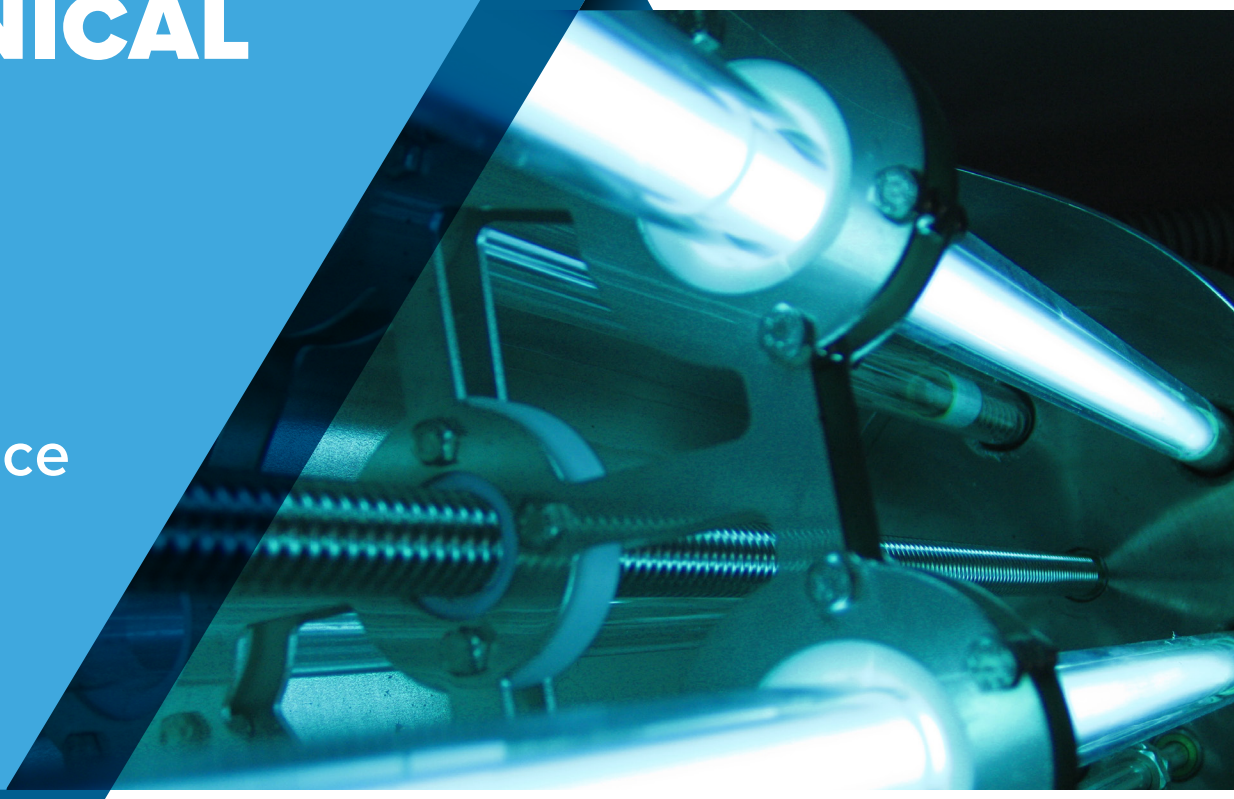
INTEGRATED-AQUA™

TECHNICAL BRIEF

SITA UV Sterilizers Performance Overview



sita®

SITA UV STERILIZERS:
The Superior Choice for Performance and Longevity

Introduction

Water treatment technologies must meet the highest standards of reliability, efficiency, and durability. Since 1982, SITA UV Sterilizers, manufactured in Italy, have set the benchmark for performance and longevity across diverse applications, including drinking water, agriculture, wastewater, aquaculture, aquariums, and zoos. With over four decades of expertise, SITA has established itself as a trusted global provider of high-quality UV disinfection systems. Since 2019, Integrated Aqua Systems, Inc. (IAS) has proudly served as the exclusive North American distributor for SITA, supporting customers with expert guidance and comprehensive product availability.

Manufacturing Excellence and Quality Assurance

SITA's production volume exceeds 9,000 UV sterilizers annually, maintaining strict ISO 9001-certified quality control processes, making it one of the largest UV manufacturers in the world. Every unit benefits from in-house fabrication of key components, including PCB boards, UVC sensors, and touchscreens, ensuring superior quality, reduced costs, and readily available parts. This commitment minimizes lead times and enhances reliability for customers worldwide.

