



TROJAN **UV** SWIFT™ SC



Trojan Technologies

Trojan UVSwift™ SC

Technology you can trust from the industry leader

Trojan Technologies Inc. is an ISO 9001 registered company and for more than 25 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 Trojan UVSwift™SC (Small Community) is one of the reasons why. Ideally suited for applications up to 1.5 MGD (240 m³/hr), this compact, robust UV system offers small communities an efficient, economical solution for drinking water disinfection of surface water or groundwater sources. Like all Trojan drinking water products, the UVSwift™SC is bioassay validated, having undergone rigorous DVGW 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 system.



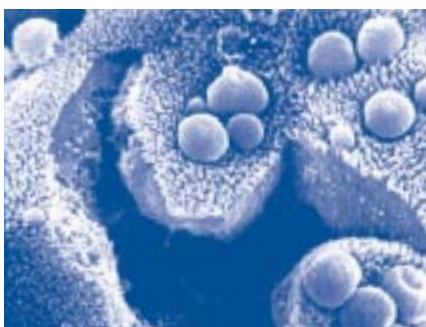
Trojan UVSwift™SC with optional automatic sleeve wiping system.

Why UV Disinfection Is The Right Choice

Cost-effective, proven protection that's safer for the public and environment

UV Offers Protection Against Chlorine Resistant Microorganisms

- UV offers proven protection against bacteria, virus, and protozoa such as *Cryptosporidium* and *Giardia*
- *Cryptosporidium* is almost completely resistant to chlorine, and high doses are required to inactivate *Giardia* – a process that creates harmful disinfection by-products
- UV is well suited to meet current and future regulatory requirements – it offers *Cryptosporidium/Giardia* inactivation of up to 4-logs at low doses



UV disinfection provides effective inactivation of *Cryptosporidium* and *Giardia*.

UV is the Most Cost-Effective Disinfection Technology

- UV offers municipalities proven protection at significantly lower capital costs than other technologies
- UV costs are about 1/5 that of ozone disinfection and 1/10 the price of membrane filtration
- With O&M costs of 0.5¢ to 3¢ USD per thousand US gallons treated, UV also offers savings in operation and maintenance expenses
- The addition of UV to existing treatment systems provides cost-effective, multi-barrier protection

UV Does Not Produce Disinfection By-Products (DBPs)

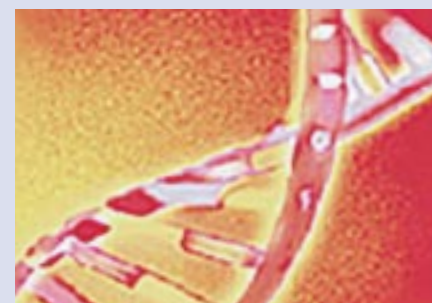
- No disinfection by-products (DBPs) are produced by UV at dose levels required for disinfection (40 mJ/cm²)
- UV is a physical disinfectant with no potential for by-products being formed.
- Other chemicals in water can react with a disinfectant, such as chlorine, and form DBPs
- DBPs can be carcinogenic, mutagenic, and capable of causing birth defects
- UV light does not alter taste, odour or temperature of the water

UV is Safer for Operators, the Public and the Environment

- Simple and safe to operate – no dangerous chemicals to transport, store or handle
- UV doesn't require accident insurance, or specially ventilated storage facilities as protection against gas leaks or liquid spills
- UV is an environmentally friendly disinfection approach

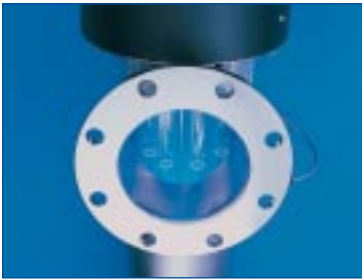
How Does UV Disinfection Work?

- Ultraviolet (UV) light is the portion of the electromagnetic spectrum where the wavelengths are between 100 and 400 nanometers (nm). Germicidal wavelengths are located in the spectral region of 200nm to 300nm.
- The UV light is produced by germicidal lamps submerged in water. As the water flows past the UV lamps, the microorganisms in the water are exposed to a lethal dose of UV energy. The UV dose is a product of UV light intensity and exposure time.
- Microorganisms are inactivated by UV light as a result of photochemical damage to the microorganism's nucleic acids (DNA). This process effectively prevents cell replication by the bacteria, viruses and other microorganisms, and results in cell death.



