

Frequently Asked Questions on Dissolved Oxygen

How should I store my DO probes?

Store a DO probe with the membrane covered by distilled water. Covering the membrane with distilled water prevents the KCl fill solution from evaporating through the membrane.

What is the difference between a galvanic and polarographic electrode?

A galvanic electrode produces its own current. The electrode is usually silver and lead with a potassium hydroxide electrolyte.

Polarographic electrodes have a silver anode surrounded by a gold cathode. Power is supplied by the DO meter.

How does temperature affect my DO readings?

Temperature affects DO readings in two ways. First, it changes the permeability of the membrane. As the temperature increases so does the permeability of the membrane. As the temperature decreases the oxygen permeability through the membrane decreases. Secondly, temperature affects the amount of oxygen that can be dissolved in water. As temperature increases the oxygen saturation point of water decreases. Most meters have automatic temperature compensation (ATC) to compensate for the temperature error due to changes in the permeability of the membrane only. To compensate for saturation changes use a correction chart. There is a correction chart for fresh water and another for sea water.

How does atmospheric pressure affect my DO readings?

Oxygen saturation of water is different at different pressures. Correction charts are provided in most instruction manuals. Many instruments automatically compensate for barometric pressure. The barometric pressure is either measured by the instrument or entered by the user.

How do I calibrate my DO probe?

Zero calibrate the probe by submersing it in a saturated solution of sodium sulfite. For full-scale calibration we recommend the forced air method. Place the probe in the middle of a vortex so that the air can be forced through the membrane quickly. Air can be forced through the membrane faster in a vortex than if the probe were simply sitting out in the air. A vortex can be created using a stirrer, stir bar, beaker of distilled water, and a probe holder to keep the probe above the water.

I just received my DO meter and it does not work, is there a serious problem?

No. This is common. The electrode must be allowed to polarize before any readings can be taken. In order to polarize the electrode must be connected to a meter. Polarization time varies from meter to meter so polarization could be from 10 minutes to 6 hours. Check your instruction manual for the recommended time.

Also check the membrane. If air is trapped under the membrane you could get erroneous readings.

What is BOD?

BOD (Biochemical Oxygen Dissolved) is a measure of the amount of oxygen that is consumed by bacteria as they decompose the organic components of waste. DO measurements are usually made at the beginning and end of a five-day incubation period for a standard test.

What is SOUR/DOUR?

SOUR = Specific Oxygen Uptake Rate indicates biological activity of microbes in the wastewater treatment process and the load placed on them. SOUR is the relationship between oxygen uptake and the amount of solids. This calculation is required to comply with US 503.

$$\text{SOUR} = \text{DOUR}/\text{solids wt} = \text{mg/hr/g}$$

DOUR = Dissolved Oxygen Uptake Rate indicates biological activity of microbes in the wastewater treatment process. It is the calculation of oxygen uptake (how quickly the microbes are using the oxygen). This calculation is required to comply with US 503.

$$\text{DOUR} = \text{DO}_1 - \text{DO}_2/\text{time} = \text{mg/L/hr}$$

How often should I replace my membranes?

Recommended service time is 2-4 weeks depending on the application.

My probe is not reading correctly, what could be the reasons and what can be done?

Try the following:

1. Replace the membrane. It may be clogged by something in your test water.
2. Clean the anode and cathode especially if they look tarnished.
 - o To clean the anode, first remove the membrane, then soak in a 3% solution of ammonium hydroxide overnight. For quicker cleaning, remove the membrane and soak in a 14% solution of ammonium hydroxide for no more than 2 to 3 minutes. Longer soaking time in 14% ammonium hydroxide will damage the electrode. After either treatment the probe should be flushed thoroughly with distilled water, and then made ready for service.
 - o To clean the cathode (gold) use a very fine abrasive and gently polish the surface using a circular pattern.
3. Some gases are known to interfere with DO readings. Check for significant concentrations of hydrogen sulfide, sulfur dioxide, halogens, neon, and nitrous and nitrite oxide.
4. Check the chemical compatibility's between your electrode's wetted materials and the test water. Strong acids, caustics, or solvents may attack the probe