pH Sensor Test Procedure

The purpose of this test is to determine if a pH electrode is functioning within acceptable limits. The asymmetry potential CAP) and slope (efficiency) can be used as guidelines to judge an electrode's performance. Typically an electrode is replaced when the AP is greater than ±40 mV and/or the slope drops below 85%. Consideration should also be given to the electrodes speed of response. Please follow this step by step procedure to determine the performance of an electrode. Required test equipment includes 7.00 and 4.01 pH buffer solutions with a pH meter that has a mV readout.

1. Set the pH/mV switch on the pH meter to the mV position.

2. Connect a shorting plug to the input on the pH meter, or connect a precision mV generator with a 0 mV input. Adjust the standardize/zero control on the pH meter for a reading equal to 0.0 mV.

3. Disconnect the shorting plug/precision mV generator, and connect the electrode that will be tested.

4. Rinse the electrode thoroughly with Dl water to remove all traces of storage solution, process medium, or previous test solution. Thoroughly rinse the electrode after each buffer test to prevent carry over contamination of the pH buffer solutions. Gently blot the electrode on a soft tissue to remove the excess rinse water. Do not rub the bulb since it can cause a static charge build-up.

5. Insert the electrode and the automatic temperature compensator (ATC) in 7.00 pH buffer solution. Allow 30 seconds for the electrode/ATC to reach thermal equilibrium with the buffer solution. Record the polarity and the my reading. This is the asymmetry potential of the electrode. A perfect electrode would have an AP equal to 0 mV, but most electrodes read between ±30 mV.

Note:If the meter does not have an ATC then place a thermometer along with the electrode in the 7.00 pH buffer solution. Allow 30 seconds for the pair to reach thermal equilibrium with the buffer. Adjust the temperature setting on the meter to correspond with the thermometer reading. Record the polarity and the mV reading to determine the AP.

6. Repeat step 4, and insert the electrode and the ATC in a 4.01 buffer solution. Allow 30 seconds before recording the my reading.

Continued

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7. Determine the mathematical difference between the two my readings. This is the electrode's span.

8. Divide the electrode's span by the theoretical span of 176.9 mV (at 250C) and multiply by 100. This determines the slope of the electrode.

Note:For best results, the pH buffers solutions should be used at 250C. Otherwise, record the temperature of the buffer and determine the temperature adjusted pH with the temperature coefficient charts printed on the buffer container.

Example:

Reading in a 7.00 pH buffer solution: [-7.4] mV (max/min range ±40 mV)

Reading in a 4.01 pH buffer solution: [164.6] mV

Span = 164.6 (Reading in 4.01 pH) mV - -7.4 (Asymmetry Potential) mV = 172.0 mV (min 150.4 mV)

Slope = Span / Theoretical Span = 172.0 mV / 176.9 mV x 100 = 97 % (min 85%)

Electrode Test Result Calculator:

Reading in a 7.00 pH buffer solution: [ ] mV (max/min range ±40 mV)

Reading in a 4.01 pH buffer solution: [ ] mV

Span = 0.0 (Reading in 4.01 pH) mV - 0.0 (Asymmetry Potential) mV = 0.0 mV (min 150.4 mV)

Slope = Span / Theoretical Span = 0.0 mV / 176.9 mV x 100 = 0 % (min 85%)

Date Tested: _____ Initial: _____ Identification: _____
(Electrode P/N, Vessel Location/No.)

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