

pH METER OPERATING PROCEDURE

OBJECTIVE

The reason for monitoring the pH of the pretreatment is to ensure that the wash solution remains in a condition or state that facilitates the type of cleaning/reaction etc. that needs to happen in that particular stage. All wash solutions should be monitored for pH (including ambient rinses). Refer to the wash parameter guides for specific pH ranges for individual stages.

THEORY OF OPERATION:

The pH of a solution is simply the measurement of the acidity or alkalinity of a solution. Pure water is neutral - pH of 7. Acids range in pH from 0 - 7 with 0 being the strongest and alkalines range from 7 -14 with 14 being the strongest. The more "extreme" the pH the more corrosive the solution.

The pH of a solution in relation to the pretreatment of metal is critical. For example - the pH of the cleaning stage must be within a specified range in order for the removal of certain soils to take place. Too mild a solution will not clean the product. For more information on pH refer to the Wash Pretreatment Guide.

The measurement of the pH of a solution is dependant on the temperature of the solution. This is why whenever pH is measured the temperature must be included. Most pH meters will compensate for temperature automatically. The temperature probe must be positioned as close as possible to the pH probe for accuracy reasons. The standard reference temperature for calibration etc. is 25 C.

TAKING A MEASUREMENT

- * Submerge electrode with temperature probe in the sample of wash solution (turn the meter on first). Stir for a few seconds.
- * Allow the readings to stabilize (a minute or so) and record the results.

Note: pH measurements may be taken without the temperature probe by:

- Disconnecting the probe from the meter.
- Determine the temperature of the sample to be measured.
- Adjust the temperature display using the “ ” and “ ” temperature key to the sample temperature.
- * Always rinse probes off with deionized water after using.

Quality: Never rinse the probe with tap water!

PROBE MAINTENANCE AND CALIBRATION

Although the meter is water resistant care should be taken not to get it wet or abuse the probes. The pH electrode must be kept moist when in storage using either the storage solution provided or in its absence a buffer of 4.

The probe should be cleaned every second day or when bulb becomes hazy using a cleaning solution of 0.1N HCL (Hydrochloric acid - Test Solution #2). Soak for a maximum of thirty minutes and rinse well with deionized water. In the event of oil or grease build up rinse the probe using 75% methanol solution, blot dry with a soft cloth and then soak for several hours in its storage solution or a buffer of 4. Do not store the pH Probe in distilled water - this will greatly reduce the life of the probe.

The meter should have its calibration verified at least once every shift. It must also be recalibrated whenever there is pH reading error that is greater than 0.1 pH from the standard buffers. Calibration is performed using a buffer of 7 first followed by a buffer of 4.

If air bubbles appear in the glass bulb they should be removed by GENTLY "shaking down" the probe similar to a clinical thermometer.

9025 Hanna and PHH - 25 Omega pH Meters/Calibration

- * Turn the meter on and press "Cal" The display will indicate calibration mode as well as the buffer value and number.
- * Adjust the buffer value to 7 using Δ and C key.
- * Immerse the pH probe and temperature probe in a buffer of 7. After the reading stabilizes the meter will display "Ready" and "Con" will blink. (If the reading will not stabilize change buffer solutions).
- * Wait 30 seconds (after "Ready" is displayed) and then press "Con". If the display reads "Wrong" then you did something wrong! Start over and double check you pH buffer values!! If everything is cool the display will prompt you to begin buffer #2.
- * Rinse probe off using deionized water and select a buffer value of 4 using the Δ and C key.
- * Submerge both probes in a buffer of 4. Allow reading to stabilize - the meter will display "con" and "Ready" when it is done.
- * Wait 30 seconds and then press the "Con" key. A display of "Wrong" indicates that once more a wrong buffer was selected. Start over! If everything is good the meter will automatically return to normal operating mode.
- * Rinse the probes using deionized water and verify the completed calibration using the buffer solutions.

HI 9023 Hanna pH Meter/Calibration

- * Assure that the meter is in pH mode.
- * Immerse the pH and temperature probes into pH 7.01 buffer, shake briefly and wait 20 seconds for reading to stabilize.

