



Delivering state of the art
UltraViolet Germicidal
Irradiation (UVGI) products.

Let's fight the Corona Virus
and increase efficiency of
our cooling needs together.

ZEPHYRUS UV SERIES

Increase HVAC efficiency & disinfect air with the same system



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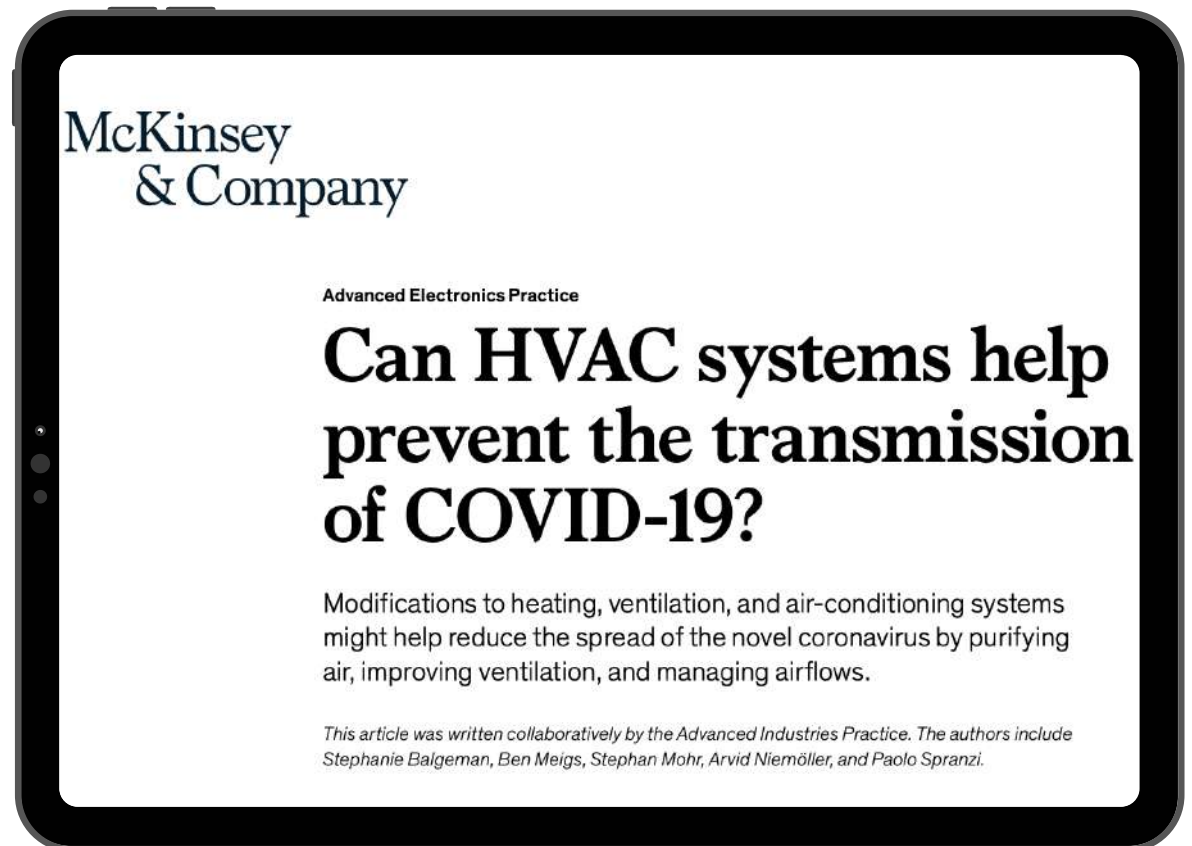
We at Finsen Ritter are Ultraviolet Disinfection Experts. We deliver to our customers the state of the art Ultraviolet Germicidal Irradiation(UVGI) devices.

Why's there a need of UVGI in HVAC devices?

