Webinar Q&A Report:
Reduce pH Measurement Errors

1. **Is dilution affecting pH?**

   Urs H.: Yes. pH is basically a concentration measurement (technically activity, not concentration), so it is strongly affected by dilution. The impact of dilution is however strongly reduced in buffer solutions.

2. **Is there a mathematical way to determine the impact of temperature due to the changes in ion concentration?**

   Urs H.: There may be for specific samples of known and well-defined concentration, but there is no general solution.

3. **Are there particular electrode cleaning solvents that should be used and also avoided?**

   Urs H.: Immersing the sensor in non-aqueous solvents for extended times damages the glass layer. The sensor should be regenerated by placing it in storage solution or acidic buffer (e.g. pH 4.01). To limit the damage, we recommend more polar solvents like ethanol or isopropanol.

4. **What is recommendation to decontaminate electrode when working with polypeptides in lipids?**

   Urs H.: For removing peptide residues, a cleaning solution containing pepsin and HCl is recommended. Fat residues can be removed with warm water and soap, ethanol or isopropanol.

5. **Can you speak in regard to measuring pH in Deionized water? Ie. Measurement Errors and should it ever be measured outside of a recirculating loop?**

   Urs H.: There are at least two potential sources of error. One is the absorption of carbon dioxide by the sample, which can be prevented by a closed measurement setup, e.g. a flow cell. The other is the junction potential error resulting from the difference in concentration between the electrolyte and the sample. This is best prevented by using a specialized sensor like the InLab™ Pure Pro-ISM, which uses a bridge electrolyte to reduce this error.

6. **I heard the Sensor is not always in perfect shape, is the Sensor ageing and does that introduce an error?**

   Urs H.: The glass membrane of a pH sensor ages with time (depending on the conditions it is used in). Generally, aging results in lower calibration slopes, which in turn reduces measurement accuracy.

7. **Is there a mathematical way to compensate for the alkaline error?**

   Urs H.: Not reliably, as it strongly depends on the concentration of sodium and lithium ions in the sample. It is better to reduce the error experimentally, e.g. by using a sensor with HA glass.

8. **Regular calibration with fresh buffers is recommended. For how long can one use a buffer after opening the bottle?**

   Urs H.: That depends on storage and conditions. Avoid contamination of the buffer at all cost, store it closed at room temperature, and never calibrate directly in the buffer bottle.

9. **What is the error introduced if one forgets to open the electrolyte-refilling hole during a measurement?**

   Urs H.: If the refilling hole is closed, electrolyte cannot flow out freely and a good contact with the solution is not guaranteed. The resulting error is unpredictable.

10. **You mentioned regular calibration, how often should we calibrate our Sensors?**

    Urs H.: A general rule is that the more frequently you perform a calibration the higher the accuracy of your results, so the frequency should be adjusted to match the requirements of your application. Some applications might require a calibration before every measurement, but in general it is enough to calibrate every 24 to 48 hours.

If you have additional questions for Mettler Toledo regarding content from their webinar or wish to receive additional information about their products and services, please contact them by phone or email:

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