

VIRGINIA DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION FOR

EMULSIFIED ASPHALT SLURRY SEAL

July 21, 1997

I. DESCRIPTION:

This work shall consist of furnishing and applying an emulsified asphalt slurry seal in accordance with this provision and as directed by the Engineer.

II. MATERIALS:

A. **Asphalt Emulsion:** Emulsified asphalt shall conform to the requirements of Section 210 of the Specifications; except it shall be a quick setting emulsion and the following requirements shall apply:

1. The emulsion shall be designated CQS-1h cationic quick setting emulsion and shall conform to the requirements of Cationic Type CSS-1h.
2. The Cement Mixing Test is waived.
3. Emulsion Setting Time - Prior to shipment of each new formulation of emulsified asphalt, the Contractor shall perform a towel test to verify that the emulsion will set sufficiently quick for early release of traffic. Testing for setting time shall be in accordance with VTM-89.

B. **Aggregate:** Aggregate shall be crushed stone and except for locations where the posted speed limit is 15 mph or less and for roadways in Traffic Groups I through VII, it shall be non-polishing. The quality of aggregate shall conform to the requirements of Section 202 except that the loss on soundness shall not exceed 18%. The sand equivalent value shall not be less than 40.

Gradation shall be as follows for the type mix specified:

DESIGN RANGE TABLE

SIEVE	Type A	TYPE B	TYPE C
SIZE	(% Passing)	(% Passing)	(% Passing)
No. 3/8	100	100	100
No. 4	100	90-100	70-95
No. 8	65-90	65-90	45-70
No. 16	45-70	45-70	32-54
No. 30	30-50	30-50	23-38
No. 50	18-33	18-33	16-29
No. 100	10-21	10-21	9-20
No. 200	5-15	5-15	5-12
Design Asphalt Content Range *	8.0 - 10.5%	8.0 - 10.5%	7.0 - 9.5%

* Residual Asphalt content by weight of dry aggregate.

- C. **Mineral Filler:** Mineral filler shall conform to the requirements of Section 201 of the Specifications.
- D. **Water:** Water used in the mix shall conform to the requirements of Section 216 of the Specifications.
- E. **Mix Design:** The Contractor shall submit for the Engineer's approval a mix design for each type of slurry on Form TL-127, results of the Compatibility Test as per VTM-60, and wear loss by the Wet Track Abrasion Test as prepared by an approved testing laboratory. The Wet Track Abrasion Test (WTAT) shall be performed in accordance with VTM-14. The wear loss shall not be greater than 75 grams per square foot. The wear loss shall apply to the asphalt content limits designated on the job mix formula. Such limits shall be determined by selecting the optimum asphalt content from the WTAT loss curve and within the ranges shown in the Design Range Table above in II. B and applying a tolerance of plus or minus 1.5 percent.

- F. **Test Strip:** The Contractor shall place a test strip for approval by the engineer prior to beginning the work. The mix consistency shall be determined by the Contractor in accordance with current International Slurry Seal Association Technical Bulletin Number 106 and shall be 2.5 cm, plus or minus 0.5 cm. Calibration data as specified in IV. B shall be provided prior to placing the test strip.
- G. **Mix Sampling and Testing Requirements:** Testing for gradation shall be based on an approved aggregate producer's modified acceptance production control plan. Gradation shall conform to the ranges specified in II. B.

Samples for asphalt content shall be taken from the completed mix and will be tested by the Department. The frequency of sampling and testing will be established by the Engineer based upon the Department's current acceptance program. The asphalt content will be determined by the Ignition Method (VTM-102) or nuclear gauge (VTM-90), as determined by the Engineer. The Contractor shall perform a minimum of two consistency tests for each day's production as specified in F, and shall conduct additional tests as requested.

Materials from the job site will be tested for Wet Track Abrasion in accordance with VTM-14 and the Department's current acceptance program. The WTAT loss shall not be greater than 75 grams per square foot.

III. EQUIPMENT

- A. **General:** All equipment, including hand tools, shall be designed or suitable for the application of slurry and be in good working order. A mobile unit is required and shall be equipped with an accurate mineral filler feeder, a fog type spray bar, be capable of an operation speed of 60 feet per minute, and have capacity to store mix components to produce a minimum of five (5) tons of slurry seal. The equipment shall be capable of delivering a continuous uniform and homogeneous mixture of aggregate, emulsion, water, and mineral filler to the spreader box. Mixing aid additive dispensers, if used, shall be capable of uniformly adding the additive to the water line prior to entering the mixing chamber.
- B. **Equipment Calibration:** The Contractor shall provide current year data for each mixing unit utilizing materials from the same sources as those to be used on the project. Data for each unit shall be in the form of a graphic scale indicating the stone gate setting required to obtain the residual asphalt content as determined in the mix design. Such data shall be maintained with each unit.
- C. **Spreader:** The spreader shall be equipped with a flexible type squeegee positioned in contact with the pavement surface. The spreader shall be designed to apply a uniform spread with a minimum loss of slurry. The

spreader box shall be equipped with augers extending its full width which shall uniformly distribute the slurry mixture across the entire width of the box. The box shall be equipped with an approximately 18 inch wide burlap drag to smooth the slurry surface.

