

# TEST METHOD T560

## APPARENT BITUMEN CONTENT OF BITUMEN EMULSION AND RECOVERY OF BITUMEN FOR TESTING

### REVISION SUMMARY

| <b>Date</b>     | <b>Clause<br/>Number</b> | <b>Description of Revision</b>                    | <b>Authorised<br/>By Gen Mgr<br/>Pavements</b> |
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## TEST METHOD T560

# APPARENT BITUMEN CONTENT OF BITUMEN EMULSION AND RECOVERY OF BITUMEN FOR TESTING

### 1. SCOPE

This test method set out the procedure for obtaining the residue on evaporation from bitumen emulsion. Procedure A shall be used when determining the percentage of residue only, reported as Apparent Bitumen Content, and Procedure B shall be used when tests on the residue are required.

### 2. APPARATUS

- (a) Metal containers of about 500 ml capacity, about 90 mm diameter and 115 mm depth with double crimped base and side seams, and with folded top rim.
- (b) A balance, of capacity 250 g, accurate and readable to 0.05 g
- (c) A heating device such as hotplate with input control.
- (d) A carbon dioxide gas bottle with pressure regulating head, connected with rubber or plastic tubing to a 500 ml gas washing bottle; then to a nozzle of glass tubing 6.44 mm internal diameter. The nozzle shall have the delivery end bent through 360 degrees so that it may be hooked over the side of the metal container and extend down inside about 50 mm the purpose being to direct the flow of gas down the inside of the container to form a non-oxidising atmosphere without hindering the escape of volatile matter.
- (e) A thermometer reading to 200°C by 1°C.
- (f) A mixture of ethanol (95 per cent) and water in the proportions of 2 to 1 by volume.
- (g) A shallow dish to hold cooling water.
- (h) Tongs or asbestos gloves to hold the metal container.
- (i) Glass rods 6.4 mm diameter and length about 180 mm, with flame polished ends.

### 3. PROCEDURE A

- (a) Weigh to the nearest 0.1 g about 60 g of the thoroughly mixed sample in a tared metal container in which a thermometer has been placed. add 25 ml of the ethanol water mixtue and place the assembly on the hot plate. Hook on the gas nozzle. Adjust the volume of gas at about 2 bubbles per second when passed through water in a gas washing bottle, and commence the evaporation process.

- (b) Adjust the temperature of the hot-plate and manipulate the container with tongs by rocking from side to side while stirring in order to control ebullition. It may be advantageous to place a piece of wire gauze over the hot-plate as an additional means of regulating the rate of heating but the air space caused by the raised rim of the base is usually adequate in this respect
- (c) Remove the container from the hot-plate when frothing subsides and the temperature rises to about 120°C. Cool to about 50°C by immersing the container in a shallow dish of water, maintaining the gas flow into the container. Remove the gas nozzle, dry the container and weigh to the nearest 0.1 g.
- (d) Add 25 ml of ethanol water mixture, attach the gas nozzle and repeat the evaporation procedure.
- (e) Repeat the evaporation with further additions of ethanol water until the loss in mass between successive evaporations is less than 0.5 g. Repeated evaporations are usually required only in the case of samples containing volatile oil.

#### 4. CALCULATION AND REPORTING

Calculate the percent of residue as follows:

$$\text{Residue, per cent} = \frac{100}{(B - A)} \times (C - A)$$

Where

|   |   |   |
|---|---|---|
| A | = | Tare Mass of metal container and thermometer in grammes     |
| B | = | Mass of metal container, thermometer and sample in grammes  |
| C | = | Mass of metal container, thermometer and residue in grammes |

Report the result as Apparent Bitumen Content, per cent.

#### 5. PROCEDURE B

Proceed in accordance with Section 3, using sufficient batches to obtain the quantity of residue required for the tests proposed. Combine the residues at as low a temperature as possible, under an atmosphere of carbon dioxide, and pass through a 300 µm sieve. Mix well and proceed with the tests.

#### 6. TECHNIQUES

- (a) The operator should check that the technique of heating and stirring in the evaporation process is reliable, by conducting a blank test with 30 - 40 g of Class 160 bitumen in place of the emulsion. The difference in mass of residue before and after evaporation, up to four cycles, should be less than 0.5 per cent. Loss by splattering or by overheating the residue can be avoided by adjustment of the rate of heating and continuous stirring of the mixture.

- (b) In cases of dispute it will be necessary to conduct control tests with bitumen and oil distillate representative of that in the emulsion, in order to decide upon the number of cycles of evaporation to be used. However, in view of the wide range of viscosity of bitumen residue from emulsion allowed by specification, it is unlikely that such a case will arise with materials normally used in the manufacture.