Forensic Biology Section

Operation of the Oakton pHTestr-30

1. Scope

1.1. The Oakton pHTestr-30 pH meter measures the acidity or alkalinity of a solution, expressed as the negative logarithm of the hydrogen ion concentration (pH=-log[H+]). The meter's built-in temperature sensor can prevent measurement errors due to temperature changes.

2. Specimen

2.1. Solutions requiring pH measurement.

3. Reagents

- Electrode Storage Solution (Cole-Parmer)
- Deionized water
- Calibration buffers (pH 4.0, 7.0, 10.0)

4. Instrumentation

4.1. Oakton pHTestr-30 Waterproof Pocket Tester (Cole-Parmer)

5. Quality Assurance

5.1. After extended periods of non-use, soak the sensor in Electrode Storage Solution (or pH buffer 4) for approximately 30 minutes before calibrating.

5.2. The pH meter should be calibrated each day prior to use.

5.3. Rinse the electrode with deionized water between each sample.

5.4. Rinsing with deionized water is OK, but do not soak or store the meter in deionized water as this will shorten the electrode's life.

6. Safety

6.1. Use caution with buffers and solutions. Acids and alkalis can cause severe chemical burns.

6.2. Wear gloves and a laboratory coat to reduce the risk of chemical exposure.

6.3. Dispose of old calibration buffers down a sink drain with copious amounts of water.

7. pH Buffer Set Selection

7.1. Use "USA" (pH 4.01, 7.00 and 10.01) or "NIST" (pH 4.01, 6.86, and 9.18) pH standards.

7.2. While pressing the **HOLD/ENT** button, switch on the meter by pressing the **ON/OFF** button.

7.3. Release the **HOLD/ENT** button. The display will flash either 'USA' or 'NIST'.

7.4. Press the **CAL** button to toggle between the two buffer set standards.

7.5. After buffer selection, the meter will go back to measurement mode.

8. pH Calibration

8.1. Calibration should be done each day before use. Up to three points can be calibrated using either USA or NIST buffer set standards.

8.2. After extended periods of non-use, soak the sensor in Electrode Storage Solution for approximately 30 minutes before calibrating.

8.3. Press **ON/OFF** button to switch unit on.

8.4. Dip electrode about 2 to 3 cm into the pH standard buffer solution.

8.5. Press the **CAL** button to enter calibration mode. The 'CAL' indicator and two numeric readings will appear. The upper display will show the measured reading based on the last calibration while the lower display will indicate the pH standard buffer solution the meter is immersed in. (To abort calibration, press the **CAL** button).

8.6. Allow approximately 2 minutes for the meter reading to stabilize, and then press the **HOLD/ENT** button to confirm the first calibration point. The upper display will be calibrated to the pH standard buffer solution and the lower display will then search for the next pH standard buffer solution. At any point, an error message 'Er. 1' will be displayed momentarily if the confirmed pH value is not within the pH calibration window

8.7. Repeat with other buffers if necessary. Rinse electrode with DI water before the next buffer.

8.8. Note: The calibration mode allows you to perform up to three calibration points before returning to the measurement mode automatically. However, if you opt to have only one or two calibration points, simply press the **CAL** button to skip the remaining calibration points, exit the calibration mode, and go to the measurement mode.

8.8.1. To do a 1 point calibration only, press **CAL** button *after the first buffer* to exit the calibration mode. Otherwise, proceed to second buffer.

8.8.2. To do a 2-point calibration only, press **CAL** button *after the second buffer* to exit the calibration mode. Otherwise, proceed to third buffer.

8.8.3. After the third point calibration, the meter will *automatically* exit the calibration mode and return to the measurement mode.

9. pH Measurement

9.1. Press the **ON/OFF** button to switch the meter on.

9.2. Dip the electrode approximately 2 to 3 cm into a test solution. Stir and let the reading stabilize.

9.3. Note the pH value or press **HOLD/ENT** button to freeze the reading (to release the reading, press **HOLD/ENT** button again).

9.4. Rinse the electrode with deionized water between each sample.

9.5. Press the **ON/OFF** button to turn the meter off. (Meter will shut off after 8.5 minutes if no buttons are pressed).

10. Storage

10.1. After use, rinse the electrode with deionized water and dry thoroughly but gently by blotting with a soft tissue (rubbing with a tissue can scratch the electrode).

