TROJAN UV SWIFT™ SC

DRINKING WATER TREATMENT

Water Confidence for Communities Large & Small

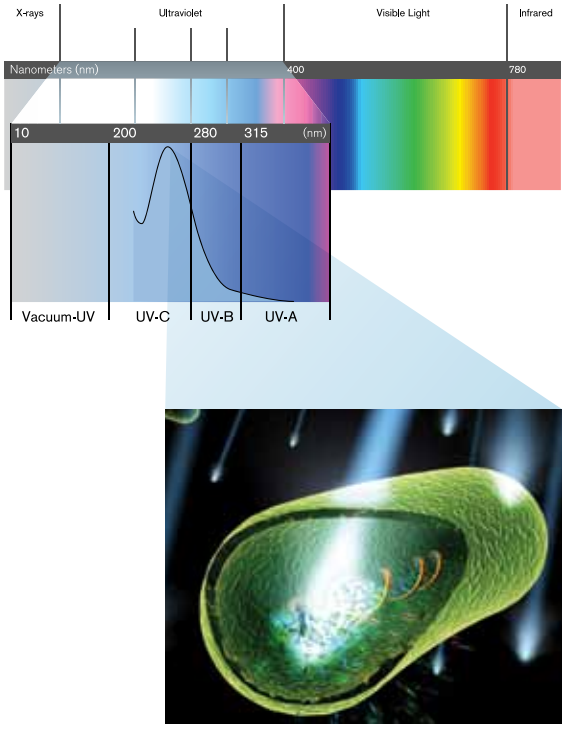
Trojan's proven UV solutions provide validated, cost-effective disinfection

Trojan Technologies is an ISO 9001: 2000 registered company and for more than 30 years has set the standard for proven UV technology and ongoing innovation. With unmatched scientific and technical expertise, and a global network of specialists, representatives and technicians, Trojan is trusted more than any other firm as the best choice for municipal UV solutions – worldwide. The TrojanUVSwift™SC is one of the reasons why. With units designed to treat flow rates of 2 gallons per minute (GPM) to 16 million gallons per day (MGD) 0.5 to 2,523 m^3/hr, these compact, robust UV systems offer communities an efficient, economical solution for drinking water disinfection. Like all Trojan drinking water products, the TrojanUVSwift™SC is bioassay validated, having undergone rigorous DVGW and USEPA certification to ensure verified dose delivery, maximum public safety and peace of mind. It's engineered and built to provide reliable performance, simplified maintenance, and reduced operating costs with innovative features like a hydraulically optimized, "L-shaped" reactor, high-intensity amalgam lamps and optional automatic or manual sleeve wiping.

The Benefits of UV

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

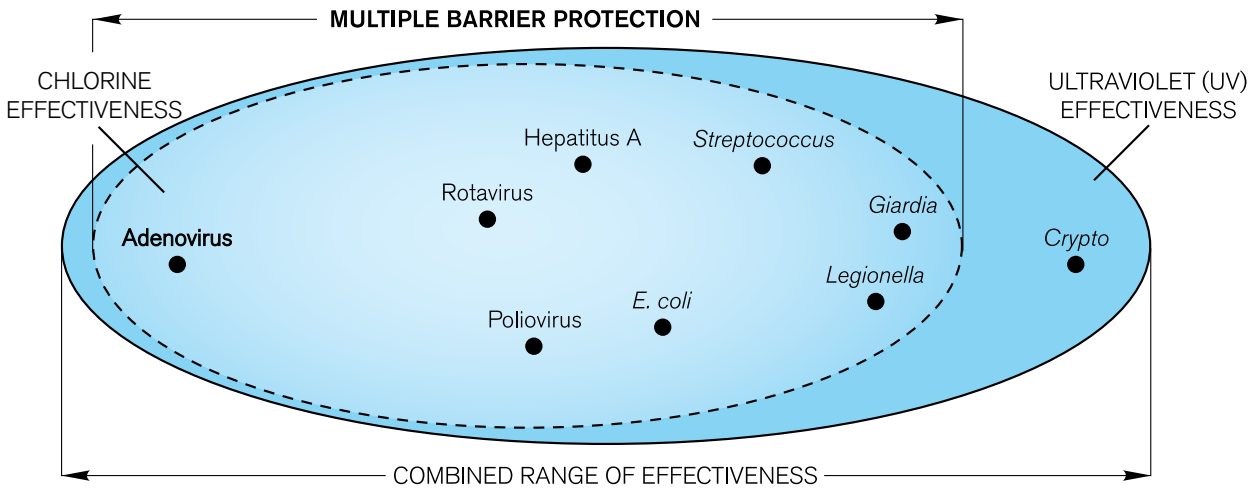
- UV light is an environmentally-friendly, chemical-free way to safeguard water against harmful pathogens
- Proven in thousands of installations, UV is widely accepted and endorsed worldwide for disinfection of drinking water
- UV offers broad-spectrum protection against a wide range of pathogens, including bacteria, viruses, and chlorine-resistant protozoa
- UV treatment provides *Cryptosporidium*, *Giardia* and virus inactivation of up to 4-log
- UV is a reliable, cost-effective part of a multi-disinfectant treatment strategy
- 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



