



Smart technology
High performance
Easy maintenance



KILL RATE WITH UNIQUE
MULTI PASS® CROSSFIRE®
TECHNOLOGY

Silver Stream®

***MOST POWERFUL
UV DISINFECTION
TECHNOLOGY***

SILVER STREAM'S PATENTED FEP CROSSFIRE TECHNOLOGY® IS CORE OF ALL OUR SYSTEMS

Silver Stream Advanced Ultraviolet Water Disinfection Systems
for commercial, industrial, municipal, residential, and decentralized
applications, with over 30,000 installations worldwide .

INDUSTRIES

- * FOOD & BEVERAGE
- * AGRI-FOOD
- * AQUACULTURE
- * DAIRY
- * AGRICULTURE
- * MUNICIPAL
- * PARKS & RECREATION
- * HOSPITALITY
- * HOSPITAL
- * RESIDENTIAL
- * TRANSPORTATION
- * COMMERCIAL
- * PHARMACEUTICAL
- * SYSTEM INTEGRATORS
- * ZOO AND AQUARIUM
- * OIL AND GAS



High grade stainless steel 316L electro polished end connector for
drinking water / packaged water and pharmaceuticals

Single unit capacity of
1 MLD Special unit design
up to 5 MLD

UVT > 95%
Transmittance



Potable



Wastewater



Reuse



Rainwater

APPLICATION

- * Bottled Water & Beverage
- * Membrane Bio-fouling Protection
- * Boiler Feed Water
- * Cooling Water Treatment
- * De-chlorination
- * Drinking Water Treatment
- * Effluent / Reuse Water Treatment
- * Intake / Service Water Treatment
- * Industrial / Process Water
- * Municipal Water Treatment
- * Open Channel Treatment
- * Ozone Destruction
- * Photon water Pasturizer
- * River Water Treatment
- * Rain Water Treatment
- * Re-circulation Water Treatment
- * RO Membrane Protection
- * Ultra pure water Treatment
- * Water for Injection (WFI) Loop Disinfection
- * Well water Treatment

**SILVER STREAM[®] CROSSFIRE TECHNOLOGY IS DESIGNED TO ACHIEVE
> 4-LOG VIRUS MICROBIOLOGICAL INACTIVATION LEVELS**

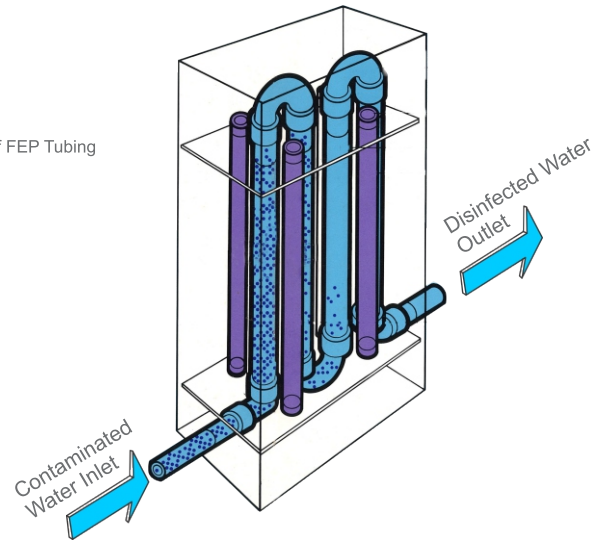
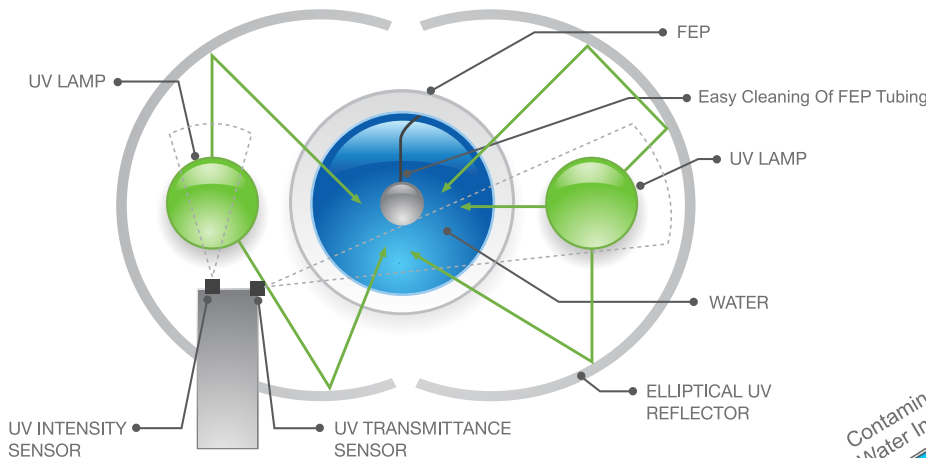


