

DRINKING WATER TREATMENT



The Reference Standard in UV

Proven, validated treatment solutions for disinfection and taste & odor (T&O) control

UV's environmental and water quality benefits for disinfection of drinking water are proven and embraced by communities large and small. Offering broad-spectrum protection against a wide range of pathogens, including bacteria, viruses and chlorine-resistant protozoa (such as *Cryptosporidium* and *Giardia*), UV is a reliable, cost-effective part of a multi-barrier treatment strategy.

The TrojanUVSwift™ is a testament to our commitment to providing water confidence. Available in multiple flange sizes, it is well suited to drinking water disinfection projects – new and retrofit applications – for a wide range of flow

rates. Many TrojanUVSwift models can be upgraded to treat the compounds responsible for seasonal T&O events (e.g. MIB and geosmin) and other chemical contaminants. Known as TrojanUVSwift™ECT (Environmental Contaminant Treatment), these UV systems use specialized controls in conjunction with hydrogen peroxide (H₂O₂) to cost-effectively perform UV-oxidation.

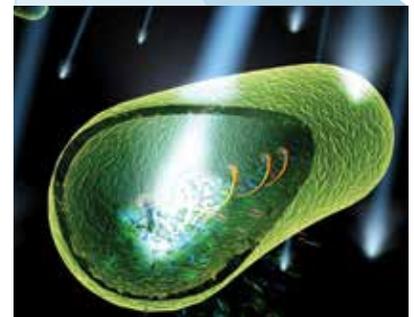
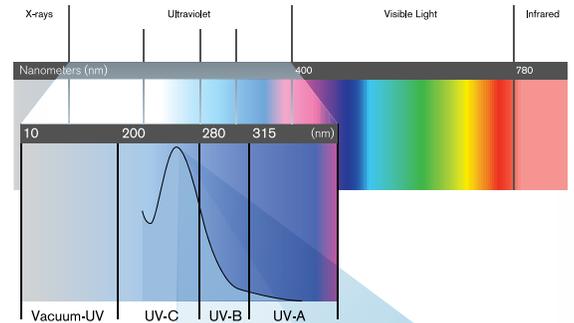
Engineered and built for dependable performance, the TrojanUVSwift requires a minimal number of lamps to treat a given flow, and is serviceable from one side for easy maintenance.

It also incorporates innovative features to reduce operation and maintenance (O&M) costs, including variable output electronic ballasts and our revolutionary ActiClean™ automatic sleeve wiping system.

The Benefits of UV

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

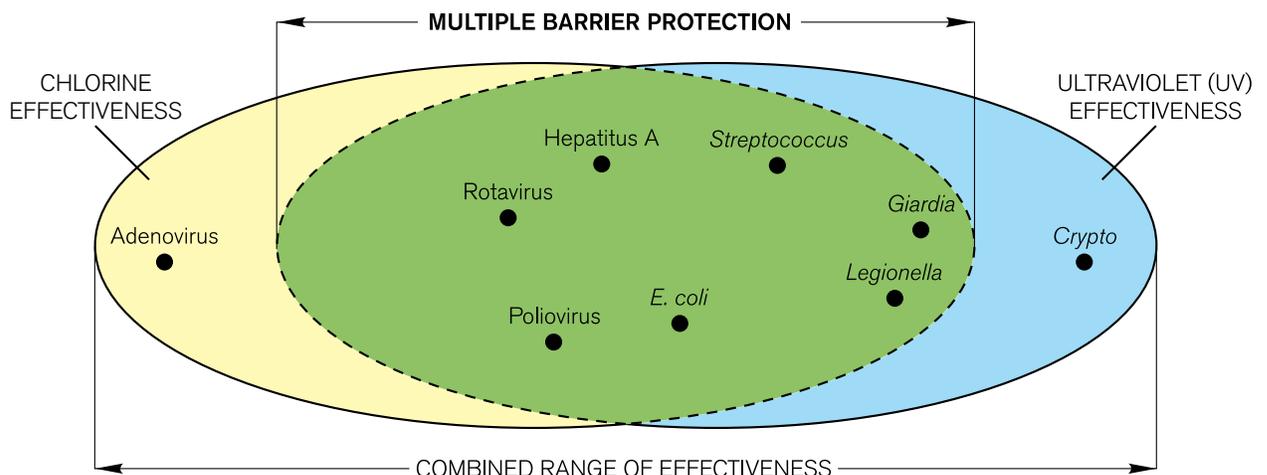
- A chemical-free way to safeguard water against harmful pathogens
- Broad-spectrum protection against a wide range of pathogens, including bacteria, viruses, and chlorine-resistant protozoa
- Provides *Cryptosporidium* and *Giardia* inactivation of up to 4-log (99.99%)
- Does not create disinfection by-products (DBPs) and does not affect taste
- At approximately 1/5th the cost of ozone disinfection and 1/10th the cost of membrane filtration, UV is the most cost-effective approach for multi-barrier treatment strategies
- User-friendly UV-oxidation solutions combine UV light and hydrogen peroxide to eliminate the chemical compounds responsible for T&O events, as well as endocrine disruptors, nitrosamines, 1,4-dioxane and other contaminants



