SECTION 9
RECOMMENDED PERFORMANCE GUIDELINES FOR MICRO-SURFACING

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A143 (Revised)
May 2003

NOTICE

It is not intended or recommended that these guidelines be used as verbatim specifications. They should be used as an outline, helping user agencies establish their particular project specifications. Users should understand that almost all areas vary as to the availability of materials. Efforts should be made to determine what materials are reasonably available, keeping in mind system compatibility and specific job requirements. Feel free to contact the ISSA for answers to any questions and also for a list of ISSA contractors and companies who could assist.

9.1 Scope

The intent of this guideline is to aid in the design, testing methods, quality control, measurement and payment procedures for the application of Micro-Surfacing.

9.2 Description

Micro-Surfacing is a mixture of polymer-modified asphalt emulsion, mineral aggregate, mineral filler, water, and other additives, properly proportioned, mixed and spread on a paved surface in accordance with a specification and as directed by the Buyers Authorized Representative (B.A.R.).

The mix should be capable of being spread in variable thick cross-sections (wedges, ruts, scratch courses and surfaces) which, after curing and initial traffic consolidation, resists compaction throughout the entire design tolerance range of bitumen content and variable thickness to be encountered. The end product should maintain a skid-resistant surface (high wet friction co-efficient) in variable thick sections throughout the service life of the Micro-Surfacing.

The mix is to be a quick-traffic system, meaning that it will be able to accept traffic after a short period of time. The amount of time will vary from job to job and must be evaluated on an individual job basis.

Normally, these Micro-Surfacing systems have been required to accept rolling traffic on a one-half (1/2) inch (12.7 mm) thick surface within one hour after placement in +75°F (24°C) temperature and 50 percent or less humidity.

9.3 Applicable Specifications

9.3.1 General

There are agencies and testing methods listed in **9.14 Appendix A: Agencies and Test Methods** which form a part of this guideline.

It is normally not required to run all referenced tests on every project. Some of the tests are expensive and take a substantial amount of time to conduct. If the materials to be used on the project have a past record of good performance, the requirements for testing may be decreased. Local paving authorities are often familiar with the materials and should be able to furnish information which would minimize the amount of testing required.

9.4 Materials

9.4.1 Emulsified Asphalt

9.4.1.1 General

The emulsified asphalt shall be a quick-traffic, polymer-modified asphalt emulsion conforming to the requirements specified in AASHTO M208 or ASTM D2397 for CSS-1h. The cement mixing test shall be waived for this emulsion.

The polymer material shall be milled or blended into the asphalt or emulsifier solution prior to the emulsification process.

The minimum amount and type of polymer modifier shall be determined by the laboratory performing the mix design. The minimum amount required will be based on asphalt weight content and will be certified by the emulsion supplier. In general, a three percent (3%) polymer solids, based on asphalt weight, is considered minimum.

The five-day (5) settlement test may be waived, provided job stored emulsion is used within thirty-six (36) hours from the time of the shipment, or the stored material has had additional emulsion blended into it prior to use.

9.4.1.2 Quality Tests

When tested according to the following tests, the emulsion shall meet the requirements of AASHTO M208 or ASTM D2397 for CSS-1h, plus the following in **Table 9-1 Quality Test Methods**.

Table 9-1 Quality Test Methods

AASHTO Test No.	ASTM Test No.	Quality	Specification
AASHTO T59	ASTM D244	Residue after Distillation	62% Minimum

The temperature for this test should be held below 280°F (138°C). Higher temperatures may cause the polymers to break down. Refer to **Table 9-2 Quality Test Temperatures**.

Table 9-2 Quality Test Temperatures

AASHTO Test No.	ASTM Test No.	Tests On Residue	Specification
AASHTO T53	ASTM D36	Softening Point	135°F (57°C) Minimum
AASHTO T49	ASTM 2397	Penetration at 77°F (25°C)	40 - 90[1]
	ASTM 2170	Kinematic Viscosity @ 275 °F (135°C)	650 cSt/sec. Minimum °F

NOTES:
1. Climate conditions should be considered when establishing this band.

