



Designation: D1293 – 18

Standard Test Methods for pH of Water¹

This standard is issued under the fixed designation D1293; 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 pH by electrometric measurement using the glass electrode as the sensor. Two test methods are given as follows:

	Sections
Test Method A—Precise Laboratory Measurement	8 to 15
Test Method B—Routine or Continuous Measurement	16 to 24

1.2 Test Method A covers the precise measurement of pH in water utilizing at least two of seven standard reference buffer solutions for instrument standardization.

1.3 Test Method B covers the routine measurement of pH in water and is especially useful for continuous monitoring. Two buffers are used to standardize the instrument under controlled parameters, but the conditions are somewhat less restrictive than those in Test Method A. For on-line measurement, also see Test Method [D6569](#) which provides more detail.

1.4 Both test methods are based on the pH scale established by NIST (formerly NBS) Standard Reference Materials.²

1.5 Neither test method is considered to be adequate for measurement of pH in water whose conductivity is less than about 5 $\mu\text{S}/\text{cm}$. Refer to Test Methods [D5128](#) and [D5464](#).

1.6 Precision and bias data were obtained using buffer solutions only. It is the user's responsibility to assure the validity of these test methods for untested types of water.

1.7 The values stated in SI units are to be regarded as standard. The values given in parentheses are mathematical conversions to inch-pound units that are provided for information only and are not considered standard.

1.8 *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, health, and environmental practices and determine the applicability of regulatory limitations prior to use.

1.9 *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:³

[D1066](#) Practice for Sampling Steam
[D1067](#) Test Methods for Acidity or Alkalinity of Water
[D1129](#) Terminology Relating to Water
[D1193](#) Specification for Reagent 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
[D5128](#) Test Method for On-Line pH Measurement of Water of Low Conductivity
[D5464](#) Test Method for pH Measurement of Water of Low Conductivity
[D6569](#) Test Method for On-Line Measurement of pH
[E70](#) Test Method for pH of Aqueous Solutions With the Glass Electrode

3. Terminology

3.1 Definitions:

3.1.1 For definitions of terms used in this standard, refer to Terminology [D1129](#).

3.2 Definitions of Terms Specific to This Standard:

3.2.1 *pH, n*—the negative logarithm of the hydrogen ion activity in an aqueous solution or the logarithm of the reciprocal of the hydrogen ion activity.

3.2.1.1 *Discussion*—The pH of an aqueous solution is derived from *E*, the electromotive force (emf) of the cell:

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 Wu, and Koch, "Standard Reference Materials: Standardization of pH Measurements," NBS Special Publications No. 260-53, 1988.

³ 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.