



Standard Test Method for Distillation of Road Tars¹

This standard is issued under the fixed designation D 20; 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 reappraisal. A superscript epsilon (ε) indicates an editorial change since the last revision or reappraisal.

1. Scope

1.1 This test method covers the distillation of road tars.

1.2 *This standard does not purport to address all of the safety problems, 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:*

E 1 Specification for ASTM Thermometers²

3. Summary of Test Method

3.1 A 100-g sample is distilled at a controlled rate from a 300-mL flask into tared receivers. The masses of distillate fractions at a series of specified temperatures and of residue at the maximum specified temperature are determined. If desired, the residue and distillates may be used for further testing.

4. Significance and Use

4.1 The distillation test separates tar into fractions according to a series of specified temperatures.

5. Apparatus

5.1 *Flask*—A side-arm distillation flask, as shown in Fig. 1, conforming to the following dimensions:

Diameter of bulb, outside, mm	86.0 ± 1.5
Diameter of neck, inside, mm	22.0 ± 1.0
Diameter of side-arm, inside, mm	10.0 ± 0.5
Height of flask, outside, mm	131.0 ± 1.5
Vertical distance, bottom of bulb, outside, to horizontal tangent at side-arm, inside, mm	93.0 ± 1.5
Length of side-arm, mm	220 ± 5
Angle of side-arm, deg	75 ± 2
Thickness of side-arm wall, mm	1.0 to 1.5

5.2 *Condenser Tube*—A tapered glass condenser, as shown in Fig. 2 and Fig. 3, having the following dimensions:

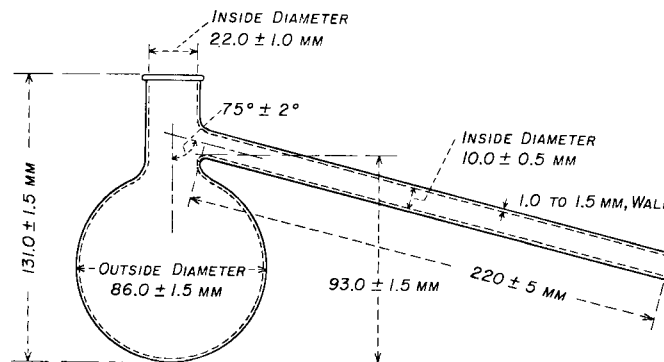


FIG. 1 Distillation Flask

Outside diameter of small end, mm	12.5 ± 1.5
Outside diameter of large end, mm	28.5 ± 3.0
Length, mm	360 ± 4
Length of uniformly tapered part, mm	100 ± 5

5.3 *Source of Heat*—A heat source consisting of a bunsen or meker-type burner (Note 1) or an electric heater. The electric heater³ shall have an output variable of 750 W and an upper refractory with dimensions as shown in Fig. 4. The temperature of the heater shall be controlled by a variable transformer or rheostat suitable for the voltage used, and shall be fitted with a clamp for mounting on a vertical support rod.

NOTE 1—An artificial gas model used with natural gas has been found to give a uniform and easily controlled source of heat.

5.4 *Flask Shield and Cover for Flame Distillation*—A steel shield (preferably stainless) lined with 3-mm Transite board, non-asbestos, with two-part cover made from 6-mm Transite board of the form and dimensions shown in Fig. 5.

5.5 *Flask Shield and Cover for Electric-Heater Distillation*—A steel shield (preferably stainless) fitted with mica windows, and a cover of the same construction and dimensions as those for flame distillation (5.4) except for the height of the shield (see Fig. 6).

5.6 *Gauze for Flame Distillation*—Two sheets of 1.0-mm opening wire gauze made of 0.56-mm diameter nickel-chromium wire measuring a minimum of 125 mm in diameter or (125 by 125-mm) square.

5.7 *Burner Chimney for Flame Distillation*—Construct a cylindrical metal shield approximately 100 mm high, 95 to 105

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² *Annual Book of ASTM Standards*, Vol 14.03.

³ The Precision Ful-Kontrol 750-W heater with built-in variable transformer control, available from Precision Scientific Co., Chicago, IL, has been found satisfactory. This heater is only available for 115 V. 50/60 Hz.

