



Designation: D5763 – 24

# Standard Test Method for Oxidation and Thermal Stability Characteristics of Gear Oils Using Universal Glassware<sup>1</sup>

This standard is issued under the fixed designation D5763; 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 ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

## 1. Scope\*

1.1 This test method covers the determination of the oxidation characteristics of extreme pressure and non-extreme pressure gear oils and includes the quantitative determination of total sludge, viscosity change, and oil loss.

NOTE 1—While the round-robin tests used ISO VG 220 extreme pressure gear oils for developing precision data, the test method can be extended to other viscosity grades and to non-extreme pressure gear oils. Refer to Classification [D2422](#) for viscosity grades.

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

1.3 *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.*

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:<sup>2</sup>

- [D445](#) Test Method for Kinematic Viscosity of Transparent and Opaque Liquids (and Calculation of Dynamic Viscosity)
- [D2422](#) Classification of Industrial Fluid Lubricants by Viscosity System
- [D2893](#) Test Methods for Oxidation Characteristics of

### Extreme-Pressure Lubrication Oils

[D4057](#) Practice for Manual Sampling of Petroleum and Petroleum Products

[D4175](#) Terminology Relating to Petroleum Products, Liquid Fuels, and Lubricants

[D4871](#) Guide for Universal Oxidation/Thermal Stability Test Apparatus

## 3. Terminology

### 3.1 Definitions:

3.1.1 See Terminology [D4175](#) for a list of terms relating to petroleum products, liquid fuels, and lubricants.

### 3.2 Definitions of Terms Specific to This Standard:

3.2.1 *adherent sludge, n*—sludge that is formed on the walls of a container and is not easily removed.

3.2.2 *aliquot, n*—portion of sample being tested that is a representative portion of the whole.

3.2.3 *extreme pressure gear oil, n*—a fluid for the lubrication of gears that contains chemical additives, such as sulfur and phosphorus compounds, which produce a protective film on the metal surface to provide enhanced load carrying capability.

3.2.4 *filterable sludge, n*—sludge that is formed in the oil.

3.2.5 *non-extreme pressure gear oil, n*—a fluid for the lubrication of gears that contains no chemical additives that produce a protective film on the metal surface to provide enhanced load carrying capability.

3.2.6 *oxidation, n*—the process by which oxygen chemically reacts with materials.

3.2.7 *sludge, n—in gear oils*, a precipitate that sometimes forms as the oil ages or oxidizes that is insoluble in *n*-heptane.

3.2.8 *universal glassware, n*—the glassware that is described in the universal oxidation thermal stability test. Refer to Guide [D4871](#).

## 4. Summary of Test Method

4.1 The viscosity of the gear oil being tested is determined. A 100 g aliquot of the oil in a weighed apparatus is subjected to a temperature of 120 °C for 312 h while dry air is passed through the aliquot at 3 L/h.

<sup>1</sup> This test method is under the jurisdiction of ASTM Committee [D02](#) on Petroleum Products, Liquid Fuels, and Lubricants and is the direct responsibility of Subcommittee [D02.09.0D](#) on Oxidation of Lubricants.

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<sup>2</sup> For referenced ASTM standards, visit the ASTM website, [www.astm.org](http://www.astm.org), or contact ASTM Customer Service at [www.astm.org/contact](http://www.astm.org/contact). For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.