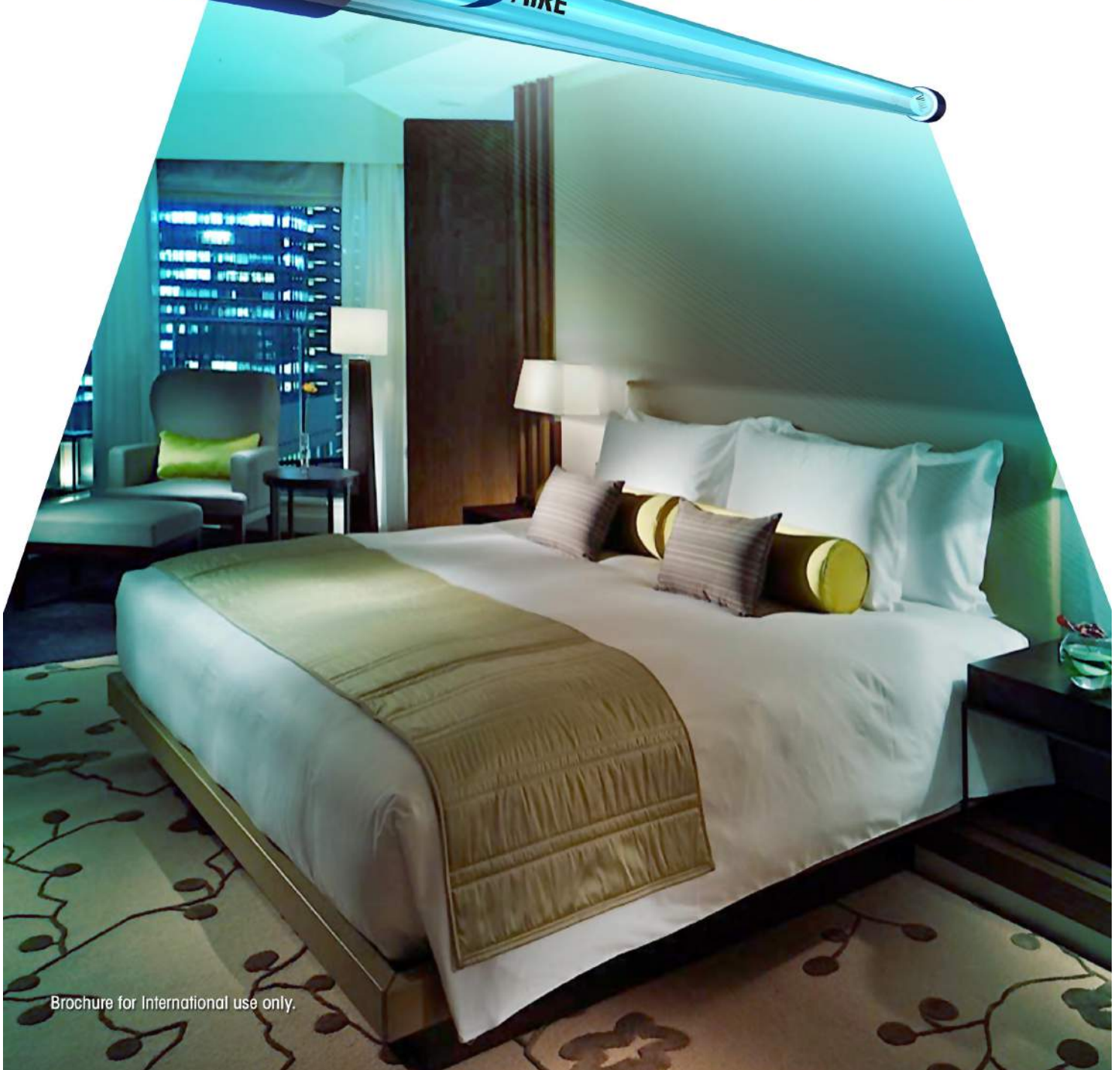


STERIL-AIRE[®]

***UVC World Leaders for
Hotel, Resort, Casino,
Convention, IAQ &
AC Energy Savings***



Brochure for International use only.