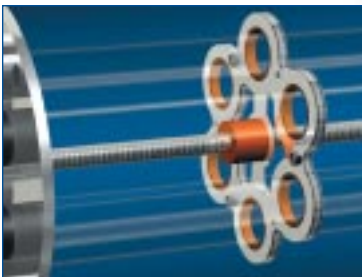
TROJAN UV SWIFT™ SC

Designed for maximum performance



Amalgam Lamps

Utilizes 2 to 12 low-pressure, 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.



Sleeve Wiping System

Optional manual or automatic systems available; both operate online, without interrupting disinfection. EPDM 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.

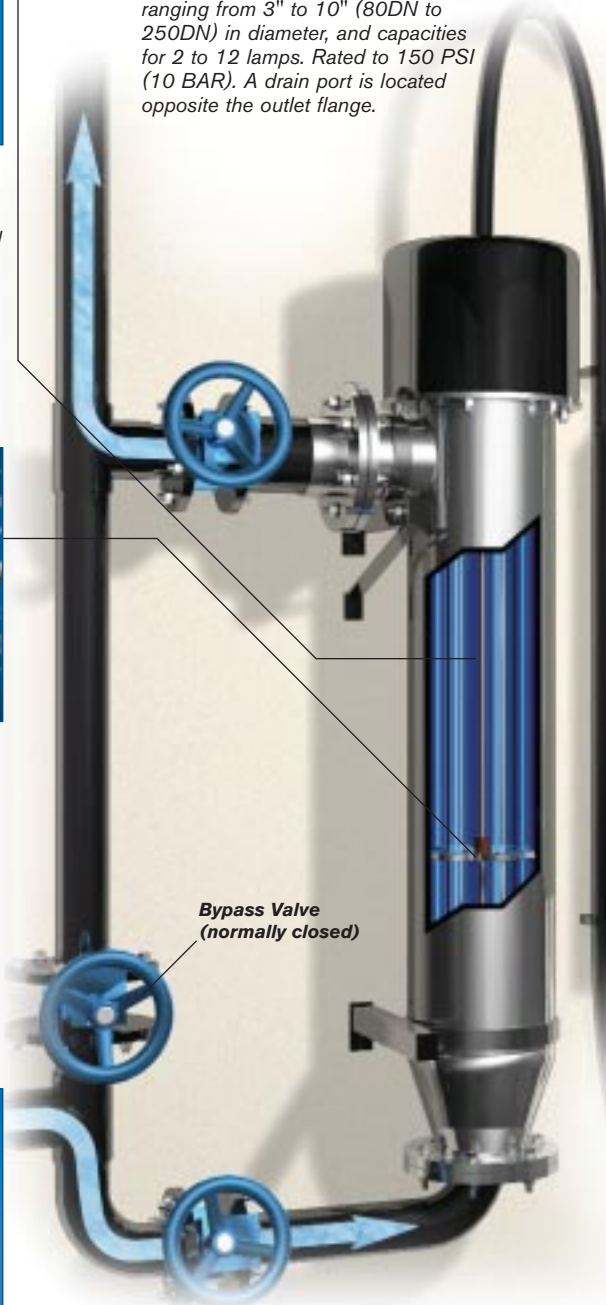


UV Sensor

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.

UV Reactor

Electropolished Type 316L stainless steel. Can be installed vertically or horizontally. Reactor configurations are available with inlet/outlet sizes ranging from 3" to 10" (80DN to 250DN) in diameter, and capacities for 2 to 12 lamps. Rated to 150 PSI (10 BAR). A drain port is located opposite the outlet flange.



Bypass Valve
(normally closed)



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 & Automatic Operation

Standard input/output signals include a Remote Power Control to permit on/off control of the system from a remote location. Upon alarm condition the controller can send signals to operate pumps and valves. The UV Intensity Analog Output option allows remote monitoring of the UV intensity. The system also features a high temperature alarm.