Corona Virus Can Be Airborne Indoors



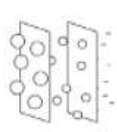

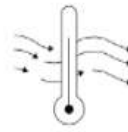

Source: New York Times



Source: McKinsey & Company

Three different methods are commonly used to purify contaminated air.

Filtration is the most common air-filtration method, followed by irradiation

Filtration	Irradiation	Thermal	Other
 <ul style="list-style-type: none"> • Air is forced through fiber-based material or membrane • Efficacy varies, depending on filter type 	 <ul style="list-style-type: none"> • Uses electromagnetic radiation, most commonly ultraviolet-C light, to deactivate pathogens • Cannot be used in occupied spaces, since light may be harmful to skin and eyes • Only practical when light can reach surfaces; many technical issues must be considered when installed 	 <ul style="list-style-type: none"> • High-intensity targeted heating • Can be deployed in stand-alone units or through HVAC systems • Requires air to be exposed to heat for significant periods and thus may be difficult to apply when there is a continuous flow 	 <ul style="list-style-type: none"> • Includes ionized purifiers and ozone generators; mechanism of action varies by technology
Virus still active	Virus is made inactive via sterilization process, which can be challenging for a continuous stream of air or aerosols		

McKinsey's recommendations

Enforcement Policy for Sterilizers, Disinfectant Devices, and Air Purifiers During the Coronavirus Disease 2019 (COVID-19) Public Health Emergency

Guidance for Industry and Food and Drug Administration Staff

March 2020



U.S. Department of Health and Human Services
Food and Drug Administration
Center for Devices and Radiological Health



ISHRAE®

For safe operation during Covid-19
Install UVGI (Ultraviolet germicidal irradiation) in AHUs to keep Coils clean and disinfected

ISHRAE COVID-19 Guidance Document for Air Conditioning and Ventilation

Learn more about preventing Covid-19 transmission Read ISHRAE Covid-19 Guidelines

Download Now

www.ishrae.in

USFDA's guidelines recommend UVC

ISHRAE recommends UVC

UV-C is a proven germicidal which disinfects the air and AHU coil.

Corona Virus needs 22mJ/sq cm of UV exposure for complete inactivation.



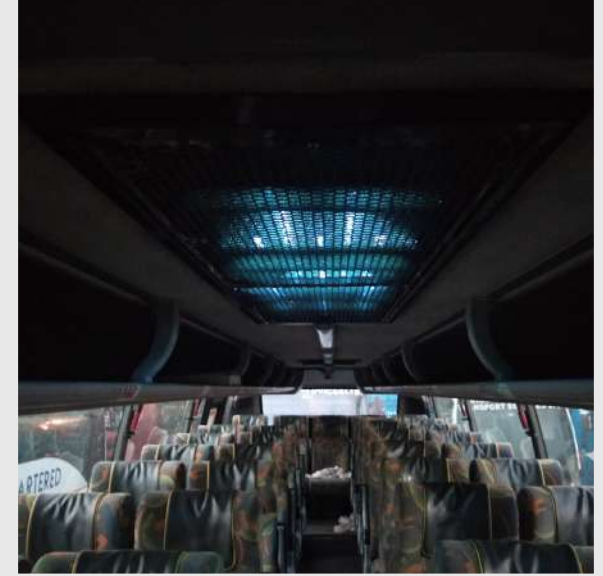
SYSTEMS FOR ALL YOUR NEEDS



AHUs



Ducts



Buses, Trains & Metros



Cost Effective: UV air disinfection costs just Rs. 5 to run for an hour, which is multiple times cheaper than other technologies