How Steril-Aire Benefits Hotels, Resorts, Casinos & Convention Centers

INTERIOR ENVIRONMENT

Improved IAQ

- Air from AC System 99% free of microorganisms *
- Green Marketing
- Reduction in distribution of airborne infections (flu etc) ***
- Partial Pandemic Protection ****
- Reduction in staff sickness and absenteeism **
- Partial Protection against Legionella
- Reduction in VOCs, odors & cigarette smells *



FACILITIES *****

Automatic coil cleaning

- Reduced AC maintenance
- Reduction of maintenance labor & chemical costs
- Reduction in room maintenance downtime
- AC energy saving (10-20%)
- Reduction in carbon footprint
- Improved sustainability
- Coil Condensate Recovery/Recycling



Extension of equipment life:

- Coil
- Chiller



* Subject to UVC Dosage applied

** See Case Study: McGill University, Montreal, Canada

*** ASHRAE Airborne Infectious Diseases Position Document

**** Use of Steril-Aire UVC at Tan Tock Seng Hospital at height of SARS pandemic (2003)

***** See Case studies at www.steril-aire.com

Hotel, Resort, Casino & Convention Center Use of Steril-Aire UVC



HVAC systems

- AHUs
- Fan-coils
- Splits
- Package Units
- Unit Ventilators
- Heat Wheels
- Refrigeration
- Humidifiers

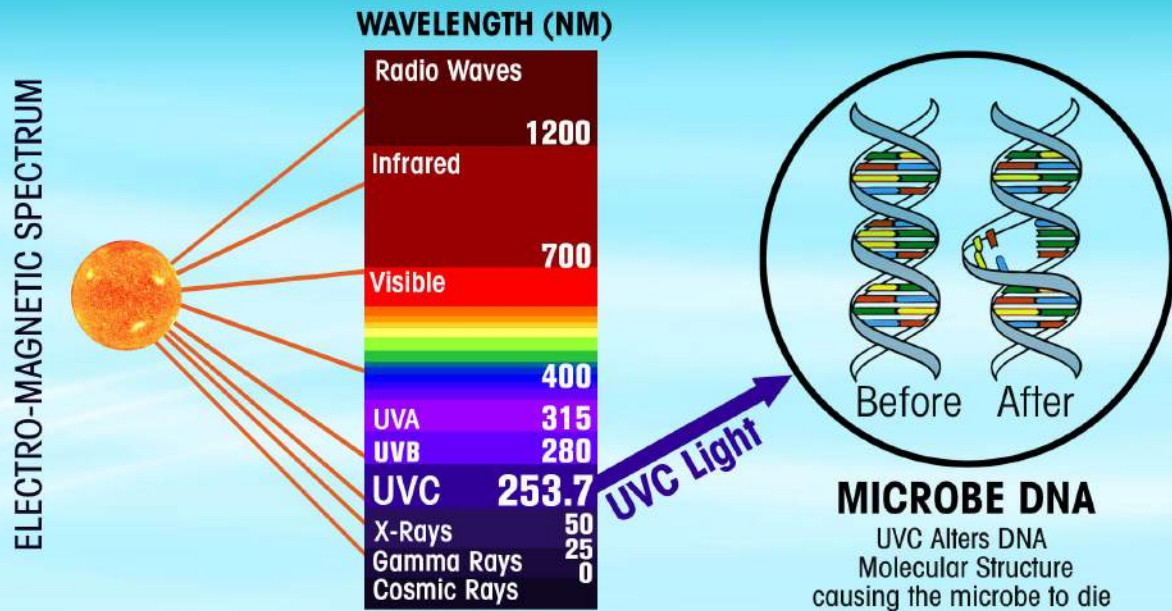
In Room

- Steril-Zone
- SterilWand

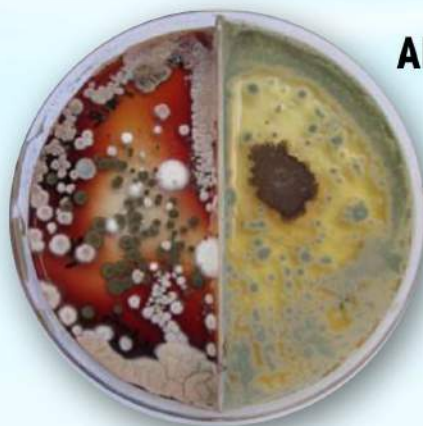
Locations

- Lobby
- Reception
- Guest Rooms
- Casinos and Bars
- Exhibition Halls
- Lecture Theaters
- Conference Rooms
- Gymnasiums & Spas
- Restaurants / Kitchens
- Ice Machines
- Administration Offices
- Restrooms
- Elevators
- Waste Collection Areas
- Parking Structure Exhausts
- Retail Stores
- Cooling Towers

