



Standard Test Method for High Temperature Universal Oxidation Test for Turbine Oils¹

This standard is issued under the fixed designation D 6514; 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 a procedure for evaluating the oxidation of inhibited lubricants in the presence of air, copper, and iron metals.

1.2 This test method was developed and is used to evaluate the high temperature oxidation stability and deposit forming tendency of oils for steam and gas turbines. It has been used for testing other lubricants made with mineral oil and synthetic basestocks for compressors, hydraulic pumps, and other applications, but these have not been used in cooperative testing.

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

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 and health practices and determine the applicability of regulatory limitations prior to use.* Identified hazardous chemicals are listed in Section 7. Before using this test method, refer to suppliers' safety labels, Material Safety Data Sheets and other technical literature.

2. Referenced Documents

2.1 ASTM Standards:

A 510 Specification for General Requirements for Wire Rods and Coarse Round Wire, Carbon Steel²

B 1 Specification for Hard-Drawn Copper Wire³

D 445 Test Method for Kinematic Viscosity of Transparent and Opaque Liquids and the Calculation of Dynamic Viscosity⁴

D 664 Test Method for Acid Number of Petroleum Products by Potentiometric Titration⁴

D 943 Test Method for Oxidation Characteristics of Inhibited Mineral Oils⁴

D 974 Test Method for Acid and Base Number by Color-Indicator Titration⁴

D 3339 Test Method for Acid Number of Petroleum Products by Semi-Micro Color Indicator Titration⁵

D 4057 Practice for Manual Sampling of Petroleum and Petroleum Products⁵

D 4871 Guide for Universal Oxidation/Thermal Stability Test Apparatus⁵

D 5846 Test Method for Universal Oxidation Test for Hydraulic and Turbine Oils Using the Universal Oxidation Test Apparatus⁶

2.2 British Standards:⁷

BS 1829 Specification for Carbon Steel, alternate to Specification A 510

2.3 Institute of Petroleum Standard:⁸

IP 2546 Practice for Sampling of Petroleum Products; Alternate to Practice D 4057

2.4 ASTM Adjunct⁹

ADJD6514 Oxidation Cell Varnish Standard⁹

3. Terminology

3.1 Definitions of Terms Specific to This Standard:

3.1.1 *Universal Oxidation Test*—the apparatus and procedures described in Guide D 4871.

4. Summary of Test Method

4.1 After determining the viscosity at 40°C and acid number of a sample, a test specimen is stressed at 155°C for 96 h. After cooling, the test specimen is vacuum filtered for the determination of the total insolubles formed during the test. Total insolubles are reported as low, medium, or high.

4.2 The viscosity and the acid number of the filtrate are determined and compared with the initial values to ascertain any increase in those values. Both the change in acid number and the increase in viscosity at 40°C are reported.

¹ This test method is under the jurisdiction of ASTM Committee D02 on Petroleum Products and Lubricants and is the direct responsibility of D02.09 on Oxidation.

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² *Annual Book of ASTM Standards*, Vol 01.03.

³ *Annual Book of ASTM Standards*, Vol 02.03.

⁴ *Annual Book of ASTM Standards*, Vol 05.01.

⁵ *Annual Book of ASTM Standards*, Vol 05.02.

⁶ *Annual Book of ASTM Standards*, Vol 05.03.

⁷ Available from British Standards Institute (BSI), 389 Chiswick High Rd., London W4 4AL, U.K.

⁸ Available from Institute of Petroleum (IP), 61 New Cavendish St., London, W1G 7AR, U.K.

⁹ Available from ASTM International Headquarters. Order Adjunct No. ADJD6514. Names of suppliers in the United Kingdom can be obtained from the Institute of Petroleum. Two master standards are held by the IP for reference.

