



Standard Test Method for Specific Gravity of Drying Oils, Varnishes, Resins, and Related Materials at 25/25°C¹

This standard is issued under the fixed designation D 1963; 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 This test method covers the determination of the specific gravity of drying oils, varnishes, alkyd resins, fatty acids, and related materials.

1.2 This test method is recommended where precision is required in the determination of specific gravity, such as establishing specifications or referee work.

1.2.1 For materials with a kinematic viscosity of 40 stokes or less, use the Leach type pycnometer.

1.2.2 For materials with a viscosity in excess of 40 stokes, use the Hubbard-type pycnometer.

1.2.3 For materials that are solid or semisolid at 25°C but liquid at slightly higher temperatures, use the Hubbard-type pycnometer.

NOTE 1—The weight per gallon cup method is satisfactory for most routine laboratory work although the precision does not equal that of the pycnometer method. The test method described herein for use with the Hubbard-type pycnometer is applicable to the weight per gallon cup method, or Test Method D 1475 may be used.

NOTE 2—Hydrometers also provide a rapid method for checking specific gravity and are generally satisfactory for routine control work. However, the precision of the hydrometer method is not adequate where accurate results are required. Test Method D 1298 covers the use of the hydrometer in the determination of specific gravity.

Most ASTM Hydrometers (See Specification E 100) are calibrated to read specific gravity at 15.5/15.5°C (60/60°F). Information on sources of hydrometers calibrated at 25/25°C is available at ASTM Headquarters.

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 Section 6.*

2. Referenced Documents

2.1 ASTM Standards:

D 1298 Test Method for Density, Relative Density (Specific Gravity) or API Gravity of Crude Petroleum and Liquid

Petroleum Products by Hydrometer Method²

D 1475 Test Method for Density of Paint, Varnish, Lacquer, and Related Products³

E 100 Specification for ASTM Hydrometers⁴

3. Terminology

3.1 Definition:

3.1.1 *specific gravity, of drying oils and varnishes*—the ratio of the mass of a given volume of material at 25°C to that of an equal volume of water at 25°C, expressed as follows: Specific gravity at 25/25°C ____.

4. Significance and Use

4.1 Specific gravity is a useful measure, since conversion from volume to weight, or vice versa, is often required. For this reason it should be determined with care.

4.2 Specific gravity is very sensitive to temperature, and the temperature of measurement must be controlled, or at least known, with high precision. If the specific gravity at some temperature other than the standard is required, temperature correction factors for this purpose are provided. These factors may also be used to correct the specific gravity from some other temperature to the standard 25/25°C.

4.3 In addition, various procedures are outlined in this test method so that specific gravities of materials with widely varying viscosities can be accurately measured.

4.4 Specific gravity is not a measure of the quality of the oil, and an oil that deviates slightly from the specified limits, but otherwise conforms, is usually completely satisfactory. Specific gravity increases with polymerization or oxidation in a regular manner, and for every bodied or blown oil of a given viscosity there is an appropriate specific gravity.

4.5 Determine the specific gravity in accordance with this test method, which is capable of high precision and is the referee method. If less accurate results (3 significant figures) are adequate, “weight-per-gallon” cups as described in Test Method D 1475 may be used.

5. Apparatus

5.1 *Leach-Type Pycnometer*—A glass pycnometer, conical in shape and vented by a side arm that has a cap with a

¹ This test method is under the jurisdiction of ASTM Committee D-1 on Paint and Related Coatings, Materials, and Applications, and is the direct responsibility of Subcommittee D01.32 on Drying Oils.

Current edition approved Nov. 29, 1985. Published January 1986. Originally published as D 1963 – 61. Last previous edition D 1963 – 74 (1984).

² Annual Book of ASTM Standards, Vol 05.01.

³ Annual Book of ASTM Standards, Vol 06.01.

⁴ Annual Book of ASTM Standards, Vol 14.03.