

High-Performance Surface Seal

Sample Construction Specification Guideline

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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 High-Performance Surface Seal.

2. Description

High-Performance Surface Seal is a laboratory-designed mixture of asphalt emulsion, fine aggregates, mineral filler, water, and other additives accurately proportioned, mixed, and uniformly spread over a properly prepared surface. High-Performance Surface Seal can be used for preventative maintenance on pavement with a sound structure to inhibit oxidative damage.

3. Materials

3.1 Asphalt Emulsion

The asphalt emulsion shall contain asphalt and water and meet the following requirements. The emulsion supplier is required to provide a certificate to the High-Performance Surface Seal Manufacturer confirming that the emulsion used meets all physical property requirements. Any changes to the emulsion requirements must receive approval from both the High-Performance Surface Seal manufacturer and the Engineer.

Table 1			
Property	Test Procedure	Specification	
		Min	Max
Base Emulsion Properties			
Saybolt Viscosity at 25°C, SFS	AASHTO T72	10	100
Sieve Test, %	AASHTO T59	-	0.3
Residue by Distillation, %	AASHTO T59	60	-
Penetration of residue, 100g, 5 seconds at 25°C	AASHTO T49	-	75

3.2 Aggregate

Aggregates shall be pre-mixed with the compounded High-Performance Surface Seal emulsion concentrate at the manufacturer facility or at a manufacturer approved mixing facility prior to arriving at the jobsite.

Aggregate shall be clean, durable, and free from organic matter, dust, clay, silt, or other detrimental substances. The aggregate shall have 100% fractured faces and shall meet the physical property requirements and gradation requirements specified in Table 2 unless otherwise permitted by the High-Performance Surface Seal manufacturer and the Engineer. Any changes to the gradation must receive approval from both the High-Performance Surface Seal manufacturer and the Engineer.

The aggregate supplier is required to provide a certificate to the High-Performance Surface Seal Manufacturer confirming that the aggregate used meets all physical property requirements.

Table 2			
Physical Properties ^a			
Property	Test Procedure	Specification	
		Min	Max
Soundness ^b	AASHTO T 104	-	15% with sodium sulfate, 25% with magnesium sulfate
Micro-Deval ^c	ASTM D 7428	-	20%
Bulk Density	AASHTO T 19	report only	
Moisture	AASHTO T 255	-	3%
Sand Equivalent	AASHTO T 176	70	-
Water absorption	AASHTO T 84	-	4%

Gradation			
Gradation Sieve	Standard	Master Grading Band Limits Percent Passing	Target Tolerance
No. 8	ASTM C 136	100	-
No. 16	ASTM C 136	85-100	-
No. 30	ASTM C 136	65-100	± 5
No. 50	ASTM C 136	10-80	± 5
No. 100	ASTM C 136	0-15	± 5
No. 200	ASTM C 117	0-5	± 1

- Perform testing on aggregates prior to blending with compounded High-Performance Surface Seal emulsion concentrate.
- Follow AASHTO T 104 for aggregate size needed for testing.
- Perform Micro-Deval testing on aggregate larger than No. 60 Sieve.

4. Mix Design

High-Performance Surface Seal shall be a uniform mixture of emulsified asphalt, water, mineral filler, fine aggregate, and other additives as required. Prior to completing the mix design, the manufacturer will verify that the compounded High-Performance Surface Seal emulsion concentrate in the absence of aggregate is durable and resistant to repeated scrubbing (>60 cycles per mil loss after 7-day cure, tested according to modified ASTM D2486). Upon request, the Manufacturer shall submit to the Materials and Tests Engineer a mix design with certified test results, project number, and a representative sample of the High-Performance Surface Seal mixture. The High-Performance Surface Seal mix design shall contain a maximum total sand content of 30% by weight. Any changes to the mix design requirements must receive approval from both the High-Performance Surface Seal manufacturer and the Engineer.

Completed High-Performance Surface Seal, prior to being loaded for installation, shall meet the requirements specified in Table 3.

Table 3			
Property	Test Procedures	Specification	
		Min	Max
Residue by Evaporation, %	AASHTO T59	45	60
Viscosity, Brookfield, @ 77°F, RV-4 spindle, 20 rpm, cPs	ASTM D2196 ^a	500	5000
Density, lb/gal	AASHTO T59	9.0	12.0

a. ASTM D2196 modified to exclude the use of a shaker. Sample will be well mixed by hand prior to temperature equilibration.