Key Benefits of the Trojan UVSwift™SC

- Most cost-effective drinking water disinfection option
- Simple and inexpensive to operate and maintain
- Minimal space requirements
- Inactivation of broad spectrum of microorganisms
- Third-party bioassay validated
- Comprehensive warranty protection



Two Trojan UVSwift™SC units installed in parallel.

Extremely Cost-Effective to Install and Maintain

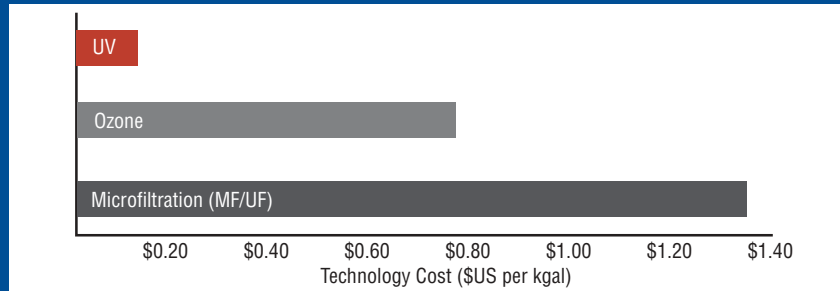
Proven UV protection at a fraction of the cost of other technologies

Benefits:

- Affordable, DVGW validated, disinfection is available to small communities
- Capital costs of the UVSwift™SC range from 2¢ to 7¢ US per US gallon of installed capacity
- O&M costs range from 0.5¢ to 3¢ US per thousand US gallons treated
- A cost comparison by the USEPA (1996) demonstrated that, for a dose of 40 mJ/cm², UV was cost-effective compared to ozonation and chlorination over a flow range of 0.024 to 1.8 MGD (4 to 284m³/hr)

Comparison of Technology Costs

(Based on system capacity of 0.6 MGD)



Source: USEPA

The capital costs of UV disinfection are a fraction of those of competing technologies, making the Trojan UVSwift™SC an economical way for small communities to safeguard their drinking water.

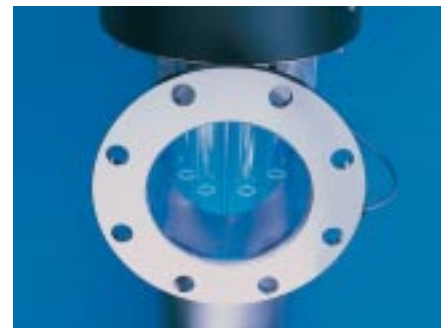
- Unlike chemically-based disinfection options, the Trojan UVSwift™SC doesn't have the added expenses associated with accident insurance or specially ventilated storage facilities as protection against gas leaks or liquid spills

Energy Efficient Amalgam Lamps

Need for fewer lamps reduces capital and O&M costs

Benefits:

- Fewer lamps are needed to deliver the required dose, compared to traditional low-pressure lamps
- With fewer lamps, the system can be located in compact spaces, reducing installation costs
- Trojan amalgam lamps draw less energy than competitive high-output systems
- Trojan's amalgam lamps produce significantly higher UV output than conventional low pressure lamps. Thus fewer lamps are required to achieve the same level of disinfection
- Conventional low-pressure lamp systems may require two to three times more lamps than the Trojan UVSwift™SC
- The hydraulically efficient Trojan UVSwift™SC reactor can accommodate from 2 to 12 lamps
- The lamps are sealed inside heavy-duty quartz sleeves by Trojan's multi-seal system, maintaining a watertight barrier around the internal wiring while individually isolating each lamp
- Lamp changeovers are fast and simple – replacing a lamp takes about five minutes, and requires no tools
- Lamps are pre-heated for reliable startup, and prolonged life



