State of Nevada
Department of Transportation
Materials Division

METHOD OF TEST FOR EMULSIFIED ASPHALT

Follow AASHTO T 59 in its entirety with the following exceptions:

SAMPLE CONDITIONING FOR TESTING

Replace this section with the following:

All emulsions with viscosity requirements of 50ºC (122ºF) should be heated to 50 ± 3ºC (122 ± 5ºF) in the original sample container in an oven or water bath set at a temperature not exceeding 71 ± 3ºC (160 ± 5ºF). The sample containers should be tightly sealed, especially if testing solvent-based emulsions. Open the containers slowly to relieve pressure. After the sample reaches 50 ± 3ºC (122 ± 5ºF), stir the sample to achieve homogeneity. Samples of solvent-based emulsions, such as CMS-2, CMS-2h and CMS-2s, should not be maintained at a temperature of 50 ± 3º (122 ± 5ºF) for more than three hours.

RESIDUE AND OIL DISTILLATE BY DISTILLATION - PROCEDURE

Add to this section the following:

Polymer modified emulsions will not be sieved prior to pouring into the test molds and containers.

It may not be possible to determine the volume of the oil distillate to the nearest 1/2 mL due to the lack of a clear line of demarcation between the water, emulsifier and the oil distillate. In this case, seal the graduated cylinder and place it in a freezer at a temperature of –18 ± 3ºC (0 ± 5ºF) until separation between water and oil is established, but no more than three hours. Afterwards, allow the sample to thaw completely in the graduated cylinder and then record the oil distillate volume.

EMULSIFIED ASPHALT RESIDUE BY EVAPORATION - APPARATUS

Replace the beakers and the glass rods in this section with the following:

Containers, 355 mL (12 oz) covered cylindrical seamless metal containers, with an approximate diameter of 86 mm (3 3/8 in.) and depth of 57 mm (2 1/4 in.).

Glass Rods, with flame-polished ends, having an approximate diameter of 6.4 mm (1/4 in.) and length of 152.4 (6 in.) for use with the 355 mL (12 oz) metal containers.

RESIDUE BY EVAPORATION - PROCEDURE

Replace this section with the following:

Determine the mass of each container with a glass rod and cover to the nearest 0.1 g. Pour 50 ± 0.1 g of thoroughly mixed, emulsified asphalt into each of three containers. Place the containers containing the rods and sample in the oven, the temperature of which has been adjusted to 163 ± 2.8ºC (325 ± 5ºF), for two hours. The containers shall be loosely covered to avoid loss of material. At the end of this period remove each container and stir the residue thoroughly. Replace the containers in the oven for one hour and then remove the containers from the oven. Allow the containers to cool to room temperature. Determine the mass of each container, with the rods and covers.

When tests on the residue from the emulsion are required, replace the containers in the oven until the asphalt residue is sufficiently fluid to pour. Pour the residue into suitable containers and molds for making such tests as desired. If there is foreign matter in the residue, the material shall be poured through a No. 50 (300 μm) sieve prior to pouring into the test molds and containers. Polymer modified emulsions will not be sieved.

Note: Care must be taken to prevent loss of asphalt from the container through foaming or spattering or both.

Note: As the method for residue by evaporation tends to give an asphaltic residue lower in penetration and ductility than the distillation method, material may be accepted but shall not be rejected as failing to meet specifications on data obtained by evaporation. If residue from evaporation fails to meet the requirements for properties specified for residue from distillation, tests shall be rerun using the distillation method.

RESIDUE BY EVAPORATION - CALCULATION AND REPORT

Replace this section with the following:

Calculate the percentage of residue on each container as follows:

Residue, percent = $2(M_{brr} - M_{br})$

where:

M_{brr} = mass of container, rod, cover and residue, g, and

M_{br} = tare mass of container, rod, and cover, g.

Report the percentage of residue by evaporation as the average of the three results.

PARTICLE CHARGE OF CATIONIC EMULSIFIED ASPHALTS - PROCEDURE

Replace the section specifying sample conditioning procedure with the following:

Heat the emulsion to be tested to 50 ± 3ºC (122 ± 5ºF) in an oven or water bath set at a temperature not exceeding 71 ± 3ºC (160 ± 5ºF). Stir the emulsion thoroughly to ensure uniformity of temperature.

VISCOSITY (SAYBOLT FUROL) - APPARATUS

Replace the specification for sieve with the following:

Sieve, 850 µm (No. 20) sieve of wire cloth, with a diameter of 1 1/2 ± 1/8 in., framed to fit into the top of the viscometer tube.

Add the following to the specification for thermometers:

An equivalent thermometric device that has been calibrated in accordance with ASTM E 220 may be used. ASTM mercury thermometers shall be used for referee testing.

Replace the specification for water bath with the following:

Oven or Water Bath capable of maintaining temperatures to 71 ± 3ºC (160 ± 5ºF).

VISCOSITY (SAYBOLT FUROL) - PROCEDURE

Replace the procedure for testing at 50ºC (122°F) with the following:

Test at 50ºC (122ºF) - Clean and dry the viscometer and insert the cork. Heat the emulsion sample to a temperature of 51.4ºC to 60ºC (124.5ºF to 140ºF) in an oven or water bath set at a temperature not exceeding 71 ± 3ºC (160 ± 5ºF). The temperature is dependent on the material being tested and will be selected to achieve a temperature of approximately 50ºC (122ºF) after the emulsion has been poured into the viscometer. Stir the sample thoroughly without incorporating bubbles. Immediately pour the emulsion through the No. 20 sieve into the viscometer until it is above the overflow rim. Stir the emulsion in the viscometer at 60 rpm with the thermometer until the test temperature is attained, avoiding bubble formation. Adjust the bath temperature until the emulsion temperature remains constant for 1 minute at 50 ± 0.05ºC (122 ± 0.1ºF). Withdraw the thermometer. Quickly remove the excess emulsion from the gallery with a suction pipet. Determine the viscosity as prescribed in AASHTO T 72. Report the results to the nearest full second.

During field testing, the material may be received at a temperature exceeding 60ºC (140ºF). In this case, the sample may be cooled by pouring approximately 100 mL into a 400 mL beaker, or other suitable container. Stir the emulsion with a wide circular motion at approximately 60 rpm with a thermometer

until a temperature of 51.4ºC to 60ºC (124.5ºF to 140ºF) is obtained.

If sufficient material to fill the viscometer tube will not pass through a single sieve due to excess particulates, the viscosity will be considered unobtainable by this procedure.

Note: The Saybolt Furol viscometer is satisfactory for testing emulsified asphalt when the viscosity is not less than 20 seconds.

DEMULSIBILITY- PROCEDURE AND CALCULATION

Change this section to use the percentage of residue by either distillation or evaporation as per Test Method Nev. T759 or Nev. T756.

SIEVE TEST - PROCEDURE

Change the mass of emulsified asphalt required for testing from 1000 g to 500 g.

SIEVE TEST - CALCULATION

Replace this section with the following:

Calculate the percentage of sample retained on the sieve as follows:

Sample retained, percent = $(M_{spr} - M_{sp}) / 5$

where:

M_{sp} = mass of sieve and pan, g, and

M_{spr} = mass of sieve, pan, and residue, g.