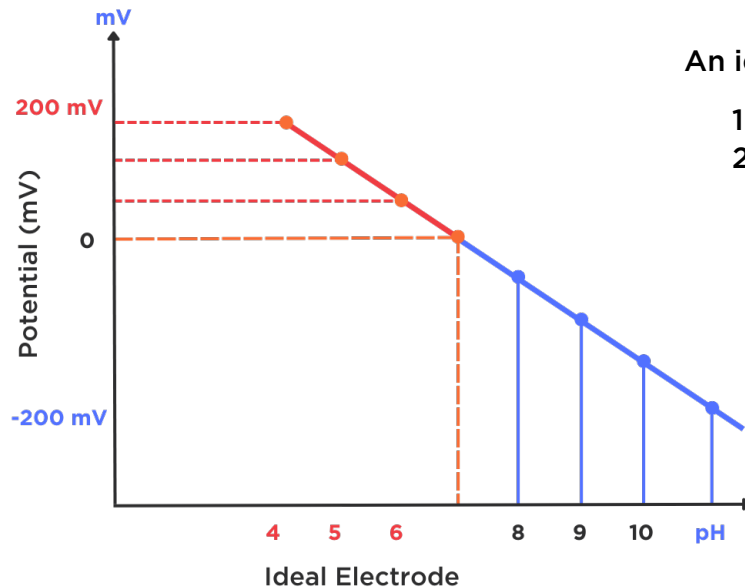


Accurate pH Measurements

pH values are critical for permeate evaporator and [membrane](#) washes, especially during the enzyme step. Make sure you are using a pH meter that is accurate. **Accurate pH measurements may require pH meter calibration with more than two pH buffers.** A pH meter with a new probe will have the pH vs mV curve represented below:



An ideal pH electrode will have:

1. Offset = 0 mV
2. Slope = 59.16 mV @ 25 °C

An ideal electrode pH curve will have a slope of 59.16 mV @ 25 °C. When a pH meter is calibrated, the meter will display a % slope value at the end of the calibration. This % value represents how close the actual slope is to the ideal value and is a measure of how accurate the pH readings will be. A probe with less than a 95% slope reading after calibration either needs maintenance or needs to be replaced.

The pH meter in the control rooms of many food plants are calibrated using two buffers, typically pH buffers 4.01 and 7.00. This is because the pH of the food products that are being tested fall between these two values.

If the pH meter is only calibrated with buffers 4.01 and 7.00, and the slope differs from the ideal given in the graph above, then when pH measurements are made on substances with a higher pH like 11.00, such as an alkaline wash on a membrane system, the meter can give an erroneous reading. This is because the alkaline pH value is extrapolated from the curve generated using only the 4.01 and 7.00 pH buffers.

Recommendations

In order for a pH probe/meter to give accurate readings, the following are recommended:

- The pH meter should be calibrated daily with fresh buffers using a minimum of a 3-point calibration using buffers 4.01, 7.00, and 10.01. The % slope of the probe should

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be greater than 95%. The portable Hanna Blue Tooth pH Probes that Hydrite recommends for the field program managers can be calibrated with up to 5 different buffers (1.68, 4.01, 7.00, 10.01, and 12.46).

- Since pH also varies with temperature, the pH probes should also be temperature-compensated
- Immediately after a pH probe value is read from the meter, the probe should be rinsed with DI water, blotted with a Kimwipe, and placed in pH electrode storage solution or pH 7.00 buffer....it should not be stored in tap water or left to sit soaking in the last sample!
- Ideally, the control room would have two calibrated pH meters; one for testing food products and the other for testing CIP or cleaning solutions.

Reach out to the **RITE team** for more information on accurate pH measurement best practices.