

pH (Hydrogen Ion)

AZPDES/APP Field Monitoring Training
January 2012



Approved Methods (In-line)

EPA 150.2

- Environmental Monitoring and Support Laboratory–Cincinnati, EPA, Pub. No. EPA-600/4-79-020, Methods for Chemical Analysis of Water and Wastes (rev. March 1983), available at <http://nepis.epa.gov/pubtitleord.htm>.



Approved Methods (Field)

- SM 4500-H B, 20th edition

- American Public Health Association et al., Standard Methods for the Examination of Water and Wastewater (20th ed. 1998), available from American Public Health Association, 800 I St., NW, Washington, DC 20001.

- HACH 8156

- Hach Company, Hach Water Analysis Handbook (3rd ed. 1997), available from Hach Company, P.O. Box 389, Loveland, CO 80539-0389.

Unacceptable Methods



Color Wheels



pH Paper

pH Calibration



- Temperature affects the value of the pH
 - Buffer temperatures and sample temperatures should be as close as possible
 - @ $\pm 2^{\circ}$ C difference is suggested
 - Two affects – mechanical and chemical
 - Only one is compensated for with an automatic temperature control (ATC)

pH Calibration



- Ensure using the correct type of electrode for the measurement
- Electrodes come with a slope percent range of acceptance
 - Often 92 – 102%, but verify
- Check the electrode for at a minimum:
 - Storage solution – correct type, not dried, filled
 - Look for cracks, scratches
 - Do not use paper towels on electrode membrane

pH General



- Ensure meter is in
 - Calibration mode when calibrating
 - Read mode when analyzing samples
- Must be analyzed within 15 minutes

pH General



- Rinse electrode with deionized water between buffers and samples and blot dry
- If using a bench meter with a magnetic stirrer, use small stir bars and stir slowly
 - This avoids bumping the electrode and potentially damaging it

SM 4500-H B



• Calibration

- Minimum of three points bracketing samples
 - One buffer at least 2 pH units from sample pH
 - Second and third buffers at least three pH units apart
 - Third buffer below pH 10
 - Recommend pH buffers 4.0, 7.0, or 10.0
- Buffer value on instrument must be within 0.1 pH units of true value
- Record temperature of buffers
- Frequency
 - Each day of use for compliance testing

SM 4500-H B



Quality Control and Reporting

- Every 10 samples (or less) analyze a mid point pH buffer (typically 7.0) used in calibration (field check)
- Analyze second source pH buffer quarterly
 - The second source buffer may be used for the mid point check
- Every 20 samples (or less) analyze a duplicate measurement of a sample within 0.1 pH units

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Quality Control and Reporting

- Record temperature
 - Some meters have automatic temperature compensators (ATC) but still need to record temperature
- Report pH to nearest 0.1 unit and temperature to nearest degree °C



Video Demonstration

