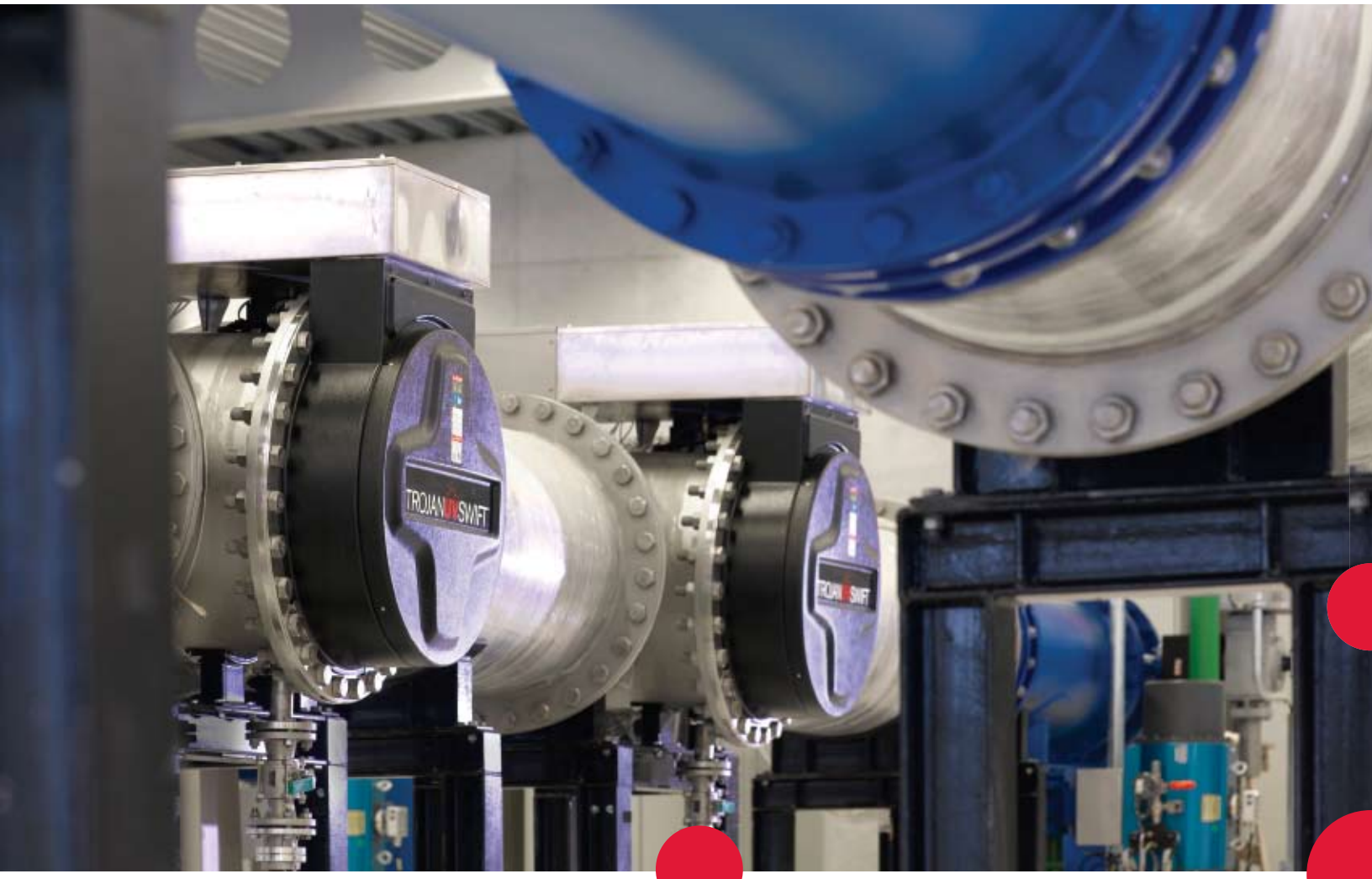
TROJAN UV SWIFT™

DRINKING WATER TREATMENT



TROJANUVSWIFT™

The reference standard in UV

Proven, validated treatment solutions for disinfection and taste & odor control

Trojan Technologies Inc. is an ISO 9001 registered company that has set the standard for proven UV technology and ongoing innovation for more than 25 years. With unmatched scientific and technical expertise, and a global network of water treatment specialists, representatives and service technicians, Trojan is trusted more than any other company as the best choice for municipal UV solutions. Trojan has the largest UV installation base worldwide – a base that includes today's highest capacity UV drinking water treatment systems.

