

Special Provision to Item 350

Microsurfacing



Item 350, "Microsurfacing" of the Standard Specifications is amended with respect to the clauses cited below. No other clauses or requirements of this Item are waived or changed.

Article 350.2., "Materials," Section 2.1., "Cationic Polymer-Modified Asphalt Emulsion," is voided and replaced by the following.

- 2.1. **Cationic Polymer-Modified Asphalt Emulsion.** Provide CSS-1P in accordance with Section 300.2.4., "Emulsified Asphalt," or CSS-1EP meeting the requirements and in accordance with Table A.

Table A
Polymer-Modified Cationic Emulsified Asphalt

Property	Test Procedure	Emulsion	
		CSS-1EP	
		Min	Max
Asphalt Base Properties			
Original DSR, kPa ($G^*/\sin\delta$, 10 rad./sec) @ 76°C	T 315	1.00	
Emulsion Properties			
Viscosity, Saybolt-Furol, @ 122°F, SFS	T 59	15	150
Sieve Test, %	T 59		0.1
Storage Stability, 1 day, %	T59		1
Distillation Test			
Residue by distillation, % by weight	T 59	62	
Oil distillate, % by volume of emulsion			0.5
Tests on Residue Properties from Low Temp Evaporation (AASHTO R-78¹):			
MSCR @ 70°C, Recovery @ 3.2 kPa, %	T 350	80	0.50
MSCR @ 70°C, Jnr @ 3.2, 1/kPa	T 350		
ODSR, kPa ($G^*/\sin\delta$, 10 rad./sec) @ 76°C	T 315	1	
ODSR, deg (phase angle δ , 10 rad./sec) @ 76°C			60

1. After recovering the residue from AASHTO R-78, the sample may be annealed before testing to remove any excess moisture and provide for a consistent sample. The annealing can be accomplished by placing 20 g of residue in a 6 oz. metal container (approx. 3 in. diameter) and heating to 163°C for no more than 15 min. The sample should be stirred with a spatula, every 5 min. The sample can then be poured directly into a 25 mm DSR silicone mold for evaluation.

Article 350.3., "Equipment," Section 3.1., "Mixing Machine," is voided and replaced by the following.

- 3.1. **Mixing Machine.** Furnish a self-propelled microsurfacing mixing machine with:
- self-loading devices to promote continuous laying operations;
 - enough storage capacity for mixture materials;
 - individual volume or weight controls that will proportion each material to be added to the mix;
 - continuous flow mixing with a revolving multi-blade mixer capable of discharging the mixture on a continuous flow basis;
 - opposite side driving stations;
 - full hydrostatic control of the forward and reverse speed during operation;
 - a water pressure system and nozzle-type spray bar immediately ahead of the spreader box and capable of spraying the roadway for the width of the spreader box;
 - a mechanical-type spreader box equipped with paddles or other devices capable of agitating and spreading the materials throughout the box;

- a spreader box with devices capable of providing lateral movement or side shift abilities;
- a spreader box with a front seal, adjustable rear strike-off, and adjustable secondary rear strike-off; and
- an electronic monitoring system:
 - consisting of pulse sensors to measure delivery rates, radar gun to monitor distance traveled, programmable micro-controller with operator's display/input board, and on-board printer;
 - capable of recording, monitoring, and displaying the amount of aggregate, emulsion, mineral filler, water, and additives, in pounds;
 - capable of displaying and recording ratios of emulsion to aggregate, mineral filler to aggregate, additive to aggregate, water to aggregate, and application rate in pounds per square yard;
 - capable of recording the percentages of emulsion, mineral filler, water, and additive;
 - capable of printing a hard copy report on demand that displays the date and the cumulative weight of aggregate, emulsion, and mineral filler in pounds and the number of gallons of additive and water; the percentages of emulsion, mineral filler, water, and additive; and the ratios of emulsion to aggregate, mineral filler to aggregate, additive to aggregate, water to aggregate, and application rate in pounds per square yard since the last reset; and
 - accurate to within 0.5% of actual weights and measures.

Calibrate and properly mark each control device that proportions the individual materials.

Article 350.4., "Construction," is supplemented by the following.

Maintain on the project at least one responsible employee certified under the AASHTO Microsurfacing Certification Program for personnel.

Article 350.4., "Construction," Section 4.1., "Mixture Design." The first paragraph is voided and replaced by the following.

