

PRODUCT DETAILS

# Environmental Contaminant Treatment

TROJAN ™

 Water  
Confidence™



## Turn-key UV-oxidation Water Treatment

State-of-the-art solutions. One trusted source.

Water resources are under stress due to increasing population, changing rainfall patterns, widespread pollution, and a variety of other factors. For this reason, water providers must strive to make the most of every available water source, even those that have been impacted by contamination. Our Environmental Contaminant Treatment solutions continue our long-standing tradition of providing water confidence with proven UV technology and innovative solutions that help restore and preserve precious water supplies.

Our turn-key UV-oxidation solutions are enabling water suppliers to cost-effectively treat chemical and microbial contaminants that affect the purity of water in drinking water, wastewater reuse and groundwater remediation applications. The revolutionary TrojanUVPhox™, TrojanUVSwift™ECT and TrojanUVTorrent™ECT provide reliable delivery of UV energy to safeguard water against microorganisms and oxidize environmental contaminants. These robust systems work in tandem with our engineered hydrogen peroxide chemical management system.

Service is an integral part of our UV-oxidation solutions. ChemWatch™ technology remotely monitors hydrogen peroxide use, enabling us to automatically schedule hydrogen peroxide deliveries or notify you of unexpected changes in usage. We also oversee replenishment of hydrogen peroxide on an as-needed basis. From our performance guarantee of system sizing – to our trained local service technicians – we deliver a level of confidence that can only come from one source.

# Key Benefits

## Our UV-oxidation Systems

**Dual treatment action provides UV disinfection and contaminant destruction.** Innovative process delivers simultaneous microbial disinfection and elimination of chemical and environmental contaminants.

**Additional barrier of protection against contaminants in drinking water.** Safeguards against a wide variety of harmful contaminants, including industrial solvents, pesticides, pharmaceuticals, personal care products and other wastewater-derived contaminants.

**Disinfection that meets USEPA guidelines.** UV chambers are validated in accordance with the USEPA's Ultraviolet Disinfection Guidance Manual (UVDGM) for inactivation of *Cryptosporidium* and *Giardia*.

**Cost-effective.** Optimized chamber technology makes UV-oxidation cost-effective for a wide range of applications.

**Compact design reduces capital costs.** Small footprint relative to ozone and other technologies simplifies installation and significantly reduces capital costs.

**Well suited to seasonal treatment.** Effectively treats taste and odor problems related to algae blooms occurring in warm summer and fall months.

**Eliminates difficult to treat contaminants.** Ideal for treatment of NDMA, 1,4-dioxane, and other contaminants treated in water reuse and groundwater remediation applications.

**Rapid, by-product-free treatment.** Single unit process treats water almost instantly, without forming bromate, other by-products, or hazardous gases.

**Three UV solutions for application flexibility.** Options include the medium-pressure lamp-based TrojanUVSwiftECT, the low-pressure, amalgam lamp-based TrojanUVPhox and the TrojanUVTorrentECT using TrojanUV Solo Lamp™ Technology – allowing us the flexibility to propose the most economical option for each unique water treatment situation.

**Easy and safe to operate.** Designed for minimal operator involvement and maximum safety.

# TROJAN UV SWIFT™ ECT

Compact, medium-pressure design for high-volume performance with UVDGM validated disinfection

## Key Benefits:

- High intensity, medium-pressure lamps deliver UV light for both microbial disinfection and UV-oxidation of contaminants
- Need for fewer lamps allows a smaller, space-efficient footprint that offers simplified integration into existing piping galleries
- Useful when large amounts of UV light are required for treatment
- Extensively validated disinfection performance for a wide range of flow rates and water parameters

## Best Suited for:

- Applications in which contaminant treatment is intermittent (e.g. seasonal taste and odor treatment)
- Locations in which electrical power is relatively inexpensive
- Use in treatment plants where space is at a premium
- Treatment of large flow rates

## Control Power Panel

Distributes power to the UV lamps, UV sensor(s) and optional ActiClean™ cleaning system. Incorporates a programmable logic controller with input/output connection points and communication hardware.

## Dual Action Automatic Cleaning



Chemical and mechanical cleaning system uses our patented, food-grade ActiClean gel to remove fouling and residue, ensuring the maximum amount of UV energy is available for UV-oxidation and disinfection.

