

**Keep Your Process Water
Free of Fruit & Human Pathogens**



**Advanced Water Sanitation Technology
Outstanding Full-Service Program**

pH/ORP
Automated Water Sanitation System





pH/ORP

Automated Water Sanitation System

Complete Automation of Water Sanitation

Accurate monitoring and recording of disinfection procedures is a key component of sound postharvest quality and food safety programs.



Oxidation-Reduction Potential (ORP), measured in millivolts (mV), is an innovative approach for fruit packers and shippers to disinfect process water used for harvest and postharvest handling of fresh fruits and vegetables.

The pH/ORP Automated Water Disinfection System decreases contamination of plant and fruit pathogens that cause postharvest losses and of microbes that can cause food-borne illness during harvest and postharvest handling, cooling, packing and processing activities that involve the use of water.

ORP, pH, and temperature sensors allow for easy monitoring, tracking, and automated maintenance of critical disinfectant levels in water systems.

The system provides complete automation of the water disinfection and chemical treatment process that allows for "Hands-Free" operation of water treatment.

Features

- Sensors monitor pH and ORP levels
- Automatically injects chemical only as needed
- Maintains a close chemical concentration range
- Self maintains and adjusts to organic load



- Data logger maintains a continuous record of concentrations
- Chemical injection occurs only when the process is operating
- Smart Logic allows "Hands Free" operation
- Special sensors have low maintenance requirements

Benefits

- Provides a continuous digital readout
- Maintains continuous chemical control
- Insures continuous recording of data
- Increases efficiency of chemical use and minimizes waste
- Increases product shelf life and safety
- Built-in safety alarms and chemical shut-off
- Saves money, time and labor
- Helps packers and processors meet HACCP requirements
- Satisfies Food Safety Guidelines (WGA, IFPA)



Operator Interface - display panel for quick and easy monitoring.

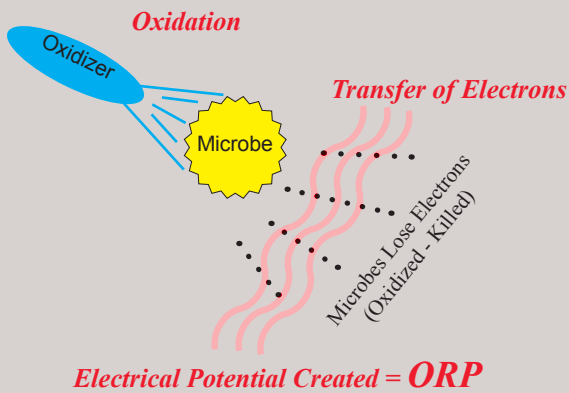


Pace International Quality Service

Pace's pH/ORP system is not only the most advanced water sanitation technology available in the market, but also receives the highest quality service possible by Pace's Technical Services Team.

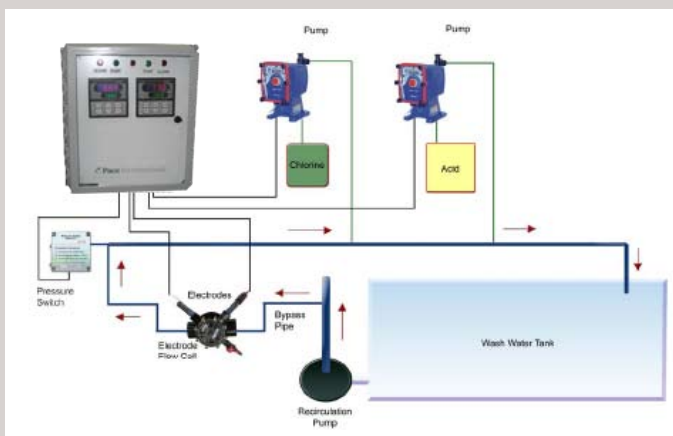
ORP = Oxidation Reduction Potential

The Oxidation Process



- Chlorine, Ozone, Peroxyacetic Acid, etc. are Oxidizers
- Oxidation is the Transfer of Electrons
- Microbes lose electrons and are killed
- The transfer of Electrons creates an Electrical Potential, which is ORP
- ORP is measured in millivolts and the greater the ORP, the faster the microbe is killed
- ORP measures disinfection potential, NOT ppm of chlorine

pH/ORP System Layout



Example of System 3 layout

Chlorine + electrons - KILLS MICROBES

Table 1: E. Coli Kill Time

ORP (mV)	KILL TIME - E. Coli
450	Infinite
500	1 hour
550	100 seconds
600	10 seconds
650	<1 seconds

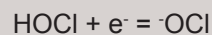
Tougher organisms require higher ORP. Ex. Listeria, Salmonella, Yeasts and Molds require ≥ 750 mV.

Typical ORP targets in apple and pear dump tanks are at 820-850 mV.

Chlorine Chemistry

Table 2: Percentage of Oxidizers

pH	HOCl	OCl ⁻
6.5	95%	5%
7.0	80%	20%
7.5	50%	50%
8.0	20%	80%



HOCl = Hypochlorous acid (strong oxidizer => strong sanitizer)

OCl⁻ = Hypochlorite ion (weak oxidizer => weak sanitizer)

Maximum Efficiency of Chlorine is at pH 6.5.

**Pace International
Brings Innovative Technologies to
Increase Application Process Efficiencies
with Unsurpassed Service Quality**



The Leading Postharvest Specialist

Innovative Technologies
High Quality Products
Efficient Application Systems
Professional Services & Support
Global Experience & Research



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