

Germicidal Lighting Options

We sincerely hope that this note finds you and yours happy and healthy!

Attached findings are based upon our research of these manufacturers with regard to:

Safety, Quality, Universality, Affordability, Reliability, & Efficiency

Thank you for reading and for being a valued customer of Capitol Light!

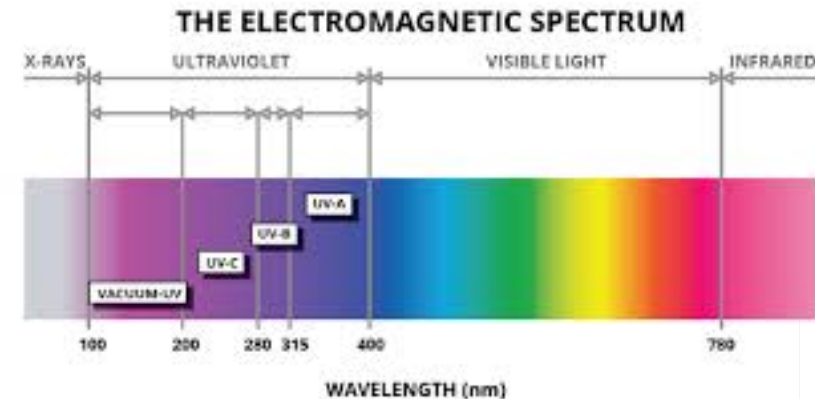
GERMICIDAL TECHNOLOGY

UV and NON-UV

- **UV (Ultraviolet) light** for this presentation is electromagnetic radiation between 200 and 400 nanometers. The length of the wave determines whether it is UVA, UVB or UVC. UVC is what has been used to sterilize surgical equipment etc., for some time, and is proven to eradicate all viruses, pathogens, and bacteria.
- **Far-UVC** operates at the frequency of 222nm and at low-doses can kill airborne flu viruses without harming human tissues*

*Welch, D., Buonanno, M., Grilj, V. *et al.* Far-UVC light: A new tool to control the spread of airborne-mediated microbial diseases. *Sci Rep* 8, 2752 (2018). <https://doi.org/10.1038/s41598-018-21058-w> (excerpt on following page)


- **Non-UV or Anti-Microbial Lighting** does not kill viruses but does kill bacteria and can run 24/7 with no ill-effects for human tissues.



FAR-UVC

- Influenza virus spreads from person to person mainly through fine liquid droplets, or aerosols, that become airborne when people with flu cough, sneeze, or talk. The current study was designed to test if far-UVC light could efficiently kill aerosolized influenza virus in the air, in a setting similar to a public space.
- In this study, aerosolized H1N1 virus—a common strain of flu virus—was released into a test chamber and exposed to very low doses of 222-nm far-UVC light. A control group of aerosolized virus was not exposed to the UVC light. The far-UVC light efficiently inactivated the flu viruses, with about the same efficiency as conventional germicidal UV light.
- “We show for the first time that far-UVC efficiently inactivates airborne aerosolized viruses, with a very low dose of 2 mJ/cm² of 222-nm light inactivating >95% of aerosolized H1N1 influenza virus,” the authors wrote. “Continuous very low dose-rate far-UVC light in indoor public locations is a promising, safe and inexpensive tool to reduce the spread of airborne-mediated microbial diseases.”

PROS & CONS

UV PROS	UV CONS
Kills Viruses, Pathogens, Bacteria, & Fungi (200-400nm)	Can cause skin-cancer and is very damaging to the eye without the proper protective equipment.
	Needs separate Lighting Controls (ties into BAS system)
Far UVC lights (early studies have shown continuous low-doses have been proven safe at 222nm)	
ANTI-MICROBIAL LEDs PROS (405nm)	Anti-Microbial LEDs CONS
Kills Bacteria (Salmonella, E.Coli, MRSA, Fungi, C-diff, Staph* etc.)	Does Not Kill Viruses or Pathogens
These LEDs would be in with the other COB LEDs and are constantly emitting the 'blue' light (frequency 405nm) produces intra-cellular Reactive Oxygen Series (ROS) – Similar to bleach, these ROS kill bacteria and prevent it from repopulating the space.	Non-Dimming and should run 24 hours per day 7 days a week for optimal disinfection. Visually the lens will have a slight purple tint.
Does NOT harm occupants	
Good option for fitting rooms, cash wrap, bathrooms, shopping cart corrals, kitchens, food-prep areas, etc.	

UV

WELCOME TO THE FUTURE

SAFETY

Early studies* have shown that continuous low doses of **far-UVC** radiation results in no harm to humans. The **far-UVC** light does not penetrate the top layer of the skin.

