

# THE LEARNING CENTER

## ORP

This stands for Oxidation Reduction Potential (also known as "Redox")

In practical terms, it is a measurement to oxidize contaminants where two atoms exchange electrons. The atom that loses an electron in the process is said to be oxidized. The one that gains an electron is said to be reduced. In picking up that extra electron, it loses the electrical energy that makes it "hungry" for more electrons.

ORP is a "potential" energy that is stored and ready to be put to work. It's not necessarily working, but we know that the energy is there and we can measure it. Another way to look at this potential might be to look at pressure. If you blow up a balloon, there is air pressure inside. As long as the balloon is closed, the pressure remains and can be measured. When released, this Potential energy becomes kinetic energy.

In electrical terms, potential energy can be measured. When we use the term "potential" in describing ORP, we are actually talking about electrical potential as expressed in millivolts. This potential is measured in water with an ORP meter. What you measure is the very slight voltage in water. We are actually measuring the presence of oxidizing or reducing agents by their specific electrical charge, thus Oxidation Reduction "Potential". High pH water has More "reducing" agents (-ORP) and low pH water has more oxidizing agents (+ORP).

Oxidation is what turns an apple brown after it is cut or causes metal to rust. Rust weakens metal and signifies the deterioration of the apple. The process of oxidation "steals" electrons from the surface being oxidized. When we measure a something's oxidizing potential, it is expressed in +ORP and measures the concentration of ions or oxidizing agents.

*In simple terms, from a microbial perspective, an oxidizing chemical pulls electrons away from a cell membrane, causing it to become destabilized or "leaky" and thus destroying its integrity. Water that has a negative ORP acts as an antioxidant.*

A "reducing" agent is simply something that inhibits or slows the process of oxidation. The reducing agent does this by "donating" an electron. When we measure a solution's oxidation reduction potential, it is expressed in terms of ORP and measures the concentration of ions or reducing agents. In its most basic form a reducing agent is an "antioxidant" ~ reducing oxidation.

The ORP of most tap water in North America is between +200 to +600mv, i.e. these waters are oxidizing agents. High pH ionized water demonstrates a -ORP and so is a reducing agent or "antioxidant". Most bottled waters are acidic (low pH) -- many are quite acidic -- and also have higher ORPs (over +400mv). The ION™ CARAFE delivers negative ORP at between -400 to -500mv.