KANSAS DEPARTMENT OF TRANSPORTATION
SPECIAL PROVISION TO THE
STANDARD SPECIFICATIONS, EDITION 2015

SECTION 606

MICROSURFACING

606.1 DESCRIPTION

Spread a mixture of modified emulsified asphalt, mineral aggregate, water and additives on a prepared surface as specified in the Contract Documents.

BID ITEMS	**UNITS**
Aggregate for Microsurfacing	Ton
Emulsified Asphalt (*) (Modified)	Ton
Mineral Filler	Ton

*Designated Type and Grade

606.2 MATERIALS

Provide materials that comply with the applicable requirements.

Emulsified Asphalt ..... **DIVISION 1200**
Aggregate for Microsurfacing ..... **DIVISION 1100, this specification**
Water ..... **DIVISION 2400**

Conduct aggregate acceptance tests at the point of usage.

Use a Cationic Type CSS-1HM emulsified asphalt complying with **SECTION 1203**.

For mineral filler, use any recognized brand of non-air-entrained portland cement that is free of lumps and acceptable to the Engineer.

Provide a Type "C" certification for any proposed additives.

The Engineer and the Contractor will test materials according to the Contract Documents and Appendix B-Sampling and Testing Frequency Chart-Quality Control/Quality Assurance Specifications.

606.3 CONSTRUCTION REQUIREMENTS

a. Mix Design.

(1) Job Mix Formula. Develop and submit the job mix formula and certified test results meeting the criteria in **TABLE 606-1** for the Engineer's approval. Include aggregate type and gradation, percentage of modified emulsion, water and cement by weight of dry aggregate in the mix.

TABLE 606-1: MICROSURFACING MIX DESIGN REQUIREMENTS

Property	**Test**	**Requirements**
Wear Loss (Wet Track Test)	ASTM D6372 (1 hr soak) (6 day soak)	 50 g/ft^2, maximum 75 g/ft^2, maximum
Wet Cohesion	ASTM D6372 @ 30 minutes @ 60 minutes	 10 in-lbs, minimum 17 in-lbs, minimum
Wet Stripping	ISSA TB-114	90%, minimum
Mix Time @ 77^{o}F	ISSA TB-113	Controllable to 120 seconds, minimum

(2) Proportioning. Use the proportions in **TABLE 606-2** unless otherwise shown in the Contract Documents. Do not begin microsurfacing until the Engineer approves the mix design, materials, and construction.

TABLE 606-2: MICROSURFACING MIX PROPORTIONING

Material	Units	Value
Mineral Aggregate	lbs/SY dry weight	15, minimum
Modified Emulsion	Percent residue by weight of dry aggregate	8.0, minimum
Mineral Filler	Percent by weight of dry aggregate	0.5 to 2.0 *
Additive	Percent by weight of dry aggregate	As required

* Unless otherwise approved by the Engineer.

(3) Aggregate and Asphalt. Screen the aggregate for lumps, and weigh it before delivery to the lay down machine. Weigh the emulsified asphalt. The Engineer will approve the screens and scales.

Provide individual volume or weight controls for proportioning each item to be added to the mix. Calibrate and mark each material control device. Locate the devices to be accessible for ready calibration, and place so the Engineer can determine the amount of each material used at any time.

Mineral filler may be added at the loading facility, provided the Engineer approves accurate proportioning and metering devices, and there is no detrimental effect on the final product.

b. Surface Preparation. Immediately before applying the microsurfacing, thoroughly clean the surface of the roadway of all foreign material and pre-wet as required.

c. Ruts. When shown in the Contract Documents, fill ruts, utility cuts and depressions in the existing surface before placing the final surface. Cover ruts and irregularities of less than ½ inch in depth with a full width scratch coat. Accomplish the scratch coat by using a rigid rear seal in the spreading equipment.

Independently fill ruts greater than ½ inch in depth using a rut filling spreader box 5 to 6 feet in width. Crown ruts filled with a rut filling spreader box to compensate for compaction.

Ruts in excess of 1 ½ inches require multiple passes with the spreader box to restore the original cross section. When multiple passes are required, carry traffic overnight on each rut-filling pass before a subsequent filling pass is made.

d. Mixing and Spreading. Mix and spread the microsurfacing materials with a self-propelled machine capable of accurately delivering and proportioning all of the required components. Operate the machine continuously while loading, eliminating construction joints. Do not use lumping, balling or unmixed aggregate.

Place longitudinal joints on lane lines. Do not overlap or leave gaps in longitudinal joints. Construct a finished microsurface with a uniform texture and free of scratches, tears and other surface irregularities. Repair the surface if any of these conditions exist:

- more than 1 surface irregularity that is ¼ inch or wider and 10 feet or longer in any 100 foot section of the microsurface;
- more than 3 surface irregularities that are ½ inch or wider and more than 6 inches long in any 100 foot section of the microsurface; or
- any surface irregularity that is 1 inch or wider and more than 4 inches long.

