Section 503. PAVER PLACED SURFACE SEAL

503.01. Description. This work consists of providing and placing paver placed surface seal (PPSS), including preparing existing pavement and constructing PPSS, uniform in texture, density, and smoothness with no measurable segregation.

503.02. Materials. Provide materials in accordance with the following.

Aggregate 902
Asphalt Emulsion, PPSS 904
Asphalt Binder, ... 904

A. **Asphalt Binder Selection Criteria.** Provide PG Asphalt Binder in accordance with Table 503-1.

Table 503-1
Performance Graded Asphalt Binder Selection Criteria

Location	PG Asphalt Binder
North of M-72 in lower peninsula and the upper peninsula	PG 64-28P
South of M-72 (including M-72)	PG 70-28P
MDOT Metro Region only	PG 70-22P

B. **PPSS Mixture Design.** Submit a mix design from a Department-approved laboratory to the Engineer, 5 working days before beginning construction. Design the mixture so asphalt binder produces a film thickness of at least 9 microns. Calculate the film thickness in accordance with the *Hot Mix Asphalt Materials, Mixture Design and Construction,* 2nd Edition, National Center for Asphalt Technology.

Provide a mix design in accordance with Table 503-2 and the minimum film thickness. Do not use reclaimed material in the mixture.

C. **Mix Design Documentation.** Provide the following documents with the mix design:

1. *Contractor Bituminous Mix Design Communication* (Form 1855);
2. *Sample Identification*, include with AWI sample (Form 1923);
3. Average maximum percent draindown for each test temperature (Report);
4. *Tensile Strength Worksheet* (Form 1937);
5. Calculation of film thickness (Report);
6. The material sources for the mix design; and
7. Test results verifying the mix meets the requirements in Table 503-2 and the specified film thickness.

Table 503-2
Mixture Requirements

Mix Type	Aggregate	% Asphalt Binder Content	Draindown Test (% Max) AASHTO T 305 (a)	Moisture Sensitivity (% Min) AASHTO T 283 (b)
B	30SS	4.8–6.2	0.10	80
C	27SS	4.6–6.2	0.10	80

a. Conduct the draindown test at the JMF asphalt content plus 0.5%. Test the draindown at the mixing temperature plus 27 °F but do not exceed 350 °F.
b. Compact specimens for T-283 testing using the Superpave Gyratory Compactor (SGC) at 100 gyrations with target dimensions of 150 mm diameter × 95 mm ±3 mm height or 100 mm diameter × 63 mm ±3 mm height. No adjustment is made to the number of revolutions to target an air void range. Cure the loose bituminous surface course mix 1 h at the specified application temperature. Minimum time for vacuum saturation: 20 min. Specimens subject to freeze-thaw conditioning. If an anti-stripping agent is needed, report the amount and type with the mix design.

503.03. Construction.

A. **Equipment.** Provide equipment, in accordance with section 107, and this subsection.

1. **Self-Priming Machine.** Provide a self-priming machine that sprays polymer modified emulsion membrane and places an HMA surface course over the membrane in a single pass, continuous application. Ensure the self-priming machine does not contact the polymer modified emulsion membrane before applying the HMA surface course. Provide a self-priming machine with the following:

   a. A receiving hopper with at least two heated, twin screw, and mix feed augers.
   b. An integral storage tank for the polymer modified asphalt emulsion.
   c. Twin expandable emulsion spray bars, immediately in front of the HMA feed augers and ironing screed. Meter the spray bars to measure the application of polymer modified asphalt emulsion and monitor the rate of spray across the width of the paving pass.
   d. A variable-width vibratory heated ironing screed. Ensure the screed is adjustable and capable of providing positive and negative crowns to the thickness and cross section shown on the plans.

2. **Compacting Equipment.** Use at least two steel-wheel rollers each weighing at least 10 tons. Ensure rollers meet the requirements of subsection 501.03.A.5.

B. **Pre-Production Meeting.** Before beginning work, conduct an on-site pre-production meeting with the Engineer to discuss the following:

1. Work schedule,
2. Traffic control plan,
3. Equipment calibrations and adjustments,
4. Condition of equipment for safety criteria,
5. Quality control plan, and
6. Contractor's authorized representative.

