**401-8 Microsurfacing (Revised 8-13-20)**

1. MICROSurfacing [401] (REVISED 8-13-20)

Description. This work is producing, furnishing, and placing microsurfacing on an approved surface.

Materials. Provide microsurfacing with the specified asphalt emulsion, mineral filler, and the specified aggregate type meeting the following requirements. Use additives as necessary.

It is recommended that the Contractor use generally recognized Statistical Quality Control methods and tests for quality control. Be responsible for all sampling, testing and control of aggregate and microsurfacing. Furnish the Project Manager quality control tests upon request.

Aggregate. Furnish aggregate in accordance with Section 106.

Select aggregate gradations for the specified aggregate type within the following gradation bands. Do not include mineral filler within aggregate gradation. Meet the following aggregate gradations as tested by MT 202:

|  |  |  |  |
| --- | --- | --- | --- |
| Table Of Gradation – Aggregate For Microsurfacing | | | |
| Percentage By Weight Passing Square Mesh Sieves | | | |
| Type 2 | | Type 3 | |
| Sieve Size | Percent Passing | Sieve Size | Percent Passing |
| ⅜-inch (9.5 mm) | 100 | ⅜-inch (9.5 mm) | 100 |
| #4 (4.75 mm) | 90-100 | #4 (4.75 mm) | 70-90 |
| #8 (2.36 mm) | 65-90 | #8 (2.36 mm) | 45-70 |
| #16 (1.18 mm) | 45-70 | #16 (1.18 mm) | 28-50 |
| #30 (0.600 mm) | 30-50 | #30 (0.600 mm) | 19-34 |
| #50 (0.300 mm) | 18-30 | #50 (0.300 mm) | 12-25 |
| #100 (0.150 mm) | 10-21 | #100 (0.150 mm) | 7-18 |
| #200 (0.075 mm) | 5-15 | #200 (0.075 mm) | 5-15 |

Furnish aggregate that is free from dirt, organic matter, clay balls, adherent films of clay, dust, or other detrimental materials.

Meet the following aggregate requirements at the job mix formula combined ratio:

|  |  |  |
| --- | --- | --- |
| Description | Test Methods | Requirements |
| Wear | AASHTO T 96 | 30% max. |
| Sand Equivalent | AASHTO T 176 | 60% min. |
| Fracture | AASHTO T 335 | 95% min. |

Asphalt Emulsion. Furnish CQS-1hP asphalt emulsion with the following properties:

|  |  |  |
| --- | --- | --- |
| Description | Test Methods | Requirements |
| Test On Emulsion | | |
| Viscosity, Saybolt Furol at 77ºF, sec. | AASHTO T 59 | 20 - 100 |
| Particle Charge Test | AASHTO T 59 | Positive |
| Storage Stability 24-hr, % | AASHTO T 59 | 1 max. |
| Sieve Test, % | AASHTO T 59 | 0.10 |
| Residue by Distillation, % | AASHTO T 59 (1) | 62 min. |
| Test On Emulsified Asphalt Residue | | |
| Penetration 77° F, mm | AASHTO T 49 | 40 - 90 |
| Softening Point, ºF | AASHTO T 53 | 135 min. |
| Ductility, 77 ºF, 5 cm/min, cm | AASHTO T 51 | 40 |

Notes. (1) Hold test temperature at 350 ± 10 °F for 20 minutes.

Polymer modified asphalt emulsion will be sampled and tested in accordance with Section 702.

Mill or blend a minimum of 3% polymer solids, based on asphalt weight, into asphalt or emulsifier solution prior to the emulsification process. If asphalt emulsion type or properties change during the project, a new laboratory mix design is required.

Mineral Filler. Furnish non-air-entrained portland cement meeting the requirements of AASHTO M 85 and/or hydrated lime meeting the requirements of Subsection 713.02 as needed to improve mixture consistency, adjust breaking and curing properties, or to meet mix design requirements. Limit mineral fill to a maximum of 3% weight of aggregate.

Water. Furnish water in accordance with Subsection 713.01.

Additives. Furnish additives to accelerate or retard the break/set properties, improve the resulting finished surface, or increase adhesion. Ensure additives used are compatible with the other components of microsurfacing.

Tack Coat. Furnish emulsified asphalt in accordance with Section 407.