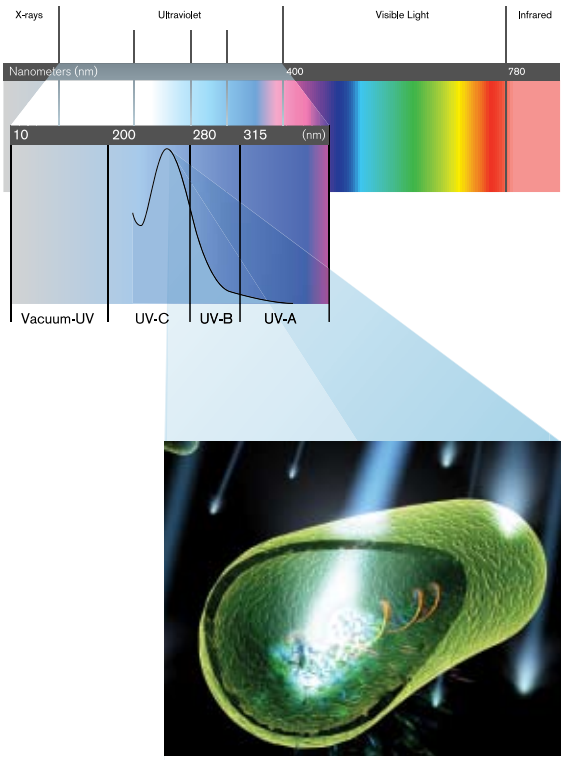
The TrojanUVSwift™ is a testament to our commitment to providing water confidence. This compact system has demonstrated its installation flexibility and effective, reliable performance around the world in hundreds of installations. Available in multiple inlet/outlet diameters, it is well suited to drinking water disinfection projects – new and retrofit applications – for a wide range of flow rates. The TrojanUVSwift™ is also upgradeable to models designed to treat the compounds responsible for seasonal taste and odor events (e.g. MIB and geosmin) and other chemical contaminants. Known as the TrojanUVSwift™ECT (Environmental Contaminant Treatment), this UV system uses specialized controls in conjunction with hydrogen peroxide (H_2O_2) to cost-effectively perform UV-oxidation.

Engineered and built for dependable performance, the TrojanUVSwift™ requires a minimal number of lamps to treat a given flow, and is serviceable from one side for easy maintenance. It also incorporates innovative features to reduce O&M costs, including efficient, variable output, electronic ballasts and Trojan's revolutionary ActiClean™ system – the industry's only dual-action, sleeve cleaning system.

The Benefits of UV

Broad-spectrum, cost-effective protection that offers unparalleled safety

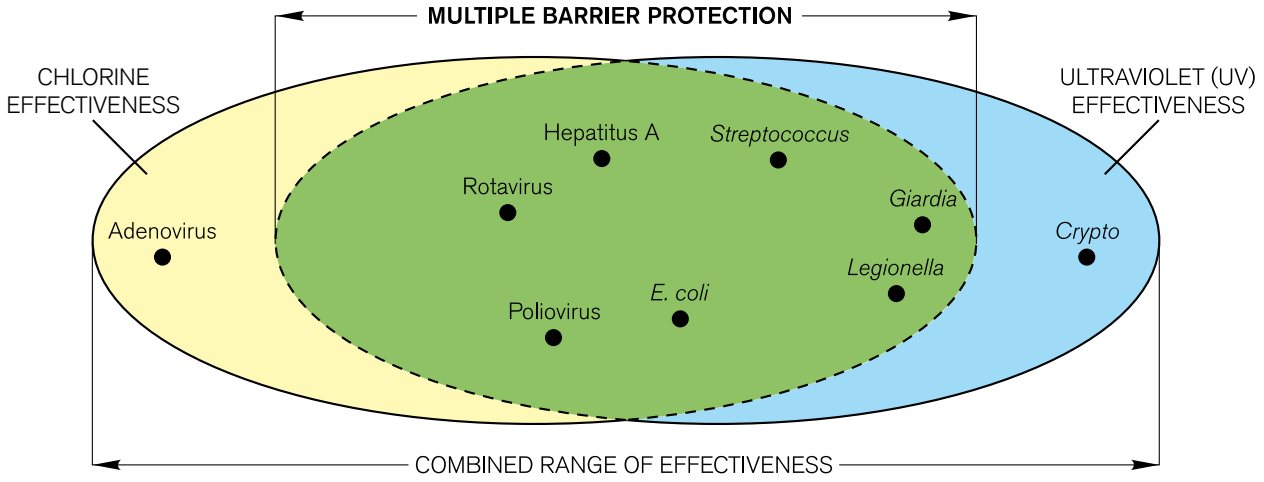
- UV light is an environmentally-friendly, chemical-free way to safeguard water against harmful pathogens
- Proven in thousands of installations, UV is widely accepted and endorsed worldwide for disinfection of drinking water
- UV offers broad-spectrum protection against a wide range of pathogens, including bacteria, viruses, and chlorine-resistant protozoa
- UV treatment provides *Cryptosporidium* and *Giardia* inactivation of up to 4-log at low doses
- UV is a reliable, cost-effective part of a multi-disinfectant treatment strategy often used in conjunction with chlorine to provide a dual barrier
- UV does not create disinfection by-products (DBPs) and does not affect taste
- At approximately 1/5 the cost of ozone disinfection and 1/10 the cost of membrane filtration, UV is the most cost-effective approach for multi-barrier treatment strategies
- Trojan's user-friendly UV-oxidation solutions use UV light and hydrogen peroxide to eliminate the chemical compounds responsible for taste & odor events, as well as endocrine disruptors, nitrosamines, 1,4-dioxane, and other contaminants



