

SECTION 32 12 36
SLURRY SEAL (POLYMER MODIFIED)

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Work on this Section includes applying a mixture of polymer modified asphaltic emulsion, aggregate, set-control additives, and water spread on a surface or pavement.

1.2 SUBMITTALS

A. Data and Test Reports:

1. Submit laboratory report:

- a. Test results used in the mix design
- b. Proportion of the following material based on the aggregate's dry weight
 - i. Aggregate
 - ii. Filler determined from tests, minimum and maximum
 - iii. Water, minimum and maximum
 - iv. Asphalt solids content
 - v. Set control agent
- c. Comparison of slurry seal test results to the specified values

2. Mix Design

3. Daily Moisture data as required by Oklahoma DOT Standard Specifications.

4. Aggregates:

- a. Gradation
- b. Sand Equivalent
- c. Durability Index

B. Certifications:

- 1. Experience: The contractor shall certify that their superintendent has at least 2 years' experience of the application of a slurry seal.
- 2. Water: The contractor shall certify that the water is from a potable source.

C. Provide SDS (Safety Data Sheets) for all chemicals used on ground.

1.3 MIX DESIGN

- A. At least 7 working days before slurry seal placement commences, the Contractor shall submit for approval a laboratory report of tests and proposed mix design covering the specific materials to be used on the project.

- 1. The mix design shall comply with the requirements of AASHTO M

208, except that the cement mixing test requirement is excluded.

- B. The tests and mix design shall be performed by a laboratory capable of performing the applicable International Slurry Seal Association (ISSA) tests.
 - 1. Mixing test must pass at the maximum expected air temperature at the project site during application.
 - 2. Using project source aggregate asphalt emulsion and set-control agents if used.
- C. The laboratory report shall be signed by the laboratory that performed the tests and mix design and shall show the results of the tests on individual materials, comparing the test results to those required by the specifications. The report shall clearly show the proportions of aggregate, filler (as determined from the tests, minimum and maximum), water (minimum and maximum), asphalt solids content based on the dry weight of aggregate, and set-control agent usage. Previous laboratory reports covering the same materials may be accepted provided they are made during the same calendar year.

1.4 PROPORTIONING

- A. Proportion slurry seal ingredients in compliance with the authorized mix design. Proportion and blend different aggregate types before adding other ingredients.
- B. Asphalt emulsion shall be added at a rate determined by the mix design and within the range specified. A job mix design shall be submitted by the Contractor for approval that conforms to the specification limits, and that is suitable for the traffic, climate conditions, curing conditions and final use. This will include recommended application rate of slurry to suit the job conditions.
- C. The Slurry Seal mixture shall be proportioned by the operation of a single start/stop switch or lever, which automatically sequences the introduction of aggregate, emulsified, asphalt, admixtures, if used, and water to the pug mill.
- D. Calibrated flow meters shall be provided to measure both the addition of water and liquid additives to the pug mill. If necessary for workability, a retarding agent, that will not adversely affect the seal, may be used.
- E. Water, and retarder if used, shall be added to ensure proper workability and permit uncontrolled traffic on the slurry seal no more than three (3) hours after placement without the occurrence of

bleeding, raveling, separation or other distress and also prevent development of bleeding, raveling, separation or other distress within fifteen (15) days after placing the slurry seal.

1.5 MATERIAL SAMPLING

- A. The minimum acceptable sampling frequency shall be as follows:
1. Asphalt Emulsion - minimum once daily
 2. Mineral Aggregate - minimum once weekly
 3. Application mixture - minimum once daily
- B. All Samples of asphalt emulsion and aggregate for slurry seal shall be captured from the storage tank of the slurry seal application truck in use on the work. Inspector shall observe the sampling of 1 gallon of the emulsion, 10 lbs. of the slurry seal aggregate and 1 gallon of the mixture. Contractor shall provide the samples and containers to the Inspector.

PART 2 - PRODUCTS

All materials shall meet the requirements of the Texas Department of Transportation Standard Specifications.

