1. SCOPE

1.1 Description of Test

This method covers the calculation of distributor application rates for various bituminous materials. It uses the known density or specific gravity of the product along with the weight applied to a known sample area to determine the actual application rate in litres per square metre.

1.2 Application of Test

This method is used to determine the application rate of bituminous materials applied by distributors.

1.3 Units of Measure

This test procedure uses the International System Units (S.I.) of measure.

2. APPARATUS AND MATERIALS

2.1 Equipment Required

A scale capable of weighing 0-1000 g to an accuracy of at least 0.1 g.

A claw hammer (carpenter’s hammer).

Needle nose pliers.

Tape measure or ruler (80 cm or more in length).

Stapler (for patch construction, used only if strings will be used).

Box cutter or scissors.

Pair of rubber/latex gloves.
2.2 **Materials Required**

Roll of specialized felt fabric material.

2 - 75 cm lengths of parcel cord per patch (optional).

Labels (for recording patch # and initial weight).

Roofing nails (40 mm or shorter).

Garbage bags (for storing patch after oil is applied).

2.3 **Patch Construction**

Measure and cut a piece of fabric that is 0.50 m by 0.50 m in dimension.

Parcel cords may be used for easier collection of the patch. If used, attach one parcel cord to opposite diagonal corners of patch using the stapler. Wrap second parcel cord around first cord and secure to other two corners using the stapler. The two cords should now be connected near the middle.

2.4 **Data Required**

The *Initial* weight is the combined weight of each patch plus the weight of one empty garbage bag and 4 nails.

The specific gravity of the bituminous product can be obtained from the delivery slip.

The area of the patch (constant at 0.25 m²).

3. **PROCEDURE**

3.1 **Patch Preparation and Setup**

Find a level 100 m section of road and secure 3 patches across the distributor width using 4 roofing nails for each patch. To avoid patch distortion, ensure that the sides of the patches are 0.50 m by 0.50 m and that the diagonals are 0.71 m each. Remove any bent or broken nails from road surface and dispose of properly.

The patches must be placed out of the distributor’s wheel path and in a location where the distributor will be operating at its regular application speed.
3.2 **Collection of Test Patches**

Collect the patches immediately after bituminous material application and before aggregate application. Put on gloves and remove the patches from the road surface by removing the 4 nails with claw hammer and grabbing both cords in the middle of the patch or folding into the center with pliers. Place patch and all 4 nails in garbage bag then tie closed. Label bag according to patch ID number(s).

4. **RESULTS AND CALCULATIONS**

4.1 **Collection of Test Results**

Record the *Final* weight of each full garbage bag separately.

4.2 **Calculations**

Calculate the *Net Weight* of the bituminous sample by subtracting the *Initial* weight from the *Final* weight for each bag.

\[
Net \ Weight \ (g) = Final \ (g) - Initial \ (g)
\]

Divide the *Net Weight* of the sample (g) by the specific gravity of the bituminous material and multiply by 0.001 to convert grams to kilograms. Now divide by the sample area to obtain a rate of application in litres per square metre.

\[
Rate \ (L/m^2) = \left(\frac{Net \ Weight \ (g)}{S.G. \ (kg/L)} \times 0.001 \ \frac{kg}{g}\right) \times \frac{1}{0.25 \ m^2}
\]

4.3 **Reporting Results**

The 3-Patch average result is given in litres per square metre for each distributor tested and for each application rate tested.

5. **CALIBRATIONS, CORRECTIONS, TOLERANCES**

5.1 **Equipment Calibration**

Patch geometry must be adjusted to proper length and width of 0.5 m by 0.5 m while on road surface.
5.2 **Tolerances**

Across the spray bar:
Results should be checked for each of the 3 patches individually to check for uniform application across the spray bar. The application rate across the spray bar will be considered uniform if the difference between any two individual tests divided by the 3-Patch average is less than 10%.

Longitudinally:
To test the consistency of the application rate along the road, use two 3-Patch averages separated by 50 to 100 m. The results are acceptable if the difference in two 3-Patch averages divided by the average of the two locations is less than 10%.

5.3 **Seasonal Calibration**

Step 1: Complete a uniformity check across the spray bar as outlined in Section 5.2.

Step 2: Complete a longitudinal check as outlined in Section 5.2.

Step 3: Conduct single patch tests at a minimum of 3 additional application rates over the range of anticipated field application rates

Step 4: Plot the four or more “Actual versus Dial-In” rates on the Department standard calibration form to produce a calibration plot.

5.4 **Sources of Error**

Sources of testing error include:

Inaccurate patch area (i.e. not 0.25 m²).

Faulty laboratory balance or wind striking the balance.

Delay of weighing after application of bituminous material.

Improper sealing of garbage bag.

Use of incorrect specific gravity for spraying temperature.

Loss or gain of material through handling.

Wind blowing material away from patch.