



Designation: D2112 – 15 (Reapproved 2023)

Standard Test Method for Oxidation Stability of Inhibited Mineral Insulating Oil by Pressure Vessel¹

This standard is issued under the fixed designation D2112; 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 U.S. Department of Defense.

1. Scope

1.1 This test method covers and is intended as a rapid method for the evaluation of the oxidation stability of new mineral insulating oils containing a synthetic oxidation inhibitor. This test is considered of value in checking the oxidation stability of new mineral insulating oils containing 2,6-ditertiary-butyl para-cresol or 2,6-ditertiary-butyl phenol, or both, in order to control the continuity of this property from shipment to shipment. The applicability of this procedure for use with inhibited mineral insulating oils of more than 12 cSt at 40 °C (approximately 65 SUS at 100 °F) has not been established.

1.2 The values stated in SI units are to be regarded as standard except where there is no direct equivalent for hardware designed on the inch-pound unit basis.

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, health, and environmental practices and determine the applicability of regulatory limitations prior to use. (See warning in 6.7.)*

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:*²

B1 Specification for Hard-Drawn Copper Wire

¹ 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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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.

E1 Specification for ASTM Liquid-in-Glass Thermometers

3. Summary of Test Method

3.1 The test specimen is agitated by rotating axially at 100 r/min at an angle of 30° from the horizontal, under an initial oxygen pressure of 620 kPa (90 psi), in a stainless steel or copper vessel (for rapid temperature equilibrium), with a glass test specimen container and copper catalyst coil, in the presence of water, at a bath temperature of 140 °C. The time for an oil to react with a given volume of oxygen is measured; completion of the test is indicated by a specific drop in pressure.

4. Significance and Use

4.1 This is a control test of oxidation stability of new, inhibited mineral insulating oils for determining the induction period of oxidation inhibitors under prescribed accelerated aging conditions. There is no proven correlation between oil performance in this test and performance in service. However, the test method may be used to check the continuity of oxidation stability of production oils.

5. Apparatus

5.1 *Oxidation Vessel*—Glass test specimen container with cover and catalyst coil, pressure gauge, thermometer, test bath, and accessories as described in **Annex A1**. The assembled apparatus is shown in **Fig. 1**, and its design shown schematically in **Fig. 2**.

6. Reagents and Materials

6.1 *Purity of Reagents*—Use reagent grade chemicals in all tests. Unless otherwise indicated, all reagents shall conform to the specifications of the Committee on Analytical Reagents of the American Chemical Society, where such specifications are available.³

³ *ACS Reagent Chemicals, Specifications and Procedures for Reagents and Standard-Grade Reference Materials*, American Chemical Society, Washington, DC. For suggestions on the testing of reagents not listed by the American Chemical Society, see *Analar Standards for Laboratory Chemicals*, BDH Ltd., Poole, Dorset, U.K., and the *United States Pharmacopeia and National Formulary*, U.S. Pharmacopeial Convention, Inc. (USPC), Rockville, MD.