## Hydrogen Peroxide Storage Tank

Durable, double-contained, high-density polyethylene resists sun damage. Includes leak detection and level indicator.

## Hydrogen Peroxide Dosing System

Ensures consistent dosing. We fully maintain the system. ChemWatch inventory management system provides usage monitoring, product delivery scheduling, and invoice tracking.

## System Control Center

Programmable logic controller continuously monitors and controls UV system functions. This maintains optimum system operation by controlling hydrogen peroxide dose and power output to ensure maximum system efficiency.

## Patented Hydrogen Peroxide Dosing Control System

Optimizes hydrogen peroxide delivery in real time. During contamination events (e.g. a taste and odor event), UV chamber interfaces with the hydrogen peroxide dosing system, collecting flow rate, hydrogen peroxide concentration, UV transmittance (using our optional Optiview™ system), relative contaminant concentration, and other data. Delivers optimum hydrogen peroxide concentration and UV chamber energy distribution to minimize operational costs.

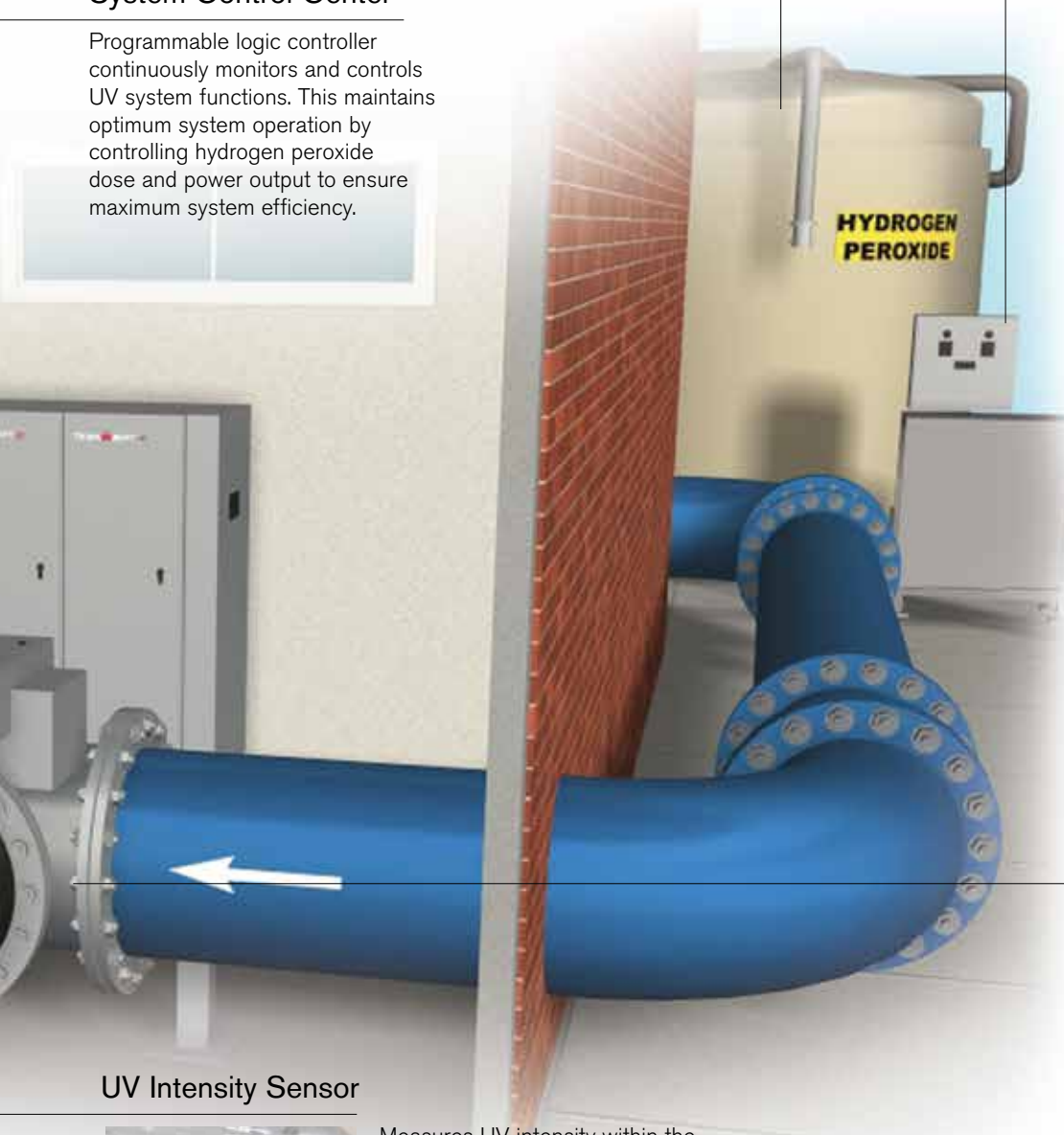
## UV Chamber

Compact, flow-through design with lamps mounted horizontally and perpendicular to the flow. 316L stainless steel construction.

## UV Intensity Sensor



Measures UV intensity within the chamber. Automated cleaning system prevents fouling of the photodiode sensor's quartz sleeve.



# Compact, Hydraulically-Efficient Chamber

Innovative design substantially reduces footprint and head loss



