



# Test method T615

Bulk density and stability of bituminous cold mix modified – Hubbard field procedure

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## Revision Summary

Ed/Rev Number	Clause Number	Description of Revision	Authorisation	Date
		Reformatted and Revision Summary 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 T615 (other than minor editorial changes) are indicated by a vertical line in the margin as shown here.

# Test method T615

## Bulk density and stability of bituminous cold mix modified – Hubbard field procedure

### 1. Scope

This test method sets out the procedure for preparing 152 mm diameter test specimens of bituminous cold mix, and for the determination of stability using the Hubbard-Field stability machine. It also sets out a method for determining the bulk density of the test specimens.

### 2. Apparatus

- (a) Mixing apparatus such as a steel tray, trowel, spatula and scoop
- (b) Quartering apparatus such as metal plates of dimensions 400 mm x 125 mm and 200 mm x 125 mm or sample dividers (riffle boxes) of appropriate size opening, e.g. the multiple slot type similar to those in AS 1289
- (c) Metal mixing dishes, approximately 350 mm diameter at the top, depth 60 mm and with sloping sides and smooth surface finish
- (d) Steel moulds, having an internal diameter and depth of 152 mm machined on the inside to a smooth surface.
- (e) A machined steel base plate 300 mm x 200 mm x 25 mm thick
- (f) A compaction stand or bench of heavy wooden construction secured to a solid concrete floor or slab.
- (g) A tamper of 47.5 mm diameter, and a tamper-plunger of 146 mm diameter
- (h) A compression machine, capable of applying a load of 44.5 kN to the compacted specimen and a 146 mm diameter plunger with ball seating to suit.
- (i) A balance of not less than 5 kg capacity, accurate readable to 1 g
- (j) Wax marking crayon
- (k) A Hubbard-Field Type stability testing machine capable of applying a total force of 44.5 kN at a uniform rate of head or platen movement of 61 mm/min. The machine is to be fitted with a testing ring, capable of transmitting the load through a ball joint to the shaft of a separate plunger of 146 mm diameter
- (l) A mould of diameter 152 mm and height of 162 mm with the shear ring fitted integrally about 64 mm from one end and provided with a lifting handle. Alternatively a testing mould assembly consisting of a mould diameter 152 mm, and height 152 mm, slightly tapered at one end, fitted to a shear ring and ring base may be used
- (m) Castor oil

### 3. Preparation of Sample

Transfer the sample to the mixing tray, mix well, reduce the size of the sample by quartering or riffing to obtain  $3000 \pm 25$  g or sufficient to produce a briquette 76 mm high and place in a mixing dish.

### 4. Procedure

#### 4.1 Preparation of Briquette

- (a) Place the mould on the base plate, lightly oil and introduce about one half of the material into the mould taking care to distribute evenly the coarse and fine materials.
- (b) Tamp the material in the mould with 40 short firm blows of the 47.5 mm tamper, evenly distributed over the surface.

- (c) Place the remainder of the material in the mould and compact in the same manner as (b) above. Now apply additional compaction, using 40 strong blows of the 146 mm tamper-plunger to level the top surface of the specimen.
- (d) Carefully invert the mould and slide the specimen to the bottom of the mould, with the aid of the tamper-plunger if necessary. Compact the new top surface of the specimen with 40 blows of the 47.5 mm tamper. Once again apply additional compaction using 40 strong blows of the 146 mm tamper-plunger to level the top surface of the specimen.
- (e) Place the plunger in position and transfer the mould and base plate assembly to the compression machine. Apply a force of 44.5 kN to the specimen, for 2 minutes. Release the force retaining the specimen in the mould until required for testing.

**Note:** Do not remove specimen from mould at this stage as it may collapse in the unconfined state.

- (f) Mark specimen with an identifying number.

## 5. Determination of Bulk Density and Stability

- (a) Measure the dimensions of the specimen in the mould to the nearest 0.02 mm taking an average of at least 5 readings equally spaced around the circumference. The diameter of the specimen (D) can be determined by measuring the internal diameter of the compression mould using inside calipers. The length of the specimen (L), can be determined using a depth gauge.

## 6. Calculations

$$\text{Bulk density of compacted briquette in g/mL} = \frac{M_1}{\frac{\pi}{4} \times \frac{D^2}{100} \times \frac{L}{10}}$$