



Standard Test Method for Oxidation Characteristics of Inhibited Mineral Oils¹

This standard is issued under the fixed designation D 943; 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.

This standard has been approved for use by agencies of the Department of Defense.

1. Scope*

1.1 This test method covers the evaluation of oxidation stability of inhibited steam-turbine oils in the presence of oxygen, water, and copper and iron metals at an elevated temperature. The test method is also used for testing other oils such as hydraulic oils and circulating oils having a specific gravity less than that of water and containing rust and oxidation inhibitors.

1.2 The values stated in SI units are to be regarded as the standard. The values given in parentheses are for information only.

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. For specific warning statements, see Section 6.*

2. Referenced Documents

2.1 ASTM Standards:²

- A 510 Specification for General Requirements for Wire Rods and Coarse Round Wire, Carbon Steel
- B 1 Specification for Hard-Drawn Copper Wire
- D 664 Test Method for Acid Number of Petroleum Products by Potentiometric Titration
- D 1193 Specification for Reagent Water
- D 3244 Practice for Utilization of Test Data to Determine Conformance with Specifications
- D 3339 Test Method for Acid Number of Petroleum Products by Semi-Micro Color Indicator Titration

D 4057 Practice for Manual Sampling of Petroleum and Petroleum Products

D 4310 Test Method for Determination of the Sludging and Corrosion Tendencies of Inhibited Mineral Oils

D 5770 Test Method for Semi-Quantitative Micro Determination of Acid Number of Used Lubricating Oils During Oxidation Testing

E 1 Specification for ASTM Liquid-in-Glass Thermometers

2.2 *Energy Institute Standards:*³

Specifications for IP Standard Thermometers

2.3 *British Standard:*⁴

BS 1829

3. Summary of Test Method

3.1 The oil sample is contacted with oxygen in the presence of water and an iron-copper catalyst at 95°C. The test continues until the measured acid number of the oil is 2.0 mg KOH/g or above. The number of test hours required for the oil to reach 2.0 mg KOH/g is the “oxidation lifetime.”

4. Significance and Use

4.1 This test method is widely used for specification purposes and is considered of value in estimating the oxidation stability of lubricants, especially those that are prone to water contamination. It should be recognized, however, that correlation between results of this method and the oxidation stability of a lubricant in field service may vary markedly with field service conditions and with various lubricants. The precision statement for this method was determined on steam turbine oils.

NOTE 1—Furthermore, in the course of testing a lubricant by this method, other signs of deterioration, such as sludge formation or catalyst coil corrosion, may appear that are not reflected in the calculated oxidation lifetime. The subcommittee responsible for this method is investigating the application of alternative criteria for evaluation of lubricants using this

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

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In 1976, this test method ceased to be a joint ASTM-IP standard.

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.

³ Available from Energy Institute, 61 New Cavendish St., London, W1G 7AR, United Kingdom.

⁴ Available from British Standards Institute, 389 Chiswick High Rd., London, W4 4AL, United Kingdom.

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