Microsurfacing Mix Design. Submit a mix design meeting the contract requirements in accordance with Subsection 401.03.1. Perform the mix design using the same materials and aggregate gradation to be used on the project. No material substitutions can be made following mix design approval unless authorized by the Project Manager.

The Project Manager may suspend operations if poor mixing, mix set, or compatibility is observed during production. Perform a new mix design if problems requiring adjustment are not resolved in 2 business days. Perform an additional mix design for microsurfacing with any substitution of aggregate, emulsion or additives. Suspend microsurfacing operations for 10 business days or until mix design approval is granted by the Project Manager. A new test strip section is required for each additional mix design. Additional mix designs are incidental to the microsurfacing bid items.

Determine additive quantities during the laboratory mix design. Provide manufacturer certifications and recommended dosage rates for each additive shipment used on the project. Use of additives not included in the laboratory mix design requires a new laboratory mix design unless determined otherwise by the Project Manager.

Perform the microsurfacing mix design in accordance with ASTM D6372 modified to include the following ISSA Specifications. Restrict the residual asphalt cement to 7.5 ± 2% by total dry weight of aggregate.

|  |  |  |
| --- | --- | --- |
| Issa Specifications | | |
| 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 or Near Spin minimum |
| ISSA TB-109 | Excess Asphalt by LWT Sand Abrasion | 50 g/ft2 Maximum  (538 g/m2 Maximum) |
| ISSA TB-114 | Wet Stripping | Pass (90% Minimum) |
| ISSA TB-100 | Wet-Track Abrasion Loss  One-hour Soak  Six-day Soak | 50 g/ft2 (538 g/m2) Maximum  75 g/ft2 (807 g/m2) Maximum |
| ISSA TB-147 | Lateral Displacement  Specific Gravity after 1,000 Cycles of 125 Pounds | 5% Maximum  2.10 Maximum |
| ISSA TB-144 | Classification Compatibility | 11 Grade Points Minimum  (AAA, BAA) |
| ISSA TB-113 | Mix Time @ 77 degrees F | Controllable to 120 Seconds Minimum |

Construction.

Aggregate Production. Be responsible for all sampling and testing to control gradation during aggregate production. Establish a process quality control plan addressing the following:

* Equipment Maintenance;
* Equipment Calibration;
* Stockpiling and materials handling; and
* Sampling and testing of component materials.

Aggregate Acceptance Sampling and Acceptance.

Quality Assurance Sampling: The Project Manager will randomly select samples taken by the Contractor and witnessed by an inspector for gradation testing. Provide sampling apparatus and sample containers. Submit a sample consisting of well mixed microsurfacing taken from the pugmill chute. Aggregate gradation testing will be performed in accordance with MT 320, and the aggregate tested will be recovered by MT 319. Samples will be dried to a constant weight in oven before beginning MT 319.

Each sample represents approximately 300 tons (mt). The Project Manager may require additional samples.

Five samples representing approximately 1500 tons (mt) constitutes a lot whenever production schedules and material continuity permits. The Project Manager may establish a lot of the quantity represented by 3 to 7 consecutive random samples when there are short production runs, significant material changes, or other unusual characteristics of the work.

Acceptance. Microsurfacing is accepted on a lot by lot basis in accordance with Subsection 105.03.2 using price reduction factors for “Cover Material.”

Asphalt Emulsion Sampling and Acceptance.

Asphalt Emulsion will be sampled in accordance with 402.03.2.

Asphalt Emulsion will be accepted in accordance with 402.03.5.

Equipment. Use equipment specifically designed and manufactured to mix and place microsurfacing. Use roadway equipment in accordance with Subsection 401.03.15.

Mix the material with an automatically sequenced, self-propelled microsurfacing machine able to accurately deliver and proportion the aggregate, asphalt emulsion, mineral filler, additives, and water to a revolving multi-blade double shafted mixer capable of distributing the final product. Use a self-propelled continuous paver to spread, shape and finish microsurfacing mix.

Microsurfacing machine must have enough storage capacity for aggregate, asphalt emulsion, mineral filler, additive, and water to maintain an adequate supply to the proportioning controls. Provide support trucks to feed the paver for continuous operation. Use proportioning devices with individual volume or weight controls for proportioning each material added to the mix. Use proportioning devices with controls properly marked that can calibrate and determine material output at any time during production.

