ULTRAVIOLET SERIES

By Adam Donnellan, Sunlight Systems

ULTRAVIOLET

Unraveling Local Regulations

This is the final installment of a four-part series covering ultraviolet (UV). Previous articles covering commerical/industrial UV systems, UV system design and UV terminology can be found at WaterInfoCenter.com.

While UV disinfection is an effective way to deliver microbiologically safe water, understanding local regulations for its use can be more complicated than understanding how UV scrambles a microorganism's DNA.

This is because local agencies aggressively are establishing their own implementation standards for the use of UV treatment. These regulations can vary dramatically from county to county, making it difficult for water treatment professionals to keep track of and understand what is needed for their clients.

Water treatment professionals who understand and can explain the regulations are more successful having their installations approved.

Local health agencies are concerned about everyone's drinking water, but most of them are tasked only with monitoring and regulating commercial establishments, schools and drinking water supplies that supply more than 20 families.

The following is a compilation of the many requirements you may encounter, along with a brief explanation.

- **A single UV unit to treat the maximum output of the pump(s) at peak demand.** Many engineering firms are recommending redundant systems to provide emergency back-up and technology needed for future growth.

- **Minimum dose of 40,000 mWs/cm² (micro watts-sec/cm²) at peak flow rate.** This is the dose that the water will receive as it passes through the system. Most microorganisms are rendered inactive at doses of 10,000 or lower.

- **Biological test results from an independent agency.** Referred to as a bioassay, this is a test performed by an independent laboratory that provides an exact UV dose. This test is accomplished by using a test microorganism and taking samples before and after exposure to the UV.
- **EPA Point Source Summation Calculations for each unit.** The EPA has established guidelines for determining UV dose. This takes many aspects into consideration including lamp strength, chamber dimensions, retention time, turbulence factors and a host of other factors.

- **Unit equipped with an analog UV light intensity monitor.** The UV light intensity monitor reads light in the 254 nm range. It is important to use a "true" UV monitor as opposed to a light meter, which also reads visible light. The monitor needs to read from 0 to 100 percent. Systems that use LED indicators are not acceptable.

- **Shut-off mechanism tied directly to the UV monitor.** If the UV light diminishes or if the lamp goes out, the UV monitor will register the drop. In turn, this will trigger a normally closed solenoid valve. This is where there is the biggest potential for problems. You should be prepared to look for the following: bad lamp, dirty UV sensor, broken monitor or broken solenoid. Water professionals should stock extra parts and be able to respond quickly to getting the system up and running.

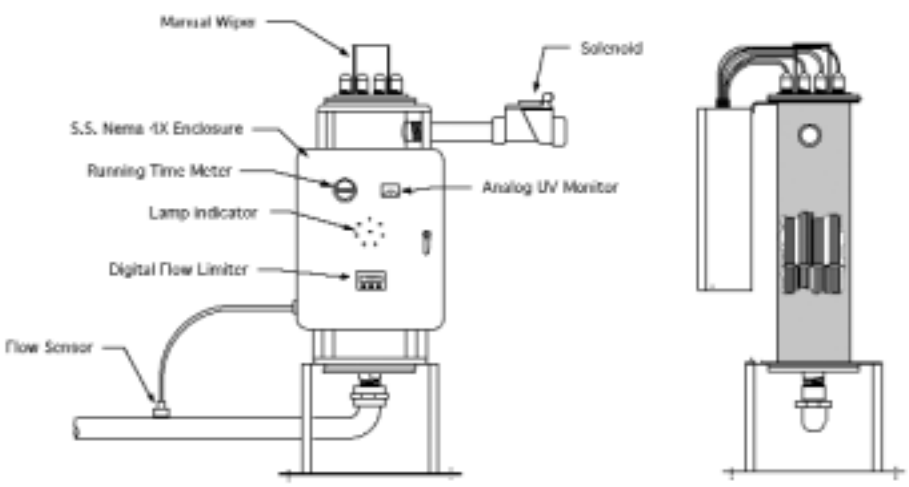
- **Lamp out indicators in the form of LEDs or a programmable logic center (PLC). Unit also should have an audible alarm that is triggered by the UV monitor. For systems requiring fewer than five lamps, the lamps each may have audible alarms.** Since most units are installed in remote locations, it is important to have a remote alarm (audible and visible) located in an accessible place. While the system control box should house individual lamp out alarms, the UV monitor should drive major alarms that will be located remotely.

- **Spare UV lamp(s), quartz sleeve(s) and O-ring(s) must be on site.** Having spares located on site will limit down time. It is recommended that you have the same number of lamps/sleeves as there are in the system.

- **An automatic flow control device should be incorporated into the system. A pre-filter will precede the unit.** For smaller systems, a generic flow control device will insure that the system is providing the required amount of UV energy. For larger systems, a flow control device may cause a head loss problem. In situations with larger flows, a flowmeter can be used if it is programmed to shut off if it exceeds the unit's flow rating.

- **The unit shall be equipped with an integral plunger swab for cleaning the quartz sleeves. System can be manual or automatic.** Any build-up on the quartz sleeves will interfere with UV transmission. A cleaning system will be supplied to ensure optimum performance.

- **A warm up device or an ultraviolet monitor to start the system.** It takes UV lamps a little while to warm up to peak performance. In order to ensure that the system is working, the system should trigger the UV monitor to open the solenoid once it has reached a safe limit. To further ensure that the system is working, a two-minute warm-up mechanism will be incorporated into the system.



Understanding local regulations for use of ultraviolet technology can be more complicated than understanding how this technology scrambles a microorganism's DNA.

Understanding and meeting these requirements may allow you to have your installations approved in a quicker, more efficient fashion. Everyone has a job to do. Health officials are looking after public welfare, water professionals are trying to provide the best solutions and manufacturers are working to help everyone meet these goals.

The best way to achieve these goals is to be completely prepared. When everyone is working as a team, the real winners will be the end users.
Everyone knows the old expression, "you can't fight City Hall." In this case, why would you want to? WQP

About the Author
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For more information on this subject, write in 1017 on the reader service card.

Overview of a Recent Installation

An elementary school required the disinfection of 100 gallons per minute (gpm) and the county Department of Health (DOH) required that the system meet all of the above regulations.

The school faced a number of issues. The goal was to install the system during the spring break week. The water professionals from Haque Water (The Water Source) in Wappingers Falls were concerned that a traditional flow control device would cause a pressure drop during peak usage: lunchtime.

Based on flow studies, they knew that the system would not exceed 90 gpm. They took this data and demonstrated how the system would meet and exceed every one of their regulations. Once they explained their concerns, they were able to get the system approved by the local DOH.

By taking their client's best interests into account and approaching the DOH with the appropriate backup material, they were able to provide the best solution.