Provide a mixture design meeting the proportions shown in Table 3 and the requirements shown in Table 4. Perform the mixture design using an AASHTO-accredited laboratory experienced in the design of microsurfacing systems. Provide the Engineer with representative samples of all component materials for verification of the mixture design, unless otherwise directed. Identify additives used to control mixture set times and cohesion, as determined by design testing, and provide acceptable limits. The Materials and Tests Division will verify the mixture design to ensure it meets the minimum requirements for wet track abrasion wear value listed in Table 4. Provide the Engineer with approximately 40 lb. of each aggregate stockpile, at least 1 gal. of asphalt emulsion, at least 1 gal. of mineral filler, and enough quantities of any additives proposed for use.

Article 350.4., "Construction," Section 4.1., "Mixture Design," is supplemented by the following.

Changes in aggregate source, emulsion source, or mineral filler will require a new mixture design submitted for the Engineer's approval. The Engineer may require a new test strip if there is a change in aggregate source, emulsion source, or mineral filler.

Article 350.4., "Construction," Section 4.8., "Placing." The first sentence of the paragraph is voided and replaced by the following.

Make necessary adjustments so that the mixture will have enough working life to allow for proper placement, with considerations for aggregate moisture and at the predicted ambient temperature and humidity.

Article 350.4., "Construction," Section 4.10., "Production Testing," is voided and replaced by the following.

- 4.10. **Production Testing.** Control the production process within the operational tolerances listed in Tables 5A and 5B. Provide access to the mixing unit discharge stream for sampling purposes. Suspend production when the Engineer's test results exceed the operational tolerances. The Engineer will allow production to resume when test results or other information indicate the next mixture produced will be within the operational tolerances listed and in accordance with Tables 5A and 5B. Take corrective action to address deficiencies.

**Table 5A
Operational Tolerances**

Property	Test Method	Requirements
Asphalt content, % by wt.	Tex-236-F ¹ or asphalt meter readings	Design target ± 0.5

1. Dried to constant weight at $230 \pm 10^\circ\text{F}$

**Table 5B
Washed Gradation % Passing Operational Tolerances¹**

Sieve Size ²	Requirement ³
3/8"	± 5
#4	± 5
#8	± 5
#16	± 3
#30	± 3
#50	± 3
#100	± 3
#200	± 3

1. Tex-200-F, Part II, sampled from stockpile or belt.
2. Material passing #200 sieve including the mineral filler must conform to the limitations of the master gradation shown in Table 1.
3. Gradations must meet both the Master Gradation Band, listed in Table 1, and the operational tolerance from mixture design.

The asphalt content may be reduced below the tolerance when lean mixes are necessary for scratch and rut passes, but not less than the design minimum shown for the wet track abrasion test when approved.

Article 350.4., "Construction," Section 4.15., "Test Section," is added.

- 4.15. **Test Section.** At the beginning of the first day of production, place a test strip with a minimum length of 500 ft. meeting the mixture design tolerances to demonstrate the mixing and placement procedures. Place the test strip at the same general time of day (night or day) the paving is to take place. Inspect the test strip for variations in surface texture, material ratios, finished surface appearance, and ability to carry normal traffic within 60 min. The Engineer will approve or reject the test strip within 2 hr. of placement. If rejected, the Engineer may require another test strip after the Contractor corrects any deficiency. Paving may proceed after the Engineer approves the test strip.

Article 350.4., "Construction," Section 4.16., "Quality Control," is added.

- 4.16. **Quality Control.** Produce a mixture according to the mixture design and the quality control tolerances. Randomly calculate and report to the Engineer the percent asphalt content of the mixture and the yield of the aggregate from the equipment computer display readings at least three times daily.

Maintain quality and provide to the Engineer a report and log sheet containing the following information:

- aggregate used, ton (dry);
- microsurfacing emulsion used, ton;
- bituminous materials for tack coat used, if specified, ton;
- mineral filler used, pound;
- water used in mixture, gallon;
- additive used in mixture, gallon;
- surface area completed, square yard;
- surface area application rate, dry pound. aggregate per square yard; and
- percentage of emulsified asphalt based on dry aggregate.

Test the aggregate for moisture content each day before placement or when aggregate moisture changes due to rainfall events or new material delivery or as directed. Enter the percent moisture determined in the electronic monitoring system.