The smaller cell structure of viruses and bacteria allow the **far-UVC** light to penetrate and cause damage.

healthē
BY LIGHTING SCIENCE

Cleanse® Portal

UV SANITIZING ENTRY GATE

While a ten second pause to reduce the spread of infection may sound like science fiction, the future is most certainly now.

Far-UVC, the Ultraviolet radiation band between 200-230 nanometers (nm), has been proven to penetrate and inactivate surface pathogens, such as bacteria, parasites, fungi and viruses. Simply step into the Cleanse Portal and make a slow 360 degree turn for a 10-12 second dosage of Far-UVC.

Early studies* indicate no harm to humans from continuous low dosages of 222 nanometer, far-UVC light. Yet the source effectively inactivates over 90% of contaminants, based on the intensity and brief exposure time described.

Position the free-standing Cleanse PORTAL next to any high traffic or critical entry point to significantly reduce infection transmission rates.



Patent Pending

APPLICATIONS

In today's global environment, we have experienced first-hand how our connectivity leads to the exponential growth rate of infectious disease. It is therefore an easy exercise to identify locations for entry sanitization in critical infrastructure, such as healthcare clinics, hospitals, medical office buildings, assisted living communities, schools, daycares, prisons, and transportation hubs.



HEALTHē BY LIGHTING SCIENCE | 801 N ATLANTIC AVE, COCOA BEACH, FL 32931 | 877.999.5742 | HEALTHELIGHTING.COM

healthē
BY LIGHTING SCIENCE

Cleanse® Downlight

UV SANITIZING AND ILLUMINATION

Reducing the spread of infection is now as simple as a flip of a light switch!

Simply unscrew the existing light from your 6" recessed light, remove existing trim (if applicable), screw in the Cleanse Downlight, push it in place and flip the switch to start the eradication of pathogens.

Equipped with built-in far-UVC light, the Downlight delivers an appropriate dose of 222 nanometer light while inactivating over 90% of contaminants, based on the dosage, wavelength and distance described. Early studies* indicate no harm to humans from far-UVC exposure.

While far-UVC light does its job to sanitize surfaces, choose from comfortable white light available in various CCTs or Healthē's GoodDay light source to provide comfortable general illumination suitable for all applications.



Patent Pending

APPLICATIONS

With studies suggesting harmful microbials, including virus that causes COVID-19, can survive on common surfaces for up to several days, the Cleanse Downlight is the ideal 2-in-1 solution to combat infectious spreads while offering illumination for workspaces such as nurse stations, medical offices, and other applicable areas inside hospitals, clinics, assisted living communities as well as schools, and childcare centers. Let's provide a contaminant-free environment and the protection needed for our frontline healthcare professionals.



HEALTHē BY LIGHTING SCIENCE | 801 N ATLANTIC AVE, COCOA BEACH, FL 32931 | 877.999.5742 | HEALTHELIGHTING.COM

UV

PORTABLE UV SANITIZING CASE

Clean, Sanitized Items
at the Touch of a Button

In today's world, keeping people and their environments healthy is more important than ever. The Cleanse® Tote provides a quick and easy method to clean and sanitize your personal belongings, creating a safe and effective way to protect against germs, bacteria and viruses. True to our mission of using light to enhance health and wellness, Healthé welcomes this partner product into the Cleanse family.

Equipped with ultraviolet (UV) LEDs, the Cleanse Tote employs a 3-minute, chemical-free cleaning cycle, which deactivates up to 99.9% of harmful pathogens. The portable case is a simple, safe and effective way to prevent from spreading germs and bacteria and protect against unwanted illness and disease.



APPLICATIONS

The CDC recommends frequent cleaning and disinfecting of common household items to combat the spread of germs, bacteria and viruses (including CoVID-19). The Cleanse Tote is another safe and effective option to sanitize personal belongings, such as glasses, wallets, watches, phones or other items, including surgical or N95 masks.



