



STERIL-AIRE®

UVC EMITTERS™

For microbial control,
enhanced IAQ and
energy savings



General Products Catalog

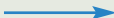
UVC FOR HVAC™: PROTECTING INDOOR ENVIRONMENTS WHILE REDUCING COSTS.

The air conditioning (A/C) coils in our buildings and homes provide cool, moist gardens for the propagation of mold and other microorganisms. These organisms multiply “24/7” to huge concentrations, creating a hidden biofilm of mold deep inside the HVAC system. These microbial contaminants travel from the coil through the airstreams, accounting for much of the illness and discomfort in buildings today and causing many of the maintenance and operational problems.

There is an effective solution to this problem: multi-patented UVC Emitters™ from Steril-Aire, the company that developed “UVC for HVAC”. These devices use germicidal ultraviolet-C (“UVC”) energy to eradicate both surface and airborne mold, as well as viruses and bacteria. The “C” wavelength of the UV spectrum targets the DNA of microorganisms, causing cell death or making replication impossible.

UVC lights have been used for decades in both air and water purification, but conventional devices do not function effectively under HVAC conditions. The UVC Emitter, pioneered by Steril-Aire in the 1990s for IAQ control, is designed to produce very high output in cold and moving air. It provides safe, continuous cleaning while actually saving money by reducing maintenance and energy requirements.

Four-Year Cost-Saving Example

UVC Installation	Before	After		
CFM – measured or selected (VAV)	7,000	8,000		
Entering air temperature – dry bulb °F	78.0	80.0		
Entering air temperature – wet bulb °F	67.0	67.0		
Leaving air temperature – dry bulb °F	61.0	60.0		
Leaving air temperature – web bulb °F	59.0	56.0		
Total cooling capacity – Btuh	183,960	280,080		
Sensible heat – Btuh	128,520	172,800		
Latent heat – Btuh	55,440	107,280		
Net cooling capacity gain – Btuh		96,120		
Pressure drop “across coil”	0.7" WG	0.5" WG		
Pressure drop reduction	0.2" WG			
Pressure drop BHP reduction	0.420	EER: 6.0		
Annual operating hours	3,400			
Energy cost per kWh	\$0.08	EER: 8.1		
Annual improvement (kWh cost)	\$4,510	After		
Annual coil & drain pan maintenance	\$800			
Total annual improvement	\$5,310			
Installation/operating costs (4 fixtures)	1st Year	2nd Year	3rd Year	4th Year
Average fixture cost each	450.00			
Installation & energy costs	509.54	209.54	209.54	209.54
Total Emitter replacement cost		340.00	340.00	340.00
Total installed & operating cost	\$2,309.54	\$549.54	\$549.54	\$549.54
Annual improvement (less costs)	\$3,001	\$4,761	\$4,761	\$4,761
Estimated return (years)	0.435			
Cumulative improvement	\$3,001	\$7,762	\$12,523	\$17,283

A Steril-Aire UVC installation offers the most rapid payback in the industry. A typical installation can pay for itself in a few months and save thousands of dollars thereafter in energy and maintenance costs.

Benefits of using UVC

- Kills or inactivates surface and airborne microorganisms that trigger allergy-asthma symptoms — including mold and mold spores, solvents and other VOCs. Also eliminates associated odors.
- Prevents the spread of infectious diseases caused by bacteria (including *TB*, *Legionella*, *E. coli*, and *whooping cough*) and viruses (including *colds*, *flu*, *measles*, *German measles*, *chicken pox*, *small pox* and *SARS*).
- Continuously cleans coils, drain pans, plenums and ducts, reducing or eliminating costly cleaning programs and the use of harmful chemicals and disinfectants.
- Lowers HVAC energy costs by improving heat transfer and increasing net cooling capacity.
- Improves general IAQ for better productivity and less absenteeism.
- Produces no ozone or secondary contaminants — will not harm building occupants, equipment or furnishings.
- Improves product quality, shelf life and yield in processing plants.
- Rapidly pays for itself in maintenance and energy savings.

