METHOD OF TEST FOR BULK RELATIVE DENSITY OF COMPACTED BITUMINOUS MIXTURES

1. SCOPE

1.1 This method covers the procedure for the determination of the bulk relative density of compacted bituminous mixtures.

1.2 This method should be used only with densely graded or practically non-absorptive compacted mixtures such as Marshall briquettes and small sections of pavement samples.

2. RELEVANT DOCUMENTS

2.1 ASTM D 2726

3. PROCEDURE

3.1 Procedure of ASTM D 2726 shall be followed, except as noted below.

4. EXCEPTIONS

4.1 PROCEDURE

4.1.1 Carefully brush off any loose particles adhering to the sample. For pavement sample (e.g., cores) taken immediately over a granular base, any imbedded granular material should be cleaned off. Determine the mass of the sample in air and record it (A_D).

4.1.2 For all samples determine the sample mass in water at 25°C after it has been immersed for 4 ∀ 1 minutes. Record the mass (B_1) and the temperature of the water.

Note: When testing multiple specimens, it is acceptable to soak the specimens in a water bath at the specified temperature. The total time of immersion (in the water bath plus during weighing) shall be within the specified limits.

4.1.2.1 When a Marshall briquette is being weighed, place the briquette with the side (curved section) resting on the bottom of the basket, ensuring that no air bubbles are trapped beneath the sample.

4.1.2.2 When a pavement sample is being weighed, place the sample with its side or end on the bottom of the basket ensuring that no air bubbles are trapped beneath the sample.

4.1.3 Remove the sample from the water, place the briquette with the side (curved face) on a damp towel. Carefully roll the specimen back and forth on a damp towel, enough to dry its surface. After surface drying the curved face, flip the specimen to surface dry the other two sides. For other pavement samples surface dry each face with a damp towel. Also dab dry any visible water film on surface cavities. Determine and record the mass (A_2) of the sample in air.

4.1.4 Dry pavement sample s at 110 ± 5°C to a constant mass to obtain the correct dry mass in air (A_C). It will be necessary to break up or separate the pavement sample in the pan to completely dry the sample. (This step is not necessary for laboratory prepared briquettes).

4.1.5 Determine the mass of all samples to 0.1 g accuracy.

4.2 CALCULATIONS

4.2.1 Calculate the Bulk Relative Density (B.R.D.) of the sample as follows:

$$\text{B.R.D.} = \frac{A_1}{(A_2 - B_1)}$$

where

A_1 = mass of sample in air, g
A_D for laboratory prepared briquettes
= A_C for oven dried pavement samples.

A_2 = surface dry mass of sample in air after water immersion, g

B_1 = mass of sample in water, g

4.2.2 If the test temperature differs from 25°C, a correction to the B.R.D. will be made in accordance with the following:

B.R.D. (at 25°C) = B.R.D. (at test temperature) x K

where: K = correction factor listed in Table 1 for test temperature

4.3 GENERAL NOTES AND PRECAUTIONS

4.3.1 When determining the mass of samples in water both the basket and handle, where provided, must be completely immersed in water.

4.3.2 Be certain that no air bubbles are adhering to the wire basket when it is immersed in water.

4.3.3 Use as thin a wire as possible to suspend the basket from the balance.

4.3.4 For Marshall briquettes, all bulk relative density determinations shall be done in triplicate. If the B.R.D. of any one briquette is more than 0.015 from the mean of the triplicate values, recheck calculations and, if necessary, re-weigh. If the briquette density remains more than 0.015 from the mean then discard this value and recalculate the mean.

4.3.5 Mass of pavement samples may vary from 1000 to 2000 g.

4.3.6 Pavement samples must be free of cracks.

4.3.7 The water in the weigh bucket must be maintained as close to 25°C as possible.

Table 1

Correction Factors

TEMPERATURE °C	CORRECTION FACTOR K
20	1.001162
21	1.000950
22	1.000728
23	1.000495
24	1.000253
25	1.000000
26	0.999738
27	0.999467
28	0.999187
29	0.998898
30	0.998599