Use spreading equipment that agitates and spreads the mixture uniformly by means of a spreader box attached to the paver and mechanically equipped to agitate and spread the material evenly throughout the box. Provide a front seal fabricated with a suitable material such as steel or stiff rubber that allows no loss of mixture at the road contact point. Provide an adjustable rear seal that acts as a final strike-off. Use a spreader box that provides a free flow of uniformly consistent materials to the rear strike-off and employs a suitable means to side shift the box to compensate for variations in the pavement geometry.

Provide a secondary strike-off to improve surface texture. A burlap or cloth drag may be used with approval of the Project Manager.

Use a rut filling spreader box specifically designed to fill ruts when filling ruts with an average depth greater than one-half inch and at locations identified in the contract.

Calibrate each mixing unit in the presence of the Project Manager prior to using on the project, after repairs, or any time directed by the Project manager. Supply the Project Manager with an electronic printout of the calibration process for each material at the time of calibration. During production, provide the Project Manager upon request with material usage reports of micro-surfacing materials for determining yields on aggregate and emulsion, and to check that calibration numbers have not changed. Material quantity printouts are required at the end of each day of production by the Contractor.

Surface Conditions and Weather Limitations. Stop microsurfacing placement when the surface or air temperature is below 60 °F (15 ºC), the surface is wet, the roadbed is unstable, or the Project Manager determines adverse weather conditions prevent the proper handling or finishing of the mix. Do not apply microsurfacing if the temperature is forecasted to be below 33 °F (0ºC) within 24 hours of microsurfacing placement.

Surface Preparation. Clean road surface of all dirt, sand, dust, oil, vegetation, and other detrimental materials prior to applying tack coat and microsurfacing material. Allow unsealed cracks to thoroughly dry prior to applying microsurfacing material when water is used to clean the surface.

Control of Centerline. Maintain control of the centerline of the road as represented by the established pavement markings. Maintain the paving control line tolerance within 0.25-foot (75 mm) of a true line of existing pavement markings. Failure to maintain centerline as defined will be corrected at the Contractor’s expense. The use of raised pavement marking tabs, survey nails, etc. is included in the cost of the Microsurfacing.

Cover manholes, valve boxes, drop inlets, and other service utility entrances in a manner that prevents microsurface bonding prior to microsurface placement. Scarify or block off areas with thermoplastic pavement markings and scarify all epoxy pavement markings before placing tack and microsurfacing. Remove all loose and delaminating thermoplastic and epoxy pavement markings. Remove all pavement markings as directed elsewhere in the contract. Fill pot holes, surface raveling, and areas where delaminated markings are removed with approved asphalt patch material prior to microsurfacing. Include this work in the cost of other bid items unless otherwise noted in the contract. The Project Manager may identify pavement markings for complete removal not identified in the contract. Removal of pavement markings not identified in the contract will be measured for payment in accordance with Section 109.04. Do not place microsurfacing on pavement within 30 calendar days of crack sealing operations. Do not apply tack coat and microsurfacing until surface preparation is approved by the Project Manager.

Submit a sequence of operations in writing to the Project Manager for approval a minimum of 7 calendar days prior to the placement of microsurfacing. Include a method to establish and maintain centerline and lane-lines for traffic control and pavement markings. Include in the submittal the sequence for placement of tack, areas of fog seal, scratch course, surfacing course and longitudinal joint locations. Tack coat placed on the scratch course may be omitted upon written request and prior written approval from the Project Manager. Tack coat is required on scratch course exposed to construction traffic or the traveling public from more than 7 calendar days. Sweep and reapply tack coat when traffic leaves dust, debris or visible film.

Test Strip. Place microsurface material in a test strip of at least 500 feet (150 m) in length prior to full production. The test strip will become part of the microsurfaced roadway and measured for payment once it achieves initial set within 30 minutes and shows no visual signs of distress when exposed to traffic action after curing for 2 hours.

Remove and replace the test strip at no expense to the Department if it fails to meet contract requirements. Make necessary adjustments if the test strip fails and obtain Project Manager approval prior to repeating the test strip process. Provide a revised mix design if the test strip failure indicates a mix design or ingredient related problem.

Application Rate. Apply microsurfacing, microsurfacing scratch coat, and rut filling at the application rates identified in the contract. Application rates may be changed if directed or approved by the Project Manager.

