



Transport
Roads & Maritime
Services

Test method T238

Initial adhesion of cover aggregates and binders

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Revision Summary

Ed/Rev Number	Clause Number	Description of Revision	Authorisation	Date
		Reformatted and Revision Summary Added	D.Dash	May 1999
		Date on Test Method Revised to Agree with Date on Revision Summary	D.Dash	Feb 2001
Ed 2/ 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 T238 (other than minor editorial changes) are indicated by a vertical line in the margin as shown here.

Test method T238

Initial adhesion of cover aggregates and binders

1. Scope

This test method sets out the procedure for the assessment of the extent of initial adhesion between a cover aggregates (with or without treatment with precoating materials) and a bituminous binder (with or without the addition of bitumen agent) under wet and/or dry test conditions.

2. Apparatus

- (a) Metal trays at least 125 mm diameter and 9 mm deep
- (b) Hot plate, electric, with adjustable temperature control
- (c) Water bath capable of maintaining water at a temperature of between 20° and 26°C
- (d) Metal dish approximately 300 mm by 200 mm and 38 mm deep
- (e) Pliers, long nose, with hollow-ground tips
- (f) Heat resistant gloves and tongs
- (g) Spatula or palette knife
- (h) Container with water-tight seal, sufficiently large to hold a metal tray

3. Test Samples

- (a) **Aggregate:** The test portion shall consist of about 20 particles representing the dominant particle size constituting the aggregate sample submitted for testing. In general ten test portions will be required.
- (b) **Binder:** The binder should be a sample of the type and class from the same source of supply or manufacture as the binder proposed for use in the field. Bitumen should be cut-back to give the desired viscosity at the temperature of test. A suggested target viscosity of the binder should be 15000 stokes.
- (c) **Precoating Materials and Bitumen Adhesion Agents:** Test samples should be from materials which are available for use by the Authority under current quotations unless the tests are being conducted to evaluate such materials being offered for use. Precoating materials and bitumen adhesion agents should be prepared and/or used in the proportions recommended by the manufacturer.
The methods for precoating aggregate particles, or incorporating adhesion agents into binders, are set out in Test Method T230.

4. Preparation

Unless otherwise specified or approved each aggregate sample submitted for test shall be prepared and tested in the following conditions:

- (i) **As received.**
- (ii) **Clean and Dry:** The aggregate particles shall be washed and scrubbed, if necessary, to remove adhering dust, and dried to constant mass in an oven in the range of 105°C to 110°C.
- (iii) **Dusty:** The aggregate particles shall be lightly sprinkled with soil material screened to pass a 75 µm sieve. Excess dust should be shaken from the particles before applying the aggregate particles to the trays.
- (iv) **Saturated, Surface Dry:** The aggregate particles shall be soaked in the water bath at 20°C and 26°C for 24 hours, allowed to drain for about 15 minutes then spread on an absorbent cloth and rolled or patted until all visible films of water are removed. Larger particles may be wiped individually.

- (v) **Saturated, Surface Wet:** The aggregate particles shall be soaked in the water bath at 20° and 26°C for 24 hours, and then allowed to drain for 15 minutes before applying the aggregate particles to the trays.

The method for precoating the aggregate particles is set out in Test Method T230

5. Procedure

- (a) Heat a quantity of binder (with or without the addition of an adhesion agent, as required) until fluid.
- (b) Pour sufficient binder onto a metal tray to provide a film approximately 3 mm thick. If necessary, use a warmed spatula or palette knife to spread the binder evenly on the tray. Allow the binder to cool.
- (c) Unless otherwise specified or approved, each sample of aggregate prepared above shall be tested after curing in the following conditions:
- (i) **Soaked Condition:** Place the metal tray and binder in the water bath at a temperature between 20° and 26°C and when the binder has reached approximately 25°C place as many aggregate particles as convenient (the number depending on the size of the particles) on the binder film and force each particle into the film by hand using moderate pressure. Allow the sample to remain in the water bath for 1 hour.
- (ii) **Unsoaked Curing Condition:** Place the metal tray and binder in a container and secure the seal. Allow the sealed tray to cure at a temperature between 20° and 26°C. Immerse the sealed container in the water bath at 25°C. When the binder has reached approximately 25°C this temperature remove the container from the water bath. Remove the tray from the container and place as many aggregate particles as convenient (the number depending on the size of the particle) on the binder film and force each particle into the film by hand using moderate pressure. Allow the sample to stand at a temperature between 20° and 26°C for one hour.
- (d) Place the tray containing binder and aggregate particles in a shallow dish containing a sufficient depth of soapy water at a temperature between 20° and 16°C to cover the aggregate particles. Pull the aggregate particles from the binder with the aid of long nosed pliers. Use steady vertical pressure when pulling the aggregate particles to avoid sliding the particles while manipulating the pliers.
- (e) Sort the aggregate particles into groups according to the following features:
- (i) **Completely stripped** - less than about one quarter of the contact area is coated with binder.
- (ii) **Partly stripped** - between approximately one half and three quarters of the contact area is coated with binder.
- (iii) **Not stripped** - more than approximately three quarters of the contact area is coated with binder.

6. Calculations

After visual assessment of each aggregate particle, calculate the percentage of particles (by number) which have stripped from the binder, as follows:-

- (i) Fully stripped - count one unit
- (ii) Partly stripped - count one-half unit
- (iii) Not stripped - count nil

The per cent stripping of the sample is the sum of these percentages.

7. Reporting

- (a) Type and source of aggregate
- (b) Type, class and source of binder, and % cutback
- (c) Precoating material
- (d) Type and proportion of binder adhesion agent
- (e) Conditions of curing and of testing (Steps 4 and 5(c))
- (f) Per cent stripping to the nearest 5 per cent