SPECIFICATIONS *All data shown is nominal*

UVC SOURCE	
Wavelength	260 - 280nm
Life	10,000 hrs
LED	24pcs
Sanitization	99.9% pathogens eliminated
ELECTRICAL	
Input Voltage	24V / 0.65A
Power	15W
Mode	3 Minute Sanitizing Cycle
Power Interface	DC Power Adapter (included)
MECHANICAL	
Dimensions	9.5 x 7.7 x 5.9 in (240 x 195 x 150 mm)
Material	Water resistant twill polyester
Safety	Auto shut-off when lid opens
Certification	CE, FCC, FDA Class I Listed

EASY TO USE IN JUST FOUR STEPS



1. Connect the power and open the lid.



2. Place personal items separately into the tote, ensuring the items are not touching. Close lid.



3. Press the button.



4. When the light stops flashing, the sterilization process is over and you may remove your items.

UV-internal

AIR SANITIZING TROFFER

cleanse[®] AIR SANITIZING TROFFER

AIR SANITIZATION

- Multi-stage process achieves 99.9% kill rate among common airborne pathogens using Activated Carbon and HEPA filtration and UV (A+C) LEDs
- Defends against MOLD, BACTERIA & VIRUSES
- One Cleanse per 800ft³ (10x10x8) achieves 4 Air Exchanges per hour (50cfm)

LIGHTING

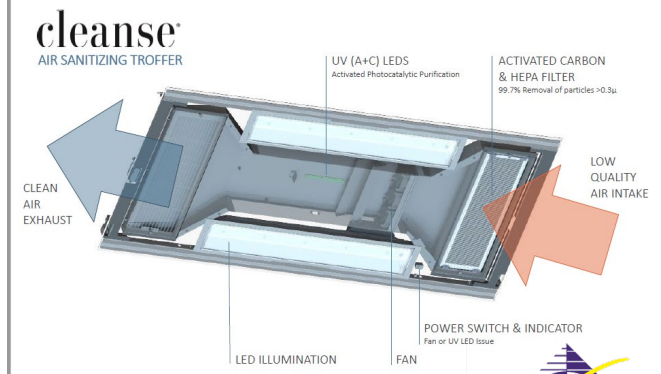
- 3200K lumens with 90+ CRI
- Other CCTs available
- Dimming (and fan speed control) via Bluetooth[®]wireless switch

INSTALLATION

- Retrofits into standard 2x4 troffer housing



- This Troffer employs **UV Light internally** to cleanse the air – the output light is standard LED.



Safety and Occupancy Sensors

The redundant safety systems ensure the unit will not activate while the room is occupied and will immediately suspend operations if motion is detected in a previously unoccupied room. If interrupted, the unit will resume its programmed cleaning cycle once motion is no longer detected.







Protection from Above

Helo F2

UV DISINFECTING FIXTURE

The Helo F2 disinfects a whole room, delivering protection from above. It is installed simply by positioning it in a drop ceiling or can be recessed in a hard ceiling, suspended or wall mounted. It emits broad spectrum UV light to eliminate up to 99.9% of the bacteria, viruses, and fungi in a space¹. In rooms that have been cleaned of mold, the unit will help control return growth if used routinely².

The unit can be ordered for manual commissioning or integration into the facility Building Automation System (BAS). Manual commissioning can be done with the assistance of a local rep using a Setup Wizard. Units integrated into BACnet are programmed through the BAS dashboard.

-  Ceiling, suspended, or wall mounted installation to disinfect a whole room without staff requirements to relocate.
-  Broad Spectrum UV-C, UV-B and UV-A light to kill bacteria and viruses.
-  Programmed manually or integrated into building automation systems through BACnet.
-  Two UV Light Engines with pulsed Xenon lamp for a 12' x 12' ft coverage area.

Product Specifications

Illumination	
Light Source	Proprietary Pulsed Xenon Lamp
Pulse Interval	1 UV Flash every 6 seconds
Wavelengths	UV-C (200-280nm) Germicidal UV-B (280-320nm) Germicidal UV-A (320-400nm) Antibacterial
Range	12' x 12' typical (144 sq feet)
UV Bulb Rated Life	> 2 Million UV Flashes ²

Electrical System	
Input Voltage	110V AC
Max Current	7 Amps
Total Power	60W per standard, 30 minute cycle
Power Connection	3-prong grounded plug

Physical	
Weight	8.4 lbs
Housing/Finish	Brushed Aluminum
Optics	Two patented UV Light Engines with transmissive UV lens and pulsed Xenon UV lamp
Beam Angle	170°

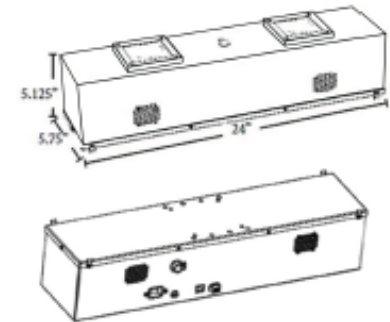
Environment	
Ambient Operating Temperature	41°F to 104°F
Ambient Operating Humidity	<80%RH non-condensing

Certifications and Qualifications	
Safety	TUV Certified, tested to UL 61010-1:2012
FCC	Compliant with Part 15 Class A
RoHS	Compliant
FDA	Materials are cleared for use in food and medical areas
EPA	Registered

Warranty	
Warranty	1 year

Dimensions

24" x 5.125" x 5.75"





Notes

- 1 Disinfection is a function of device run time and the distance to the UV light source.
- 2 Operating Life is dependent on frequency and duration of disinfection cycles.