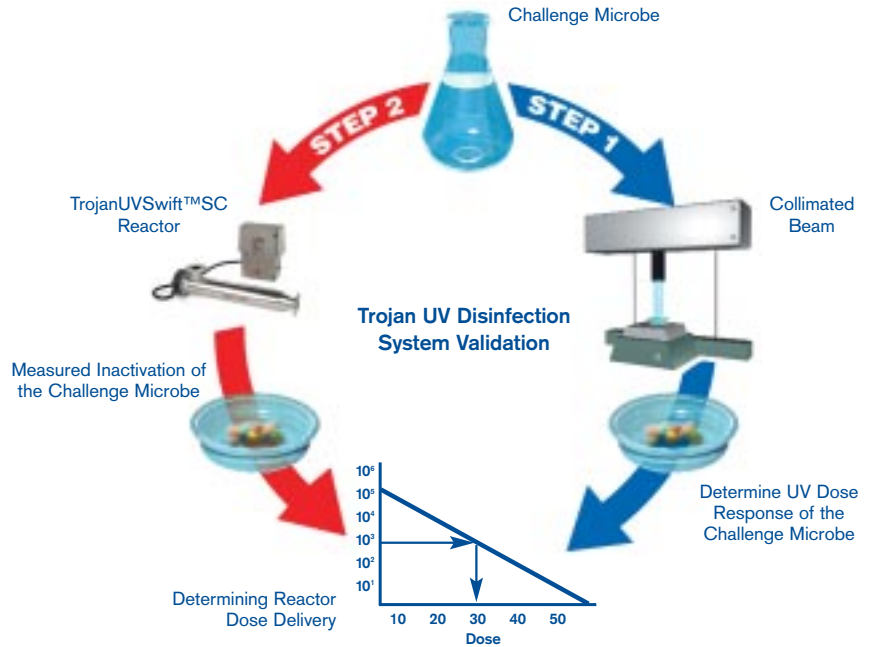
Trojan's amalgam lamps generate stable UV output and are very efficient in converting electrical energy to UVC.

DVGW – Bioassay Validated Performance

Real world testing ensures that regulatory targets are met at all operating conditions

Benefits:

- The stringent standards of Deutsche Vereinigung des Gas und Wasserfaches e.v. – German Association of Gas and Water (DVGW) are recognized internationally
- Performance data is generated from real-world testing at a dose of 40 mJ/cm² over a range of flows using the DVGW W294 standard
- Ensures maximum public safety by providing physical verification that system will perform as expected
- All Trojan UVSwift™SC units are certified for source water of various qualities, having been DVGW bioassay tested under a range of UV transmittances
- Provides accurate assessment of equipment sizing needs



Trojan UVSwift™SC systems installed under real-life conditions have been challenged using live organisms.

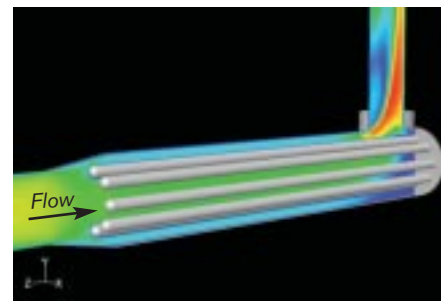
- Bioassay validation offers peace of mind through verified dose delivery, not theoretical calculations that can lead to inaccurate assessments of system sizing and delivered dose
- Many competitive systems have been validated for only one transmittance level, typically 95-99% UVT. As a result, such systems are not certified for use at other UVT levels
- The performance of the Trojan UVSwift™SC system was evaluated at a number of flow levels under the worst-case orientation – with a 90° elbow at the inlet
- The U.S. Environmental Protection Agency (USEPA) has endorsed bioassays as the standard for assessment and comparison of UV technologies

Optimized Hydraulics Maximize Performance

Reactor design maximizes efficiency and reduces headloss

Benefits

- Computational Fluid Dynamic (CFD) modeling has resulted in an innovative “L-Shaped” reactor which is twice as efficient as a conventional “U-Shaped” reactor
- Significantly increases reactor efficiency which permits the system to use fewer lamps – thus reducing O&M costs
- Permits vertical or horizontal reactor installation to minimize space requirements and installation costs
- Reactor design minimizes headloss eliminating the need for additional pumps and the associated capital and operational costs



Trojan's innovative “L-Shaped” reactor reduces hydraulic interruptions thus increasing the efficiency of the system.