The TrojanUVSwiftECT was developed using advanced Computational Fluid Dynamics modeling, resulting in a compact, highly efficient system that minimizes space requirements and installation costs.

## Benefits:

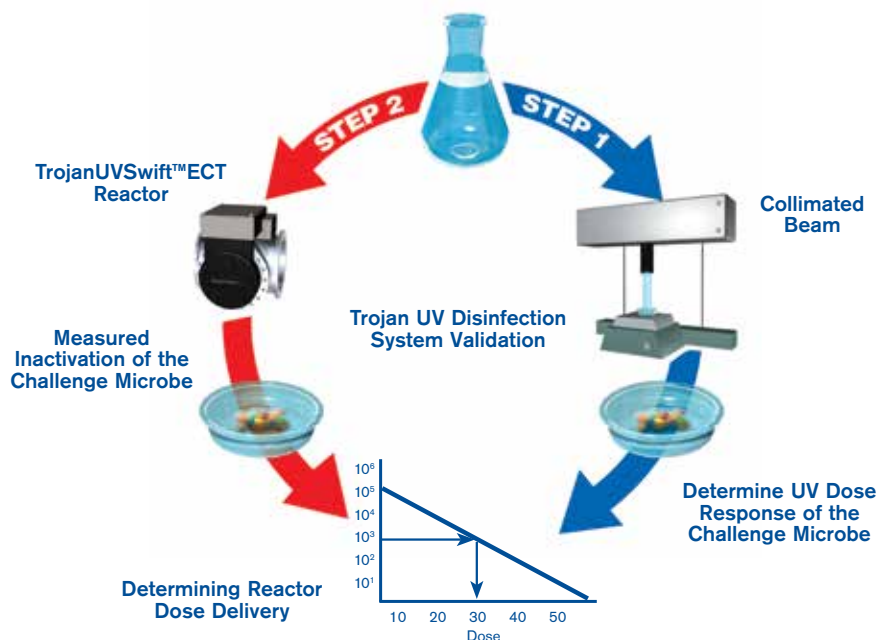
- Compact, in-line design minimizes chamber footprint
- Space requirements for taste and odor treatment are significantly less than ozone equipment/contact tanks – leading to significantly reduced installed capital costs
- Full serviceability from one side of the chamber allows installation in restrictive pipe galleries and against walls for maximum flexibility
- Hydraulically efficient, flow-through design developed through extensive computer analysis to minimize head loss and pumping requirements

# Comprehensive Disinfection Validation

Extensive third-party testing

## Benefits:

- The TrojanUVSwiftECT shares a platform with the widely successful TrojanUVSwift™ – a system with a significant installation base for disinfection-only drinking water applications
- TrojanUVSwiftECT disinfection is validated in accordance with the UVDGM. Validated for up to 4-Log inactivation of chlorine-resistant pathogens including *Cryptosporidium* and *Giardia*
- Specific disinfection dose deliveries of the system were determined in the field (bioassay) over a wide range of flow rates and UV transmittance values
- In our UV-oxidation process, disinfection occurs simultaneously with the treatment of contaminants



Simultaneous microbial disinfection is a key advantage of our UV-oxidation process. The disinfection performance of the TrojanUVSwiftECT in disinfection-only mode has been accurately documented through rigorous, third-party validation.