FEP Advantage

- UV Transmittance > 95 %
- Easy Maintenance
- Easy Cleaning of FEP Tubing
- Non Sticky
- Non Fouling
- Un Breakable
- High Pressure Withstanding
- High Temperature Resistance
- High Delta T Resistance
- Easy Changeover to Suit Different Water Conditions
- High pressure Rating (0 to 16 bar)
- High temperature resistance (200 deg c)
- High delta T range (-240 to 205 deg c)
- Zero scaling



KILL RATE WITH UNIQUE
Multi Pass[®]Crossfire[®]Technology
targets pathogens from
every angle - 360 degrees



Total Internal Reflection By Mirror Polished Aluminium Reflectors In Elliptical Shape

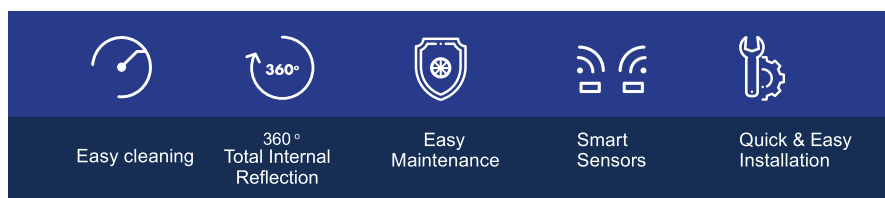
Silver Stream's patented FEP Crossfire technology[®] is core of all our systems incorporates elliptical reflectors that redirect light energy from 360 degrees to overcome shadowing and deliver a sterilizing UV dose to harmful pathogens.

Dual smart UV sensors in every Silver Stream's system continually monitor lamp output and water quality to ensure the highest level of disinfection is consistently achieved.

The smart sensors practically eliminate nuisance alarms and make troubleshooting simple when the system is out of compliance.

99.9+% Destruction of Microorganisms

Certified by the American Institute of Chemical Engineers, FEP tubes contain a higher UV energy field than quartz. FEP's higher energy field results in a higher kill rate.



The **UV Touch Control** has been completely redeveloped and adapted to today’s requirements for small- to medium-sized UV systems, both hard- and software-wise.

It is characterized by its **modern design and intelligent functional characteristics** and forms the basis of an extensive system control. Thanks to its **modular structure**, it is **configurable on customer’s request**. The setting of system parameters is certainly achieved by an **user-friendly menu navigation**.

Characteristics

The **UV Touch Control** is operated with a 24 V supply and can be used in almost all UV systems worldwide. The **touch-sensitive screen** can be equipped with a **splash-proof front foil** for protection in harsh environments, thus ensuring **IP68 protection**. The resistive display allows a flawless operation by finger, pen and even with gloves, even if an additional front foil is used.

The controller can be combined with **any analog and digital peripherals**.

Operation

After the UV system has been switched on for the first time, **an automatic query of the connected digital electronic ballasts** and a parameterization of all connected components takes place.

For each UV system, the desired operating parameters and **individual alarm thresholds** can be set.

Thus, an optimal system operation is always guaranteed. In operating mode, changing the parameters per **password** will be blocked.

Alarm messages are visually displayed.

In addition, alarms via the **configurable relay outputs** can also be sent to superior control systems or acoustic signal transmitters to get redirected.

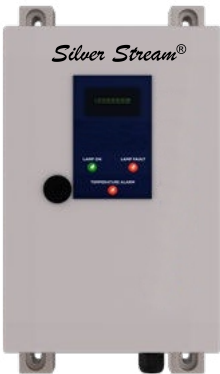
Technical Data

Display (3,2“, 5“)	7 inch (standard size) 90 x 160 mm 480 x 800 Pixels
Weight	500 g (including I/O board)
Power supply	24 V DC
Basic configuration	Display size I/O board with • 5x Relays output (changer) • 1x Input potential-free • 1x RS485
Modules (6 slots)	2x digital RS485 4x analog • 4-20mA transmit • 4-20 mA receive • voltage input • PT100 • Pulse/PWM • Data logger
Installation options	in cabinet door or in separate housing
Scope of functions	• UV intensity measurement • Flow control monitoring • Temperature control • Control of electronic ballasts • Setting of alarm thresholds
Temperature range	0-40°C operation
Protection class	IP68* when installed

