Soft Water Saves Hard Dollars

Jason Johnson

Water treatment solutions that are best for your brand and the planet

Water-softening technology has come a long way, and new solutions have been proven to save restaurants up to $2,000 per year per location. Facing tighter budgets and the desire to increase the environmental sustainability of your brand, you should consider several important aspects when reviewing your restaurants' water treatment programs.

Earth's Ancient Resource

Have you ever considered that the same water we use today was here when the dinosaurs roamed the earth? Our planet's water has seen a lot of things over millions of years.

Water is part of everything we do. According to the Environmental Protection Agency, 97 percent of the world's water is in the oceans, and 2 percent is frozen in ice caps and glaciers. That leaves less than 1 percent of fresh water for our use. This means we need to take a sustainable approach to water.

The fresh water that is available for our use has gone through the hydrologic cycles millions of times, picking up dissolved minerals, metals and chemicals as it runs over all the surfaces of our earth.

Hardness in Water

Hardness (calcium and magnesium) can be one of the most difficult and costly challenges to a restaurant's operation. Hardness presents itself as spots on glassware and dishware, as well as scale in dish machines, steamers and water heaters. Hardness decreases the efficiency of equipment and increases overall operating costs.

A New Mexico State University study found that gas water heaters that use hard water require an extra 29 percent of energy to run, and electric water heaters need an extra 21 percent of energy. Scale acts as a thermal insulator and doesn't allow the heating elements to efficiently heat the water. It is like trying to boil a pot of water with a brick between the stove and the pot.

The U.S. Geological Survey (USGS) states that water is considered "moderately hard" at 3.5 grains per gallon (gpg) and "hard" at 7.0-10.5 gpg. Anything higher than 10.5 gpg is considered "very hard." The USGS calculated that 89.3 percent of U.S. homes have hard water. Considering most restaurants are concentrated in populated areas, the number of restaurants with hard water would be similar.

Guests perceive spotted dinnerware as dirty, which can negatively impact a restaurant's brand. Alternatively, soft water allows for chemicals in the dish machine

to work more effectively. Detergent doesn't know the difference between food soil and hardness. If you remove hardness from the equation, you have freed up the detergent to more effectively address food soils, improving your results. For every restaurant that is in a hard water area, a water softener is vital to its operations.

"We consider water softeners a critical component to ensuring a wonderful guest experience. It is important for us to have a dependable, low-maintenance option for the restaurants," said Kevin Carringer, Director of Facilities at Ruby Tuesday.

Choosing the Right Water Softener

When deciding on a water softener for your facilities, there are some choices to be made:

- Electric valve or hydro-mechanical
- Single tank or twin tank
- Timer-initiated regeneration or volumetric regeneration
- Co-current or counter-current regeneration

Considering less than 1 percent of the Earth's water is available for our use, it is important to select a water softener that is considerate of our precious resources.

The most efficient water softeners are those that use twinalternating tank configurations that are volumetrically regenerated. For many years, single-tank systems had been popular due to relatively lower upfront cost and, in some cases, smaller footprints.

Single-tank, timer-based systems require an estimation of water usage and are set to regenerate based on a fixed number of days. So if you have an abnormally busy day, you may run out of soft water before closing time, forcing you to wash dishes with hard water, resulting in spotty dinnerware.

All single-tank systems (timed and metered) require a reserve factor to be taken into consideration, which can cause a significant decrease in efficiency and an increase in total operating costs. Single tanks require the units to be regenerated at night; otherwise the softener will deliver hard water for 90 minutes during the regeneration. Twin-tank metered systems allow for constant soft water and only regenerate as needed. Basically, the more soft water you use, the more often the unit will regenerate. Alternatively, the less water you use, the less often it will regenerate. The less you regenerate, the less water and salt you will use, preserving our resources. A metered twin-tank, volumetrically regenerated softener is designed to keep up with your business trends. Additional technologies that further improve the efficiency of the watersoftening process include counter-current regeneration versus co-current regeneration, which can optimize water and salt usage during regeneration.

Choosing Cost-Effective Solutions

Inefficient use of water and salt during water softener regeneration can drive up the total operating costs of your water softener. A recent study by SW Water in

Scottsdale, Ariz., (see table above) showed a return on investment of less than 10 months on the cost of a single-tank timed softener versus a twin-tank metered softener, with an annual savings of $1,766 for one location.

These salt and water savings will repeat year over year, and after seven years, will result in an overall savings of more than $12,000 per restaurant. These are hard dollar savings that go right back into the restaurant's operating budget. This particular study did not take into consideration the financial saving associated with the decrease in scale-related breakdown in the water heater, dish machine, steamer and other water-using equipment.

Systems that use an electronic circuitry are subject to electronic valve failure. Electronic circuit boards are frequently subjected to wet environments, which can cause failure. Additionally, there are times when they are unplugged in order to plug in other equipment, or even lose power and memory for a period of time. Hydro-mechanical designs are non-electric valves, meaning they will not fail due to wet environments or power disconnection, and function with mechanical gear sets that track the flow of water.

Going High-Volume

Recently, there has been interest in high-volume, scale-reducing systems. Many systems add a polymeric sequestering agent to the water, or use template assisted crystallization (TAC) to reduce the amount of scale on heating elements and other equipment. These systems do not remove the calcium and magnesium (hardness) from the water but make it less likely to stick.

With these systems, the hardness is the same, which is why they are called water conditioners, not water softeners. Because scale-reducing systems do not completely eliminate scale, they do not improve final dishware results as a traditional ion exchange water softener.

In 2001, the U.S. Army Corps of Engineers completed a study of magnetic de-scalers and found that "devices tested did not prevent mineral scale formation under the conditions of this study. The heat exchange capacity of all three shell and tube heat exchangers was considerably reduced by the formation of mineral scale during the course of the study. This study found no significant difference between the devices and the controls in the amount of scale that formed."

Restaurants compete in a world where social media reviews drive customer perception. Good food, great service and clean, spot-free dishware are the driving forces in guest experiences. Meanwhile, we continue to see sustainability and social responsibility as a part of our goal in the industry.

Although water softening is an important part of a restaurant's operation, be mindful to implement solutions that protect and reduce our environmental impact through decreased water and salt use. Remember, we have less than 1 percent of fresh water to sustain life. It is our responsibility to be good stewards within our industry.

Jason Johnson is currently the National Sales Manager for Kinetico's Commercial Water Systems. He has spent the last 20 years in different roles within restaurant

operations and the last 13 years working to help restaurants and facilities to improve their operations. Johnson has been with Kinetico for 2.5 years and an active member of RFMA for more than two years.