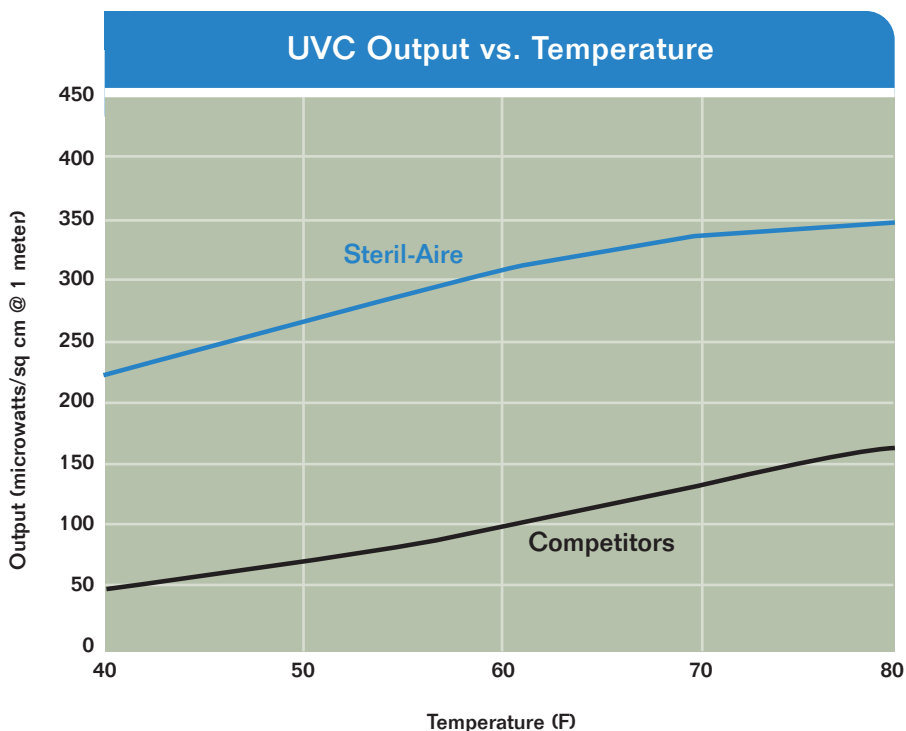
THE UVC EMITTER™: THE BEST PROTECTION AVAILABLE... WITH THE LONGEST SERVICE LIFE.

Steril-Aire devices work better and last longer: The service life and germicidal effectiveness of UVC devices relate directly to how much output or intensity they deliver. There are many UVC products on the market today that claim to work just like Steril-Aire. But in truth, their performance claims are derived from tests conducted at 90° F still air rather than 45° F moving air. Buyer beware: In cold/moving air, output of these competitive lights is much lower than the advertised output at 90° F.

Independent testing proves that UVC Emitter output is significantly higher than the competition at all temperatures, especially under real-life HVAC operating conditions. Only Steril-Aire delivers:

- ▶ *3-4 times longer life:* UVC lights lose up to half their output over a year. Competitive UVC devices must be changed every 3-4 months because they quickly lose the output needed to maintain microbial control. The UVC Emitter, by contrast, has a 12-month service life — and even after a full year, it has 2-3 times greater output than competitive devices deliver on Day 1! As a result, only Steril-Aire can ensure the germicidal performance you need, with no return of microbial growth, for 3-4 times longer than the competition.
- ▶ *Independently verified output:* Tested in accordance with the general provisions of the Illuminating Engineering Society's 1981 Applications Volume.
- ▶ *A patented state-of-the-art solid state electronic power supply* for enhanced reliability and performance.
- ▶ *High performance construction*, including stainless steel housings with high spectral aluminum reflectors, and thick-wall quartz tubes.
- ▶ *Many sizes and configurations* to fit the widest range of applications — externally mounted, internally mounted, and portable.
- ▶ *Complete technical and engineering support* with in-house expertise in both HVAC technology and microbiology.
- ▶ *Lowest life-cycle cost* of any UVC product.

Steril-Aire vs. Other UVC Products: Output Comparison



Steril-Aire's multi-patented UVC Emitter™ provides the best and longest-lasting UVC performance available. As shown in the comparison graph, it has been independently tested to deliver an average of 5 times the output of other ultraviolet devices under HVAC operating conditions (45° F @ 550 fpm air velocity).

APPLICATIONS FOR UVC EMITTERS



Commercial Buildings

- ▶ Offices, government buildings, retail stores and malls, hotels, casinos, museums.
- ▶ Users report HVAC energy savings up to 25-30%, plus improved IAQ and reduced maintenance.
- ▶ Key products: DE Series, SE and SEN Series, Fan Coil UVC Kit.

We have eliminated our four-times-per-year coil cleaning program, and we no longer expose our maintenance people to chemicals required for this task.... By bathing our coils in UVC lights, we've also experienced a big power consumption reduction. We estimate a conservative 28% drop in total A/C system energy usage.

— American Electric Power, Dallas, Texas



Health Care Facilities

- ▶ Hospitals and medical offices, hospices, clinics, laboratories.
- ▶ May be used for infection control or general IAQ, operational and energy savings.
- ▶ Key products: DE Series, SE and SEN Series, Fan Coil UVC Kit, SterilWand™.

Our experiences have shown us repeatedly that UVC enhances indoor air quality and infection control, while saving on maintenance labor, materials and downtime. The substantial energy savings achieved have been a great bonus. Since our administrators now have a high confidence level in the effectiveness of UVC lights, we will continue to equip both new and existing air handling units with the devices.

