

## When is calibration required?

This process will give information on how frequently calibration/maintenance/replacement of the sensor needs to be done in regard to the frequency of use and the sample matrix.

### Accuracy

The frequency that you should calibrate your pH electrode depends on many factors such as the type of your test samples, performance of electrodes, and the requirement of the accuracy. For High-Accuracy measurements ( $\leq \pm 0.02\text{pH}$ ), the electrode should be calibrated before test every time; For general-accuracy Measurements ( $\geq \pm 0.1\text{pH}$ ), once calibrated, the electrode can be used for about a week or longer.

In the following cases, the electrode must be re-calibrated before use:

- The electrode hasn't been used for a long time or the electrode is brand new.
- After measuring strong acid ( $\text{pH} < 2$ ) or strong base ( $\text{pH} > 12$ ) solutions.
- After measuring fluoride-containing solution and strong organic solution
- There is a big difference between the temperature of the test sample and the temperature of the buffer solution that is used in the last calibration.

### Frequency

Typically, pH probes and many conductivity probes are calibrated at the start of each 8 hour shift, but this can vary depending on application.

Calibration frequency depends on:

- The environment factors and measuring conditions.
- The likelihood the sensor will change with time.
- The likelihood the sensor will be contaminated by the sample
- How the sensor is maintained by the operator between each measurement.
- The customer experience in regard to samples and application.

### Simple check

There is a simple way to quickly check if your pH meter needs a calibration at the moment. All you need to do is dip the pH probe into the calibration standard solutions such as pH 4.00 or pH 7.00, and see if the measurements have a big difference to the standard value. For most applications (if not for scientific research), if the difference is within 0.05 pH, for example the meter reads 6.97 in 7.00 solution or 4.03 in 4.00 solution, then it means the meter is in good condition and a calibration is not a must at the point. If the difference is over 0.05 pH, for example the meter reads 6.92 in 7.00 or 4.08 in 4.00, then a calibration is necessary and highly recommended before testing.

## General advice

In all cases the calibration frequency is a customer experience based decision linked to the sample type measured and the measurement frequency. Some generic advice and recommendations for use would be:

- Prior to using the sensor, use a check standard.
- If the reading of the check standard is outside of the accuracy acceptance limits, then re-calibrate the sensor.
- If the calibration is outside of the acceptance limits, then clean/maintain the sensor according to manufacturer recommendations. If maintenance doesn't help, then replace the sensor.

From:

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