5. Equipment

5.1 Asphalt Distributor

Approval: The asphalt distributor must be approved prior to use.

Agitation System: Must be equipped with a full sweep agitation system to maintain a uniform mixture of fine aggregate and compounded finished asphalt emulsion.

Pumping System: The system must be capable of handling fine aggregate mixtures and should have enough power to operate the entire spray system.

Weigh Scales: Must be equipped with weigh scales that can print tickets, including the date, time, and weight of the applied product per shot.

Application Rate Calculation: Field personnel will receive a weigh ticket, and the application rate must be calculated based on the measured surface area covered.

Spraying Capacity: The asphalt distributor should be capable of spraying the product across full lane widths with each pass.

Equipment Calibration: The asphalt distributor must be calibrated to the correct application rate before the project begins, in the presence of the engineer. Calibration must also occur at least once during each week of production. No equipment will be allowed to operate until calibration is completed and accepted. Additional calibrations may be needed during production, as directed by the engineer.

6. Equipment Calibration

6.1 Asphalt Distributor

The asphalt distributor must be calibrated to the correct application rate before the project begins, in the presence of the engineer. Calibration must also occur at least once during each week of production. No equipment will be allowed to operate until calibration is completed and accepted. Additional calibrations may be needed during production, as directed by the engineer.

The asphalt distributor shall be calibrated by applying compounded finished 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

Alternate calibration methods may be utilized as approved by the agency.

7. Test Strip

Prior to the beginning of the project, the contractor must perform a test strip in a suitable area such as a parking lot or staging area to determine the correct settings for the equipment, including pump settings, spray bar height, and ground speed. 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 considered as part of the project.

8. Weather

The High-Performance Surface Seal shall not be placed when rain is possible 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 55°F and rising before beginning application. Warmer temperatures are preferred up to 90°F for best performance. If the pavement temperature is above 90°F mist with water to cool to avoid causing the sealer to dry too quickly.

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 High-Performance Surface 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. Application of the surfacing mixture shall be suspended early enough each day to permit traffic to safely travel over the completed work before sunset.

10. Surface Preparation

10.1 General

Immediately prior to applying e Seal, the pavement surface shall be cleared of all loose material, silt spots, sand, dust, oil, vegetation, and other objectionable material. Do not flush water over cracks or apply pressured water to cracked pavement. Severely raveled or porous pavements may require a bond coat. Asphalt concrete inlay may be required in rut deformations. Patch any holes, raveled areas, and low areas with asphalt concrete.

The contractor shall provide a means for clean straight lines at the transition points of the installation area. In applying High-Performance Surface Seal, the Contractor shall use effective means to protect structures, walls, curbs, etc. from discoloration or spattering.

11. Application

A 0.021-inch orifice tip size is recommended. Note that tip size and pressures may vary based on application rate.

Two separate layers are required. The first layer shall be thoroughly dry and free of any damp areas before the second layer application begins. Pavement should be free from oil and grease before coating. Do not apply when rainfall is expected for 24 hours.

Machine settings shall match the following application rates.

LAYER PLACEMENT RATE (GAL/SY)

- 1 0.20 minimum
- 2 0.16 minimum

All applications shall be consistent in delivery with uniform coverage of the surface without streaking.

Application along gutters and shoulders shall be straight, uniform and at the appropriate application rate.

The contractor shall not dilute the mixture.

Approved traffic control measures shall be used by the Contractor to protect High-Performance Surface Seal from traffic until the new surface will support traffic without damage. Flaggers, warning signs, and barricades shall be provided by the Contractor to properly control traffic from traveling on the wet surface. All traffic control devices shall be removed from the travelled roadway at the end of the day.

12. Inspection

A field inspection by the Engineer will be conducted to verify uniform coverage and completion of the contracted work. Any overspray onto unintended surfaces as described elsewhere in the plans shall be cleaned and restored to original condition at no additional pay. If the over sprayed items cannot be cleaned, they shall be removed and replaced at no additional pay. Streaking, which causes a non-uniform surface appearance, in the opinion of the Engineer, shall be corrected at no additional pay. Any de-bonding of High-Performance Surface Seal caused by surface contaminants, dirt or other issues shall be corrected and the area re-sprayed with High-Performance Surface Seal at no additional pay.

13. Measurement

Measurement will be made of the number of square yards of accepted High-Performance Surface Seal, complete in place.

The length shall be the actual length measured along the surface of the treatment. The width shall be the designated width of the completed surface.

14. 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.