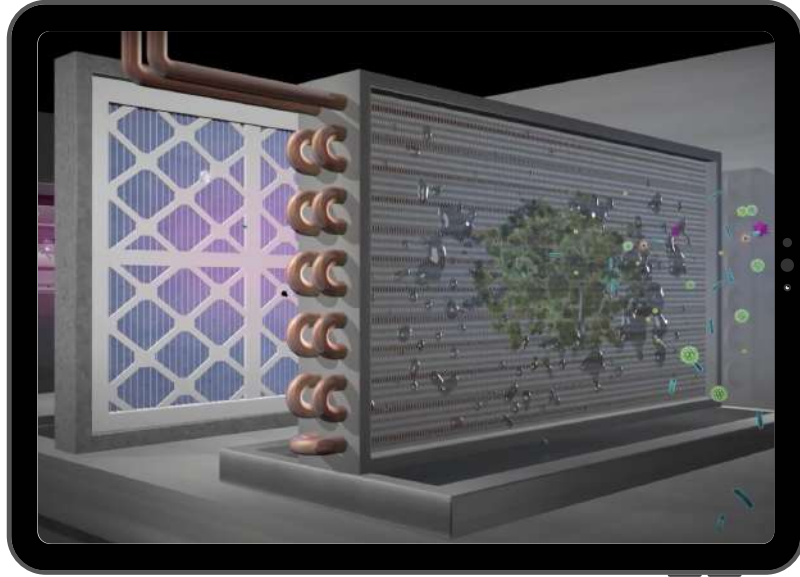
Continuous air disinfection- It is effective against bacteria, fungi and virus. Corona virus spreads via air. Buildings with HVAC are at high risk spread of COVID-19. UV device continuously disinfects air in the building.



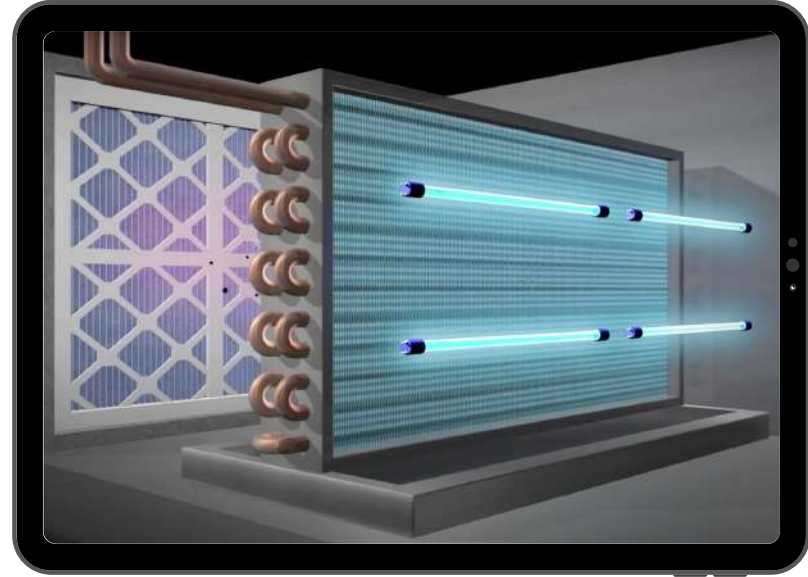
Saves Power: UV prevents mould formation on coil. Hence saves power by increasing efficiency.

ENERGY EFFICIENCY WORKING PRINCIPLE

Development of Bio-film & no air disinfection



Bio-film gets removed increasing efficiency & air is disinfected



AIR DISINFECTION WORKING PRINCIPLE

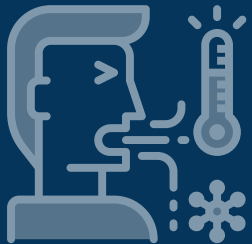
1) Airborne Corona Virus

2) Zephyrous HVAC UV System

3) UV Light Kills/Inactivates Corona Virus

4) Air Handling Unit (AHU)

Corona Free Air



EFFICIENCY GAIN

Effectiveness of an ultraviolet germicidal irradiation system in enhancing cooling coil energy performance in a hot and humid climate



