



**Transport**  
Roads & Maritime  
Services

# Test method T611

Compaction of test specimens of  
bituminous mixtures by vibratory  
compaction

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## Revision Summary

Ed/Rev Number	Clause Number	Description of Revision	Authorisation	Date
		Reformatted and Revision Summary Added. Safety Notes Added. 3(m) altered	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 T611 (other than minor editorial changes) are indicated by a vertical line in the margin as shown here.

# Test method T611

## Compaction of test specimens of bituminous mixtures by vibratory compaction

### 1. Scope

This method sets out the procedure for preparing 152 mm diameter test specimens of bituminous mixtures. It is suitable for mixtures of nominal aggregate size up to 40 mm. The method is applicable only if conducted under standard laboratory conditions (ie ambient temperature of  $21 \pm 5^\circ\text{C}$  and free of draughts likely to cause irregular cooling).

### 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 sheet should be consulted before handling any materials.

### 3. Apparatus

- (a) A mechanical vibratory compaction device comprising an electrically operated vibratory type demolition hammer mounted in a frame. The hammer shall have a frequency of vibration of  $1450 \pm 50$  Hz: and mass, including the rammer, of  $16.0 \pm 0.05$  kg. The apparatus shall be fitted with a timing switch set at  $30 \pm 1$  seconds.
- (b) Compactor ram  $145.5 \pm 0.5$  mm diameter to fit the vibratory device.
- (c) Steel moulds  $152.5 \pm 0.5$  mm inside diameter by  $150 \pm 0.5$  mm high machined on the inside to a smooth surface finish.
- (d) Steel inserts  $150 \pm 0.5$  mm diameter by  $13 \pm 0.5$  mm thick to fit into the moulds.
- (e) A thermostatically controlled oven at least  $0.25 \text{ m}^3$  in volume, capable of maintaining temperatures up to  $150^\circ\text{C}$  within a range of  $10^\circ\text{C}$
- (f) Mixing apparatus such as a steel tray, trowel, spatula and scool.
- (g) Quartering apparatus such as metal plates of dimensions 400 mm x 125 mm and 200 mm x 125 mm, or sample dividers (rifle boxes) of appropriate size opening, eg multiple slot type similar to those shown in Australian Standard 1289-1977.
- (h) Metal mixing dishes approximately 350 mm diameter at the top, depth 60 mm and with sloping sides and a smooth surface finish.
- (i) Heating devices such as hot plates.
- (j) A compression machine, capable of applying a load of  $44.5 \pm 0.5$  kN to the compacted specimen.
- (k) A balance of not less than 5 kg capacity accurate and readable to 1 g.
- (l) A thermometer in a metal case range 0 to  $200^\circ\text{C}$  in divisions on  $2^\circ\text{C}$ .
- (m) Heat resisting gloves and tongs for handling hot apparatus.
- (n) Marking crayon.

### 4. Preparation of Sample

Heat the sample in its original container in the air oven at  $140 \pm 5^\circ\text{C}$  for a bitumen mix or  $105^\circ\text{C}$  to  $110^\circ\text{C}$  for a tar mix until the material can be broken up and well mixed. Avoid unnecessary length of heating and exposure to air. Transfer the sample to the mixing tray, mix well, reduce the size of the sample by quartering or riffing to obtain  $2500 \pm 25$  g and place in mixing dish.

## 5. Procedure

- (a) Heat the mould spacer and compactor ram in the air oven at  $140 \pm 3^\circ\text{C}$  for a bitumen mix or  $105^\circ\text{C}$  to  $110^\circ\text{C}$  for a tar mix.
- (b) Heat the test sample in the air oven at  $140 \pm 3^\circ\text{C}$  for a bitumen mix or  $105^\circ\text{C}$  to  $110^\circ\text{C}$  for a tar mix, for a period not exceeding 1.5 hours.
- (c) Remove the test sample from the oven and check the temperature by inserting the thermometer and stirring the material with the trowel until the temperature is reasonably steady.
- (d) If necessary adjust the temperature to within the range  $140 \pm 3^\circ\text{C}$  for a bitumen mix or  $105^\circ\text{C}$  to  $110^\circ\text{C}$  for a tar mix by heating on the hot plate while stirring continuously with the trowel to ensure even distribution of heat and determining the temperature as before.
- (e) Fit the compaction rammer in the compactor and lock. Lightly oil the mould and place mould on base of compactor. Similarly, oil the spacer disc and place the spacer disc in the mould. Introduce the material into the mould taking care not to segregate the material.
- (f) Slide the mould under the compactor. Lower the rammer onto the material and vibrate for a period of  $30 \pm 1$  seconds.
- (g) Raise the compactor, remove the spacer and invert the mould, placing another oiled spacer below the material in the inverted mould.
- (h) Lower compactor and vibrate for a further  $30 \pm 1$  seconds. Raise the compactor and lock in the raised position.
- (i) Remove the mould from the compactor and transfer to the compression machine. Apply a force of  $44.5 \pm 0.5$  kN to the specimen, sustained for approximately 2 minutes. The total elapsed time between the removal of the material from a controlled elevated temperature environment to the completion of the compaction of the specimen shall not exceed five minutes.
- (j) Release the force and allow the mould and specimen to cool in the open laboratory. Mark the sample for identification.
- (k) When cool, eject the compacted material from the mould and store for subsequent testing.