2.1 AGGREGATE FOR SLURRY SEAL

- A. The aggregate shall be a Type II Aggregate crushed gravel or crushed stone meeting the requirements of the Texas Department of Transportation Standard Specification Item 302, Aggregates for Surface Treatments. Limestone aggregates shall not be used as mineral aggregate. The aggregate shall meet the following gradation requirements:

Table 1

<u>Sieve Size, (mm)</u>	<u>Type II Percent Passing (by weight)</u>
3/8" (9.5)	100
#4 (4.75)	90 - 100
#8 (2.36)	65 - 90
#16 (1.18)	45 - 70
#30 (0.600)	30 - 50
#50 (0.300)	18 - 30
#100 (0.150)	10 - 21
#200 (0.075)	5 - 15
Residual Asphalt Content, % weight of dry aggregate	7.5-13.5
Application Rate, lb/sq.yd Based on mass of dry agg.	10-15
Los Angeles Test (AASHTO 6)	35 max.
Sand Equivalent Test (AASHTO T 176)	45 min.

- B. The amount of smooth-textured sand of less than 1.25 percent water absorption is limited to not more than 50 percent of the total combined aggregate.

2.2 ASPHALT EMULSION

- A. The polymer modified emulsified asphalt shall be LMCQS - 1h that has been modified to meet the following requirements by addition of polymers:

<u>Table 1</u>	<u>Min.</u>	<u>Max.</u>
Viscosity, Saybolt Furol at 77° F (25° C), Sec.: Test Method: ASTM D244	20	100
Storage stability test, one day		1%
Particle Charge test:	Positive	
Sieve test, percent:		0.1
Distillation*: Oil distillate, by vol. of emulsion, %:		0.5
Residue from distillation:		62.0
Polymer Solids, percent	3.0	
Penetration, 77° F (25° C), 100 g, 5 sec.: Test Method: ASTM D5	55	90
Ductility, 77° F (25° C), 5 cm/min., cm: Test Method: ASTM D113	70	
Solubility in trichloroethylene:	97%	
Softening point, R. & B., ° F Test Method: ASTM	135° (57° C)	
Polymer Content (by weight)	> 2.5%	

* The standard distillation procedure shall be modified as follows: The temperature on the lower thermometer shall be brought slowly to 349° F ± 11° F (176° C ± 6°C) and maintained at this point for 20 minutes. Complete the total distillation in 60 ± 5 minutes from the application of heat.

- B. The polymer modified emulsified asphalt slurry seal shall be so formulated that when the paving mixture is applied with the relative humidity at not more than 50% and ambient air temperature of at least

77° F (25° C), it will cure sufficiently that rolling traffic can be allowed to use the surface in one hour with no damage to the surface.

2.3 MINERAL FILLER

- A. Mineral filler shall be Portland Cement, hydrated lime, limestone dust, fly ash, or other approved filler which meets the requirements of AASHTO M 17. Portland cement shall be a commercial quality, non-air-entraining cement and shall not be considered as mineral filler for the purpose of satisfying the gradation requirement of the aggregate.

2.4 WATER

- A. Water should be potable, free of soluble salts and of such quality that the asphalt will not separate from the emulsion before the slurry seal is placed.

2.5 STOCKPILING AND STORAGE

- A. If the mineral aggregates are stored or stockpiled, they shall be handled in such a manner as to prevent segregation, mixing of the various materials or sizes, and contamination with foreign materials. The grading of aggregates supplied to the mixing plant shall be uniform. Suitable equipment of acceptable size shall be furnished by the Contractor to work the stockpiles and prevent segregation of the aggregates. Stockpile & Storage location may not be available at the work site. The Contractor is responsible for determining storage locations before submission of bid/proposal.
- B. The asphalt material storage shall be ample to meet the requirements of the plant. Asphalt emulsion shall not be heated to a temperature in excess of 160° F (71° C). All equipment used in the storage and handling of asphalt material shall be kept in a clean condition at all times and shall be operated in such manner that there will be no contamination by foreign matter.

PART 3 - EXECUTION

3.1 MIXING AND SPREADING EQUIPMENT

- A. All equipment used for materials handling and mixing and placing of mixture shall be maintained in good repair and operating condition and subject to the approval of the Contracting Officer. Any equipment found to be defective with a potential for affecting the quality of the paving mixture will be rejected by the Contracting Officer and must be replaced or repaired before its use or continued use.
- B. The material shall be mixed by a self-propelled mixing machine which shall be a continuous flow mixing unit able to accurately deliver

and proportion the aggregate, emulsified asphalt, mineral filler, additives, and water to a revolving multi-blade mixer and discharge the mixed product on a continuous flow basis. The machine shall have sufficient storage capacity for aggregate, emulsified asphalt, mineral filler, and water to maintain an adequate supply to the proportioning controls. The machine shall be equipped with self-loading devices which provide for the loading of all materials while continuing to lay slurry seal, thereby minimizing construction joints.