## Sophisticated Hydrogen Peroxide Dosing Control System

Optimized dose delivery and cost-efficiency

### Benefits:

- Sophisticated control system optimizes the UV-oxidation process
- Controls hydrogen peroxide dose, lamp power and on/off status in real time
- Collects and analyzes information on flow rate, hydrogen peroxide concentration, UV transmittance, relative contamination event strength and other data
- Minimizes ongoing operational costs while maintaining optimized UV energy distribution and hydrogen peroxide dosing

### Inputs

- Flow rate
- UV transmittance
- Hydrogen peroxide dose
- Relative strength of the contamination event

### Outputs

- Optimum hydrogen peroxide dose
- Optimum lamp power
- Optimum number of lamps in operation
- UV energy output to minimize operation and maintenance (O&M) costs



## Ideal for Seasonal Contaminants in Drinking Water

Addresses both disinfection and seasonal contamination

Recurring seasonal contamination events compromise drinking water supplies in many areas. Taste and odor events as a result of 2-methylisoborneol (MIB) or geosmin present in water, for example, can impact the aesthetic quality of drinking water. The TrojanUVSwiftECT is ideally suited to this challenge, operating in two treatment modes to address the dual needs of communities with seasonal issues:



**Disinfection-Only Mode:** *Normal operating mode for year-round drinking water treatment. Runs at lower energy levels sufficient for elimination of microorganisms including Cryptosporidium and Giardia. Reduces O&M costs for more efficient operation.*



**Disinfection + Contaminant Control Mode:** *Activated only during taste and odor/pesticide contamination events. Additional UV lamps/chambers are energized and hydrogen peroxide is dosed into the water upstream of the UV system. Initiates a powerful oxidation reaction that destroys contaminants and also increases the level of disinfection.*

### Benefits:

- Year-round disinfection and simultaneous elimination of seasonal contaminants
- Validated disinfection performance to meet Long Term 2 Enhanced Surface Water Treatment Rule regulations
- Provides disinfection barrier when eliminating contaminants where activated carbon (powdered or granular) does not
- Produces no disinfection by-products (DBPs) such as bromate
- Lower capital and O&M costs relative to ozone
- Easily retrofitted into existing plants
- Safer and less costly than ozone systems
- Flexible — active contaminant treatment turned "on" only when needed (verses GAC which is always "on" and continuously being depleted)

# TROJAN UVPHOX™

Low-pressure, amalgam UV lamps maximize electrical-efficiency for year-round treatment

## Key Benefits:

- Highest electrical-efficiency solution
- Capable of treating large flow rates
- Low-pressure, high-output amalgam lamps deliver lowest electrical energy per order (EE/O) and O&M costs
- Provides simultaneous microbial disinfection
- Small footprint – vertically stackable, modular design allows for expansion without increasing footprint
- Available in multiple configurations with various numbers of lamps

## Best Suited for:

- Water reuse, drinking water, and groundwater remediation requiring treatment of chemical contaminants and disinfection
- Areas where electrical costs are relatively high
- Year-round treatment applications

## Hydrogen Peroxide Storage Tank

Durable, double-contained, high-density polyethylene tank is resistant to sun damage. Included leak detection and level indicator.

## UV Chamber

Welded, electropolished 316L stainless steel.

## Hydrogen Peroxide Dosing System

Ensures consistent dosing. ChemWatch inventory management system provides usage monitoring, product delivery scheduling, and invoice tracking.



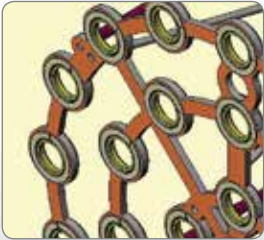
## Flanges

Available sizes range from 4 to 20 inches.



### Optional Wiping System

Food-grade rubber wipers ensure maximum treatment efficiency by maintaining optimal transmittance of quartz sleeves.



### Power Distribution Center

Houses the electronic ballasts and control board with local display. Each power distribution center provides power distribution for one UV chamber.

### Control Board

Door-mounted interface displays the UV Intensity ( $mW/cm^2$ ), Elapsed Time (hours), Lamp Status/Ballast Status and Alarm Conditions.