UV 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 and 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*. Treatment using UV provides significantly greater community safety and reduced liability risk for municipalities



Control Power Panel (CPP) & Alarms

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.

The Programmable Logic Controller (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, touchscreen operator interface provides at-a-glance system status. Communicates with plant Supervisory Control and Data Acquisition (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 CPP and plant SCADA systems using a 4-20 mA output corresponding to the UVT level.

UV Chamber

Hydraulically-efficient chamber is extremely compact with optimized flow characteristics to minimize head loss and eliminate short-circuiting. Designed and refined using extensive 3D computational fluid dynamic (CFD) modeling and verified with bioassay validation. Offers flexibility to be installed horizontally or vertically. Available in multiple flange diameters. Rated for up to 150 PSI (10 bar). Additional lamps can be added post-installation in response to 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 chamber, thus allowing installation flexibility in pipe galleries, and minimizing O&M costs for lamp change-outs.

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 cleaning gel contained within the sleeve wiping collars to eliminate fouling and residue. Programmable cycling cleans lamp and sensor sleeves automatically without disrupting disinfection or operator involvement.

Key Benefits

TrojanUVSwift

Proven performance – fully validated. Comprehensive validation at a wide range of flow rates and UV transmittance levels in full compliance with the protocols of the United States Environmental Protection Agency (USEPA) UV Disinfection Guidance Manual.

Assurance of NSF 60/61 compliance. Meets the stringent standards of NSF International.

Compact footprint for installation flexibility. 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 hydraulically-challenging upstream piping configurations.

Dual-action sleeve cleaning system reduces maintenance costs. ActiClean system uses mechanical wiping and a 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 maintain dose in varying water qualities.

Fewer lamps required to treat a given flow. High-intensity, medium-pressure lamps minimize the number of lamps and seals, and reduces maintenance.

Upgradeable for T&O control. Using our advanced UV-oxidation process, the TrojanUVSwiftECT is available to provide a low maintenance, cost-effective alternative to powdered activated carbon, granular activated carbon or ozone to address seasonal T&O events, as well as provide a barrier to a variety of chemical compounds.

Global support. Local service. Comprehensive network of certified service providers offers ongoing maintenance programs and fast response for service and spare parts.

Guaranteed performance and comprehensive warranty. Our systems include a Performance Guarantee and comprehensive protection for your investment.

Compact Chamber Design for Installation Flexibility

Small footprint reduces installation costs

Benefits:

- Engineered to fit into restrictive pipe galleries, including installation after individual filter beds
- Designed for horizontal or vertical installation to allow maximum flexibility
- Chamber 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 chamber to ensure dose delivery – even under challenging hydraulic conditions created by upstream piping
- Efficient hydraulic design minimizes head loss, simplifying integration into existing processes
- Control panel can be located with the chamber or remotely



Compact footprint enables the integration of the TrojanUVSwift into restrictive pipe galleries – 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 cleaning gel and mechanical action removes deposits on sleeves much more effectively than mechanical wiping alone
- Ensures performance for more reliable dose delivery
- Reduced fouling factor leads to lower equipment sizing requirements and power consumption
- Provides automatic sleeve cleaning 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
- 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 cleaning gel to provide unparalleled elimination of fouling.

