Standard Operating Procedure

pH Measurements

1. **Introduction**

   1.1. **Purpose**

   To outline the procedure for operation of typical pH meter in the TRACES Centre and the undergraduate laboratories. This procedure describes how to accurately measure the pH of a solution.

   1.2. **Scope**

   Applicable to digital pH meters located in TRACES Centre and UG Laboratory. These include (but not limited to) Sartorius, Oakton and Mettler-Toldeo brand devices.

   1.3. **Responsibility**

   User

   1.4. **Accountability**

   TRACES Manager/Course Instructor

2. **Referenced Documents**

   2.1. Oakton Instruction Manual PC 700 :68X541704 Rev. 1 Feb. 2010.pdf

   2.2. Mettler-Toledo Operating Instructions SevenEasy pH Meter S20: ME-51710234C.pdf

3. **Equipment**

   3.1. **pH meter,** digital

       3.1.1. Double-junction Ag/AgCl electrode pH electrode

       3.1.2. ATC (automatic temperature control) probe (if available)

   3.2. **Various clean containers,** beakers (wide-mouth) for samples, pH standard and waste

   3.3. **Transfer utensils,** pipettes, spatula or capillaries

   3.4. **Stir Plate,** with clean stir bars (mini and micro)

   3.5. **pH Standard Solutions,** pH 4,7 and 10 buffers

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4. Procedures

4.1. pH Calibration: For best results, periodic calibration with known accurate standards recommended. It is recommend before the start of a pH measurement. Calibrate with standards that bracket your intended measuring range while including a pH 7 standard.

    4.1.1.1. Calibration group available: USA and NIST

    4.1.1.2. Place 35-40mL of pH buffer into separate 50mL beaker with a magnetic stir bar.

        4.1.1.2.1. <u>**STIR BAR MUST NOT MAKE CONTACT WITH pH ELECTRODE**</u>

4.1.2. Press 'MODE' as needed to select pH

4.1.3. Dip the pH and ATC electrodes into pH buffer and press 'CAL/MEAS'. The secondary display will lock on the appropriate buffer value. Provide stirring and ensure the pH electrode bulb is immersed in the solution for best results.

    4.1.3.1. When the <u>**READY**</u> indicator appears, press 'ENTER/RANGE' to accept. The primary reading will flash briefly before the secondary display begins scrolling the remaining available buffers.

4.1.4. Rinse the pH and ATC electrodes then dip into the next pH buffer. The secondary display will lock on the appropriate buffer value.

    4.1.4.1. When the <u>**READY**</u> indicator appears, press 'ENTER/RANGE' to accept. The primary reading will flash briefly then display the percent efficiency (slope) before the secondary display begins scrolling the remaining available buffers.

4.1.5. To calibrate another buffer repeat step **4.1.4** or press 'CAL/MEAS' to return to the measurement mode. **Note:** The meter will automatically return to measurement mode upon successful completion of the number of specified calibration points.

4.2. Measuring pH: For best results, rinse the pH and ATC electrodes with deionized water (Type 1) BEFORE and AFTER dipping into the sample solutions.

4.2.1. Ensure that 'MEAS' is indicated on the display.

4.2.2. Place 35-40mL of liquid sample into a 50mL beaker with a magnetic stir bar. Provide stirring and ensure the pH electrode bulb is immersed in the solution for best results.

4.2.3. Dip the pH electrodes into sample solution and read the pH value once it has stabilized. <u>Please consult your lab manual or TRACES Staff/TA for clarification</u>.

5. <u>Cleaning up</u>

5.1. Once you have completed the use of the pH meter, ensure you have properly cleaned the electrodes by rinsing with deionized water. Place the electrode in pH4 solution.

5.2. If instructed, place the pH electrode in the pH storage solution provided by the technical staff.

Approver:
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