Construct finished, uniform, longitudinal and transverse joints in the microsurface. Repair the joints if any of these conditions exist:

- build-up of microsurface material at the joints;
- uncovered areas at the joints;
- longitudinal joints with more than ½ inch vertical space between the surface and a 4 foot straightedge placed perpendicular to the joint; or
- transverse joints with more than ¼ inch vertical space between the surface and a 4 foot straightedge placed perpendicular to the joint.

Construct the edges of the microsurface to follow the centerline, lane lines, shoulder lines and curb lines. Repair edges that vary more than ± 3 inches from a 100-foot straight line (or a 100-foot arch on a curved section).

Use methods approved by the Engineer to correct deficiencies in the microsurface. Construct a dense, repaired surface with a uniform texture.

e. Curing. Provide adequate means to protect the microsurface from damage by traffic until the mixture has cured sufficiently. Allow the surface of microsurfacing to cure so as to not adhere to or be picked up by the tires of vehicles. Allow traffic to use the microsurfacing when cured.

Cure the material used for filling wheel ruts a minimum of 24 hours before the full width coverage is applied.

f. Seasonal and Weather Limitations. Construct the microsurfacing between May 1 and October 15. Do not place microsurfacing when the ambient air temperature is less than 50ºF, or the weather is foggy or raining, or the air temperature is forecasted to go below 32ºF within 24 hours following the placement.

g. Observation Period. If the microsurfacing is constructed in accordance with the seasonal limitations in subsection **606.3f.**, the Engineer, along with the Contractor, will inspect the microsurfacing 30 days after work is completed on the microsurfacing. If the seasonal limitations in **subsection 606.3f.** are modified, the Engineer, along with the Contractor, will inspect the microsurfacing between May 1 and April 1 the following year. Repair areas where there is no microsurface left in place (bare areas) as directed by the Engineer:

- In 5% the wheel paths; and
- Individual areas ≥ 10 square yards; and
- Where the total square yards of bare areas is greater than 5% of the total square yards of the microsurfacing.

h. Pavement Smoothness. Microsurfacing is excluded from profilograph testing, and not eligible for pay adjustments.

606.4 MEASUREMENT AND PAYMENT

The Engineer will measure aggregate for microsurfacing, emulsified asphalt (modified) and mineral filler by the ton. No deduction will be made for moisture in the aggregate. When sacked portland cement is used, 1 sack equals 94 pounds.

Water used for pre-wetting the pavement surface and mix water is subsidiary to other bid items and will not be measured for separate payment.

Material used to correct surface deficiencies in the microsurfacing will not be measured for payment.

Payment for "Aggregate for Microsurfacing", "Emulsified Asphalt (Modified)" and "Mineral Filler" at the contract unit prices is full compensation for the specified work.

SECTION 1109

AGGREGATE FOR MICROSURFACING

1109.1 DESCRIPTION

This specification covers aggregates for use in microsurfacing operations.

1109.2 REQUIREMENTS

a. Composition. Provide aggregate for microsurfacing that is crushed gravel, crushed calcite cemented sandstone, or chat which is a material obtained from the mining of lead and zinc ores.

Produce crushed gravel by mechanical crushing of siliceous gravel and not containing more than 15% non-siliceous material.

b. Quality.

- Soundness, minimum (KTMR-21) 0.90
- Wear, maximum (AASHTO T 96) 40%

c. Product Control.

Provide material that complies with **TABLE 1109-1**:

TABLE 1109-1: GRADING REQUIREMENTS							
Percent Retained - Square Mesh Sieves							
½"	3/8"	No. 4	No. 8	No. 16	No. 30	No. 50	No. 200
0	0-1	6-14	30-55	50-75	65-85	75-90	85-95

Additional Requirements for Crushed Gravel.

- Percent Crushed Particles (KT-31) (minimum) 98%*
- Uncompacted Void Content of Fine Aggregates (KT-50) (minimum) 46%
- Sand Equivalent (KT-55) (minimum) 65%

*Provide 98% of the crushed gravel with 2 or more fractured faces.

Deleterious Substances. Provide materials that are free from weeds, sticks, grass, roots and other undesirable foreign matter.

d. Stockpiling. Stockpile and handle aggregates in such a manner to prevent detrimental degradation and segregation, the incorporation of appreciable amounts of foreign material, and the intermingling of stockpiled materials.

1109.3 TEST METHODS

Test aggregates according to the applicable provisions of **SECTION 1115**.

1109.4 PREQUALIFICATION

Prequalify aggregate sources according to **subsection 1101.4**.

1109.5 BASIS OF ACCEPTANCE

Aggregates covered by this subsection are accepted based on the procedures described in **subsection 1101.5.**