Designation: D2893 – 04

Standard Test Methods for Oxidation Characteristics of Extreme-Pressure Lubrication Oils[1]

This standard is issued under the fixed designation D2893; 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 These test methods (A and B) cover the determination of the oxidation characteristics of extreme-pressure fluid lubricants, gear oils, or mineral oils.

NOTE 1—The changes in the lubricant resulting from these test methods are not always necessarily associated with oxidation of the lubricant. Some changes may be due to thermal degradation.

1.2 *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.*

2. Referenced Documents

2.1 *ASTM Standards:*[2]

D91 Test Method for Precipitation Number of Lubricating Oils [2]

D445 Test Method for Kinematic Viscosity of Transparent and Opaque Liquids (and Calculation of Dynamic Viscosity)

D943 Test Method for Oxidation Characteristics of Inhibited Mineral Oils

E1 Specification for ASTM Liquid-in-Glass Thermometers

3. Summary of Test Method

3.1 The oil sample is subjected to a temperature of 95°C (Test Method A) or 121°C (Test Method B) in the presence of dry air for 312 h.

3.2 The oil is then tested for precipitation number and increase in kinematic viscosity.

4. Significance and Use

4.1 These test methods have been widely used to measure the oxidation stability of extreme pressure lubricating fluids, gear oils, and mineral oils.

5. Apparatus

5.1 *Heating Bath or Block*, thermostatically controlled, capable of maintaining the oil sample in the test tube at a temperature of 95 ± 0.2°C (Test Method A), or 121 ± 1.0°C (Test Method B) and large enough to hold the desired number of oxidation cells immersed in the heating bath or block to a depth of approximately 350 mm. The liquid heating bath shall be fitted with a suitable stirring device to provide a uniform temperature throughout the bath.

5.2 *Test Tubes*, of borosilicate glass, 41 ± 0.5 mm inside diameter and 600 mm in length are required, each fitted with a slotted cork (Note 2) stopper into which shall be inserted a glass air delivery tube of 4 to 5 mm of inside diameter. The length of the air delivery tube shall be such that one end reaches to within 6 mm of the bottom of the tube and the other end projects 60 to 80 mm from the cork stopper.

NOTE 2—New corks should be used for each run.

5.3 *Flowmeter*, one to each test tube, capable of measuring an air flow of 10 L/h with an accuracy of ±0.5 L/h.

5.4 *Thermometer*—ASTM Solvent Distillation Thermometer having a range from 76 to 126°C and conforming to the requirement for Thermometer 40C as prescribed in Specification E1. Alternatively, calibrated thermocouples may be used.

5.5 *Air Supply*—Oil-free, dried air at constant pressure shall be supplied to each flowmeter.

5.6 *Air Dryer*—Before being supplied to the flowmeters, the air shall be passed through a drying tower packed with indicating grade of anhydrous calcium sulfate or equivalent. The quantity of dessicant should be sufficient to last for the entire test.

[1] These test methods are 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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[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.

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