Oakton PC2700 pH and Conductivity Meter Calibration and Use

1. PH EQUIPMENT AND SUPPLIES

    1.1. Oakton PC2700 (S/N CP354757)

    1.2. Combination pH Electrode

        1.2.1. Keep the electrode stored in electrode storage solution when not in use. The fill solution level should not fall more than 0.25" below the cap. If it is below this level, fill it with the reference fill solution before use.

    1.3. Automatic Temperature Compensation (ATC) probe

    1.4. pH Reference Fill Solution, Cole-Parmer

    1.5. pH Electrode Storage Solution, Orion

    1.6. Buffer solution, pH 7, Fisher Scientific

    1.7. Buffer solution, pH 10, Fisher Scientific

    1.8. Buffer solution, pH 4, Fisher Scientific

    1.9. Secondary buffer solution, pH 7, Orion

    1.10. Small plastic cups

    1.11. Squirt bottle with deionized (DI) water

2. CONDUCTIVITY EQUIPMENT AND SUPPLIES

    2.1. Oakton PC2700 (S/N CP354757)

    2.2. Conductivity Probe

        2.2.1. Electrode is stored dry. If electrode has been stored dry for some time, soak the electrode in alcohol or clean water for a few minutes to ensure better accuracy.

    2.3. Conductivity Standard, 100 umhos/cm, Fisher Scientific

    2.4. Conductivity Standard, 1000 umhos/cm, Fisher Scientific

    2.5. Conductivity Standard, 10000 umhos/cm, Fisher Scientific

    2.6. Small plastic cups

    2.7. Squirt bottle with DI water

3. PH CALIBRATION

    3.1. Turn meter on, and, if necessary, press "**mode**" until "**Measure pH**" is listed at the top of the screen.

    3.2. Press "**Cal"** to enter calibration mode. Click "**Clr-C"** then "**enter"** to clear the previous calibration. Submerge the pH electrode and ATC probe in the Fisher pH 7 buffer solution. When the reading is stable, use the up and down arrows to adjust the

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upper pH value displayed on the screen to the appropriate pH buffer (the reading is stable when the number displayed on the screen will go from faded to bold). Press "**enter"** to confirm the calibration value. When the calibration for the point is successful, the accepted value will be visible in the beaker icon on the screen.

3.3. Rinse the pH and ATC electrodes with DI water and repeat Step 3.2 for the Fisher pH 4 and 10 buffers. Once the calibration has been performed with all buffers, the percentage slopes will be displayed at the bottom by the beaker icons, which should display 4,7, and 10. Press "**Esc"** when the calibration is completed. The calibration passes if the slope is within 95-105%, or within the limits specified on the pH probe's Certificate of Analysis if more stringent.

Repeat Steps 3.2-3.3 if calibration fails. If the calibration fails more than once, inform a supervisor for assistance.

3.4. Press the "**Meas"** tab and take a final verification reading with the pH 7 Orion buffer solution.

If it does not read at a pH of 6.9-7.1, recalibrate according to Steps 3.2-3.4.

Record the calibration in the *pH_Meter_Log* in LIMS **Laboratory / Technical / Laboratory Logbook**.

3.5. The pH must be calibrated once per day unless not in use.

4. CONDUCTIVITY CALIBRATION

4.1. Turn meter on, and, if necessary, press "**mode**" until "**Measure Cond**" is listed at the top of the screen.

4.2. Press "**Cal"** to enter calibration mode. Click "**Clr-C"** then **"enter"** to clear the previous calibration. Submerge the conductivity probe in the 100 umhos/cm standard solution. When the reading is stable, use the up and down arrows to adjust the upper conductivity value displayed on the screen to the appropriate conductivity standard (the reading is stable when the number displayed on the screen will go from faded to bold). Press "**enter"** to confirm the calibration value. When the calibration for the point is successful, the accepted value will be visible in the beaker icon on the screen.

4.3. Rinse the conductivity probe with DI water and repeat Step 4.2 for the 1000 umhos/cm and 10000 umhos/cm standards. Press "**Esc"** when the calibration is completed.

4.4. Press the "**Meas"** tab and take a final verification reading with the 1000 umhos/cm standard solution.

If it does not read between 950-1050 umhos/cm (5% deviation), repeat steps 4.2-4.3. If it fails more than once, inform a supervisor for assistance.

Record the calibration in the *Conductivity_Meter_Log* in LIMS **Laboratory / Technical / Laboratory Logbook**.

4.5. The conductivity mode must be calibrated at least once per week. Verify the accuracy of the conductivity calibration daily before use by measuring the 1,000 umhos/cm

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standard.

If it does not read between 950-1050 umhos/cm, repeat steps 4.2-4.3.

Record the verification in the *Conductivity_Meter_Verification_Log* in LIMS **Laboratory / Technical / Laboratory Logbook**.

5. pH/CONDUCTIVITY MEASUREMENT

5.1. Make sure the meter is in the appropriate measure mode. If not, press the "**Mode"** tab to change. Rinse the ATC probe and pH electrode if measuring pH, or the conductivity probe if measuring salinity. Place the appropriate probes into the solution to be read, and stir the solution.

5.2. When the reading stabilizes and the numbers go from faded to bold, record the measurement.

5.3. To return meter to standby, press the power button. To shut down, hold down the power button at the bottom of the screen. Return the probes to their appropriate storage solutions: pH electrode into electrode storage solution, Conductivity electrode is stored dry.

6. CALIBRATION OF ATC PROBE

6.1. The ATC probe should be calibrated annually against a NIST traceable temperature probe or sooner if temperature readings are questionable.

6.2. Place the ATC probe and NIST traceable probe in a large beaker of DI water (600 ml or larger) and acclimate to room temperature for at least 1 hour.

6.3. Press Cal from any mode and select **Temp.** The upper display shows the active temperature while the lower display shows the last calibration and offset.

6.4. Press the up and down arrows to adjust the temperature to match the reading to 0.1 ˚C of the NIST traceable probe.

6.5. Press **Enter** to accept the calibration temperature.

6.6. Document the calibration in LIMS **Laboratory / Technical / Equipment Editor** and in DEAR/Labs/Lab5/Biology/BenchCommon/Calibrations/Thermometer.

7. REFERENCES

7.1. Standard Methods 4500-H^+-2000

7.2. Oakton PC2700 series instruction manual.

APPENDIX OF CHANGES

03/21/2022 Updated section 2.2.1 to reflect current method of storage for conductivity electrode. Edited syntax and semantics for clarity.

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02/22/2023 Removed references to pH 10 buffer solution. Updated where to document ATC probe calibration.

02/19/2024 Updated section 1 to mention the use of reference fill solution, and sections 1 and 5.3 to mention electrode storage solution. Added both to the list of supplies.

03/13/2024 Updated sections 1 and 3 to mention the use of pH 10 buffer solution when calibrating the pH meter and added it to the list of supplies. Removed sections 3.1.1 and 3.2 as they are no longer relevant. Changed the slope % deviation in section 3.3 to reflect our method requirements. Mentioned visiting a supervisor upon more than one failure when applicable. Edited sections 3 and 4 to clarify when to calibrate what mode, specifically mentioning the verification of the conductivity mode and the LIMS logbook those entries go in.

03/10/2024 Added clarification to procedures in sections 3-5.

03/17/2026 Updated slope % deviation requirement in section 3.3.

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