C. **Weather and Seasonal Limitations.**

1. **Weather Limitations.** Place PPSS on dry pavement. Do not place PPSS if the air temperature is below 50 °F.

2. **Seasonal Limitations.** Place PPSS from May 1 to October 15.

D. **PPSS Placement.** Ensure the quality of the PPSS, including materials sampling, testing, and construction inspection. Provide and install a finished product as required.

1. **Emulsion Membrane.** Apply polymer modified asphalt emulsion membrane at a rate of 0.20 gallon per square yard. The Engineer will allow a field adjustment of the emulsion application rate for changes in existing pavement surface conditions or limitations of the HMA mix design. Apply the polymer modified asphalt emulsion membrane at a temperature from 140 °F to 175 °F.

2. **PPSS.** Apply Type B surface course mixture at a rate of 73 pounds per square yard and Type C surface course mixture at a rate of 83 pounds per square yard. Ensure the application rate provides a PPSS thickness that prevents the fracture of aggregate by the screed. Apply the PPSS mix at a temperature from 300 °F to 330 °F and compact before the mat cools to 185 °F.

3. **Rough Joints.** Repair transverse or longitudinal construction joints from PPSS operations that cause bumps or poor riding joints, as determined by the Engineer, using a mutually agreed upon repair method.

E. **Ride Quality.** Before PPSS placement, the Department will determine the ride quality of the original pavement, except shoulders, using the International Roughness Index (IRI). The Department will retain plots of the original roadway profiles.

Ensure the pavement ride quality does not diminish after applying PPSS. The Engineer may accept the finished pavement surface without measuring the new roadway profile if, in the Engineer's opinion, the final ride quality at least equals the original pavement.

If the Engineer determines the ride quality is diminished after PPSS placement, correct the ride quality. If the Contractor disputes the diminished ride quality assessment, the Department will re-measure the pavement profile and compare the IRI values for the finished pavement surface to the original IRI values. Correct reductions in the ride quality, as directed by the Engineer, to produce a finished pavement surface with an IRI at least equal to that of the original pavement.

F. **Quality Control (QC).** Provide and follow a QC plan, in accordance with requirements of section 501, that will maintain QC for production and construction processes, as required. Provide the Engineer a copy of the QC plan for review and approval, before the pre-production meeting. The Engineer may verify QC test accuracy and production controls.

Notify the Engineer immediately and stop mixture production if the QC test results exceed any tolerance shown in Table 503-3. Identify the cause of the deviation and determine the corrective action necessary to bring the mixture into compliance prior to resuming mixture placement.

Perform, at a minimum, the following QC tests.

1. **HMA Surface Course.** Perform three yield checks, daily, to determine the application rate of the HMA surface course. Ensure the yield does not exceed a tolerance of ±5 pounds per square yard from the target application rate.

2. **HMA Mixture.** Take a sample of the HMA mix from the truck transports in accordance with ASTM D 979 and reduce the sample size in accordance with MTM 313. Test this sample before beginning production the following day. Test results must fall within the quality control tolerances specified in Table 503-3.

Table 503-3
PPSS Quality Control Tolerances

Sieve Size	Mix Type B Tolerance, % (a)	Mix Type C Tolerance, % (a)
¾ in	—	—
½ in	—	±5
⅜ in	±5	±5
No. 4	±5	±5
No. 8	±4	±4
No. 200	±1	±1
PG Asphalt Binder Content, %	±0.4	
Film Thickness	9 microns (Min)	

a. Tolerance in reference to values listed in Table 902-7.

G. **Acceptance.** Upon completion of all or a portion of the PPSS placement, as determined by the Engineer, review the PPSS with the Engineer for compliance with the contract documents. If the Department

determines the PPSS does not comply with the contract, repair defects at no additional cost to the Department.

503.04. Measurement and Payment.

Pay Item	**Pay Unit**
Paver Placed Surface Seal, Type __	Square Yard

A. **Paver Placed Surface Seal.** The unit price for **Paver Placed Surface Seal**, of the type required, includes the cost of preparing the surface, placing temporary pavement markings, and placing a membrane and HMA surface course for full width coverage.