



Transport
Roads & Maritime
Services

Test method T735

Laboratory preparation of rubber bitumen mixes

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Revision Summary

Ed/Rev Number	Clause Number	Description of Revision	Authorisation	Date
		Reformatted and Revision Summary Added. Safety Notes Added Old 4.1 Temp altered (now 5.1) Old 5. and 5.1 altered(now 5.2 & 5.3). Old 5.2 removed	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 T735 (other than minor editorial changes) are indicated by a vertical line in the margin as shown here.

Test method T735

Laboratory preparation of rubber bitumen mixes

1. Scope

This method sets out the procedure for preparing laboratory batches of rubber modified bitumen by digesting residual bitumen complying with AS 2008 with either:

- (a) Scrap rubber (comminuted tyre rubber).
- (b) Rubber bitumen concentrates (high concentration of polymer dispersed in bitumen).
- (c) Powdered polymer/filler blends (designed for use with asphaltic concrete).
- (d) Or simply for melting ready for use rubber bitumen under specified conditions.
- (e) This method also sets out the heating and test specimen preparation procedure for rubber and polymer bitumen sampled in the field as well as for laboratory prepared mixes.

2. Safety Notes

A poster describing the action to be taken in the event of bitumen burns must be displayed in the laboratory in the vicinity of the bitumen pouring area(s).

Use either tongs or heat resisting gloves when handling hot bitumen. Loosen or puncture lids before heating containers. Examine cold samples for signs of water. Remove all visible water. Wear spectacles when heating samples suspected of containing water. Cleaning solvents such as toluene may be toxic, handle such solvents in a fume cupboard, consult safety data sheet.

3. Apparatus

- (a) Warming ovens maintained at 105 - 110°C and 163°C.
- (b) A balance capacity 2 kg accurate to 0.5 g.
- (c) Aluminium blocks of approximately double the diameter of the beaker intended to be used with them and with a cylindrical cavity deep enough to accept 90% of the height of the beaker to a 0.3 mm tolerance and with a minimum of 20 mm of aluminium at the bottom of the cavity. (Suggested beaker sizes, 400 mL, 1 L).
- (d) Several beakers able to fit snugly into the cavity.
- (e) Variable speed stirrer motor (capable of at least 600 rpm).
- (f) Paint mixer type impeller. Model number 446 (long shaft) or 447 (short shaft) marketed by Warner (USA) or Oldfield. The end of the shaft has two shaped metal structures 50 mm across at right angles and facing in opposite directions. No other impeller may be used. It should be placed in the beaker so that it is approximately 1 cm from the bottom.
- (g) Hot plate capable of maintaining the temperature of bitumen in the block at $180 \pm 3^\circ\text{C}$. A SEM 204A 1200W has been found to be satisfactory.
- (h) Thermometer reading to 200°C and accurate to 0.5°C eg IP61C.

4. Preparation of Materials

Any bitumens or bituminous concentrates may be left (loosely lidded if desired) in the 105°C air oven on the day before mixing or testing.

Powders (and scrap rubber) shall be riffled or quartered before sampling. For scrap rubber preparation see method T730.

5. Procedure

5.1 Scrap Rubber - Bitumen Mix

- (a) Weigh into the beaker to the nearest 0.5 g the amount of bitumen required for the mix. (The total mix weight in g not to exceed 70% of beaker volume in mL).
- (b) Weigh the calculated amount of crumbed rubber to the nearest 0.5 g. See Note.
- (c) Place the beaker in the aluminium block and heat while stirring at first at slow speed until temp is 190°C and stirrer at about 270 rpm. A stable vortex which is neither in danger of spilling over the sides of the beaker, nor sucking in air should form.
- (d) Carefully add the rubber in portions to the bitumen while still stirring and heating (watch for foaming!) When all rubber is ensure that the temperature is 190°C ± 3 and continue stirring for 1 hour.
- (e) Immediately pour into sample tins or moulds for specified tests. Do not discard immediately. Shrinkage necessitates topping - up of some moulds.

5.2 Polymer Concentrates - Bitumen Mixes

Preheating the concentrates in the 105°C oven may not be sufficient to render them mobile. A further heating at 163°C for 30 minutes is permissible but it is better to cut cold concentrate into chunks with a knife for easy weighing. The bitumen is weighed and heated to 180°C, the polymer is added at a safe speed and when all is in the lumps have dissolved and the temperature is up to 180°C the mixture is stirred at temperature at 600 rpm for 1 hour.

5.3 Pure Polymer as Beads or Prills and Polymer Crumbs Mixed with Mineral Filler

As for Scrap Rubber - Bitumen Mix; when beads seem to have dissolved it is permissible to turn stirrer off and examine consistency on a spatula blade. Continue stirring at 600 rpm and heating at 180°C for 1 hour after all beads have dissolved.