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Standard Test Method for Oxidation Stability of Lubricating Greases by the Oxygen Pressure Vessel Method¹

This standard is issued under the fixed designation D942; 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 determines resistance of lubricating greases to oxidation when stored statically in an oxygen atmosphere in a sealed system at an elevated temperature under conditions of test.

1.2 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard.

1.2.1 *Exception*—Pressure measurement appears in psi with kPa provided in parentheses for information only.

1.2.2 *Exception*—In Fig. A1.1, all dimensions are in inches, with millimetres provided in parentheses 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 hazard statements see Sections 6 and 7.

2. Referenced Documents

2.1 ASTM Standards:²

A240/A240M Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications

D525 Test Method for Oxidation Stability of Gasoline (Induction Period Method)

E1 Specification for ASTM Liquid-in-Glass Thermometers

2.2 *Other Standards:*

IP Specification for Standard IP Thermometers³

BS 970:1983 Part I, Section S⁴

3. Summary of Test Method

3.1 The sample of grease is oxidized in a pressure vessel heated to 99°C (210°F) and filled with oxygen at 110 psi (758 kPa). Pressure is observed and recorded at stated intervals. The degree of oxidation after a given period of time is determined by the corresponding decrease in oxygen pressure.

NOTE 1—The pressure vessel has been referred to as “a bomb” in previous issues of this test method.

NOTE 2—The accepted unit of pressure is the pascal (Pa) for ASTM methods and will be parenthetically included after the conventional pound-force per square inch (psi) value. The Institute of Petroleum uses the bar as a pressure measurement. Conversion of units may be obtained as follows:

To convert from pound-force per square inch (psi) to pascal (Pa) multiply by 6.894757×10^3 .

To convert from pound-force per square inch (psi) to bar multiply by 0.06894757.

To convert from bar to pascal (Pa) multiply by 10^5 .

4. Significance and Use

4.1 This test method measures the net change in pressure resulting from consumption of oxygen by oxidation and gain in pressure due to formation of volatile oxidation by-products. This test method may be used for quality control to indicate batch-to-batch uniformity. It predicts neither the stability of greases under dynamic service conditions, nor the stability of greases stored in containers for long periods, nor the stability of films of greases on bearings and motor-parts. It should not be used to estimate the relative oxidation resistance of different grease types.

¹ This test method is under the jurisdiction of ASTM Committee D02 on Petroleum Products and Lubricants and is the direct responsibility of Subcommittee D02.09.0E on Oxidation of Greases.

In the IP, this test method is under the jurisdiction of the Standardization Committee. This test method has been approved by the sponsoring committee and accepted by the cooperating societies in accordance with the established procedures.

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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.

³ Available from Energy Institute, 61 New Cavendish St., London, WIG 7AR, U.K., <http://www.energyinst.org.uk>.

⁴ Available from British Standards Institute (BSI), 389 Chiswick High Rd., London W4 4AL, U.K., <http://www.bsi-global.com>.

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