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The Key to Trouble-Free Commercial Misting Systems



Designer's Guide / Fire Protection / Code Update

RO:

The Key to Trouble-free Commercial Misting Systems

Photography by Ken Epstein



The application of a reverse osmosis (RO) system is a state-of-the-art approach. There's simply no better way to treat the water for misting.

By Derek Sajdak

Evaporative cooling or misting systems have become one of the most popular tools for dealing with hot weather throughout the Southwest region of the United States. They can also be used for odor, dust, or pollen control and for humidification. Misting systems are much more effective than conventional Heating, Ventilation and Air Conditioning (HVAC) for cooling outdoor locations. Outdoor air temperatures are easily lowered 20° to 30°F with misting technology, so it's no wonder that these systems are a favorite in areas where outdoor temperatures can reach 110°F or higher.

Typically, misting systems are used to cool outdoor public spaces such as restaurant dining and sitting areas, patios and pavilions, and common areas at community parks and hotels. They can also be found in "wandering" areas at nurseries, in tents and even in ticket lines. Schools, auto malls, carwashes and health spas also find value in gently and efficiently cooling open spaces by atomizing water, producing "microns," through pressurized misting systems. They've even found their way into the residential market.

One restaurant owner in Arizona recently told me that there was an immediate jump in business after installing a misting system at their outdoor deli. Even when the deli

was full, the restaurant next door had very few outdoor customers. There's no doubt that the misting system is a comfort that patrons have come to appreciate, and there's no doubt that the system also offers a dynamic visual effect.

One of the most vexing challenges to trouble-free operation of misting systems is the treatment of the water that's pressurized and sent to the atomizing nozzles. Minerals in the water should be removed before it reaches the nozzles. Otherwise, waterborne minerals and impurities quickly build up and prevent the easy flow of water through the fine nozzle tips. Mineral-clogged nozzles can also cause an annoyance by spitting dripping water onto patrons.

The application of a reverse osmosis (RO) system is a state-of-the-art approach. There's simply no better way to treat the water for misting. It's a technique, however, that relatively few of our customers choose, although more are opting for RO systems than did just a few years ago.

Many misting systems are installed to serve as an evaporative, cooling, perimeter curtain around an outdoor space. In these situations, water treatment isn't critical. It's especially important, however, to have RO-treated water

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for applications in places where there's a lot of glass and where furniture is placed below the spray area. Without RO, mineral deposits come down in powder form and build up rather quickly on these surfaces. These deposits can be very difficult to remove and can ruin furniture if not removed regularly.

An added advantage of the use of commercial RO equipment tied to a misting system is that it can provide the highest quality drinking water for any facility that needs it. When restaurant owners learn that an RO system will do this "double duty," they often ask that the system be sized to provide drinking water. The taste and quality of the water, ice and other beverages is so remarkably improved that users routinely get positive comments from customers.

High-pressure misting

Professional high-pressure misting units generally run at 1,000 to 1,500 pounds per square inch (psi). In most instances, the higher the pressure is, the finer the mist produced will be. High-pressure systems create a fine mist – with droplets of 5 to 10 microns in size – that looks like airborne fog. The smaller the particles, the better the evaporative cooling.

The atomizing lines should be stainless, although high-pressure copper is occasionally used because an owner

wants a different look. For most installations, 3/8-inch lines in 316 stainless steel are used, sometimes with a colored powder coat to match the structure. For most patio systems, it's best to mount the mist line about eight to 10 feet off the ground for optimal cooling.

Depending on the amount of line needed to cover an area you wish to cool with misting, the amount of water that's required will vary. On average, the majority of commercial systems will use between one to three gallons per minute (gpm), varying of course with the amount of space to be cooled.

A one-gpm misting system usually covers a 60-linear foot area that might be configured as one 45-foot length with a 15-foot right angle attached to it. Nozzle spacing is usually 20-24 inches. Every gallon of water, at 1,000 psi, with a twelve-thousandths (of an inch) nozzle orifice (typically used) will supply 30 nozzles per gallon per minute. Each misting nozzle uses about two gallons of water per hour of operation. The twelve-thousandths nozzle is much less likely to plug up than smaller sizes, such as the eight-thousandths nozzle. One of the misconceptions in my business is that you achieve more cooling with more nozzles; that's rarely true.

The amount of storage space available for the equipment will determine the size of the RO and storage tank. Ideally, production or output of the RO system should be about 1.25 times (or greater) the mist unit's consumption. This will allow the use of smaller storage tanks for the RO water. With a 1.25 times multiplier for system capacity, the user not only has a buffer, but also can cut back on the size of a storage tank from, say, 300 gallons to 40 gallons. Where space is at a premium, that can be a big advantage.

Many systems are of the 1,000 to 5,000 gallon/day capacity, although we recently installed a 10,000-gallon/day RO unit at a large restaurant for a misting and drinking water application. When restaurants want drinking water RO, that can easily exceed the capacity required for misting. Installing both the misting and RO units in the same mechanical area is preferred, though sometimes that just can't be done because of space constraints.

Some guidelines for commercial applications of misting systems are as follows.

- Mistifiers should be divided into groups that can be independently controlled.
- Mistifiers should be turned off when no one is present. Install timing and sensing devices to do this, or train facility owners to do it manually.
- Trees, structures and awnings should also be used to keep outdoor areas naturally cooler.
- Mistifiers should be turned off when outdoor temperatures are moderate, during periods of high humidity or during windy conditions. They don't work well in these circumstances. ■



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About the Author

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