



Transport
Roads & Maritime
Services

Test method T436

Voids in dry compacted fine material

OCTOBER 2012



Revision Summary

Ed/Rev Number	Clause Number	Description of Revision	Authorisation	Date
		Reformatted and Revision Summary Added	D.Dash	May 1999
		Date on Test Method Revised to Agree with Date on Revision Summary	D.Dash	Feb 2001
Ed 2/ Rev 0	All	Reformatted RMS template	J Friedrich	October 2012

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

The most recent revision to Test method T436 (other than minor editorial changes) are indicated by a vertical line in the margin as shown here.

Test method T436

Voids in dry compacted fine material

1. Scope

This test method describes the procedure for the determination of the voids in dry compacted fine materials such as fillers for asphalt. It conforms to the procedure described in Australian Standard 1141.17

2. Number of Determinations

Three determinations of the percentage dry voids are to be made, using a separate test portion of filler for each determination. If any of these values differs by more than one percent from the mean percentage, that value is to be discarded and two further determinations made.

3. Apparatus

- (a) A balance of at least 50 g capacity, readable and accurate to 0.01 g within the operating range.
- (b) Compaction apparatus - of the form shown in AS 1141.17 made of steel, and consisting of the following:
 - (i) A base of approximately the dimensions shown in AS 1141.17
 - (ii) A cylinder of 25 ± 1 mm internal diameter and 65 mm internal depth, closed at one end
 - (iii) A ram or plunger of such diameter as will allow it to slide freely in the cylinder with minimum lateral play, provided with a hole to allow air to escape. The hole, about 5 mm in diameter, shall be drilled axially from the top to about 13 mm from the bottom. From the bottom upward the hole shall be about 1.5 mm diameter and about 1.5 mm off centre, meeting the hole drilled from the other end. The plunger shall have a circumferential groove about 6.5 mm from its lower end to accommodate filler that works up the side of the cylinder while in use. The mass of the plunger shall be 350 ± 2 g.
 - (iv) Means for raising the cylinder and dropping it freely between vertical guides from a height of 101.5 ± 0.25 mm to the base. The total mass dropped on to the base shall be 850 g to 900 g, including the filler.
 - (v) Means for reading the depth of the compacted material in the cylinder to an accuracy of 0.1 mm.
 - (vi) The compaction apparatus is used dry, without lubricant on any part. During use hold or clamp the apparatus firmly on a rigid, level non-resilient support; a position above the leg on a firm bench is recommended.
- (c) A desiccator containing anhydrous silica gel. A convenient size is 200 mm to 250 mm.
- (d) A thermostatically controlled oven, with good air circulation capable of maintaining a temperature within the range of 105°C to 110°C

4. Procedure

- (a) Dry the material for 4 hrs in the oven at a temperature of 105°C to 110°C and cool it to room temperature in a desiccator.
- (b) Pour about 10 g of the dried material into the compaction cylinder and distribute it uniformly in the bottom of the cylinder by tapping it gently on the bench.
- (c) Pressing a finger on the central hole in the plunger to prevent ejection of the material from the cylinder, insert the plunger and allow it to slide slowly on the filler. Apply pressure to the plunger so as to form the material into a slightly compacted bed.
- (d) Remove the plunger without disturbance of the material, wipe excess filler from the plunger and sides of the cylinder and clean the hole through the plunger if necessary.
- (e) Clamp the base or otherwise firmly hold it on a firm level surface free from vibration or resilience. Reinsert the plunger and place the cylinder gently in position on the base.

- (f) Raise the cylinder, with plunger in position, and allow it to fall freely through a vertical height of 101.5 ± 0.25 mm to the base.
- (g) Drop the cylinder 100 times, allowing a pause for about one second each time before dropping. The plunger shall remain free to move in the cylinder throughout this operation and to ensure this ease it frequently by twisting it in the cylinder and, if necessary, removing it and wiping it clean of clogging material.
- (h) After 100 impacts, read the depth (*D*) of the compacted material in millimetres, to an accuracy of 0.1 mm.
- (i) Dismantle the apparatus without damaging the bed of material, and wipe the outside of the apparatus clean of any adhering compacted material.
- (j) Remove the material forming the compacted bed and determine its mass to an accuracy of 0.01 g (*m*).
- (k) Make three determinations of the percentage dry voids content using a separate test portion of material for each determination. If any of these values differs by more than 1 percent from the mean percentage, discard that value and make two further determinations.

5. Calculations

Calculate the percentage voids by the following formula:-

$$\text{Percentage voids in dry compacted fine material} = 100 \left(1 - \frac{10000m}{ADp} \right)$$

Where *m* = mass of material bed, in grams.

A = cross-sectional area of cylinder, in square millimetres.

D = depth of compacted bed, in millimetres.

p = apparent particle density of material, determined in accordance with Test Method T435, in tonnes per cubic metre.

6. Reporting

Report the mean value of the three or more results to the nearest 0.5 percent.

7. Repeatability

Percentages of voids obtained by one operator using the same equipment in repeat tests on different test portions drawn from the same sample should not differ by more than 2.