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.

Trojan's New Virus Validation Redefines Multi Barrier

UV offers a cost-effective, secondary barrier of protection to safeguard drinking water against virtually all microorganisms treated by chlorine – including adenovirus – 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™ SC

Designed for efficient performance

Amalgam Lamps

Utilizes high-output amalgam lamps. Each is located within its own protective quartz sleeve and supported by a removable, sleeve holder assembly. Designed for easy lamp replacement.

UV Sensor

Highly accurate, DVGW-approved, photodiode sensor monitors UV output within the reactor. Mounted within the sensor port on the side wall of the reactor for easy access.

Sleeve Wiping System

Optional manual or automatic systems available; both operate online, without interrupting disinfection. Fluorocarbon wipers are mounted in stainless steel yoke around the quartz sleeve of each lamp. The manual system is driven by hand using an external handle. The automatic system allows cleaning at preset intervals using a motor-driven wiper assembly.

UV Reactor

Type 316L stainless steel. Reactor configurations are available with multiple inlet/outlet diameters. Rated to 150 PSI (10 BAR) with an optional rating of 232 psi (16 BAR). A drain port is located opposite the outlet flange.

Control Panel (CP)

Epoxy-painted, carbon steel cabinet is designed for indoor, wall-mount installation. Houses a microprocessor-based controller with I/O connection points, and electronic power supplies. Distributes power to the UV reactor as well as the UV sensor and optional automatic wiping system. UV intensity, lamp elapsed time and lamp status are continuously monitored and displayed on the operator interface, located on the control panel door.

Remote Monitoring & Control

Robust microprocessor-based controller provides standard input/out signals for on/off control from a remote location. Programmable digital and analog I/O capabilities can generate unique alarms for individual applications, and send signals to operate valves and pumps. All units feature optional SCADA communication via ModBus for remote monitoring and control, and D-Series systems offer dose pacing.

Key Benefits
TrojanUVSwift™SC

Proven performance – full bioassay validation. TrojanUVSwift™SC systems meet the stringent, internationally-recognized standards of DVGW, ÖNORM, and USEPA – having undergone comprehensive validation at a wide range of flow rates and UV transmittance levels.

Assurance of NSF 61 compliance. TrojanUVSwift™SC systems meet the stringent standards of NSF International.

Compact footprint for installation flexibility. The TrojanUVSwift™SC can handle maximum flow capacity in minimal space. Its compact design allows it to be installed vertically or horizontally in restrictive spaces, thereby lowering installation costs. Where approved by local regulators, the system can even be installed immediately after a 90° elbow and other upstream piping configurations.

Fewer lamps required to treat a given flow. Trojan's use of efficient, high-intensity amalgam lamps minimizes the lamps, seals, and maintenance to meet dose delivery requirements.

Sleeve wiping system reduces maintenance costs. The TrojanUVSwift™SC can be equipped with a highly effective manual or fully automated sleeve wiping system to minimize the frequency and costs of cleaning. Both options work while the UV unit is online and disinfecting.

Designed for maximum operating efficiency. High-efficiency, electronic ballasts ensure cost-effective operation. Trojan's high-capacity D-Series models can be equipped with optional dose pacing that adjusts lamp output to match dose to actual disinfection requirements – minimizing operating costs and extending lamp life.