Each load of emulsified asphalt shall be accompanied with a Certificate of Analysis/ Compliance to assure that it is the same as that used in the mix design.

9.4.2 Aggregate

9.4.2.1 General

The mineral aggregate used shall be of the type and grade specified for the particular use of the Micro-Surfacing. The aggregate shall be a manufactured crushed stone such as granite, slag, limestone, chat, or other high-quality aggregate, or combination thereof. To assure the material is totally crushed, 100 percent of the parent aggregate will be larger than the largest stone in the gradation to be used.

9.4.2.2 Quality Tests

When tested according to the tests in **Table 9-3 Quality Test Numbers**, the aggregate should meet these minimum requirements.

Table 9-3 Quality Test Numbers

AASHTO Test No.	ASTM Test No.	Quality	Specification
AASHTO T176	ASTM D2419	Sand Equivalent	65 Minimum
AASHTO T104	ASTM C88	Soundness	15% Maximum using NA_2SO_4 or 25% Maximum using $MgSO_4$
AASHTO T96	ASTM C131	Abrasion Resistance	30% Maximum

The abrasion test is to be run on the parent aggregate. The aggregate should meet state-approved polishing values. Proven performance may justify the use of aggregates that may not pass all of the tests shown in **Table 9-3 Quality Test Numbers**.

9.4.2.3 Grading

When tested in accordance with AASHTO T27 (ASTM Cl36) and AASHTO T11 (ASTM C117), the target (mix design) aggregate gradation (including the mineral filler) shall be within one of the bands (or one currently recognized by your local paving authority) as shown in **Table 9-4 Grading Percents**.

Table 9-4 Grading Percents

Sieve Size	Type II Percent Passing	Type III Percent Passing	Stockpile Tolerance
3/8 (9.5 mm)	100	100	
# 4 (4.75 mm)	90 – 100	70 – 90	± 5%
# 8 (2.36 mm)	65 – 90	45 – 70	± 5%
# 16 (1.18 mm)	45 – 70	28 – 50	± 5%
# 30 (600 µm)	30 – 50	19 – 34	± 5%
# 50 (330 µm)	18 – 30	12 – 25	± 4%
#100 (150 µm)	10 – 21	7 – 18	± 3%
#200 (75 µm)	5 – 15	5 – 15	± 2%

The job mix (target) gradation shall be within the gradation band for the desired type. After the target gradation has been submitted (this should be the gradation that the mix design is based on), then the percent passing each sieve shall not vary by more than the stockpile tolerance shown in the above table for each individual sieve, and still remain within the gradation band. It is recommended that the percent passing shall not go from the high end to the low end of the range for any two consecutive screens.

The aggregate will be accepted at the job location stockpile or when loading into the support units for delivery to the lay-down machine. The stockpile shall be accepted based on five gradation tests according to AASHTO T2 (ASTM D75). If the average of the five tests are within the gradation tolerances, then the materials will be accepted. If the tests show the material to be out, the contractor will be given the choice to either remove the material or blend other aggregate with the stockpiled material to bring it into specification. Materials used in blending must meet the quality tests before blend-

ing and must be blended in a manner to produce a consistent gradation. If blending is used, it will require that a new mix design be performed.

Screening shall be required at the stockpile prior to delivery to the paving machine if there are any problems created by having oversize material in the mix.

9.4.3 Mineral Filler

Mineral filler, if required, shall be any recognized brand of non-air entrained Portland cement or hydrated lime that is free from lumps. It may be accepted upon visual inspection. The type and amount of mineral filler needed shall be determined by a laboratory mix design and will be considered as part of the aggregate gradation. An increase or decrease of less than one percent (1%) may be permitted when the Micro-Surfacing is being placed if it is found to be necessary for better consistency or set times.