- C. Individual volume or weight controls for proportioning each material to be included in the mixture shall be provided. Each material control device shall be calibrated and properly marked.
- D. Calibration shall be performed prior to starting the project and in the presence of the Contracting Officer. Documentation shall be included for each individual calibration of material at the various settings, which can be related to the machine's metering devices. The machine will be equipped with a metering device for the mineral filler which indicates the quantity used. No machine will be allowed to work on the project until it has met all the requirements of TxDOT Item 520 and the calibration has been completed and/or accepted.
- E. Calibration shall be verified by the Contractor using Tex-922-K Part III under observation by the COR.
- F. The emulsion pump shall be a positive displacement type and shall be equipped with a revolution counter or similar device so that the amount of emulsion used may be determined at any time.
- G. The mixing machine shall be equipped with a water pressure system and nozzle type spray bar to provide a water spray immediately ahead of and outside the spreader box.
- H. The mixing machine shall be equipped with an approved fines feeder and liquid additives feeder that shall provide a uniform, positive, accurately metered, predetermined amount of the specified mineral filler.

3.2 SEASONAL LIMITATIONS

- A. No slurry seal shall be placed after October 15 or before May 1 without prior approval by the Contracting Officer. Slurry seal shall not be applied if either the pavement or ambient temperature is 55° F (13° C) or less.

3.3 SURFACE PREPARATION

- A. If cracks in the existing pavement are from 1/8 to 1 inch wide, treat the cracks in accordance with contract specifications. Do not place the slurry seal until the COR determines that the crack treatment is cured.
- B. Before you place slurry seal, clean the pavement surface. Remove loose particles of extraneous materials, including paving and dirt. Use any nondestructive method, such as flushing or sweeping.
- C. Before applying slurry seal, cover manholes, valve and monument covers, grates, or other exposed facilities located within the area of application, using a plastic or oil resistant construction paper secured by tape or adhesive to the facility being covered. Reference the covered facilities with a sufficient number of control points to relocate the facilities after the application of the seal coat. In areas inaccessible to spreading equipment, spread the slurry seal mixture with hand tools or other authorized methods. If placing with hand tools, first lightly dampen the area. Do not handle or shift the material.

3.4 PLACEMENT

- A. Workmanship. No excessive buildup, uncovered areas or unsightly appearance will be permitted at longitudinal or transverse joints.
- B. Longitudinal joints shall be placed at lane lines. Excessive overlap will not be permitted. Care shall be taken to ensure straight lines along the roadway centerline, lane lines, shoulder, or curb lines. Lines at intersections shall be kept straight to provide a good appearance. Care shall be exercised in areas that require hand work so that the finished surface is uniform in texture, density, and of overall appearance comparable to that produced by the spreader box.
- C. Areas of non-uniform texture, density, or appearance will be patched as directed. Patching shall be done using the same process and equipment that originally surfaced the area. Hand working of patches will not be permitted, except as authorized by the Contracting Officer.
- D. The Contractor shall supervise and direct the work, using their best skill and attention. The work shall be directed using any means as is the custom of the trade to complete the work in an acceptable manner.

3.5 PROTECTION

- A. Traffic Control. It shall be Contractor's responsibility to provide

adequate traffic control measures, such as barricades, cones, advance warning signs, flagmen, etc., to protect the uncured slurry seal from all types of traffic and to provide traffic safety in the construction area. These measures shall be employed in a safe manner and must not be used until approved by the Contracting Officer. The Contractor shall leave half of the roadway available for cemetery traffic at all times. The Contractor shall coordinate with the COR to plan work in parking areas.

- B. Opening the roadway surface to traffic does not constitute acceptance of the work. Any damage to the uncured slurry seal material will be the responsibility of the Contractor and the damaged surface shall be repaired to the satisfaction of the Contracting Officer.

3.6 FINAL CLEAN-UP

- A. Remove all debris, rubbish, and excess material from the work area.

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