



By Derek Sajdak

*Evaporative cooling or misting systems have become one of the most popular tools to deal with hot weather in the southwestern U.S. Typically, the systems are used commercially to cool outdoor public spaces such as restaurant dining areas, patios and pavilions, and common areas at community parks and hotels. But they can also be found in “wandering” areas at nurseries, in tents and even ticket lines.*

# Reverse Osmosis

*The key to trouble-free commercial misting systems*

Schools, auto malls, car washes, health spas and even residential customers find value in gently and efficiently cooling open spaces by atomizing water droplets through pressurized misting systems.

Commercial misting systems are much more effective than conventional HVAC for cooling outdoor locations. The systems also can be used for odor and dust pollen control and humidification.

Outdoor air temperatures are easily cooled 20 to 30°F with misting technology, so it is no wonder they are a favorite in areas where outside temperatures can reach 110°F or more.

A business owner in Arizona recently saw an immediate jump in business after having a misting system installed at his outdoor deli. To the point where—even when the deli was full—the restaurant next door had very few outdoor customers. There is no doubt that the patrons came to appreciate the comfort provided by the misting system as well as its dynamic visual effect.

However, one of the most vexing challenges to trouble-free operation of misting systems is the treatment of the water that is pressurized and sent to the atomizing nozzles. Minerals must be removed from the water before it reaches the misting nozzles. Otherwise, waterborne minerals and impurities quickly build up and prevent the easy flow of water through the fine nozzle tips. In addition, mineral-clogged nozzles cause

an annoyance by spitting dripping water onto patrons.

The application of a reverse osmosis (RO) system for misting is a state-of-the-art approach. Although more customers are choosing this option than a few years ago, it is still a technique that relatively few customers choose. This is probably because many misting systems are installed to serve as an evaporative cooling perimeter curtain around an outdoor space. In these situations, water treatment is not critical.

It is especially important to use RO-treated water for applications where there is a lot of glass, and where furniture is placed below the spray area. Without RO, mineral deposits quickly build up on these surfaces. These deposits can be very difficult to remove, and if not guarded against regularly, can ruin furniture.

An added advantage of commercial RO equipment tied to misting systems is that for any facility that needs the highest quality drinking water, it is readily available. When restaurant owners learn that an RO system will do this “double-duty,” they often ask that the system be sized to provide quality drinking water as well. The taste and quality of the water, other beverages and ice is remarkably improved, and owners routinely get positive comments from customers.

## High Pressure Misting

Professional high pressure misting units generally run at 1,000 to 1,500 psi. In most instances, the higher the pressure used, the finer the mist. High pressure systems create a fine mist—with droplets of 5 to 10 microns in size—that look like airborne fog. The smaller the particles, the better the evaporative cooling.

The amount of water used by the system varies depending on the amount of line needed to cover the area to be misted. On average, the majority of commercial systems will use 1 to 3 gal per minute.

A misting system using 1 gpm usually covers a 60-linear ft area that might be

## tech update

configured as one 45-ft length with a 15-ft right angle attached to it. Nozzle spacing is usually 20 to 24 in. At 1,000 psi, and using a twelve-thousandths of an inch nozzle orifice, the water will supply 30 nozzles at an overall rate of 1 gpm. Each misting nozzle sprays at a rate of 2 gph.

The twelve-thousandths nozzle is ideal because it is less likely to plug up than smaller sizes, such as the eight-thousandths nozzle.

For most patio systems, it is best to mount the mist line about 8 to 10 ft off the ground for optimal cooling. One of the misnomers in this business is that more cooling is achieved with more nozzles; this is rarely true.

The amount of storage space available for the equipment determines the size of the RO unit and storage tank. Ideally, production or output of the RO system should be about 1.25 times (or greater) the misting unit's consumption. This will allow the use of smaller storage tanks for the RO. A 1.25-times-multiplier for system capacity not only gives the user a buffer, but also can reduce the size of a

storage tank from 300 to 40 gal. Where space is at a premium, that can be a big advantage for the buyer.

Most of the systems Aqua Science installs have a capacity of 1,000 to 5,000 gpd. Although, a recent installation featured a 10,000 gpd RO unit used for both misting and drinking water at a large restaurant. When restaurants want RO-treated drinking water, that can exceed the capacity required for misting. The preference is to install Watts Pure Water and Flowmatic RO units, which works best because of their reliability, ease of maintenance and breadth of the equipment lines. The Watts Pure Water commercial RO line offers capacities of 450 to 15,000 gpd.

Generally, it is best to install both misting and RO units in the same mechanical area, but that is not always possible due to space constraints.

The atomizing lines usually should be stainless, although, high-pressure copper can be used if the customer wants a different look. Most installations require use 3/8-in. lines in 316 stainless steel, sometimes with a colored powder coat to match the structure.

Most commercial RO systems offer the capability to vary the rate of recovery; this influences the amount of wastewater that is rejected by the filter. Most commercial systems operate at about a 50% recovery rate, meaning that 1 gal of water is produced for every gallon rejected (as compared with a residential drinking water system that may reject 5 to 8 gal of water for every gallon of RO-purified water produced). At the common 50% range for commercial RO, the concentrate water is recycled back through the filter, enhancing the recovery rate. Ultimately, this uses the filter at a faster rate (requiring replacement), but it is great for water conservation.

### Guidelines

A few guidelines that may help include:

- For commercial applications, divide the misters into groups that can be independently controlled;
- Timing and sensing devices can be used to turn off the misters when no one is present. Or, show facility owners how they can do this manually;
- Trees, structures and awnings also

should be used to keep outdoor areas naturally cooler;

- Misters should be turned off during windy conditions because wind will negate the effect of a misting system; and
- Misting systems should not be used when outdoor temperatures are moderate, or during periods of high humidity - they don't work well in these conditions. *wqpp*

### About the Author

Derek Sajdak is owner of Phoenix-based Aqua Science and a licensed master plumber in Arizona. Aqua Science has more than 8,000 customers in the metro area and has been in the misting and water treatment business since 1998. Sajdak can be reached at 602.861.8000, or by e-mail at [info@aquascienceaz.com](mailto:info@aquascienceaz.com).

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## RO—Reversing Water Quality Issues

By John Vastyan

Reverse osmosis is used for a wide variety of water purification purposes. The most common use of RO is for drinking water. In fact, RO is the fastest growing form of in-home water treatment in the U.S.

A recent study revealed that 70% of the people in the Los Angeles area drink only filtered or bottled water. That's a lot of money spent on clean water.

With this growing demand for higher quality drinking water, it's no surprise that homeowners and businesses are buying and installing the same state-of-the-art technology used to process Coca Cola's Dasani, and Pepsi's Aquafina. The filtering process used by these bottling giants is nothing more than simple RO filtration.

The key function of RO, or hyperfiltration, takes place within a tight, semi-permeable membrane that allows only pure water to pass through it. Contaminants such as arsenic, copper,

iron, lead, chromium, fluoride, radium, cyanide, nitrates, bacteria and more are rejected. RO vastly improves water purity, color and taste.

Unlike charcoal or carbon filters that become less efficient with each glass of water drawn through them, and which remove only some contaminants, odors, and tastes, an RO system's membrane is self-cleaning.

As the source water flows through the RO module, it's divided into two streams. One stream is the high quality

drinking water that has passed through the membrane. The second stream is the rinsed water that carries the rejected contaminants down the drain. As a result, RO has become a preferred water treatment method, delivering safe drinking water to consumers today.

### About the Author

John Vastyan is a writer specializing in the plumbing and mechanical, water quality, HVAC, radiant heat & geothermal industries. He can be reached at 717.664.0535.