

## SECTION 218 – MASTIC SURFACE TREATMENT

### 1. GENERAL

This work shall consist of mixing cationic asphalt emulsion, aggregate, water, and other additives as needed and applying the mixture on a surfacing or pavement as shown on the plans or as directed by the engineer

### 2. MATERIALS

Asphalt Emulsion. Bituminous material shall be an asphalt emulsion, grade CSS-1H, in accordance with the following table. The bituminous material shall show no separation after mixing. The emulsion shall be sampled in accordance with AASHTO T40.

<b>Asphalt Emulsion (CSS-1H)</b>			
	<b>Min.</b>	<b>Max.</b>	<b>Test Method</b>
Viscosity, Saybolt Furol at 25 C, s	20	100	AASHTO T 72
Storage stability test, 24 hr, %	--	1 <sup>a</sup>	AASHTO T 59
Particle charge test	Positive <sup>b</sup>		AASHTO T 59
Sieve test, %	--	0.10 <sup>c</sup>	AASHTO T 59
Cement Mixing, %	--	2	AASHTO T 59
Residue, %	60	--	AASHTO T 59
<b>Test on Residue from Distillation</b>	<b>Min.</b>	<b>Max.</b>	<b>Test Method</b>
Penetration, 25 C, 100 g, 5 s,	15	150	AASHTO T 49

<sup>a</sup> The storage stability test may be waived provided the asphalt emulsion storage tank at the mixing site has adequate provisions for circulating the entire contents of the tank, and provided satisfactory field results are obtained.

<sup>b</sup> If the particle charge test is inconclusive, material having a maximum pH value of 6.7 will be acceptable.

<sup>c</sup> The sieve test may be waived if material applies without clogging nozzles and satisfactory field results are obtained.

Aggregate. The composite aggregate blend shall be free of cemented or conglomerated material and shall not have any detrimental material.

The aggregate blend shall contain a minimum of 50 percent non-carbonate aggregate.

The aggregate blend shall have 100% of the material passing the No. 8 (2.36 mm) sieve. For spraying applications, the following gradation shall be used:

Sieve	Percent Passing
No. 8 (2.36 mm)	100
No. 16 (1.18 mm)	80-100
No. 30 (600 µm)	75-100
No. 50 (300 µm)	50-85
No. 100 (150 µm)	40-65

No. 200 (75 µm)	25-50
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Water. Water shall be potable and free of harmful soluble salts.

Additives. Any other material added to the mixture or to any of the component materials to provide the required properties shall be supplied by the manufacturer.

Material Acceptance. All aggregate shall be sampled, tested and approved by the engineer prior to use or as directed by the engineer.

### 3. JOB MIX FORMULA

The manufacturer shall develop the job mix formula and shall present certified test results for the engineer's approval prior to use. Mix acceptance will be subject to satisfactory field performance. The mixture shall contain a minimum of 25% aggregate by weight of wet mixture and shall meet the following requirements.

#### Mix Design Requirements:

	<b>Min.</b>	<b>Max.</b>	<b>Test Method</b>
Wet-Track Abrasion Loss (3 day) Soak, g/ft <sup>2</sup>	--	7.5	TB 100 (ISSA)
Asphalt Content by Ignition Method, percent	30	--	AASHTO T-308-08 <sup>c</sup>

<sup>c</sup> This method is modified to account for a fine emulsion mixture.

### 4. EQUIPMENT

Mixing Equipment. The mixture shall be mixed thru a central mixing plant. Aggregate, asphalt emulsion, water and additives shall be proportioned by volume or weight (mass) utilizing the mix design approved by the Engineer. The tank shall be equipped with a full sweep agitator capable of producing a homogeneous mastic surface treatment mix.

Individual volume or weight (mass) controls for proportioning each item to be added to the mix shall be provided. Each material control device shall be calibrated and properly marked. Each device shall be accessible for ready calibration and placed such that the engineer may determine the amount of each material used at the time.

Mobile Distribution Unit (MDU). The MDU shall be fully self-contained and shall have a storage tank with full sweep agitation, hydraulic system, operator controls, pumping system with multiple piston pumps, material filters and spray bar capable of applying a full lane width. The equipment shall have sufficient available power to operate the full spray system and the agitation system at the same time.

As material is delivered to the job site and applied, the proportion of the mixture shall be maintained as it was manufactured per the mix design.

The storage tank shall have an internal full sweep mixing system driven via an hydraulically powered drive unit. The storage tank shall have sufficient mixing capability to assure proper suspension of fine aggregates in the surfacing mix.

The MDU shall be equipped with a system allowing the measurement and calculation of application rates. This system shall include a tank scale to determine weight of material, have the ability to print a document showing this information, and a GPS to determine distance and area.

The spray system shall have low shearing piston driven pumps regulated by the hydraulic control system. The pumps shall provide operation resulting in high volume and low potential for cavitation. The pumps shall be engineered to allow the system to handle fine aggregate filled materials.

The spray system's pumps shall be equipped with a primary filter prior to the pumps and a secondary filter system for fine post pump filtration of the material. The MDU shall have an air driven clean out system for each nozzle to eliminate clogging. An operator shall be able to monitor the spray system insuring even distribution of material and be able to control the clean out system of each nozzle during application. The MDU shall have a safe area on the back of the MDU for an operator to monitor and control clean out of the spray system.

The applicator spray bar shall be sized with volumetric capacity to dampen any possible pressure ripples by providing even pressure to all spray tips. Attachments such as a spray shield and wind deflector shall be available.

## 5. CONSTRUCTION REQUIREMENTS

Surface Preparation. The surface shall be thoroughly cleaned of all vegetation, loose material, dirt, mud and other objectionable material immediately prior to application of the mixture.

Protection of Adjacent Structures. Protect the surfaces of all structures and other roadway appurtenances from damage or splatter of the mastic surface treatment. Restore any damaged or splattered appurtenances to their original condition at own expense.

Weather Limitations. Mixture shall not be placed when either the air temperature or the temperature of the surface on which the mixture is to be placed is below 50° F (10° C), when it is raining, when there is a chance of temperatures below 32° F (0° C) within 24 hours after placement, or as directed by the engineer.

Dilution. Contractor shall not dilute mixture in the field with water or any other additive except as approved by the manufacturer.

Placement. The exact rate will be as shown on the plans or as directed by the engineer.

The mixture shall be uniform and homogeneous after applying on the existing surfacing and shall not show separation of the emulsion and aggregate after setting.

Placement of the material may be permitted in multiple passes at the election of the contractor. Contractor shall provide a mat ensuring total coverage and especially free of voids and pit holes.

6. MEASUREMENT AND PAYMENT

Measurement of mastic surface treatment will be made to the nearest square yard (SY), complete in place, and accepted by the engineer. The accepted quantity of mastic surface treatment will be paid for at the contract unit price for Mastic Surface Treatment.