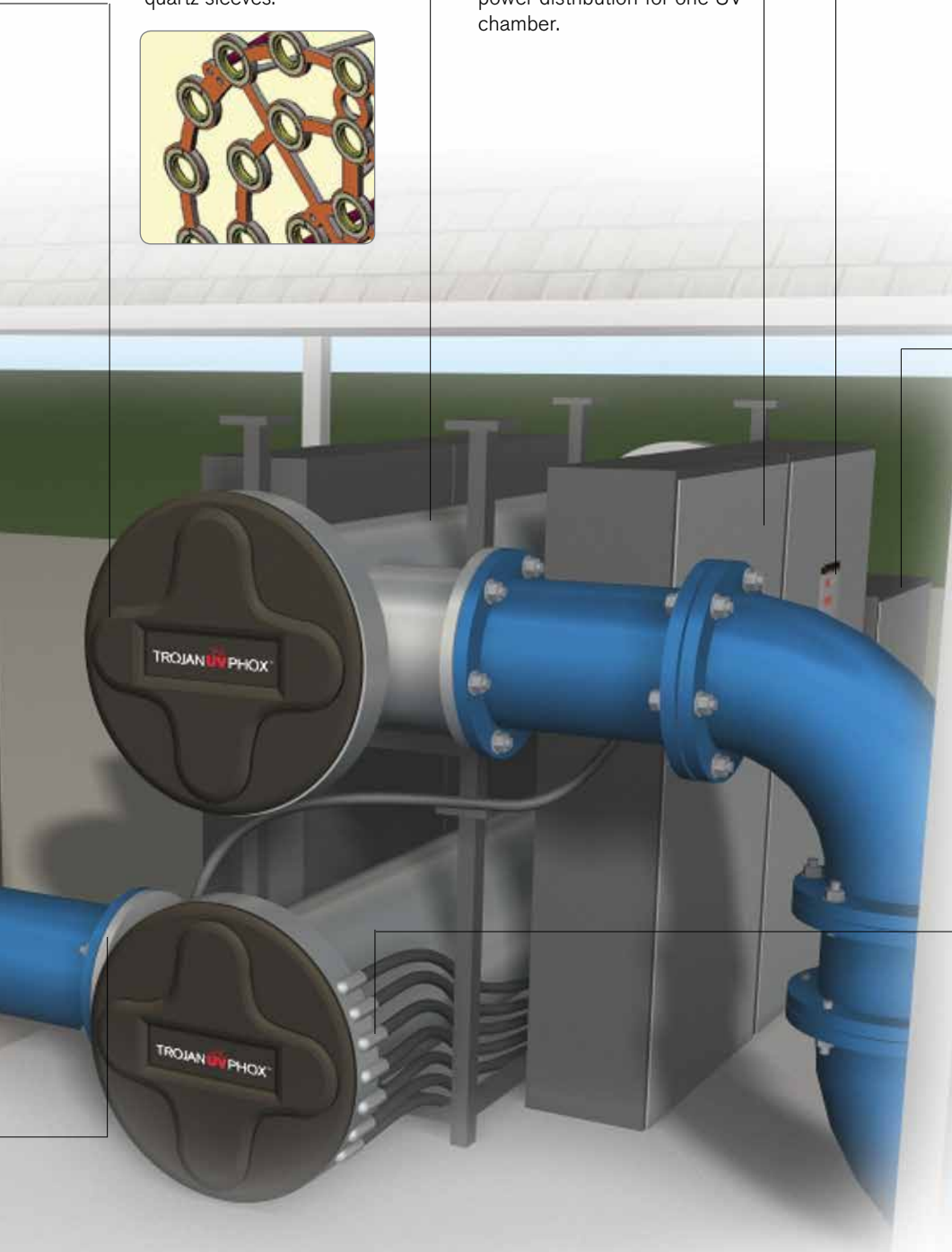
### Optional System Control Center

Optional programmable logic controller continuously monitors and controls UV system functions. This maintains optimum system operation by controlling hydrogen peroxide dose and power output to ensure maximum system efficiency.



### UV Intensity Sensor

Highly accurate photodiode sensor monitors UV output within the chamber. Mounted in the sensor port on the side wall of the chamber for easy access.



