ITEM 410.2040 01 M – SEAL COATING ASPHALT SURFACES

DESCRIPTION. Apply a properly proportioned mixture of coal tar pitch emulsion containing latex rubber, mineral aggregate, and water, to a sound, hot mix asphalt surface. Seal coating is designed to protect off-street hot mix asphalt surfaces such as parking lots from the deleterious effects of weather, moisture, oxidation, fuel spillage, and other contaminants.

MATERIAL REQUIREMENTS.

A. Bituminous Materials. Use a coal tar pitch emulsion prepared from a high temperature, coke-oven tar conforming to ASTM D 490, Standard Specification for Road Tar, Grades RT-11 or RT-12. Petroleum tar and oil and water gas tars shall not be used. The coal tar emulsion shall conform to all requirements of Federal Specification R-P-355, Pitch, Coal Tar Emulsion (Coating for Bituminous Pavements) except as modified in Table 1 – Physical Requirements.

Copolymer latex rubber will be added to the coal tar pitch emulsion. This material will contain 51-70 parts butadiene and 30-40 parts acrylonitrile. The minimum solid content will be 40%, particle size will be less than 80 nanometers, and silicone content will be 4% of the rubber content.

Acceptance of the coal tar pitch emulsion containing latex rubber will be based on Manufacturer's Certification of the test results.

TABLE 1 – PHYSICAL REQUIREMENTS

Property	Test Method	Requirement
Water Content %	ASTM D 95	50, maximum
Non Volatile, %	ASTM D 2939	47, minimum
Ash of Non Volatiles, %		30 min. – 40 max.
Solubility of Non Volatiles in CS^2, %		20, minimum
Specific Gravity @ 25/25ºC	ASTM D 490	1.16, minimum
Drying Time, firm set	ASTM D 4866	8 hour, maximum
Resistance to Heat		No blistering, sagging, or slipping.
Resistance to Kerosene		No penetration of loss of adhesion.
Resistance to Water		No blistering, loss of adhesion, or tendency to re-emulsify.
Flexibility		No flaking, cracking of loss of adhesion to the substrate.

B. Aggregates. Use aggregate meeting the requirements of Section 703-01, Fine Aggregate, of the Standard Specifications.

Stockpile. Build an aggregate stockpile at a location approved by the Engineer. When blending multiple aggregates, use automated proportioning and blending equipment to produce a uniformly graded stockpile. Screen the aggregate at the stockpile, prior to delivering it to the equipment.

1. Testing. Take three samples, according to Materials Method 5, "Plant Inspector's Manual for Bituminous Concrete Mix Production" and test for gradation, according to AASHTO T 11, "Materials Finer than 75 µm Sieve in Mineral Aggregates by Washing," and AASHTO T 27, "Sieve Analysis of Fine and Coarse Aggregates." Each sample must contain material from the face of the stockpile.

Submit the test results to the Regional Materials Engineer (RME) for approval before using material from the stockpile.

2. ***Gradation Requirements and Tolerances.*** The stockpile gradation requirements and maximum tolerances are given in Table 2 – Gradation Requirements and Tolerances. The design value plus the stockpile tolerance cannot exceed the gradation limits.

TABLE 2 - GRADATION REQUIREMENTS AND TOLERANCES

Screen Sizes (mm)	2.36	1.18	0.850	0.600	0.425	0.150
Percent Passing (%)	100	97 – 100	85 – 100	15 – 85	2 – 15	0 – 2.0
Maximum Stockpile Tolerance	–	–	± 5.0%	± 5.0%	± 3.0%	–

3. ***Approval.*** Stockpile gradation approval is valid until new material is added to the stockpile. Approval will be based on the average of three gradation tests. If the percent passing exceeds the stockpile tolerance or is outside the gradation limits for any sieve, or ranges from the high end to the low end of the tolerance limits for any two consecutive sieves, the stockpile will be rejected.

   All seal coating placed with material from a stockpile rejected for gradation will be rejected pending submission and approval of a mix design representing the stockpile gradation and mixture placed.

C. Water. Use water meeting the requirements of §712-01, Water.

MIXTURE DESIGN. Develop a job mix formula, following the procedure outlined in ASTM D 3910, Standard Practices for Design, Testing, and Construction of Slurry Seal. The mixture design must meet the all of material requirements. Aggregates will be added to the mix at a rate of 0.3 to 0.7 kilograms per liter of emulsion. All materials used to develop the rubberized sand slurry mixture design must be representative of the materials to be used on the project. The mixture design must clearly list the proportions of mineral aggregate, water, percent of coal tar asphalt emulsion containing latex rubber, and the application rate. Submit the mixture design for approval to the Director, Materials Bureau at least 14 days before the start of work. Mixture design approvals are valid until December 31st, of the year in which they are approved. The seal coating slurry shall not be produced for payment until a job mix formula has been approved by the Engineer.

