



## Dissolved Oxygen Measurement Frequently Asked Questions (FAQs)

### Q - How often should I calibrate my dissolved oxygen meter?

A – As a rule, YSI recommends that a calibration be performed or verified daily, before sampling starts. But in general, calibration frequency is determined by the user and the importance of the data. The more critical the data, i.e. when used for compliance purposes, the more attention that should be paid to timely calibrations.

The calibration of newer optical based dissolved oxygen meters is very stable but YSI still recommends that it be verified on a regular basis to ensure accurate data.

Your data is as good as your calibration.

### Q - How do I verify my calibration?

A - Place the sensor in its calibration environment and check to see that the instrument is reading the calibration value for the current barometric pressure. For example, if your 'true' barometric pressure is 750, divide this number by 760 and then multiple by 100% to calculate what your instrument should be reading in water-saturated air or air-saturated water.

$$750/760 \times 100 = 98\%$$

A post-check can also be performed with this value in mind. If, for instance, you calibrate your instrument to 98% and then conduct your DO testing, you can place the sensor back into the same calibration environment and it should read +/- 2% (+/- 1% on optical) of 98% once stable.

### Q – What is 'true' barometric pressure?

A – DO instruments need to be calibrated to "True" barometric pressure, i.e. a barometric pressure value that has not been corrected to sea level. Laboratory barometer readings are usually "true" (uncorrected) values of air pressure and can be used "as is" for DO calibration. Weather service readings are usually not "true", i.e., they are corrected to sea level, and therefore cannot be used until they are "uncorrected". An approximate formula for this "uncorrection" is:

$$\text{True BP} = [\text{Corrected BP}] - [2.5 * (\text{Local Altitude in ft. above sea level}/100)]$$

Q - If a calibrated instrument is turned off, then back on, does it need to be recalibrated?

A – There is no need to recalibrate new digital or older analog models when the instrument is turned back on. Instruments are designed to record and save the calibration values so no recalibration is required at power-up unless it requires normal calibration as mentioned in #1.

You can also “verify” that the instrument is holding its calibration by knowing the original calibration value (98% as an example) and the instrument should read within +/-2% (+/- 1% on optical) of 98% upon power on once it's stable.

Q - After turning the instrument on, how long should I wait before calibrating or taking a measurement?

A - There really is no set time period. Regardless of the sensor type that is used, wait for the temperature and dissolved oxygen values to become stable. For dissolved oxygen systems that use a polarographic sensor, achieving stability takes about 5-15 minutes. For galvanic and optical sensors, the readings will reach stability almost immediately after turning on unless the ambient temperature has changed. For each sensor type, it is recommended to make sure there are no water droplets on the sensing element (membrane) to help ensure quicker stability and ensure calibration accuracy.

For the best calibration results, it is very important to have the DO system in an environment where the temperature is stable and does not change prior to, or during the calibration procedure.

Q - Is it necessary to recalibrate if there is a change in altitude or barometric pressure after the initial calibration?

A – No. Dissolved oxygen sensors are calibrated to and measure the partial pressure of oxygen. Therefore, after performing an accurate calibration, the sensor will automatically compensate for changes in pressure. For systems that are using the DO% Local function, the calibration value will be 100% regardless of the altitude or barometric pressure and the internal barometer will be used to keep the saturated value at 100%.

Q – For consumptive electrochemical sensors, how do I know when I have enough stirring?

A - When increasing the amount of stirring does not result in an increase in the dissolved oxygen readings, enough stirring is being supplied.

Q – How often should the membrane be changed on an electrochemical sensor?

A - As a general rule, YSI recommends that the membrane be changed every 2-8 weeks. This is dependent on the sampling application. Additionally, keeping the membrane clean and in a moist environment between uses will lengthen the membrane life.

When measuring samples with high levels of hydrogen sulfide, a weekly membrane change will reduce sensor cleaning and maintenance and thus provide better performance. When measuring in clean water, membrane changes can easily go beyond 4 weeks without negative effects.

Q – How often do electrochemical sensor electrodes need to be cleaned or serviced?

A –Maintaining electrochemical sensors is relatively easy but is only necessary when the sensor no longer performs to factory established specifications.

When calibrating, YSI instruments perform a sensor performance check. If the sensor is outside of its normal working parameters, the instrument will give an out of range indication. Before cleaning electrodes, always try fresh probe electrolyte solution and a new membrane.

It is normal for a polarographic sensor's silver anode to darken over time due to the build up of silver chloride. This typical darkening will not affect the sensors performance so do not clean the electrodes just because they 'look dirty'. Long term exposure to hydrogen sulfide can cause darkening of the anode that will influence a sensors performance. Typical symptoms will be jumpy readings, inability to calibrate and/or low probe current, both of which may respond well to cleaning. Typically, the electrodes will require cleaning or servicing about once per year.

Go to the troubleshooting and maintenance section of the instruments instruction manual (Professional Plus or ProODO<sup>®</sup> onboard "Help") for the best advice regarding resolving these issues.

Q - How often should I replace an Optical sensing element?

A - The optical sensing elements are warranted for 1 year but may last longer. Be sure to keep the sensing element clean and stored in a moist environment between uses to obtain the longest usable life possible.