

Ultravation®
UVMatrix™

INDOOR AIR QUALITY (IAQ) IMPROVEMENT PRODUCTS
ENERGY USE OPTIMIZATION
LARGE AIR HANDLER APPLICATIONS

COMMERCIAL
INSTITUTIONAL
MEDICAL
MANUFACTURING

Ultravation®

Better Air | Better Water | Better Living™





Since 1935 ultraviolet light has been used for disinfection for a variety of applications including air treatment. It has gained a reputation for being a cost effective and environmentally friendly disinfection technology.

- UV provides high operating efficiency by way of its consistent prevention of bio-growth on HVAC components
- UV reduces or completely eliminates the need for other types of system / cooling coil cleaning
- Runtime is reduced through maintained optimized heat transfer
- HVAC airstream exposure to germicidal UV can reduce airborne pathogen counts throughout an air conditioned space
- UV can eliminate the HVAC system as a significant source of odors and unhealthful air contamination.

For more than thirty-five years, the people at the heart of Ultravation have been working together to study, engineer and manufacture products that improve people's well being with the proven application of UV light.

— Scott Russell, President and Founding Partner

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Bio-growth in HVAC systems is inevitable

UV-C light is the cost effective and sustainable solution



Air conditioning has brought great benefits to people in terms of productivity in the workplace and making our lives far more comfortable at home as well. It has become ubiquitous and fully integrated into everyday life.

As air conditioning came into use, the need to maintain the equipment became necessary to keep the air flowing smoothly and drain pans from clogging.

UV is effective, energy saving and the only method that continually keeps bio-growth from taking hold in the constantly wet coils, drain pans and other moist areas which are ideal breeding ground for microbes.

Ultravation® also manufactures both HVAC airstream disinfection and convection driven upper room products that have been suggested by the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE). They emit pure 254 NM UVC (UVGI) with no production of ozone.



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UV light is nature's way of controlling bio-growth

Natural UV controls microorganism populations outdoors. UVMatrix™ brings UV inside.

UV emitted from lamps installed in an HVAC system is unfiltered and far more lethal to microbes than sunlight. Unchecked, even a thin bio-film measuring just a few thousandths of an inch on a cooling coil can reduce HVAC efficiency by 30% to 50% – as well as cause HVAC odors. This fact alone makes UV well worth consideration for maintaining the efficiency and cleanliness of an HVAC system.

Non-chemical sustainability

UV light does not pose a threat to the environment and consumables are recyclable.

UV-C short wave ultraviolet light generates no ozone

Ultravation UV lamps are focused at the most lethal wave length of UV light – the UV-C range – and specifically centered on 254nm. It is possible for UV to generate ozone, but only at the lower frequency of 185nm which is not emitted by Ultravation lamps.

Ultravation UV is 40% more intense

40% additional UV intensity over typical UV installations by Ultravation's T3 UV Lamp technology. The UV lamps are encased in water-tight transparent quartz sleeves that insulate the lamp, optimizing operating temperature. Output intensity is raised without additional power consumption.

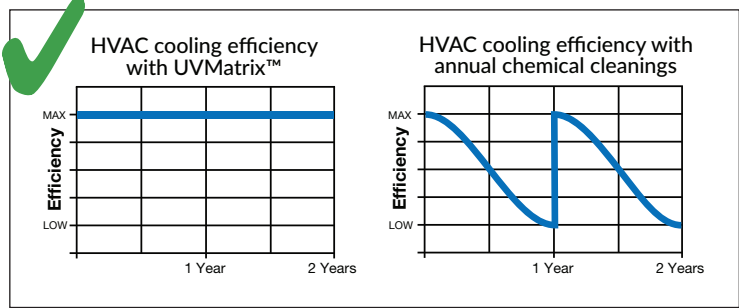
Real time monitoring

Sensors that monitor actual UV intensity are available that provide assurance of needed UV dose at all times. Available for all UVMatrix products.

