pH in Liquid and Soil
SW-846 Method 9040 (Liquid) and SW-846 Method 9045 (Soil)

Table 1. Summary of Holding Times and Preservation for liquid and soil pH

Analytical Parameter	**Technical and Contract Holding Times**	**Preservation**
pH (Liquid and Soil)	Analyze pH immediately upon sample receipt by the laboratory	Cool to 4EC ±2EC

For soil samples:
In addition to the procedure outlined in Section 7.2 of SW-846 method 9045C,

For noncalcareous soils:
1. Weigh 20 grams of soil in a 50 mL beaker. Add 20 mL of Type II water. Stir the resulting suspension several times during the next 30 minutes.
2. Let the suspension to stand undisturbed for about 1 hour to allow most of the suspended clay to settle out

For calcareous soils:
1. Weigh 10 grams of soil in a 50 mL beaker. Add 20 mL of 0.01M $CaCl_2$. Stir the resulting suspension several times during the next 30 minutes.
2. Let the suspension to stand undisturbed for about 1 hour to allow most of the suspended clay to settle out.

Data Calculations and Reporting Units:

Read pH meter results directly in pH units and solution temperature in EC.

Report pH results to the nearest 0.1 pH unit and temperature to the nearest EC. Report the results for noncalcareous soils as “soil pH measured in water” and for calcareous soils, report the results as “soil pH measured in 0.01M $CaCl_2$".

For rounding results, adhere to the following rules:
a) If the number following those to be retained is less than 5, round down;
b) If the number following those to be retained is greater than 5, round up; or
c) If the number following the last digit to be retained is equal to 5, round down if the digit is even, or round up if the digit is odd.

All records of analysis must be legible and sufficient to validate all sample and QC analyses.

Table 2. Summary of Calibration Procedures for pH by SW-846 Method 9040 (Liquids) and SW-846 Method 9045 (Soil)

Calibration Element	**Frequency**	**Acceptance Criteria**	**Corrective Action**
Meter Standardization	Initially	Refer to manufacture's instructions	Refer to manufacture's instructions concerning standardization and electrode(s) care
Calibration	Daily, prior to sample analysis	A minimum of 2 primary or secondary standard buffers must be used; Buffers must bracket expected pH of sample; Buffers must be 3 or more pH units apart; Buffer readings must be within 0.05 pH units of buffer's true value	1. Allow buffer temperatures to reach equilibrium 2. Repeat measurement with successive volumes of fresh buffer until acceptance criteria are met 3. Replace electrode(s) (follow manufacture's instructions)
Buffer pH Check	Check a calibration buffer solution after every 10 samples (minimum)	<±0.1 pH unit difference	1. Repeat measurement with successive volumes of fresh buffer until acceptance criteria is met before continuing analysis 2. Recalibrate meter and reanalyze samples

NOTE: Electrode(s) must be cleaned after each sample analysis by thoroughly rinsing and gently wiping.

Table 3. Summary of Internal Quality Control Procedures for pH by SW-846 Method 9040 (Liquids) and SW-846 Method 9045 (Soil)

QC Element	Frequency	Acceptance Criteria	Corrective Action
Sample Temperatures	Every sample	<2 EC difference from buffer	Refer to manufacture's instructions concerning the pH meter temperature compensating function
Duplicate Sample (DUP)	One per batch or SDG (1 per 20 samples minimum)[a]	<±0.1 pH unit difference	1. Allow sample temperatures to reach equilibrium 2. Perform buffer pH check (See Calibration Procedure) 3. Clean electrode (See Calibration Procedure Note)

[a] SDG - Sample Delivery Group - each case of field samples received; or each 20 field samples within a case; or each 14 calendar day period during which field samples in a case are received.