Ultraviolet light is invisible to the human eye, but a highly effective, chemical-free way of inactivating microorganisms in water. UV light penetrates the cell wall of the microorganism and alters its DNA so it can no longer reproduce or cause infection.

Benefits of a Multiple Barrier Treatment Approach

- UV offers a cost-effective, secondary barrier of protection to safeguard drinking water against virtually all microorganisms treated by chlorine – as well as proven inactivation of chlorine-resistant protozoa, including *Cryptosporidium* and *Giardia*. Dual barrier treatment using UV provides significantly greater community safety and reduced liability risk for municipalities



TROJAN UVSWIFT™

Electronic Ballasts

High efficiency, variable output (30 – 100%) electronic ballasts are enclosed in an epoxy-painted, carbon steel case for indoor installation. Provide stable power and allow dose-pacing – adjusting lamp intensity to flow and water conditions in order to optimize disinfection performance, minimize power consumption, and extend lamp life.

Control Power Panel (CPP) & Alarms

The PLC-based CPP monitors and controls all UV functions and dose pacing, and can be configured to automatically trigger valves and other components. User-friendly, touch-screen operator interface provides at-a-glance system status. Communicates with plant SCADA systems, allowing operators to remotely monitor UV system performance, lamp status, power levels, hours of operation and other parameters.

Features extensive alarm reporting system to ensure fast, accurate diagnostics of process and maintenance alarms. Programmable control software can generate unique alarms for individual applications.

OptiView™ UVT Monitor

Optional, on-line UV transmittance (UVT) monitoring system provides highly accurate readings and offers added reassurance that proper UV dose is maintained during water quality changes. Integrates easily with Control Power Panel and plant SCADA systems using a 4-20 mA output corresponding to the UVT level.

UV Reactor

Hydraulically efficient reactor is extremely compact with optimized flow characteristics to minimize headloss and eliminate 'short circuiting.' Designed and refined using extensive 3-D computational fluid dynamic (CFD) modeling and verified with bioassay validation. Offers flexibility to be installed horizontally or vertically. Available in multiple inlet/outlet diameters. Rated for up to 150 psi (10 bar). Upgradeable – additional lamps can be added post-installation in response increased capacity requirements.

Medium-Pressure UV Lamps

High-output, medium-pressure lamps minimize the number of lamps required to treat a given flow. Fewer lamps allows for an extremely compact UV reactor, thus allowing installation flexibility in pipe galleries, and minimizing O&M costs for lamp changeouts.

UV Intensity Sensor

The UV sensor continuously monitors UV lamp output to ensure specified dose levels are maintained. The system can be configured with one sensor per lamp for maximum assurance of disinfection performance.