9.4.4 Water

The water shall be potable and free of harmful soluble salts or reactive chemicals and any other contaminants.

9.4.5 Additives

Additives may be added to the emulsion mix or any of the component materials to provide the control of the quick-traffic properties. They must be included as part of the mix design and be compatible with the other components of the mix.

9.5 Laboratory Evaluation

9.5.1 General

Before the work commences, the contractor shall submit a signed mix design covering the specific materials to be used on the project. This design will be performed by a laboratory which has experience in designing Micro-Surfacing. After the mix design has been approved, no substitution will be permitted, unless approved by the B.A.R.

ISSA can provide a list of laboratories experienced in Micro-Surfacing design.

9.5.2 Mix Design

The contractor shall submit to the B.A.R. for approval a complete mix design prepared and certified by a laboratory. Compatibility of the aggregate, polymer-modified emulsion, mineral filler, and other additives shall be verified by the mix design. The mix design shall be made with the same aggregate gradation that the contractor will provide on the project. Recommended tests and values are shown in **Table 9-5 Mix Design Tests**.

Table 9-5 Mix Design Tests

ISSA Test No.	Description	Specification
ISSA TB-139	Wet Cohesion @ 30 Minutes Minimum (Set) @ 60 Minutes Minimum (Traffic)	12 kg-cm Minimum 20 kg-cm Minimum or Near Spin
ISSA TB109	Excess Asphalt by LWT Sand Adhesion	50 g/ft^2 Maximum (538 g/m^2 Maximum)
ISSA TB-114	Wet Stripping	Pass (90% Minimum)
ISSA TB-100	Wet-Track Abrasion Loss One-hour Soak Six-day Soak	50 g/ft^2 (538 g/m^2) Maximum 75 g/ft^2 (807 g/m^2) Maximum

The wet-track abrasion tests are used to determine the minimum asphalt content and resistance to stripping. Some systems require longer times for the asphalt to adhere to the stone. In these systems, a modified Marshall Stability Test (ISSA TB-148) or Hveem Cohesiometer Test (ASTM D 1560) has been used to confirm asphalt content. Refer to **Table 9-6 Wet-Track Abrasion Tests**.

Table 9-6 Wet-Track Abrasion Tests

ISSA Test No.	Description	Specification
ISSA TB-147	Lateral Displacement Specific Gravity after 1,000 Cycles of 25 Pounds (11.34 kg)	5% Maximum 2.10 Maximum
ISSA TB-144	Classification Compatibility	11 Grade Points Minimum (AAA, BAA)
ISSA TB-113	Mix Time @ 77°F (25°C)	Controllable to 120 Seconds Minimum

The mixing test is used to predict how long the material can be mixed in the machines before it begins to break. It is more for information to be used by the contractor than for quality of the end product.

The mixing test and set-time test should be checked at the highest temperatures expected during construction.

The mix design should report the quantitative effects of moisture content on the unit weight of the aggregate (bulking effect). The report must clearly show the proportions of aggregate, mineral filler (minimum and maximum), water (minimum and maximum), additive usage, and polymer-modified asphalt emulsion based on the dry weight of the aggregate.

All the component materials used in the mix design shall be representative of the materials proposed by the contractor to be used on the project.

The percentages of each individual material required shall be shown in the laboratory report. Adjustments may be required during construction, based on field conditions. The B.A.R. will give final approval for all such adjustments. Refer to **Table 9-7 Mixing Test Percentages**.

Table 9-7 Mixing Test Percentages

Component Materials	Limits
Residual Asphalt	5.5 to 10.5% (5) by dry weight of aggregate
Mineral Filler	0.0 to 3% by dry weight of aggregate
Polymer-Based Modifier	Minimum of 3% solids based on bitumen weight content
Additives	As needed
Water	As required to produce proper mix consistency

9.5.3 Rate Of Application

The Micro-Surfacing mixture shall be of the proper consistency at all times, so as to provide the application rate required by the surface condition. The average single application rate, as measured by the B.A.R., shall be in accordance with the information in **Table 9-8 Application Rates**.

