



Designation: D1172 – 15 (Reapproved 2024)

Standard Guide for pH of Aqueous Solutions of Soaps and Detergents¹

This standard is issued under the fixed designation D1172; 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 This guide covers the preparation of aqueous solutions of soaps and detergents and the determination of their pH.

1.2 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard.

1.3 *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.* Material Safety Data Sheets are available for reagents and materials. Review them for hazards prior to usage.

1.4 *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

D460 Test Methods for Sampling and Chemical Analysis of Soaps and Soap Products (Withdrawn 2023)³

D501 Test Methods of Sampling and Chemical Analysis of Alkaline Detergents

E70 Test Method for pH of Aqueous Solutions With the Glass Electrode

3. Sampling

3.1 The material shall be sampled in accordance with Test Methods D460 or D501, whichever is applicable.

¹ This guide is under the jurisdiction of ASTM Committee D12 on Soaps and Other Detergents and is the direct responsibility of Subcommittee D12.15 on Physical Testing.

Current edition approved Jan. 1, 2024. Published January 2024. Originally approved in 1951. Last previous edition approved in 2015 as D1172 – 15. DOI: 10.1520/D1172-15R24.

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

4. Reagent

4.1 *Distilled Water or Equivalent*—Distilled water or equivalent shall be boiled thoroughly, or purged with CO₂-free air, to remove CO₂ and shall be protected with soda-lime while cooling and in storage. The pH of this water shall be between 6.2 and 7.2 at 25 °C. The residue on evaporation, when heated at 105 °C for 1 h, shall not be more than 0.5 mg/L.

5. Procedure for Synthetic Detergents

5.1 *Preparation of Solutions*—Weigh 1 g ± 0.001 g of the sample (see Note 1 and Note 2) and transfer to a 1 L volumetric flask. Partially fill the flask with distilled water or equivalent and agitate until the sample is completely dissolved. Make certain the solute is completely dissolved and allow time for the evolution of dissolved gases. Fill to the calibration mark with distilled water or equivalent. Stopper the flask; mix thoroughly. The desirable condition requires the solution to come to equilibrium. Allow the solution to equilibrate at 25 °C ± 2.0 °C. The use of a temperature compensation probe may allow alternate temperatures. Records should show the time interval between solution preparation and pH measurement.

NOTE 1—The procedure for detergents other than soaps is applicable to some compositions that contain minor proportions of soap, provided that the solutions do not show evidence of gelling prior to carrying out the pH measurement.

NOTE 2—Measurements of pH of gelled solutions lack constancy and reproducibility. The procedure for soaps (Section 6) is designed to produce solutions that will not gel before the pH measurement is carried out. This procedure should be used for all detergent solutions, soap or nonsoap, that give evidence of gelling or incomplete solution when prepared in accordance with 5.1. The procedure for soaps is not applicable to detergent compositions that are known to be chemically altered by the boiling water used in dissolving the sample, or that are intended exclusively for use in cold water.

5.2 *Determination of pH*—Calibrate the pH meter and suitable electrodes. The recommended electrodes are Fisher Scientific accupHast Variable Temperature pH Combination Electrodes or Orion Ross Sure Flow electrode or equivalent electrodes. Measure the pH of the solution while stirring.

6. Procedure for Soaps (use for soaps and detergents that tend to gel when added to water at room temperature)

6.1 *Preparation of Apparatus*—Use a pH meter and electrodes as defined in Test Method E70. Set the temperature