Cycle	Time	Approx. Bulb Life
Standard	30 min/day	18.3 years
Deep	1 hr/day	9.1 years
Terminal	2 hr/day	4.6 years

Certifications

-  This device is TUV Certified, tested to UL 61010-1:2012 specifications.
-  Tested to be compliant with FCC Part 15 Class A.

Internal components of this device are UL Listed or UL Recognized.

The manufacturer is registered with the US Environmental Protection Agency (EPA). Clinical laboratory testing has been performed at independent labs.

UV

ONE-LIGHT UV UNIT

PURO Helo F1

2 of 4



shown with 12"x12" flange

Protection from Above

Helo F1 UV DISINFECTING FIXTURE

The Helo F1 disinfects a whole room, delivering protection from above. The unit can be ordered for installation in a drop-in grid ceiling, recessed in a hard ceiling, surface or wall mounted, or used as a portable, table top unit. It emits broad spectrum UV light to eliminate up to 99.9% of the bacteria, viruses, and fungi in a space¹. In rooms that have been cleaned of mold, the unit will help control return growth if used routinely².

The unit can be ordered for manual commissioning or integration into the facility Building Automation System (BAS). Manual commissioning can be done with the assistance of a local rep using a Setup Wizard. Units integrated into BACnet are programmed through the BAS dashboard.



Ceiling or wall mounted installation to disinfect a whole room without staff requirements to relocate it.



Broad Spectrum UV-C, UV-B and UV-A light to kill bacteria and viruses.



Programmed manually or integrated into building automation systems through BACnet.



One UV Light Engine with pulsed Xenon lamp for a 10' x 10' ft coverage area.

Product Specifications

Illumination

Light Source	Proprietary Pulsed Xenon Lamp	
Flash Interval	1 UV Flash every 6 seconds	
Wavelengths	UV-C (200-280nm) UV-B (280-320nm) UV-A (320-400nm)	Germicidal Germicidal Antibacterial
Range	10' x 10' typical (100 sq feet)	
UV Bulb Rated	> 2 Million UV Flashes ²	

Electrical System

Input Voltage	120V AC
Max Current	3.5 Amps
Total Power	25W per standard, 30 minute cycle
Power Connection	3-prong grounded plug

Physical

Weight	F1 26 lbs F1-12 4lbs F1-24 65 lbs
Housing/Finish	Brushed Aluminum
Optics	One patented UV Light Engine with transmissive UV lens and pulsed Xenon UV lamp
Beam Angle	170°

Environment

Ambient Operating Temperature	49°F to 104°F
Ambient Operating Humidity	<80%RH non-condensing

Certifications and Qualifications

Safety	TUV Certified, tested to UL 61010-1:2012
FCC	Compliant with Part 15 Class A
RoHS	Compliant
FDA	Materials are cleared for use in food and medical areas
EPA	Registered

Warranty

Warranty	1 year
----------	--------

CAUTION

CAUTION - IF THE FIXTURE EXHIBITS UNDESIRABLE OPERATION (BUZZING, FLICKERING, OR IF THE UNITS LED STATUS INDICATOR IS FLASHING RED), IMMEDIATELY TURN OFF POWER AND CONTACT MANUFACTURER.

INDOOR USE ONLY.

* IMPORTANT ORDERING NOTE

THIS UNIT MUST BE ORDERED FOR INTEGRATION INTO A BUILDING AUTOMATION SYSTEM VIA BACNET OR FOR MANUAL COMMISSIONING. UNITS ARE NOT INTERCHANGEABLE.



Notes

- Disinfection is a function of device run time and the distance to the UV light source.
- Operating Life is dependent on frequency and duration of disinfection cycles.

Cycle	Time	Approx. Bulb Life
Standard	30 min/day	18.3 years
Deep	1 hr/day	9.1 years
Terminal	2 hrs/day	4.6 years

Certifications



This device is TUV Certified, tested to UL 61010-1:2012 specifications.



Tested to be compliant with FCC Part 15 Class A

Internal components of this device are UL Listed or UL Recognized.

The manufacturer is registered with the US Environmental Protection Agency (EPA). Clinical laboratory testing has been performed at independent labs.

