

## Method of Test for Residue of Specified Penetration

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### 1. Scope:

This test is for determining the percent of residue having a specified penetration at 100 g, 5 sec. 77°F.

### 2. Apparatus:

- 2.1 Container. The container in which the sample is to be tested shall be a flat-bottomed, cylindrical seamless tin box, approximately 2 3/4" in diameter and 1 3/4" in depth.
- 2.2 Heating bath. The heating bath shall be a cast iron air bath permitting the immersion of the container to a depth of 1 1/4" through an opening 1/16" larger in diameter than the container. It shall support the container 1/4" above the hot plate and with at least 1/4" free air space between the sides of the container and of the air bath below the opening.
- 2.3 Hot plate. The air bath shall be heated on a suitable mounted hot plate, heated either electrically or by means of a gas flame. The plate shall be capable of maintaining the sample continuously at the required temperature.
- 2.4 Thermometer. An open flash thermometer, graduated in either Fahrenheit or Celsius degrees as specified, having a range of 20° to 760°F and conforming to the requirements for this thermometer as prescribed in (ASTM E1).
- 2.5 Scale or balance having the capacity to weigh any sample which may be tested utilizing this procedure and readable to the nearest 0.1 gram.

### 3. Procedure:

- 3.1 Thoroughly stir and agitate a complete mixture before removing the portion for testing.
- 3.2 Weigh a  $100 \pm 10$  g sample of the material to be tested in a tared container. Place the container in the air bath in position to be heated. Support the thermometer in the sample equidistant from the sides of the container and with the bottom of the bulb neither more than 1/4" above nor touching the bottom of the container. Completely immerse the bulb in the sample throughout heating.
- 3.3 Heat the sample, as rapidly as possible without foaming, to 480°F and during the evaporation, the temperature shall be maintained between 480°F and 500°F. Stir the sample with the thermometer from time to time to prevent local overheating and, to maintain a homogeneous sample. Flux all cakes of hardened bitumen which form at the sides of the container.

- 3.4 Judge approximately what percentage of residue is needed to secure the desired penetration. When it is supposed that the residue will show the required penetration, scrape off the bitumen on the thermometer and return to the container. Remove the container from the air bath, cool and weigh. Determine the penetration of the residue in accordance with AASHTO T 49, with the exception that a 6 oz. container shall be used instead of the 3 oz. container specified in the AASHTO T 49 for the evaporation.
- 3.5 It is frequently necessary to make several trials before a residue of the required penetration is obtained. If it is determined to be greater than that required, remove the water from the container and the surface of the sample and repeat the heating and determination of penetration. Consider a residue satisfactorily obtained when its penetration is within 15 of that desired. Calculate its percentage by weight of the original sample. When it is necessary to determine the percentage more precisely, calculate by interpolation between percentages of 2 residues, one having a penetration greater and one having a penetration lower than specified.
- 3.6 Duplicate determinations by this method should not differ from each other by more than 1.0% with the same operator nor more than 2.5% between operators.

**4. Report:**

The percentage shall be reported as:

Percentage of residue of \_\_\_\_\_ penetration (determined \_\_\_\_\_).  
Stating first, the specified penetration, and second, the penetration actually determined for the sample tested or calculated by interpolation.

**5. References:**

AASHTO T 49  
ASTM E1