



Designation: D20 – 03

Standard Test Method for Distillation of Road Tars¹

This standard is issued under the fixed designation D20; 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 (ϵ) indicates an editorial change since the last revision or reapproval.

This standard has been approved for use by agencies of the Department of Defense.

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:*²

E1 Specification for ASTM Liquid-in-Glass Thermometers

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

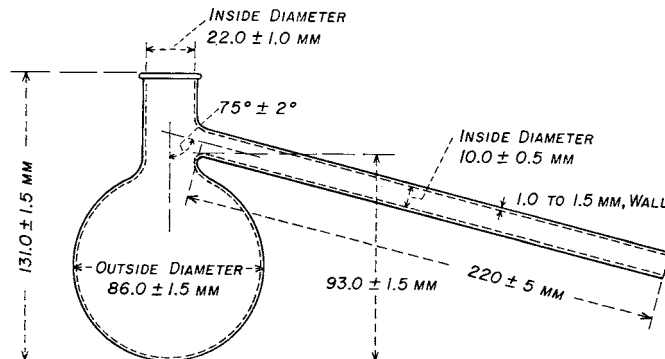


FIG. 1 Distillation Flask

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

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

¹ This method is under the jurisdiction of ASTM Committee D04 on Road and Paving Materials and is the direct responsibility of Subcommittee D04.43 on Specifications and Tests for Tar and Tar Products.

Current edition approved July 10, 2003. Published September 2003. Originally approved in 1911. Last previous edition approved in 1999 as D20 – 99. DOI: 10.1520/D0020-03.

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.

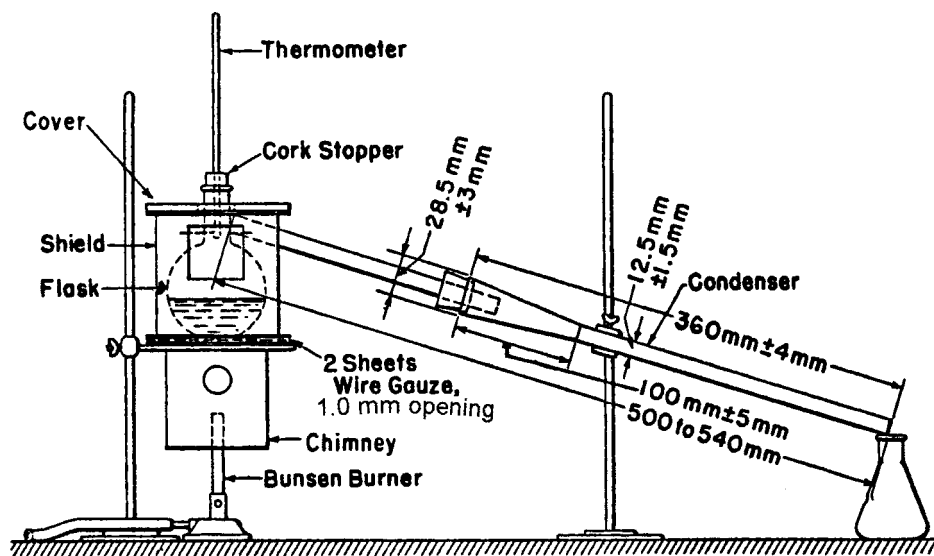


FIG. 2 Apparatus Assembly for Flame Distillation

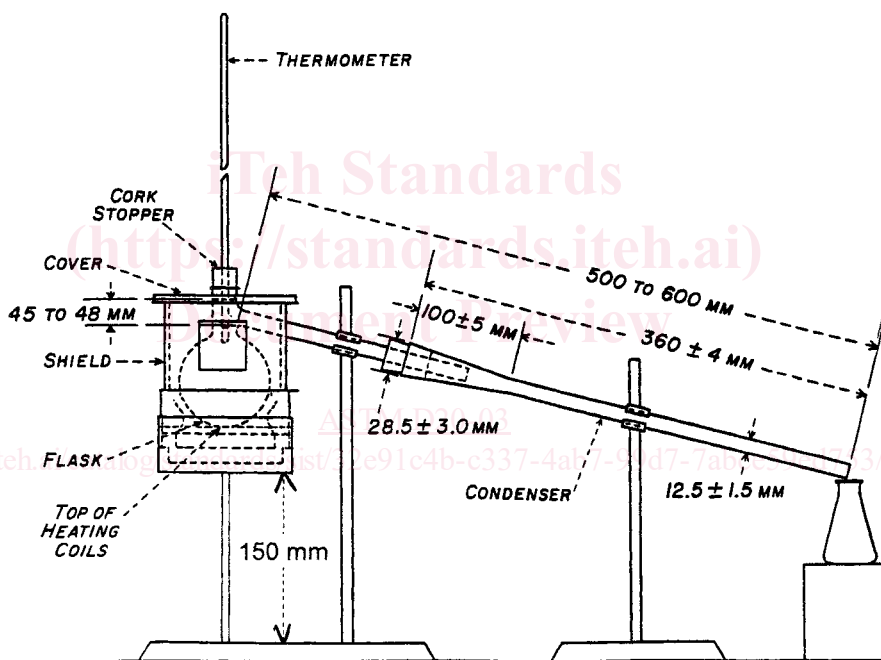


FIG. 3 Apparatus Assembly for Electric Heater Distillation

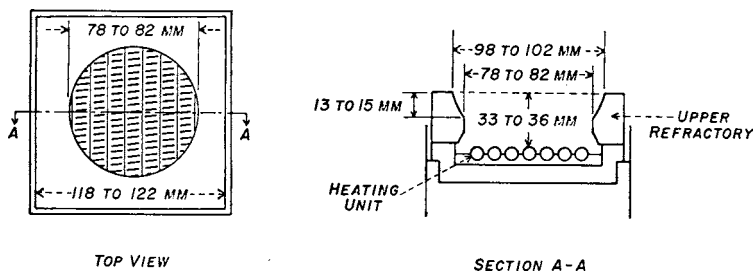


FIG. 4 Upper Part of Electric Heater

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