



Designation: D1125 – 23

Standard Test Methods for Electrical Conductivity and Resistivity of Water¹

This standard is issued under the fixed designation D1125; 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 These test methods cover the determination of the electrical conductivity and resistivity of water. The following test methods are included:

	Range	Sections
Test Method A—Field and Routine Laboratory Measurement of Static (Non-Flowing) Samples	10 to 200 000 μS/cm	12 to 18
Test Method B—Continuous In-Line Measurement	5 to 200 000 μS/cm	19 to 23

1.2 These test methods have been tested in reagent water. It is the user's responsibility to ensure the validity of these test methods for waters of untested matrices.

1.3 For measurements below the range of these test methods, refer to Test Method [D5391](#).

1.4 The values stated in SI units are to be regarded as 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

[D1066 Practice for Sampling Steam](#)

¹ These test methods are under the jurisdiction of Committee [D19](#) on Water and are the direct responsibility of Subcommittee [D19.03](#) on Sampling Water and Water-Formed Deposits, Analysis of Water for Power Generation and Process Use, On-Line Water Analysis, and Surveillance of Water.

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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.

[D1129 Terminology Relating to Water](#)

[D1192 Guide for Equipment for Sampling Water and Steam in Closed Conduits](#) (Withdrawn 2003)³

[D1193 Specification for Reagent Water](#)

[D2186 Test Methods for Deposit-Forming Impurities in Steam](#) (Withdrawn 2014)³

[D2777 Practice for Determination of Precision and Bias of Applicable Test Methods of Committee D19 on Water](#)

[D3370 Practices for Sampling Water from Flowing Process Streams](#)

[D4519 Test Method for On-Line Determination of Anions and Carbon Dioxide in High Purity Water by Cation Exchange and Degassed Cation Conductivity](#)

[D5391 Test Method for Electrical Conductivity and Resistivity of a Flowing High Purity Water Sample](#) (Withdrawn 2023)³

[E2251 Specification for Liquid-in-Glass ASTM Thermometers with Low-Hazard Precision Liquids](#)

3. Terminology

3.1 *Definitions:*

3.1.1 *electrical conductivity, n*—the reciprocal of the a-c resistance in ohms measured between opposite faces of a centimetre cube of an aqueous solution at a specified temperature.

3.1.1.1 *Discussion*—The unit of electrical conductivity is siemens per centimetre. (The previously used units of mhos/cm are numerically equivalent to S/cm.) The actual resistance of the cell, R_x , is measured in ohms. The conductance, $1/R_x$, is directly proportional to the cross-sectional area, A (in cm²), and inversely proportional to the length of the path, L (in cm):

$$1/R_x = K \cdot A/L$$

The conductance measured between opposite faces of a centimetre cube, K , is called conductivity. Conductivity values are usually expressed in microsiemens/centimetre or in siemens/centimetre at a specified temperature, normally 25°C.

3.1.2 *electrical resistivity, n*—the a-c resistance in ohms measured between opposite faces of a centimetre cube of an aqueous solution at a specified temperature.

³ The last approved version of this historical standard is referenced on www.astm.org.