following options:

- By the square yards (square meters) covered
- By the gallons (liters) of emulsion and ton (metric ton) of aggregate used