INFORMATION: Engineering Brief No. 35A, SEP 27 1994
Thermoplastic Coal-Tar Emulsion Slurry Seal
Amended Interim Specification

From: Manager, Engineering and Specifications
Division, AAS-200

To: All Regions
ATTN: Manager, Airports Division

Engineering Brief No. 35A provides an updated interim specification for use of a thermoplastic coal-tar emulsion as a slurry seal. The following paragraphs have been revised:

2.1 Aggregate (type and gradation)
3.1 Composition
3.2 Application
4. Test Section
5.3 Preparation of Pavement
5.4 Application of Tack Coat
5.5 Application of Slurry Seal
5.7 Contractor's Certification.

Origonal Signed By
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Attachment

THERMOPLASTIC COAL-TAR EMULSION SLURRY SEAL
(Revised September 1994)

1. DESCRIPTION

1.1 This item shall consist of an application of a thermoplastic resin coal-tar emulsion slurry seal, with mineral aggregate, applied on an existing, previously prepared asphalt surface, in accordance with these specifications.

2. MATERIALS

2.1 AGGREGATE. The aggregate shall consist of sound, durable crushed igneous type stone (crushed basalt, granite, trap rock, etc.) with a hardness greater than 5 on the MOH hardness scale and shall show no more wear than 25 percent when tested in accordance with ASTM C 131. The aggregate shall be free from coatings of clay, organic matter, and other deleterious materials and shall meet the gradation in Table 1 when tested in accordance with ASTM C 136.

Samples of aggregates shall be submitted by the Contractor at least 14 days prior to the start of production. During production, the sampling points and intervals will be designated by the Engineer. The samples will be the basis of approval from the standpoint of the quality requirements of this section.

TABLE 1. GRADATION OF AGGREGATES

Sieve Size	Percentage By Weight Passing Sieves
No. 4	100
No. 8	80-90
No. 16 (1.18mm)	55-70
No. 30 (0.60mm)	35-60
No. 50 (0.30mm)	25-45
No. 100 (0.15mm)	15-25
No. 200 (0.075mm)	5-20

2.2 BITUMINOUS MATERIALS. The emulsion material shall be a thermoplastic coal tar emulsion made up of plastic resin and emulsified coal-tar pitch conforming to the requirements of ASTM D 3320. The thermoplastic coal-tar emulsion shall be manufactured as a complete product which can be tested at the manufacturing plant. The water content of the emulsion shall not exceed 48 percent +/- 1 percent when tested in accordance with ASTM D 244, paragraph 3. A dried film of emulsion shall contain a minimum of 89 percent of a combination of plastic resin and coal-tar with the remaining percentage being inorganic filler. The dried emulsion shall have a softening point greater then 212 degrees F (100 degrees C) when tested in accordance with ASTM D 36. A film of the dried emulsion material, 8 mils thick, shall stretch

to 5 times its original length at 70 degrees F (21 degrees C) without breaking, and recover 35 percent of this length in one minute.

3. COMPOSITION AND APPLICATION

3.1 COMPOSITION. The aggregate shall be mixed with the thermoplastic coal-tar emulsion at the rate of 21-23 lbs per gallon of emulsion into a homogeneous slurry mixture.

3.2 APPLICATION. The thermoplastic emulsion slurry seal shall be applied in one coat at an application rate of 7-8 pounds of slurry per square yard.

4. TEST SECTION. Prior to full production, the Contractor shall prepare a quantity of mixture sufficient to place a test section of approximately 16 feet wide by 100 feet long at the application rate specified in paragraph 3.2. The area to be tested will be designated by the Engineer and will be located on the existing pavement.

The test section should be used to verify the adequacy of the mixture and to determine the exact application rate. The same equipment and method of operations shall be used on the test section as will be used on the remainder of the work. If the test section should prove to be-unsatisfactory, the necessary adjustments to the mix composition, application rate, placement operations and equipment shall be made. Additional test sections shall be placed and evaluated if required.

5. CONSTRUCTION METHODS

5.1 WEATHER LIMITATIONS. The slurry seal shall be applied only when the surface is dry and the air temperature is above 50 degrees F (10 degrees C). It should not be applied when the humidity or impending weather conditions will not allow proper curing.

5.2 EQUIPMENT AND TOOLS. Descriptive information on the mixing and application equipment proposed for use shall be submitted to the Engineer not less than 10 days before work starts. All methods employed in preforming the work and all equipment, tools, and machinery used for handling materials and executing any part of the work shall be subject to the approval of the Engineer before the work is started.

(1) Slurry Machine. The slurry machine shall be a truck-mounted mobile mixing plant with a towed-type spreader box. It shall have a water tank and water pump capable of delivering a constant volume of water.