10.2. Place the cap over the electrode and return the meter to the storage case.

11. HOLD Function

11.1. This feature lets you freeze the display to allow a delayed observation of the meter's reading.

11.2. Press the **HOLD/ENT** button to freeze the measurement ('HOLD' will be displayed).

11.3. Press the **HOLD/ENT** button again to release the measurement ('HOLD' will no longer be displayed).

12. User Reset

12.1. You can reset the pH calibration to the factory default by using the user reset function. Buffer set selection and temperature calibration are not affected by the user reset function.

12.2. Switch the meter off.

12.3. While pressing the **CAL** button, press and release the **ON/OFF** button to enter the 'User Reset' selection menu. The screen will display 'rSt' on the bottom display with a flashing 'NO' selection.

12.4. Use the **CAL** button to toggle between 'NO' and 'YES' selection:

12.4.1. 'NO' deactivates the reset selection.

12.4.2. 'YES' activates the reset selection.

12.5. Press the **HOLD/ENT** button to confirm the selection made.

12.6. If 'YES' was selected, the unit will show 'CO' momentarily and proceed to the measurement mode with the calibration reset back to factory default value.

12.7. If 'NO' was selected, the unit will proceed to the measurement mode without any calibration reset.

13. Temperature Calibration

13.1. From the measurement mode, press the **HOLD/ENT** button to bring the meter to the 'HOLD' mode.

13.2. Press the **CAL** button for 3 seconds to switch to the °C or °F mode setting selection screen. Pressing the **CAL** button continuously for 3 seconds will toggle between the °C and °F mode setting selection screen. To exit without confirming the calibration, press the **CAL** button before the automatic confirmation takes place.

13.3. Release the **CAL** button to confirm your mode selection and the display will go to the temperature calibration mode with the upper display flashing. The upper display shows the current measured temperature reading based on the last set offset and the lower display shows the current measured temperature reading based on factory default calibration.

13.4. Dip the meter into a solution of known temperature and wait for the built-in temperature sensor to stabilize.

13.5. Press the **HOLD/ENT** button to set the upper display to the temperature value of the solution. Pressing the **HOLD/ENT** button increases the offset up to +5 °C (+9 °F) from default value,

then it will roll over to -5 °C (-9 °F) from default value and start increasing again. When the temperature offset value is reached, the new value is automatically confirmed if no key is pressed for 5 seconds.

13.6. Once the new temperature setting is reached, the meter returns to the measurement mode (if no button is pressed after 5 seconds).

14. Electrode Maintenance

14.1. Rinse the electrode with electrode storage solution after each measurement. Take care not to damage the sensor's glass electrode while rinsing.

14.2. In aggressive chemicals, dirty or viscous solutions, and solutions with heavy metals or proteins, take readings quickly and rinse electrode immediately afterward.

14.3. If possible, keep a small piece of paper or sponge in the electrode cap – moistened with clean water or electrode storage solution (NOT de-ionized water) – and close the cap over the electrode.

15. Self-Diagnostic Messages

15.1. Battery indicator: 3 Bars = battery is full (100%); 2 Bars = 50% of the battery life is left; 1 Bar = 25% of the battery life is left; Blinking battery icon = replace the four A76 batteries.

15.2. Or / Ur (steady): Over-range/Under-range signal due to one of the following:

15.2.1. Electrode is not in contact with solution or electrode is failing.

15.2.2. Replacement sensor is not connected properly.

15.2.3. The pH value or temperature value exceeds the maximum or minimum value.

15.3. ATC / Or / Ur (blinking): Blinking 'ATC', 'Or' or 'Ur' indicates that there is a short or open circuit at the built-in temperature sensor.

15.4. Er.0 error message: Temperature calibration error from attempting to calibrate the meter to a value which is over- or under-range.

15.5. Er.1 error message: pH calibration error after attempting to confirm a calibration value which is not within the specified calibration window.

16. Electrode Replacement

16.1. When the meter fails to calibrate or gives fluctuating readings in calibration standards, replace the electrode module.

16.2. With dry hands, grip the ribbed meter collar. Twist the collar counter clockwise. Save the ribbed meter collar and O-ring for later use.

16.3. Pull the old electrode module away from the meter.

16.4. Align the four tabs of the new module with the four slots in the meter.

16.5. Gently push the module into the slots to set it in position. Push the smaller O-ring fully onto the new electrode module. Push the collar over the module and thread it into place by twisting clockwise.

16.6. Recalibrate the meter with the new electrode installed prior to use.