State of Nevada
Department of Transportation
Materials Division

METHOD OF TEST FOR RECOVERY FROM DEFORMATION OF POLYMER MODIFIED ASPHALT EMULSION RESIDUE

SCOPE

This test method is an indicator of the amount of elasticity that a polymer modifier has imparted to an asphalt. This elasticity is an indicator of the percent of modifier that has been added to the asphalt.

SUMMARY OF TEST METHOD

A sample of the emulsion is evaporated or distilled and the residual asphalt obtained. A torsional head is placed in the asphalt residue, rotated through an angle of π radians (180°), and the percent recovery from deformation is calculated.

APPARATUS

1. Containers, cylindrical seamless metal containers. The containers used for testing the samples will be 89 mL (3 oz) containers, with an approximate diameter of 54 mm (2 1/8 in.) and depth of 33 mm (1 5/16 in.).

2. Balance, conforming to the requirements of M231, Class G2.

3. Oven, thermostatically controlled, capable of maintaining temperatures up to 163°C (325°F).

4. Gloves, heat resistant gloves capable of gripping the containers.

5. Torsion Head, the details of the torsion head are shown is Figure 1. The disc will be made of aluminum. The spider, pointer and nut will be made of steel. The stem will be threaded and fitted with a nut to allow for accurate adjustment of the torsion head in the sample container.

6. Holder, any device capable of holding the 89 mL (3 oz) container in a fixed position while rotating the torsion head.

7. Wrench, an 8 mm (5/16 in.) wrench for rotating the torsion head.

8. Timer, a stopwatch or other timing device graduated in divisions of one second or less.

9. Scale, a flexible plastic ruler graduated in millimeters.

PROCEDURE

Evaporate two containers as per Test Method Nev. T759. Immediately pour the hot, residual asphalt from both containers into one 89 mL (3 oz) container. Immerse the torsion head into the asphalt and align the notches in the spider with the can so that the disc is centered. Adjust the disc height such that the asphalt level is approximately 1 mm below the top of the disc. Place the container in an oven set at a temperature of $163 \pm 2.8°C$ ($325 \pm 5°F$) to allow bubbles to escape and to break the surface tension around the disc. After ten minutes, remove the container from the oven and adjust the torsion head until the asphalt is level with the top of the disc. Allow the samples to cool at room temperature for two hours. The temperature of the room will be maintained at $24 \pm 4°C$ ($75 \pm 7°F$).

Place the container in the holder so that it will be held in a fixed position. With the wrench attached to the top of the shaft, rotate the torsion head π radians (180°) and release it immediately. The rotation should be done at a steady rate, taking approximately five seconds to accomplish. Begin timing the recovery at the release of the torsion head. After 30 seconds, mark the pointer's location on the container. Mark the pointer=s location on the container again after 30 minutes.

CALCULATION AND REPORT

Calculate the percent recovery from deformation as follows:

Percent Recovery = 100A/(B/2)

   Where:

      A = the arc on the container between the mark at 30 seconds and the mark at 30 minutes, in millimeters.

      B = the circumference of the container, in millimeters

Report the percent recovery to the nearest whole number.