Transport Roads & Maritime Services

NSW GOVERNMENT

Test method T657

Water permeability of bituminous pavements (Method 2 – High flow falling head field permeameter)

NOVEMBER 2012

Revision Summary

Ed/Rev Number	Clause Number	Description of Revision	Authorisation	Date
		New Issue – Adapted from Test Method Q707B by Craig Brady	Gavin Donald	Nov 2006
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 T657 (other than minor editorial changes) are indicated by a vertical line in the margin as shown here.

Test method T657

Water permeability of bituminous pavements (Method 2 – High flow falling head field permeameter)

1. Scope

This method describes the procedure for the determination of the permeability of pavement materials using the High Flow Field Permeameter. It is applicable to bituminous materials (e.g. sprayed seal, asphalt) having permeability values within the range 10 to 5000 µm/s. The method is based on Queensland Department of Main Roads Test Method No. Q707B.

2. Apparatus

(a) Field permeameter (see Figure 1), consisting of a cylinder of clear rigid plastic (eg. Perspex) attached to a rigid plastic base plate as follows:

(i) The base plate (see Figure 2) shall have a diameter of about 200 mm and a thickness of about 20 mm. It shall contain a centrally located circular hole of diameter 100 ± 1 mm. A circular groove shall be formed around the hole in the top surface of the base plate to locate the top edge of the inverted funnel centrally over the hole. The top surface of the base plate shall extend beyond the bottom surface by about 10 mm to enhance removal of the base plate from the pavement at the completion of the test

(ii) The cylinder shall have a height of about 215 mm, an internal diameter of about 145 mm and an outside diameter of about 152 mm

(iii) With the bottom of the cylinder inserted in the groove on the base plate, silicone sealant shall be applied externally over the join between the cylinder and the base plate. The cylinder shall then be marked with etched lines at heights of 165 mm and 185 mm above the bottom of the base plate. The top of the cylinder shall be about 225 mm above the bottom of the base plate (the base plate accounts for approximately 10 mm)

(b) Annular template, of diameter 190 mm and containing a centrally located hole of 110 mm diameter (bituminous materials only)

(c) Stop watch or other suitable timing device readable to 0.1s

(d) Containers, of 10 L and 1 L capacity and fitted with a pouring lip

(e) Water container, having a capacity of at least 20 L

(f) Ball Clay (as used in PAFV testing)

(g) Spatula, to aid application of the silicone sealant to the pavement or base of the permeameter.

(h) Marking crayon

(i) Assorted implements, for cleaning of the pavement before and after testing (eg. wire brush, broom, paint scraper)

3. Procedure

(a) Remove any loose material from the pavement

(b) Attach the permeameter to the pavement using the appropriate procedure as follows:

(i) For sprayed seal/asphalt material

- Place the annular template on the pavement and use the crayon to mark two concentric circles of diameter 100 mm and 200 mm (see Note 6 (a))
- Apply Ball Clay to the pavement between the two concentric circles and spread it out evenly to a final thickness of about 2 mm using a spatula (see Note 6 (b))

- Align the base plate with the 200 mm diameter circle and press the permeameter firmly onto the pavement

(c) Using the containers as appropriate, pour water into the cylinder to fill it to the 165 mm mark

(d) Check for leaks at the base of the permeameter. If any leakage is observed, caulk the area with additional clay

(e) Continue adding water to the permeameter to maintain the water level at the 165 mL for 2 minutes or until 600 mL of water has passed through the pavement

(f) Immediately add additional water as required to raise the water level to the 185 mm mark. Discontinue the additional of water and record the time to the nearest 0.1 seconds for the water level to drop to the 165 mm mark

(g) Repeat Step 3(f) twice

(h) Remove the bulk of the clay from the pavement

4. Calculations

(a) Calculate the average of the three time measurements to the nearest 0.1s

(b) Calculate the volume of cylinder between the 165 mm and 185 mm marks to the nearest 0.1 mL using the formula:

(c) $$V = \frac{\pi D^2}{200}$$

(d) Calculate the permeability using the formula:

(e) $$k = \frac{25.5V}{t}$$

Where:

V = volume of cylinder between 165 mm and 185 mm marks (mL)
D = internal diameter of the cylinder (mm)
k = permeability (μm/s)
t = average time (s)

5. Reporting

Report the following:

(a) Test location including a longitudinal (chainage) and a lateral (offset) reference.

(b) Test site description including pavement type and surface condition.

(c) Permeability to three significant figures (μm/s).

6. Notes on Method

(a) The dimensions of the annular template allow for a 5 mm gap between the line marked by the crayon and the edge of the template. If necessary, the marking technique should be adjusted to ensure that the internal diameter of the smaller circle is 100 mm.

(b) The clay should be applied in a manner which spreads the clay to, but not inside, the 100 mm diameter circle when the permeameter is pressed into position on the pavement.

