



# FROM ORDINARY WATER TO EXTRAORDINARY STEAM

Optimizing Water Quality for  
Foodservice Steam Applications



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## THE PROTECTION AND PROFITABILITY OF PURER STEAM

Combi ovens and steamers provide restaurants and other foodservice operations with versatile, efficient, predictable results at the push of a button. But it's impossible for your customers to realize the full benefits of steam cooking without carefully considering the impact of water quality on their steam equipment.

To provide your foodservice customers with the right water treatment system, it's important to understand how steam equipment and water quality relate to each other, and how they impact the success and profitability of your customers' operations.



### Equipment Performance

Scale buildup from unfiltered water can damage steam equipment and can have a significant effect on efficiency: just an eighth of an inch of scale can increase steamer energy usage by 25%.\* Properly treated water reduces scale buildup and helps reduce corrosion. For your customers, that means less time and less money spent on service interruptions, inefficiencies, and repairs.

\*Source: Scale Deposits and Efficiency Loss  
Johnston Boiler, 2020 - <https://johnstonboiler.com/resources/product-knowledge-base/scale-deposits-and-efficiency-loss/>



### Warranty Compliance

Water composition and the physics involved with different methods of generating steam can be complex. So much so that many equipment manufacturers have stringent water quality standards that must be adhered to under their warranty agreements. Water treatment systems protect an operation's bottom line by ensuring warranty compliance for expensive equipment.



# WATER TESTING AND WHAT IT REVEALS

# WATER'S CHARACTERISTICS AND ITS COMMON CONTAMINANTS

Steam is 100% water, but water itself isn't just H<sub>2</sub>O. Water is a natural solvent, carrying away particles of whatever it encounters along its way to the tap. It's these particulates, chemicals and contaminants that can positively or negatively impact food quality and equipment performance.



## Total Dissolved Solids (TDS)

A combined measure of all organic and inorganic substances dissolved in the water, including minerals, salts, metals and other particulates.



## Chlorine

While added chlorine makes water safe to drink, it also contributes to corrosion in steam equipment and can impart an offensive taste and odor which can affect food quality.



## Particulates

Fine sediment, rust and other particles that provide a catalyst for scale buildup and wear on equipment.



## Silica

Even small amounts of silica can form a very hard mineral scale that is difficult to remove. Unlike calcium and magnesium ions, silica cannot be removed through ion exchange.



## Hard Minerals

Evaporation causes dissolved calcium and magnesium ions to build up as limescale in boilers and steam generators. This rock-like scale acts as an insulating layer, preventing the efficient transfer of heat. It increases maintenance frequency and can reduce equipment life by years.



## Iron

In addition to giving water an unpleasant metallic taste, iron in water that's made into steam is a recipe for corrosion.



## Chlorides

Even at low levels, chloride ions can penetrate the passive film on stainless steel and trigger corrosion in steam equipment. In steam equipment, corrosion can be rapid, destructive and expensive, drastically reducing equipment life.



## Alkalinity

Alkalinity is water's capacity to neutralize acid. High alkalinity can indicate an increased potential for hard minerals to form scale; low alkalinity can indicate increased potential for corrosion.



## pH

Water's balance of acid and alkaline substances can be an indication of whether it will be scale-forming or corrosive.

The first step in finding the right water treatment solution for your customers is conducting a comprehensive on-site water analysis to determine the specific level of particulates, chemicals and contaminants in their water.

A water analysis is a "snapshot" of water characteristics at the time and place the sample was drawn. Although municipal water reports have value by measuring general safety and potability, they commonly combine samples from multiple sources and may not take seasonal changes into account. Therefore, municipal water reports alone may not provide an accurate picture of the water at a specific location.

# GIVE YOUR CUSTOMERS THE RIGHT ANSWERS BY ASKING THEM THE RIGHT QUESTIONS

- How frequently does your equipment require service, and at what cost?
- Are water-related problems covered under the equipment warranty?
- Is scale buildup affecting the efficiency of your water-using equipment?
- How will corrosion impact equipment life and what is the replacement cost?
- How will downtime and service interruption affect business?



# RECOMMENDING THE RIGHT SOLUTION



# WATER QUALITY THAT MEETS WARRANTY REQUIREMENTS

Without question, the chemical and physical properties of water have a significant impact on steam equipment performance. As such, it's reasonable for manufacturers to require that water quality standards be met to validate warranties.

Optimized water quality can drastically reduce water-related problems and support years of consistent, trouble-free performance from combi ovens and steamers. Most water in North America cannot meet manufacturer standards without treatment.

Although water quality will vary based on what other contaminants are present, and many variables can influence the overall impact water has on a specific application, warranty requirements from major manufacturers of combi ovens and steamers tend to fall within these parameters:<sup>†</sup>



**TDS**  
70-200 ppm



**Iron**  
<0.25 ppm



**Chlorine**  
<0.05 ppm



**Chlorides**  
< 30 ppm



**Hardness**  
17-85 ppm



**Alkalinity**  
<100 ppm



**Silica**  
<12 ppm



**pH**  
6.80- 7.40

<sup>†</sup>These are only general guidelines. For recommendations and requirements specific to your equipment, reference the equipment manual provided by the manufacturer.