ActiClean Gel is Safe and NSF 60 Compliant

- ActiClean Gel meets NSF/ANSI Standard 60
- Lubricating action of cleaning gel maximizes life of wiper seals



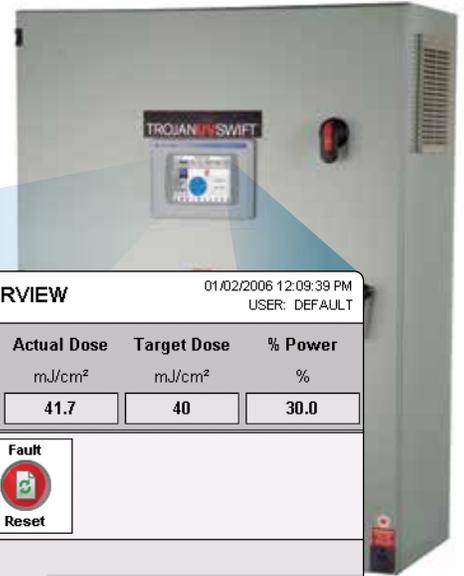
ActiClean
Gel Reservoir

Teflon
Bearing

Rubber
Wiper Seal

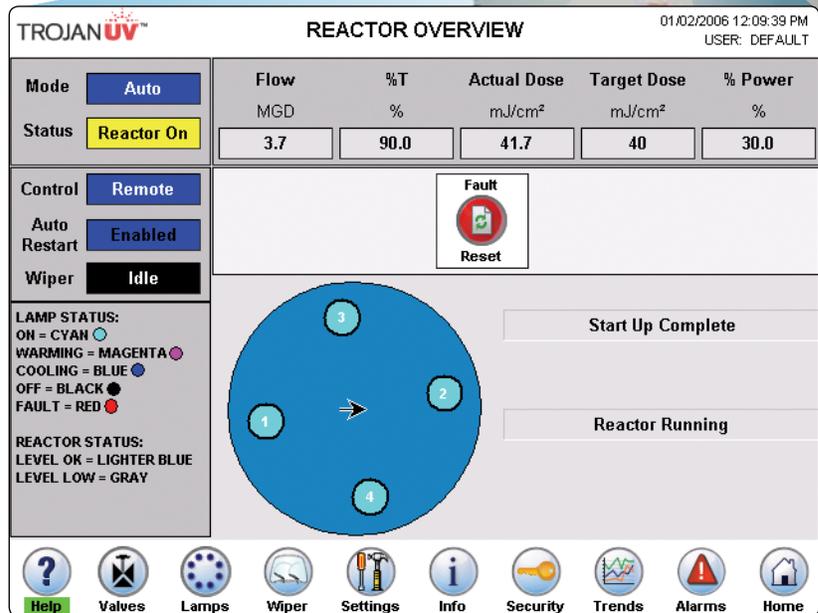
Intuitive, Operator-Friendly Controller and Interface

Touchscreen 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 touchscreen 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 validation of all systems over a wide range of flow rates, UVT levels, and other water quality parameters
- ActiClean system ensures optimal UV output and measurement
- System can be configured with one sensor per lamp for maximum accuracy