CONSTRUCTION DETAILS.

A. Equipment. The Engineer will evaluate and approve the equipment.

1. Use equipment that is capable of providing a uniform coated surface at the required application rates. Distributors or Spray Units used for the application of the seal coat shall use positive displacement pumps. These units will be equipped with removable covers, tachometers, pressure gauges, and volume-measuring devices. Squeegee/brush units will be attached to a drag box. They will be properly adjusted so that the application of the seal coat is done without streaks.

2. The seal coat will be mixed in a tank; capable of continuously mixing the entire contents contained in the unit and will accurately deliver a predetermined proportion of aggregate, water, and coal tar emulsion containing latex rubber. The completely mixed product will be discharged into the drag box without segregation.

Equipment will be kept clean and in working order. Calibrations will be done to assure that the quantities used during construction conform to the job mix design. The RME or representative of the RME will evaluate the equipment for acceptance. Calibrations are valid for 90 days.

The counters must be accessible to the Engineer or authorized representative to verify the

quantities used during construction. If requested by the Engineer, verify the quantities during construction.

B. *Weather and Seasonal Limitations.* The requirements of Section 402-3.01, Weather and Seasonal Limitations apply, except as modified herein. Do not apply a seal coat under any of the following conditions: when the surface is wet, in the rain, when the relative humidity exceeds 85% and/or if the air temperature is expected to fall below 10ºC within 24 hours after application. Application will be permitted to begin when pavement temperature is greater than 10ºC and is expected to rise above 15ºC. Stop applying the slurry if the surface or air temperature drops below 10ºC during placement.

C. *Mixture Consistency.* Produce a homogeneous mixture, without lumps, balls, unmixed aggregate, segregation, excess water, or excess emulsion.

Control the break time and mix consistency with mixture proportion adjustments. Keep the mixture from setting until after application. Notify the Engineer of all mixture adjustments before making them.

D. *Surface Preparation.* Shall be done in accordance with Section 633 – Conditioning Existing Pavement of the Standard Specifications including the following:

1. Existing pavement markings will be abraded so that at least 90% of existing markings are removed. When abrading existing pavement markings, the maximum surface depth of the HMA pavement that can be removed shall not exceed 4 mm. The method of abrading may include sand blasting, water blasting, surface grinding, or other method approved by the Engineer.

2. Potholes, softened asphalt areas, or raveling will be cleaned and patched with a patching material and method approved by the RME.

3. Thoroughly clean the entire area to be seal coated. The surface of the area to be seal coated must be free of vegetation, dirt, oil, and other foreign materials. Verification of cleanliness of the asphalt surface shall be done by placing a sheet of water over the entire pavement surface. Should any area show an oily ring then this area will need to be cleaned again. Problem areas that are difficult to clean may be sprayed with latex based primer that has been approved by the RME. Remove all debris and standing water.

4. Cover all manhole covers, water boxes, catch basins, and other such utility structures within the area being paved with plastic, building felt, or other material approved by the Engineer. Remove the covers each day.

E. *Application.* Asphalt surfaces that were recently patched will have to cure a minimum of 15 days prior to seal coating. However, newly paved surfaces will require at least 30 days of cure time prior to seal coating.

1. Application Rate. Apply seal coating in a uniform manner to provide a constant, adherent coating. Two coats of seal coating shall be applied over the existing hot mix asphalt surface. In addition to the two coats of seal coating a latex based primer coat will be placed in parking areas that contain fuel spills as detailed in the Contract Plans or as required by the Engineer. Seal coating shall be applied at a rate of 0.4 to 0.7 L/m^2 per application. Allow each coat to dry and cure before applying any subsequent coats. No traffic will be allowed on the newly seal coated surfaces if additional coats are needed on subsequent days.

2. ***Coverage.*** Apply the rubberized slurry seal to the pavement evenly to produce a smooth riding surface with no streaks, excess buildup, thin, or uncovered areas.

F. ***Curing.*** Protect the rubberized slurry seal from traffic until the mixture sufficiently is cured to resist damage. The time required will vary based on the mix design and environmental conditions. Repair damage from traffic to the Engineer's satisfaction.

METHOD OF MEASUREMENT. This work will be measured as the number of square meters of seal coating satisfactorily applied in accordance with the Contract documents and as directed by the Engineer.

BASIS OF PAYMENT. The unit price bid for seal coating shall include the cost of furnishing all labor, materials, and equipment necessary to satisfactorily complete the work, including pavement marking removal and hot mix asphalt repairs. Additional work, such as cleaning the pavement surface, joint sealing, crack filling, and utility grade adjustments will be paid for under their appropriate items.

Payment will be made under:

Item No.	Item Description	Pay Unit
410.2040 01 M	Seal Coating Asphalt Surfaces	Square Meter