Test Procedure for

LABORATORY METHOD OF MIXING AND CURING POLYMER-MODIFIED SLURRY SEAL (MICROSURFACING) MIXTURES

TxDOT Designation: Tex-230-F

Effective Date: December 2004

1. SCOPE

1.1 Use this test method to prepare microsurfacing mixtures in order to verify that the mixture design conforms to the applicable specifications.

1.2 The values given in parentheses (if provided) are not standard and may not be exact mathematical conversions. Use each system of units separately. Combining values from the two systems may result in nonconformance with the standard.

2. APPARATUS

2.1 *Balance*, Class G2 in accordance with Tex-901-K.

2.2 *Mechanical mixer*, or other mixer fitted with a wire whip.

2.3 *Containers*, for batching aggregates.

2.4 *Miscellaneous mixing tools.*

2.5 *Wax paper.*

2.6 *Large capacity pans,* for curing mixtures.

2.7 *Mechanical sieve shaker.*

2.8 *Forced draft oven,* capable of maintaining the temperatures specified in the test procedure.

2.9 *Mercury thermometer,* marked in 1°C (2°F) divisions, or digital thermometer capable of measuring the temperatures specified in the test procedure.

2.10 *Set of standard U. S. sieves,* as listed in the applicable specification, meeting the requirements of Tex-907-K.

3. MATERIALS

3.1 *Aggregates.*

3.2 *Emulsified asphalt.*

3.3 *Mineral fillers.*

3.4 *Water.*

3.5 *Additives.*

4. PROCEDURE

4.1 Obtain a representative sample of processed aggregates in accordance with Tex-221-F.

4.2 Dry the aggregate in an oven at a temperature between 38 and 150°C (100 and 302°F). Cool aggregate to 25 ± 3°C (77 ± 5°F).

4.3 Prepare diluted solution of liquid additive at 25 ± 3°C (77 ± 5°F). Substitute an appropriate amount for a portion of mix water.

Note 1—Prepare a fresh solution each day it is used.

4.4 Weigh and mix the desired amounts of water and diluted liquid additive into a container and set aside.

4.5 Weigh into a mixing bowl approximately 5000 g of aggregate. Maintain all components at 25 ± 3°C (77 ± 5°F) during preparation of the mix.

4.6 Add the mineral fillers to the aggregate and mix dry at a slow speed.

4.7 Add the mixture of water and liquid additives and mix until the sample displays a homogeneous moisture content.

4.8 Form a crater in the aggregate mixture and add the required amount of the emulsified asphalt.

4.9 Mix thoroughly with a mechanical mixer.

Note 2—Mix until the aggregate is completely coated. Exercise care to prevent loss of material during mixing and subsequent handling.

4.10 Line a large metal pan with a piece of wax paper of adequate size to extend above the sides of the pan.

4.11 Pour the mixture into the pan and allow the material to flow out evenly across the base of the pan.

4.12 Smooth the mix into a uniform thickness of approximately 51 mm (2 in.), if necessary.

4.13 Complete mixing and pouring in less than 2 minutes.

Note 3—The design mixture must maintain a free flowing consistency during the mixing and pouring process. If the mix exhibits a break before completion of the pouring, discard and prepare a new mixture with a different concentration of liquid additive.

4.14 Immediately after placing the mixture in the pan, place the pan in an oven at 60 ± 3°C (140 ± 5°F).

4.15 Cure the mixture for 24 hr. or until constant weight is reached.

Note 4—Constant weight is the weight at which the mixture shows less than 1 g loss in weight after successive weighing at 30-min. intervals of additional curing in the oven.

4.16 Remove the sample pan from the oven.

4.17 Examine the surface of the mixture for an excessively sticky appearance. Use a white paper towel to blot the surface of the mixture gently. Discard mixtures exhibiting excess asphalt on the surface and prepare a new mix design.

Note 5—After curing, where the mixture does not appear excessively sticky, invert the sample pan on a clean, nonabsorptive surface, and remove the wax paper.

5. REPORTING

5.1 Report any observations regarding the consistency of the slurry or excessive asphalt on the surface of the cured specimen.

6. CALCULATIONS FOR PREPARING SAMPLE

6.1 *Example of Calculations:*

6.1.1 Table 1 shows an example of calculations required to determine batch weights of various slurry seal components. The following mixture proportions are identified from mixture design.

Table 1—Calculations for Preparing Sample

Aggregate	5000 g sample of dry aggregate
Residual Asphalt	7% by weight of dry aggregate
Mineral Filler	0.8% portland cement by weight of dry aggregate
Water	10% by weight of dry aggregates
Liquid Additive	1.2% by weight of asphalt emulsion
Polymer Modified Emulsion	65% residual asphalt

6.1.2 Examples:

- emulsion or residual asphalt content = $(0.07 \times 5000)/0.65 = 538.5$ g
- mineral Filler = $0.008 \times 5000 = 40$ g
- water = $0.10 \times 5000 = 500$ g

6.2 *Liquid Additive:*

6.2.1 Supply liquid additive in diluted or concentrated form. When supplying concentrated additive, determine the required amount by multiplying the additive content by emulsion weight. For this example:

$$Concentrated\ \ Additive\ Weight = 0.012 \times 538.5 = 6.46\ g$$

6.2.2 When supplying concentrated additive, prepare and use a diluted solution.

6.2.3 Determine the required amount of solution:

$$Amount\ of\ \ solution = \frac{(required\ \ additive\ weight) \times 100}{solution\ concentration}$$

6.2.4 For this example, assuming a 4% solution was supplied:

$$Amount\ of\ solution = \frac{6.46\ g \times 100}{4} = 161.5\ g$$

6.2.5 From the previous steps, 500 g was the required amount of water. However, the actual amount of water to add to the mix in addition to the diluted solution is:

500 - 161.5 = 338.5 g water.

7. ARCHIVED VERSIONS

7.1 Archived versions are available.