Table 9-8 Application Rates

Aggregate Type	Location	Suggested Application Rate
Type II	Urban and Residential Streets Airport Runways	10 - 20 lb/yd^2 (5.4 - 10.8 kg/m^2)
Type III	Primary and Interstate Routes Wheel Ruts	15 - 30 lb/yd^2 (8.1 - 16.3 kg/m^2) As Required (See **9.15 Appendix B: Re-Profiling Rutted Wheelpaths with Micro-Surfacing**)

Application rates are affected by the unit weight of the aggregate.

Micro-Surfacing is often put down in two full-width passes in place of rut-filling when the rutting or deformation is not severe. When two passes are used, the first pass (scratch course) is made using a metal or stiff rubber strike-off and applying only what the surface demands for leveling. The second course is applied at 15 - 30 lb/yd^2 (8.1 - 16.3 kg/m^2).

9.6 Equipment

9.6.1 General

All equipment, tools, and machines used in the performance of this work shall be maintained in satisfactory working condition at all times to ensure a high-quality product.

9.6.2 Mixing Equipment

The machine shall be specifically designed and manufactured to lay Micro-Surfacing. The material shall be mixed by an automatic-sequenced, self-propelled Micro-Surfacing mixing machine, which shall be a continuous-flow mixing unit able to accurately deliver and proportion the aggregate, emulsified asphalt, mineral filler, control setting additive, and water to a revolving multi-blade, double-shafted mixer and to discharge

the mixed product on a continuous-flow basis. The machine shall have sufficient storage capacity for aggregate, emulsified asphalt, mineral filler, control additive and water to maintain an adequate supply to the proportioning controls. On major highways, the machine may be required to be a self-loading machine capable of loading materials while continuing to lay micro-surfacing, thereby minimizing construction joints. If used, the self-loading machine shall be equipped to allow the operator to have full control of the forward and reverse speeds during applications of the Micro-Surfacing material and be equipped with opposite-side driver stations to assist in alignment. The self-loading device, opposite-side driver stations, and forward and reverse speed controls shall be original equipment manufacturer design.

9.6.3 Proportioning Devices

Individual volume or weight controls for proportioning each material to be added to the mix (i.e., aggregate, mineral filler, emulsified asphalt, additive, and water) shall be provided and properly marked. These proportioning devices are used in material calibration and determining the material output at any time.

9.6.4 Spreading Equipment

The mixture shall be agitated and spread uniformly in the surfacing box by means of twin-shafted paddles or spiral augers fixed in the spreader box. A front seal shall be provided to insure no loss of the mixture at the road contact point. The rear seal shall act as a final strike-off and shall be adjustable. 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. The spreader box shall have suitable means provided to side shift the box to compensate for variations in the pavement geometry.

9.6.4.1 Secondary Strike-off

A secondary strike-off shall be provided to improve surface texture. The secondary strike-off shall have the same adjustments as the spreader box.

9.6.4.2 Rut-Filling Box

When required on the plans, before the final surface course is placed, preliminary micro-surfacing material may be required to fill ruts, utility cuts, depressions in the existing surface, etc. Ruts of one-half (1/2) inch (12.7 mm) or greater in depth shall be filled independently with a rut-filling spreader box, either five foot (5) (1.5 m) or six foot (6) (1.8 m) in width. For irregular or shallow rutting of less than one-half (1/2) inch (12.7 mm) in depth, a full-width scratch-coat pass may be used as directed by the B.A.R. Ruts that are in excess of one and one-half (1-1/2) inches (38.1 mm) in depth may require multiple placements with the rut-filling spreader box to restore the cross-section. All rut-filling level-up material should cure under traffic for at least a twenty-four (24) hour period before additional material is placed on top of the level up.

