



Designation: D 1275 – 96a



315/98

Standard Test Method for Corrosive Sulfur in Electrical Insulating Oils¹

This standard is issued under the fixed designation D 1275; 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 adopted for use by government agencies to replace Method 5328-2 of Federal Test Method Standard No. 791b. This standard was adopted as an ASTM-IP Standard.

1. Scope

1.1 This test method covers the detection of corrosive sulfur compounds in electrical insulating oils of petroleum origin.

1.2 Mineral insulating oils may contain substances that cause corrosion under certain conditions of use. This test method is designed to detect the presence of free sulfur and corrosive sulfur compounds by subjecting copper to contact with oil under prescribed conditions.

1.3 The values stated in inch-pound units are to be regarded as the standard. SI units are included for informational purposes.

1.4 *This standard does not purport to address 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:

D 130 Test Method for Detection of Copper Corrosion from Petroleum Products by the Copper Strip Tarnish Test²

E 11 Specification for Wire-Cloth Sieves for Testing Purposes³

2.2 Other Document:

ANSI B74.10 Grading of Abrasive Microgrits⁴

3. Significance and Use

3.1 In most of their uses insulating oils are continually in contact with metals that are subject to corrosion. The presence of corrosive sulfur compounds will result in deterioration of these metals. The extent of deterioration is dependent upon the

quantity and type of corrosive agent and time and temperature factors. Detection of these undesirable impurities, even though not in terms of quantitative values, is a means for recognizing the hazard involved.

4. Apparatus

4.1 *Bath*—A hot-air oven or oil bath provided with suitable means of heating to, and controlling at, $140 \pm 2^\circ\text{C}$. A circulating hot-air oven is preferred.

4.2 *Containers*—Narrow-mouth, 250-mL, ground-glass stoppered flasks, of chemically resistant glass, capable of holding 270 to 280 mL when filled completely to the stopper. Flasks of such capacity are required in order to allow sufficient space for expansion of the oil.

4.3 *Electrolytic Sheet Copper*, 0.127 to 0.254 mm (0.005 to 0.010 in.) in thickness.

4.4 *Polishing Material*, consisting of 240-grit silicon carbide paper or cloth, and also 230-mesh silicon carbide grains and pharmaceutical absorbent cotton.

NOTE 1—It should be noted that 240-grit silicon carbide paper and 230-mesh silicon carbide grains have particle sizes of about the same size (63 μm). In the United States, abrasive papers are classified in accordance with ANSI B 74.10. Abrasive powders are classified by ASTM mesh size.

5. Reagents

5.1 *Acetone*, cp.

5.2 *Nitrogen Gas*— Commercial cylinders of nitrogen gas are satisfactory for this purpose.

6. Preparation of Apparatus

6.1 Chemically clean flasks with solvents to remove oil; then wash the flasks with phosphate-type cleaning powder. Rinse with tap water, then with distilled water, and dry in an oven.

6.2 Cut a strip of copper 6 by 25 mm ($\frac{1}{4}$ by 1 in.) (Note 2) and remove blemishes from surfaces with the 240-grit silicon carbide paper. Strips may be stored in sulfur-free acetone at this point for future use. Do the final polishing of the strip by removing it from the acetone, holding it in the fingers protected with ashless filter paper, and rubbing with 230-mesh silicon

¹ This test method is under the jurisdiction of ASTM Committee D-27 on Electrical Insulating Liquids and Gases and is the direct responsibility of Subcommittee D27.06 on Chemical Tests.

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² *Annual Book of ASTM Standards*, Vol 05.01.

³ *Annual Book of ASTM Standards*, Vols 04.02 and 14.02.

⁴ Available from American National Standards Institute, 1430 Broadway, New York, NY 10018.