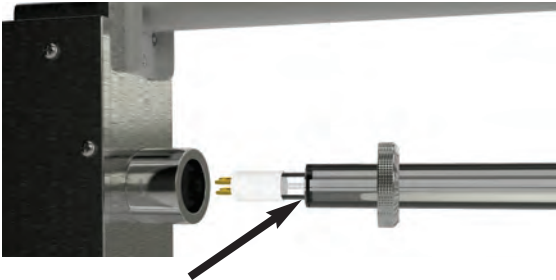
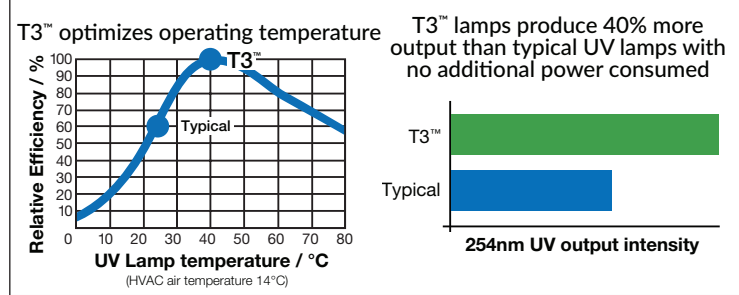


Microbials killed by UV-C light

- | | | | | | |
|------------------------|------------------|------------------------|-------------------------|---------------------------|------------------------|
| Bacteria | Ragweed | Humidifier Fever | Neoformans | Mycrobacterium aviumintra | Neisseria meningitidis |
| Viruses | Dust mites | Microplasma pneumoniae | Mucor | Streptococcus pyogenes | Moraxella |
| Legionella pneumophila | Measles | Penicillium expensum | Aspergillus niger | Bacillus anthracis | Acinetobacter |
| Molds | Tuberculosis | Cryptococcus | Adenovirus | Cornebacterium diptheria | Haemophilus influenzae |
| Fungi | Chicken Pox | Stachybotrys atra | Coxsackievirus | Serratia marcescens | Pseudomonas aeruginosa |
| | SARS Coronavirus | | Mycrobacterium kansasii | | |



Continually clean and efficient: Without UV, manual / chemical cleanings are needed to restore efficiency, but performance begins to degrade almost immediately. Peak operation is limited. UV disinfection maintains peak efficiency for substantial energy conservation.



T3™ design encases UV lamps in protective quartz glass sleeves that insulate the lamp from the cold HVAC airstream, allowing them to operate at optimum temperature

Warranty

Ultravation® UVMatrix™ commercial application products are covered by Ultravation's Lifetime Warranty*
 *when used with genuine Ultravation UV lamps

Ultravation®
UVMatrix™ SI

HVAC coil and interior surface disinfection

The **UVMatrix SI-Series** is an innovative UV equipment design that stresses germicidal effectiveness as well as HVAC energy efficiency. It is also engineered to facilitate installation, maintenance, longevity and a low cost of ownership.

- Built-in expansion system assures excellent fit and UV exposure
- Stainless steel construction available
- Complete system — no extra framework or hardware to purchase
- Rapid return on investment
- Reduces wear and tear, extends HVAC lifespan
- Complete assessment and sizing service provided



Ultravation SI Series is protected under U.S. Patent #7419642B2



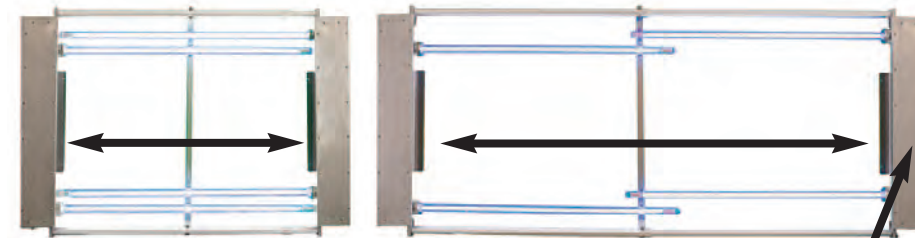
UVMatrix™ CP system monitoring with elapsed time display and available real-time UVC intensity display with individual lamp performance sensors and remote alarm triggers.

Factory techs available for installation: Ultravation engineers are available to assist with specifying product configuration and sizing, as well as provide on site installation.



