



Designation: D1122 – 22

Standard Test Method for Relative Density of Engine Coolant Concentrates and Engine Coolants By The Hydrometer¹

This standard is issued under the fixed designation D1122; 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 U.S. Department of Defense.

1. Scope*

1.1 This test method covers the determination of the relative density of glycols, glycerin, heat transfer fluids, engine coolant concentrates, and aqueous engine coolants.

1.2 The values stated in SI units are to be regarded as standard. The values given in parentheses after SI units are provided for information only and are not considered 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:²

D1176 Practice for Sampling and Preparing Aqueous Solutions of Engine Coolants or Antirusts for Testing Purposes
E100 Specification for ASTM Hydrometers
E230/E230M Specification for Temperature-Electromotive Force (emf) Tables for Standardized Thermocouples

3. Terminology

3.1 Definitions:

¹ This test method is under the jurisdiction of ASTM Committee D15 on Engine Coolants and Related Fluids and is the direct responsibility of Subcommittee D15.03 on Physical 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.

3.1.1 *relative density, n*—the ratio of the density of a material at a stated temperature to the density of water at the same stated temperature.

4. Significance and Use

4.1 The relative density of an engine coolant may be used to determine the approximate percent glycol, freezing point, and boiling point, provided the glycol type is known.

4.2 The relative density of an engine coolant concentrate can be used as a production control test.

4.3 ASTM specifications normally state the temperatures for relative density of fluids; 25 °C, 20 °C, and 15.6 °C are commonly used temperatures.

5. Apparatus

5.1 *Hydrometers*—Hydrometers shall be of glass, graduated in specific gravity range as listed in Table 1, and shall conform to Specification E100.

5.2 *Hydrometer Cylinder*—The hydrometer cylinder in which the sample for the relative density test is confined shall be made of clear glass and shall be cylindrical in shape. For convenience in pouring, it may have a lip on the rim. The inside diameter of the cylinder shall be at least 25.4 mm (1.0 in.) greater than the outside diameter of the hydrometer. The height of the cylinder shall be such that the length of the column of sample it contains is greater by at least 25.4 mm (1.0 in.) than the portion of the hydrometer which is immersed beneath the surface of the sample after a state of equilibrium has been reached.

5.3 *Temperature Measuring Instrument* (environmentally safe thermometer or thermocouple) capable of monitoring the observed test temperature to within an accuracy of ± 0.05 °C, Specification E230/E230M. If a liquid-in-glass thermometer is used, it shall be calibrated and graduated to 0.1 °C. The thermometer shall be calibrated at least annually against a certified and traceable standard. See Section 8, Precision and Bias. The data presented in this subsection are derived using mercury-in-glass thermometers only.

5.4 *Water Bath*—A water bath capable of maintaining a sample temperature to ± 0.3 °C (± 0.5 °F) during the test.

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