

First on your menu:
**TREATING
RESTAURANT
WATER**

The varieties of food-service water needs create business opportunities.

How many times have you asked for a glass of water at a restaurant and then not wanted to drink it? And have you noticed that some restaurants have really good coffee and others don't?

In the food service market, consistency is the key to good beverages. And good-quality water is what makes the difference. After all, coffee contains 98.8 percent water. "Post mix" soda, found in most fast-food restaurants, contains about 80 percent water, the balance being the flavor syrup. So if a food service establishment wants to maintain its consistency, it needs to have consistent-tasting ingredient water.

To make water safe to drink, local water companies add disinfecting chemicals, and chlorine in many forms is added as a disinfectant. It has a medicinal taste and odor that can make water unpleasant to drink and affect other beverages' tastes.

To offset or mask the taste of chlorine, many restaurants without good onsite water treatment will increase the amount of coffee grounds or increase the amount of syrup in post mix. This often makes the coffee too strong and the soft drinks too sweet. A better solution is to remove the chlorine taste and odor from the water before it goes into a beverage.

While many of the larger fast-food and restaurant chains have water quality standards, many local/smaller restaurants and neighborhood diners are unaware of how a treatment system could improve the quality of their beverages. Likewise, many water treatment dealers may be unaware of the potential business opportunities and repeat business in the food service industry.

Choosing the right system requires a review of the available technology and a thorough assessment of the customer's needs.



By John Tadlock

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MORE INFORMATION

For more information on this topic, go to www.watertechnology.com and enter keyword(s): **commercial** or **restaurant**.

Technology systems and issues

Activated carbon filters have for years been used to remove chlorine and other tastes and odors from water. In most instances, GAC (granular activated carbon) can be an effective media for taste and odor reduction. GAC filters are relatively inexpensive and can provide many gallons of good-tasting water. Some commercial cartridge systems can supply up to 250,000 gallons of water with up to 85 percent reduction of chlorine.

While taste and odor reduction using GAC filters may solve many common issues, fine-particulate reduction may still be needed. Many commercial systems have microfiltration, which can filter amoebic cysts and particulates down to 0.5 microns. One of the most common of these is the carbon block filter, which comes in varying micron ratings according to their removal capabilities.

Other "precoat" filters offer taste and odor reduction along with sub-micron filtration, all in one disposable housing. These cartridge-type filters have a septum that is coated with a powdered carbon during use and have capacities of up to 9,000 gallons from one filter. They have a sanitary design so they are not contaminated during a cartridge change — a plus when it comes to servicing a system.

Newer systems on the market use hollow-fiber filters or membranes to perform sub-micron filtration. These systems, coupled with GAC type filters for taste and odor, can provide over 200,000 gallons of highly treated water. Some units have auto-flushing to forestall particulate build-up and pressure loss.

Other water quality problems in a restaurant can be high TDS, alkalinity, hardness and harmful chemicals, to name a few. These will require more treatment than simply taste and odor or particulate reduction.

In a commercial food service establishment, two very important types of equipment are ice machines and hot-water or steaming devices. They require special water treatment.

When water goes through a phase change, that is, from a liquid to a solid (ice) or a vapor (steam), it leaves behind any dissolved minerals. When the water becomes saturated with these minerals, it precipitates

out as scale. Scale reduction or removal is an important service you can provide.

Ice and scale

Scale formation in an ice maker? Most of the time we think of scale in relation to things that are heated. But in a commercial ice machine, scale forms as the water freezes on an evaporator plate. Since pure water freezes first, it leaves behind any dissolved minerals. When those minerals reach saturation, they precipitate on any surface that comes into contact with the water. Often the scale forms on the walls of the water sump or on the distributor over the ice machine evaporator plate.

When scale forms on the distributor it causes an uneven water flow over the plate and creates "white ice." This can lead to "freeze-ups" of the ice machine. The results are poor-quality ice and loss of ice production. In the end, the ice machine will require de-liming with an acid cleaner.

Multiple cleanings with acid will eventually destroy the plating on the evaporator, resulting in ice sticking to the evaporator during the ice-making process. And, since most evaporator plates are made from plated copper, repeated acid cleanings will corrode away the copper, and the establishment must buy a new ice maker.

When water is heated

In a commercial food service device that heats water, of course, scale is also an issue. Some devices will form scale more rapidly than others. Coffee makers, steam proofers (for baking), steam tables and some "combi" ovens don't generate steam like a countertop steamer with a boiler, and they are easier to de-lime. Still, they will need periodic cleaning with a commercial de-liming chemical.

Some methods for treating scale:

- *Carbon filters* provide good taste and odor reduction. They work well on coffee-makers but will not reduce lime-scale formation.

- *Softening* is best suited for automatic dishwashers. In ice-makers, softening makes white, soft ice. And the sodium still precipitates out, leaving white flecks in the ice cubes. Soft water in steamers still forms a pre-

