
Standard Practice for Emulsified Asphalt Scrub Seal Design

AASHTO Designation: R 107-22¹

Adopted: 2022

Technical Subcommittee: 5b, Bridge and Pavement Preservation



**American Association of State Highway and Transportation Officials
555 12th Street NW, Suite 1000
Washington, D.C. 20004**

Standard Practice for

Emulsified Asphalt Scrub Seal Design

AASHTO Designation: R 107-22¹



Adopted: 2022

Technical Subcommittee: 5b, Bridge and Pavement Preservation

1. SCOPE

- 1.1. This standard practice determines application quantities for applying aggregate and emulsified asphalt for scrub seals.
- 1.2. A scrub seal is a four-step process in which the application of emulsified asphalt is followed immediately by a scrub broom to push the emulsion into the cracks in the pavement, followed with an application of a single layer of cover aggregate, and then rolled with a pneumatic tire compactor. There is the option of including a fog seal to help with chip retention.
-

2. REFERENCED STANDARDS

- 2.1. *AASHTO Standards:*
- [M 140](#), Emulsified Asphalt
 - [M 208](#), Cationic Emulsified Asphalt
 - [M 316](#), Polymer-Modified Emulsified Asphalt
 - [T 11](#), Materials Finer Than 75- μ m (No. 200) Sieve in Mineral Aggregates by Washing
 - [T 19M/T 19](#), Bulk Density (“Unit Weight”) and Voids in Aggregate
 - [T 27](#), Sieve Analysis of Fine and Coarse Aggregates
 - [T 84](#), Specific Gravity and Absorption of Fine Aggregate
 - [T 85](#), Specific Gravity and Absorption of Coarse Aggregate
- 2.2. *State Agency Guidance Document:*
- *Minnesota Seal Coat Handbook* (2006, Minnesota DOT)
- 2.3. *Federal Lands Highway (FLH) Standard:*
- FLH T 508, Flakiness Index Value
-

3. TERMINOLOGY

- 3.1. *Definitions:*
- 3.1.1. *average least dimension*—reduction of median particle size to account for flat particles by using flakiness index. Represents the sealcoat thickness in the wheel path where traffic forces flat aggregate to orient on its flattest side.
- 3.1.2. *badly pocked, porous, oxidized*—severe raveling of surface with much cracking.
-

- 3.1.3. *flushed-bleeding*—free asphalt on the pavement surface with little or no texture.
- 3.1.4. *median particle size*—theoretical aggregate size that corresponds to 50 percent passing on the gradation curve.
- 3.1.5. *medium cracking*—medium severity transverse, longitudinal, and/or longitudinal joint cracking. Spalling is observed at the crack edge and some cracks have begun to become interconnected. Block cracking, with cracks creating sections approximately 1 to 3 ft in width, also falls under this distress category.
- 3.1.6. *severe cracking*—high severity transverse, longitudinal, and/or longitudinal joint cracking. There is significant spalling at crack edges and cracks have become interconnected. Alligator cracking is also included in this distress category. Use caution in applying maintenance treatments on pavements with severe cracking distress.
- 3.1.7. *slight cracking*—single or well-spaced low severity transverse or longitudinal cracks. Also includes low severity longitudinal joint cracking.
- 3.1.8. *slightly pocked, porous, oxidized*—raveling beginning to show with moderate cracking.
- 3.1.9. *smooth, non-porous*—some free asphalt on the pavement surface, but with some cracking.

4. SIGNIFICANCE AND USE

- 4.1. This standard practice may be used to determine the quantities of materials required for the construction of emulsified asphalt scrub seals. Practitioners may select one of the two design methods detailed in this practice.
- 4.2. The design practice is similar to those used for chip seals with adjustments made to account for the surface condition and cracking of the existing pavement.

5. SCRUB SEAL DESIGN REQUIREMENTS

- 5.1. *Materials:*
 - 5.1.1. *Scrub Seal*—Emulsified asphalt and aggregate used in the design shall meet the requirements specified by the Owner Agency and shall be representative of the materials used for the project.
 - 5.1.2. *Fog Seal (Optional)*—Common emulsified asphalt grades for fog seal include CSS-1, CSS-1h, SS-1, SS-1h, and CQS-1h. Materials shall meet the requirements of [M 140](#), [M 208](#), or [M 316](#). For fog seal, the emulsified asphalt is usually diluted at a 1:1 ratio with potable water. Materials available for fog seal and dilution rates are subject to the requirements and specifications of the Owner Agency.
- 5.2. *Design Methods for Selection of Initial Emulsion and Aggregate Application Rates:*
 - 5.2.1. All design work will be carried out using aggregate either directly from the job site stockpile or equivalent material from the same source and having substantially the same material properties.
 - 5.2.2. *Modified Kirby Design Method:*
 - 5.2.2.1. *Aggregate Application Rate:*