Designation: D5559 – 95 (Reapproved 2017)

Standard Test Method for Determination of Acidity as Free Fatty Acids/Acid Number in the Absence of Ammonium or Triethanolamine Soaps in Sulfonated and Sulfated Oils[1]

This standard is issued under the fixed designation D5559; 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.

1. Scope

1.1 This test method covers the determination of the acidity as free fatty acids existing in a sample of sulfonated or sulfated oil, or both, by titrating the sample dissolved in a solvent. It is not applicable in the presence of ammonium or triethanolamine soaps or salts or other compounds that do not react neutral to phenolphthalein when dissolved in alcohol.

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. Significance and Use

2.1 This test method is intended for use in the determination of the acidity as free fatty acids in the absence of ammonium or triethanolamine soaps in sulfonated and sulfated oils for the purpose of quality assurance.

3. Apparatus and Reagents

3.1 *Alcohol-Ether Mixture*—Mix 50 mL of neutral alcohol with 25 mL of ether.

3.2 *Phenolphthalein Indicator Solution (10 g/L)*—Dissolve 1 g of phenolphthalein in 100 mL of ethanol (95 %).

3.3 *Sodium Hydroxide, Standard Solution (0.5 N)*—Prepare and standardize a 0.5 *N* solution of sodium hydroxide (NaOH). Potassium hydroxide (KOH) may be substituted for NaOH.

4. Procedure

4.1 The procedure consists of titrating a solution of the sample in a mixture of alcohol and ether in the presence of phenolphthalein indicator. Dissolve 10 g of the sample in an alcohol-ether mixture, add five drops of phenolphthalein indicator solution, and titrate the solution with 0.5 *N* NaOH or KOH solution until the pink color persists after vigorous shaking.

5. Calculation

5.1 Calculate the acidity as free fatty acids, as follows:

$$K = (C \times E)/W \quad (1)$$

or

$$\%\ \text{free fatty acids} = 0.503 \times K \quad (2)$$

where:

K = acid number, mg of KOH/g,
C = mL of NaOH or KOH solution required for titration of the sample,
E = strength of NaOH or KOH solution, mg of KOH/mL, and
W = weight of sample, g.

6. Precision and Bias

6.1 This test method is adopted from the procedures of the American Leather Chemists Association where it has long been in use and was approved for publication before the inclusion of precision and bias statements was mandated. The original interlaboratory test data are no longer available. The user is cautioned to verify by the use of reference materials, if available, that the precision and bias (or reproducibility) of this test method is adequate for the contemplated use.

7. Keywords

7.1 acidity; free fatty acids; leather; sulfonated and sulfated oils

[1] This test method is under the jurisdiction of ASTM Committee D31 on Leather and is the direct responsibility of Subcommittee D31.08 on Fats and Oils. This test method was developed in cooperation with the American Leather Chemists Assn. (Method H 50-1956).

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