Material Superiority: HDPE and Stainless Steel for Long-Term Durability

SITA UV sterilizers are constructed from either High-Density Polyethylene (HDPE) or 316L Stainless Steel. HDPE is ideal for seawater and similar applications that require the utmost in corrosion resistance. Unlike PVC, which can weaken and deteriorate under prolonged UVC exposure, HDPE's inclusion of carbon black ensures long-term structural integrity [1,2], making it the preferred choice for demanding applications. Additionally, one of the weaknesses of PVC UV chambers is that they are chemically bonded, creating potential failure points over time. In contrast, HDPE UV chambers are thermally welded, maintaining the same structural integrity as the rest of the chamber for superior durability. For freshwater applications and even cold saltwater systems, 316L Stainless Steel is the preferred choice, which is often more economical and allows for enhanced features not available in HDPE.

Comprehensive UV Solutions: Low-Pressure, Amalgam, and Medium-Pressure Units

SITA offers a full range of UV sterilization solutions, including low-pressure, high-output amalgam, and medium-pressure systems. This versatility allows for tailored solutions that meet specific flow rates, dose, and application requirements, ensuring optimal disinfection performance across various industries. When selecting a UV system, IAS can provide ROI analysis between different model choices to help customers make the most informed and cost-effective decision with consideration to Capital Expense (CapEx) and Operational Expense (OpEx).

The main cost savings of a medium pressure unit compared to a low pressure unit is due to the number of lamps. For example, a low pressure UV with 28 lamps can be replaced by a medium pressure units with only 4 lamps. Even with the fewer lamps, the medium pressure units do consume more electricity than the low pressure units, however, that cost is offset by how few lamps there are and how much less labor it would be to do maintenance. Looking at a facility with multiple UVs and comparing electrical use, lamp costs, quartz sleeve costs, and labor costs – the medium pressure units would have a 20% less operating cost when compared to the lower pressure units.

Superior Lamp Performance and Efficiency

SITA exclusively uses German-engineered UV lamps designed for maximum output and reliability. 200-watt and 440-watt low pressure, high output amalgam lamps deliver high-intensity performance, reducing the number of lamps required for effective disinfection. These lamps boast extended lifespans—14,000 hours for 200-watt models and 16,000 hours for 400-watt and 440-watt models—compared to 9,000 to 12,000-hour lifespans seen with generic lamps. High power medium-pressure lamps are rated up to 10,000 hours and utilize much fewer lamps which equate to optimal operating expense over time. Extended lifespan translates into lower maintenance costs and increased system uptime.

FEATURE	GERMAN UV LAMPS	GENERIC ALTERNATIVES
Quartz purity	High (low-iron, high transmittance)	Medium to variable
Manufacturing consistency	Excellent	Inconsistent batch-to-batch
UV output stability	High	Often declines faster
Service Life	14,000 - 16,000 hours	9,000 - 12,000 hours typical
Standards compliance	ISO, CE, RoHS	May be uncertified or informal
Documentation & traceability	Strong	Minimal or lacking

Ease of Installation and Maintenance

SITA UV units are engineered for user-friendly installation and servicing. The 200-series models feature flat-bottom designs for easy vertical installation, while the 440-series models include integral HDPE support legs for horizontal placement. Double open-ended (DOE) quartz sleeves allow for lamp access from either side, streamlining maintenance and reducing downtime.

Shown Above:

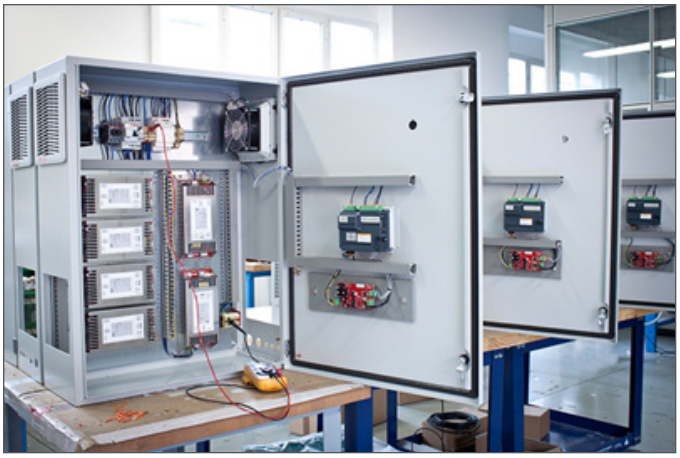
(left) HDPE model PE200 shown in vertical configuration
(middle) HDPE model PE400 shown horizontal with support legs
(right) AM-440 Series UV shown in horizontal configuration with support legs

