Determination of Core Density

Lab Test Reference: 106
British Standard Reference
BS598 : Part 104 : 1989

Principal Apparatus

Weighing in Water Apparatus - Lab Invent No. xx
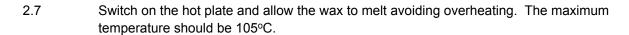
Electronics Balance - Lab Invent xxx

Wax Bath + Paraffin wax of known density Invent No. xxx

Hot Plate Invent No. xxx

Oven xxx

1.	Preliminaries

1.1   The test is carried out in the concrete laboratory.

1.2   Check that the water bath is full and that the apparatus for weighing in water is correctly set up.

1.3   Check that calibration certificates for the balance is valid.

1.4   Check the sample number and test schedule correspond and obtain a worksheet from the cabinet.

2.	Standard Test Method

2.1   The cores shall first be inspected to ensure that the diameter is at least 150mm. Any undersize cores shall be rejected as shall irregularly shaped cones such as those where the ends have degraded or broken unevenly.

2.2   Where cores contain two or more layers they shall be saw cut to form sub-specimens unless directed otherwise.

2.3   Where the cores are asphalt wearing course, the pre-coated chippings shall be removed by heating the cores to not more than 60^oC and dislodging them by means of a spatula.

2.4   The core shall be placed upright in a drying oven at a temperature of 40° until its mass is stable. This usually takes at least 16 hours.

2.5   Allow the core to cool at room temperature. Measure the diameter, depth received, and depth of test specimen and record on the sheet. Note whether any loose material has been removed.

2.6   Weigh in air and record as mass $^W1$. (Note: Only balance xxx is accurate enough)

2.7   Switch on the hot plate and allow the wax to melt avoiding overheating. The maximum temperature should be 105°C.

2.8   Immerse the core in molten paraffin wax ensuring all voids are sealed. Any pinholes can be brushed with a paint brush dipped in wax.

2.9   The wax is allowed to harden and then the waxed core weighed and the weight recorded as mass W_2. (Balance xxx)

2.10   Position the water bath apparatus on the balance platen, suspend the weighing basket in the water and tare the balance to zero.

2.11   Place the coated sample in the basket and weigh the core again suspended in water. Record this weight as mass W_4.

3.   Calculations

3.1   The bulk density of the core is calculated using the formula.

$$\text{Bulk Density } D = \dfrac{W_1}{\dfrac{W_4 - (W_2 - W_1)}{S_5}}$$

3.2   If the air voids are required then the theoretical density is obtained by consulting data sheets and this defined as T.

The air void of the core is calculated using the formula.

$$\text{Air Voids \%} = \dfrac{T-D}{T} \times 100$$

4.   Reporting Results

4.1   The core density of the specimen will be reported to the nearest $0.1 Mg/m^3$.