9.6.5 Auxiliary Equipment

Suitable surface preparation equipment, traffic control equipment, hand tools, and any other support and safety equipment shall be provided by the contractor as necessary to perform the work.

9.7 Calibration

Each mixing unit to be used in the performance of the work shall be calibrated in the presence of the B.A.R. prior to construction. Previous calibration documentation covering the exact materials to be used may be acceptable, provided that no more than 60 days have lapsed. The documentation shall include an individual calibration of each material at various settings, which can be related to the machine metering devices. No machine will be allowed to work on the project until the calibration has been completed and/or accepted.

9.8 Weather Limitations

Micro-Surfacing shall not be applied if either the pavement or air temperature is below 50°F (10°C) and falling, but may be applied when both pavement and air temperatures are above 45°F (7°C) and rising. No Micro-Surfacing shall be applied when there is the possibility that the finished product will freeze within 24 hours. The mixture shall not be applied when weather conditions prolong opening to traffic beyond a reasonable time.

9.9 Notification And Traffic Control

9.9.1 Notification

All homeowners and businesses affected by the construction shall be notified one day in advance of the surfacing. Suitable signs may be posted prior to the surfacing. Should work not occur on the specified day, a new notification will be distributed. The notification shall be in a form of a written posting, stating the time and date that the surfacing will take place.

9.9.2 Traffic Control

All traffic control devices shall be in accordance with State and Federal requirements and, further, shall conform to the requirements of the Manual on Uniform Traffic Control Devices.

Suitable methods shall be used by the contractor to protect the Micro-Surfacing from damage from all types of vehicular traffic. Opening to traffic does not constitute acceptance of the work. The B.A.R. shall be notified of the methods to be used.

9.10 Surface Preparation

9.10.1 General

Immediately prior to applying the Micro-Surfacing, the surface shall be cleared of all loose material, silt spots, vegetation, and other objectionable material. Any standard

cleaning method will be acceptable. If water is used, cracks shall be allowed to dry thoroughly before applying Micro-Surfacing. Manholes, valve boxes, drop inlets and other service entrances shall be protected from the Micro-Surfacing by a suitable method. The B.A.R. shall approve the surface preparation prior to surfacing. No dry aggregate either spilled from the lay-down machine or existing on the road, will be permitted.

9.10.2 Tack Coat

Normally, tack coat is not required unless the surface to be covered is extremely dry and raveled or is concrete or brick. If required, the tack coat should consist of one part emulsified asphalt/three parts water and should be applied with a standard distributor. The emulsified asphalt should be SS or CSS grade. The distributor shall be capable of applying the dilution evenly at a rate of 0.05 to 0.10 gal/yd^2 (0.23 to 0.45 l/m^2). The tack coat shall be allowed to cure sufficiently before the application of Micro-Surfacing. If a tack coat is to be required, it must be noted in the project plans.

9.10.3 Cracks

It is advisable to pre-treat the cracks in the surface with an acceptable crack sealer prior to the application of the Micro-Surfacing.

9.11 Application

9.11.1 General

When required by local conditions, the surface shall be pre-wetted by fogging ahead of the spreader box. The rate of application of the fog spray shall be adjusted during the day to suit temperatures, surface texture, humidity, and dryness of the pavement.

The Micro-Surfacing shall be of the desired consistency upon leaving the mixer. A sufficient amount of material shall be carried in all parts of the spreader at all times so that a complete coverage is obtained. Overloading of the spreader shall be avoided. No lumping, balling, or unmixed aggregate shall be permitted.

No streaks, such as those caused by oversized aggregate, shall be left in the finished surface. If excess streaking develops, the job will be stopped until the contractor proves to the B.A.R. that the situation has been corrected. Excessive streaking is defined as more than four drag marks greater than one-half (1/2) inch wide (12.7 mm) and four inches (4) long (101 mm), or one inch (1) wide (25.4 mm) and three (3) inches long (76.2 mm), in any 29.9 yd^2 (25 m^2) area. No transverse ripples or longitudinal streaks of one-fourth (1/4) inch in depth (6.4 mm) will be permitted, when measured by placing a ten (10) foot (3 m) straight edge over the surface.

