Spotlight on ORP

Oxidation-Reduction Potential (ORP) is a measure used to routinely monitor a water system's disinfecting power. ORP represents the water's ability to oxidize (break down) contaminants and kill or inactivate microbes like bacteria and viruses. ORP can be used as a warning signal that a treatment system is low in disinfectant, biofilm is present, or that corrosion is occurring.

Interpreting ORP Measurements

ORP is influenced by pH, temperature, and conductivity. Appropriate ORP ranges are specific to each system and should be interpreted alongside other water quality measurements to determine if correction is needed.

Using ORP as a Tool to Support Water Treatment Systems

1. Understand how ORP changes under different conditions for your system.
2. Interpret ORP readings alongside other water measurements.
3. Define a target ORP range and use out-of-range measurements as a warning signal:
   - Too low ORP values can signal insufficient disinfectant concentration (contaminants are not broken down).
   - Too high ORP values can signal too much disinfectant (may cause corrosion).
4. Regularly clean, calibrate and service ORP probes.
5. Compare and verify ORP readings with biocide residual readings (see below).

Cooling Towers, Nonpotable Water Systems, and Swimming Pools

In these systems, ORP is often used to check disinfection. For example, a quick increase in ORP can confirm that a biocide dose was added as expected. However, ORP is not a *direct* measure of how much disinfectant is in the water. It is important to measure actual disinfectant residuals, such as chlorine and bromine concentrations, to check that targets are achieved.

ORP is measured in millivolts (mV)

Higher values → more oxidizer present such as chlorine, bromine

Lower values → less oxidizer present and potential for more contaminants

Know the rules! Direct measurement of disinfectant residuals from water test kits are required even if automated ORP systems are in place for certain systems, such as swimming and spa pools. For more information, see NYC Health Code Section 165.23(c).