The Science of Steril-Aire UVC

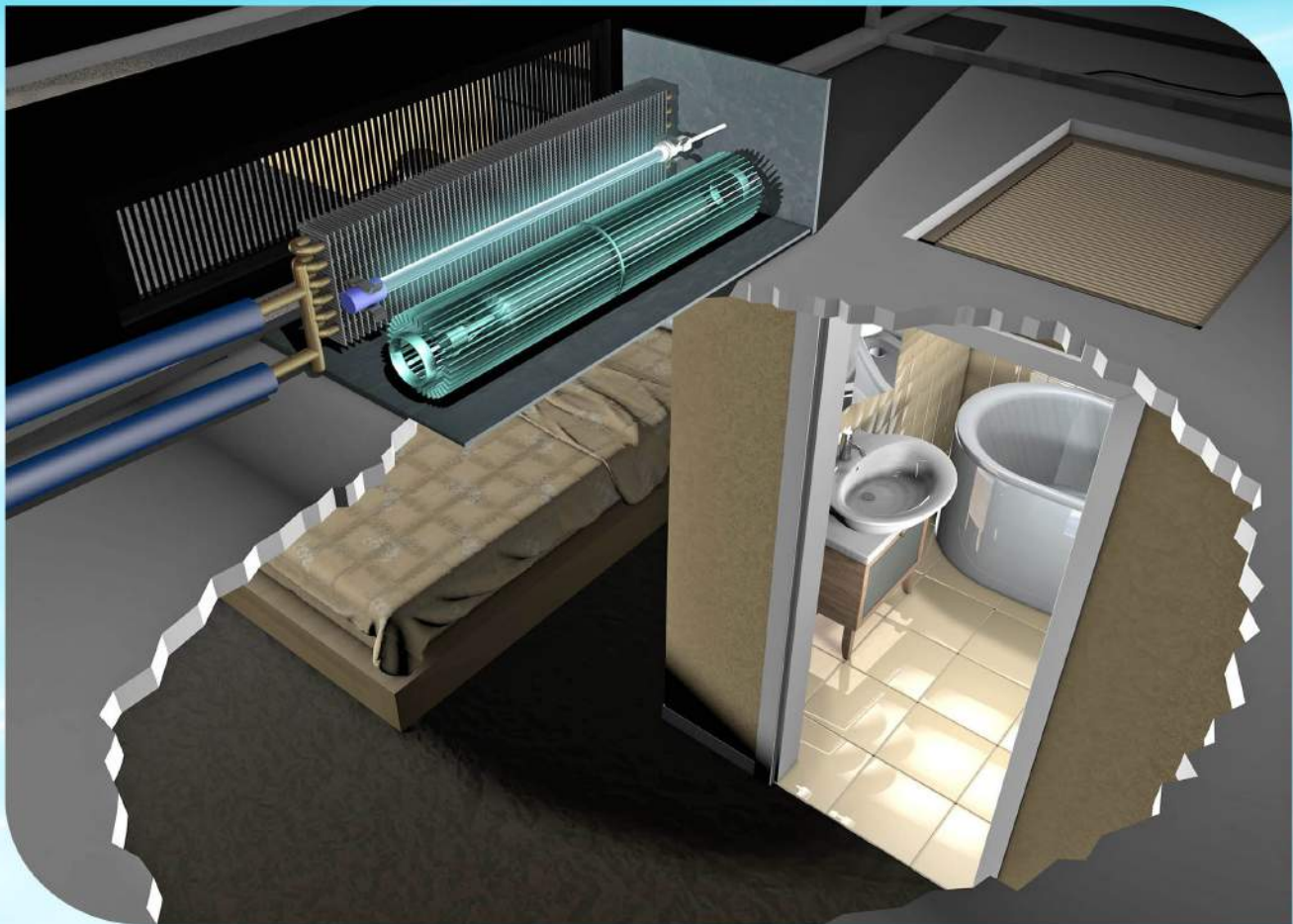


Air-Conditioning Cooling Coil



AUTOMATIC GUEST ROOM COIL CLEANING

Hotel Room Fan Coil



FOUR SEASONS
Hotels and Resorts



Sheraton
HOTELS & RESORTS



Hilton



Seoul Hilton



MÖVENPICK

DELFINES
★★★★ HOTEL & CASINO



Lyford Cay
SALES & RENTALS



Sandy Lane



CASAdeCAMPO
THE CARIBBEAN'S MOST COMPLETE RESORT

THE CLUB
EST. 1962 • ABU DHABI

Steril-Aire UVC Products

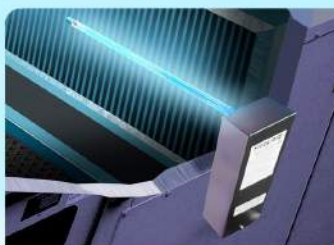
Full catalogue at www.steril-aire.com

DE SERIES UVC EMITTER®



- For use in medium to large AHUs.
- Double-ended Emitters are mounted internally and fitted end-to-end to fit any size coil.
- Available in: 18", 24", 30", 36", 42", 62" inch lengths.
- Universal power-supply. 110 to 277v - 50/60 Hz

SE SERIES UVC EMITTER®



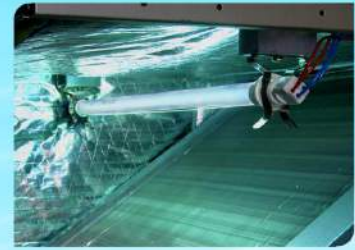
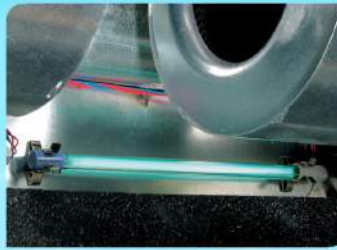
- For fan-coils, heat-pumps, unit ventilators, packaged AHUs, terminal units, and ducts.
- Mounted on exterior of AHU. Tube Installed through a one-inch hole drilled through the AHU casing.
- Available in 12", 16", 20", 24", 30", 36", 42" inch lengths. 110 to 277v- 50/60 Hz
- Also available as an internally mounted kit with 12" to 61" SE Emitter tubes.

SEN SERIES UVC EMITTER®



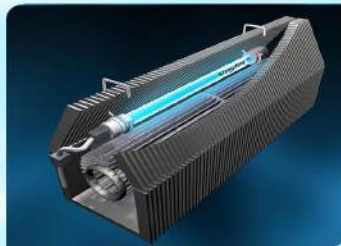