# Modular Compact Chamber

Innovative design maximizes efficiency and minimizes footprint



*The modular design of the TrojanUVPhox allows space efficient configurations capable of treating large flow rates.*

## Benefits:

- More contaminant treatment per input power than competing contaminant treatment systems
- Vertically stackable, modular design allows for system expansion without increasing footprint
- Proven chamber design – configuration and components have demonstrated superior performance in hundreds of installations
- Scalable system is available in multiple configurations and various lamps per chamber to handle virtually any flow rate
- Designed using Computational Fluid Dynamics modeling and other advanced computer simulation tools to ensure optimum lamp spacing, uniform flow field, and significant efficiency advantages
- Constructed of electropolished 316L stainless steel for a smooth interior and exterior finish, long life, and durability

# High-Output Amalgam Lamps

Advanced, energy-efficient lamps reduce electrical costs

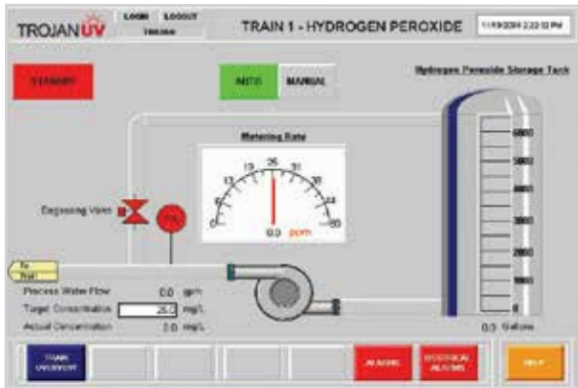
## Benefits:

- Energy efficient lamps with high UVC-range UV light output
- High-output amalgam lamps permit a compact chamber footprint
- Our amalgam lamps deliver even, stable UV energy output over a wide range of water temperatures
- Performance guaranteed to 12,000 hours for reduced maintenance requirements
- Single-ended lamp and sleeve design simplifies change-outs



## Sophisticated Controls

Integrated, user-friendly systems ensure optimized operation



User-friendly, integrated control systems automate delivery of UV energy and hydrogen peroxide for efficient contaminant treatment and microbial disinfection with minimal operator requirements.

### Benefits:

- UV controls are integrated with hydrogen peroxide system to ensure smooth operation with minimal operator involvement
- Easy-to-use, digital interfaces are menu-driven for simple operation and comprehensive display of system status
- Optional control algorithm minimizes electrical consumption by dimming lamps automatically while maintaining performance
- Another optional control algorithm matches UV energy output to flow rate – a process called “flow pacing” – to minimize O&M costs
- Controls interface with plant SCADA for full integration of facility operation and alarm systems

## Operator-Friendly System with Optional Sleeve Wiping

Designed for maximum UV energy delivery and minimum maintenance

### Benefits:

- Optional sleeve wiping system ensures lamps deliver maximum UV energy for disinfection and UV-oxidation of contaminants
- Automated wiping at preset intervals provides ongoing prevention of sleeve fouling, improves efficiency and minimizes operational EE/O values
- Sleeve wiping takes place while the system is online and operating – so there is no need to shut down or bypass the chamber
- Single-ended lamp and sleeve design simplifies lamp change-outs and reduces maintenance time and expense
- Lamp change-outs can be completed without depressurizing or draining the chamber – the procedure takes only minutes per lamp, and does not require tools
- UV sensor is mounted on the outside of the chamber for easy access



Single-ended lamps and the optional sleeve wiping system of the TrojanUVPhox simplify and reduce maintenance requirements and their associated costs.

# Hydrogen Peroxide (H<sub>2</sub>O<sub>2</sub>)

Safe, effective, and fully managed for worry-free water treatment

- Hydrogen peroxide (H<sub>2</sub>O<sub>2</sub>) supplied by US Peroxide, the largest supplier of H<sub>2</sub>O<sub>2</sub> in North America
- Our integrated UV-oxidation offerings include full service and management of H<sub>2</sub>O<sub>2</sub> and its related equipment
- H<sub>2</sub>O<sub>2</sub> monitoring, replenishment, and equipment maintenance are done for you
- Installation and all maintenance is performed by experienced, highly trained professionals
- H<sub>2</sub>O<sub>2</sub> is a liquid, so there is no potential for gaseous leaks that can endanger surrounding communities
- No requirement for hazard permit or evacuation plan
- Any spills are localized and are cleaned up with water (decomposition by-products are water and oxygen)

