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## Standard Test Method for Distillation of Cutback Asphalt<sup>1</sup>

This standard is issued under the fixed designation D402/D402M; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

### 1. Scope

1.1 This test method covers a distillation test for cutback asphalts.

1.2 The values stated in either SI units or inch-pound units are to be regarded separately as standard. The values stated in each system may not be exact equivalents; therefore, each system shall be used independently of the other. Combining values from the two systems may result in non-conformance with the standard.

1.3 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

### 2. Referenced Documents

2.1 *ASTM Standards:*<sup>2</sup>

D86 Test Method for Distillation of Petroleum Products at Atmospheric Pressure

D370 Practice for Dehydration of Oil-Type Preservatives

E1 Specification for ASTM Liquid-in-Glass Thermometers

E77 Test Method for Inspection and Verification of Thermometers

E133 Specification for Distillation Equipment

E220 Test Method for Calibration of Thermocouples By Comparison Techniques

E644 Test Methods for Testing Industrial Resistance Thermometers

E1137 Specification for Industrial Platinum Resistance Thermometers

<sup>1</sup> This test method is under the jurisdiction of ASTM Committee D04 on Road and Paving Materials and is the direct responsibility of Subcommittee D04.46 on Durability and Distillation Tests.

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<sup>2</sup> For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

### 3. Summary of Method

3.1 Two hundred millilitres of the sample are distilled in a 500-mL flask, at a controlled rate, to a temperature in the liquid of 360°C [680°F], and the volumes of distillate obtained at specified temperatures are measured. The residue from the distillation, and also the distillate, may be tested as required.

### 4. Significance and Use

4.1 This procedure measures the amount of the more volatile constituents in cutback asphalt. The properties of the residue after distillation are not necessarily characteristic of the bitumen used in the original mixture, nor of the residue which may be left at any particular time after field application of the cutback asphalt. The presence of silicone in the cutback asphalt may affect the distillation residue by retarding the loss of volatile material after the residue has been poured into the residue container.

### 5. Apparatus

5.1 *Distillation Flask*, 500-mL side-arm, having the dimensions shown in Fig. 1.

5.2 *Condenser*, standard glass-jacketed, of nominal jacket length from 200 to 300 mm and overall tube length of 450 ± 10 mm (see Fig. 3).

5.3 *Adapter*, heavy-wall (1-mm) glass, with reinforced top, having an angle of approximately 105°. The inside diameter at the large end shall be approximately 18 mm, and at the small end, not less than 5 mm. The lower surface of the adapter shall be on a smooth descending curve from the larger end to the smaller. The inside line of the outlet end shall be vertical, and the outlet shall be cut or ground (not fire-polished) at an angle of 45 ± 5° to the inside line.

5.4 *Shield*, steel, lined with 3-mm fire proof insulation and fitted with transparent mica windows, of the form and dimensions shown in Fig. 2, used to protect the flask from air currents and to reduce radiation. The cover (top) shall be made in two parts of 6.4-mm fire proof insulation.

5.5 *Shield and Flask Support*—Two 15-cm<sup>2</sup> sheets of 16-mesh Chromel wire gauze on a tripod or ring.

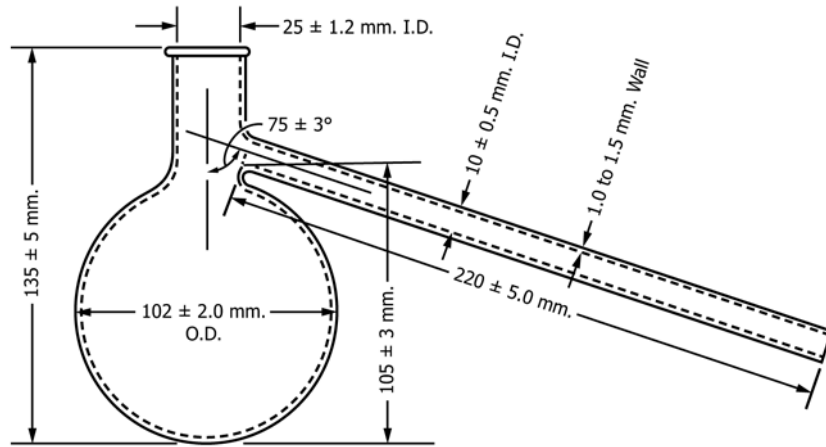


FIG. 1 Distillation Flask

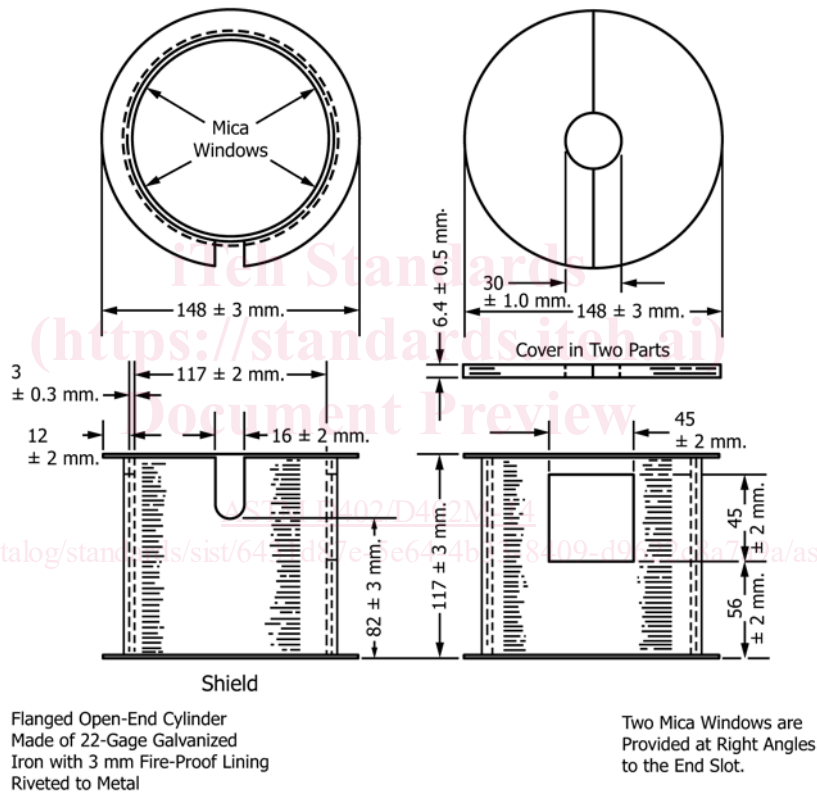


FIG. 2 Shield

5.6 Heat Source:

5.6.1 Adjustable Tirrill-type gas burner or equivalent.

5.6.2 An electric heater equipped with a transformer capable of controlling from 0 to 750 W. The shield and support shall be a refractory with an opening of 79 mm, with the upper surface beveled to 86 mm to accommodate the specified 500-mL flask. When the flask is placed on the refractory, there should be a distance of approximately 3 mm between the bottom of the flask and the heating elements.

5.7 Receiver—A standard 100-mL graduated cylinder conforming to dimensions of Specification E133, or a 100-mL Crow receiver as shown in Fig. 4 of this test method.

NOTE 1—Receivers of smaller capacity having 0.1-mL divisions may be used when low volumes of total distillate are expected and the added accuracy required.

5.8 Residue Container—A seamless metal container with slip on cover of 75 ± 5 mm in diameter, and 55 ± 5 mm in height.

5.9 Thermometer—The thermometer shall be one of the following:

5.9.1 An 8C (8F) thermometer which conforms to the requirements of Specification E1. Calibrate the thermometer in accordance with one of the methods in Test Method E77.