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STANDARD

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AMERICAN SOCIETY FOR TESTING AND MATERIALS

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Standard Test Method for 2,6-DITERTIARY-BUTYL PARA-CRESOL IN ELECTRICAL INSULATING OILS¹

This standard is issued under the fixed designation D 1473; 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.

1. Scope

1.1 This method covers the determination of the 2,6-ditertiary-butyl para-cresol content of new and used (Note 1) electrical insulating oils.

NOTE 1—In used oils, degradation products of the oils and of the inhibitor interfere with the color development in this test and generally cause high results. This interference may be essentially eliminated by treating the oil with alkali and clay before applying the test.

1.2 This method is specific for 2,6-ditertiary-butyl para-cresol alone. Use of this method for 2,6-ditertiary-butyl phenol or for mixtures of 2,6-ditertiary-butyl phenol and 2,6-ditertiary-butyl para-cresol will result in misleading determinations. Refer to Method D 2668, Test for 2,6-Ditertiary-Butyl Para-Cresol and 2,6-Ditertiary-Butyl Phenol in Electrical Insulating Oil by Infrared Absorption,² for the determination of 2,6-ditertiary-butyl para-cresol and 2,6-ditertiary-butyl phenol, and mixtures thereof.

2. Applicable Document

2.1 *ASTM Standard:*

D 1193 Specification for Reagent Water²

3. Significance

3.1 The quantitative determination of 2,6-ditertiary-butyl para-cresol measures the amount of this material that has been added to new electrical insulating oil as protection against oxidation or the amount remaining in a used oil. Certain new oils may contain naturally occurring substances which have not been added to the oil, yet will yield a positive test within the limits of detectability of this method.

NOTE 2—The limits of detectability are being investigated by ASTM Committee D-27 on Electrical Insulating Liquids and Gases.

4. Summary of Method

4.1 The sample containing the 2,6-ditertiary-butyl para-cresol is dissolved in ethylene glycol monobutyl ether (butyl Cellosolve³). An aliquot portion of the solution is reacted with phosphomolybdic acid and ammonium hydroxide to form a clear solution of the characteristic molybdenum blue complex. The intensity of the blue color is measured by means of a photoelectric photometer at approximately 700 nm, and the percentage of 2,6-ditertiary-butyl para-cresol is determined from a calibration curve.

5. Apparatus

5.1 *Buret*, micro, 5-ml, having 0.01-ml subdivisions.

5.2 *Photoelectric Photometer*, suitable for measurements at 700 nm.

NOTE 3—Any optical instrument designed for the requirements of practical photoelectric photometry and suitable for measurements at the specified wavelength may be used for this test.⁴

6. Reagents and Materials

6.1 *Purity of Reagents*—Reagent grade chemicals shall be used in all tests. Unless

¹ This method is under the jurisdiction of ASTM Committee D-27 on Electrical Insulating Liquids and Gases.

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² *Annual Book of ASTM Standards*, Part 40.

³ "Cellosolve" is a registered trademark of the Union Carbide Corp.

⁴ The following instruments have been found satisfactory for this purpose: the Klett-Summerson photoelectric photometer, with No. 66 red color filter (640 to 700 nm) and two or more glass-matched cells allowing a 40-mm light path; and a Beckman Spectrophotometer, Model DU, equipped with two or more matched 10-mm glass or quartz absorption cells. The optimum wavelength is 700 nm.