*only with splash-proof foil

CONTROL CABINET VARIANTS

ONE LAMP STANDARD



ONE LAMP ADVANCED



MULTI LAMP



MULTI LAMP





Total Internal Reflection

Total Internal Reflection enhancing UV disinfection by over 30% compared to quartz systems. Multi Pass® Crossfire Technology® uses unique Polished Aluminium elliptical reflector design with dual air-mounted lamps to concentrate sterilizing UV light from 360 degrees on the FEP water column.

This unique design achieves TIR i.e, Total internal Reflection and providing up to 30% energy savings with automatic power adjustments from 100% to 50%.

Polished aluminum reflects 80-90% of visible light, outperforming electro-polished stainless steel 316L, which reflects 60-70% thereby enhancing UV disinfection by over 30% compared to quartz systems.



Easy-Cleaning

- Fouling resistance of the FEP tubes eliminates the need for mechanical cleaning or frequent chemical cleaning.
- If an upstream plant upset or improper operation should cause FEP tube fouling. The FEP tubes can be easily cleaned by a high-pressure water jet cleaner (optional) while the unit is in operation, or by a re-circulating chemical cleaning solution.



Smart Sensors

Enhanced Control Mechanism Displays real-time metrics for Ultra violet transmittance (UVT), flow rate, power usage, and UV dosage. Offers immediate data on system operation and effectiveness. Includes integrated data logging capabilities for up to six months.

Seamlessly connects with SCADA control systems. Allows customization of user-defined alarm settings. Incorporates a smart authentication framework for user management.

Continuous Water Quality Assessment each Silver Stream UV system is equipped with an integrated UV transmittance (UVT) sensor. Provides ongoing monitoring of UVT percentage. Adjusts system operations based on real-time UVT data for optimal performance.

Ongoing Lamp Performance Evaluation each Silver Stream UV lamp has its own dedicated UV sensor, a distinctive feature of SS UV technology. Continuously assesses the output intensity of each Silver Stream UV lamp. Guarantees the necessary UV dosage is consistently delivered



Difficult Water

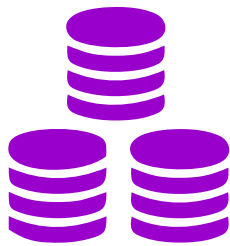
The special water flow pattern through the FEP tubes assures full exposure to the UV rays. This unique design maintains an optimum lamp temperature for maximum UV efficiency and a microorganism “kill” of 99.9 + %



Easy Maintenance

Multi Pass® Crossfire Technology® is uniquely configured so that operators are never exposed to untreated water during lamp replacement.

The system design makes most maintenance activities quick and easy within a very small footprint. The UV lamps are air-mounted in the reactor chamber rather than in the wetted quartz sleeve to eliminate the risk of breaking the quartz during lamp replacement.



Modular Redundancy

Take advantage of the compact modular design of Multi Pass® Crossfire Technology® to easily configure multiple-unit systems for additional capacity and redundancy at a fraction of the cost of large conventional systems.

Variable flow and water quality conditions can also be accommodated with a modular UV system so that disinfection performance is always achieved.

Optimized manifold or cabinet configurations can be prefabricated by Silver Stream or simply built in-place to accommodate the installation requirements.

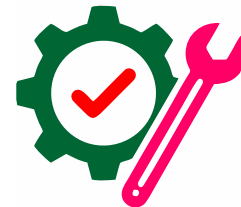


Low Operating Cost

Multi Pass® Crossfire Technology® is engineered to deliver exceptional performance with predictable low operating and total lifetime costs.

Quality components like durable anodized aluminum casings and long-lasting LPHO lamps mean that parts don't have to be replaced often. The functional Crossfire design cuts down on recurring operating costs like manual chemical cleaning, time-consuming lamp changes, and FEP tube replacement caused by accidental breakage during maintenance.

Crossfire systems require no chemicals and have low energy consumption from standard electrical supply.



Quick Installation

Multi Pass® Crossfire Technology® systems are plug-and-play with a regular electrical outlet connection and simple plumbing, whether single or multi-unit configuration.

