1. **SCOPE**

1.1. **Description of Test**

This method covers measurement of the wearing qualities of slurry seal, hot sand asphalt mix and sulphur mixes under wet abrasion conditions.

2. **APPARATUS AND MATERIALS**

2.1. **Equipment Required**

Balance 5000 g ± 1 g.

Sieves - Canadian Metric Standard square mesh of size numbers as required by the specifications for the materials being tested.

Oven - thermostatically controlled at 60°C ± 1°.

Model C-100 Hobart mixer or equivalent.

Metal tray 264 mm by 267 mm by 57 mm deep fitted with four vertical pins near the corners for holding template, sample and distilled water.

Template 6 mm thick by 241 mm square with a centre hole 216 mm in diameter complete with four holes in corners to match pins in container tray.

22 to 27 kg grade asphalt roll roofing paper, 240 mm square with four holes to fit pins in metal tray.

Water bath thermostatically controlled at 25°C ± 1°.

Abrasive head weighing 2.27 kg coupled to the Hobart mixer with approximately 14 mm free up and down movement in the shaft sleeve. A section of 300 psi reinforced rubber hose 14 mm ID by 31 mm OD and 127 mm in length shall be mounted horizontally on the abrasive head as shown in ASTM Method D3910.

Plywood base 305 mm square for transporting and drying of sample in template in the oven.
Suitable prop block and spacers for supporting platform assembly in position during testing.

Mixing pan, soft brush, spatula, graduated cylinder, 1800 ml beaker and distilled water.

Squeegee or straight edge 305 mm in length.

Fume hood, hot plate.

Hydraulic press.

Steel plate 255 mm square and a 215 mm diameter steel disk, both about 10 mm thick to hold sample while forming in press.

3. **PROCEDURE**

3.1. **Sample Preparation**

3.1.1. **Slurry**

Air dry aggregate similar to stockpile average to be used on job.

Riffle carefully and complete sieve analysis as per STP 206-1.

Place template on roofing paper and tack coat opening with SS1 emulsion.

Quarter sufficient amount of dry aggregate required.

Weigh approximately 80 gm of aggregate into mixing bowl making sure it is uniformly distributed. Add the predetermined amount of water and mix until particles are uniformly wetted. Finally, add the predetermined amount of emulsion and mix for a period of not less than 1 minute and not more than 3 minutes. Note: the required water and emulsion content are determined by the consistency test method described in ASTM method paragraph 5.1. A flow of 2 to 3 cm is normally required.

Immediately pour sample into template containing smooth roofing paper.

Squeegee or straight edge slurry level with the top of the template with minimum amount of manipulation and scrape off excess material and discard.
Place specimen in oven at 60°C and dry to constant weight. This usually requires a minimum of 15 hours.

Remove sample from oven and allow to cool at room temperature and remove template and weigh.

After weighing, place sample in 25°C water bath for 60 to 75 minutes before doing abrasion test.

3.1.2. **Hot Sand Asphalt Mix**

Dry aggregate and adjust gradation with filler as necessary.

Heat aggregate and asphalt cement to desired temperature required and mix at the asphalt content required by the engineer (usually 8 to 12%).

Cut square of roofing paper, place on steel plate.

Apply tack coat of asphalt to roofing paper and place two template molds on top.

Spread 800 g of mix in mold and strike off level with straight edge.

Place steel disk over centre of template and place in hydraulic press under 4545 kg for 5 minutes.

Weigh mold, mix and paper.

Place in oven at 60°C for 4 1/2 hours.

After removing specimen from oven, place in water bath at 25°C for 1 1/2 hours.

3.1.3. **Sulphur Mixes**

Dry aggregate and riffle sample to approximately 800 g required for testing.

Select grade of asphalt cement and heat to approximately 135°C.

Heat aggregate and asphalt to 135°C and mix at required asphalt content (usually 8%).

Add pelletized sulphur to asphalt mixture based on weight of total mix. This usually requires 16-17% sulphur when the asphalt used is 8 to 8.5 percent range.
Mix well under fume hood until the mixture becomes sloppy. Do not allow the temperature to exceed 150°C as the sulphur will combine with hydrogen to give off sulphur oxide gas.

Cut square of roofing paper and place on steel plate.

Apply tack coat of asphalt to roofing paper and place two mold plates on top.

Spread sulphur mix in mold and strike off level with straight edge.

Allow to cool at room temperature for 24 hours and weigh.

After curing, place in water bath for 1 1/2 hours.

3.2. **Test Procedure**

Remove specimen, template and roofing paper from water bath and place in metal tray with four pins to secure sample in bottom of tray.

Cover sample with 6 mm distilled water at room temperature.

Secure metal tray on the Hobart mixer by means of clamps provided and attach the rubber hose abrasion head. Elevate the platform until the rubber hose contacts the surface of sample. This usually requires sufficient pressure for the pin to be at the midpoint of the slotted sleeve. Use prop block to support platform assembly during testing.

Operate mixer for exactly 5 minutes ± 2 seconds, at low speed.

Remove sample from metal tray and wash off debris using soft brush.

Place washed sample at 60°C in oven and dry to constant weight.

Remove from oven and allow to cool at room temperature and weigh.
4. **RESULTS AND CALCULATIONS**

4.1. **Collection of Test Results**

Record original sample weight after molding and drying to constant weight.

4.2. **Calculations**

Weigh sample after abrasion and dry to constant weight.

Original sample weight minus final abraded weight multiplied by 32.9 expresses the loss in grams per meter square.

\[(W_1 - W_2) \times 32.9 = \text{g/m}^2\]

4.3. **Reporting Results**

Report the loss in g/m².

5. **ADDED INFORMATION**

5.1. **References**

A.S.T.M. D3910


5.2. **General**

Slurry showing a loss of more than 800 g/m² is not acceptable.

For asphalt mixes, a loss of 400 g/m² should not be exceeded.

For sulphur mixes no values are available.

When pouring sample into template, care should be taken to mix the material uniformly to avoid segregation.

Rotate hose after completion of each test and replace if badly worn.
Rubber hose and roofing paper available from local distributors with Hobart mixer available from S.T.I.

Sulphur should be added to the mix between 115°C and 150°C and final mix temperature should not exceed 150°C at any time because of sulphur oxide emissions.
APPROVAL SHEET

New __ Revision _X__ Date of Previous Document 85-11-08
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):

Prepared and Recommended by D. MacLeod _____________ 93-11-10
Materials Standards Engineer Date

Approval Recommended by R.A. Widger _____________ _- -_
Senior Materials Engineer Date

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 _- -_
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