# Providing Water Purity

**By Yves Stefani**

Combination of treatment methods results in purest drinking water

Water purity issues in developing nations and third-world countries populate the news, but pure drinking water can be just as difficult to achieve in developed countries. In the U.S., significant amounts of tap and well water are not fit for drinking due to heavy industrial and environmental pollution that result in water contamination. Even low-level exposure to some contaminants can cause illness, including liver damage, cancer and other serious ailments.

## Keeping Treatment on Track

Drinking water emerges from unmonitored natural resources such as glaciers or springs. While the water may be pure at inception, natural elements make it impossible to completely control when pollutants or contaminants interact with it. From naturally occurring minerals to man-made chemicals and byproducts, contaminants infiltrate drinking water from a variety of sources.

With so many factors contributing to water supply contamination, steps must be taken to ensure pure, good-tasting water. Because contaminants in water are often invisible and tasteless, the average person has no way of knowing if a seemingly clean glass of water is actually pure or not. Processes must be employed that accurately and efficiently treat drinking water.

## Purification Methods

There is no single simple solution to water purification. The treatment process often requires multiple steps to render the water clean and ensure that it meets necessary quality standards. A wide range of filters, purifiers and other treatment devices are offered for applications on the municipal and residential levels. Some treatment systems use a combination of technologies, while others target specific contaminants.

For example, ultraviolet (UV) water purification systems rely on UV lamps to emit electromagnetic radiation with a wavelength shorter than that of visible light to sterilize water. Lamps are mounted in a filter so that water passing through the system is exposed to the light, effectively eliminating a wide range of biological contaminants. This is a purely physical, chemical-free process, so it is vital that the UV lamp performs at an optimum level for extended periods.

There are two primary types of UV water purification systems. One type passes the water around the UV lamp once, but the light's intensity is increased to effectively kill pathogens. The second type transfers water through coiled tubing that surrounds the UV lamp multiple times to ensure that all water comes in close enough contact to the sanitizing light. UV water purification systems have a diverse range of applications, and are utilized in everything from municipal water treatment to residential water purification.

Reverse osmosis (RO) systems also can be used to treat drinking water. While UV systems eliminate microbes in the water, RO systems remove other, more solid particles. This process is ideal for a system with a limited flow rate, which is common in residential systems. In these types of systems, RO forces water with a high concentration of particles through a semi-permeable

membrane to a state with fewer particles, leaving the water more pure.

By combining RO with UV purification, water treatment equipment manufacturers and end users can maximize disinfection and ensure water purity.

## Effective Disinfection

To ensure the performance of UV systems, equipment that maintains water purity while facilitating the sterilization process is needed. One way in which UV equipment manufacturers are able to ensure that the integrity of their systems is protected is by employing high-performance tubing solutions.

In UV purification systems, the UV lamp first is enclosed in a protective transparent sheath. It is important that this sheath does not disrupt or occlude the UV light as it provides a protective shield to the bulb. As water is transferred around the UV lamp, the tubing it passes through must remain flexible and durable, as well as exhibit superior clarity properties in order to maximize sterilization effectiveness. Companies have developed tubing products specifically designed to interact with the UV sterilization process.

In RO systems, the equipment must uphold the water's integrity after the process and remain reliable throughout its lifespan. Because RO systems are commonly used in residential applications, the equipment must uphold its performance throughout the wear and tear of everyday use. It is important for tubing to be strong and flexible, in case homeowners need to move the equipment or if they bump into it. If the tubing that connects the system is tampered with or broken, the damage could be detrimental, resulting in water leakage or potential contamination.

## Reducing Maintenance

When these technologies are employed in residential and municipal water purification systems, users want to know that the equipment will perform as indicated. Because water purification systems are used daily, the equipment must have a long shelf life. Tubing needs to be durable and lasting, without suffering degradation of any sort.

System maintenance also should be minimal to prevent the potential of transferring untreated water to end users and to reduce the costs associated with maintenance and replacement. For example, in the case of the heat-shrink sheath that protects the UV lamp, minimizing the need for end users to replace or repair this delicate equipment themselves can reduce downtime and associated costs.

Clean drinking water is something we often take for granted. In order to ensure that we are filling our glasses with pure water, it is important to integrate proper water treatment operations. *wqp*

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