— Florida Hospital, Orlando, Florida (shown in photo)



Food and Beverage Industry

- ▶ Conveying lines, packaging containers, filling stations, cooling and drying areas, HVAC and refrigeration systems, storage rooms.
- ▶ Enhances food safety through control of mold, bacteria and viruses.
- ▶ Extends shelf life and improves production yields.
- ▶ Key products: DE, SE and SEN Series, SterilWand (all available with optional shatter-resistant tubes)

To reduce mold counts in the room where we process butternut squash, we pressurized the space and installed Steril-Aire UVC lights. We've had a tenfold reduction in mold counts, our air quality has improved and our shelf life has increased dramatically as a result.

— Martin and Sons Farms Inc., Brockport, New York (shown in photo)

APPLICATIONS FOR UVC EMITTERS

Schools and Institutions

- ▶ Classrooms, libraries, meeting rooms, auditoriums, gyms, offices.
- ▶ Stops mold problems.
- ▶ Prevents the spread of childhood diseases — reduces illness and absenteeism.
- ▶ Key products: Unit Ventilator UVC Kit, DE Series, SE and SEN Series, Fan Coil UVC Kit, SterilWand.

This winter has been an especially bad flu season for Southern California. I can say very confidently that our students and teachers have had some colds, but not the humdinger fevers and flus that other schools in our area have experienced. Since adopting the lights in the summer of 2002, we report an estimated 20% drop in absenteeism among students and a 50% drop among teachers.

— Crescent Avenue Christian Preschool, Buena Park, California (shown in photo)



Industrial Buildings

- ▶ Chemical, electronic, food, pharmaceutical, biotech and general manufacturing plants.
- ▶ Controls microbes that can contaminate sensitive products and processes.
- ▶ Provides dramatic energy/operational savings in cleanroom and HVAC applications through continuous cleaning of coils.
- ▶ Key products: DE Series, SE and SEN series, SterilWand.

Maintaining temperature and RH at proper levels is vitally important in the pharmaceutical industry, so HVAC equipment must be maintained at peak performance. But the chemicals used to clean coils and restore heat exchange efficiency can contaminate the manufacturing process. The use of UVC at the cooling coils provides a less costly, non-chemical solution and also helps to extend the life of our HEPA filters.

— Pharmaceutical plant, Northeastern U.S.



Residences

- ▶ Houses and multi-family dwellings.
- ▶ Relieves allergy and asthma symptoms through continuous mold control.
- ▶ Prevents the spread of colds, flu and other ailments.
- ▶ Key products: SteriLight™ I and II.

I couldn't stop coughing, I couldn't sleep at night.... Within just a couple of days after installing SteriLightI, I noticed a dramatic difference in the house. My symptoms began to ease up. As the days went by, I continued to get better and better.

— B. Oblath, Southern California homeowner



PRODUCT INFORMATION: UVC EMITTERS



DE Series UVC Emitters

- ▶ For medium to large systems in commercial, industrial, health care and institutional buildings.
- ▶ Double-ended (DE) units are assembled end-to-end and mounted internally.
- ▶ Five sizes (18", 24", 30", 36" and 42") fit any coil width.
- ▶ Four voltage options: 115-208/230 or 277 Vac.
- ▶ The most widely used product for commercial "UVC for HVAC" — the industry standard!



SE Series UVC Emitters

- ▶ For non-residential systems that cannot be accessed internally — fan coils, heat pumps, unit ventilators, packaged air handlers, terminal units and ductwork.
- ▶ Single-ended (SE) units are installed from the exterior and through the wall of HVAC equipment. Servicing is exterior.
- ▶ Available with six tube lengths (16", 20", 24", 30", 36" and 42").
- ▶ Four voltage options: 115-208/230 or 277 Vac.



SEN Series UVC Emitters

- ▶ For non-residential rooftop and outdoor air handlers, ductwork and other difficult-to-access sites.
- ▶ Combines the external-mounted, single-ended design of the SE Series with a NEMA 4x fixture.
- ▶ Available with six tube lengths (16", 20", 24", 30", 36" and 42").
- ▶ Four voltage options: 115-208/230 or 277 Vac.



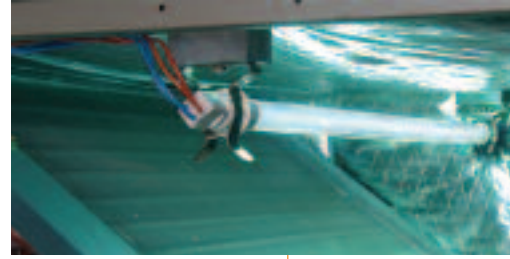
Unit Ventilator UVC Kit

- ▶ For use with all major brands of classroom unit ventilators.
- ▶ Each kit contains one UVC Emitter and all necessary installation components.
- ▶ Two to six kits typically required to serve a unit ventilator.
- ▶ Space-saving design features quick and easy snap-in installation.
- ▶ Four voltage options: 115-208/230 or 277 Vac.