Rut Filling. Furnish a rut filling spreader box specifically designed to fill ruts to the project site prior to placement of microsurfacing. Use the rut filling spreader box to fill ruts with an average depth greater than ½-inch (12.5 mm) and at locations identified in the contract. Fill additional ruts at locations marked by the Project Manager and as directed. Make multiple passes with the rut filling spreader box for ruts greater than ¾-inch (19 mm). Crown the microsurfacing used to fill ruts as necessary to completely fill the rut after volume loss when the microsurfacing has set. Fill ruts prior to the placement of the scratch course.

Apply microsurfacing scratch course as indicated by the plans. Spread the scratch course with a similar type of spreader box used to spread the surface course. For scratch course placement, use an adjustable steel strike-off device in place of the final strike-off device used for the surface course. Terminate scratch course 10 feet (3 m) from structures or project connections. Allow 24 hours cure time after placing scratch course or rut filling before subsequent microsurfacing layer.

Rut data collected by the Department may be available upon request for informational purposes only. The Department does not guarantee the accuracy or precision of the data that may be provided. The Contractor is responsible to field verify rut measurements prior to bidding.

Microsurfacing Application. Place microsurfacing meeting the mix design criteria. If disparities between placement and mix design requirements are observed, the Project Manager will request submittal of a new mix design.

Maintain at least one lane open to traffic during all microsurfacing operations. Schedule microsurfacing operations to ensure all lanes are opened to traffic a minimum of 30 minutes prior to sunset of the same working day. Ensure all lanes are open to traffic during non-working hours.

Control ingredient proportions by using the metering or measuring devices on the microsurfacing equipment to ensure mix design compliance.

Limit any increase or decrease in the amount of mineral filler added during production to ±1 percent of the approved mix design.

Pass the mineral aggregate over a scalping screen prior to transfer to the microsurfacing mixing machine to remove oversize material.

Carry enough microsurfacing in all parts of the spreader box to ensure full width and complete coverage with no streaks, narrow spots, or mix segregation. Do not overload the spreader. Do not manually add water to the microsurfacing within the spreader box or on the roadway surface. Submit to the Project Manager for approval water misting systems intended to maintain equipment or paver tires. Submit to Project Manager for approval water misting systems intended to retard the pull out of recently placed crack sealant.

Remove and replace or correct defects in the microsurfacing at no expense to the Department if any of the following occurs:

* Lumping, balling, or unmixed aggregates.
* Course aggregate separates from the emulsion and fines.
* Excessive breaking of emulsion inside the spreader box.
* Excessive streaking. Excessive streaking is defined as longitudinal steaks greater than 0.25 inches (6 mm) in depth when measured by placing a 10 foot (3 m) straight edge over the surface or drag marks greater than ½-inch (12.5 mm) wide and 4 inches (100 mm) long, or 1-inch (25 mm) wide and 3 inches (75 mm) long, in any 30 square yard (25 m2) area.
* Transverse ripples 0.25 inches (6 mm) in depth when measured by placing a 10-foot (3 m) straight edge over the surface.
* Surface profile defects greater than 0.40 inches over 25 feet.
* Flushing or excessively rich areas appearing in microsurfacing after 2 hours from time of placement.
* Any measurable rutting, shoving, or other evidence of premature deformation when exposed to traffic.

Compaction. Do not roll or compact microsurfacing material in a manner which damages the microsurfacing or breaks down the microsurfacing aggregate. Do not use modes of vibratory compaction. Compaction used to smooth transitions or improve ride quality may be allowed if approved by the Project Manager. The Project Manager may suspend any and all compaction efforts at his/her sole discretion visual signs of damage are suspected.

Joints. Construct longitudinal and transverse joints without any buildups, uncovered areas or unsightly appearance.

Place longitudinal joints with less than 3 inches (75 mm) overlap on adjacent passes and no more than ¼-inch (6 mm) difference in elevation between the adjacent passes. Do not allow longitudinal edge lines to vary horizontally by more than ± 2 inches (50 mm) within any 100-foot length (30 m). Place longitudinal joints on lane lines unless directed otherwise by the Project Manager.

Place microsurfacing adjacent to concrete pavements or concrete curb and gutter with a straight longitudinal edge. Taper longitudinal joints at approaches and at intersections with a maximum slope of 50:1 unless otherwise directed on the plans.