9.11.2 Joints

No excess buildup, uncovered areas, or unsightly appearance shall be permitted on longitudinal or transverse joints. The contractor shall provide suitable-width spreading equipment to produce a minimum number of longitudinal joints throughout the project. When possible, longitudinal joints shall be placed on lane lines. Half passes and odd-

width passes will be used only in minimum amounts. If half passes are used, they shall not be the last pass of any paved area. A maximum of three (3) inches (76.2 mm) shall be allowed for overlap of longitudinal lane line joints. Also, the joint shall have no more than a one-fourth (1/4) inch (6.4 mm) difference in elevation when measured by placing a ten (10) foot (3 m) straight edge over the joint and measuring the elevation drop-off.

9.11.3 Mix Stability

The Micro-Surfacing shall possess sufficient stability so that premature breaking of the material in the spreader box does not occur. The mixture shall be homogeneous during and following mixing and spreading. It shall be free of excess water or emulsion and free of segregation of the emulsion and aggregate fines from the coarser aggregate. Under no circumstances shall water be sprayed directly into the lay-down box while laying micro-surfacing material.

9.11.4 Handwork

Areas which cannot be reached with the mixing machine shall be surfaced using hand squeegees to provide complete and uniform coverage. If necessary, the area to be handworked shall be lightly dampened prior to mix placement. Care shall be exercised to leave no unsightly appearance from handwork. The same type of finish as applied by the spreader box shall be required.

9.11.5 Lines

Care shall be taken to ensure straight lines along curbs and shoulders. No runoff on these areas will be permitted. Lines at intersections will be kept straight to provide a good appearance. If necessary, a suitable material will be used to mask off the end of streets to provide straight lines. Edge lines shall not vary by more than ± 2 inches (± 50 mm) horizontal variance in any 96 feet (30 m) of length.

9.11.6 Clean-up

All areas, such as man-ways, gutters, and intersections, shall have the Micro-Surfacing mix removed as specified by the B.A.R. The contractor shall, on a daily basis, remove any debris associated with the performance of the work.

9.12 Method Of Measurement

9.12.1 Area

On smaller projects, the method of measurement and payment is usually based on the area covered, measured in square feet, square yards, or square meters.

9.12.2 Ton And Gallon

On larger projects of over 50,000 yd (41,806 m), measurement and payment are based on the ton of aggregate and the gallons (liters) of emulsified asphalt used.

The aggregate is measured by the actual weight delivered to the job lay-down site or is weighed on the job site with certified scales. Delivery tickets or printed weights shall be used for measurement. The emulsified asphalt used on the project will be measured by the certified tickets for each load delivered to the job site. Any emulsified asphalt not used or returned to the supplier shall be deducted from this quantity.

9.13 Payment

The Micro-Surfacing shall be paid for by the unit area or the weight of the aggregate and the weight or gallons (liters) of emulsified asphalt used on the work and accepted by the B.A.R. The price shall be full compensation for furnishing all preparation; mixing and applying these materials; and for all labor, equipment, tools, test designs, cleaning, and incidentals necessary to complete the job as specified herein.

9.14 Appendix A: Agencies and Test Methods

9.14.1 Agencies

American Association of State Highway and Transportation Officials (AASHTO)

American Society for Testing and Materials (ASTM)

International Slurry Surfacing Association (ISSA)

9.14.2 Test Methods

Table 9-9 Aggregate And Material Filler

AASHTO Test No.	ASTM Test No.	test
AASHTO T2	ASTM D75	Sampling Mineral Aggregates
AASHTO T27	ASTM C136	Sieve Analysis of Aggregates
AASHTO T11	ASTM C117	Materials Finer than No. 200 in Mineral Aggregates
AASHTO 176	ASTM D2419	Sand Equivalent Value of Soils and Fine Aggregate
AASHTO T96	ASTM C131	Resistance to Abrasion of Small-Size Coarse Aggregate by Use of the Los Angeles Machine (This test should be performed on the parent rock that is used for crushing the finer gradation Micro-Surfacing material.)
AASHTO T104	ASTM C88	Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate