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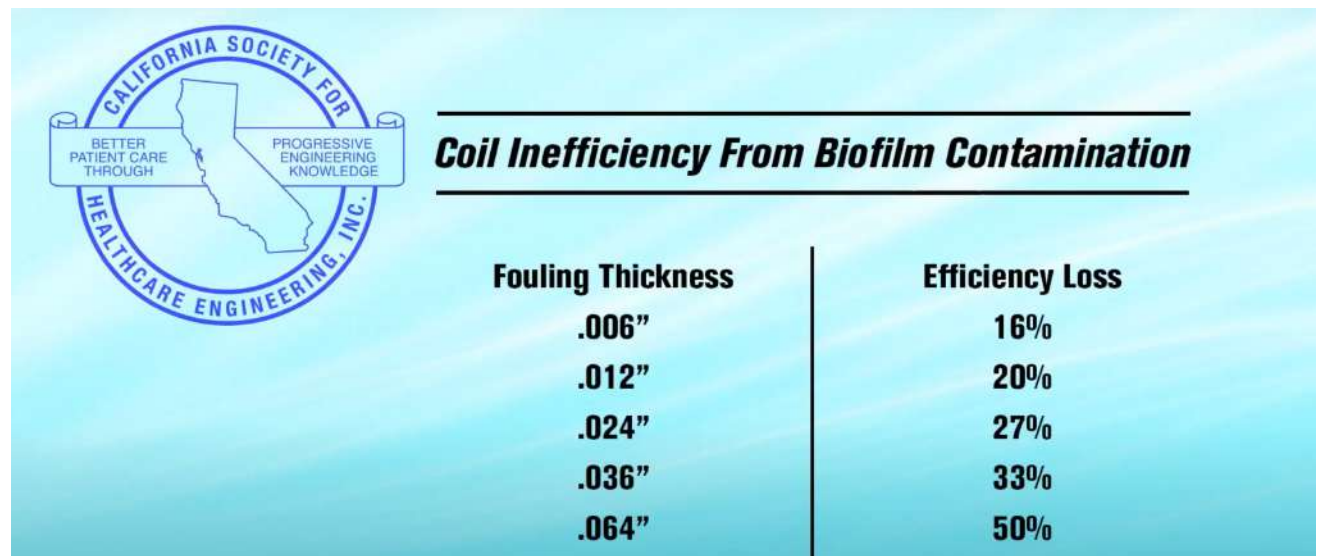
Hot and humid climate

ABSTRACT

Biological fouling (biofouling) on wetted cooling coil surfaces decreases heat transfer efficiency, increases air-side flow resistance and may eventually lead to more energy consumption by fans and chiller plants. Applying ultraviolet germicidal irradiation (UVGI) systems in air handling units (AHUs) has the potential to clean coils, improve coil performance and save energy. In this study, the effectiveness of a coil irradiation system in improving coil performance and saving energy was investigated through a field test in a hot and humid climate. A commercially available coil irradiation system was installed downstream of a cooling coil in a variable air volume (VAV) AHU. The duration of the field test was 14 months, with four months before UVGI intervention and 10 months after UVGI intervention. The effectiveness of UVGI was evaluated via a "before UV" and "after UV" comparison of coil performance. The coil overall thermal conductance increased by 10% and the pressure drop decreased by 13%, with the improvement being most rapid over the first month after UVGI intervention. Fan energy use fell by 9% over the ten months of UVGI operation. Savings in fan energy were 39% greater than the energy used by the UV lamps.

