

EVERPURE®

MINIMIZE EQUIPMENT DOWNTIME AND INCREASE PRODUCTIVITY BY IMPROVING THE WATER QUALITY

Scheduled or unexpected equipment downtime results in lost revenue, especially if this occurs during peak hours of operation. A failed solenoid on an ice machine can shut the system down completely. De-liming a steam oven takes time – often 2-3 hours – and can require the use of harsh chemicals. If this job is outsourced, it can cost up to \$75.00 or more per hour per deliming, plus scheduling arrangements and dealing with equipment that is out of commission during the cleaning.

The technical service personnel of equipment manufacturers have found that most equipment problems are caused by poor water. In fact, most warranties either recommend or require some type of water treatment.

Common problems that poor water causes include:

- **Cube Ice Machines:** Commercial cuber-type ice makers require more service to correct scale build-up than any other equipment commonly used in foodservice. Ice machines leave behind a high concentration of minerals as most of the water becomes ice. The resulting residue is a murky mixture full of sediment and scale that restricts tubes, fouls pumps, clogs orifices and scores

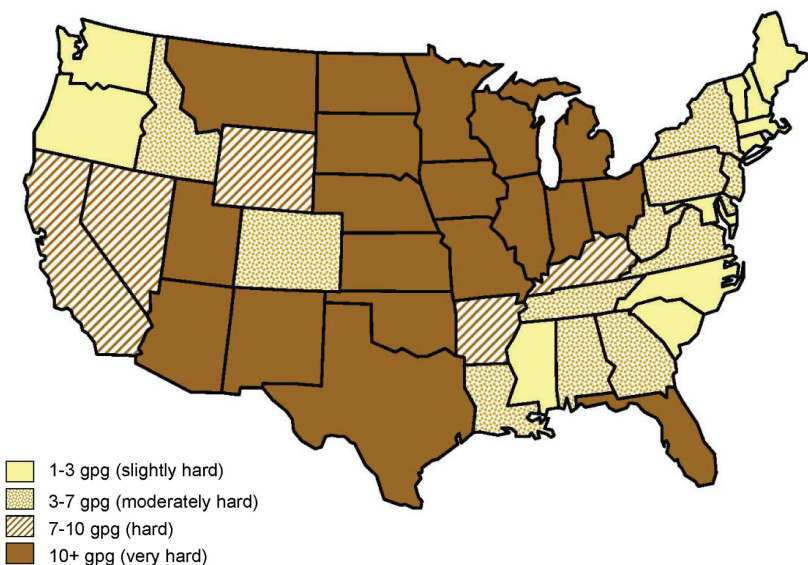


valves. Scale can cause valves and floats to stick, causing low water shutdown or leaks. Scale on the evaporator can cause ice to stick and refreeze with each cycle, causing “freeze up”.

- **Flaker Ice Machines:** Scale can cause valves to stick, causing ice production to stop or overflow. Dirt, sediment and minerals can cause excessive wear on augers and bearings. High TDS can cause soft and mushy ice, putting stress on the gear motor. Scale on the evaporator cylinder impedes heat transfer, causing poor ice quality.
- **Coffee and Tea Brewers:** Scale on the heating elements can cause excessive energy usage, incorrect temperatures and machine breakdown. High TDS can lead to over extraction of the coffee grounds, causing a bitter taste.

- **Espresso Machines:** Scale on the heating elements, inside the boiler chamber and in the group heads cause excessive energy consumption, and impede temperature transfer leading to poor quality espressos.

- **Steam Ovens:** Scale on heating elements can cause excessive energy usage. It can also cause valves to stick, causing poor steam production, and the tank probes to fail, leading to under- or over-filling of the reservoirs. Chlorine can cause corrosion to tubes, and cause gaskets to fail. On combi ovens, scale can build inside the cabinet cavity, and on the fan and heating elements, causing temperature drops and slow steam production.



- **Fountain Beverage Systems:** High TDS and chlorine can cause weak carbonation, and require additional syrup to mask poor taste.
- **Warewashing or Dish Machines, Boilers, Hot Water Boost:** Scale can increase energy consumption and damage heating elements. Scale can also clog orifices. Minerals cause spotting on dishes and glassware.

All water, whether it's treated by a municipality, or comes straight from a well, will have contaminants that will affect equipment. Well water is high in minerals, due to water being a solvent, and it dissolves limestone as it percolates to the underground aquifers. Water drawn from lakes and rivers tends to be lower in mineral ("soft" water), but can have other problems such as decaying organics, and low pH from acid rain or industrial pollutants. In addition, water travels long distances in pipes that are often very old and can leach materials into the water. Municipalities often draw water from both wells and surface water, so a company's water supply could have a myriad of potential issues.

The two most common and costly problems caused by poor water are scale and corrosion.

Scale calcium carbonate, found in most water on every continent, is a "temporary hardness" and the main contributor toward scale buildup. Temporary hardness means that when conditions are right, such as when energy is applied to the water, it will return to being rock from its dissolved state. The rock will fall out of solution and adhere to nearby surfaces such as heating elements and surfaces, creating scale.