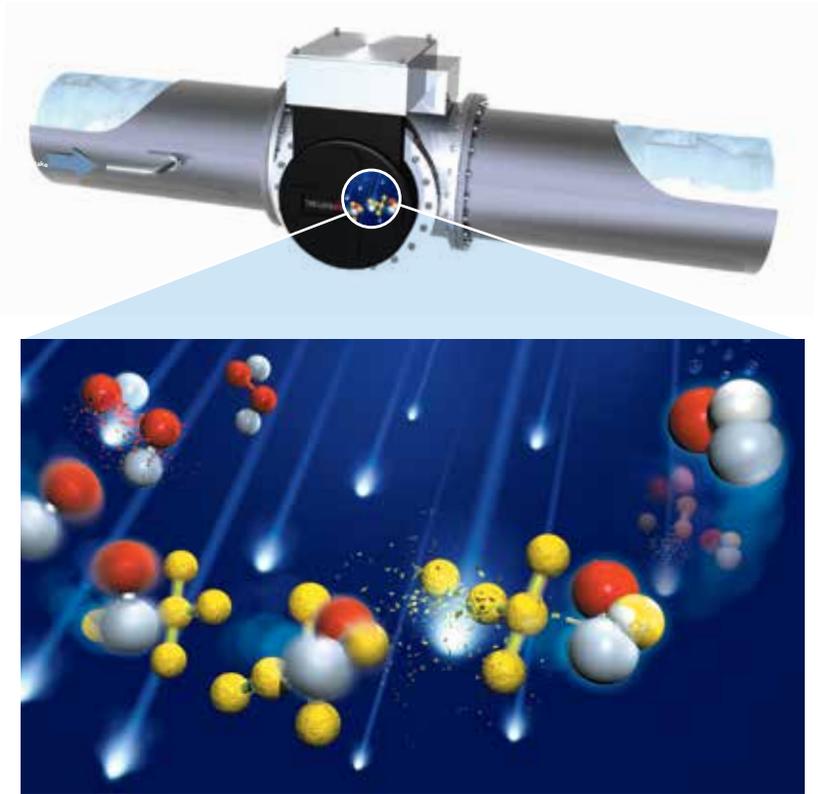
The TrojanUVSwift is designed to accommodate one sensor per lamp to allow highly accurate monitoring of UV output and system performance. Systems include a National Institute of Standards and Technology (NIST)-traceable reference sensor for simple, on-line sensor calibration checks.

Upgradeable for Changing Requirements and T&O Control

Designed to address future capacity demands and eliminate chemical contaminants

Benefits:

- Chambers can be configured to accept additional lamps after installation to cost-effectively meet increased capacity, system redundancy, or T&O treatment requirements
- The TrojanUVSwiftECT, 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
- Provides year-round disinfection and simultaneously addresses seasonal T&O events
- Patented controls combine UV with hydrogen peroxide (H_2O_2) and minimize operation and maintenance costs
- 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 T&O events.

Built for Reliable Performance and Easy Maintenance

Designed for trouble-free operation and minimal service

Benefits:

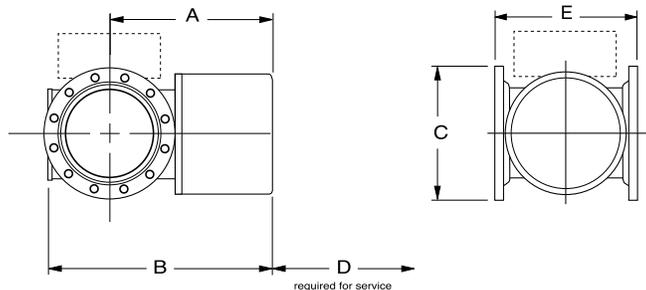
- Automatic ActiClean sleeve cleaning system works while the UV lamps are disinfecting
- Routine procedures, including lamp change-outs and sensor calibration checks, are simple and require minimal time



The system was designed for easy service, and all routine maintenance procedures require access to only one side of the chamber.

System Specifications

System		TrojanUVSwift 12	TrojanUVSwift 24	TrojanUVSwift 30	
Max Flow Rate		6 MGD (950 m ³ /h)	25 MGD (3950 m ³ /h)	40 MGD (6300 m ³ /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			
Chamber					
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 PN6	
			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 Certification 60/61		✓			
Control Power Panel					
Material		Painted Mild Steel			
Environmental Rating		Type 12 (IP54)			
Separation Distance (Chamber to Control Power 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 Certification		✓			
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. Chamber 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)	



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