



Transport
Roads & Maritime
Services

Test method T618

Density of aggregate in bituminous material

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Revision Summary

Ed/Rev Number	Clause Number	Description of Revision	Authorisation	Date
		Reformatted and Revision Summary Added. Safety Notes Added	D.Dash	Jan 2000
Ed 2/ Rev 0	All	Reformatted RMS template	J. Friedrich	November 2012

Note that Roads and Maritime Services is hereafter referred to as 'RMS'.

The most recent revision to Test method T618 (other than minor editorial changes) are indicated by a vertical line in the margin as shown here.

Test method T618

Density of aggregate in bituminous material

1. Scope

This test method sets out the procedure for the determination of the density of aggregate in a bituminous material. The value derived is dependant on the conditions of test and the porosity of the aggregate. The method is derived from the appendix to a paper presented to the American Society for Testing and Materials in 1954 by W.C. Ricketts et al.

2. Safety Notes

Heat resisting gloves or tongs should be used when handling hot bituminous materials. Loosen or puncture lids before heating containers. Solvents such as toluene should be used within a fume cupboard. Safety data sheets should be consulted before handling any materials.

3. Apparatus

- (a) A thermostatically controlled oven with good air circulation, controlled sensitive to $\pm 2^{\circ}\text{C}$ in the approximate range 110°C to 175°C .
- (b) Balance of approximately 3000 g capacity accurate and readable to 0.1 g. suitably arranged for weighing the sample in air and water.
- (c) A spun aluminium container with a seamless bottom of approximately 3 litre capacity, fitted with a handle and wire for suspension in water.
- (d) A container of sufficient capacity as to allow the aluminium container to be completely immersed with a clearance of at least 50 mm around the edge of the container.
- (e) Suitable pans for drying and heating the aggregate.
- (f) A stiff flat metal stirrer approximately 25 mm wide for stirring the contents of the aluminium container.

4. Samples

The size of the samples to be as follows:

Fine aggregate 1000g
 Coarse aggregate 1500g
 Blended aggregate 1500g

5. Procedure

- (a) Dry the aggregate sample in the oven overnight at a temperature of 140°C and maintain at 140°C for test with bitumen or 110°C for test with tar
- (b) Heat the bituminous material to the following temperature.

Bitumen	140°C
Tar	110°C
- (c) Pour sufficient of the bituminous material into the aluminium container to fill it to approximately 0.3 of its depth. Insert the metal stirrer and allow the material to cool to $25 \pm 1^{\circ}\text{C}$. 5 light hours or preferably overnight is the recommended cooling period.
- (d) Weigh the container and bituminous material in air and record the mass.
- (e) Weigh the container and bituminous material in water at $25 \pm 1^{\circ}\text{C}$ and record the mass.
- (f) Drain the water from the container, dry the outside and place in a current of warm air to remove water from the inside of the container and the surface of the bituminous material.

- (g) Replace the container in the oven and heat to 140°C for bitumen or 110°C for tar.
- (h) Remove the aggregate and bituminous material from the oven and add the aggregate carefully to the container stirring thoroughly as the aggregate is added. Continue stirring until the entrapped air has been removed. Vibration and tapping the container assists in the elimination of air.
- (i) Replace the container in the oven at the appropriate temperature for 0.5 hour.
- (j) Remove from the oven and allow to cool, flaming the surface during the cooling period to remove air bubbles if such are present.
- (k) Cool to 25 ± 1°C for at least 8 hours or preferably overnight.
- (l) Weigh the container in air and record the mass.
- (m) Weigh the container in water at 25 ± 1°C and record the mass.

6. Calculations and Reporting

Calculate the density of the aggregate in the bituminous material (effective density) as follows:

Density of aggregate in bituminous material

$$D_1 = \frac{(C - A)}{(A - B) - (C - D)}$$

Where

A= mass of container, bituminous material in air.

B= mass of container, bituminous material in water at 25°C.

C= mass of container, bituminous material, aggregate in air.

D= mass of container, bituminous material, aggregate in water at 25°C.