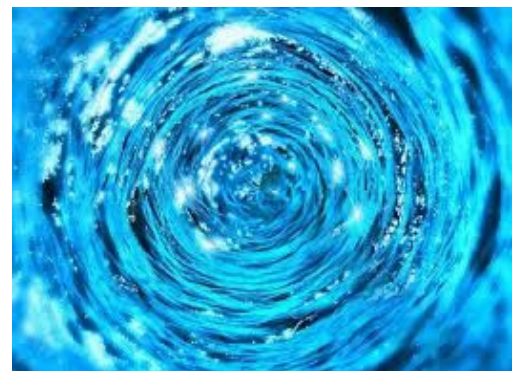
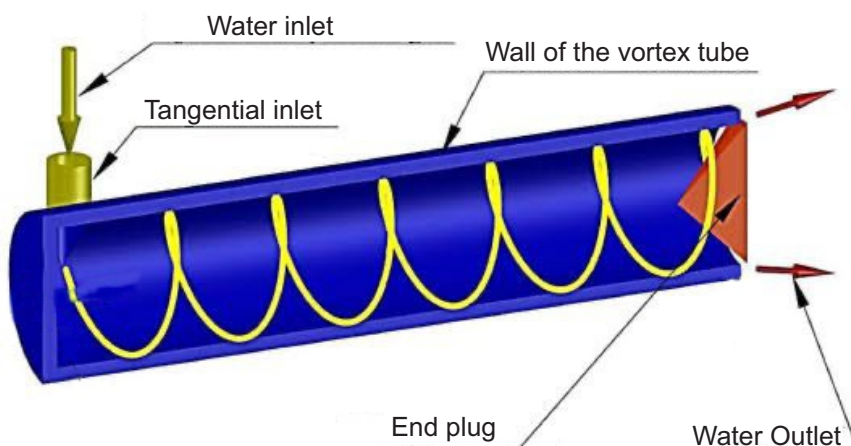
All systems are compact and vertically mounted to take up the least footprint. Installation is easy with the provided mounting template, basic hardware, and optional flexible stainless-steel hose connections.

KEY HIGHLIGHTS

- FEP cross fire™ technology with Multi sensor for optimal disinfection process
- USFDA protocol 3rd party bioassay validation
- 10 X times more efficient than conventional Quartz systems
- Unique patented vortex flow™ technology enabling 90% hydraulic efficiency
- CFD optimized for hydraulic efficiency with minimum head loss
- Operational efficiency with advanced automated lamp dimming
- High-grade polished Aluminum reflectors with construction – Up to 30% energy savings while achieving total internal reflection
- Guaranteed 9000 to 16 000-hour lamp lifetime depending on type of lamp
- Easy SCADA integration – Connection via ethernet MODBUS
- Easy maintenance – FEP Tubing and UV lamp replacements
- High efficiency silver ray® UV lamp and ballast technology
- Silver touch™ operator-friendly UV system controller with SCADA communication
- Photon dose™ control - Silver Streams's true intensity based control philosophy
- ÖNORM-certified UV intensity sensor
- Pro safe™ flow diverter* Inner surface finishing of Reflectors Ra <0.8 µm
- Stainless steel cabinet (IP 65)
- Hygienic connections (Tri-Clamp or DIN 11864-2)
- Real-time remote monitoring and control capabilities through to Silver Streams's smart utility management system, Silvosense™

Vortex Flow Technology

A key feature of the Silver Stream Cross fire UV disinfection system is the unique patented vortex flow™ technology which enables optimal UV exposure of all pathogens, ensuring 90% hydraulic efficiency at all water qualities. The vortex flow™ technology has made the Silver Stream suitable for a wide UVT range – from 70% to 98%.