- For exteriors including roof-top units, AHUs, heat-pumps, fan-coils, terminal units, and ducts.
- NEMA 4 rated.
- Mounted on exterior of AHU. Tube Installed through a one-inch hole drilled through the AHU casing.
- Available in 12", 16", 20", 24", 30", 36", 42", inch lengths. 110 to 277v - 50/60 Hz.

SE VO EMITTER® KIT FOR AIR HANDLERS



- Designed for air-handlers, fan coils, packaged systems, heat pumps and unit-ventilator systems.
- For coils larger than 15 inches high and up to 61 inches wide.
- The Kit includes a 110-277 V power supply (selection based on Emitter length) & one Mounting Kit selected from: 2 Short Hooks; 2 Small Spring Clips; Flat Plate Lamp Holder; Insert Emitter Holder, to fit most major brands.
- Available in: 12", 16", 20", 24", 30", 36", 42", 50" and 61" inch lengths.

SE HO EMITTER® KIT FOR UNITARY/SPLIT SYSTEMS



- Designed for air handlers below 5 tons, splits / mini splits, fan-coils, package units, PTAC units, & ceiling cassettes.
- For coils smaller than 15 inches high and 24 inches wide.
- The Kit includes a 110V 60Hz or 220V 50Hz power supply (please specify) plus Mounting Kit, selected from: 2 Short Hooks; 2 Small Spring Clips; Flat Plate Lamp Holder; Insert Emitter Holder.
- Available in: 7.5", 10", 16" 20", 24" inch lengths.