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Expands to fit any HVAC system, new or retrofit

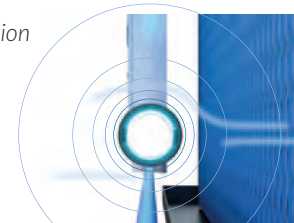
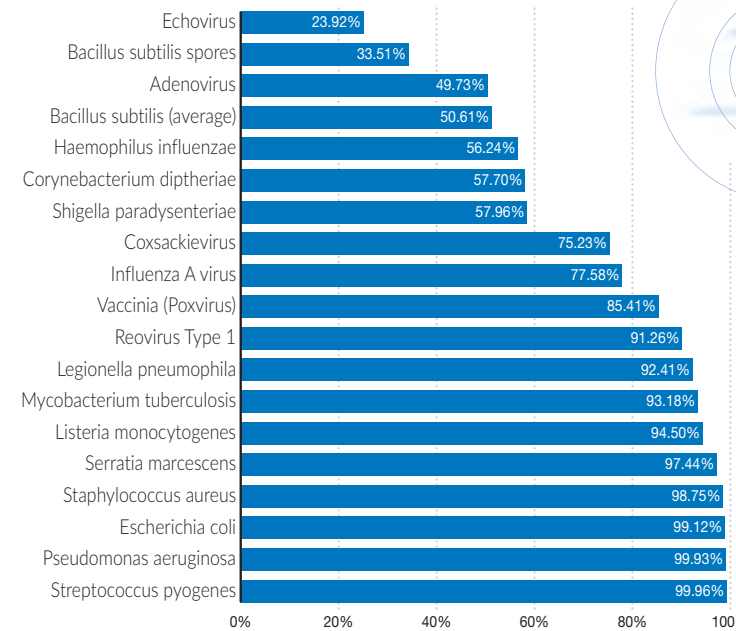


The SI-Series extends for perfect fit — sliding adjustability widens for exact fit! Ensures optimized UV coverage for all air handlers. Ships disassembled in a compact carton with 15 minute assembly procedure.

The SI-series is self-contained and does not need additional framework or hardware..

360° UV dispersion maximizes HVAC surface coverage plus airstream disinfection

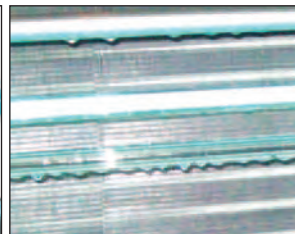
Results of airstream disinfection from a UVMatrix™ SI installation



Low turbulence T3™ UV lamp design requires no reflective panels on the lamps, extending disinfection 360° for complete coil exposure plus adjacent surfaces — and the airstream itself.



T3™ temperature optimized UV lamps with water-tight connections for tolerance of wet HVAC environments.

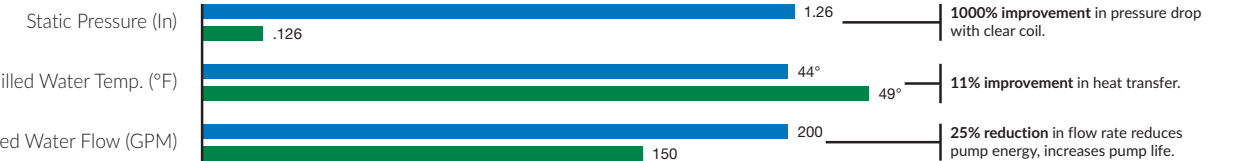


Condensate accumulates on UV lamps and frame

UVMatrix™ SI-Series Energy Reduction Results

Measured benefits from adding UV to a clogged HVAC system — from an independent study

System Performance Factors



Energy Used kWh/yr.



Net Energy Savings
✓ **112,075 kWh or \$13,090**
Electric rate @ \$0.1168 kWh

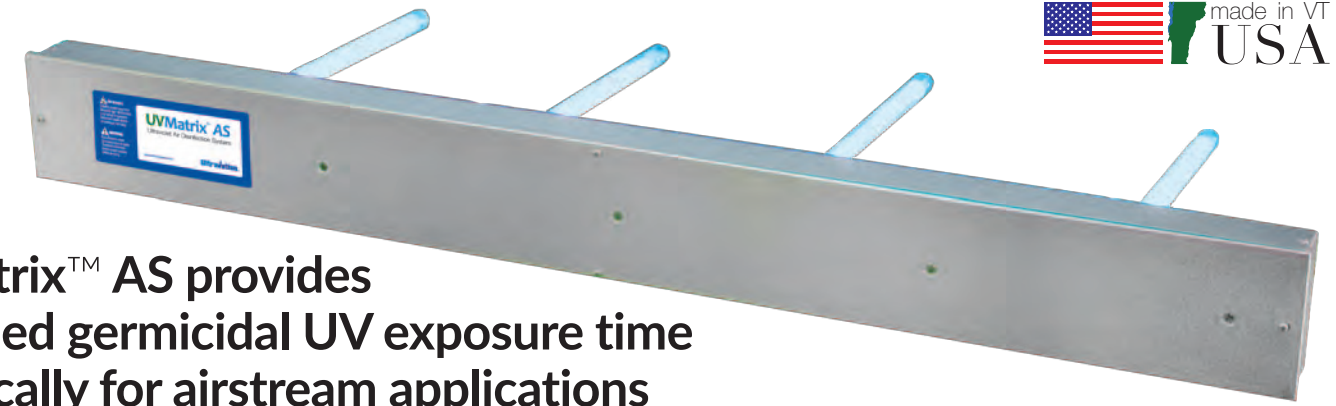
An independent study conducted by and copyright © B. Alan Whitson Company