PRODUCT INFORMATION: UVC EMITTERS AND ACCESSORIES

Fan Coil UVC Kit

- ▶ For use with fan coils, split package systems and other room units.
- ▶ Brings enhanced IAQ to hotel rooms, dormitories, offices, patient rooms and classrooms.
- ▶ Contains one UVC Emitter and all the necessary components to retrofit a fan coil with UVC.
- ▶ Space-saving design features quick and easy snap-in installation.
- ▶ Available with six tube lengths (16", 20", 24", 30", 36" and 42") .
- ▶ Four voltage options: 115-208/230 or 277 Vac.



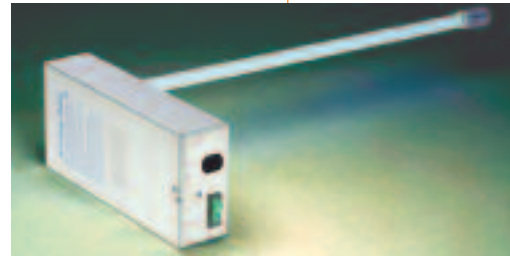
SterilWand™

- ▶ For surface decontamination in labs, hospitals, processing areas, schools, libraries and homes.
- ▶ Hand-held device may be passed over tabletops, walls and other surfaces infested with mold, bacteria or viruses. Safety shield prevents direct exposure to UVC energy.
- ▶ Ideal for use as a mold remediation tool.



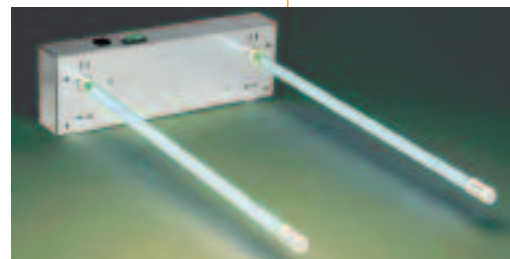
SteriLight™ I

- ▶ For residential and light commercial applications.
- ▶ Single-tube device installs quickly and easily from the exterior of the coil box. Designed for use with "N" and "W" style, low-profile flat and counter-flow "A" coils.
- ▶ Offered in three tube lengths (16", 20" and 24").
- ▶ Three voltage options: 115, 208, or 230 Vac.



SteriLight™ II

- ▶ For residential and light commercial applications.
- ▶ Double-tube device installs quickly and easily from the exterior of the coil box. Designed for use with conventional "A" style, flat and slant coils.
- ▶ Offered in three tube lengths (16", 20" and 24") and configurations of 10" or 14" centerlines.
- ▶ Three voltage options: 115, 208, or 230 Vac.



PRODUCT INFORMATION: ACCESSORIES FOR UVC EMITTERS

Radiometer



- ▶ For monitoring UVC output in large or critical systems.
- ▶ Monitors output in both $\mu\text{W}/\text{cm}^2$ and user-defined preset percentage.
- ▶ Allows Emitter tube changeout at optimum intervals.
- ▶ NIST-traceable calibration sensors.
- ▶ Available with portable (hand-held) and/or stationary display.

Shatter-Resistant Emitter Tubes

- ▶ For food, pharmaceutical and other critical processing applications.
- ▶ Shatter-resistant sheathing encapsulates the Emitter tube without affecting UVC output.
- ▶ Prevents glass contamination in the unlikely event of tube breakage.

UL *Complies with current U.S. and Canadian UL Standards for use in HVAC equipment.*

These products may be covered by one or more of the following patents, others pending: 5,334,347/ 5,866,076/ 5,817,276/ 6,372,186/ 6,313,470/ 6,245,293/ 6,267,924/ 6,280,686/ 6,423,882/ 6,500,267/ 6,589,476/ 6,627,000

Cleaning Kit

- ▶ Recommended for use at installation and changeout.
- ▶ Includes disposable gloves and clean-wipes with 99% isopropyl alcohol.

Replacement Tubes

- ▶ Available for all UVC Emitter styles.
- ▶ Use only Steril-Aire replacement tubes to assure output and eliminate potential failure.

Residential Soft-Wiring Kit

- ▶ For use with SteriLight and other 115 Vac products when hard wiring is not required.
- ▶ Includes UL-listed 3-wire cord and all other components needed for soft-wiring.

Emitter Bank Wiring Kit

- ▶ Simplifies end-to-end installation of DE Series UVC Emitters.
- ▶ Includes wire and all related installation components.

STERIL-AIRE®

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