

## Frequently Asked Questions about UV Water Disinfection

### *Is UV effective against protozoa such as Cryptosporidium and Giardia lamblia?*

Yes, as a result of academic research, it has been proven that UV is the best available technology to treat these protozoan cysts which are not susceptible to chlorine. In addition, the dose levels required to inactivate these cysts are relatively low: less than 10 mJ/cm<sup>2</sup> for 99.9% reduction of both *Cryptosporidium parvum* and *Giardia lamblia*.

### *Why do I need to disinfect my water supply?*

Disinfection is recommended for all water supplies that are not protected by a municipal water source. Unfortunately, due to the uncertainties that exist with our current water supplies, we can no longer rely on the fact that our water supplies "may be safe". By providing your own disinfection, you are taking the responsibility of ensuring the safety of your water supply for you and your family.

### *Does UV remove E. coli?*

Yes, *E. coli* requires a UV dose of 6 to 10 mJ/cm<sup>2</sup> for a 4-log (99.99%) reduction. This UV dose is well within the capabilities of the UV water disinfection systems at rated water flows.

### *Is UV 100% effective?*

UV disinfection typically offers a 4-log reduction (99.99%) for both bacteria and most viruses. UV is more effective than chemical disinfection processes at destroying viruses.

### *How do I know the system is working?*

The UV systems are equipped with "lamp-out" monitors which give a visual (some models have audible alarm also) signal in case of lamp failure. For the ultimate protection, some systems incorporate true UV intensity monitors which physically monitor the UV intensity delivered by the system. An alarm will sound if the disinfection level falls below a safe level.

### *Do I need to disinfect my municipal water supply?*

Our municipalities work very hard to provide safe, disinfected water for their customers. This is quite evident when you consider the difficulties involved in providing safe drinking water through a vast distribution network. If you use water that comes from a municipal water supply and wish to provide your family with added "peace of mind", then we believe a UV system acts as an inexpensive insurance policy against the possibility of drinking microbiologically contaminated water.

### *How much does it cost to operate UV systems?*

UV systems are extremely economical to operate. A typical 10GPM whole house UV system operates on the same power requirements as a 40 watt light bulb!

### *Will UV change the taste of my water?*

No, UV is a physical disinfection process. It does not change the taste or odor of the water. It simply provides safe, reliable disinfection without adding anything to the water.

### *Should I shut my system off when I am not using it?*

No, the UV system should be left on at all times. The lamps are not affected by the amount of water drawn through the system but age faster if turned on and off. By leaving the unit on, you will eliminate the potential problem of having contamination pass through the system while the unit is off. However, if water is drained from your disinfection system (eg. winterizing), your UV system must be switched off.

### *What are the annual maintenance requirements?*

UV systems contain no mechanical parts that wear out or require maintenance. UV lamps have a useful life of 9,000 hours and require annual replacement. The UV light may offer illumination beyond 1 year, however there will not be enough UV energy to provide adequate disinfection. Proper maintenance of any pretreatment is also required.

### *Do I need to consider the quality of my water prior to the UV?*

Yes, for UV to be effective, it is recommended that the influent water is within the following parameters:

- Iron < 0.3 ppm (0.3 mg/L)
- Manganese < 0.05 ppm (0.05 mg/L)
- Hardness < 7gpg
- Tannins < 0.1 ppm (0.1 mg/L)
- Turbidity < 1NTU
- UV transmittance > 75%

**Note:** If you are unsure of the quality of the water supply, it is imperative to have the water tested. A UV transmittance test (UVT) is strongly recommended for problem water, or water that is colored (eg. some surface water supplies).

## The 10 Most Frequently Asked Questions about UV Water System Installation

### *Do I need any pre-filtration?*

Yes, as microbes can potentially be shielded by suspended particles (turbidity) in the water supply, it is necessary to filter the water to remove the suspended particles. A high quality graded density filter cartridge with nominal micron rating of at least 5 microns is recommended.

### *How do I control the water flow?*

The UV systems are designed to operate at a specific flow rate so it is imperative that the systems operate within their designed rate. The use of flow restrictors are recommended to control the flow of the unit. A true flow restrictor designed with a variable orifice that fluctuates based on water pressure is the only flow restrictor that is recommended as those that are simply a "flat washer with a hole in it" do not regulate the flow based on variances in water pressure. As the variable orifice may not be extremely resistant to UV, it is recommended to install the flow restrictor at least 6" away from the outlet port (axial flow reactors can install restrictors directly on installation port).

### *Does it matter if I install the UV vertically or horizontally?*

Although it is recommended to install the disinfection system in the vertical position with the inlet port located on the bottom (this is recommended to allow any air that may be contained inside the reactor chamber to be purged from the system), if necessary, the disinfection system can be installed in any other orientation. If this is done, care must be taken to make sure all the air is purged from the reactor chamber.

### *Should I install a by-pass assembly?*

Although not essential, the installation of a simple by-pass assembly would allow for emergency use of the water in case the UV unit was required to be removed from service. A simple by-pass assembly with three isolation valves can be installed quite easily.

### *As UV has no residual, how do I make sure the entire distribution system is free of microbiological contaminants?*

It is imperative that the entire water system located after the UV unit is chemically disinfected. This is easily accomplished by filling the pre-filter with 1-2 cups of household bleach and allowing this to flow through the system. While doing this, you must ensure that all taps, including outside faucets, dishwashers, washing machines, etc. pass chlorinated water. Once you detect the bleach at the faucets, shut the faucet off and wait a minimum of 20 minutes to allow adequate disinfection. Return to all locations and flush the chemical disinfectant from the system. Make sure the UV is on during this procedure. Remember to have your water tested on a regular basis to ensure that your system is operating correctly.

### *Will the UV restrict my water pressure?*

No, the UV systems are designed with inlet/outlet ports correctly sized for the specific application. As an example, the 10GPM system comes with 3/4" ports. The typical pressure drop on this system would be 2-3PSI.

### *What size of system do I need?*

Models range in sizes from 0.5GPM to 1,000GPM. An average household UV ranges in size from 5 to 12GPM. Determining the flow rate of your pump will typically determine your required flow rate. It is important to never undersize the UV system - when in doubt about the size, always choose the next largest size.

### *How do I clean the quartz sleeve?*

If the quartz sleeve becomes stained, remove the sleeve from the reactor chamber and clean with a commercially available scale remover such as Lime-Away or CLR.

### *How much space does a UV require?*

As the UV lamps and/or sleeves need to be periodically removed from the reactor chamber, you must leave at least double the length of the disinfection system to facilitate removal. A typical 5GPM UV system would require approximately 45".

### *Should I be concerned about the adequacy of my electrical system?*

The UV system does require consistent power, both voltage and frequency, for the system to operate effectively. To compensate for variations in power some UV systems incorporate ballasts that provide a constant output voltage regardless of variations in input frequency or voltage. This results in consistent UV output and consistent UV dose. It is recommended to install the UV on a separate outlet protected by GFI (ground fault interrupter).