WHITEPAPER: UV DISINFECTION FOR

Medical Facility Water

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The Issue

According to the EPA, medical facilities are the third largest consumers of water in the U.S., measured in water use intensity (WUI).[1] Heating, cooling, humidification, drinking, bathing, and cleaning are just some of the ongoing medical facility needs which require water. Given the sterile nature and high health standards required of a hospital, rehabilitation, or long-term medical facility, water safety needs to be carefully considered.

An estimated 65% of HAIs are associated with wet biofilms, or the presence of moisture or liquid.

Jan Dyer, Infection Control Today[2]

According to the CDC, infections and colonizations in medical facilities originate from the following sources:[3]

- Medical instruments improperly sterilized
- Insufficiently cleaned dialyzers/infusion devices
- Drinking water/ice machines
- Laboratory solutions
- Hydrotherapy tanks and pools
- Aerosols from shower heads or other sources
- Cooling towers and condensers
- Sink and drain splashing
- Faucets and handles
- Building water systems (premise plumbing)

A Water Management Program

It is incumbent upon healthcare facilities to reduce water-based risks through proper means of prevention and management. ASHRAE recommends establishing a program team to analyze, devise, and implement a Water Safety Plan (WSP) to ensure overall system hygiene in buildings like hospitals and other medical facilities.[4] According to the CDC, the principles of effective water management include:[5]

- Ensuring adequate disinfection
- Maintaining devices to prevent sediment, scale, corrosion, and biofilm
- Maintaining water temperatures to limit bacteria
- Preventing water stagnation

Documented UV-C Success

Adequate facility-wide water disinfection will involve more than chlorine or other chemicals. As one study reveals, UV disinfection is a safe and effective addition to your existing water management program, addressing the most common hospital outbreaks, such as Legionella[6] (see Table 1 for additional microbes).

After an extensive follow-up study at another hospital, Cambridge University Press stated, “Ultraviolet light usage was associated with negative water cultures and lack of clearly documented nosocomial Legionella infection for 13 years.”[7]

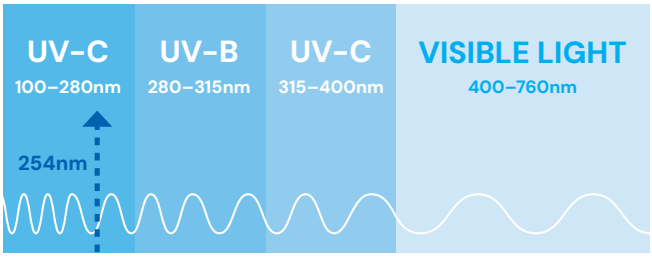

Figure 1: A Portion of the Electromagnetic Spectrum

UV-C rays at 254 nanometers (nm) attack the DNA of microorganisms, disrupting it to the point that they are unable to reproduce and are ultimately eliminated.

UV-C Doses

The UV-C doses below will inactivate many bacteria that can be found in medical facility water systems. Millijoules per square centimeter (mJ/cm^2) measure energy produced by germicidal lamps over a certain amount of time.

Microorganism	UV Dose (mJ/cm^2)
Klebsiella pneumoniae	7.0
Enterobacter cloacae	12.80
Pseudomonas aeruginosa	3.90
Serratia marcescens	6.160
Legionella	12.30
Acinetobacter baumannii	1.80

Table 1: UV-C Doses to Neutralize Waterborne Bacteria

UV-C Solutions

Water can be disinfected at two places within medical facilities: the point of entry or the point of use. Point of entry models can neutralize microbes of concern in facility-wide water systems.

