



Designation: D2532 – 03

# Standard Test Method for Viscosity and Viscosity Change After Standing at Low Temperature of Aircraft Turbine Lubricants<sup>1</sup>

This standard is issued under the fixed designation D2532; 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.

*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 kinematic viscosity of aircraft turbine lubricants at low temperature, and the percent change of viscosity after a 3-h and a 72-h standing period at low temperature.

1.2 This test method uses the millimetre squared per second ( $\text{mm}^2/\text{s}$ ) as the unit of kinematic viscosity. For information, the equivalent cgs unit, the centistokes, is shown in parentheses.

1.3 The values stated in SI units are to be regarded as the standard. The values given in parentheses are for information only.

1.4 *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 Section 6.

## 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)

**E1** Specification for ASTM Liquid-in-Glass Thermometers

## 3. Summary of Test Method

3.1 Kinematic viscosity is measured at low temperature in accordance with Test Method **D445** and at time intervals of 3 h and 72 h.

NOTE 1—This test method was developed and the precision established on tests at  $-53.9^\circ\text{C}$  ( $-65^\circ\text{F}$ ). It is also applied at  $-40^\circ\text{C}$  ( $-40^\circ\text{F}$ ) and may

<sup>1</sup> This test method is under the jurisdiction of ASTM Committee **D02** on Petroleum Products and Lubricants and is the direct responsibility of Subcommittee **D02.07** on Flow Properties.

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<sup>2</sup> 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.

be used at other temperatures. Viscosities may be measured and reported at other intervals as agreed by the contracting parties.

## 4. Significance and Use

4.1 Aircraft turbine lubricants, upon standing at low temperatures for prolonged periods of time, may show an increase in kinematic viscosity. This increase may cause lubrication problems in aircraft engines. Thus, this test method is used to ensure that the kinematic viscosity does not exceed the maximum kinematic viscosity in certain specifications for aircraft turbine lubricants.

## 5. Apparatus

5.1 Viscometers, drying tubes, low-temperature bath, thermometer, timer, secondary viscosity standard, filter, and cleaning supplies are described in detail in Test Method **D445**.

5.2 *Viscometer*—The viscometer shall meet the requirements of Test Method **D445** and be of the type in which the sample can be rerun without cleaning the viscometer. Suitable holders should be used. For convenience it is recommended that the viscometer size be chosen to keep the efflux time between 200 and 1000 s.

5.3 *Drying Tubes*—Fit the viscometer openings with drying tubes filled with indicating silica gel, using cotton at top and bottom to hold the loosely packed desiccant in place. Provide a cross-connection on the viscometer side of the drying tubes (which can be closed by a pinch clamp or stopcock while liquid is being drawn into the efflux bulb) so that the restriction to air flow will not cause error. Replace the silica gel when a lavender color is noticeable.

5.4 *Viscosity Temperature Bath*—The constant-temperature bath must be capable of holding several viscometers at once. It must have adequate stirring of the liquid medium (**Note 2**) and balance between heat losses such that the bath temperature can be maintained at the required temperature  $\pm 0.03^\circ\text{C}$  ( $\pm 0.05^\circ\text{F}$ ).

NOTE 2—Isopropanol or other clear, low-freezing liquid may be used as a bath liquid.

5.5 *Low-Temperature Storage Cabinet*—If it is desired to exercise the option described in **Note 3 (7.4)**, a low-temperature storage cabinet or bath shall be provided which is

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