ActiClean™ Sleeve Cleaning System

Optional, dual-action cleaning system uses mechanical wiping in conjunction with a food-grade cleaning gel contained within the sleeve wiping collars to eliminate fouling and residue. Programmable cycling cleans lamp and sensor sleeves on-line automatically without disrupting disinfection or operator involvement, to ensure optimal system operation and dose delivery.

Key Benefits

TrojanUVSwift™

Proven performance – fully validated. TrojanUVSwift™ systems have undergone comprehensive validation at a wide range of flow rates and UV transmittance levels in full compliance with the protocols of the USEPA UV Guidance Manual.

Assurance of NSF 60/61 compliance. The TrojanUVSwift™ system and the food-grade ActiClean™ sleeve cleaning gel meet the stringent standards of NSF International.

Compact footprint for installation flexibility. TrojanUVSwift™ systems can handle maximum flow capacity in minimal space. The compact design allows them to be installed vertically or horizontally in restrictive spaces, thereby lowering installation costs. The systems can even be installed immediately after a 90˚ elbow and other upstream piping configurations.

Dual-action sleeve cleaning system reduces maintenance costs. Patented ActiClean™ system uses mechanical wiping and a food-grade cleaning gel to eliminate fouling automatically while the system is disinfecting – eliminating the expense of taking the system off-line for manual cleaning.

Designed for maximum operating efficiency. High efficiency, electronic ballasts allow lamp output to be adjusted from 30% to 100% to match dose to actual disinfection requirements, minimize operating costs, and extend lamp life.

Fewer lamps required to treat a given flow. Trojan's use of high-intensity, medium-pressure lamps minimizes the number of lamps and seals, and reduces maintenance.

Upgradeable for taste & odor control. Using our advanced UV-oxidation process, the TrojanUVSwift™ECT is available to provide a low maintenance, cost-effective alternative to PAC, GAC or ozone to address seasonal taste & odor events, as well as provide a barrier to a variety of chemical compounds.

Global support. Local service. Trojan's comprehensive network of certified service providers offers ongoing maintenance programs and fast response for service and spare parts.

Guaranteed performance and comprehensive warranty. Trojan systems include a Performance Guarantee and comprehensive protection for your investment. Ask for details.

Compact Reactor Design for Installation Flexibility

Smallest footprint in the industry reduces installation costs

Benefits:

- Compact footprint simplifies installation and minimizes related capital costs
- Engineered to fit into restrictive pipe galleries, including incorporation after individual filter beds
- Designed for horizontal or vertical installation to allow maximum flexibility
- Reactor is fully serviceable from one side – allowing the system to be installed tight to walls, other equipment or piping
- Validated with a 90˚ elbow installed immediately before the reactor to ensure consistent dose delivery – even under challenging hydraulic conditions created by upstream piping
- Highly efficient hydraulic design minimizes headloss, simplifying integration into existing processes
- Control panel can be located with the reactor or remotely

Developed in consultation with Operators and Consulting Engineers, the TrojanUVSwift™ is extremely space efficient. Its compact footprint allows the system to be integrated into restrictive pipe galleries of water treatment facilities – reducing installation costs and eliminating the need for larger buildings or additions.

ActiClean™ Dual-Action Automatic Cleaning System

Optional cleaning system sets the standard in preventing sleeve fouling

Benefits:

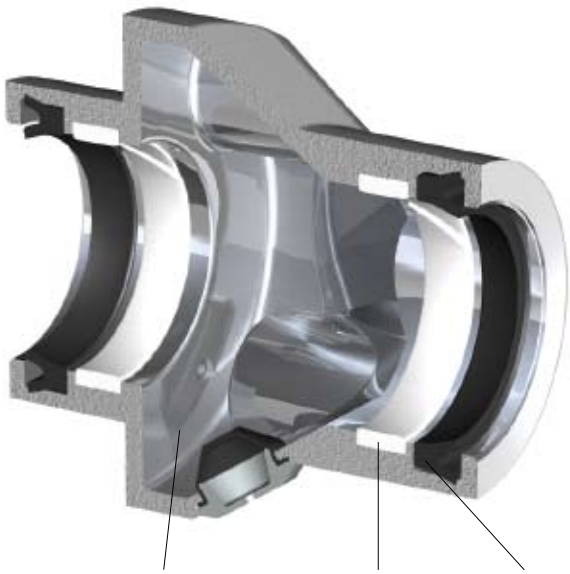
- Significantly better cleaning – combination of food-grade cleaning gel and mechanical action removes deposits on sleeves much more effectively than mechanical wiping alone
- Ensures performance for more reliable dose delivery
- Elimination of fouling factor reduces equipment sizing requirements and power consumption
- ActiClean™ provides on-line sleeve cleaning automatically while the system is disinfecting – eliminating the need and labor costs of taking the system off-line for routine manual cleaning
- Innovative wiper design incorporates a small quantity of ActiClean™ Gel for superior, dual-action cleaning
- Trojan's ActiClean™ cleaning system has been proven effective in hundreds of systems around the world
- ActiClean™ can be added to an installed TrojanUVSwift™ not originally equipped with a cleaning system