Point of Entry Disinfection

Feature	Sanitron®	Megatron®
Flow Rate (GPM)	3–40	90–450
Min. Clearance (Lamp/Quartz)	17–50"	71”
Min. Clearance (Gland Access)	6"	12–24”
Lamp Indicators		✓
Number of Lamps Per Unit	1	4–19
Modular Models for Higher Flow Rate	✓	✓
NSF® Certified Models	✓	
Sight Port	✓	✓
Drain Fitting	✓	✓
HMI Touchscreen		✓
Dual-Action Wiper	✓	Manual or Auto
UV Monitor	Optional	Standard
Audio Alarm	Optional	
Solenoid Valve	Optional	
Flow Control Valve	Optional	

Table 2: Comparison of Point-of-Entry UV Water Disinfection Models

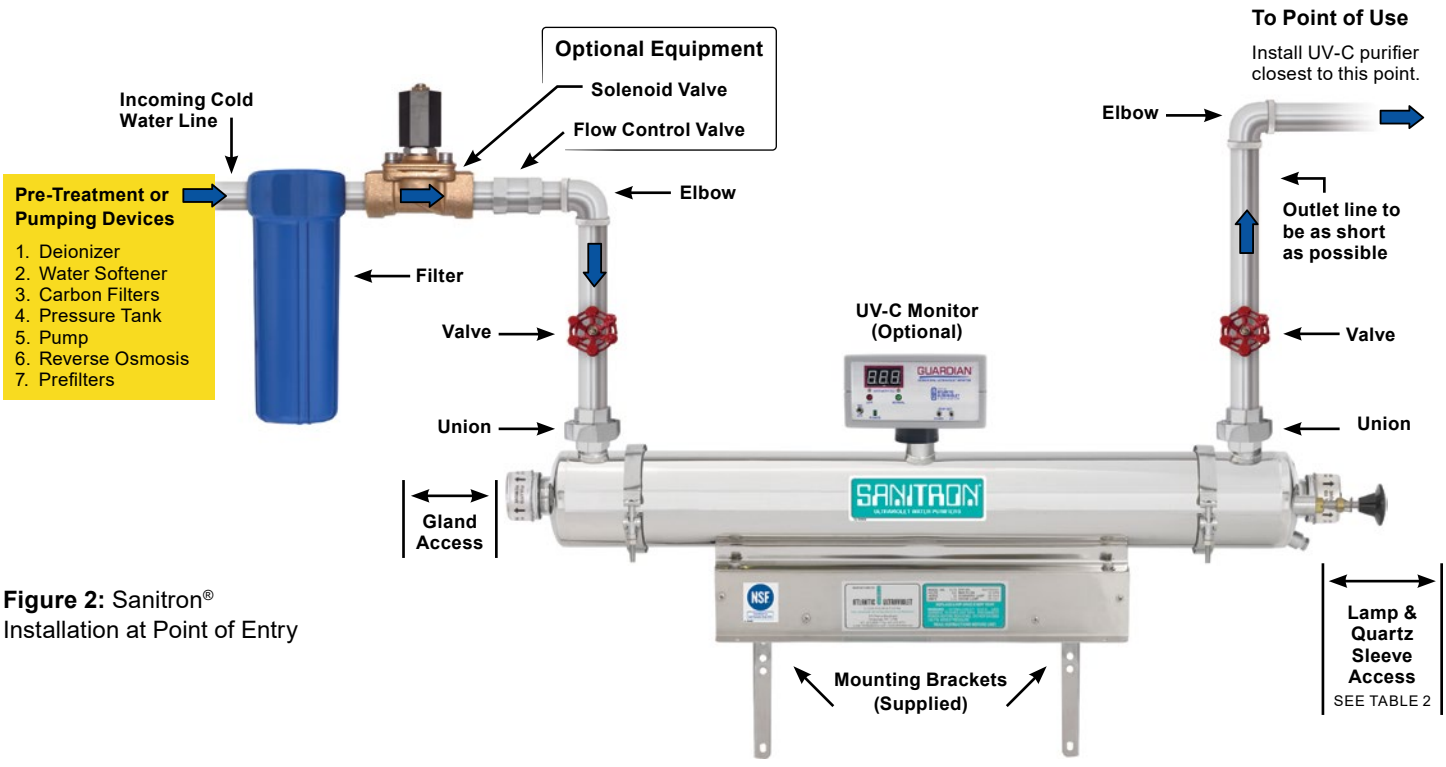

Figure 2: Sanitron® Installation at Point of Entry

UV-C Solutions

Point of Use Disinfection