Compact Footprint Provides Installation Flexibility

Cost-saving design can be installed vertically or horizontally

Benefits:

- Small footprint enables easy installation and retrofitting into small spaces and pipe galleries
 - Stainless steel reactor can be installed vertically or horizontally for maximum flexibility, with no reduction in disinfection performance
 - Small reactor size reduces the requirements and costs for buildings or expansion of existing facilities
 - Compact, wall-mounted control panel can be located up to 15' (5m) from the reactor
 - Reactor can be installed in a vertical orientation virtually eliminating footprint requirements
-
- Small size of reactor and control panel permits running multiple units in parallel
 - Clearance for maintenance and lamp changeovers is required at only one end of the reactor, thus allowing orientation of the input port against walls or at floor level
 - The Type 12 (IP54) Control Panel houses the controller, and electronic ballasts in a small, wall-mountable cabinet



With its small footprint and installation flexibility, the system can be designed with units running in parallel to meet capacity or redundancy requirements. Shown with optional manual wiping system.



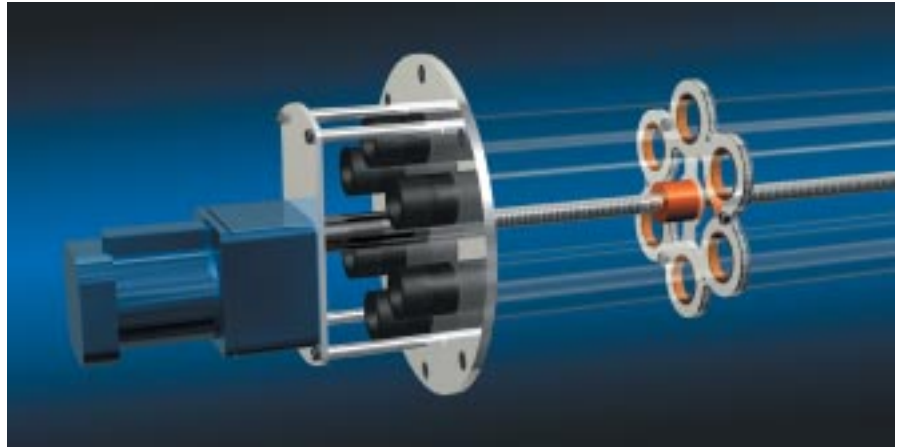
The compact Trojan UVSwift™SC system can easily be accommodated in very restrictive spaces, and can be mounted vertically or horizontally. Shown with optional automatic wiping system.

Sleeve Wiping System Ensures Maximum UV Dose Delivery

Optional manual or automatic wiping simplifies routine maintenance

Benefits:

- Allow amalgam lamps to deliver full UV dose for maximum disinfection, public safety and peace of mind
 - Easy maintenance by preventing fouling from accumulating on quartz lamp sleeves
 - Reduce the frequency, inconvenience and cost of manual chemical cleaning
 - Operate online while the lamps are disinfecting – there's no need to shut down the reactor or bypass the lamp modules for routine wiping
 - Automatic wiping system can be programmed to wipe lamp sleeves at preset intervals
-
- Wiping systems can be retrofitted to Trojan UVSwift™SC systems after installation



The optional wiping systems reduce maintenance costs. Operators have a choice of the manual system that is operated by hand, or the automatic, motorized system (shown above) which can be programmed to wipe at preset intervals with no operator involvement.

Designed for Easy Maintenance

Operator-friendly design simplifies routine maintenance

- Fewer lamps are required, thus reducing associated maintenance
- Single-ended lamp design simplifies lamp changeovers and eliminates the need for tools
- Annual lamp replacement is fast and does not require the reactor to be drained. Each lamp takes only five minutes to change.
- Sensor mounted on outside of reactor for easy access
- Control Panel can be mounted up to 15' (5m) from the reactor
- Optional wiping systems reduce the frequency of manual chemical cleaning