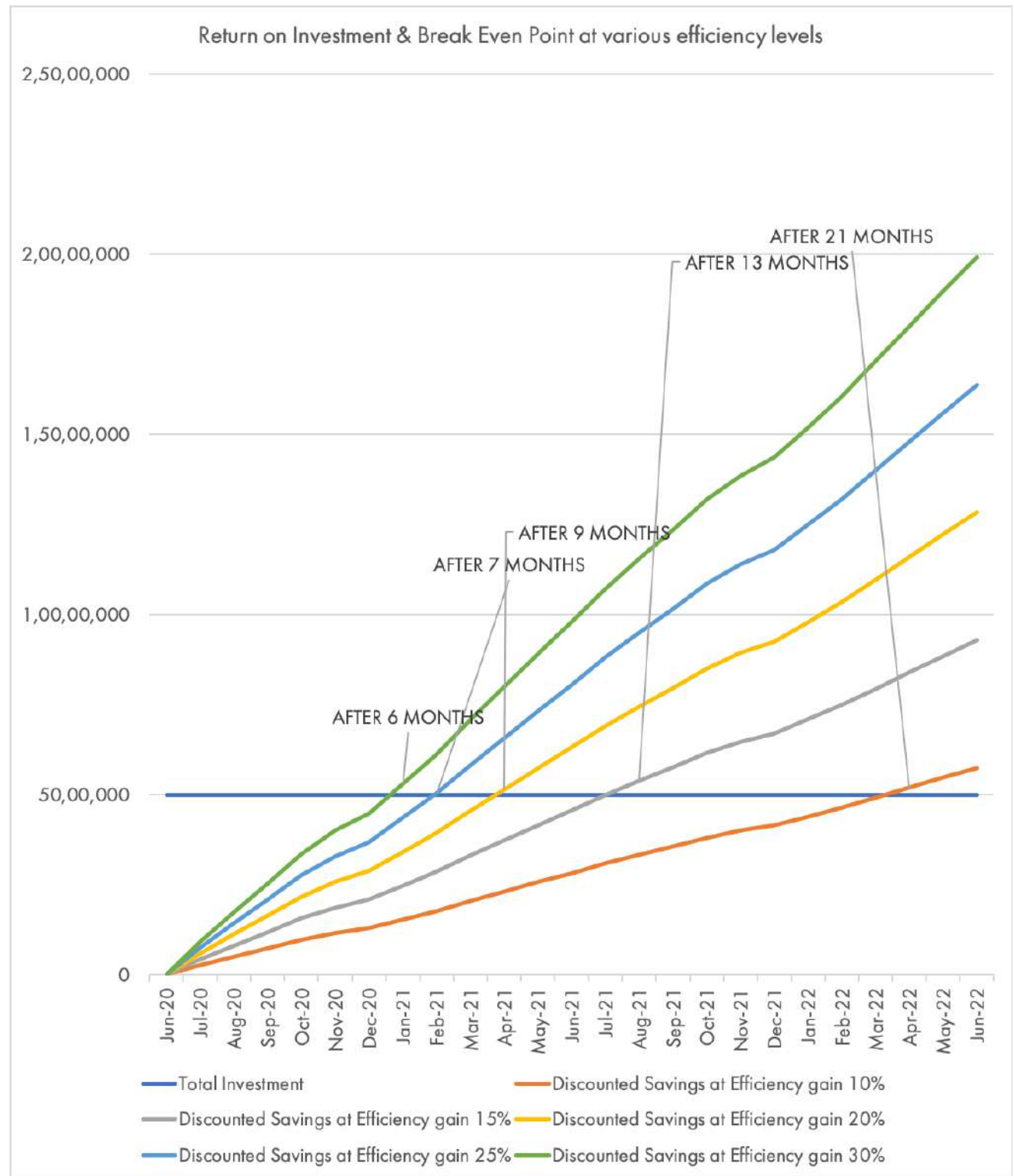
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Research Paper validating the energy efficiency increase



Decrease in efficiency due to bio-film.

TYPICAL BREAKEVEN POINT FOR THE SYSTEM



WHY CHOOSE FINSEN RITTER HVAC UV SOLUTION?



Saves Power



Cost Effective



High Power
UV Lamps



Cloud Integration & Electronic
Control Panel



Stainless Steel SAE
Grade 304

FINSEN RITTER



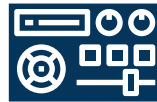
Best in class UV irradiance of minimum 5300 to maximum 8500 uW/sq cm



ISHRAE guidelines: 200-2000 uW/sq cm
Hence, Factor of Safety(FoS)= 2.65



Custom Made Design for all AHUs



Electronic Control Panel



Realtime before and after temperature, humidity & air flow rate sensor



Cloud Integration



Realtime alerts



Monthly report on HVAC working

OTHERS

Typically 500-2000 uW/sq cm

FoS<1

Long Installation Time due to non custom design.