The dual-action ActiClean™ sleeve cleaning system uses a combination of mechanical wiping and an NSF 60 certified food-grade cleaning agent to provide unparalleled elimination of fouling. The patented system reduces O&M costs, and operates on-line while the system is disinfecting.

ActiClean™ Gel is Safe and NSF 60 Compliant

- ActiClean™ Gel is comprised of food-grade ingredients and meets NSF/ANSI Standard 60
- Lubricating action of cleaning gel maximizes life of wiper seals

NSF International

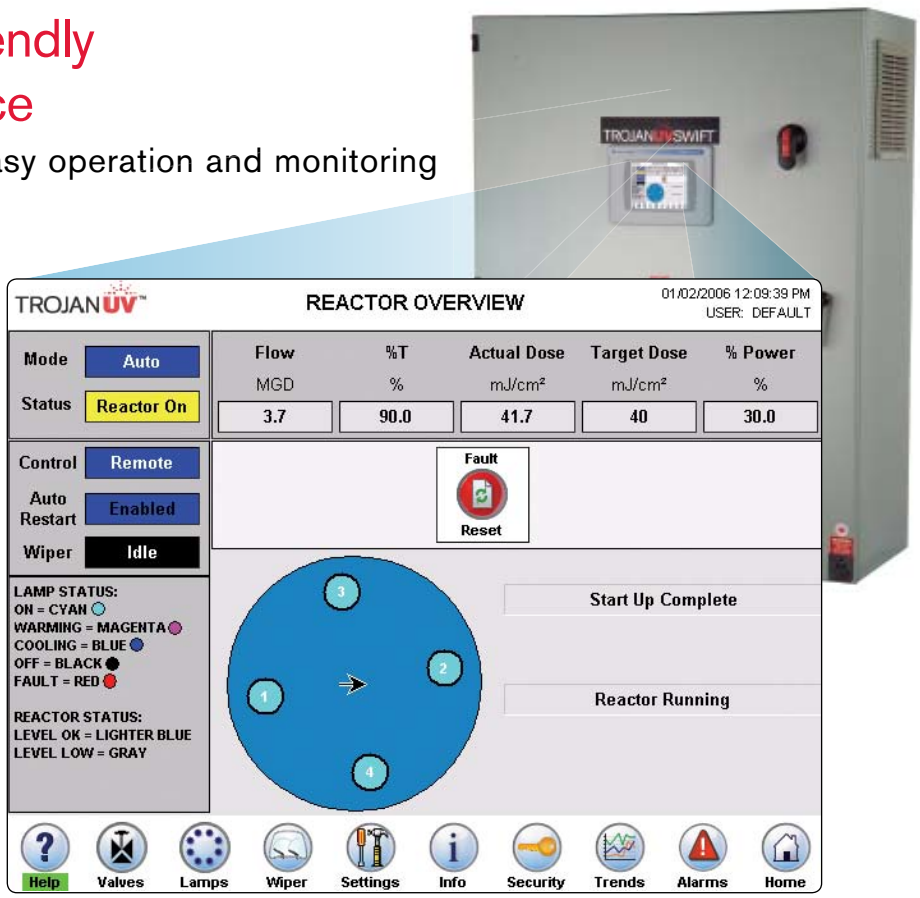


Intuitive, Operator-Friendly Controller and Interface

Touch-screen display allows easy operation and monitoring

Benefits:

- PLC-based system controls all UV functions and dose pacing to minimize energy use while maintaining required dose
- Controller features intuitive, graphical display for at-a-glance system status
- Controller communicates with plant SCADA systems for centralized monitoring of UV performance, lamp status, power levels, hours of operation and alarm status
- Extensive alarm reporting system for fast, accurate determination of process and maintenance alarms



The TrojanUVSwift™ controller is equipped with a robust PLC and touch-screen display configured for user-friendly operation. The system provides dose pacing for optimized disinfection performance and communicates with plant SCADA systems for centralized monitoring.