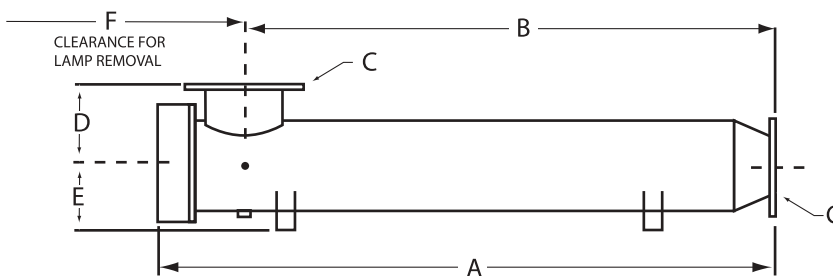
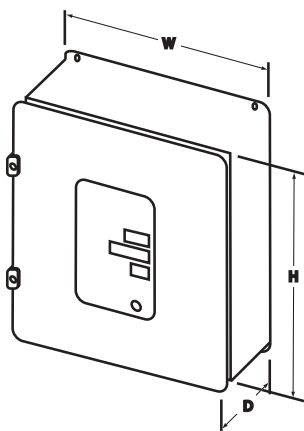
The Trojan UVSwift™SC design simplifies maintenance procedures. For example, lamp changeovers require no tools and take only about five minutes per lamp.

TROJAN UVSWIFT™ SC

System Specifications

Model #	A02	B03	B04	B06	B08	C06	B12
System Characteristics:							
Maximum Disinfection Flow Rate (95%UVT 40 mJ/cm ²): GPM (m ³ /hr)	49 (11)	118 (27)	162 (37)	256 (58)	279 (63)	493 (112)	821 (187)
Number of Lamps:	2	3	4	6	8	6	12
Electrical Requirements:							
60 Hz, Single Phase 120V, 2 wire + ground	.	.	.	.	.	.	.
50/60 Hz, Single Phase 208-240V, 2 wire + ground	.	.	.	.	.	.	.
50/60 Hz, 277V/480V, 3 Phase, 4 wire + ground	.	.	.	.	.	.	.
Nominal Power (watts)	260	500	650	950	1250	1550	1900
Nominal Power (VA) Single Phase	275	522	682	997	1312	1627	1997
Ballast Type	Electronic Constant Output		Electronic Constant Power				
Control Panel:							
Dimensions:	inches	16x14x6	24x16x8	24x16x8	24x20x8	24x24x8	24x20x8
	(cm)	(41x36x15)	(61x42x20)	(61x42x20)	(61x51x20)	(61x61x20)	(61x51x20)
Rating		Type 12 (IP54)					
Water Chamber (Engineered Materials/Options):							
Materials of Construction, Stainless Steel	316L (1.4404 / Europe)						
Max Operating Pressure PSI (BAR)	150 psi (10)						
Max Fluent Temp °F (°C)	120 (50)						
Sleeve Cleaning Mechanism, Optional	Manual Only	Manual or Automatic	Manual or Automatic	Manual or Automatic	Manual or Automatic	Manual or Automatic	Automatic Only
Dimensions - Inches (cm)							
A: without auto wiper	35 (89)	50 (127)	50 (127)	50 (127)	50 (127)	72 (183)	60 (152)
A: with auto wiper	N/A	60 (152)	60 (152)	60 (152)	60 (152)	80 (203)	60 (152)
B:	29 (74)	43 (109)	43 (109)	42 (107)	42 (107)	62 (158)	37.5 (95)
C:	3 (80DN)	4 (100DN)	4 (100DN)	6 (150DN)	6 (150DN)	6 (150DN)	10 (250DN)
D:	6 (15)	8 (20)	8 (20)	8 (20)	8 (20)	8 (20)	14 (36)
E:	6 (15)	8 (20)	8 (20)	8 (20)	8 (20)	8 (20)	12 (30)
F:	40 (102)	48 (122)	48 (122)	48 (122)	48 (122)	74 (188)	48 (122)
* A: 59.46 (15) on Bx with Automatic Wiper * A: 80 (203) on Cxx with Automatic Wiper							

Products in this brochure may be covered by one or more of the following patents:
US 5,504,335 CA 2,160,729
Other patents pending.



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Trojan Technologies is a publicly traded company on the Toronto Stock Exchange under the symbol TUV.

Find out how your drinking water system can benefit from Trojan UVSwift™ SC – call us today.

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