# Surface Sealing Treatment NJSP-15-28

**1.0 Description.** This work shall consist of furnishing and applying a surface sealing treatment to the existing roadway as shown on the plans. The surface treatment shall contain a mixture of cationic asphalt emulsion, latex polymer, fine aggregate, water, and other additives as needed.

**2.0 Mix Design.**

**2.1** At least 30 days prior to placing the surface sealing treatment on the project, the contractor shall submit a mix design for approval to Construction and Materials. One gallon of the asphalt emulsion and 2500 grams of each aggregate material comprising the combined gradation shall be submitted with the mix design.

**2.2 Required Information.** At a minimum the Surface Sealing mix design shall contain the following information on the job mix formula:

1. Emulsified asphalt source and properties required.
2. Fine aggregate source, Acid Insoluble Residue (AIR) results, absorption, and deleterious requirements required.
3. Blended aggregate gradation required.
4. Mixture performance test results required.
5. Additives and their sources required.

**2.3 Mix Design Gradation Requirement.** The fine aggregate, mastic materials such as mineral filler, and/or other additives that comprise the combined gradation shall have 100 % of the material passing the No. 8 (2.36 mm) sieve. For spraying applications, the following mix gradation shall be required:

|  |  |
| --- | --- |
| **Sieve** | **Percent Passing** |
| No. 8 (2.36 mm) | 100 |
| No. 16 (1.18 mm) | 95-100 |
| No. 30 (600 μm) | 85-100 |
| No. 50 (300 μm) | 40-70 |
| No. 100 (150 μm) | 30-65 |
| No. 200 (75 μm) | 25-60 |

**2.4 Mixture Performance Requirements.** The mixture shall meet the following requirements.

|  |  |  |  |
| --- | --- | --- | --- |
| **Testing Requirement** | **Min.** | **Max.** | **Test Method** |
| Maximum Wet-Track Abrasion Loss,  grams per square meter. | -- | 80 g/m2 | TB 100 (ISSA) Modifieda |
| Asphalt Content by Ignition Method, percent | 30% | -- | AASHTO T-308-08b |
| Percent Solids, Asphalt Residue by Evaporation, percent | 48% | -- | AASHTO T59,  Section 6 |

aThis method is modified to a three day soak and samples prepared per MoDOT TM 86.

bTo account for high percentage of binder, sample size should be adjusted based on laboratory oven capability.

**2.5 Required Additives.** A minimum of 3% latex polymer by weight of wet mixture is required in the surface sealant treatment and shall be listed in the job mix formula.

**2.6 Other Additives.** Any other material added to the mixture or to any of the component materials shall be listed in the job mix formula.

**3.0 Material Certification.**

**3.1** The materials used in the mix design shall be certified to meet the following specifications.

**3.2 Bituminous Material.** The bituminous material shall be an asphalt emulsion in accordance with the following table. The bituminous material shall show no separation after mixing. The emulsion shall be sampled in accordance with AASHTO T 40.

|  |  |  |  |
| --- | --- | --- | --- |
| **Asphalt Emulsion (CSS)** | | | |
|  | **Min.** | **Max.** | **Test Method** |
| Viscosity, Saybolt Furol at 25 C, s | 15 | 100 | AASHTO T 72 |
| Particle charge test | Positiveb | | AASHTO T 59 |
| Residue, % | 60 | -- | AASHTO T 59 |
| **Test on Residue from Distillation** | **Min.** | **Max.** | **Test Method** |
| Penetration, 25 C, 100 g, 5 s, | 30 | 100 | AASHTO T 49 |

bIf the particle charge test is inconclusive, material having a maximum pH value of 6.7 will be acceptable.

**3.3 Noncarbonated Fine Aggregate Requirement.** The fine aggregate material (not including mastic material or additives) shall contain 100 percent non-carbonate aggregate. The fine aggregate material shall have an acid insoluble residue (AIR), MoDOT Test Method TM 76, of at least 75 percent insoluble residue.