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

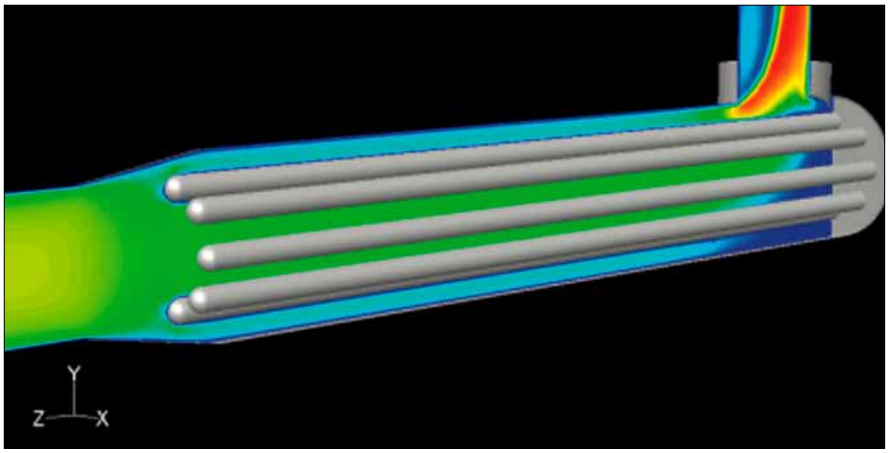
Guaranteed performance and comprehensive warranty. Trojan systems include a Performance Guarantee and comprehensive protection for your investment. Ask for details.

Compact Reactor for Installation Flexibility

Efficient, cost-saving design can be installed vertically or horizontally

Benefits:

- Compact footprint simplifies installation and minimizes related capital costs – making it ideal for retrofit applications into existing water treatment plants
- Engineered to fit into restrictive pipe galleries
- Lamps and sleeves are 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
- "L-shaped" reactor design is 40% more efficient than "U-shaped" systems
- Low head-loss design simplifies integration into existing processes, and minimizes the need for additional pumps and their associated capital and operating costs
- Compact wall-mounted control panel can be located up to 82' (25 m) from the reactor



The highly efficient "L-shaped" design and LPHO amalgam lamps result in an extremely compact footprint.

Developed using advanced Computational Fluid Dynamic (CFD) modeling, and incorporating high-output amalgam lamps, the TrojanUVSwift™SC 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 additions to buildings.

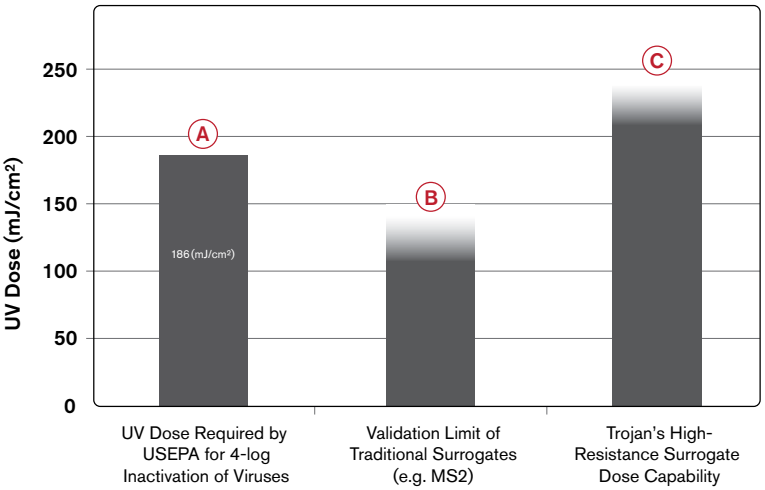
Industry-Leading Bioassay Validations

Validation testing to world standards ensures regulatory compliance regardless of location

Benefits:

- D-Series Units validated in accordance with USEPA 2006 Guidance
  - Use of multiple surrogate organisms (T1, T7 and MS2) allows tailoring of UV dose to that of the target organism (e.g. *Cryptosporidium*)
  - Intensity Setpoint or Calculated Dose control options
  - Validations performed under worst-case hydraulics – with a 90° elbow at the inlet
- UV for Virus Treatment
  - Cutting-edge validation for TrojanUVSwift™ D-Series reactors demonstrates doses sufficient for 4-log inactivation of viruses, including adenovirus, with a single unit
  - Fully EPA compliant, third-party witnessed
- All TrojanUVSwift™SC units are bioassay tested according to German DVGW standards
- Selected D-series models validated in accordance with Austrian ÖNORM protocols
- Bioassay validations eliminate the use of theoretical calculations which can significantly overstate dose, potentially jeopardizing community safety (see Figure 2).
- Trojan systems meet stringent standards of NSF International (NSF 61)

