

Electrical Conductivity Information Sheet

Background

Conductivity is one way to measure of the inorganic materials including calcium, bicarbonate, nitrogen, phosphorus, iron, sulphur and other ions dissolved in a water body. It is measured by placing a conductivity probe in the sample and measuring the flow of electricity between the electrodes.

Salinity is the component of conductivity that is critical to the survival of some aquatic plants and animals. Many species can survive only within certain salinity ranges so changes in salinity levels result in changes to the variety and types of species found.

Salinity problems occur where deep rooted vegetation is removed from the surface and through irrigation practices. This means that much more water can infiltrate the soil and causes the water table to rise. This water can move towards the surface, bringing with it large amounts of salt from underground storage. After the water evaporates, high concentrations of salt remain which can eventually find its way into water courses.

Variation in conductivity can result through changes in geology of an area. It can also be due to seepage of groundwater, Industrial and agricultural effluent, stormwater runoff and sewage effluent flowing into the stream.

Measuring Conductivity

Conductivity is measured with a meter in micro siemens per centimeter units ($\mu\text{S}/\text{cm}$). The natural conductivity of fresh water varies from very low values ($30\mu\text{S}/\text{cm}$) to very high values ($2000\mu\text{S}/\text{cm}$) which is unsuitable for irrigation.

Conductivity measurements are affected by temperature so the water temperature needs to be measured at the same time as conductivity.

HINTS

Sea water is approximately 50,000 Electrical conductivity units (ECs). Many people can taste salt in water at 1,500 to 2,000 ECs.

One millisiemen/cm = 1,000 micro siemens/cm or ECs.

To convert mS/cm to μ S/cm, multiply the reading on the instrument by 1000.

- Be very attentive to the units that your meter reads. As the conductivity of the solution rises past 2,000 ECs, the meter automatically changes to read millisiemens/cm rather than microsiemens/cm.
- Normal reporting of electrical conductivity is in ECs. To be consistent, you should always encourage reporting by monitors in microsiemens/cm or ECs.
- Normally, conductivity meters stay calibrated for some time. If you do not recalibrate every time you use your meter, the meter should be calibrated weekly. Recalibrate more often if you meter is used heavily.
- Rinse the electrode well with clean water after each test.
- If possible, use a standard solution that is close to the level of conductivity in the sample solution being tested.
- Do not place the electrode directly into the standard bottle when calibrating.