



Standard Test Procedures Manual

Section: ASPHALT MIXES

Subject: MOISTURE BY REFLUX

1. SCOPE

1.1. Description of Test

This method determines the direct measurement of moisture fractions in a bituminous mix.

2. APPARATUS AND MATERIALS

2.1. Equipment Required

Metal Still - a vertical metal still complete with a paper gasket to which the head can be tightly attached by means of a metal clamp. The head will be of metal, preferably copper or brass, and will be equipped with a 25.4 mm tubulation inside diameter. A suitable still is described in ASTM Method D244 or AASHTO T59.

Condenser glass tube type having a condenser jacket not less than 400 mm long with an inner tube 9.5 to 12.7 mm in outside diameter. The end of the condenser inserted in the trap will be ground off at an angle of 30 degrees from the vertical axis of the condenser.

Trap - a well annealed glass trap of 10 or 25 ml capacity graduated in 0.1 ml divisions with 0.05 ml maximum error below 1 ml and in 0.2 ml divisions with a 0.1 maximum error above 1 ml as shown in ASTM Spec E123.

Solvent - Xylene.

Heat Device - any satisfactory source of heat that is capable of maintaining a distillation rate of 85 to 95 drops per minute. A ring burner of hot plate has been found to be satisfactory.

Chemicals - wetting agent such as household detergent.

Balance - sensitive to 0.1 g.

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3. PROCEDURE

3.1. Sample Preparation

Thoroughly mix the sample to be tested and break up any large lumps. Weigh 500 g of the mixed sample and place in the metal still. Keep the remainder of the sample in a tightly covered container for possibly future use.

3.2. Test Procedure

After placing the sample in the metal still, add 200 ml of xylene and quickly stir into the sample.

Firmly attach the still cover along with the paper gasket and assemble the trap and condenser.

Apply heat using the ringer burner or hot plate at a rate that refluxing will start within 5 to 10 minutes. Regulate the heat so that the condensed solvent will drop into the trap at a rate of 85 to 90 drops per minute.

Continue the refluxing until three successive readings of the trap at 15 minute intervals show no increase. Do not continue the distillation for more than 1 1/2 hours under any circumstances.

Allow the contents of the trap to reach room temperature before taking final H₂O readings. Read to the nearest scale division.

4. RESULTS AND CALCULATIONS

4.1. Calculations

$$\% \text{ water} = \frac{\text{Volume of Water in Trap}}{\text{Weight of Sample}} \times 100$$

4.2. Reporting Results

Report the percent moisture by reflux on form MR 70.

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5. ADDED INFORMATION

5.1. References

A.S.T.M. D-1461, D-244 and E-123.

A.A.S.H.T.O. T-59 and T-110.

5.2. General

Care should be taken to avoid overheating of the sample and the test must be completed within the 1 1/2 hour time limit.

Stills should be cleaned out with solvent and rinsed with chloroethene after using.

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STP 204-12

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APPROVAL SHEET

New Revision Date of Previous Document 86-01-02
Effective Date: - -

Description of Revision (Reason for Revision):
Format of test procedure updated.

Review/Implementation Process:
Reviewed by the Materials Section of the Technical Standards and Policies Branch.

Other Manuals/Policies Affected:
Nil

Follow Up/Training Required:
Nil

Comments/Concerns/Implications (Budget/Environment/Stakeholders):

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Approval Recommended by R.A. Widger - -
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Approval Recommended by A.R. Gerbrandt - -
Dir., Technical Standards & Policies Br. Date

Approved by D.G. Metz - -
Assistant Deputy Minister, Infrastructure Date

Electronic File Updated - -
Update Mailed - -