Construct transverse joints with no more than 1/8-inch (3 mm) difference in elevation across the joint. Use construction paper, or comparable product, so all beginning and ending edge lines from each construction pass are straight. Transition transverse joints at connections structures or other terminations by tapering microsurfacing surface course and/or scratch course at a maximum slope of 50:1 unless otherwise directed on the plans.

Ride Specification. Construct all rut filling, scratch and surfacing courses to provide completed surfacing with surface smoothness values less than or equal to the Target International Roughness Index (IRI) value. Finished microsurfacing which improves surface smoothness will qualify for a Quality Incentive Allowance. Finished microsurfacing exceeding the Target value for surface smoothness will be subject to Quality Disincentive and/or corrective action.

The Target IRI value is defined as the ‘pre-ride’ IRI value plus 5 in/ mile, measured within the same calendar year as the placement of microsurfacing. An additional pre-ride will be performed upon the Contractor’s written request if the initial pre-ride differs from most recent annual Pavement Management data by more than 5%. The additional pre-ride will be scheduled within 20 business days of the commencement of crack sealing operations included in the Contract. The pre-ride IRI value will be determined by the overall lane average of two measured passes of the travel lane under evaluation.

Notify the Project Manager a minimum of 10 business days prior to the start of crack sealing operations. The Project Manager will furnish pre-ride ride results prior to the placement of microsurfacing. Surface smoothness and surface profile will be analyzed from data collected by the Department using a Class I laser road profiler. The IRI will be measured in inches/mile, regardless of the unit of measure used on the contract. IRI data collected by the Department’s Pavement Management Unit may be available upon request through the Question and Answers Forum for informational purposes only. The Department does not guarantee the accuracy or precision of the data that may be provided.

The Department will test for surface smoothness and surface profile after the placement of the final microsurfacing course. The post-ride may be extended up to 10 business days to facilitate grinding prior to initial ride evaluation. The post-ride may be requested on a specific date to allow for sweeping and traffic control. Notify the Project Manager 5 business days prior to the requested date~~.~~

The travel lane will require corrective action when the overall lane Pay Factor, as defined in part 16) Quality Incentive/Disincentive Allowance, is less than 0.90. Areas requiring corrective work will be identified by the prime Contractor or their designee. Perform additional corrective action as directed by the Project Manager at transitions, bumps, irregularities, and as required to meet the surface tolerances outlined in section 14) Joints. Quality incentive allowances will be used to offset any price reductions on progress estimates.

A Pay Factor for each 0.5-mile segment will be calculated for the sole purpose of determining if removal or replacement is required on any segment. Remove and replace any 0.5-mile (0.8 km) segment of roadway requiring corrective action when the Pay Factor evaluated on the segment is less than 0.75. A segment will be determined by the Department’s ride evaluation software, where project limits coincide with the beginning of the first segment. The Project Manager may delineate a new segment immediately following roadway sections not evaluated for pay.

Segments shorter than 0.5 miles may occur at connections and where portions of the roadway are omitted for evaluation. Remove the segment by micromilling or diamond grinding the full thickness of the new material to the top of the preexisting surfacing and replace with new material meeting the contract requirements. In lieu of removal and replacement, one additional overlay of microsurfacing surface course may be applied to meet the contract requirement.

Other methods of corrective action may be approved by the Project Manager. Submit a written proposal for corrective action differing from that directed herein. Sections requiring removal and replacement, or other corrective action will be rerun once the corrective work has been performed. Perform additional corrective action or removal and replacement until the corresponding Pay Factor thresholds are reached.

If partial thickness grinding or micromilling is utilized for smoothness improvement, or for corrective action, furnish 1-inch (25 mm) minimum diameter cores as directed by the Project Manager. Core within 6” of the centerline of the travel lane. Cores may be required at all locations where grinding or micromilling is used to ensure a minimum of 3/8” microsurfacing thickness. Overlay areas with one additional surface course if the measured thickness is less than 3/8”. Alternate proposals for repair may be submitted to the Project Manager for approval.

All work to prepare the roadway for testing, including sweeping, grinding and traffic control prior to the ride test, is incidental to the work and is not measured for payment. All work to complete any corrective action and re-testing, including but not limited to aggregate, emulsion, sweeping and traffic control, is incidental to the work and is not measured for payment. Include all costs and resources to prepare the roadway for surface tolerance testing in the microsurfacing items.

