METHOD OF TEST FOR BULK SPECIFIC GRAVITY AND DENSITY OF COMPACTED BITUMINOUS MIXTURES (FIELD METHOD)

SCOPE

This test method covers a rapid determination of bulk specific gravity and density of specimens of compacted bituminous mixtures. It will be used for drilled cores obtained from the field.

APPARATUS

1. Balance, 12000 g minimum capacity, sensitive to 0.1 g.

2. Suspension Apparatus, suitable wire for suspending the immersed wire basket from the balance, so that the weight of the cores in water can be obtained.

3. Water Tank, thick heavy-duty plastic, minimum of 30 gal. capacity and dimensions of 610 mm x 457 mm x 457 mm (24 in. x 18 in. x 18 in.) W x D x H.

4. Thermometer, for monitoring water and specimen temperatures, accurate to 1°C (2°F).

5. Oven, capable of maintaining a temperature of 110 ± 5°C (230 ± 9°F).

6. Microwave Oven.

7. Wire Basket, made of 2.36 mm (No. 8) stainless steel wire mesh with a lift style handle. Dimensions of the basket will have a minimum size of 203 mm x 203 mm (8 x 8 in.) diameter x height.

8. Towel, large absorbent cloth or towel.

SAMPLE PREPARATION

1. Test specimens are to be drilled cores taken from the bituminous pavement mat, after final compaction.

2. Size of specimens – Core size shall be 100 mm (4 in.) in diameter. Thickness shall be as close to plan as possible or greater.

3. Pavement specimens shall be taken from bituminous pavement with a core drill taking care to avoid distortion, bending or cracking of specimens during and after removal from the pavement.
4. Specimens shall be free from foreign materials such as tack coat, seal coat, soil, etc.

5. Specimens may be separated from other pavement layers by sawing, chiseling, or other suitable means.

PROCEDURE

1. **Inside the water tank,** maintain the water temperature at 25 ± 3°C (77 ± 5°F). While the wire basket is immersed in the water, adjust the water level until water flows from the overflow spout of the water tank, allow the water and basket to stabilize, then tare the immersed basket. Place specimen in the wire basket, leave immersed in the water for four minutes and record the “Weight in grams (immersed in water)” to the nearest 0.1.

2. Remove the specimen from the water and bring it to a saturated surface-dry condition by blotting the sample with a damp towel, determine the “Weight in grams (saturated surface-dry)” to the nearest 0.1.

3. Place specimen in a large flat bottom drying pan (conventional oven); may also use paper plate, glass dish or ceramic dish (microwave oven). For microwave oven use, refer to Test Method Nev. T306. For conventional oven drying use, refer to Test Method Nev. T112. Place the specimen in conventional oven or microwave oven. Leave the specimen in the conventional oven or heat in microwave oven until it can be easily broken down. Place the separated specimen in the conventional oven or microwave oven and dry to a constant weight. When a constant dry weight is obtained, allow the sample to cool to 25 ± 3°C (77 ± 5°F), determine the “Weight in grams in air (oven-dry condition)” to the nearest 0.1.

CALCULATIONS

1. Calculate the Bulk Specific Gravity as follows:

   \[
   \text{Bulk S.G.} = \frac{A}{B - C}
   \]

   where
   
   \[A = \text{Weight in grams in air (oven-dry condition)}\]
   
   \[B = \text{Weight in grams (saturated surface-dry)}\]
   
   \[C = \text{Weight in grams (immersed in water)}\]

2. Core Density (lb/ft³) = Bulk Specific Gravity x 62.4 lbs/ft³. Round to the nearest 0.1.

NOTES

1. Maintain a constant water level for all weights obtained in the water tank.

2. Do not overheat or burn samples. Note: If the sample is smoking the specimen has been burned.

3. To obtain the SSD condition, do not use paper towels to blot the specimen dry, paper towels will absorb too much moisture, affecting the SSD weight.

4. Use the same scale for all weight measurements.
5. Make sure the suspension apparatus is not in contact with the hole in the counter nor any other obstructions exist.

REPORT

Bulk Specific Gravity to nearest 0.001.

Core Density to the nearest 0.001 Mg/m³ (0.1 lb/ft³).