

Recommend Approval: <u>Robert A. Vellal</u> <u>1/19/12</u> Team Leader Date <u>Benny</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	<b>TESTING OF ASPHALT RELEASE AGENTS</b>	<b>MSMT 414</b>

**SCOPE:**

This procedure is used to determine the effectiveness of asphalt release agents used in preventing adherence of hot mix asphalt (HMA) mixtures to truck bodies during hauling. The effect of the release agent on the asphalt is also evaluated.

**NOTE:** The use of a detergent as a supplement to an approved asphalt release agent is permitted provided it does not contaminate or alter the characteristics of the hot mix asphalt.

**MATERIALS AND EQUIPMENT:**

1. Oven capable of maintaining a temperature of 265 ±15 F. Use of a microwave oven is optional.
2. Oven capable of maintaining a temperature of 140 ±9 F (optional).
3. Balance conforming to M 231, Class C.
4. Flasks, 125 mL Erlenmeyer.
5. Slip Box - A metal box with a bottom area of 26 ±2 in<sup>2</sup> with sides of sufficient height to hold 1000 g of HMA. One side shall be removable or have a gate to permit the HMA to slide freely from the box (FIGURE 1).
6. Atomizer or other spray apparatus, 50 mL capacity.
7. Thermometer, 50 to 500 F range.
8. Mixing spoon.
9. Pie Pan, approximately 9 in. diameter.
10. Beaker, 100 mL capacity.
11. 1000 g of a hot mix with an asphalt content greater than 5.0 percent and conforming to Maryland State Highway HMA Surface Bands SC or SF. This material may be obtained from field production.

## **INFRARED SPECTROGRAM**

An infrared spectrogram shall be conducted on the undiluted product in conformance with T 237. Retain the original test result and report acceptance samples as satisfactory if they match the pre-qualification sample visually.

## **RELEASE PROPERTIES**

### **TEST PROCEDURE:**

1. Following the manufacturer's recommendations, dilute the release agent to the suggested concentration and pour it into the atomizer.
2. Prepare 1000  $\pm$ 5 g of HMA and maintain it at a temperature of 265  $\pm$ 15 F.
3. Spray the release agent on the inside of the slip box, covering the bottom and all sides completely. Drain off the excess by tilting the box toward the hinged gate or open end.
4. Place the entire HMA mixture into the box. Hold the box level at a height of 3  $\pm$ 1/2 in. from a flat level surface and drop it from this height 5 times.
5. Place the test container at a 45  $\pm$ 5 degree angle for a maximum of 20 seconds, and allow the mixture to slide freely out of the hinged end of the test container into the pie pan.
6. Estimate the asphalt coating on the bottom and lower 2 in. of the slip box as a percent of the area coated.
7. Return the HMA mixture to the oven and reheat to the test temperature.
8. Repeat Steps 4 thru 7 until the test container is 20 percent coated with asphalt residue. Discontinue the test and record the number of cycles completed.

### **REPORT:**

1. Record the number of cycles required to achieve 20 percent coating (n).
2. Report the frequency at which the truck body must be recoated (n-1).
3. Report the release agent as unsatisfactory if more than 20 percent of the test container is coated with asphalt after the first test cycle.

## EFFECT ON ASPHALT

### TEST PROCEDURE:

1. If necessary, dilute the release agent in conformance with the manufacturer's recommendations.
2. Record the weight of a clean, dry 125 mL Erlenmeyer flask.
3. Add  $5.0 \pm 0.5$  g of liquid asphalt cement conforming to M 226, AC 20, Table 2 to the flask and allow to cool to room temperature. After the sample has cooled, weigh it and record the weight of asphalt to the nearest 0.01 g.
4. Pour  $100 \pm 5$  mL of the diluted release agent into the flask.
5. Allow to set at room temperature for  $24 \pm 1$  hour.
6. Using distilled water, wash the release agent and any dissolved asphalt from the flask. Be sure that no undissolved asphalt is lost.
7. Air dry the remaining asphalt to a constant weight. As an alternative the sample may be dried to a constant weight in an oven maintained at  $140 \pm 9$  F.
8. Weigh the flask and asphalt and record the weight of asphalt remaining in the flask to the nearest 0.01 g.