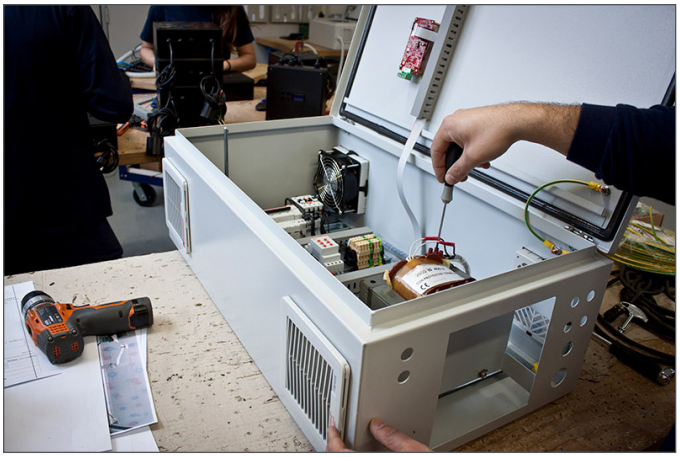
Advanced Controller Technology and Durability

SITA's controllers are housed in NEMA 4X-rated enclosures, offering superior environmental protection. They feature passive heat dissipation and optional air conditioning for extreme conditions. The use of NEDAP UV ballasts—recognized for their high-performance capabilities—ensures stable operation with Modbus communication, LED diagnostics, and wide voltage input compatibility. This prevents voltage fluctuations that can impact lamp longevity and minimize total harmonic distortion (THD<10%) that can affect other sensitive electronics in your system.

FEATURE	NEDAP BALLASTS	GENERIC ELECTRONIC BALLASTS
Power Regulation	Intelligent, high-frequency	Basic or fixed
Compatibility	Multi-lamp types, adjustable output	Often single-type
Protection Features	Thermal, voltage, end-of-life	Minimal
Communication & Control	SCADA/BMS-ready (Modbus, DALI, etc..)	Rare or absent
Reliability (*MTBF)	50,000+ hours	10,000 - 20,000 hours typical
Total cost of ownership	Lower over time	Lower upfront, higher maintenance costs