The slurry machine shall have an agitated storage tank for the thermoplastic emulsion and a non-shearing peristaltic pump with variable rate of flow for the delivery of

this material. The slurry machine shall have a hopper for holding aggregate, supplying this material to the mixing chamber by a conveyor belt. The rate of aggregate delivery shall be volumetrically controlled by an adjustable gate opening. The speed of the conveyor shall be mechanically dependent upon the speed of the peristaltic pump.

The slurry machine shall be a continuous-flow mixing unit capable of delivering predetermined quantities of thermoplastic emulsion, aggregate, and if necessary, water, to the mixing chamber and discharging the thoroughly mixed slurry on a continuous basis. The slurry machine shall deliver the materials to the mixing chamber in a constant proportion in a manner not dependent on power plant or vehicle speed.

The machine shall be equipped with a water spraybar capable of fogging the pavement surface with up to 0.05 gallons of water per square yard.

(2) Batch-Mixing Machine. The batch-mixing machine shall be a truck-mounted 500 to 1000 gallon tank containing suitably-driven mixing blades to combine predetermined quantities of thermoplastic emulsion, aggregate, and, if necessary, water into a homogeneous slurry. It shall be equipped with a water tank and pump capable of delivering a constant volume of water to a spraybar. The spraybar shall be capable of fogging the pavement surface with up to 0.05 gallons of water per square yard.

(3) Spreading Equipment. Attached to the mixing machine shall be a mechanical-type squeegee distributor, equipped with flexible material in contact with the surface to prevent loss of slurry from the distributor. It shall be maintained to prevent loss of slurry on varying grades and adjusted to assure uniform spread. There shall be a lateral control device and a flexible strike-off capable of being adjusted to lay the slurry at the specified rate of application. The spreader box shall have an adjustable width. The box shall be kept clean; dried slurry build-up on the box shall not Se permitted.

(4) Auxiliary Equipment. Other tools or equipment such as power brooms, power blowers, air compressors, hand brooms hand squeegees, etc. , shall be provided as required.

5.3 PREPARATION OF PAVEMENT. Prior to placing the slurry seal, unsatisfactory areas shall be repaired and the surface shall be cleaned of dust, dirt or other loose foreign matter. Any standard cleaning method will be acceptable except that water flushing will not be permitted in areas where

considerable cracks are present in the pavement surface. Remove vegetation growing in cracks with compressed air (hot air lance).

Any painted stripes on the surface to be treated shall be removed before applying the slurry seal.

Small oil spots are be treated by scraping off excess oil, heating with a torch, brushing loosened material away and primed with a solution containing one part water and one part thermoplastic emulsion.

When large oil or grease soiled areas are present, the area shall be cleaned of the contaminants by chemical or mechanical abrasion.

All oil spot areas shall be prime sealed with thermoplastic coal-tar emulsion diluted with 50 percent water applied to the areas at the rate of 0.10 gallons per square yard.

Cracks wider than 1/4 inch shall be routed and sealed with compatible crack filler prior to applying the slurry seal.

A minimum period of 30 days shall elapse between the placement of a bituminous surface course and the application of the slurry seal.

5.4 APPLICATION OF TACK COAT. Following preparation of the pavement, a tack coat of thermoplastic coal tar emulsion diluted with 50 percent water shall be applied to the pavement at the rate of 0.05 gallons per square yard.

5.5 APPLICATION OF SLURRY SEAL. The surface shall be prewet by fogging ahead of the spreader box. Water used in prewetting the surface shall be applied at such a rate that the entire surface is damp with no apparent flowing water in front of the spreader box. The mixture shall be of the desired consistency when deposited on the surface, and no additional elements shall be added. A sufficient amount of mixture shall be carried in the spreader box at all times so that even distribution is obtained. No clumped or unmixed aggregate shall be permitted. No segregation of the emulsion and aggregate fines from the coarse aggregate will be permitted. If the coarse aggregate settles to the bottom of the slurry, the applied slurry will be removed from. the pavement surface.

Upon completion of the work, the slurry shall have no pin holes, bare spots or cracks through which liquids or foreign matter could penetrate to the underlying pavement. No excessive buildup, uncovered aggregate, or unsightly appearance shall be permitted on longitudinal or transverse joints. The finished surface shall present a uniform texture.

In areas where the spreader box cannot be used, the slurry shall be applied by means of a hand squeegee.

5.6 CURING. The slurry shall be permitted to dry a minimum of 24 hours before opening to traffic and shall be sufficiently cured to drive over without damage to the slurry seal.

5.7 CONTRACTOR'S CERTIFICATION. The Contractor shall furnish the manufacturer's certification that each consignment of thermoplastic emulsion shipped to the project meets the requirements of paragraph 2.2. The Contractor shall submit a certification that the material proposed has been in field use for a minimum of 2 years. The Contractor shall furnish a certification demonstrating their experience in the application of a thermoplastic coal tar emulsion slurry seal for a minimum of two years.