FLORIDA DEPARTMENT OF TRANSPORTATION
State Materials Office
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Florida Method of Test for Re-emulsification of Asphalt Emulsions

Designation: FM 5-624

1. SCOPE

This method covers the procedure for determining whether a broken asphalt emulsion will re-emulsify when exposed to water.

2. REFERENCED DOCUMENTS

AASHTO R 28-12 (2016) Accelerated Aging of Asphalt Binder Using a Pressurized Aging Vessel (PAV)

3. SIGNIFICANCE AND USE

This test method is used to determine in a laboratory setting whether a broken emulsified material (tack or prime coat) will re-emulsify when exposed to water (representing rain in a field setting).

4. SUMMARY OF TEST METHOD

A small quantity of well stirred emulsion is poured into a small metal pan. The emulsion is then spread in the pan using a stirring rod to evenly distribute the material. This pan is then promptly placed into an oven set at 115°F to aid in the breaking of the emulsion. A total of three split samples are prepared at the same time, i.e., three pans of material. One pan is removed at each of three 15-minute intervals to provide a re-emulsification evaluation at 15, 30 and 45 minutes. A few drops of tap water are placed on the broken emulsion in the pan. Typically, within 5-10 seconds, re-emulsification will occur for emulsions that are prone to this condition. A white paper towel is dabbed in the water droplets and a brown to black stain will appear on the paper towel if re-emulsification has occurred.

5. APPARATUS

5.1. Three pressure aging vessel (PAV) pans, as specified in AASHTO R 28-12 (2016) Accelerated Aging of Asphalt Binder Using a Pressurized Aging Vessel (PAV).

5.2. Balance - A balance conforming to the requirements of M 231, Class G 2.

5.3. Oven – Capable of maintaining a temperature of 115 ± 3°F.

5.4. Glass stirring rods.

5.5. White paper towels.

5.6 Timing device able to measure to the nearest minute and accurate within ± 5 seconds.

6. MATERIALS

6.1. A minimum of 32 ounces of emulsion (approximately 1000 grams) supplied in a wide mouth plastic or glass container.

7. PROCEDURE

7.1 Thoroughly stir the emulsion in the container. Examine the emulsion by sight and smell for abnormalities, such as contamination, solvents, or conglomerations of pre-broken tack. Should the emulsion have any of these irregularities, discard the sample and obtain another sample with no irregularities.

7.2 Obtain three PAV pans and verify the pans are cleaned in accordance with the cleaning procedure specified in Section 8.4.3.1 of AASHTO T 59-16 (2021). The cleaning steps are repeated below:

1) Wash with distilled water.
2) Wash with a suitable asphalt solvent.
3) Wash with isopropyl or ethyl alcohol.
4) Wash with distilled water.

7.3 Place one PAV pan on the balance and zero the balance.

7.4 Pour 4.28 grams of the well-stirred emulsion into the pan. This represents an emulsion spread rate of 0.06 gallons per square yard.

7.5 Spread the emulsion to an even thickness across the entire area of the pan (see **Figure 1**).

Figure 1 – Spreading the Emulsion in the PAV Pan

7.6 Immediately insert the pan into the oven set for 115°F and start the timing device.

7.7 Repeats steps 7.3 through 7.6 for the other two PAV pans.

7.8 Remove the first pan from the oven or after 15 minutes.

7.9 Emulsions should break within 15 minutes. To test to see if the emulsion has broken, dab the emulsion/residue with a white paper towel using mild pressure. If the paper towel shows brown to black staining, the emulsion is considered unbroken. If the emulsion has not broken at the 15-minute interval, stop the test and consult with the producer. If the emulsion has broken, immediately apply two to three drops of tap water on the broken emulsion contained in the PAV pan.

7.10 Between 10 and 15 seconds after applying the drops of water to the broken emulsion, dab the water droplets with a white paper towel using mild pressure. If the emulsion has re-emulsified, the paper towel will show brown to black emulsion staining (see **Figure 2**).

Figure 2 – Testing for Re-emulsification

7.11 Repeat steps 7.8 through 7.10 for the second pan after 30 minutes and the third pan after 45 minutes in the oven.

8. PASSING TEST RESULT

An emulsion that does not re-emulsify at the first 15-minute interval will be considered passing. Should the emulsion re-emulsify at the first 15-minute interval, the remaining 2 time intervals (30 and 45 minutes) are still evaluated for the purpose of providing further information to the producer.

9. REPORTING

Reporting should consist of documenting the following items:

a) Date tested, tester's name, and name of emulsion being tested.
b) Whether the emulsion had broken at each time interval.
c) Whether re-emulsification occurred at each time interval.
d) Photograph of the emulsion in the PAV pan, as well as the paper towel (similar to **Figure 2**) after testing at each time interval.

10. PRECISION AND BIAS

Precision and bias statements have not been established for this test procedure.