



Standard Test Method for pH Measurement of Water of Low Conductivity¹

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1. Scope

1.1 This test method is applicable to determine the pH of water samples with a conductivity of 2 to 100 $\mu\text{S}/\text{cm}$ over the pH range of 3 to 11 and is frequently used in power generation low conductivity samples. pH measurements of water of low conductivity are problematic. Specifically, this test method avoids contamination of the sample with atmospheric gases and prevents volatile components of the sample from escaping. This test method provides for pH electrodes and apparatus that address additional considerations discussed in [Annex A2](#). This test method also minimizes problems associated with the sample's pH temperature coefficient when the operator uses this test method to calibrate an on-line pH monitor or controller (see [Appendix X1](#)).

1.2 This test method covers the measurement of pH in water of low conductivity with a lower limit of 2.0 $\mu\text{S}/\text{cm}$, utilizing a static grab-sample procedure where it is not practicable to take a real-time flowing sample.

NOTE 1—Test Method [D5128](#) for on-line measurement is preferred over this method whenever possible. Test Method [D5128](#) is not subject to the limited conductivity range, temperature interferences, potential KCl contamination, and time limitations found with this method.

1.3 For on-line measurements in water with conductivity of 100 $\mu\text{S}/\text{cm}$ and higher, see Test Method [D6569](#).

1.4 For laboratory measurements in water with conductivity of 100 $\mu\text{S}/\text{cm}$ and higher, see Test Method [D1293](#).

1.5 The values stated in SI units are to be regarded as standard.

1.6 *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 appro-*

priate safety and health practices and determine the applicability of regulatory limitations prior to use.

2. Referenced Documents

2.1 ASTM Standards:²

- [D1129 Terminology Relating to Water](#)
- [D1193 Specification for Reagent Water](#)
- [D1293 Test Methods for pH of Water](#)
- [D2777 Practice for Determination of Precision and Bias of Applicable Test Methods of Committee D19 on Water](#)
- [D3370 Practices for Sampling Water from Closed Conduits](#)
- [D4453 Practice for Handling of High Purity Water Samples](#)
- [D5128 Test Method for On-Line pH Measurement of Water of Low Conductivity](#)
- [D6569 Test Method for On-Line Measurement of pH](#)

3. Terminology

3.1 *Definitions of Terms*—For definitions of terms used in this test method, refer to Terminology [D1129](#).

3.2 Definitions:

3.3 Definitions of Terms Specific to This Standard:

3.3.1 *liquid-junction potential, n* —a dc potential that appears at the point of contact between the reference electrode's salt bridge (also known as reference junction or diaphragm) and the sample solution.

3.3.1.1 *Discussion*—Ideally, this potential is near zero and is stable. However, in low-conductivity water this potential may change from its value in buffer solution by an unknown amount, and is a zero offset (**1**).³

4. Reagents

4.1 *Purity of Reagents*—Reagent grade chemicals shall be used in all tests. Unless otherwise indicated, it is intended that

¹ These test methods are under the jurisdiction of ASTM 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.

³ The boldface numbers in parentheses refer to the list of references at the end of this standard.