The U.S. average for Total Dissolved Solids (TDS) is 300 ppm, with some regions greater than 1200 ppm. Limestone, also known as calcium carbonate, leads to hard water. It's extremely common and found in every continent. Water that has a TDS of 220 ppm or Total Hardness of 120 ppm (7 grains) is considered "hard." At a TDS of 300 ppm, 467 gallons will produce one pound of rock.

Scale prevention: There are two ways to prevent scale, either removal of the dissolved hard mineral from the water by using reverse osmosis or ion exchange (water softening), or keeping the mineral suspended in solution by using a filter that has scale inhibitor such as polyphosphate.

Corrosion is an oxidation/reduction process that can cause severe damage to metals. Dissolved minerals such as chloride, copper, iron, manganese and zinc can all contribute to corrosion because their ions increase the conductivity of the water.

All municipalities in the U.S. are required to disinfect drinking water with chlorine. Enough chlorine must be added to the water supply to ensure it's still present in the water to the furthest edges of the pipeline. Chlorine is corrosive to metals, especially copper tubing. Corrosion on stainless steel includes pitting, crevice corrosion and even stress cracking.

Corrosion prevention: Water can have a low pH (<7) and be corrosive because of chlorine, decaying organic matter, industrial pollutants and naturally occurring mineral acids such as sulfuric. Chlorine is relatively easy to remove with carbon filtration. The pH of water can be raised by

using a calcite mineral feed (minerals raise pH). Orthophosphates are also used as a corrosion inhibitor. It creates a protective coating on the inside of pipes and other surfaces to prevent leaching.

Even if you have a filtration system, you could still have problems with equipment due to water. This could be the result of two problems:

- The filters need to be replaced
- The wrong filtration is in place

Some facility managers change their water filters based on a schedule, which is typically 6 months. Others change the filters when they see a reduction in water flow. This could be indicated by short pots of coffee or a drop in ice production or misshapen ice. If the filter has a gauge, a drop in pressure when water is being drawn could be a sign the filter is plugging.



When using the above methods, it's best to consider the following:

- **Does the filter system have an automatic bypass?** When a filter becomes plugged, it simply routes the unfiltered water to the equipment. Often times, there's no evidence that this is taking place. So instead of the minerals being removed or neutralized, they are scaling the equipment. This can occur if the filter becomes plugged, or the system is undersized. Some reverse osmosis systems use automatic bypass. The best solution is to ensure that the filter system can meet peak demand, and the filters are changed on a regular basis.
- **Not all filters can control or remove the mineral effectively.** For a filter to protect the equipment from scale, it has to prevent the scale-forming process. Some filters use a scale inhibitor such as polyphosphate. This "lubricates" the mineral, which keeps it from bonding with dirt (much like water vapor bonds with dust to form a raindrop) and falling out of solution. The challenge with phosphates are that they are not as effective at very high hardness levels (>15 grains). For high hardness water, it's best to use reverse osmosis or ion exchange.

- **Have you added a new application?** If a filtration system is supporting multiple applications, adding another piece of equipment, such as an iced tea brewer, may cause "short life" (premature clogging) of the filter system or create a flow rate demand that is too high for the filter to keep up with, causing the applications to be starved of water.

For a filtration, it's important to know:

- The condition of the source water.
- The flow rate of the water-using equipment.
- The water usage expected.

In some cases filter systems are specified by an architect, designer or a construction manager. Most often, these professionals are selecting the filtration system based on a brand they are familiar with, and the type of equipment requiring a filtration system. This leaves out an important consideration: what is the condition of the source water? As discussed above, water conditions vary widely. For example, Chicago has a TDS of about 250. Romeoville, which is only slightly over 30 miles southwest, has a whopping 700 TDS. The same filter system might work excellent for Chicago, but not well at all for Romeoville.

Also, filter needs to be able to keep up with the flow rate of the applications. Here are some typical flow rates of foodservice equipment:

- Single pot coffee brewer: 0.5 gpm
- Dual coffee brewer: 1 gpm
- Espresso machine: 0.5 gpm (dual group head: 1 gpm)
- Cube ice machine: 0.5-1.0 gpm (Hoshizaki: 2.5-5 gpm)
- Flaker ice machine: 0.5 gpm
- Steam or Combi oven: 0.5-3.0 gpm

If a company has a high volume operation, filters should last for at least 6 months to avoid additional filter costs.

To learn more about the business benefits of improving water quality, contact Pentair Everpure.



WATER QUALITY SYSTEMS

EVERPURE-SHURFLO WORLD HEADQUARTERS, 1040 MUIRFIELD DRIVE, HANOVER PARK, IL 60133 USA • FOODSERVICE.PENTAIR.COM
800.942.1153 MAIN (US ONLY) • 630.307.3000 MAIN • 630.307.3030 FAX • CSEVERPURE@PENTAIR.COM EMAIL

All Pentair trademarks and logos are owned by Pentair, Inc. or its affiliates. All other registered and unregistered trademarks and logos are the property of their respective owners. Because we are continuously improving our products and services, Pentair reserves the right to change specifications without prior notice. Pentair is an equal opportunity employer.

EV7015-18 REV C AU15 © 2015 Pentair Filtration Solutions, LLC. All Rights Reserved.