Ultravation® UVMatrix™ AS airstream disinfection for healthier working environments

The UVMatrix™ AS-Series is capable of exposing airborne microorganisms circulating through an HVAC system to high levels of UVC energy. A major benefit of HVAC airstream disinfection is the reduction of airborne bacteria and viruses that accumulate in one area from being spread to other areas of the building. Another is the ability to apply a very intense germicidal dose with needed exposure or dwell time since people are completely shielded from the germicidal UV light.

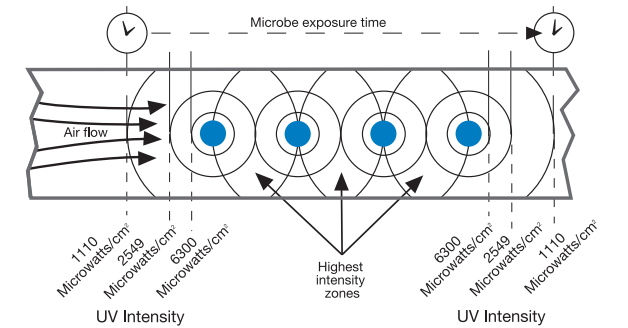
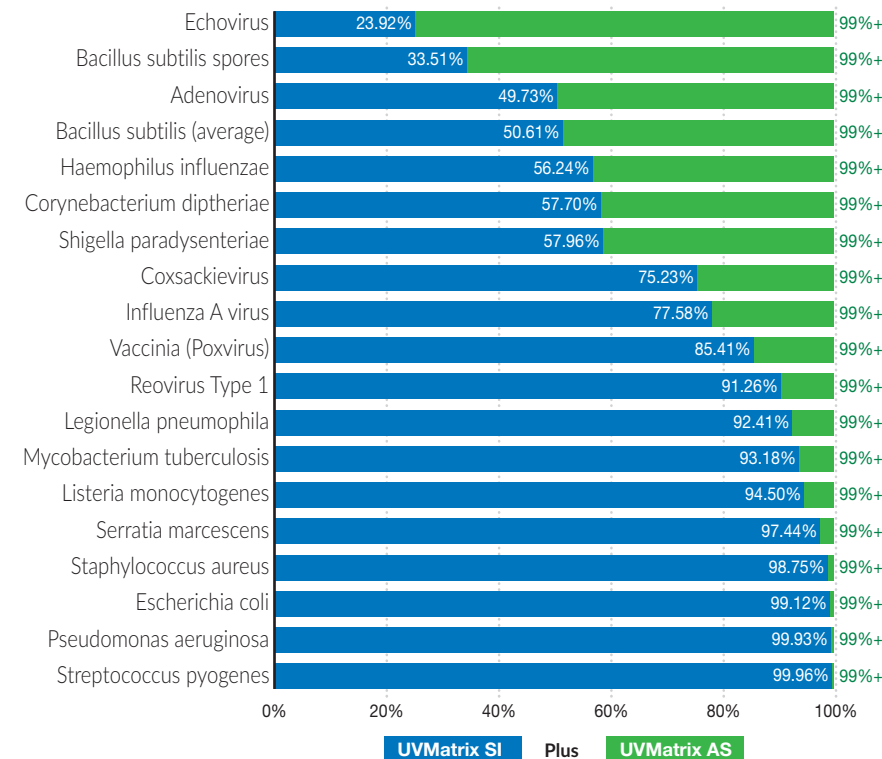
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T3™ T3™ temperature optimized, high intensity UV lamps
Optimized Ultraviolet

