

TYPICAL SPECIFICATION FOR MICRO-SURFACING: ROADS

GENERAL

Work under this contract shall consist of the application of modified slurry seal to asphaltic concrete surfaces. The slurry shall consist of a mixture of latex modified emulsified asphalt, mineral aggregate, mineral filler, water and other additives properly proportioned, mixed, and spread evenly on the asphaltic concrete surface in strict accordance to the specifications. The cured slurry shall have a uniform and homogeneous appearance, fill minor cracks, adhere firmly to the existing surface, and have a skid-resistant texture.

Work shall be performed in accordance to the "Recommended Performance Guidelines for Micro-Surfacing" A143 (Revised), January, 1991, published by the International Slurry Surfacing Association (ISSA) with the modifications specified herein.

A notice to proceed with work will be issued to the successful bidder on or after. Work will commence on a date, which is mutually agreeable to both the Contractor and the Department. No work will begin after October 1 or before April 15.

MATERIALS

The slurry seal material shall be a mixture of modified emulsified asphalt (CSS-1HP), mineral aggregate (satisfying the gradation and quality requirements noted below), mineral filler (an approved brand of Portland Cement), clean potable water, and other additives as approved.

The mineral aggregate shall be clean, angular, uniform, and have a Los Angeles (L.A.) abrasion rating of 35 or less.

Aggregate used for this project shall be slag or porphyry sand subject to the following quality requirements:

Measure Test	ASTM C-566
Sieve Analysis	ASTM C-136
Material Passing No. 200 Sieve	ASTM C-1 17
Cleanness	ASTM C-2419
Soundness	ASTM C-88
Hardness	ASTM C-1 31

A stockpile of aggregate shall be dedicated for this project.

International Slurry Surfacing Association Type II gradation slurry is specified. The target mix design will fall within the ranges specified on page 2. Stockpile tolerances are established from the target mix design.

<u>Sieve</u>	<u>Passing</u>	<u>Tolerance %</u>
3/8"	100	
No. 4	90-100	+/-5
No.8	65-90	+/-5
No. 16	45-70	+/-5
No.30	30-50	+/-5
No.50	18-30	+/-4
No. 100	10-21	+/-3
No.200	5-15	+/-2

The following proportioning guidelines are intended for design purposes. Adjustments to the mixture may be made by the Engineer on a site-by-site basis.

Emulsified Asphalt- 6.5% to 13.5% by weight of dry aggregate, or as needed.

Mineral Aggregate- 15 pounds to 20 pounds per square yard, dry weight.

Mineral Filler- 2% minimum by weight of dry aggregate.

Water- As needed to provide proper consistency

Latex-Based Modifier*- A minimum of 2.5% natural or synthetic latex (measured by weight) must be milled into the asphalt emulsion at the time that the emulsion is manufactured to provide the specified properties.

The latex modified asphalt emulsion shall be sampled in accordance with AASHTO T-40 and shall comply with the following requirements:

	<u>Min.</u>	<u>Max.</u>
<u>Tests on Emulsion, AASHTO T-59</u>		
Viscosity, Saybolt Furol at 770 F. (25°C.),s	20	100
Storage Stability Test, 24-Hr., Percent		1 (a)
Particle Charge Test	Positive (b)	
Sieve Test, Percent	0.50	
<u>Distillation, AASHTO T-59</u>		
Residue, Percent	57	
<u>Tests on Residue from Distillation Test</u>		
Penetration, 77* F. (25* C), 100g, 5s AASHTO T-49	40	90
Ductility, 77* F. (25* C.), 5cm/min, cm AASHTO T-51	40	
Solubility in Trichloroethylene, Percent AASHTO T-44		97.5

Note: (a) Waive if storage tank on site can circulate material.

(b) If the particle charge test is inconclusive, material having a maximum pH value of 6.7 will be acceptable.

EQUIPMENT

A. Mixing Equipment: The latex modified emulsion mixture shall be mixed and laid by a truck mounted mixing machine, which shall be able to accurately deliver and proportion the aggregate, Portland Cement, water, additive, and emulsified asphalt to a revolving multi-blade dual mixer, and discharge the thoroughly mixed product. The self contained machine shall have sufficient storage capacity for aggregate, emulsified asphalt, Portland Cement, water and additive to maintain an adequate supply to the proportioning controls.

Individual volume or weight controls for proportioning each item to be added to the mix shall be provided. Each material control device shall be calibrated and properly marked. They shall be accessible for ready calibration and so placed that the Engineer may determine the amount of each material used at the time.

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 of the spreader box as required.

