



Transport
Roads & Maritime
Services

Test method T107

Fine particle size distribution of road construction materials

OCTOBER 2012



Revision Summary

Ed/Rev Number	Clause Number	Description of Revision	Authorisation	Date
		Reformatted and Revision Summary Added 2(a) revised	D.Dash	April 1999
		Date on Test Method Revised to Agree with Date on Revision Summary	D.Dash	Feb 2001
		Typographical errors Sections 3(b) and 4(a) corrected	D.Dash	Mar 2003
Ed 2/Rev 0	All	Generally revised – title changed. Revised to reference to AS 1141.19.	G Donald	Nov 2007
Ed 3/Rev 0	All 2. 3(a)(i)(v),(vi), (vii),(viii), (ix)	Generally revised. Clarify use of T106 portion and results, reporting tolerance and rewording, % Between Sizes added to table. ABC Ratios reworded and are optional. Add T106 where appropriate.	D Hazell	Oct 2011
Ed 4/ 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 T107 (other than minor editorial changes) are indicated by a vertical line in the margin as shown here.

Test method T107

Fine particle size distribution of road construction materials

1. Scope

This Test Method sets out the procedure for determining the particle size distribution in that portion of a soil, gravel, rock or similar material passing a 2.36 mm AS sieve.

2. General

- (a) This method is used to determine the fine particle size distribution for 425 µm, 75 µm and 13.5 µm size particles based on Stoke's Law.
- (b) Where required, the method is used in conjunction with T106 to determine a complete particle size distribution of the material. When both tests are required, T106 is carried out first

NOTE: T106 is for determining the particle size distribution of coarse and intermediate sized material that is retained on AS sieve 2.36 mm or larger.

- (c) The following documents are referred to in this Test Method:
 - (i) T106 Coarse Particle Size Distribution of Road Construction Materials (By Dry Sieving)
 - (ii) AS 1141.19 Fine particle size distribution in road materials by sieving and decantation

3. Apparatus, Preparation, Procedure, Calculations and Reporting

- (a) This test method is identical to AS 1141.19 except for the following amendments:
 - (i) Reagents may also include other products that have proved to be effective in dispersing soil particles (e.g. CALGON® Water Softener).

NOTE: OHS requirements must be followed. Try the least hazardous reagent first.

- (ii) Samples are prepared in accordance with T105
- (iii) Where “20 percent ammonia solution” is referred to, replace with “suitable reagent”
- (iv) The following are notes to assist the procedure:
 - Stir occasionally during boiling to avoid material adhering to the base
 - When decanting, stir using the rod with a figure ‘8’ motion to avoid rotation on ceasing stirring
 - Take care when transferring fractions from the sieve so that material is not inadvertently lost. Invert the sieve over a clean dish of suitable size (e.g. about 230 mm diameter for 200 mm sieves) and then clean the sieve with a brush and collect the fines. Keep a pair of dishes that are clean and smooth on the inside surface specifically for the purpose
 - Do not discard the fractions until all calculations are checked. The total mass of the fractions should equal the mass of the original portion
- (v) When used in conjunction with T106, the following amendments apply:

NOTE: The Percentage passing the 2.36 mm sieve for the sample ($P_{2.36}$) is obtained from the T106 test result.

- Step 6 Procedure (a) and (b) are not required
- Step 7 Calculation (a) Percentage passing the 2.36 mm sieve is not required
- Carry out Step 7 Calculation (b) and adjust the percentage passing from the – 2.36 mm portion to a percentage of the mass of the total sample as follows:

Multiply each of the results from equations 7(2), 7(3) and 7(4) by $\left(\frac{P_{2.36}}{100}\right)$

- (vi) Where required, calculate the percentage of the sample retained as the difference between percent passing the two adjacent sieves (e.g. $P_{2.36} - P_{425}$)
Unless otherwise specified, the nominated sizes are 2.36 mm, 425 μm , 75 μm , 13.5 μm .
- (vii) Report the following results to the nearest 1%:

NOTE: *The following table is a suggested layout.*

- The particle size distribution of the material as a percentage of the total sample tested
- Where required, report the percentage retained between the nominated sieves
- Where required, plot the particle size distribution with semi-logarithmic axes with particle size as the 'x' axis and percentage passing as the 'y' axis

Sieve Size	% Passing P_s	% Retained Between Sieves ⁽ⁱ⁾	Comment
75.0 mm			
53.0 mm			
37.5 mm			
26.5 mm			
19.0 mm			
13.2 mm			Obtained from T106
9.5 mm			
4.75 mm			
2.36 mm			
425 μm			
75 μm			Obtained from T107 as adjusted using Step 3(a)(v).
13.5 μm			

NOTE TO TABLE: (i) *Report this column of results where required.
The result is for the material < larger sieve but \geq the smaller sieve.*

- (viii) Where required, calculate and report the following three Fine Particle Size Distribution Ratios (A, B and C) to the nearest 1%:

- $A = \frac{\% \text{ Passing } 425 \mu\text{m}}{\% \text{ Passing } 2.36 \text{ mm sieve}} \times 100\%$

- $B = \frac{\% \text{ Passing } 75 \mu\text{m}}{\% \text{ Passing } 425 \mu\text{m}} \times 100\%$

- $C = \frac{\% \text{ Passing } 13.5 \mu\text{m}}{\% \text{ Passing } 75 \mu\text{m}} \times 100\%$

- (ix) Reference to this Test Method instead of the Australian Standard, and where used, add the reference to T106