Quality Incentive/Disincentive Allowance. A Pay Factor will be applied to the corresponding microsurfacing aggregate and emulsion bid items in accordance with the following table:

|  |  |
| --- | --- |
| Travel Lane Pre-Ride Average < 751 | |
| Incentive/Disincentive | Pay Factor (Pf) |
| (Pre-Ride > Post Ride) | PF = 1+(0.05) \*((“Pre-Ride” IRI)/ (“Post-Ride” IRI))5 |
| (Pre-Ride < Post Ride ≤ Pre-Ride + 5) | PF = 1.0 |
| (Pre-Ride+ 5 < Post Ride) | PF = 1-(0.01) \*((“Post-Ride” IRI)/ (“Pre-Ride” IRI))10 |
| Travel Lane Pre-Ride Average ≥ 751 | |
| Incentive/Disincentive | Pay Factor (Pf) |
| (Pre-Ride > Post Ride) | PF = 1+(0.05) \*((“Pre-Ride” IRI)/ (“Post-Ride” IRI))5 |
| (Pre-Ride < Post Ride ≤ Pre-Ride + 5) | PF = 1.0 |
| (Pre-Ride+ 5 < Post Ride) | PF = 1-(0.01) \*((“Post-Ride” IRI)/ (“Pre-Ride” IRI))15 |

Notes: All units are in "Inches/Mile"

Pay Factors will be applied based on the overall average for the travel lane under evaluation. If corrective action is required, one additional post-ride will be provided after all corrective action has been completed. Incentive and Disincentive will be calculated using the final post-ride value. Incentive and Disincentive will be calculated based on the quantity of aggregate and emulsion placed in Rut filling, Scratch Course and Surface Course within the travel lane and adjacent shoulder along the measured length of the travel lane.

Handwork. Complete all handwork prior to mainline microsurfacing placement. Use hand squeegees to spread microsurfacing in areas that cannot be reached with microsurfacing machine. Provide a complete and uniform coverage. Finish hand worked areas in a manner that provides uniform finish when compared to material placed by the microsurfacing machine.

Clean up. Remove microsurfacing from all utility access areas and concrete surfaces. Remove any debris or excess microsurfacing materials associated with work daily.

Opening to Traffic. Prior to opening to traffic, allow the microsurfacing to sufficiently cure to ensure it will not deform or be picked up under traffic conditions. Do not allow traffic on microsurfacing less than 45 minutes after placement. Place traffic on microsurfacing within 2 hours after placement unless a longer duration is approved by the Project Manager. Opening of microsurfaced areas to traffic does not constitute Department acceptance of work.

Seal Coat. Do not perform Seal Coat within 7 calendar days of microsurfacing placement. Perform seal coat in accordance with Section 409. Schedule work to ensure seal coat is completed within the same calendar year of the microsurfacing.

Rumble Strips. Do not install rumble strips within two weeks of microsurfacing placement unless approved by the Project Manager. Meet all requirements of Subsection 401.03.24.

Place pavement markings in accordance with Section 620. Locate, mark and place new words, symbols, and stop bars, etc. directly over the existing markings unless otherwise specified in the contract.

Method of Measurement. Microsurfacing aggregate is measured by the ton as metered by the mixing unit. Microsurfacing emulsion is measured by the ton in accordance with Section 109. Additives, mineral filler, and water are to be included in the cost of the microsurfacing aggregate and no additional measurements or payments will be made. No additional measurements or payments will be made for the test strip, mix design, or surface preparation. Rut filling is measured by the linear foot of each wheel path.

Basis of Payment. Payment for completed and accepted quantities is made under the following:

|  |  |
| --- | --- |
| Pay Item | Pay Unit |
| Microsurfacing Aggregate | Ton (MT) |
| Microsurfacing Emulsion | Ton (MT) |
| Rut Filling | Foot (m) |

Tack Coat will be paid for as specified elsewhere in the contract. Microsurfacing aggregate and emulsion used for rut filling and scratch course will be paid for with the respective bid items.

Repair microsurfacing material not meeting contract requirements at no additional cost to the Department. Repair damage to the microsurfacing due to premature opening to traffic at no additional cost to the Department.

Include the costs of polymer in the unit price bid for microsurfacing emulsion.