**(MTBF) Mean Time Between Failures*

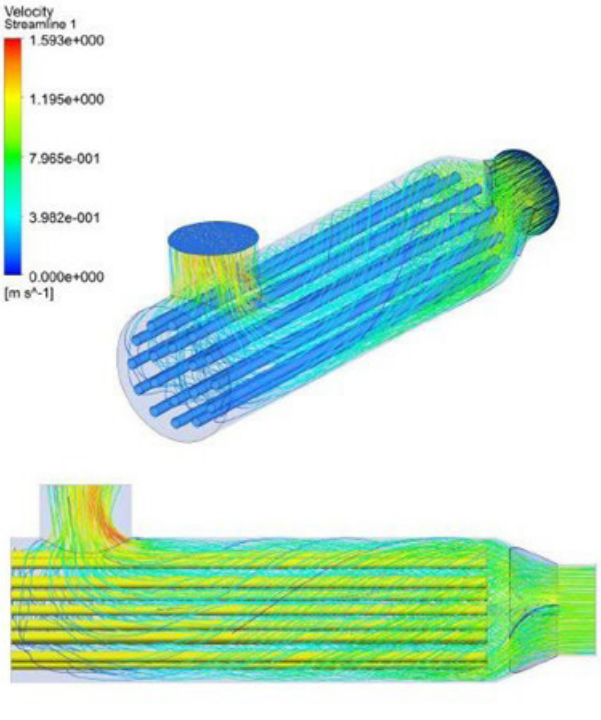




Guaranteed Performance Through MPS and CFD Analysis

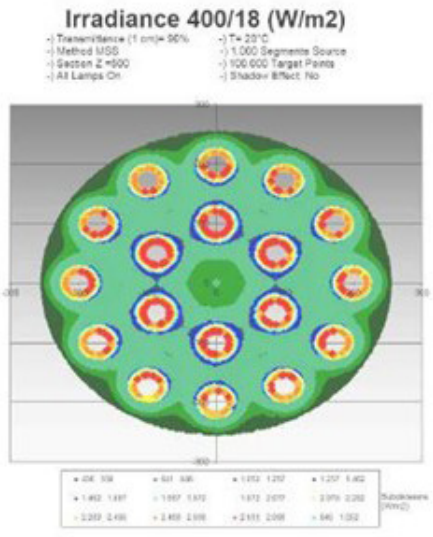
SITA employs advanced Multiple Point Source (MPS) and Computational Fluid Dynamics (CFD) analysis software to calculate the UV Irradiance distribution in each type of UV chamber at specific flow rates and UV Transmittance (UVT) of the water. These mathematical models optimize flow distribution and irradiation dose, ensuring verifiable and manufacturer guaranteed UV performance.

Using CFD analysis SITA UV sterilizers are designed to maximize UV exposure across the entire vessel, ensuring that all water receives effective irradiation, optimal mixing and exposure enhancing overall disinfection efficiency and biosecurity. Through CFD analysis, the UV vessel head loss can be accurately calculated, ensuring the systems pumping TDH is right-sized, ensuring peak operating efficiency.



Shown left:

CFD analysis example for SITA model 400/18 TC designed for 1200 gpm. Calculation of CFD + MPS on temperature effect, quartz and lamp type, contact time. Results are compared with validated IT series tested by third party laboratory under ONORM M5873-1 with biodosimetric test and recommendation either matched or oversized based on results.



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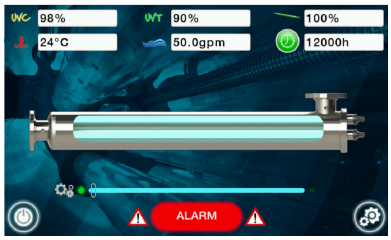
Multiple Point Source (MPS) calculation example for SITA model 400/18 TC able to treat 1200 gpm UVT 90% by 1 cm giving a UVD of 150mJ/cm2 at the end of lamp life.

Through MPS Each UV system is validated using USDA-approved UV Design Guide Manual calculations, eliminating guesswork and ensuring precise operation. Engineers also benefit from access to digital CAD files, available in a wide range of file extensions for seamless system integration (DWG, DXF, STEP).

Next-Generation Control Options

SITA offers multiple controller options to meet diverse operational needs. The ECOLINE LCD controllers provide basic monitoring features, with a 2-line LCD HMI and simple membrane button navigation. Perfect solution for those “no frills” applications. The ST Evolution controller is SITA’s next-generation control platform. Industry-leading 7” color touchscreen HMI, simplified menu navigation, IoT standard communication protocols, & advanced operating features. With the input of a flowmeter, the system can adjust lamp output, optimizing energy consumption, and ensuring a minimum UVC dose is maintained at all times, even during fluctuating flows or UVT values. Optional enhancements, including a second UVC sensor for real-time UV transmittance (UVT) measurement and manual or automatic wipers for quartz sleeve maintenance, further enhance system performance.

AL2 Series



ST Series

LCD Series

Comprehensive Support and Spare Parts Availability

Integrated-Aqua (IAS) is dedicated to supporting our customers. We do this by providing exceptional customer service and maintaining a complete inventory of critical spare parts. This commitment ensures quick access to critical replacement components when you need them, minimizing downtime. IAS also offers on-site startup services, maintenance contracts, and ongoing technical support, reinforcing SITA's reputation for reliability and customer satisfaction.

Conclusion

SITA UV Sterilizers stand as the premier choice for aquatic life support and water treatment applications. With unmatched material quality, advanced engineering, superior lamp performance, and robust controller technology, SITA delivers unparalleled reliability and longevity. Backed by CFD-verified performance and comprehensive support from IAS, SITA UV Sterilizers offer the most effective and durable solution for UV disinfection available today—at a cost that remains competitive with lower-quality alternatives.

REFERENCES:

[1] Plastics Pipe Institute. (2013). Technical Note TN-47: Polyethylene resin testing requirements to support ASTM D2513 UV exposure limits of polyethylene compound.
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[3] S.I.T.A. S.r.l. Technical Department. (n.d.). UV 400/18 sizing and CFD validation summary.
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[4] Uni-Bell PVC Pipe Association. (n.d.). The effects of ultraviolet radiation on PVC pipe.
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