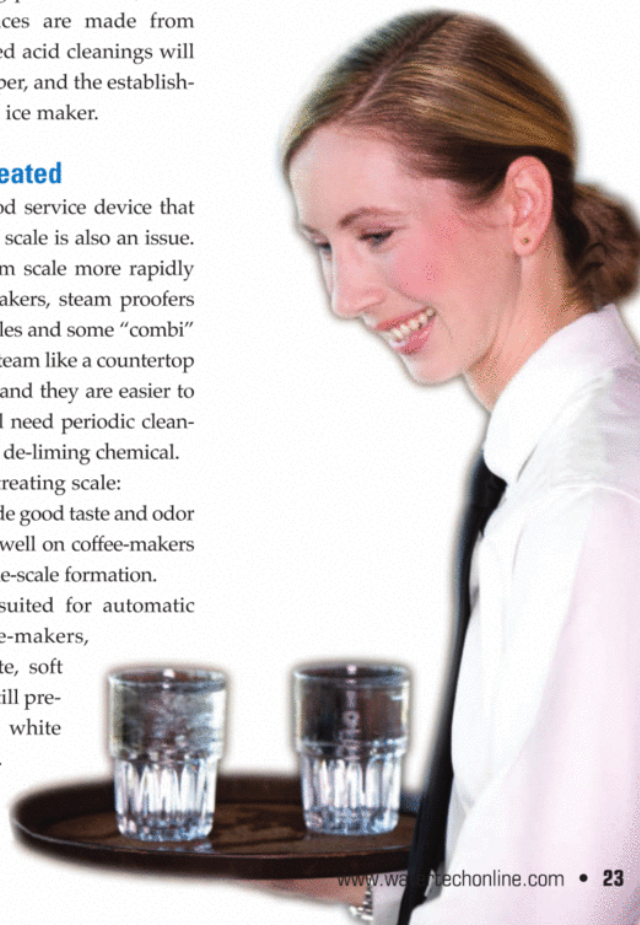
cipitate, but it's not as hard as lime scale. It can also contribute to white flecks on steamed food.

Soft water use in coffee makers tends to over-extract flavor and oils from the grounds, making coffee bitter. (Some individuals claim that they can taste salt in the coffee.) In some "consumption" applications, softening may not be recommended.

- *Polyphosphates* do not prevent scale but act like a "coating," keeping scale from forming and building up on surfaces. Along with carbon filtration, this is one of the most commonly used methods for taste and odor reduction and preventing scale build-up in coffee makers. When used in steamers, phosphates can break down and become ineffective at controlling scale build-up. Overfeeding of polyphosphates can create a phosphate scale — more like mush — and can build up in the heating chamber and ice-maker surfaces.

- *Acid feeding to control scale:* When dissolved minerals build up in these devices, the pH of the water shifts to being more alkaline. If we can keep the pH at a neutral

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What a restaurant needs

In assessing a particular food-service customer's needs, many things need to be checked:

Water-use requirements and numbers of various equipment: Are there ice-makers, or post mix, coffee, tea or water fillers? All will need to be identified and sized for usage. (Note: Most major manufacturers of food service equipment provide specifications on their Web sites, or you can call them and inquire about water consumption.) Some equipment may be water-cooled, requiring splitting of water into treated and untreated streams.

Location of the treatment system: Does it need a drain? Electricity? Will it serve more than one piece of equipment? It may be more cost-effective to install several point-of-use units at each piece of equipment rather than one large system that pipes treated water to every piece of equipment.

Clientele: Does the restaurant have a large client population and/or peak operating periods, e.g., a breakfast or lunch-hour rush?

Source water: If the source is a lake or river, cyst-reduction filters of 2.0 micron or finer ratings may be needed.

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point, the minerals will not precipitate out. Use of acid feeders can keep the pH more neutral or acidic, preventing scale.

But feeding acids (usually a weak acid, like citric) can cause other problems like corrosion and staining of stainless steel components. (If you feed acid, make sure water-using equipment will not be damaged.)

- **Reverse osmosis (RO)** systems have become common in the food service market. RO water is typically 96 to 98 percent free of dissolved minerals. That makes RO water more "aggressive," but if the RO unit

has a mixing system or a remineralization device which can reduce the effect of the lower pH, it can be a very good choice.

In sizing an RO for a commercial food service establishment, consider these factors: peak operating periods, initial water draw of equipment (some steamers can require several gallons of water to fill the steam chamber), makeup water, and what will be served by the RO.

Note: Since water temperature can affect RO output, keep in mind the water supply source. Always size on the higher side to compensate for seasonal variations. If the water has high hardness, a water softener can prevent RO membranes from fouling with scale.

Some other technologies

- **Nanofiltration** has been used with success in reducing scaling in steamers and ice-makers. It doesn't remove all of the TDS, which makes blending or a remineralizer unnecessary.

- **Weak acid cation resin systems** is another treatment, widely used in Europe. The resin exchanges calcium and magnesium ions for hydrogen ions. The result is no scale-forming ions in the treated water. Their size is small, like a mini-water softener, with a simple in/out head featuring quick disconnects. The quick disconnects are needed because these systems require an acid regen-

eration. The units are exchanged with a regenerated tank, and the exhausted tank is taken to a regeneration facility.

- **Mixed-bed deionization (DI) cartridges** have been successful on small individual steamer applications, or those that require a minimal amount of water per use. These cannot be regenerated and are likely to be disposable.

- **Nano-treated resins**, an emerging technology, have found their way into the food service market. These systems contain resins that have "nano plates" or "nano sites" on the resin. The scale-forming ions attach to these plates. As the water flows through the unit, usually as upflow, these plates break away from the resin and pass along with the water. Since the scale-forming ions are bonded to these plates, they do not have the ability to produce hard scale.

The characteristics of the water, such as TDS and pH, do not change, so these systems do not have any adverse effects on the equipment.

Some homework needed

Whatever water treatment system is decided upon for a restaurant, do your homework on what equipment will be fed.

Get to know how ice machines work, both the cube and pellet types. Many consume large amounts of water, and some use very little. Review the way a steamer works and how it draws water. Some have a large initial fill and then use very little water during operation.

Check other areas at the food service facility, and in many instances you'll find additional spots requiring different types of treatment. Remember, one system may not cover all of the equipment. Provide the best treatment for the lowest cost. That's what the restaurant owner is looking for. And you're the expert.

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