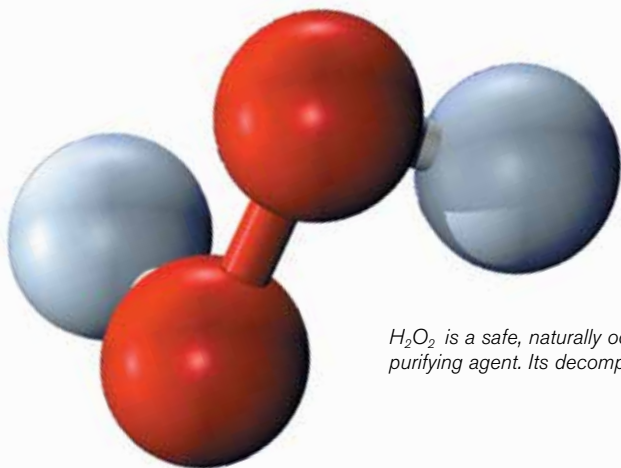
## Automated H<sub>2</sub>O<sub>2</sub> Supply and Delivery

NSF 60-approved H<sub>2</sub>O<sub>2</sub> plus the benefits of complete support and logistics

- Reliable supply of technical-grade H<sub>2</sub>O<sub>2</sub> for general applications or high-purity NSF 60-approved H<sub>2</sub>O<sub>2</sub> for drinking water applications
- Remotely monitored H<sub>2</sub>O<sub>2</sub> inventory and management
- Automatically scheduled deliveries and customized usage reports
- Our UV-oxidation packages include a specified period of H<sub>2</sub>O<sub>2</sub> supply, delivery, and proper maintenance and servicing of storage and dosing equipment
- Continuation of the H<sub>2</sub>O<sub>2</sub> service package is available simply by continuing to purchase H<sub>2</sub>O<sub>2</sub> from us



*Our turn-key programs eliminate additional demands on plant staff. Our full service offering includes remote monitoring of H<sub>2</sub>O<sub>2</sub> levels, automated delivery scheduling, and all peroxide handling and equipment maintenance.*



*H<sub>2</sub>O<sub>2</sub> is a safe, naturally occurring compound and a very effective purifying agent. Its decomposition by-products are water and oxygen.*

# Comprehensive H<sub>2</sub>O<sub>2</sub> Equipment & Services

Turn-key program eliminates training and handling requirements

Our UV-oxidation systems are fully integrated packages that include:

## Double Containment Tank Systems

- High density polyethylene construction with integral secondary containment
- Fully conform to the most stringent safety standards
- Includes fill line, inspection ports, overflow pipe, vent, and ultrasonic level sensor
- Available in a range of sizes

## Metering Pump Assembly Skids

- Standard equipment includes ProMinent™ pumps for precise H<sub>2</sub>O<sub>2</sub> metering
- Passivated 316L stainless steel suction and discharge piping ensures product quality
- Includes backpressure regulator, pressure relief valves, and calibration assembly for maximum safety
- Electrical control panel provides manual or automatic ON/OFF operation of either pump

## Full Equipment Maintenance and Ongoing Service

- Comprehensive maintenance program and support
- Includes preventative maintenance, remote diagnostics, and process optimization support as treatment conditions change



*Our UV-oxidation solutions include complete H<sub>2</sub>O<sub>2</sub> storage, delivery and monitoring systems that meet the most stringent safety standards.*

# TrojanUVTorrentECT

This low-pressure, high-efficiency UV system equipped with high-output Solo Lamp Technology offers the electrical efficiency of amalgam lamps but with a lower lamp count and is ideal for installations requiring year-round chemical contaminant treatment at higher flows.

## Key Benefits:

- High electrical-efficiency and UV output per lamp
- High-efficiency solution for treatment of pesticides, pharmaceuticals, personal care products, endocrine disrupting compounds and other persistent chemical contaminants
- Independently operating banks provides an energy-efficient solution for intermittent contaminants (e.g. seasonal taste & odor causing compounds) while maintaining year-round disinfection
- Third-party validated for microbial disinfection based on UVDGM standards for the inactivation of *Cryptosporidium*, *Giardia* and viruses
- Automatic chemical-mechanical wiping system (ActiClean) limits sleeve fouling and ensures continuous energy-efficient operation with minimum maintenance
- Efficient reactor design minimizes head-loss and pumping requirements