Figure 1. A UV dose of 186 mJ/cm² is required by the USEPA for 4-log treatment of viruses (column A). Traditional surrogates, such as MS2, aren't resistant enough for UV to demonstrate inactivation of 4-log virus (column B). To overcome this challenge, a high-resistance surrogate was used to validate to the doses required for 4-log virus inactivation (column C).



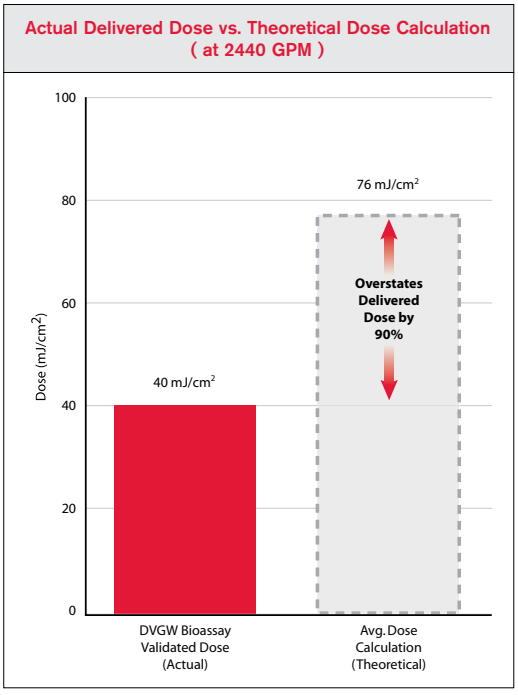


Figure 2. The graph to the left highlights an actual comparison of DVGW bioassay validation results with theoretical dose calculations for a TrojanUVSwift™SC at a flow rate of 2440 GPM. The theoretical calculation overstates the delivered dose by 90%. Had a drinking water system been selected based on the results of the calculated dose, public safety could have been compromised.

DVGW

NSF International

Energy Efficient, High-Output Amalgam Lamps

Need for fewer lamps reduces capital and O&M costs

Efficient, low-pressure, high-output amalgam lamps allow TrojanUVSwift™SC systems to deliver the required UV dose with fewer lamps and lower operating costs.

Benefits:

- The TrojanUVSwift™SC requires 1/2 to 1/3 fewer lamps to deliver the required dose compared to traditional UV systems using low-pressure lamps
- With fewer lamps, the TrojanUVSwift™SC is very compact and can be located in small spaces, reducing installation costs
- Trojan high-efficiency, amalgam lamps draw less energy than competitive high-output systems – minimizing operating costs
- Fewer lamps means reduced annual maintenance costs for lamp change-outs

Robust Sleeve Wiping Systems

Optional manual or automatic wiping ensures consistent dose delivery

The optional wiping systems reduce maintenance costs. Operators have a choice of the manual system that is operated by hand, or motorized system (shown above) which can be programmed to wipe automatically at preset intervals.

Benefits:

- Wiping systems minimize fouling of the quartz sleeves
- Ensure consistent UV dose delivery for maximum public safety
- Systems operate online while the lamps are disinfecting, reducing downtime
- Automatic wiping system can be programmed to wipe lamp sleeves at preset intervals

User-Friendly Digital Controller

Intuitive system provides at-a-glance system status and allows remote operation

The TrojanUVSwift™SC controller and high efficiency electronic ballasts have been proven in thousands of installations. The Control Panel features a user-friendly digital interface, and can be mounted up to 82 ft (25 m) from the reactor.

Benefits:

- Robust, microprocessor-based controller combines extensive functionality with an operator-friendly, digital interface
- Display provides at-a-glance, real-time system status information
- Programmable digital and analog I/O capabilities allow remote on/off control and alarm code differentiation for fast identification of changes in system status
- Optional dose pacing on high capacity D-Series systems minimizes energy use while maintaining required dose
- Optional ModBus protocol communicates with plant SCADA system for centralized monitoring of UV performance, lamp status, power levels and other parameters

Designed for Easy Maintenance

Operator-friendly design for easy routine maintenance

The TrojanUVSwift™SC design simplifies maintenance procedures. For example, lamp changeovers require no tools and take less than five minutes per lamp.

