Lab Name (Lab ID# 5 Digit #:)

**Standard Operating Procedure for pH Analysis**

**ENTER ANALYTICAL METHOD OF USE (e.g., SM 4500-H B-11)**

**Revision #** Enter #

1. **Summary**
   1. The pH of a sample is determined electrometrically using a pH meter that is capable of temperature compensation.
2. **Equipment**
   1. pH meter capable of temperature compensation: Enter Manufacturer Name and Model
   2. pH probe/electrode: Enter Manufacturer Name and Model
   3. The equipment used is operated and stored in accordance with the manufacturer’s instructions. A copy of the manufacturer’s instructions is readily available within the laboratory.
3. **Reagents**
   1. The pH buffers used at the laboratory are pH buffers Specify the buffers used (e.g., 4, 7 and 10).
   2. pH buffers are marked with the “date received” and the “date opened” by the laboratory.
   3. pH buffers are discarded after each use.
   4. pH buffers are not used past the manufacturer’s expiration date and are immediately discarded upon expiration.
   5. The “Certificate of Analysis” for each buffer is retained by the laboratory.
4. **Calibration** 
   1. Calibration is performed each day of pH analysis, prior to taking any sample measurements.
   2. Calibration is performed with fresh aliquots of List the pH values of the buffers used standard buffers, which bracket the values to be measured.
   3. EDIT THIS SECTION TO DESCRIBE THE STEP-BY-STEP LABORATROY PROCEDURE FOR CALIBRATION.
   4. The calibration values must be within ±0.05 pH units of the temperature-dependent buffer true values, otherwise the meter is recalibrated.
   5. After calibration, a mid-range pH buffer (List which buffer will be used) is measured in measurement mode (without any control adjustments) to check the calibration. The mid-range buffer check must be within ±0.1 pH units of the temperature-dependent buffer true value, otherwise the meter is recalibrated and rechecked.
   6. If the pH meter is in use for longer than 3 hours, the pH of the mid-range pH buffer is checked once every 3 hours. If the 3-hour check value is not within ±0.2 pH units of the temperature-dependent buffer true value, then the meter is recalibrated and rechecked.
   7. If the calibration or check values continue to fail criteria, then corrective action, such as replacing the pH probe, is performed. Accuracy criteria must be met prior to performing sample analysis.
   8. All calibration data, including the temperature (°C) of the buffers during calibration and check(s), the results of the calibration and check(s), the time and date of calibration and check(s), and the signature/initials of the analyst, is recorded on the pH log sheet/logbook.
5. **Sample Analysis**
   1. Samples must be analyzed within 15 minutes of collection.
   2. All samples are stirred during measurement at a constant rate. This is accomplished by Specify either “manually stirring or “swirling” the sample container during measurement” or “using a stir plate and a stir bar”.
   3. The pH probe/electrode is rinsed with reagent water after each reading.
   4. The temperature of each sample pH measurement is observed and recorded with the pH result.
   5. A duplicate sample is analyzed each analysis day or with each batch of 20 or fewer samples, whichever is more frequent. The difference between the original sample pH result and the duplicate sample pH result must not exceed ±0.10 pH units.
   6. The sample collection date and time, signature/initials of the sampler, sample identification/location, sample analysis date and time, pH results (s.u.) and temperatures (°C), signature/initials of the analyst, and the analytical method used is recorded on the pH sample analysis log sheet/logbook.
6. **Maintenance and Storage**
   1. When not in use, SPECIFY STORAGE CONDITIONS FOR THE PROBE/ELECTRODE (e.g., the pH probe/electrode is placed in electrode storage solution).
   2. ENTER ANY PROBE CLEANING OR MAINTENANCE HERE.
7. **Records**
   1. All pH values are recorded to two decimal places.
   2. PEN is to be used, NOT PENCIL. NO WHITEOUT is to be used. Any errors recorded shall be single-lined (ex: ~~error~~), dated, and initialed.
   3. All original records are retained for at least five years. The records are initially maintained on-site for a minimum of 1 year, so that they are readily accessible for review.
   4. This SOP is readily available to all personnel and will be updated to reflect any procedural changes.

**APPROVED BY: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Printed Name Position**

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**Signature Date**

**Note: If custody of the samples is passed among more than one individual (for example, if one employee takes the sample, then passes it along to another who conducts the pH analyses), then a Chain-of-Custody (COC) form may be used to record the pH sampling information. If used, the COC form must be retained as part of the sample record. An example COC form is provided below. If this form is not being used, please do not include this as part of the SOP.**

**EXAMPLE**

**Sample Chain of Custody Form**

**Date:**

**Sample location:**

***Chain of Custody Transmittal Record***

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| ***Sample ID*** | ***Date Sampled*** | ***Time Sampled (include am/pm)*** | ***No. of Sample Containers*** | ***Type of Sample Containers (e.g., glass jar)*** |
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|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
| **Sampled by:**  **(Printed Name)** | **(Signed Name)** | **Date / Time:** | | |  |
| **Relinquished by:**  **(Printed Name)** | **(Signed Name)** | **Date / Time:** | | |
| **Received by:**  **(Printed Name)** | **(Signed Name)** | **Date / Time:** | | |