A point of use UV purifier adds another layer of disinfection immediately before the tap. Operating rooms, patient rooms, examination rooms, and dialysis treatment rooms can benefit from sanitized water flow from their sinks. Our Bio-Logic® models are a perfect option for underneath the sink, making high quality disinfected water available for cleaning and washing. Bio-Logic® models are available as standalone water purifiers (model BIO-1.5 or BIO-3.0) or with a dual-filter system (Bio-Logic® with Pure Water Pack™).

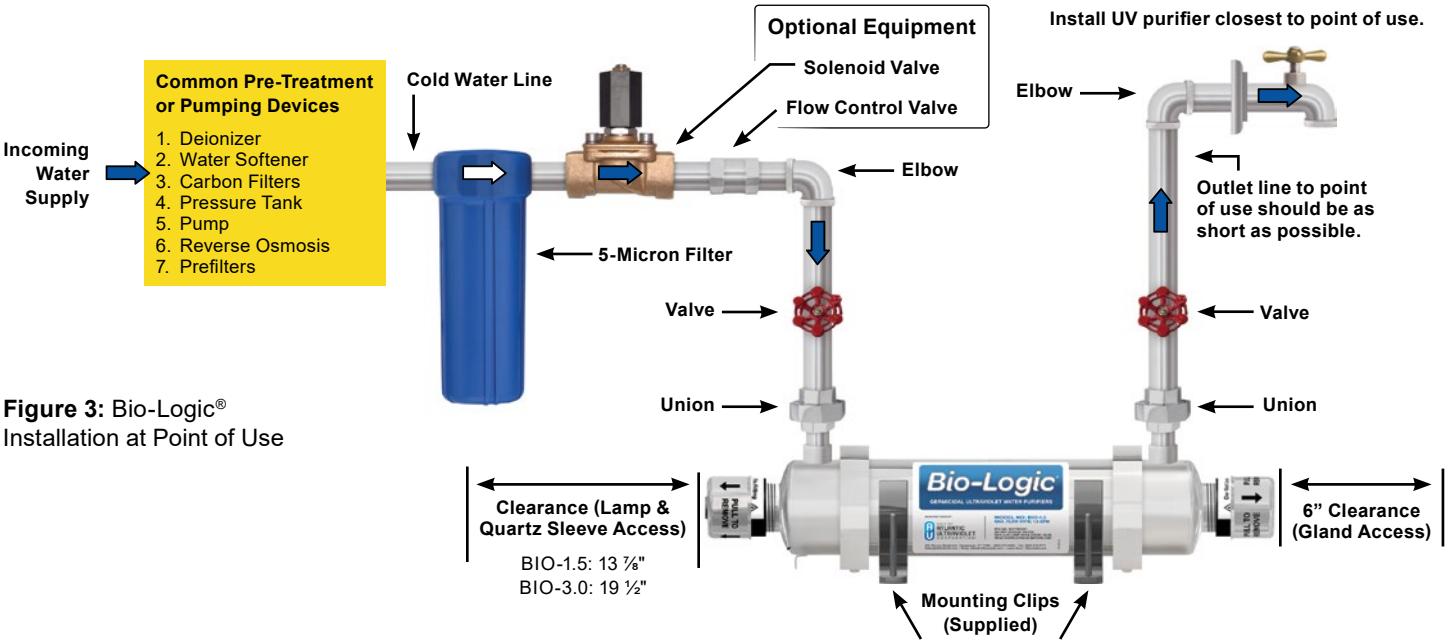

Figure 3: Bio-Logic®
Installation at Point of Use

Sources

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