Basic Control Panel with no electronic integration

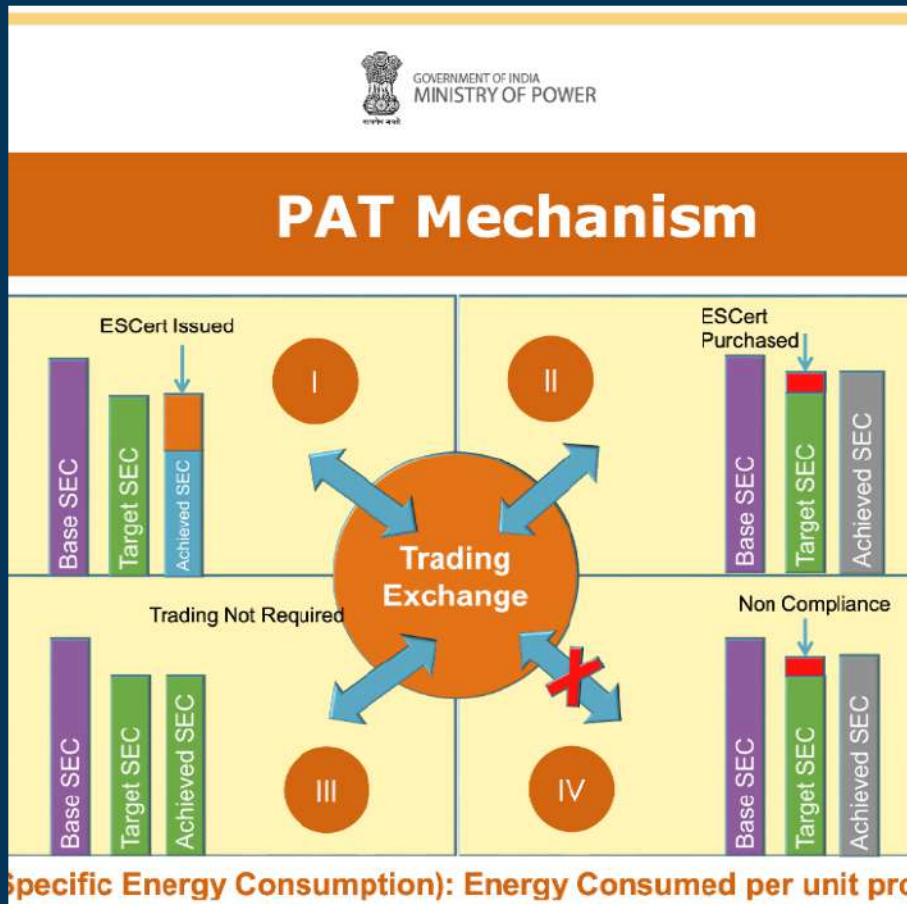
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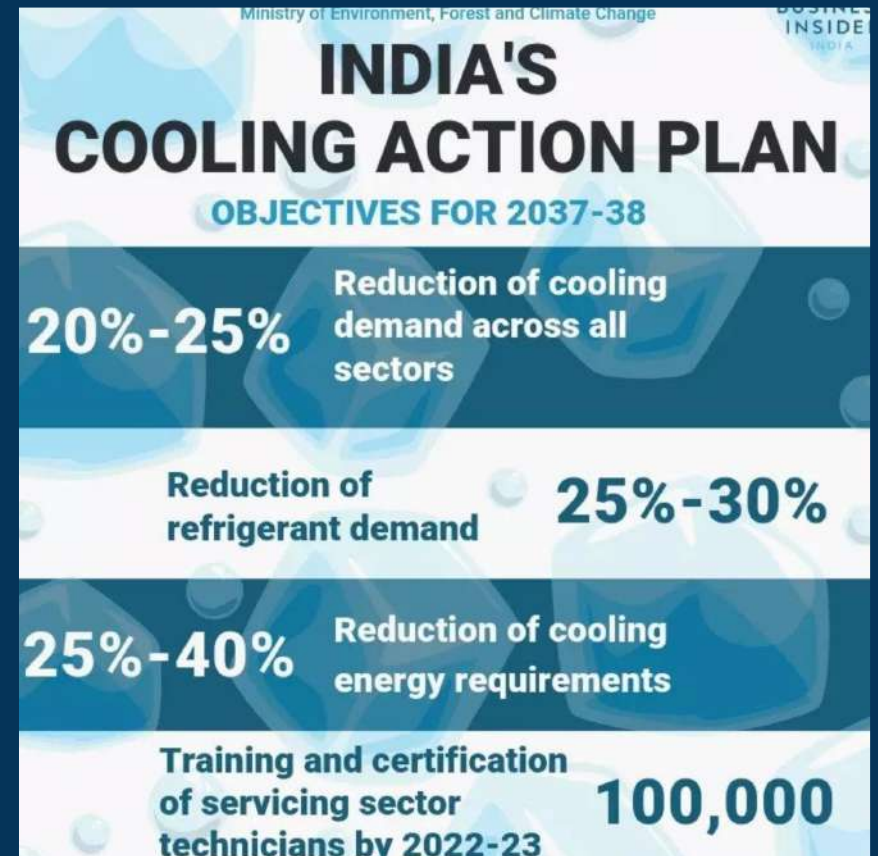
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GOVERNMENT'S INITIATIVES