## Best Suited For:

- Water reuse and drinking water requiring year-round treatment of chemical contaminants
- Projects requiring simultaneous microbial disinfection to internationally recognized standards
- Projects with large flow rates and poor water quality
- Installations treating surface water with high potential for sleeve fouling
- Surface water applications where head loss and UV lamp sleeve fouling are important considerations



TrojanUVTorrentECT Product Specifications	
Model	96SL48
Number of Lamps	96 (6 x 16 lamp banks)
Lamp Type	TrojanUV Solo Lamps
Dimensions/Miscellaneous	
Flange Size (in/mm)	48/1200
Side Distance Required for Service (in/m)	72/1.83
End Distance Required for Service (in/m)	21.25/0.54
Electrical/Power Distribution Center	
Electrical Supply	480V, 60Hz, 3-phase, 4-wire + ground for environmental
Panel Rating	Type 12 Indoor, Type 4x Indoor
Enclosure Dimensions (HxWxD)	81.9" x 139.8" x 24"   2.08 m x 3.55 m x 0.61 m



### TrojanUVSwiftECT Product Specifications

Model	L24	L30
Number of Lamps	8	8,16
Dimensions/Miscellaneous		
Approximate Dimensions		
Width (in/m)	54/1.4	62/1.6
Length (Flange to Flange) (in/m)	35/0.9	53/1.35
Overall Height (in/m)	38/1.0	49/1.25
Required for Service beyond End Cap (in/m)	24/ 0.6	48/1.2
Vertical Distance Required for Service (in/m)	88/2.2	88/2.2
Maximum Operating Pressure (PSI/kPa)	150/1,034	75/517 or 150/1,034
Dry Chamber   Wet Chamber Weight (lb/kg)	1,500/680   2,240/1,016	2,178/990   4,050/1,837 (75 PSI model)
Electrical/Control Power Panel		
Electrical Supply	480 V, 3 Ph + GND, 60Hz; (400 V, 380 V, or 415 V), 3Ph + GND, 50 Hz	
Maximum Power Supply Range	8 lamp - 83 kVA unbalanced	8 lamp - 103 kVA unbalanced 16 lamp - 202 kVA unbalanced
Nominal kW Input per Lamp	9.6	12.3
Panel Rating	Type 12 Indoor	
Enclosure Dimensions (HxWxD)	86.75" x 94" x 23.5"   2.2 m x 2.4 m x 0.6 m (4 cabinets per chamber [16L30])	

### TrojanUVPhox Product Specifications

Single Chamber Model	12AL30	18AL50	30AL50	72AL75
Dual Chamber Model	NA			D72AL75
Number of Lamps (single chamber)	12	18	30	72
Number of Lamps (dual chamber)	NA			144
Dimensions/Miscellaneous				
Overall Length (in/m)	76/1.9	82.25/2.1	Single 82.25/2.2   Dual 147.25/3.8	Single 86.5/2.2   Dual 147.75/3.8
End Cap Diameter (in/m)	20.5/0.5	29.25/0.7	29.25/0.7	41.25/1.0
Required for Service Beyond End Cap (in/m)	66/1.7			
Flange Size Options (in)	8, 4		12, 8	20, 16, 12, 8
Maximum Operating Pressure (PSI/kPa)	100/690			65/450
Dry Chamber   Wet Chamber Weight (lb/kg)	300/136   600/272	1,100/500   1,800/818	Single: 1,200/545   1,875/953 Dual: 3,000/1,360   4,300/1,950	Single: 2,100/953   3,700/1,678 Dual: 3,700/1,678   7,200/3,265
Electrical/Power Distribution Center				
Electrical Supply	480V, 3 phase, 4 wire + ground, with 120VAC, single phase, 2 wire + ground for environmental			
Approximate Panel Power Draw (kW, Single Chamber)	3	4.6	7.8	18.5
Panel Rating	Type 12 Indoor, Type 4X Indoor, Type 4X Outdoor (sun sheltered)			
Enclosure Dimensions (HxWxD)	48" x 40" x 12"   1.2 m x 1.0 m x 0.3 m		Single: 80.25" x 47.25" x 23.75" ; Dual: 80.25" x 96" x 23.75"	

TrojanUV is part of the Trojan Technologies group of businesses.

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