

Calibration, storage and maintenance are important when it comes to keeping your water quality meters accurate and in working condition. You should always follow the manufacturer's instruction manual when it comes to maintaining your meter, but many have the same general rules to follow which are listed below.

pH Meters

Calibration - A pH meter will typically have 1, 2, and/or 3 calibration points and the most common calibration buffers are 4, 7 and 10.

- If the meter has a 1 point calibration, the pH 7 buffer should be used.
- If the meter has a 2 point calibration, the pH 7 buffer and either the pH 4 or pH 10 buffer will be used. In most cases, the user will have the choice. The pH 4 buffer should be used if measuring acidic solutions and the pH 10 buffer should be used if measuring basic solutions.
- If the meter has a 3 point calibration, then all three (pH 4, 7 and 10) buffers will be used.

Sometimes the meter will allow the user to choose how many points to calibrate to. The more calibration points you calibrate to which are within the range of the measurements you are taking, the more accurate your measurements will be.

Storage - A pH meter with a glass probe (which does not include ISFET/silicon chip probes) needs to be stored wet. It is best to use an "electrode storage solution" or a pH 4 or 7 buffer, but tap water will sometimes work for short storage periods. Never use distilled or deionized water for storage, this will ruin the probe. During storage, the probe can either be immersed in the storage solution or in contact with a soaked sponge or paper towel (the cap for the probe will typically have a sponge or a reservoir to fill with

solution). If a probe dries out, it can usually be reconditioned by soaking for a few hours in a storage or buffer solution.

Meters with an ISFET or silicon chip electrode can be stored dry.

Maintenance - Electrodes with glass membranes can get dirty after heavy use which affects the sensitivity of the electrode. Soaking the electrode in an "electrode cleaner solution" will help with this. The typical lifetime of a glass pH probe is about 6 months to 2 years, dependent upon if pH probe is used correctly and is properly maintained. Most meters will allow you to change out the electrode when it is time for replacement.

ISFET or silicon chip probes require no maintenance except for scrubbing material off of the sensor. A toothbrush works well for this.

ORP Meters

Calibration - Most ORP meters are pre-calibrated in the factory and do not need to be calibrated throughout use. If verification of accuracy is needed so there are "validation solutions" which show if a meter is reading correctly.

Storage and Maintenance - ORP meters require the same storage and maintenance as most pH meters. They should be stored wet, in a storage or buffer solution (not in deionized/distilled water). If left dry, the probe can be reconditioned by soaking in a storage solution for about an hour. Electrode cleaning solution should be used every once and a while to keep the probe clean and working correctly.

Conductivity, TDS and Salinity Meters

Calibration - These types of meters also usually have 1 to 3 point calibration points. If you have a combination conductivity/TDS/salinity meter, it should only need to be calibrated for conductivity and the meter will convert the calibration according to the ratio for TDS and salinity. If using a single parameter meter (TDS or salinity), the calibration solution will usually

show the ppm value for KCl, NaCl, or 442 (442 is a formulation that represents an average μS to ppm relationship for natural fresh water). When calibrating for TDS or salinity, you should choose the value of the formulation/compound you are measuring for (KCl, NaCl, or 442). For conductivity calibration, you can just use the μS value.

Calibration solutions typically come in:

10 μS (4.7 ppm KCl; 4.8 ppm NaCl; 7.0 ppm 442)
84 μS (40.38 ppm KCl; 38.04 ppm NaCl; 50.50 ppm 442)
447 μS (225.6 ppm KCl; 215.5 ppm NaCl; 300.0 ppm 442)
1413 μS (744.7 ppm KCl; 702.1 ppm NaCl; 1000 ppm 442)
2764 μS (1382 ppm KCl; 1414.8 ppm NaCl; 7608 ppm 442)
12,880 μS (7447 ppm KCl; 7230 ppm NaCl; 11,367 ppm 442)
15,000 μS (8759 ppm KCl; 8532 ppm NaCl; 13,455 ppm 442)

Conversions:

1000 μS = 1 mS
1000 ppm = 1 ppt
1 mg/L = 1 ppm
1 g/L = 1000 mg/L

Storage - These probes can usually be stored dry.

Maintenance - Conductivity probes can get dirty over time which interferes with the flow of electricity and

can skew your measurements. Soaking/rinsing them in an alcohol solution will help clean any oils and organics off of the electrodes.

Dissolved Oxygen Meters

Calibration - The only solution typically used for calibrating a dissolved oxygen (DO) meter is a "zero-oxygen" solution. This is usually used only if the samples being measured have very low oxygen concentrations. Most meters will allow you to calibrate the meter in air or against a wet sponge, which gives a "saturated air" calibration. If looking for very accurate results or if working in a small range of levels, certain meters will allow you to calibrate to known DO values, which are acquired through the "Winkler Method", a manual titration test for dissolved oxygen.

Storage - Dissolved oxygen meters that use membranes should be stored wet to prevent the electrolyte solution and membrane from drying out. This can be done by submerging the probe in tap water or placing it against a moistened sponge (which many meters include for storage). If the probe dries out, the electrolyte solution and membrane may have to be changed.

Optical DO meters do not contain electrolyte solution or membranes, so they can be stored dry.

Maintenance - Dissolved oxygen probes with membranes should have their membrane and electrolyte solution changed about every 2 months with normal use. After a while, deposits will also start to build up on the metal cathode. This can be removed by using very fine sandpaper (400 grit) or by soaking in ammonia overnight (ammonium hydroxide or household cleaning strength ammonia). DO meters will typically come with a maintenance kit that includes membranes, electrolyte solution, and a sanding disk (or ammonia).

Optical DO meters do not need any maintenance

except for changing the sensing element (typically once a year with normal use).

Turbidity Meters

Calibration - Turbidity meters have calibration standards that are usually between 0 and 1000 NTU (nephelometric units) or FNU (formazin nephelometric units). Most turbidity meter kits will already come with a set of these standards. When choosing which calibration standards to use, you should choose one close the measurements of your samples and the more calibration points that are used, the better the accuracy.

Storage - There are no storage requirements.

Maintenance - The only maintenance involves the glass cuvettes. Light must be able to pass through the cuvettes, so if there are scratches, dirt, or even oils from fingers on the sides of the cuvettes, it could skew your measurements. Make sure the cuvettes are clean, dry and free of scratches before they are placed in the turbidity meter.

Colorimeters

Calibration - Calibration of colorimeters will typically involve taking a known solution and adding reagents to create known standards for the parameter you are testing for.

Storage - There are no storage requirements.

Maintenance - Maintenance of colorimeters usually only involves the glass cuvettes. This is very similar to turbidity meters. Light needs to pass through the cuvettes in order to measure the absorbance of particular light wavelengths, so the cuvettes need to be kept clean, dry and free of scratches before they are placed in the colorimeter.

Remember that these are just general guidelines to

follow for water quality meters. These guidelines do not replace the information found in the manufacturer's instruction manual. If you need any questions on how to maintain, store or calibrate your water quality meter feel free to contact our Product Pros at 1-800-241-6401.

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