

Test Method

Bulk Density of Compacted Asphalt - Presaturation Method

RC 202.02

1. Scope

This method details the apparatus and procedures to be followed to determine the bulk density of dense graded asphalt cylindrical specimens.

2. Apparatus

- Top loading balance with adequate capacity and a limit of performance of not exceeding ± 0.5 g.
- Suspension device to suspend the asphalt specimen in the water bath under the balance.
- Water container, filled with water, with a device to maintain a constant water level and of sufficient capacity to contain the suspended asphalt specimen.
- Rigid suspension bridge to support the balance and suspension device over the water container.
- Timer accurate to 5 seconds.
- Temperature measuring device graduated to 1 °C over the range of the test temperatures used.
- Zero the balance.
- Transfer the sample to the suspension device under water ensuring the sample remains completely immersed. Remove any air bubbles adhering to the sample and determine its mass (m_2).
- Remove the sample from the suspension device and allow it to freely drain above the water container for 5 ± 1 seconds.
- Immediately determine the mass of the wet sample (m_3).
- Determine the temperature of the water in which the specimen was soaking to the nearest 1 °C.

3. Test Sample

The asphalt sample may be either compacted in the laboratory according to AS 2891.2.2, AS 2891.5 or cored from the pavement in accordance with AS 2891.1.

4. Procedure

The procedure shall be as follows:

- Clean all loose material from the sample and air dry the sample to constant mass. Determine the mass of the sample (m_1).
- Immerse the sample in the water container for at least 2 hours.
- Position the water container immediately beneath the balance, supported on the suspension bridge, and attach the suspension device.

5. Calculation

Calculate the bulk density of the specimen (ρ_{bulk}) from the following equation:

$$\rho_{bulk} = \frac{m_1 \rho_w}{m_3 - m_2}$$

where: ρ_w = density of water at the test temperature (see Table 1) in t/m^3

m_1, m_2, m_3 = masses, determined above

6. Reporting

Report the bulk density to the nearest 0.001 tonnes per cubic metre.

Table 1 Variation of Water Density with Temperature

Temperature °C	Density of water (ρ_w) t/m^3
0 to 12	1.000
13 to 17	0.999
18 to 23	0.998
24 to 27	0.997
28 to 30	0.996
30 to 33	0.995
34 to 36	0.994
37 to 39	0.993
40	0.992

Test Method - Revision Summary

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Date	Clause Number	Description of Revision	Authorised by
June 2013	Full document Step 5	Re-issued without change, except Defined masses	Manager Construction Materials