PAT Scheme
Ministry Of Power



India Cooling Action Plan
Ministry of Environment, Forest & Climate Change

APPLICATIONS

One product, many uses. Find out if this product can be useful for you.



Offices



Hospitals



Co-working spaces



Gyms



Hotels



Shops & Stores

TECHNICAL SPECIFICATIONS & CONSULTATION



Specifications	Zephyrous 450	Zephyrous 600	Zephyrous 900
Power	450 W	600 W	900 W
Weight	4 Kg	4.4 Kg	5 Kg
Wavelength	254 nm	254 nm	254 nm
Structure	Stainless Steel SAE 304 grade	Stainless Steel SAE 304 grade	Stainless Steel SAE 304 grade
Power to UV-C efficiency	34%	34%	34%
Operating Voltage	220 V AC/ 24 V DC/ 110 V DC	220 V AC/ 24 V DC/ 110 V DC	220 V AC/ 24 V DC/ 110 V DC
AC Voltage Frequency	50 Hz	50 Hz	50 Hz
Lamp Life	9000 hr	9000 hr	9000 hr

Consultancy

We at Finsen Ritter Provide consultancy for your custom requirements and needs. Providing one stop end-to-end solutions for UV disinfection methods and protocols at no additional cost.

Installation

Installation support is provided as an option. We provide full literature and installation guide for customers who avail the self installation module.

Does it work on Corona Virus (SARS CoV-2)?

Yes. UVGI inactivated the Corona Virus on sufficient exposure.

WHAT IS UV-C and UVGI?

Ultraviolet radiation is divided into three categories UV-A (315 - 400 nm), UV-B (280 - 315 nm) & UV-C (200 - 280 nm). UV C is the light with the higher frequency and smaller wavelength. UVGI refers to radiation with specific wavelength (254 nm), scientifically proven to kill and inactivate most harmful Microbial Pathogens

WILL UV-C DEGRADE OBJECTS IN THE ROOM?

UV-C is a short wavelength light and does not penetrate most objects. Hospital room disinfection does not accumulate sufficient exposure time to cause any material degradation.

IS UV-C LIGHT HARMFUL?

