



Deciding on Disinfection

By Kyle Hicks & Phil Jones

Over the years, the public has become more aware of drinking water quality issues. Urban development has placed increased stress on water resources, which in turn has increased the need for cost-effective methods to treat drinking water. This is true regardless of whether the installation is at a single point of use (POU) or at the point of entry (POE) for treating all water used in the home.

Choosing the right treatment option for the water supply

Point-of-Use Treatment

At the POU level, a water treatment system only affects one faucet or water access point. For POU applications, reverse osmosis (RO) is a popular choice since it can provide chlorine and sediment removal as well as reduction of dissolved contaminants (e.g., heavy metals) in one unit. However, the benefits of low cost and minimal maintenance should be balanced against significant water wastage to the drain.

In some applications, a single inline filter is sufficient for taste, odor and sediment reduction. If only a single filter is supplied for drinking water, it is recommended that the water be free of pathogens such as bacteria, viruses and parasitic cysts. In conjunction with a pretreatment system, a properly installed ultraviolet (UV) disinfection system can ensure drinking water is microbiologically safe. Treating water at the POU level can be simple and cost-effective in certain situations, especially those involving low volumes of water and minimal plumbing requirements.

Point-of-Entry Treatment

POE applications utilize many types of treatment equipment, most commonly inline filters, whole-home UV disinfection systems and water softeners. Water softening equipment can be on municipal or private well water supplies. The presence of water hardness in the form of calcium is not a health concern, but can be responsible for scale and stains on plumbing fixtures, excessive detergent use and blocked showerheads and faucets.

Water softeners are easy to install and require little maintenance, making them ideal for homeowners. They also

can be cost-effective since they improve the efficiency of appliances such as water heaters and washing machines.

Where red and black iron and manganese staining is present, specific backwashable filters are available to effectively treat these contaminants without the use of chemical additives. Sulfur that creates a “rotten egg” odor can be treated in a similar way. POE filtration is more widespread than POU filtration since it provides consistent water quality throughout the home rather than at just a single faucet.

UV Disinfection

For bacteriologically unsafe water, there is a growing demand for UV treatment. Historically, chemical treatment using chlorine was the primary method of disinfection, but the growing awareness of disinfection byproducts and their associated potential health concerns, in addition to the unnatural taste and odor that can result from chlorine use, have allowed other technologies to enter the market.

One benefit of UV treatment technology is that it does not modify or add anything to the water, while still providing disinfection when harmful bacteria, viruses and cysts, such as *Cryptosporidium* and *Giardia*, are of concern. UV technology is cost-effective and simple in its functionality. Water flows through a reaction chamber and is exposed to a specific wavelength of UV light (254 nanometers), which disrupts microorganisms’ DNA, preventing reproduction. The reproduction of microorganisms inside the human body leads to illness and is the mechanism that produces a positive bacteria test, or colony count.

For optimal UV treatment, the appropriate pretreatment must be put in place to ensure adequate UV light transmission through the water. The recommended minimum pretreatment is filtration down to 5 microns, which can be achieved with a high-quality sediment prefilter.

When dealing with surface water or shallow wells, a UV system equipped with a sensor is recommended, as water quality can change quickly based on dry conditions or heavy rains. These water sources may contain variable levels of tannin, a slight coloration caused by decomposed vegetation that can reduce UV transmission levels, requiring specialized tannin removal pretreatment. Water quality in a drilled well can change over longer periods of time, but typically remains consistent with proper levels of UV transmission.

The Right Treatment Method

Whether the water is sourced from a surface water or groundwater, water supplies are never 100% safe from pathogen contamination. Seasonal changes bring changes to the water table. These changes can cause a water source once deemed safe to become contaminated or non-potable.

Before treating a water supply, it is essential to analyze water quality to identify any aesthetic issues or potentially hazardous contamination. The appropriate treatment equipment can then be supplied and professionally installed with both peace of mind and long-term cost savings in mind. Everybody deserves clean drinking water, and it can be achieved by taking the right steps. *wqp*

Kyle Hicks is a technical support specialist at Viqua – a Trojan Technologies Co. Hicks can be reached at khicks@viqua.com. Phil Jones is the customer service/technical support manager at Viqua – a Trojan Technologies Co. Jones can be reached at pjones@viqua.com.

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