



Designation: D1534 – 95 (Reapproved 2017)

# Standard Test Method for Approximate Acidity in Electrical Insulating Liquids by Color-Indicator Titration<sup>1</sup>

This standard is issued under the fixed designation D1534; 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 describes the determination of the approximate total acid value of used electrical insulating liquids having viscosities less than 24 cSt at 40°C. It is a simple procedure that can be applied in the field. Where a quantitative neutralization value is required, use Test Method D664 or Test Method D974. These test methods should be applied in the laboratory.

1.2 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this 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.*

1.4 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

## 2. Referenced Documents

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

D664 Test Method for Acid Number of Petroleum Products by Potentiometric Titration

D974 Test Method for Acid and Base Number by Color-Indicator Titration

D1193 Specification for Reagent Water

<sup>1</sup> This test method is under the jurisdiction of ASTM Committee D27 on Electrical Insulating Liquids and Gases and is the direct responsibility of Subcommittee D27.06 on Chemical Test.

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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 Test Method

3.1 To determine whether the acidity is greater or less than a specified arbitrary value, a fixed volume of liquid to be tested is added to a graduated cylinder, together with a small amount of indicator (phenolphthalein) and the appropriate quantity of standard potassium hydroxide solution. The mixture is shaken and allowed to separate. The color of the aqueous layer at the bottom of the container when testing mineral oils, or at the top when testing askarels, determines whether the acidity is less than or greater than the arbitrary value chosen.

3.2 To determine the approximate total acidity, the procedure is the same as described in 3.1 except that the potassium hydroxide solution is added in small increments until the color of the aqueous layer, after shaking and settling, is a faint pink. The volume of standard potassium hydroxide solution used determines the approximate total acid value.

## 4. Significance and Use

4.1 The approximate acidity of used electrical insulating oils is an estimate of the total acid value of the oil. As acid values increase, oil quality decreases. This is usually due to oxidation of the oil while in service. In general, acidic by-products produce increased dielectric loss, increased corrosivity, and may cause thermal difficulties attributable to insoluble components called "sludge." This test method is adapted to a specific volume of oil; total acid values of 0.05 to 0.5 mg of potassium hydroxide per gram of oil is a range which is functionally significant.

## 5. Apparatus

5.1 *Graduated Cylinder*, 50 mL, stoppered.

5.2 *Medicine Dropper*, calibrated at 1-mL intervals.

5.3 *Calibrated Pipet*, 1-mL capacity, calibrated to deliver 0.05-mL increments.

## 6. Reagents and Materials

6.1 *Purity of Reagents*—Use reagent grade chemicals in all tests. Unless otherwise indicated, it is intended that all reagents shall conform to the specifications of the Committee on Analytical Reagents of the American Chemical Society, where