**3.4 Absorption and Deleterious Requirement.** The absorption of the fine aggregate (not including mastic material or additives) shall have a maximum absorption limit of 2.0 percent tested in accordance with AASHTO T84. The percentage of deleterious substances shall not exceed the following values in accordance with AASHTO T113:

|  |  |
| --- | --- |
| **Item** | **Percent by Weight** |
| Clay lumps | 1.0 |
| Total lightweight particles, including coal and lignite | 0.5 |
| Other deleterious substances | 0.1 |

**3.5** Lightweight fine aggregate sources not meeting the absorption limits or deleterious requirements of Section 3.4 above shall be in accordance with the following requirements tested on the parent material:

|  |  |
| --- | --- |
| **Property** | **Percent Maximum Limit** |
| Micro-Deval, ASTM D7428, percent, max | 20 |
| Los Angeles Abrasion for Lightweight Aggregate, MoDOT Test Method TM 78, percent, max | 50 |

**3.6 Water.** Water shall be potable and free of harmful soluble salts.

**4.0 Construction Requirements.**

**4.1** The surface sealing mixture may be mixed and applied through mobile distribution equipment as described herein.

**4.2 Mixing Equipment.** All materials shall be thoroughly mixed as to produce a homogenous surface treatment. Individual volume or weight controls for proportioning each material in the mix shall be provided. Materials shall be added by a calibrated controlled device capable of monitoring the amount of material used at the time.

**4.3 Distribution Equipment.** The Distributor shall be equipped with a full sweep agitation system, a pumping system designed to handle fine aggregate mixes, and sufficient power to operate the full spray system and the agitation system at the same time. The Distribution equipment shall be equipped with a monitoring system that ensures the even distribution of material and measures the application rate of the mix.

**4.4 Storage Tanks.** If the mix is being delivered from a central mixing plant, then a job site storage tank shall have the minimum capacity of the entire transport load. The storage tank shall have an internal full sweep mixing system having a mixing capability of providing a homogenous mix representing the mix design at any given location within the tank.

**4.5 Environmental Protection.** The contractor shall comply with all federal, state, and local laws and regulations controlling pollution of the environment.

**4.6 Weather Limitations.** Bituminous material shall not be placed on any wet surface or when the ambient temperature or the temperature of the pavement on which it is to be placed is below 60⁰ F. Temperatures shall be obtained in accordance with MoDOT Test Method TM 20.

**4.7 Surface Preparation.** The surface shall be thoroughly cleaned immediately prior to placing the surface treatment.

**4.8 Protection of Other Surfaces.** All curbs, manhole covers, and ADA facilities shall be protected from the spray or laydown of the bituminous mixture during placement.

**4.9 Dilution.** The bituminous material shall not be diluted in the field with water or other additives except as approved by the manufacturer.

**4.10 Placement.** Placement of the mix shall be performed in two passes with a minimum coverage of 0.125 gal/yd2 per pass and the minimum total coverage of 0.25 gal/yd2. Contractor shall provide a mat ensuring total coverage free of voids and pit holes.

**4.11 Opening to Traffic.** After the sealant application, the roadway shall remain closed until the surface is tack-free and capable of being open to traffic without tracking.

**4.12 Basis of Acceptance.**

**4.12.1 Quality Control.** Two samples shall be collected during production on a project. One sample shall be retained for the engineer. The contractor shall test the other sample and verify the mix design in accordance with Section 2.4 of this specification and submit the test results to the engineer.

**4.12.2 Field Performance.** The finished surface sealant treatment shall be evaluated by the engineer based on the following criteria. Any of the following shall be considered unacceptable material.

1. The presence of loose aggregate or synthetic materials that may cause damage to traveling vehicles.
2. A final surface with insufficient coverage or delamination.

**5.0 Method of Measurement.** Final measurement of the surface treatment will not be made except for authorized changes during construction, or where appreciable errors are found in the contract quantity. Where required, measurement of the surface treatment, complete in place, will be made to the nearest square yard. The revision or correction will be computed and added to or deducted from the contract quantity.

**6.0 Basis of Payment.** The accepted quantity of surface treatment, in place, will be paid for at the contract unit (square yard) price. No separate payment will be made for any additional construction methods or processes. Manufacturer shall report the unit weight (lbs/gallon) of the surface sealing material on the bill of lading.