Technical Specification

Feature	Silver Stream 1H - 20H	Silver Stream 25H - 40H	Silver Stream 50H - 75H	Silver Stream 100H - 300H
Crossfire Technology	Built in	Built in	Built in	Built in
>> Elliptical Reflectors, >> 360° Disinfection	Built in	Built in	Built in	Built in
>> Dual Lamps, >> Multiple Sensors	Built in	Built in	Built in	Built in
>> Self cleaning mechanism	Built in	Built in	Built in	Built in
User Interface	Single button	Four mechanical buttons	Touch screen Color	Touch screen Color
Operational alarms	Dual visual - audible	Dual visual - audible	Dual visual - audible	Dual visual - audible
Display - Liquid Crystal (LCD)	Optional	Built in	Touch screen Color	Touch screen Color
Communications	4-20 mA output	Not available	4-20 mA output Modbus	4-20 mA output Modbus
UV Intensity Warning Dry Contact	Optional	Built in	Built in	Built in
Remote Start/Stop	NA	NA	Built in	Built in
Built-in Surge Protection	Optional	Optional	Built in	Built in
Message History	NA	Last 50 messages	Last 99 messages	Last 99 messages
Data logging - local	NA	NA	Optional	Optional
Flow range (@ 40 mJ/cm ² , 95% UVT)	upto 88 US gpm 333 L/min	upto 176 US gpm 666 L/min	upto 330 US gpm 1250 L/min	upto 1322 US gpm 5000 L/min
Minimum UVT required	<99.9%	<99.9%	<99.9%	<99.9%
Lamp Type	LPHO	LPHO / Amalgam	Amalgam / MPUVC	Amalgam / MPUVC
Lamp Expected Life	9000 hours	9000 hours	9000 hours	9000 hours
Lamp Heaters	NA	NA	Available	Available
Time Needed for Lamp Change	5 minutes	< 5 minutes	< 2 minutes	< 2 minutes
Sensor Design	Analog technology	Digital technology	Digital technology NIST compliant	Digital technology NIST compliant
Dual Sensors	One per unit	One per unit	One per unit	One per unit
Temperature Control	Convection cooling Optional purge valve	Forced air cooling Built-in purge valve	Improved forced air cooling Built-in purge valve	Improved forced air cooling Built-in purge valve
Performance Validation	Factory Tested	Factory Tested	Third party Validation (1)	US EPA UVDGM Validated
Drinking Water Performance Certification	IBWA / CE / GMP NABL	IBWA / CE / GMP NABL	IBWA / CE / GMP NABL	IBWA / CE / GMP NABL
Drinking Water System Components – Health Effects / Lead Free Compliance	IBWA / CE / GMP NABL certified	IBWA / CE / GMP NABL certified	IBWA / CE / GMP NABL certified	IBWA / CE / GMP NABL certified
Drinking Water and Water Reuse Performance Validation	Factory Tested	Factory Tested	Factory Tested	NWRI Validation
Operating / Maintenance water temperature	0-60°C / 32-140°F / 0- 90°C / 32-194°F			
Disinfection chamber material	Non Contact with water Disinfection advance FEP Tubing			
Maximum working pressure	10 bars / 145 PSI			
Housing material	Electro-polished stainless steel 304 / 316			
Max Power Consumption (lamp only)	upto 1.7 kW	upto 3.4 kW	upto 5.1 kW	upto 6.8 kW
Electricity requirements	220VAC 1 phases / 400VAC 3 phases / 440VAC 3 phases / 480VAC 3 phases			



To select a configuration and model number for a particular disinfection application, It is first necessary to know the following information:

- A. Available floor space
- B. Flow rate and flow variation – peak, average and minimum
- C. Disinfection requirement – inlet and required outlet concentration of the microorganism of interest.
- D. Water quality – upstream process, suspended solids, and BOD.

The steps required to select configuration and model numbers are then as follows:

1. Select a design UV dosage and fluid absorption coefficient from the disinfection requirement and water quality information.
2. Determine the model number and number, units required from the flow ratings given on the design curves.
3. Select the configuration (multiple units only) from the available floor space.
4. Select the number of flow-proportioning steps, if any, from the flow variation and the number of units (determined in Step 3)
5. If the flow rate per unit differs from the flow rating determined in Step 2, determine the new EOL UV dosage from the appropriate design curve.

Silver Stream® Technology Systems vs. Typical Quartz UV Systems

Quartz UV		Silver Stream® Technology
Liquid must flow through chamber when lamps operating	Reliability	Lamps can operate continuously without any liquid in chamber
Mechanical or Chemical cleaning required, especially with turbid waters	Maintenance	Non-fouling FEP tubes and highly turbulent flow eliminate need for frequent cleaning, even with turbid water
Expensive alloys used to minimize corrosion of outer shell	Corrosion	All wetted parts are made of FEP and plastic to eliminate corrosion
More expensive than comparable Silver Stream models.	Cost	Less expensive than any other comparable disinfection method.
Normally provides actual disinfection of 99.0% during continuous flow.	Efficiency	Normally provides actual 99.9 + % disinfection during continuous flow.



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