Table 9-10 Emulsified Asphalt

AASHTO Test No.	ASTM Test No.	Test
AASHTO T40	ASTM D140	Sampling Bituminous Materials
AASHTO T59	ASTM 244	Testing Emulsified Asphalt
AASHTO M280	ASTM D2397	Specifications for Cationic Emulsion

Table 9-11 Residue From Emulsion

AASHTO Test No.	ASTM Test No.	Test
AASHTO T59	ASTM D244	Residue by Evaporation (This test method may have to be modified by using lower temperatures.)
AASHTO T53	ASTM D36	Softening Point by the Use of Ring and Ball
AASHTO T49	ASTM C2397	Penetration 3.5 oz (100 gm) at 5 Seconds 77°F (25°C)

Table 9-12 Mix Design

ASTM Test No.	ISSA Test No.	Test
ASTM D6372-99a	—	Standard Practice for Design, Testing and Construction of Micro-Surfacing
—	ISSA T100	Test Method for Wet-Track Abrasion of Slurry Seals (This test is used to determine the minimum percent of asphalt in the mix.)
—	ISSA TB109	Excess Asphalt by LWT Sand Adhesion
—	ISSA TB113	Mix Time
	ISSA T114	Wet Stripping Test for Cured Slurry Seal Mixes
—	ISSA T144	Classification Compatibility by Use of the Schulze-Breuer
—	ISSA T148	Modification of Marshall Stability Test
ASTM D1560	—	Hveem Cohesiometer

9.15 Appendix B: Re-Profiling Rutted Wheelpaths with Micro-Surfacing

9.15.1 Rule of Thumb

For every inch of micro-surfacing mix, add one-eighth (1/8) inch (3.2 mm) to one-fourth (1/4) inch (6.4 mm) as a crown to allow for compaction under traffic.

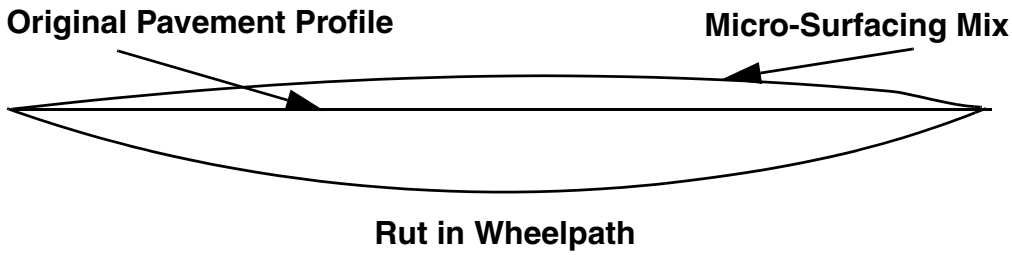

Figure 9-1 Rule of Thumb for Wheelpath Rut Resurfacing

Table 9-13 Wheelpath Rut Resurfacing Quantities

Rut Depth	Micro-Surfacing Quantity Needed
0.5 - 0.75" (12.7 - 19.1 mm)	20 – 30 lb/yd^2 (10.8 - 16.3 kg/m^2)
0.75 - 1.00" (19.1 - 25.4 mm)	25 – 35 lb/yd^2 (13.6 - 19.0 kg/m^2)
1.00 - 1.25" (25.4 - 31.75 mm)	28 – 38 lb/yd^2 (15.2 - 20.6 kg/m^2)
1.25 - 1.5" (31.75 - 38.1 mm)	32 – 40 lb/yd^2 (17.4 - 21.7 kg/m^2)