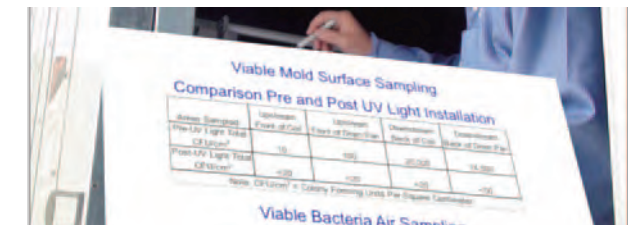


UVMatrix™ AS provides extended germicidal UV exposure time specifically for airstream applications

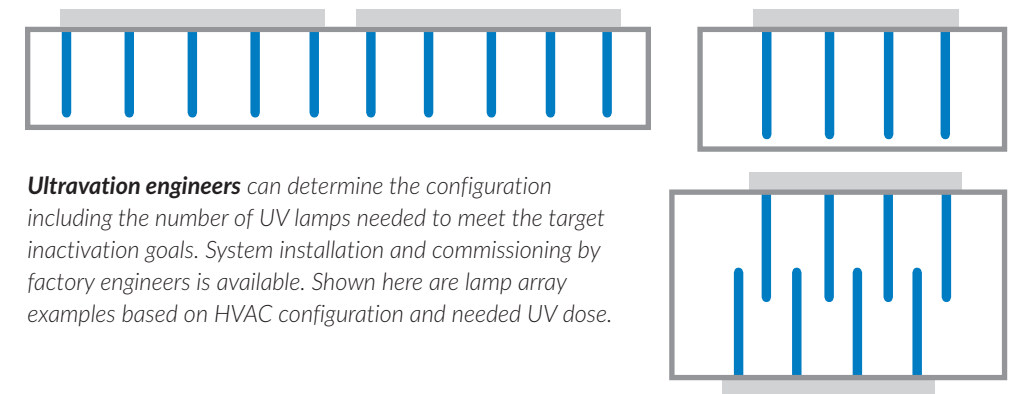
The AS-Series can be configured for nearly any airstream disinfection task. It is often used in tandem with UVMatrix SI as an efficient, unified system that provides coil and surface irradiation while efficiently combining the airstream disinfection of both systems.



Getting the right UV dose: Ultraviolet light disinfection effectiveness is based on UV intensity and duration of exposure. UVMatrix™ AS installs in-line along the ductwork to obtain necessary contact or dwell time. Pre and post testing can be performed to confirm performance. Realtime UV intensity monitoring is available.



Factory technicians are available for HVAC analysis and UV system installation



Ultravation engineers can determine the configuration including the number of UV lamps needed to meet the target inactivation goals. System installation and commissioning by factory engineers is available. Shown here are lamp array examples based on HVAC configuration and needed UV dose.

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BIOGARDUV™ An “Upper Air” UV system that disinfects the air naturally circulating in a room



Ultravation® BioGardUV™ germicidal ultraviolet air disinfection destroys airborne pathogens by exposing the upper regions of a room to germicidal UV light. Since air naturally circulates in any room due to convection, air that is warmed in the lower part of a room (from respiration and other sources) continually rises where it will be exposed to UV light, which kills airborne

bacteria and viruses in seconds. Since the UV light field is restricted to areas above seven feet, the room is safe for occupancy while the air is continuously disinfected.

BioGardUV™ is completely quiet and is energy efficient, using no more power than a fluorescent lamp and uses no fans or blower.