Performance Assurance for Peace of Mind

Dose accuracy is ensured by comprehensive validation and robust UV sensors

Benefits:

- USEPA field validation of all systems over a wide range of flow rates, UVT levels, and other water quality parameters
- UV sensors are filtered for germicidal UV wavelengths, in accordance with USEPA validation requirements, for more accurate dose delivery
- ActiClean™ system ensures optimal UV output and measurement
- System can be configured with one sensor per lamp for maximum accuracy

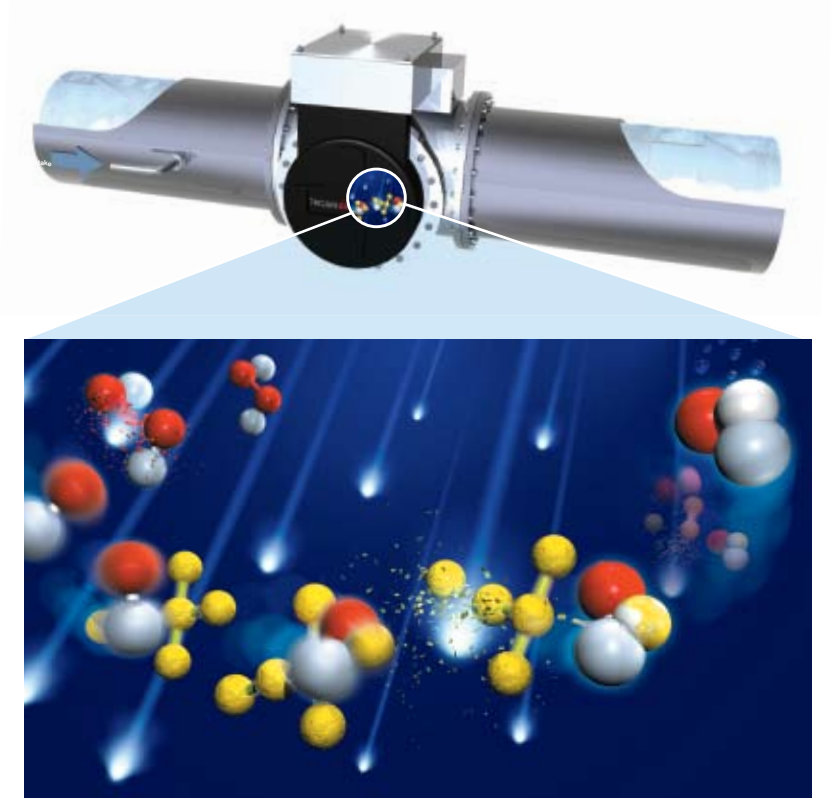
The TrojanUVSwift™ is designed to accommodate one sensor per lamp to allow highly accurate monitoring of UV output and system performance. Systems include a NIST-traceable reference sensor for simple, on-line sensor calibration checks.

Upgradeable for Changing Requirements and Taste & Odor Control

Designed to address future capacity demands and eliminate chemical contaminants

Benefits:

- Reactors can be configured to accept additional lamps after installation to cost-effectively meet increased capacity, system redundancy, or taste & odor (T&O) treatment requirements
- The TrojanUVSwift™ECT, an upgraded system for Environmental Contaminant Treatment, acts as a barrier against microbial contaminants, as well as nitrosamines, endocrine disruptors, pesticides, and other chemical compounds
- The TrojanUVSwift™ECT provides year-round disinfection and simultaneously addresses seasonal T&O events
- Trojan's UV-oxidation systems use patented controls to effortlessly combine UV with hydrogen peroxide (H_2O_2) and minimize operation and maintenance costs
- Trojan UV-oxidation offers lower operating costs/installed building capital costs than ozone and carbon-based T&O control, plus the ability to treat high T&O-causing compound concentrations



Additional lamps can be added to installed TrojanUVSwift™ units to allow them to handle greater flow volumes or address changes in water characteristics. The system can also be upgraded to treat chemical contaminants, such as NDMA and pesticides, as well as address seasonal taste and odor events.