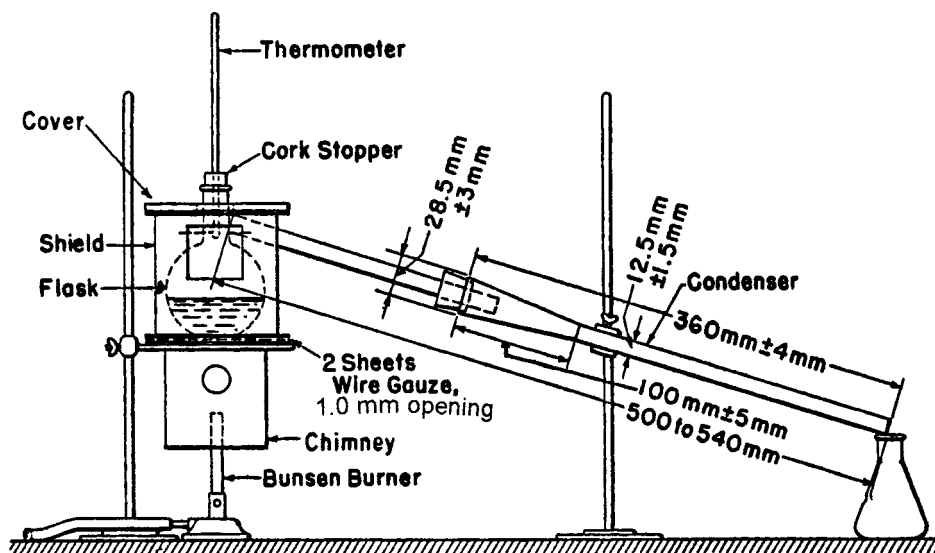


FIG. 2 Apparatus Assembly for Flame Distillation

mm in diameter, and having a peephole 25 mm in diameter centered about 32 mm below the ring support. The top of the shield shall be flanged to permit its being suspended from the ring support.

5.8 *Receivers*—Erlenmeyer flasks or beakers having a nominal capacity of 50 to 125 mL, and tared to the nearest 0.1 g.

5.9 *Balance and Masses*, accurate to 0.1 g.

5.10 *Thermometer*— An ASTM High Distillation Thermometer having a range from -2 to $+400^{\circ}\text{C}$ and conforming to the requirements for Thermometer 8C as prescribed in Specification E 1.

6. Preparation of Sample

6.1 Thoroughly stir or otherwise mix the sample immedi-

ately before removing the portion for testing, to ensure that such portion will be representative of the sample. If warming is necessary, take care to avoid loss of volatile material.

7. Preparation of Apparatus

7.1 Assemble the apparatus as follows (see Fig. 2 and Fig. 3):

7.1.1 Suspend the burner chimney by its flange from the support ring, place the specified two sheets of flat wire gauze on the burner chimney, and place the flask shield on the upper sheet of gauze. In case the electric heater is used, attach the heater to a vertical support so that at the end of the distillation it can be lowered at least 150 mm. Place the upper refractory on the heater with the larger opening facing upwards. Set the flask shield on the upper refractory.

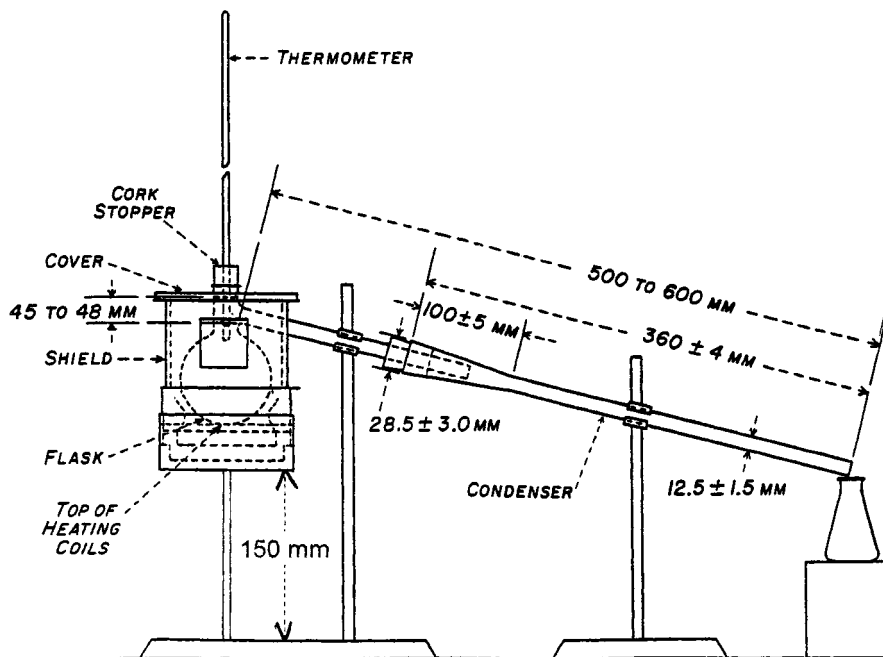


FIG. 3 Apparatus Assembly for Electric Heater Distillation