

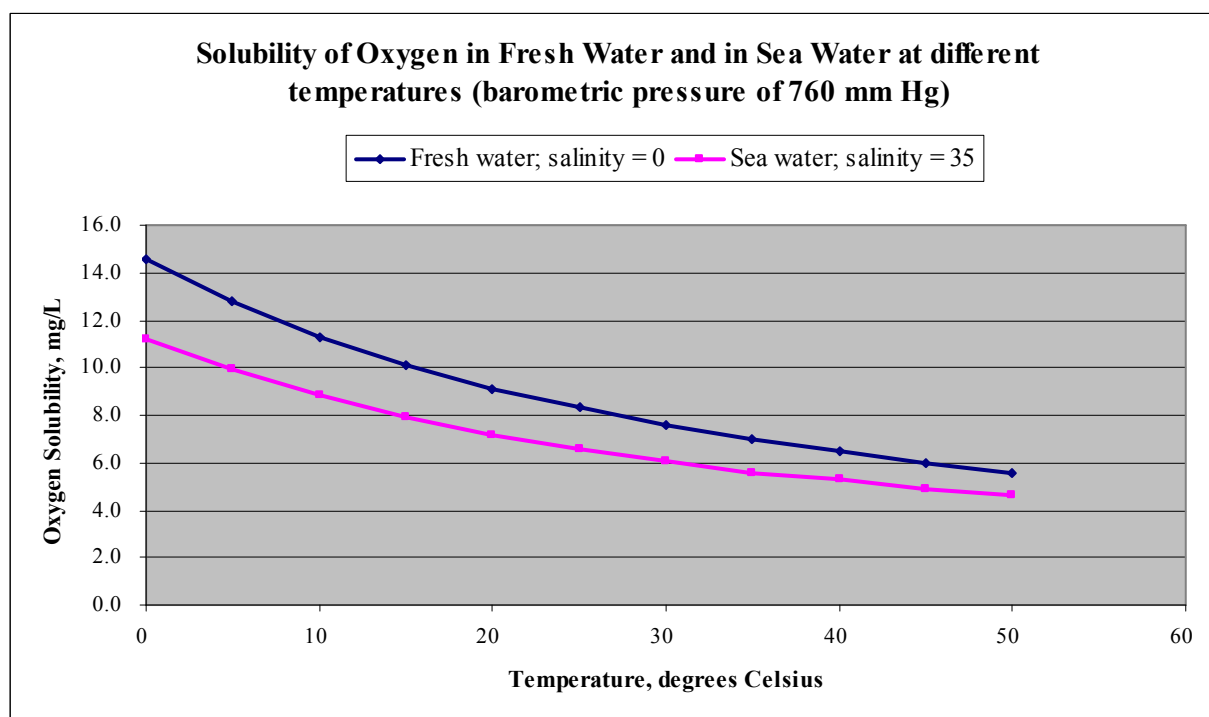


Applications Tip of the Week

Dissolved Oxygen and Salinity

The saturated dissolved oxygen (DO) concentration in water is dependent on a number of factors. Salinity is one of the factors that affects oxygen solubility in water. The solubility of oxygen in water is reduced when salinity increases. This means that in absolute concentration, an oxygen saturated seawater sample will contain less oxygen than a saturated freshwater sample at the same temperature and barometric pressure.

The chart below is an example to demonstrate the oxygen solubility of fresh and sea water at a temperature of 25 degrees Celsius and barometric pressure of 760 mm Hg. For example, at 25°C, fresh water dissolves up to 8.3 mg/L of oxygen, while seawater dissolves only 6.6 mg/L of oxygen.



In order to obtain an accurate DO measurement, the salinity value of the sample should be used to correct for the change in oxygen solubility due to salt content. The solubility of oxygen in water as a function of salinity, water temperature, and barometric pressure are documented by many scientists over the years and presented in tables. These tables are built in modern instruments such as the Thermo Scientific Orion Star Plus DO and RDO Meters.

The Orion DO Meters have the two following options to apply the appropriate salinity correction factor:

1. Automatic salinity correction, when the DO Meter has conductivity and salinity modes and can be connected simultaneously to DO and conductivity probes. Below is a brief summary of the steps for

automatic salinity correction; the detailed procedure can be found in Log # 54 "Correcting DO measurements for salinity"

- Connect the DO and conductivity probes to the meter.
- In DO setup mode, set the salinity correction type to automatic.
- In conductivity setup mode, set temperature compensation to linear, temperature coefficient to 2.0, cell constant to nominal value, and temperature reference to 25.
- Calibrate the conductivity probe (see the Calibration section of the Log # 54).
- Calibrate the dissolved oxygen probe as described in the specific application note for your sample DO measurement application.
- Place both probes in the sample and perform DO measurement as it is described in the DO measurement application specific for your sample. The conductivity probe will measure salinity of the sample and the DO reading will automatically be corrected for the salinity effect.

2. Manual salinity correction, when the DO meter is used without a conductivity probe.

- Connect the DO probe to the meter.
- In DO setup mode, set the salinity correction type to manual.
- Enter the salinity value of the specific sample that was obtained from another source into the DO meter.
- The DO meter will use the entered salinity value to compensate the DO readings.