IV. PROCEDURES:

- A. **Beginning Work:** The Contractor shall notify the Engineer at least three work days prior to beginning work. Two weeks prior to beginning work, the Contractor shall provide 6 quarts of liquid emulsion and 50,000 grams of aggregate material for the Department's use in determining asphalt content.
- B. **Preparation of Surface:** The surface upon which slurry seal is to be applied shall be thoroughly cleaned of all loose material, vegetation, silt spots, and other objectionable materials by either brooming or the use of compressed air.
- C. **Application:** When warranted by local conditions or when the pavement temperature is above 90°F, the surface of the pavement shall be fogged with water at a rate of 0.05 gallons per square yard immediately preceding the pass of the spreader. The slurry mixture shall be of a consistency such that it "rolls" in the spreader box in a continuous mass. Slurry that segregates in the spreader box, so that flowing of liquids (water and emulsion) is evident, is not acceptable and shall not be applied. The liquid portion of a slurry mixture shall not flow from either the spreader box or the applied slurry. Evidence of such flow shall be sufficient cause for rejection of the applied material. A mixing aid additive may be used when necessary to accommodate slow placements or high temperatures.

The slurry shall be uniformly placed on the road in full lane widths up to and including 12 feet. Excess buildup of slurry on longitudinal and transverse joints shall be corrected.

Treated areas shall not be opened to traffic until such time as the slurry seal has cured to the extent that it will no longer be damaged by traffic. (Where earlier opening to traffic is necessary, such as at entrances, the contractor may lightly sand the surface using the same aggregate as in the mix and may be required to remove excess aggregate from the roadway in curb and gutter sections.) The applied slurry mixture shall be uniform in texture and shall not flush under traffic. In the event a failure occurs prior to acceptance, the Contractor shall repair or replace the failed treatment as directed by the Engineer.

Slurry Seal surface course shall not be applied on surfaces containing puddled water and on surfaces less than 50°F, except that in the early AM the

minimum surface temperature will be 40°F provided the ambient temperature is expected to be above 60°F.

Should oversize aggregate be encountered, the Contractor shall immediately cease operation until approved corrective measures have been taken.

A certified paving technician shall be at the job site at all times.

- D. **Rate of Application:** The minimum aggregate application rate shall be 16 pounds per square yard for Type B and 20 pounds per square yard for Type C.

The Contractor shall provide to the Engineer aggregate weight tickets, a daily delivery summary, and an estimate of aggregate lost and otherwise not used in the work for each stockpile location. Where disagreements occur, the Engineer shall have the final judgment of such loss.

E. **Test Failure:**

1. Asphalt Content - Samples representing a maximum of 25,000 square yards will be taken from material produced by each mixing unit for asphalt content determination. The asphalt content of such samples shall be within plus or minus 1.5 percent of the approved job mix. When two successive tests from a mixing unit fail or one test fails by more than two percent, that mixing unit shall be removed from service until approved by the Engineer.
2. Consistency Test - Upon failure, adjustment shall be made in the mix immediately and rechecked. If more than two consecutive tests fail, work shall cease. The equipment and/or materials shall be adjusted and approved by the Engineer before proceeding.
3. Wet Track Abrasion Test - Upon failure, adjustment shall be made in the mix and/or process immediately and rechecked. If two or more consecutive tests fail, work shall cease until the cause is determined and remedied and approved by the Engineer.

F. **Price Adjustment:**

1. Emulsified asphalt certified weight tickets showing the residual asphalt content shall be provided to the Engineer. Asphalt not used shall be documented and considered in determining the percent of asphalt used on the total project. Upon completion of the project, the percent of asphalt shall be determined by dividing the calculated weight of residual asphalt by the delivery ticket weight of aggregate used in the work. A one percent reduction in the unit price per square

yard will be applied for each one-tenth percent the residual asphalt content is more than one percent below the approved job mix formula.

2. Application Rate - a three percent reduction in price per square yard will be applied for each pound of aggregate per square yard less than the specified application rate. The square yards retreated, if any, shall be added to the total square yards retreated, if any, shall be added to the total square yards for calculation of application rate. The price adjustment will be applied to the total square yards for which payment is made. Material applied over the specified application rate will not be considered for extra payment.

Price adjustments under 1 and 2 above shall apply concurrently.

v. MEASUREMENT AND PAYMENT

Emulsified asphalt slurry seal will be measured and paid for in square yards on a plan quantity basis for the type specified. Authorized increases and decreases to plan quantities will be adjusted in accordance with Section 109.02 of the Specifications. Payment shall be full compensation for furnishing, applying, testing, and maintenance of traffic.

The Contractor will be paid at the rate of \$15.00 per hour for the removal of vegetation as required, which price shall include each operator and the necessary equipment, maintenance, and all incidentals necessary to perform this operation.

When vacuuming is required by the Engineer, the contractor will be paid \$85.00 per hour for the removal of loose particles, by mobile vacuum unit with no less than an eight cubic yard capacity, which price shall include each operator and the necessary equipment, maintenance and all incidentals necessary to perform this operation.

The required flaggers will not be measured as a separate pay item, when the Engineer determines additional flaggers are necessary, as described in the two flagging conditions in Section 512 Maintenance of Traffic in the contract documents, additional flaggers will be measured in hours and will be paid at the rate of \$10.00 per hour.

Pilot vehicles will be measured in hours of actual use, as required by the Engineer, and will be paid for at the rate of \$15.00 per hour, which price shall include vehicles, necessary warning devices, drivers, fuel and maintenance.