B. Spreading Equipment: The paving mixture shall be spread uniformly by means of a mechanical-type laydown box attached to the mixer, equipped with paddles to agitate and spread the materials throughout the box. These paddles shall be designed and operated so all of the fresh mix will be agitated and to create a turbulence to prevent the mixture from setting-up in the box, causing side buildup and lumps. Flexible seals shall be in contact with the road to prevent loss of mixture from the box. The rear flexible strike-off shall be adjustable. The spreader shall be maintained to prevent the loss of the paving mixture in surfacing super-elevated curves. The spreader box and rear strike-off shall be so designed and operated that a uniform consistency is achieved to produce a free flow of material to the rear strike-off without causing skips, lumps or tears in the finished surface.

CONSTRUCTION REQUIREMENTS

A. Surface Preparation Immediately prior to applying the modified slurry seal, the surface shall be thoroughly cleaned of all vegetation, loose materials, dirt, mud and other objectionable materials and pre-wetted if required. The area to be sealed shall be cleaned with either a blower or suction-type sweeper. Water used in pre-wetting the surface shall be applied at such a rate that the entire surface shall be damp.

B. Application: The mixture shall be spread to fill minor cracks and leave a uniform non-skid film of fine aggregate and asphalt on the surface. Approved squeegees shall be used to spread the slurry seal mixture in areas inaccessible to the

spreader box and other areas where hand-spreading may be required. A hand drag shall be used at the locations to give the same texture as the machine-laid surface.

A sufficient amount of slurry seal shall be carried in all parts of the spreader box at all times so that complete coverage is obtained. No lumping, balling, or unmixed aggregate shall be permitted. Any oversized or foreign materials shall be removed from the aggregate prior to delivery to the mixing machine. No streaks or slick spots shall be left in the finished pavement. A hand drag shall be used on longitudinal joints to give the same texture and thickness on successive passes of the spreader box.

The seam where two (2) spreads join shall be neat-appearing and uniform. If, in the opinion of the Engineer, the seam is rough enough to cause a noticeable effect on steering of an automobile, the seam shall be removed, and new slurry seal patch applied.

All excess material that overruns in gutters shall be removed or squeegeed back onto the surface and burlap-mopped as directed by the Engineer.

All burlap drag materials shall be changed as directed by the Engineer to prevent streaks or slick spots.

All excess material shall be removed from ends of each job site immediately.

When needed, all joints, radii, ends and returns will be squeegeed and burlap mopped as directed by the Engineer.

All discolored curbs and sidewalks shall be cleaned and flushed immediately before material sets up, and all material tracked or lost past ends of job site shall be cleaned up before sealing crew leaves for next location. Any material left on the curbs and sidewalks shall be removed by sandblasting.

- C. Weather Limitations: Micro seal shall be placed only when the surface temperature is 60° F. or above at the job site, the relative humidity is below 80 percent, and the weather is not foggy or rainy.
- D. Seasonal Limitations: Micro seal shall not be constructed after October 1 or before April 15, without written approval of the Engineer.
- E. Curing: Adequate means shall be provided to protect the modified slurry seal from damage by traffic until the mixture has cured sufficiently so that it will not adhere to or be picked up by the tires of vehicles. The treated pavement must be cured to the point where it can handle traffic in 120 minutes. The contractor shall provide signs, barricades and flagmen necessary to control traffic around the area under construction. Any damage done by traffic to the slurry seal shall be repaired by the Contractor at the Contractor's expense.

MAINTENANCE OF TRAFFIC

In accordance with Section 104.4.4, the Contractor will be required to maintain traffic over the project at all times.

It is anticipated that the Contractor will be able to microsurface the project roadways one (1) lane at a time.

It shall be the responsibility of the contractor to provide, install, and maintain such signs, arrow boards, cones, and other facilities that may be necessary to protect the work and provide for safe travel through the construction area. Flaggers may be required from time to time if deemed necessary by the Engineer.

The City shall be responsible for prior notification of residents for no parking on streets during micro-surfacing operations.

Micro-surfacing across intersecting streets shall be done in stages to allow for crossing and turning traffic, or the Contractor may elect to control surface marring by the addition of aggregate blotter material. Such material shall be the same aggregate used in the micro-surfacing mixture.

TEMPORARY LANE MARKERS

Chip Seal Markers are intended for use as temporary delineation during the microsurfacing operation. The markers shall consist of impact-resistant polyurethane plastic with one or two mounted microprism retroreflective elements designed to reflect incident light from one or both directions.

METHOD OF MEASUREMENT

Micro-surfacing will be measured by the square yard.

BASIS OF PAYMENT

The amount of completed and accepted work, measured as provided above, shall be paid for at the contract unit price bid per square yard. Prices shall be full compensation for furnishing all materials, for the cost of all traffic control, and for all labor, tools, equipment and incidentals necessary to complete the work.

MOBILIZATION

A separate lump sum payment will be made for mobilization.

TEMPORARY LANE MARKERS

A separate lump sum payment will be made for lane markers.