# FINDING THE RIGHT TREATMENT

## Filtration



Recommend filtration technologies to help your customers trap and hold particulates. Different filtration media excel at removing different contaminants, and the finer the filter, the more particulates are removed.

Everpure Kleensteam® and Claris Prime filtration systems designed for steam equipment combine carbon filtration and inhibition technology, with Claris systems featuring additional saltless ion exchange softening.

## Inhibiting Technology



Inhibiting systems suspend dissolved calcium minerals in a solution that inhibits them from forming scale and allows them to be flushed away when the boiler is drained. These systems also provide chlorine reduction and nominal sediment reduction. Inhibiting technology is recommended for boiler steam applications, but not recommended for use with combi ovens.

## Reverse Osmosis



The RO process forces water through a semipermeable membrane, separating pure water from any substances dissolved within it. This makes it ideal for foodservice, but this degree of purity can also promote corrosion and other complications in steam equipment. Blending valves on RO systems let your customers find the right balance to minimize scale and guard against corrosion.

Pentair® Everpure® Conserv® RO systems protect both boiler and flash steam equipment from limescale buildup while giving your customers up to 50% water savings over other conventional RO systems.

## Softening



Customers concerned about limescale buildup on valuable steam equipment like combi ovens can benefit from a softening system to remove the calcium and magnesium ions. Softening does not lower TDS or remove other types of minerals such as chlorides, sulfates or silica, but it is strongly recommended for high-efficiency reverse osmosis (RO) systems in order to keep those systems working better and lasting longer, and as a pre-treatment for filtration and other RO systems.



# SELECTING THE RIGHT SYSTEM

# UNDERSTANDING STEAM APPLICATIONS AND EQUIPMENT

Once a water quality analysis has been done and the right water treatment technology has been determined, the next step is to determine what system will fit an operation's usage requirements. You'll need to consider:

- Type of equipment used
- Size of connection
- Operational capacity/flow rate required

Different methods of making steam can require different types of water treatment, so in order to select the right system, you need to know what steam generation methods your customers are using in their kitchens.



# UNDERSTANDING STEAM APPLICATIONS AND EQUIPMENT



## Boiler Steam Equipment

In boiler steam equipment, a volume of water is contained and heated to generate steam. This includes ovens with boilers, steam generators and ovens with open reservoirs of water inside the oven cabinet.

Boiler Steamers				
	Size	Flow Rate (gallons per minute)	Cartridge Replacement	
			STEAM USAGE 4 HOURS/DAY	STEAM USAGE 8 HOURS/DAY
Small	<125,000 BTU	0.5 to 1.5 gpm	5 months	3 months
Medium	125,000 to 200,000 BTU	0.5 to 1.5 gpm	3 months	2 months
Large	200,000 to 300,000 BTU	0.5 to 1.5 gpm	2 months	2 months

An eighth of an inch of limescale can increase the amount of energy your steamer requires by 25%; a quarter inch increases fuel requirements by almost 40%.\*

\*Source: Scale Deposits and Efficiency Loss - Johnston Boiler, 2020  
<https://johnstonboiler.com/resources/product-knowledge-base/scale-deposits-and-efficiency-loss/>



## Flash Steam Equipment

In flash steam equipment, water is dispensed onto a heated surface and instantly vaporized into steam. Any minerals dissolved in the water are then deposited in the oven. If your customers are using flash steam equipment, recommend RO filtration systems for the best performance.

Flash Steamers				
	Size	Flow Rate (gallons per minute)	Cartridge Replacement	
			STEAM USAGE 4 HOURS/DAY	STEAM USAGE 8 HOURS/DAY
Rapid flash steamers	2 to 3 kW	0.5 gpm	4 months	2 months
Proofers & small flash steamers	4 to 10 kW	0.5 gpm	4 months	2 months
Medium flash steamers & combi ovens	11 to 24 kW	0.5 to 1.5 gpm	2 months	2 months
Large flash steamers & combi ovens	25 to 38 kW	0.5 to 1.5 gpm	2 months	2 months

# DON'T FORGET THE FILTER

Perhaps the most important and most overlooked component when considering a water treatment system is replacing filter cartridges on a routine basis.

You've helped your customers take their water from ordinary to extraordinary—to help them keep it that way, make sure to stick with Pentair® Everpure® Replacement Filter Cartridges.



# WHY PENTAIR® EVERPURE®?

Pentair has set the standard for foodservice water quality for over 85 years. Today, that standard is the Pentair Everpure line of water filtration and RO systems. Customers across the globe trust Pentair Everpure for:

- Easy, sanitary quick-change filter replacement
- A single-source supplier of foodservice water treatment systems, with the breadth of product to provide right-sized solutions for any size operation
- High-efficiency RO systems that provide significant water savings over conventional RO systems
- Compact, configurable RO systems with capacities from 50 to 880 gallons per day, featuring controlled remineralization or blending valves to achieve the right mineral balance
- Comprehensive water testing services to ensure recommendation of the right system
- Total Water Management to help restaurants and other foodservice operations take their water from ordinary to extraordinary and keep it that way

Visit [foodservice.pentair.com](https://www.foodservice.pentair.com) or call 800.942.1153 for all the support and assistance you need finding the right water treatment system for any restaurant or foodservice operation.