



Designation: D5770 – 23

Standard Test Method for Semiquantitative Micro Determination of Acid Number of Lubricating Oils During Oxidation Testing¹

This standard is issued under the fixed designation D5770; 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 is a semiquantitative micro method intended for monitoring the changes in acidic constituents occurring in lubricating oils during oxidation testing, when the acid number of such oils falls within the range from 0.02 mg to 1.0 mg of potassium hydroxide per gram of sample. It is applicable to such oils as turbine oils, hydraulic oils, and other circulating oils.

NOTE 1—This test method is a micro version of Test Method D974 and it produces results similar to that method.

1.2 This test method is designed for use where sample size is limited. It shall not be used as a replacement for higher precision methods such as Test Methods D974 or D664. It shall not be used to monitor oils in-service.

1.3 The values stated in SI units are to be regarded as the standard.

1.3.1 *Exception*—The values given in parentheses are for information only.

1.4 *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, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.5 *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:²

¹ This test method is under the jurisdiction of ASTM Committee D02 on Petroleum Products, Liquid Fuels, and Lubricants and is the direct responsibility of Subcommittee D02.06 on Analysis of Liquid Fuels and Lubricants.

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² 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.

- D664 Test Method for Acid Number of Petroleum Products by Potentiometric Titration
- D943 Test Method for Oxidation Characteristics of Inhibited Mineral Oils
- D974 Test Method for Acid and Base Number by Color-Indicator Titration
- D3339 Test Method for Acid Number of Petroleum Products by Semi-Micro Color Indicator Titration
- D4175 Terminology Relating to Petroleum Products, Liquid Fuels, and Lubricants
- D4871 Guide for Universal Oxidation/Thermal Stability Test Apparatus

3. Terminology

3.1 Definitions:

3.1.1 For definitions of terms used in this test method, refer to Terminology D4175.

3.2 Definitions of Terms Specific to This Standard:

3.2.1 *acid number, n*—the quantity of a specified base, expressed in milligrams of potassium hydroxide per gram of sample, required to titrate a sample in a specified solvent to a specified endpoint using a specified detection system.

3.2.1.1 *Discussion*—In this test method, the acid number is calculated from the number of drops required to produce a change in solution color from blue-green to orange, compared to the number of drops required to produce an identical color change using a reference standard. Because this is a direct comparison method, the acid number value can be reported in milligrams of potassium hydroxide per gram of sample.

4. Summary of Test Method

4.1 A 2.0 mL portion of the titration solution is titrated with a sample using a dropping pipet. The number of drops of sample required to turn the blue-green titration solution to a persistent orange color is noted.

4.2 A second 2.0 mL portion of the titration solution is titrated with an acid number reference solution of known acid number. The number of drops of the reference solution required to turn the blue-green titration solution to a persistent orange color is noted.

4.3 The estimated acid number of the sample is calculated using the acid number of the reference solution and the ratio of

*A Summary of Changes section appears at the end of this standard