STERIL-ZONE® INDOOR AIR-CLEANER



- Recommended for rooms up to 70 m². 9,000 hours of operation (approximately 1 year of continuous operation)
- Variable speed fan for maximum user control. Max. air delivery up to 300 cmh (cubic meters per hour)
- Filters particles down to 0.3 micron in size with 95% efficiency. MERV 16 filter rating – the highest level for filter efficiency.
- Activated carbon filter absorbs chemicals, gases, cigarette, smoke and odors.
- Safety features include a UVC shield and Ozone-free operation. Power: 110V 60Hz or 230V 50Hz
- Size: W 343mm x D 381mm x H 533mm (W 13.5" x D 15" x H 21")

How Steril-Aire Works

The intended purpose of air-conditioning ("AC") is to enable people to work, play and live in buildings with economical, clean and cold air – sadly this is seldom the case. Because the pollution in the air is mainly invisible it is often ignored, yet the US EPA, World Health Organization and ASHRAE all warn of the potential health risks of AC systems. The health risks come from two main sources; 1: The bio-film (mould) that grows inside the AC system, fed by the condensate created when the warm air passes over the cold cooling coils, sending out mould, bacteria and their products (VOC's) into the air. 2: The bacteria that enter into the building via ducts, doors and windows, and the viruses and bacteria (coughs and sneezes) that enter with the people, all of which are distributed by the AC system. This leads to cold and flu outbreaks, sickness, absenteeism and a drop in productivity.

Case studies confirm that high output Steril-Aire Emitters remove the bio-film from the AC coil and microbes from the air-stream making the air exiting the AC registers up to 99% free of virus, bacteria and mould, and thereby reducing sickness and absenteeism. Air-conditioning uses a lot of energy, often as much as 60% of the total building's energy, and contributes proportionally to the carbon footprint. The chiller and pumps normally consume 70% of the AC energy. The biofilm on the coil restricts airflow and reduces the heat transfer capability of the coil, resulting in warmer and humid air. This causes the occupants to lower the temperature settings on the thermostats, or the maintenance department to lower the chiller set point, causing the chiller to work more and use more energy.

(The heat conductivity of aluminium used in coiling coils is approximately 200 W/m.K while that of biofilm is approximately 0.2 W/m.K. Most coils are only cleaned once or twice a year and, due to the physical structure of the coil, the inside of the coil is seldom cleaned. Even after the coil is cleaned the bio-film starts re-growing immediately).

A typical case study example came from Steril-Aire's Singapore, GETC Green Team, that was asked to improve the air and energy efficiency of the AC system in the Singapore Parliament Building. The Green Team introduced the Steril-Aire UVC Emitter® into the AHUs, which resulted in improved heat transfer efficiency at the cooling coil, raising the chilled water set-point from 6.6 °C to 8.5 °C. The parameters (tonnage and chilled temperature) for the cutting-in and cutting-out of the chillers, were readjusted to 'stretch' the chillers to maximize chiller efficiency. After the fine-tuning process, the return chilled water temperature was raised from the previous 9.8 °C to 13.9 °C. As a result, the chilled water ΔT was increased from 3.2 °C to 5.1 °C. The overall chiller plant efficiency improved from 1.1 kW/ton to 0.86 kW/ton (an improvement of 21.8% in chiller plant efficiency), enabling the Singapore Parliament House to secure the Green Mark Gold Award.

Before Improvement				After Improvement (UVGI for AHUs, Resetting of Chiller Plant Control Parameters)			
Chilled Water Supply Temp	Chilled Water Return Temp	ΔT	Chiller Plant Efficiency	Chilled Water Supply Temp	Chilled Water Return Temp	ΔT	Chiller Plant Efficiency
6.6 °C	9.8 °C	3.2°C	1.1 kW/ton	8.5 °C	13.6 °C	5.1°C	0.86kW/ton

Data Showing Improvement in Chiller Plant Efficiency with Contribution from Clean Coils Installed with Steril-Aire UVC Emitters

USA HOMELAND SECURITY RESEARCH

Dose $\mu W \cdot sec/cm^2$ per watt

STERIL-AIRE
SANUVOX TECHNOLOGIES
ULTRAVIOLET DEVICES
NOVATRON
LUMALIER
DUST FREE
ATLANTIC UV
AMERICAN UV
ABRACAIR LLC



Case Studies (www.steril-aire.com)

Industry UVC Acknowledgement: ASHRAE

- Director's Letter June 24th 2009
- Chapter 17 - 2012 ASHRAE Handbook (HVAC Systems and Equipment)
- Chapter 60 - 2011 ASHRAE Handbook (HVAC Applications)

Contact : sales@steril-aire.com | +1-818-565-1128 | © Steril-Aire 2013. All Rights Reserved

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