



Designation: D4972 – 19 (Reapproved 2024)^{ε1}

Standard Test Methods for pH of Soils¹

This standard is issued under the fixed designation D4972; 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.

^{ε1} NOTE—Reapproved with editorial changes in July 2024.

1. Scope*

1.1 These test methods cover the measurement of the pH of soils that will pass the 2.00 mm (No. 10) sieve. Such measurements are used in the agricultural, environmental, geotechnical, and natural resources fields. This measurement determines the degree of acidity or alkalinity in soil materials suspended in water and a 0.01 *M* calcium chloride solution. Measurements in both liquids are necessary to fully define the soil's pH. This variable is useful in determining the solubility of soil minerals and the mobility of ions in the soil and assessing the viability of the soil-plant environment. A more detailed discussion of the usefulness of this parameter is given in Refs (1-6)².

1.2 Two methods for measuring the pH of soils are provided. The method to be used shall be specified by the requesting authority. When no method is specified, Method A shall be used. The pH is measured in test water and a calcium chloride solution for both methods.

1.2.1 *Method A*—The pH is measured using a potentiometer having a pH sensitive electrode system. This method can be used for any application and must be used when the application warrants a higher level of resolution.

1.2.2 *Method B*—The pH is measured using pH sensitive paper. This method can be used for any application, however, because paper typically has a lower resolution, it provides an approximate estimate of the pH of the soil and should not be used when the application requires a higher level of resolution (Note 1).

NOTE 1—For example, paper with a sensitivity to the nearest 1 pH unit placed into a buffer solution of 4 should indicate a pH of 4, however, it would not indicate if the pH is 4.449 or 3.449.

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

¹ These test methods are under the jurisdiction of ASTM Committee D18 on Soil and Rock and is the direct responsibility of Subcommittee D18.22 on Media for Plant Growth.

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² The boldface numbers in parentheses refer to a list of references at the end of this standard.

1.4 All measured and calculated values shall conform to the guidelines for significant digits and rounding established in Practice D6026.

1.4.1 The procedures used to specify how data are collected/recorded and calculated in the standard are regarded as the industry standard. In addition, they are representative of the significant digits that generally should be retained. The procedures used do not consider material variation, purpose for obtaining the data, special purpose studies, or any considerations for the user's objectives; and it is common practice to increase or reduce significant digits of reported data to be commensurate with these considerations. It is beyond the scope of these test methods to consider significant digits used in analysis methods for engineering data.

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:³

- C670 Practice for Preparing Precision and Bias Statements for Test Methods for Construction Materials
- D653 Terminology Relating to Soil, Rock, and Contained Fluids
- D1193 Specification for Reagent Water
- D2487 Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System)
- D2488 Practice for Description and Identification of Soils (Visual-Manual Procedures)

³ 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.

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