



Newsletter Volume 15  
December 7, 2004

## ORP: Frequently Asked Questions

Q: What is **ORP**?

A: **Oxidation Reduction Potential**

**Oxidation** – A chemical reaction where one or more elements loses electrons.

**Reduction** – A chemical reaction where one or more elements gains electrons.

**Potential** – Electrical reaction capability at a given moment.

Q: What does ORP measure?

A: The instantaneous reactivity of a solution, expressed in millivolts (negative mV for a reducing climate, positive mV for an oxidizing climate).

Q: When does ORP have meaning?

A: A reducing chemical gives up electrons, and an oxidizing chemical takes them. A chemical process that involves one must include its other half, making what is known as a redox reaction (A reducing agent gets oxidized in a reaction, and an oxidizing agent gets reduced). The ORP voltage of a solution is the sum of its collective charged particles, which tells you how strongly a solution could react at that instant.

Q: What is a practical application of ORP?

A: A great majority of redox reactions involve only one oxidizing agent and one reducing agent. So even though ORP is generic and not ion-specific, much like TDS (Total Dissolved Solids) for conductivity, it does have value for a given fluid process. A common application involves disinfection, typically with sodium hypochlorite producing the highly reactive oxidizing agent, free chlorine. Some other oxidizing agents monitored by ORP include chlorine dioxide and ozone. An example of a reducing agent that can be measured by ORP would be a dechlorination chemical like sodium metabisulfite.

Q: How sensitive is an ORP measurement?

A: It's not brain surgery, and at low levels ORP can be a difficult horse to ride. An accurate electrode calibration encompasses a range of  $\pm 40$  millivolts, and the pH level of the system being measured is crucial. Trying to hold a free chlorine level under half a part per million in a cooling tower can be challenging. Keeping 3-5 ppm in a swimming pool is achievable. Working in conjunction with pH control, disinfection levels greater than 5 ppm are manageable.