



Transport
Roads & Maritime
Services

Test method T613

Moisture content of bituminous mixes
(Mass of condensate method)

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Revision Summary

Ed/Rev Number	Clause Number	Description of Revision	Authorisation	Date
Ed 1/Rev 0	All	Reformatted and Revision Summary Added. Safety Notes Added. Scope date added.	D Dash	Jan 2000
Ed 2/Rev 2	All	Reformatted. Title change, clarifications of wording, formula based on dry mass.	G Hall	July 2009
Ed 3/ 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 T613 (other than minor editorial changes) are indicated by a vertical line in the margin as shown here.

Test method T613

Moisture content of bituminous mixes (Mass of condensate method)

1. Scope

This test method sets out the procedure to determine moisture of bituminous mixes by measuring the mass of condensate.

NOTE: The method is based on a procedure previously included in AS 2150-1978 Appendix H.

2. General

- (a) This test is applicable to freshly mixed bituminous material (e.g. asphalt)
- (b) The test determines the volume of water condensed from a sample
- (c) The following document is referred to in this Test method: AS 2891.1.1 Sampling of loose asphalt.

3. Apparatus

- (a) A water cooled reflux condenser, having a jacket not less than 400 mm in length with an inner tube 9.5 to 12.7 mm in outside diameter, with the end of the condenser ground to an angle of approximately 60° to its vertical axis. The drainage tip may finish either in a B19 cone or project 60 mm below the water jacket for fitting into a cork
- (b) Glass traps listed in Table 1 to collect and measure the condensed water and to return the carrier liquid to the distillation vessel

Table 1 – Requirements for Glass Traps

Capacity at 20°C (mL)	Graduation Interval (mL)	Max. Error in Calibration (mL)
1 to 10	0.1	0.05
5 to 25	0.2	0.10

- (c) Friction top tins preferably with double crimped seams, approximately 2 L capacity
- (d) A balance of 3.5 kg capacity with a limit of performance of not greater than ± 0.1 g
- (e) An electric hot plate with variable heat control
- (f) A neoprene O ring with diameter 19 mm
- (g) Tarred metal sample tin with a double tight friction lid and approximately 2 L capacity. Determine the mass of the tarred sample tin and lid (M_l) and record before use
- (h) Brass or copper ring of sufficient height and diameter to accommodate the trap outlet when fitted with an O ring. Solder equipment
- (i) Cotton plug
- (j) Hoses and water supply
- (k) Glass rod
- (l) The following general chemical is required for the test:
 - (i) A carrier liquid of commercial grade with a boiling range not exceeding 5°C (e.g. Xylene, Toluene)

NOTE: Preferably aromatic in nature.

4. Preparation

- (a) Take a sample of at least 1 kg of material directly from the source of supply when discharged from the plant mixing chamber in accordance with AS 2891.1
- (b) Place the sample directly into a tarred 2 L sampling tin and seal the tin immediately

5. Procedure

- (a) Determine the mass of the sample, container and lid (M_2)
- (b) Solder the ring to the lid of the container while still in position
- (c) Select the trap from Table 1 with capacity that will collect the expected water content
- (d) Puncture the lid of the tin within the confines of the ring to produce as large a hole as practicable. Immediately assemble the apparatus and ensure that all connections are vapour and liquid tight
- (e) Pour 150 to 200 mL of the carrier fluid carefully down the reflux condenser to drain into the sample
- (f) Insert a loose cotton plug in the top of the condenser and circulate cold water through the jacket of the condenser
- (g) Apply heat to the sample container adjusting the rate of boiling so that the condenser distillate discharges from the condenser at the rate of 2 to 5 drops per second
- (h) Continue distillation until no water is visible in any part of the apparatus except the trap and the volume of water in the trap remains constant for 5 min
- (i) When the evolution of water is complete allow the trap and contents to cool to room temperature. Dislodge any drops of water adhering to the sides of the trap with a glass rod or any suitable means and transfer them to the water layer
- (j) Read the volume of water (V) in the trap to the nearest graduation interval

6. Calculations

- (a) Calculate the moisture content (w) as a percentage of the dry mass of the sample as follows:

$$w = \frac{V}{(M_2 - M_1) - V} \times 100\%$$

- Where
- w = Moisture content (%).
 - V = Volume of water (mL).
 - M_1 = Mass of container (g).
 - M_2 = Mass of container and moist sample (g).

7. Reporting

Include the following results in the report:

- (a) The product identification, batch numbers and date of production
- (b) The moisture content (w) as a mass percentage of the sample to the nearest 0.1 or 0.2% according to the graduation interval of the apparatus used
- (c) Reference to this test method