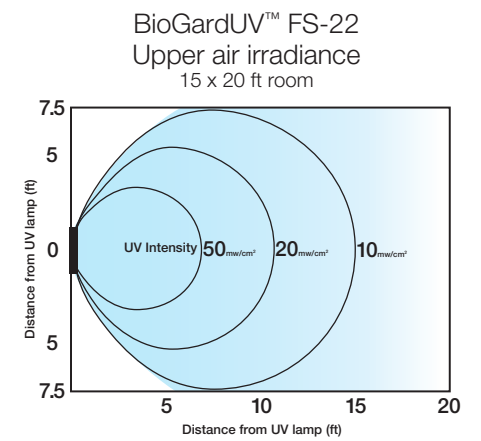
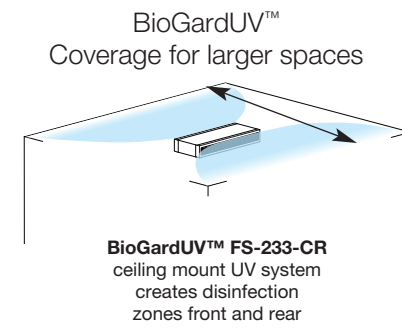
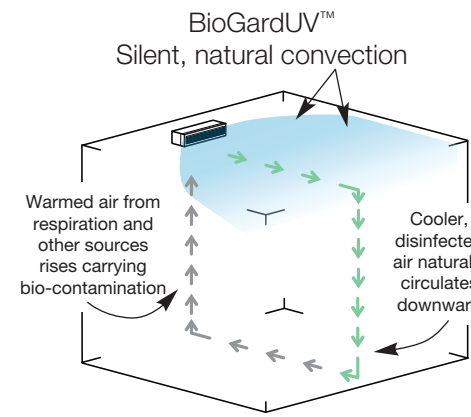
Two sizes are available as wall-mount models plus a ceiling mount model that installs flush-to-ceiling or with optional pendants. The ceiling mount model creates two disinfection zones, front and rear.

Contact Ultravation for information and advice on the number of units required based on room size, and for placement suggestions.

Features:

- Focused 254nm germicidal UV wavelength
- 9,000 hour UV lamp life
- Silent operation
- Energy efficient
- Aluminum construction
- Powder coat finish
- Safety interlock switch
- Hinged access door
- No tools required for UV lamp changes

How UVMatrix™ FS uses convection to reduce airborne microbials

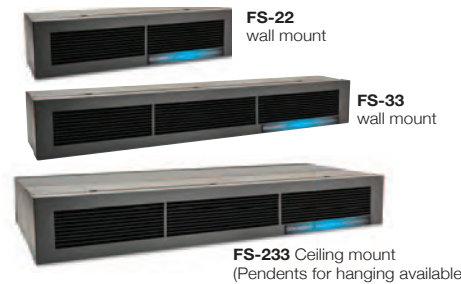


Independent Studies Prove UV-C Destroys Bacteria, Viruses and Fungi in the Air and on Surfaces

UV has been proven in laboratory studies to achieve a 100% kill rate on static coronaviruses including SARS-coV-2 in 15 seconds while in the same study UV eliminated 99%-99.9% of all bacteria and fungi within 90 seconds.

UV is the only air disinfection technology that is supported as effective by ASHRAE.

ASHRAE’s recommendation for airborne pathogen reduction: “Consider adding air treatment and cleaning devices such as UVGI (ultraviolet germicidal irradiation) in duct, plenums and air handling units and on the face of cooling coils.” – ASHRAE’s online guide to pandemic preparedness - Develop a Preparedness Plan, Item 9



Specifications

Model	Coverage sq. ft.	Total UV-C output	UV lamp wavelength	UV lamp life	Power consumption	Width	Height	Depth
BioGardUV™ FS-22	225 (15'x15')	10w	254nm	9,000 hrs	25VA	23 7/16"	5 1/2"	7 1/4"
BioGardUV™ FS-33	350 (16'x22')	16w	254nm	9,000 hrs	36VA	35 1/8"	5 1/2"	7 1/4"
BioGardUV™ FS-233-CR	750 (16'x44')	32w	254nm	9,000 hrs	72VA	35 1/8"	5 1/2"	15 1/16"

Power: All models auto-sensing 120-277 VAC, 50/60 hz.

Important: When installed, bottom of fixture must be at least 7 feet above the floor.



Ultravation®

UVMatrix™ Specialized Applications

The same UVMatrix disinfection performance is available in these special application products

Ultravation® UVMatrix™ LCI-Series

Light commercial/industrial UVGI disinfection provides a solution for smaller air handlers or installations that require independent support framework.



Ultravation® UVMatrix™ 4X-Series

For outdoor / rooftop HVAC applications with remote monitoring available.



Ultravation® UVMatrix™ EZ-Light

Design accommodates ice machines and PTAC systems to kill bio-growth and prevent “dirty sock” odors from contaminated cooling coils.



Member:



EPA establishment number: 074725-VT-001

Manufactured in the USA by **Ultravation, Inc.**, PO Box 165, Poultney, VT 05764

Ultravation's T3™ system is protected by US patents 6,809,326B2 and 6,838,057B2
Ultravation's SI-Series™ system design is protected by U.S. patents 7419642B2 and 682805B2

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