Built for Reliable Performance and Easy Maintenance

Designed for trouble-free operation and minimal service

Benefits:

- Automatic ActiClean™ sleeve cleaning system works while the UV lamps are disinfecting
- Routine procedures, including lamp changeouts and sensor calibration checks, are simple and require minimal time – reducing maintenance costs

With hundreds of installations, the TrojanUVSwift™ has demonstrated proven reliability in the field. The system was designed for easy service, and all routine maintenance procedures require access to only one side of the reactor.

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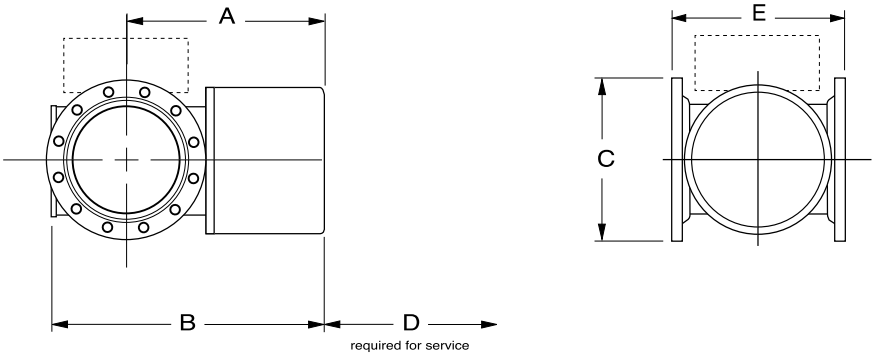
System Specifications

System		UVSwift 12	UVSwift 24	UVSwift 30
Max Flow Rate		6 MGD (950 m³/h)	25 MGD (3950 m³/h)	40 MGD (6300 m³/h)
UV Transmittance at 254nm/cm^{-1}		70 – 98%		
Number of Lamps		up to 4	up to 8	up to 16
Total Lamp Power		1.8 – 12 kW	5.7 – 75 kW	14 – 200 kW
Max System Pressure		150 psi (10 bar)		
Dual-Action On-Line Sleeve Cleaning System		Optional		
Max Ambient Operating Temperature		40°C		
Max Water Temperature		30°C		
Reactor				
Material		316L SS		
Flange Types		ANSI 12" 150 lb	ANSI 24" 150 lb	AWWA 30" Class B
		AWWA 12" Class D	AWWA 24" Class D	AWWA 30" Class D
		DIN 2576 300 mm PN10	BS4504 600 mm PN16	DIN 800 mm PN 6
			BS10 TABLE E 24"	DIN 800 mm PN10
Drain and Vent Ports	Standard	1-1/2" Vent	1-1/2" Drain and Vent	2" Drain, 1-1/2" Vent
	Optional	3/4" NPT Adapter or Vent	3/4" NPT Adapter	
NSF Certfication 60/61		✔		
Control Panel				
Material		Painted Mild Steel		
Environmental Rating		Type 12 (IP54)		
Separation Distance (Reactor to Control Panel)		Up to 60' (18.5 m)	Up to 72' (22 m)	
Power Input Options		480V, 3 Phase, 4 Wire + GND, 60Hz	480V, 3 Phase, 3 Wire + GND, 60Hz	
		380 – 415V, 3 Phase, 4 Wire + GND, 50Hz		
		600V, 3 Phase, 3 Wire + GND, 60Hz (Step Down Transformer required)		
		240V, 1 Phase, 3 Wire + GND, 60Hz		
		240V, 3 Phase, 3 Wire + GND, 60Hz		
UL & CE Certfication		✔		
Ethernet Network Interface		✔		
Operational Data Trending		✔		
Standard Hardwired Outputs	System On/Off Status	✔		
	UV Dose	✔		
	Alarm Status	✔		
Remote Monitoring Modem		✔		
UPS		Optional		
Inlet/Outlet Valve Control		Optional		
Approx. Reactor Dimensions				
A		25" (635 mm)	34" (864 mm)	36" (914 mm)
B		36" (914 mm)	54" (1372 mm)	62" (1574 mm)
C		19" (483 mm)	32" (813 mm)	39" (991 mm)
D		15" (381 mm)	24" (610 mm)	48" (1219 mm)
E		21" (533 mm)	35" (889 mm)	53" (1346 mm)



Find out how your drinking water treatment plant can benefit from the TrojanUVSwift™ or TrojanUVSwift™ECT – call us today.

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WATER CONFIDENCE™

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