

pH Electrode Maintenance and Cleaning

Quality pH electrodes, like our cars, require some routine care such as flushing, refilling and topping-off of the fluids. The sensing bulb and reference junction should be immersed in a solution at all times. The pH electrode should never be stored dry and the pH-sensing bulb and reference junction must not dry out. When it comes to storing pH electrodes long term (>1-week), the pH electrode should be placed into a storage bottle or protective cap with the specified manufacturer's storage solution. If it is refillable, the pH electrode should have also been topped off with fill solution and the fill hole closed. If you have carefully taken these steps, your pH electrode should be primed to go through the same preparation steps, outlined below, as if it were a new electrode. If your pH electrode has not been stored properly, there is a chance the pH glass bulb has dried out and may require reconditioning steps to bring back the functionality.

Electrode preparation

1. Unscrew the cap on the storage bottle and remove the storage bottle from the electrode. Save the bottle for storage.
2. Rinse the electrode with distilled water to remove any salt precipitate.
3. If the electrode is refillable, open the fill hole, drain the chamber, and refill with the appropriate fill solution.
4. The electrode should be ready for calibration; typically you should calibrate with fresh pH 4.01 and pH 7.00 buffers traceable to NIST standards.
5. The ideal slope from calibration is 92–102%.
6. An ideal offset (E0) from calibration is +/- 59 mV. Note: offset is the mV value reading of pH 7 buffer.
7. If your calibration results are outside these ranges, follow the electrode maintenance steps to help clean and recondition your electrode. If recalibration is not successful, try using fresh unopened pH buffers. If using fresh buffers does not result in a successful calibration, please consider replacing your pH electrode.
8. If the electrode will not be used immediately, soak it in pH electrode storage solution.

Electrode cleaning tips

Soak the electrode in solvent that will remove deposits. Thermo Scientific™ Orion™ 900020 pH Electrode Cleaning Solutions are designed to simplify pH electrode maintenance. Bottles of the ready-to-use cleaning solutions are provided along with a small beaker to hold the cleaning solution and a plastic pipette for removing the electrode internal filling solutions. Kit contains the following cleaning solutions:

- 0.1 M HCl for general cleaning
- 1% pepsin in HCl for proteins
- bleach for disinfecting
- detergent for grease and oil

Role of solution quality in pH measurement

Using high-quality solutions to calibrate and maintain your sensors is the best way to ensure your data is both accurate and reproducible. Avoid using low-quality, home-made, or expired buffers. These can lead to measurement errors, which require lengthy troubleshooting, or may go unnoticed.

Recommended shelf life for buffers and solutions

Unopened Thermo Scientific™ pH Buffers and Electrode Filling Solutions are traceable to NIST Standards. All buffers, except for pH 10.01, have an expiration date of 2 years from the date of manufacturing. pH 10.01 buffer has an expiration date of 18 months from date of manufacture. Once a pH buffer or electrode filling solution is opened, discard the unused portion after 2 to 3 months. Once pH 10.01 buffer is opened, discard the unused portion after 1 month, since pH 10.01 buffer is vulnerable to carbon dioxide contamination. Never pour used pH buffers or electrode filling solutions back into the bottle.

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