Designation: D525 – 05

British Standard 4347

Designation: 40/97

Standard Test Method for Oxidation Stability of Gasoline (Induction Period Method)[1]

This standard is issued under the fixed designation D525; 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 determination of the stability of gasoline in finished form only, under accelerated oxidation conditions. (**Warning**—This test method[2] is not intended for determining the stability of gasoline components, particularly those with a high percentage of low boiling unsaturated compounds, as these may cause explosive conditions within the apparatus. However, because of the unknown nature of certain samples, the pressure vessel assembly shall include a safety burst-disc in order to safeguard the operator.)

NOTE 1—For measurement of oxidation stability of gasoline by measurement of potential gum, refer to Test Method D873, or IP Test Method 138.

NOTE 2—The precision data were developed with gasolines derived from hydrocarbon sources only without oxygenates.

1.2 The accepted SI unit of pressure is the kilo Pascal (kPa), and of temperature is °C.

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.*

2. Referenced Documents

2.1 *ASTM Standards:*[3]

D873 Test Method for Oxidation Stability of Aviation Fuels (Potential Residue Method)

D4057 Practice for Manual Sampling of Petroleum and Petroleum Products

E1 Specification for ASTM Liquid-in-Glass Thermometers

2.2 *Energy Institute Standards:*

IP-138 Test Method for Oxidation Stability, Aviation Gasoline[4]

Part IV—Petroleum and its Products [5]

3. Terminology

3.1 *Definitions of Terms Specific to This Standard:*

3.1.1 *break point*—the point in the pressure-time curve that is preceded by a pressure drop of exactly 14 kPa within 15 min and succeeded by a drop of not less than 14 kPa in 15 min.

3.1.2 *induction period*—the time elapsed between the placing of the pressure vessel in the bath and the break point at 100°C.

4. Summary of Test Method

4.1 The sample is oxidized in a pressure vessel initially filled at 15 to 25°C with oxygen pressure at 690 to 705 kPa and heated at a temperature between 98 and 102°C. The pressure is recorded continuously or read at stated intervals until the breakpoint is reached. The time required for the sample to reach this point is the observed induction period at the temperature of test, from which the induction period at 100°C can be calculated. (**Warning**—In addition to other precautions, to provide protection against the possibility of explosive rupture of the pressure vessel, the pressure vessel should be operated behind an appropriate safety shield.)

5. Significance and Use

5.1 The induction period may be used as an indication of the tendency of motor gasoline to form gum in storage. It should be recognized, however, that its correlation with the formation

[1] This test method is under the jurisdiction of ASTM Committee D02 on Petroleum Products and Lubricants and is the direct responsibility of Subcommittee D02.14 on Stability and Cleanliness of Liquid Fuels.

This test method has been approved by the sponsoring aommittees and accepted by the Cooperating Societies in accordance with established procedures.

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[2] Further information can be found in the June 1978, January 1979, and June 1986 editions of the *Institute of Petroleum Review*.

[3] 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.

[4] Available from Energy Institute, 61 New Cavendish St., London WIM, 8AR U.K.

[5] A convenient template for measuring the breakpoint is described in the paper by Korb, E. L., "Induction Period Calculator," *ASTM Bulletin*, No. 153, August 1948, pp. 99–102.

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