UVC radiation refers to wavelengths shorter than 280 nm. These wavelengths are entirely absorbed by our atmosphere and no natural UVC radiation reaches the surface of the earth. These wavelengths are available to us through artificial sources, such as UVC LEDs or mercury lamps. UVC does not penetrate the skin and is almost entirely absorbed by the outer dead layer (stratum corneum) and outer skin (Outer Epidermis) and negligible radiation reaches the living cells of the skin. Human Eyes are most susceptible to UVC exposure due to absence of an outer dead protective layer of skin. Exceeding the threshold level of exposure will cause a painful irritation of the cornea similar to looking directly at Sun. This damage is painful but transitory with corneal shedding and replacement in a day or two. The intensity from point sources like UVC LEDs falls off as 1 over distance squared, and once it gets past the scattering length, it falls off exponentially. This means that the further away a UVC source from a human, the lesser dose they are exposed to.

FREQUENTLY ASKED QUESTIONS



FREQUENTLY ASKED QUESTIONS

HOW DOES IT WORK?

Multiple Scientific Papers and Research Studies prove conclusively that when Pathogenic organisms are irradiated with UV-C light with specific wavelength(UVGI), The UV Photons interact Photochemically with DNA and RNA molecules. Photon absorption by DNA or RNA (specifically by thymine bases) is known to cause inactivation of the DNA or RNA double helix strands through the formation of thymine dimers. If enough of these dimers are created in DNA, the DNA replication process is disrupted and the organism cannot replicate rendering it inactive

SHOULD I CLEAN MY DEVICE?

Yes - depending on the surrounding environment, UVC lamps should be checked periodically (approximately every three months) and can be cleaned with a dry cotton cloth or paper towel.



For more information visit:
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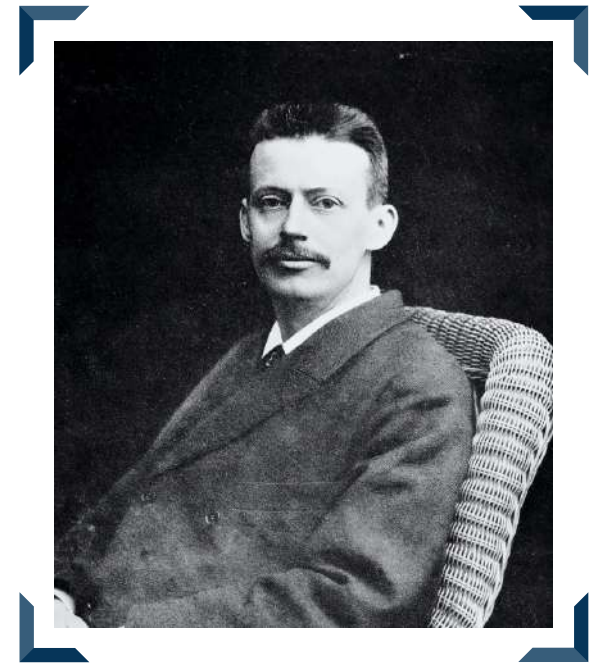
OUR TRIBUTE



NIELS RYBERG FINSEN

15 December 1860 – 24 September 1904

He was one of the pioneers to use UV light in medicine. In 1903, he was awarded the Nobel Prize in Medicine and Physiology "in recognition of his contribution to the treatment of diseases, especially lupus vulgaris, with concentrated light radiation, whereby he has opened a new avenue for medical science."



JOHANN WILHELM RITTER

16 December 1776 – 23 January 1810

Johann Wilhelm

Ritter was a German chemist, physicist and philosopher. He was one of the first to document the UV rays. In 1801, after hearing about the discovery of "heat rays" (infrared radiation) by William Herschel (in 1800), Ritter looked for an opposite (cooling) radiation at the other end of the visible spectrum. He did not find exactly what he expected to find, but after a series of attempts he noticed that silver chloride was transformed faster from white to black when it was placed at the dark region of the Sun's spectrum, close to its violet end. The "chemical rays" found by him were afterwards called ultraviolet radiation