Benefits:

- Single-ended UV lamps simplify annual replacement
- Lamps require less than 5 minutes each to change – without tools
- Externally mounted sensor allows easy access
- Optional automatic or manual sleeve wiping system reduces the frequency, inconvenience and cost of manual cleaning

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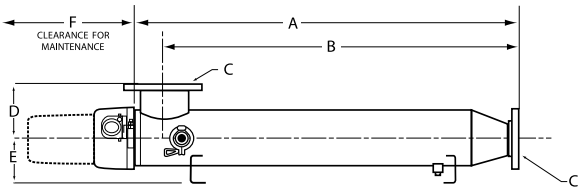
System Specifications

Model #	A02	B03	B04	B06	B08	D03	D06	D12	D18	D30
Validated Dose Range DVGW (mJ/cm²)	40									
EPA (mJ/cm²)	N/A					186				100
Önorm (mJ/cm²)	N/A					40	N/A		40	N/A
UVT Range	Nominal range of 80% to 98%					70% to 98%				
Water Temperature	1°C to 40°C (34°F to 104°F)									
UV Reactor										
Number of Lamps	2	3	4	6	8	3	6	12	18	30
Reactor Material	Type 316L stainless steel									
Mounting Feet (Brackets)	Optional					Standard				
Max Operating Pressure PSI (BAR) *Additional Pressures Available	150 (10)									
Reactor Weight (Dry) lbs (kg)	34 (15)	72 (33)	75 (34)	81 (37)	85 (39)	115 (52)	275 (125)	430 (195)	665 (301)	1,200 (545)
Reactor Weight (Wet) lbs (kg)	65 (29)	149 (68)	150 (68)	160 (73)	162 (85)	230 (104)	530 (240)	860 (390)	1400 (635)	2,250 (1,150)
Wiping System Available	Manual	Manual/Automatic				Automatic				
Control Panel (CP)										
Ballast Power Level	Electronic Constant Output (100%)					Electronic Variable Output (60% - 100%)				
Electrical - Voltages	120 V 230V (Europe)	208 or 240 V, single phase , 2 wire + gnd, 50/60 Hz L-L								
Control Panel Rating	Type 12 (IP54), Type 3R (IP24)			Type 12 (IP54), Type 3R (IP24), Type 4X (IP66)						
Material	Painted Mild steel (Type 12) SS304 (1.4301 in Europe) (Type 3R & Type 4X)									
Inputs/Outputs	5 Analog In, 2 Discrete In, 4 Analog Out, 7 Discrete Out									
Instrumentation										
UV Sensors Per Reactor (DVGW/EPA) 1 per 10 lamps as per DVGW & Onorm 1 per reactor as per EPA	1					1	1	2/1	2/1	3/1
Other										
Languages	**Standard:** English, French, Dutch, German, Spanish, Norwegian, Swedish, Italian									
Dimensions – Inches (cm)										
without auto wiper A:	33 (84)	47 (119)	47 (119)	47 (119)	47 (119)	68 (173)	66 (170)	68 (173)	68 (173)	70 (178)
B:	30 (75)	43 (109)	43 (109)	43 (109)	43 (109)	62 (157)	60 (152)	59 (150)	56 (142)	56 (142)
Flange Size C:	3 (80DN)	4 (100DN)	4 (100DN)	6 (150DN)	6 (150DN)	6 (150DN)	8 (200DN)	12 (300DN)	16 (400DN)	20 (500DN)
D:	6 (15)	8 (20)	8 (20)	8 (20)	8 (20)	8 (20)	11 (27)	14 (35)	17 (42)	21 (53)
E:	6 (15)	7 (18)	7 (18)	7 (18)	7 (18)	7 (18)	9 (23)	12 (30)	15 (38)	18 (45)
F:	50 (127)	60 (152)	60 (152)	60 (152)	60 (152)	70 (178)	70 (178)	70 (178)	70 (178)	70 (178)



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

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MDW-003 (0812)

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