



Designation: D2162 – 21

Standard Practice for Basic Calibration of Master Viscometers and Viscosity Oil Standards¹

This standard is issued under the fixed designation D2162; 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 practice covers the calibration of master viscometers and viscosity oil standards, both of which may be used to calibrate routine viscometers as described in Test Method [D445](#) and Specifications [D446](#) over the temperature range from 15 °C to 100 °C.

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 The SI-based units for calibration constants and kinematic viscosities are mm^2/s^2 and mm^2/s , respectively.

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.* For specific warning statements, see Section 7.

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:²

- [D445](#) Test Method for Kinematic Viscosity of Transparent and Opaque Liquids (and Calculation of Dynamic Viscosity)
- [D446](#) Specifications and Operating Instructions for Glass Capillary Kinematic Viscometers
- [D1193](#) Specification for Reagent Water

¹ This practice is under the jurisdiction of ASTM Committee [D02](#) on Petroleum Products, Liquid Fuels, and Lubricants and is the direct responsibility of Subcommittee [D02.07](#) on Flow Properties.

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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.

- [D1250](#) Guide for the Use of the Joint API and ASTM Adjunct for Temperature and Pressure Volume Correction Factors for Generalized Crude Oils, Refined Products, and Lubricating Oils: API MPMS Chapter 11.1
 - [D1480](#) Test Method for Density and Relative Density (Specific Gravity) of Viscous Materials by Bingham Pycnometer
 - [D1590](#) Test Method for Surface Tension of Water
 - [D8278](#) Specification for Digital Contact Thermometers for Test Methods Measuring Flow Properties of Fuels and Lubricants
 - [E1](#) Specification for ASTM Liquid-in-Glass Thermometers
 - [E563](#) Practice for Preparation and Use of an Ice-Point Bath as a Reference Temperature
 - [E644](#) Test Methods for Testing Industrial Resistance Thermometers
 - [E1137](#) Specification for Industrial Platinum Resistance Thermometers
 - [E1750](#) Guide for Use of Water Triple Point Cells
 - [E2593](#) Guide for Accuracy Verification of Industrial Platinum Resistance Thermometers
 - [E2877](#) Guide for Digital Contact Thermometers
- 2.2 ISO Standard:³
- [ISO 3666](#) Viscosity of Water

3. Terminology

3.1 Definitions:

3.1.1 *digital contact thermometer (DCT)*, *n*—an electronic device consisting of a digital display and associated temperature sensing probe.

3.1.1.1 *Discussion*—This device consists of a temperature sensor connected to a measuring instrument; this instrument measures the temperature-dependent quantity of the sensor, computes the temperature from the measured quantity, and provides a digital output. This digital output goes to a digital display and/or recording device that may be internal or external to the device.

3.1.1.2 *Discussion*—The devices are often referred to as a “digital thermometers,” however the term includes devices that

³ Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036, <http://www.ansi.org>.

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