

Recommend Approval: <u>Robert A. Vellal</u> <u>1/19/12</u> Team Leader Date <u>Bryce</u> <u>1/19/12</u> Division Chief Date	Maryland Department of Transportation State Highway Administration Office of Materials Technology MARYLAND STANDARD METHOD OF TESTS	
Approved: <u>Tim Smith</u> <u>03/09/12</u> Director Date	LABORATORY AND FIELD STRIP TEST FOR HOT MIX ASPHALT (HMA)	MSMT 410

SCOPE:

This procedure is used to determine the necessity of and the effectiveness of a heat-stable additive when used as an asphalt antistripping compound in hot mix asphalt.

MATERIALS AND EQUIPMENT:

1. Balance conforming to M 231, Class D.
2. Containers:
 - (a) 6 oz ointment tins or similar containers.
 - (b) 1 qt cans or 800 mL beakers.
3. Stirring rod or mixing spoon.
4. Hot plate or gas burner.
5. Timer accurate to 1 second.
6. Sand bath.
7. Oven capable of maintaining a desired temperature within ± 10 F.
8. Paper towels or glass plates.

TEST PROCEDURE:

1. A minimum of 100 g of asphalt shall be placed in an ointment tin and heated on a hot plate to a temperature corresponding to the required mixing viscosity as given below.
 - (a) Normal temperature mixes - 220 centistokes.
 - (b) Plant mix seals - 800 centistokes.
2. Determine the amount of asphalt and aggregate required to produce a total mix of 300.0 g as shown in CALCULATIONS, then place the aggregate in a qt can or beaker.

3. Place the blended samples in an oven maintained at a temperature not more than 50 F above the temperature established by the mixing viscosity for the particular asphalt being used.
4. Remove aggregate from the oven and place on the scale. When the aggregate reaches 10 F above the desired mixing temperature, add the required asphalt and place the aggregate in a preheated sand bath which will maintain the aggregate at the mixing temperature during the mixing operation.
5. Mix the asphalt and aggregate until the aggregate is completely coated and for not less than 60 seconds at the required mixing temperature ± 10 F. Then, immediately place the mixture in boiling water so that it is completely submerged and boil for 10 minutes.
6. Drain the water from the mixture and place the mixture on a paper towel or glass plate for 12 to 24 hours before evaluating the percentage of asphalt coated aggregate. This will be a visual inspection without breaking the sample apart.
7. If 95 percent or more of the visible area of the aggregate is coated, no further testing is required. If less than 95 percent of the aggregate is coated, the use of a heat-stable antistripping additive will be required.
8. Using the manufacturer's recommended amount as a starting point, determine the quantity of heat-stable antistripping additive to be added to the asphalt as shown in Step 2 of the Calculations. Prepare the asphalt additive sample using a greater quantity of asphalt, e.g. 100 g, than will be added to the mixture in order to facilitate this operation. The exact amount to be added to the aggregate can then be poured from this amount. Repeat the test procedure previously outlined, using the asphalt additive.
9. If the additive is to be introduced into the asphalt and stored prior to use, the treated asphalt shall be kept in an oven maintained at the required mixing temperature for a period of 96 hours. During that time the sample shall be well sealed by taping the lid to the container. After the 96 hour period, remove the treated asphalt from the oven and stir thoroughly prior to testing.

CALCULATIONS:

1. Determine the batch weights for 300.0 g HMA.

$$A = 300.0 P_a$$

$$B = 300.0 - A$$

where:

A = batch weight of asphalt,

B = weight of aggregate, and

P_a = percent of asphalt.

2. When the use of a heat-stable antistripping compound is required, determine the weight of the asphalt additive compound:

$$C = A_1 P_c$$

where:

C = weight of additive, and

A₁ = weight of asphalt,

P_c = percent of heat-stable antistripping additive.

REPORT:

Report the required percentage of heat-stable antistripping additive necessary for a passing mix to the nearest 0.1 percent. If the mix tested fails, report the failure and the highest percent of additive used.

TEST PROCEDURE:

1. Select a representative coated sample of about 300 g.
2. Completely submerge the sample in boiling water for 10 minutes.
3. Drain the water by gradually inverting the container to place the sample in one mass on a glass slide or paper towel.
4. Examine the sample after 30 minutes without breaking it apart. If less than 95 percent of the visible area of the aggregate is coated, discard the sample and prepare another sample with the antistripping agent increased by 0.25 percent. The sample passes only if at least 95 percent of the aggregate is coated after it is reexamined unbroken after 12 to 24 hours.
5. The Inspector is authorized on the basis of this test to adjust the specified quantity of antistripping agent to a maximum of ± 0.25 percent. Any action concerning adjustments shall

be communicated immediately to the Engineer. All other adjustments will be made only by the Engineer.