### CALCULATIONS:

Calculate the percent of asphalt lost.

$$A = \frac{B - C}{B} \times 100$$

where:

A = Percent of asphalt lost,

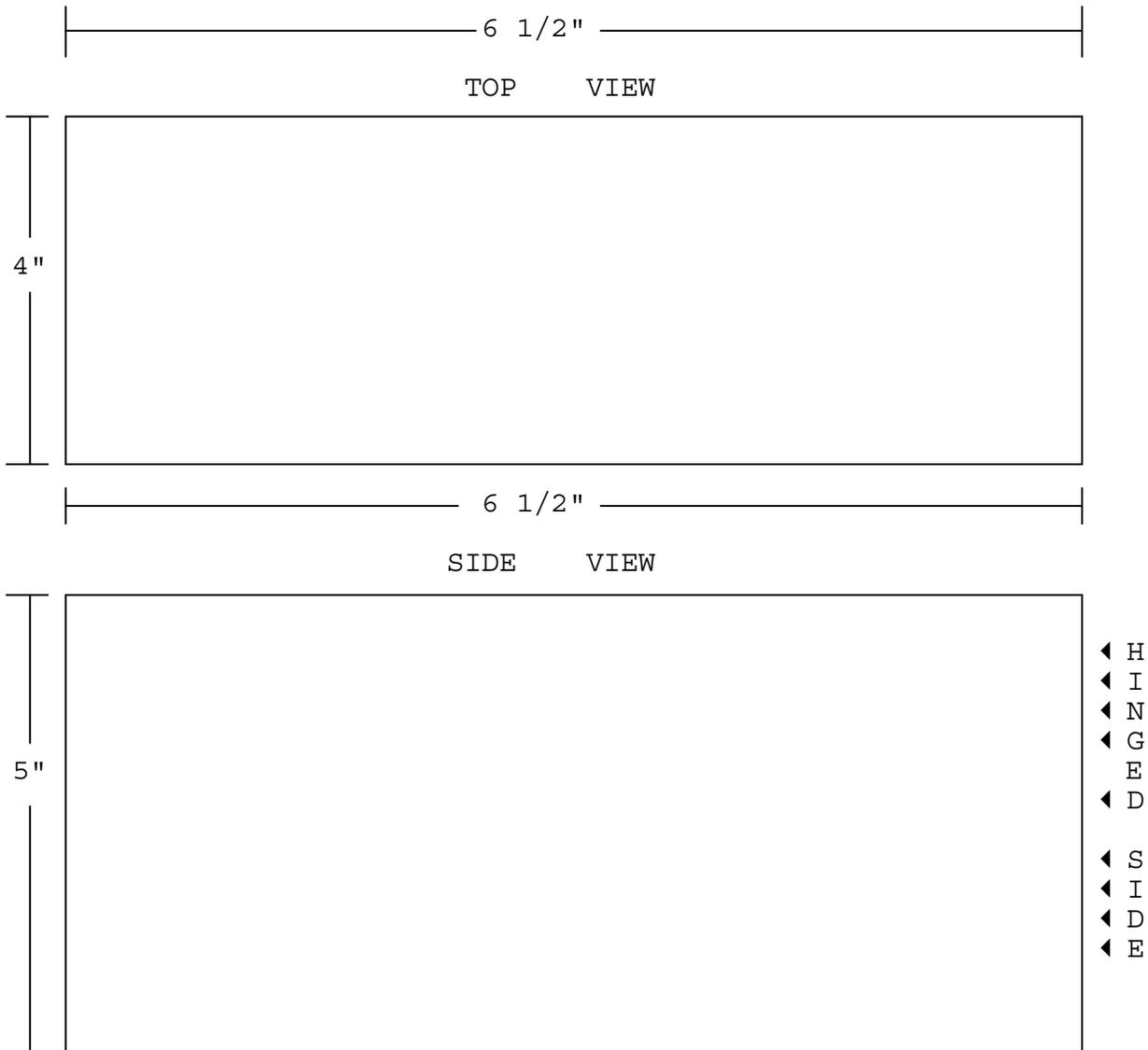
B = weight of asphalt originally placed in flask, and

C = weight of asphalt remaining after setting period.

**REPORT:**

Report as satisfactory if less than 2 percent of the asphalt is lost.

S L I P     B O X



**NOTE 1** - The slip box shall be constructed of steel or aluminum.

**NOTE 2** - A one gallon, metal can with the top portion removed, and one 4 in. side cut away and hinged is acceptable.

**FIGURE 1**