Note: Probes should be at least 3 cm into the solution. Probes should be as close together as possible.

- * Press the 'CAL' button. The temperature compensated pH value will blink on the display. (i.e.: if temperature is 25 C, reading will be pH 7.01. If temperature is 20 C the reading will be 7.03.)

Note: If "E4" appears, the buffer solution is wrong or the probe is defective. Check buffers and replace. If "E4" still appears, call Maintenance to replace probe.

- * Wait for the pH symbol to stop flashing and press the "CFM" button. The symbol "E5" will appear to indicate that the electrode is still in the pH 7.01 buffer.
- * Rinse both probes well with fresh, distilled water.
- * Dip both probes into the 4.01 pH buffer solution; shake briefly and wait for reading to stabilize.
- * The "E5" symbol should disappear and the temperature compensated value will blink in the display.
- * When pH symbol stops flashing, press the "CFM" button to confirm the calibration.

Quality: To ensure the most accurate results, verify calibration of the meter (calibrate if out greater than .1) the meter before each set of titrations.

Record any and all cleaning and maintenance performed on the log of service performed for that particular meter and serial #.

TROUBLE SHOOTING

9025 Hanna and PHH - 25 Omega pH Meters

1. pH reading is slow or will not stabilize
 - visually inspect probe - clean if
 - initiate calibration procedure after
 - check for air bubbles in electrode
 - probe may have been allowed to dry
 - inspect the electrode cable for cracks
 - contact Maintenance!

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| 2. | Probe broke | - | get a new one from systems Maintenance section. |
| | | - | verify calibration. |
| 3. | Will not calibrate selected. | - | be sure proper buffers are |
| | | - | clean probe and soak in buffer of probe may be "out of range" due to age or use - try a new one. |
| 4. | Display reads ""Cal"" when meter is Turned | - | all calibration data has been lost. |
| | | - | press "Cal" and the meter will reset to a slope of 0 to 100% (an ideal |
| | | - | Initiate normal calibration |
| 5. | Display reads "lo batt" | - | replace the batteries by removing the two screws on the battery cover on the back of the meter. |
| | | - | ensure water proof seal is not |

TROUBLE SHOOTING

9023 Hanna pH Meter

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| 1. | Instrument fails to calibrate or gives faulty Readings | - | replace pH probe (Call gives faulty readings to Maintenance.) |
| 2. | Slow response time or give faulty read outs | - | visually inspect probe-clean if necessary. |
| | | - | re-initiate calibration after cleaning. |
| | | - | "shake - down" any air bubbles in probe. |
| | | - | soak in a buffer of 4 overnight (or at least 2 hours) - check again. |
| | | - | inspect probe for broken parts, cracks, or breaks. |
| | | - | contact Maintenance. |
| 3. | Instrument does not accept second buffer solution in calibration: or reading drift | - | replace pH probe (contact Maintenance) |
| 4. | Display reads "Err 1" | - | sample solution may be out of range -assure solution pH is between 0 and 14. |

- check pH probe - contact Maintenance
- 5. Display reads "Err 2" - ensure C is within 0 - 100 C.
- 6. Display reads "Err 3" - you are in an "mV" mode; switch to pH mode.
- 7. Display reads "Err 4" - ensure pH buffers are correct and replace if not.
- replace probe; contact Maintenance.
- 8. Display reads "Err 5" - use fresh buffer solutions.
- replace probe; contact Maintenance.
- 9. Display reads "lo batt" - replace batteries (4 AAA batteries)

NEW PROBE

Several different types of probes are available for the Omega and Hanna meters.

Omega Probes:

1. The electrode must be kept moist.
2. If probe is moist it should be able to be used immediately.
3. If the probe has been allowed to dry out it should be soaked in a pH buffer of 4.0 for 2 hours prior to re-using it. If it has been dry for an extended period of time permanent damage will result.
4. Avoid storage in Distilled Water.

WJF Probes:

1. Keep electrode moist. Store in buffer of 4.
2. Prior to first use or after extended storage soak pH bulb in buffer of 4 or 7 for 30 minutes. It is now ready to use.