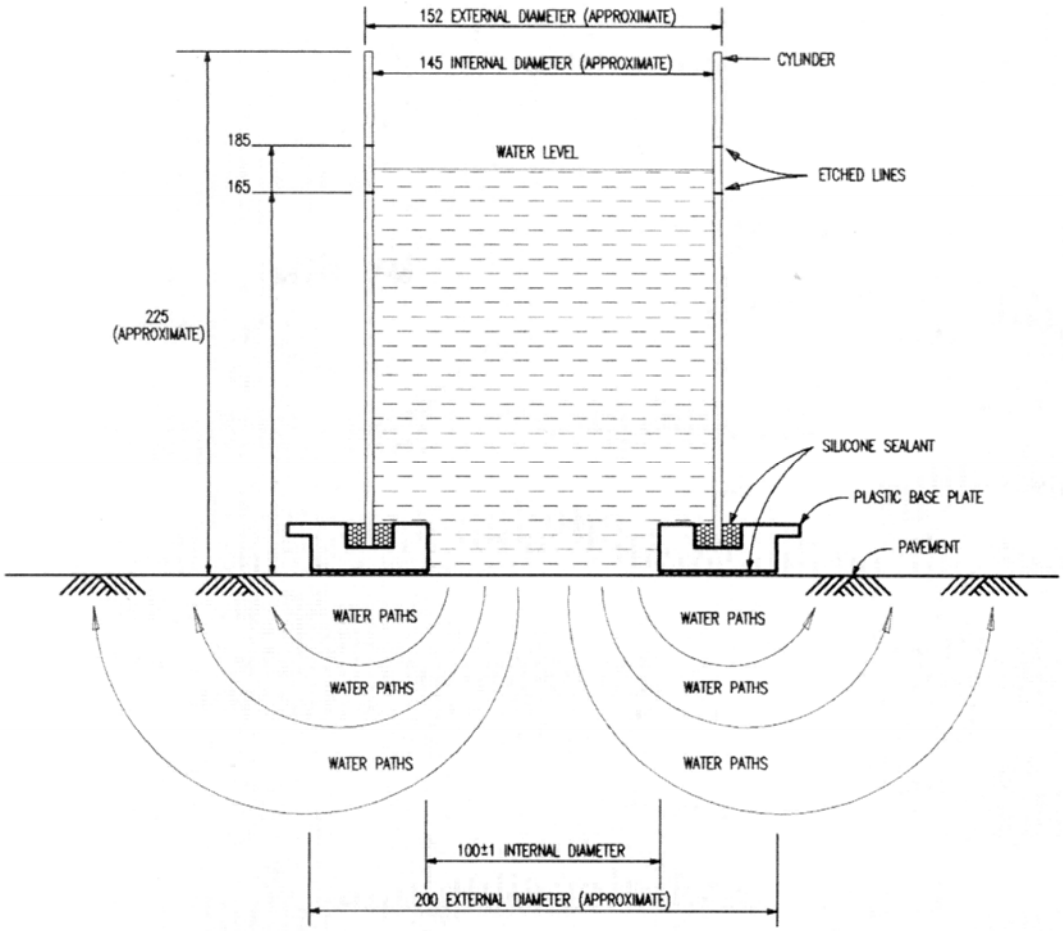

Figure 1 – High Flow Field Permeameter

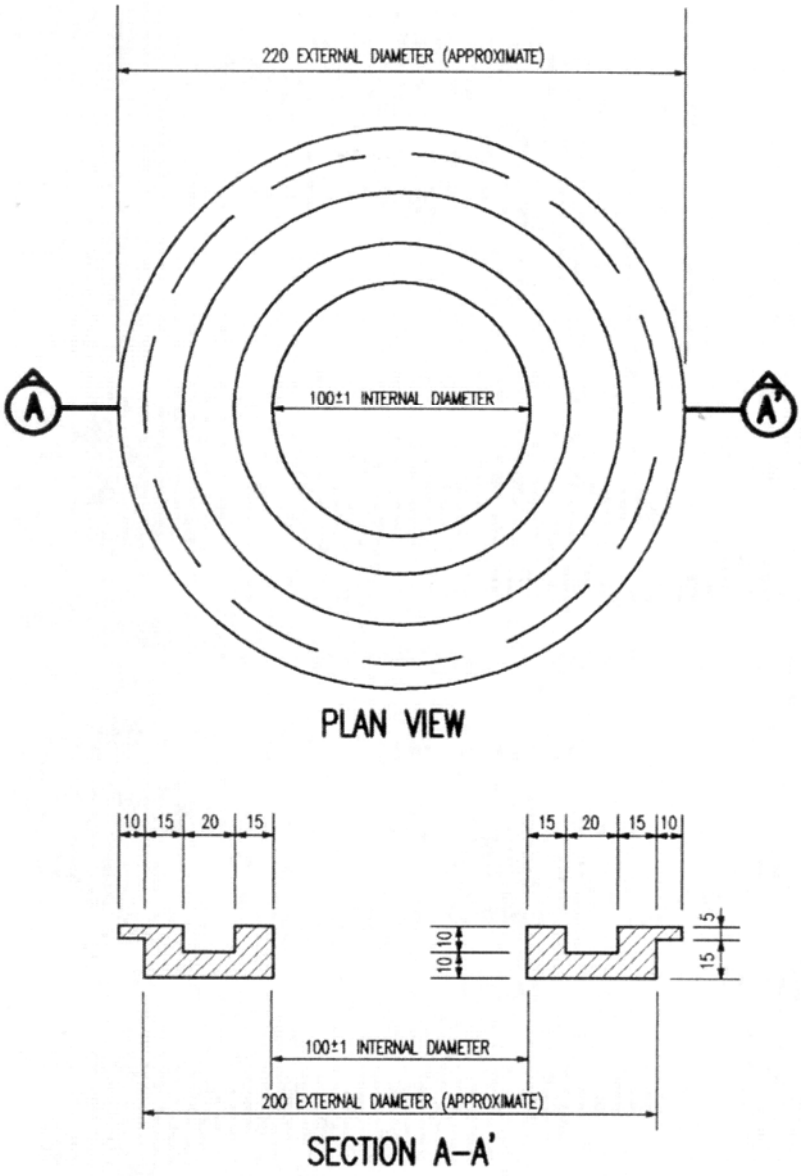

Figure 2 – Plastic Base Plate