



Designation: D8634 – 25

Standard Test Method for Measurement of Conductivity in Electric Vehicle (EV) Coolants¹

This standard is issued under the fixed designation D8634; 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 method for determining the conductivity of coolant samples for use in electric vehicles (EV) using a conductometer.

1.2 This method is applicable to ethylene glycol and propylene glycol-based coolants and mixtures of it within a temperature range of 20 °C to 30 °C.

1.3 The conductivity range should be within 0.1 $\mu\text{S}/\text{cm}$ up to 300 $\mu\text{S}/\text{cm}$.

1.4 *Units*—The values stated in SI units are to be regarded as the standard. No other units of measurement are included in this standard.

1.5 *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.*

1.6 *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

D1125 Test Methods for Electrical Conductivity and Resistivity of Water

D1176 Practice for Sampling and Preparing Aqueous Solutions of Engine Coolants or Antirusts for Testing Purposes

D1193 Specification for Reagent Water

D4725 Terminology for Engine Coolants and Related Fluids

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 D15.26 on Electric Vehicle Coolants.

Current edition approved Oct. 1, 2025. Published November 2025. DOI: 10.1520/D8634-25.

² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at www.astm.org/contact. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

3. Terminology

3.1 *Definitions:*

3.1.1 For definitions of terms used in this test method, refer to Terminology D4725.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *cell constant (K), n*—a factor that describes the geometry of the measurement cell, expressed in cm^{-1} .

3.2.2 *conductance (G), n*—the inverse of resistance, representing how easily electric current flows through a material, expressed in millisiemens (mS) or microsiemens (μS).

3.2.3 *electrical conductivity (κ), n*—the ability of a material to conduct electric current, expressed in microsiemens per centimeter ($\mu\text{S}/\text{cm}$) or millisiemens per centimeter (mS/cm).

3.2.4 *temperature correction, n*—the adjustment of the measured conductivity to a reference temperature of 25 °C using a temperature correction factor.

3.2.4.1 *Discussion*—For ethylene glycol-based coolants, the factor is 2.9 %/°C, and for propylene glycol-based coolants, it is 3.7 %/°C.

4. Summary of Test Method

4.1 A sample is placed in a clean beaker, and conductivity is measured using a conductometer. The results are corrected to a reference temperature of 25 °C. Ready-to-use coolants that have an ethylene glycol (EG) or propylene glycol (PG) concentration of 40 % to 60 % by volume may be measured with this test method. In-service or performance test coolants are filtered through a 0.45 μm filter.

5. Significance and Use

5.1 Electrical conductivity is a critical physical property for thermal management fluids with intended use in electrical applications such as battery electric and fuel cell vehicles. A fluid's electrical conductivity is used to assess its compatibility and safety with these systems, and therefore accurate measurement of this property is necessary.

6. Interferences

6.1 When performing measurements, air bubbles adhering to the surface of the measuring cell or air interface with the conductivity cell will affect the measured value. Care should be taken to expel air bubbles entrained in the measuring cell.