1. Study Report August 2017, "Antimicrobial Effectiveness of Puro Device", using modified ASTM International Standard Test Method E1153.
2. Research Journal of Microbiology, 2 (1), 43-49, 2007; Mycological Research, Vol. 92, Issue 3, 1989

UV

MOBILE DISINFECTING UNIT



PURO™
UV Disinfection Lighting

With the Sentry M2F-T, protection follows you. The Sentry M2F-T is an affordable mobile UV disinfecting unit designed for easy positioning and simple control. It emits broad-spectrum UV light to eliminate up to 99.9% of the bacteria, viruses, and fungi in a space. In rooms that have been cleaned of mold, the unit will help control return growth if used routinely.

The compact unit has two Helo F1 UV Light Engines in a lightweight, miniaturized design. Mounted on a tripod base, the M2F-T unit has a telescoping neck and adjustable UV head angle for perfect spot treatment where contamination is suspected.

1. Study Report August 2017, "Antimicrobial Effectiveness of Puro Device", using modified ASTM International Standard Test Method E1153.
2. Research Journal of Microbiology, 2 (1), 42-49, 2007; Mycological Research, Vol. 92, Issue 3, 1989

www.purolighting.com



Lightweight, tripod base and a telescoping neck for easy positioning.



Broad-spectrum UV-C, UV-B, and UV-A light to kill bacteria and viruses.



Simple single-cycle operation with occupancy detection for safety.



Two Helo F1 UV Light Engines with pulsed Xenon lamp for 340° coverage over 200sf.

Product Specifications

Illumination

Light Source	Proprietary Pulsed Xenon Lamp
Pulse Interval	1 UV Flash every 6 seconds
Wavelengths	UV-C (200-280nm) Germicidal UV-B (280-320nm) Germicidal UV-A (320-400nm) Antibacterial
Range	20' x 20' coverage
UV Bulb Rated Life	> 2 Million UV Flashes

Electrical System

Input Voltage	110V AC
Max Current	7 Amps
Total Power	50W per standard, 30 minute cycle
Power Connection	3-prong grounded plug

Physical

Weight	14 lbs
Housing/Finish	Brushed Aluminum
Optics	Two patented UV Light Engines with transmissive UV lens and Xenon UV lamp
Beam Angle	340°

Environment

Ambient Operating Temperature	41°F to 104°F
Ambient Operating Humidity	<80%RH non-condensing

Certifications

Safety	TUV Certified, tested to UL 61010-1:2012
FCC	Compliant with Part 15 Class A
RoHS	Compliant
FDA	Materials are cleared for use in food and medical areas
EPA	Registered

Warranty

Warranty	1 year
----------	--------

Dimensions

Height: 42.9" - 71.0" Width and Depth: 24.0" - 47.2"

Adjustable tripod base M2F-T



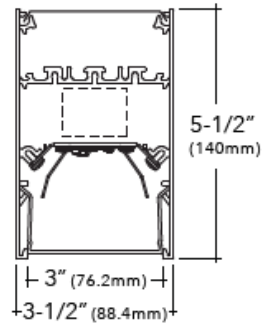
Sentry M2F-T

MOBILE UV DISINFECTING UNIT

Powered by
Violet Defense™ technology

ANTI-MICROBIAL LINEAR OPTION

- What is Visible Light Disinfection?
 - Target spectrum of light
 - Light fixture becomes a disinfecting component
 - Kills harmful bacterial on hard and soft surfaces



EDGE EX3D
3" Suspended Direct Linear



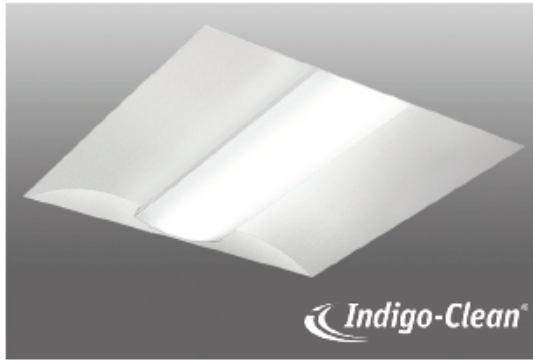
Key Features

- Boards and driver are specifically for Indigo Clean®
- Indigo Clean® emits 405nm light which targets bacteria & produces intra-cellular Reactive Oxygen Species (ROS)
- Standard, white luminaire that provides on-demand disinfection when light is on
- Laboratory-tested disinfection
- Unlike UV disinfection, light is safe for occupants
- Proven effectiveness per independent lab test results
- Provides a cleaner, safer environment, even in areas normal cleaning doesn't reach



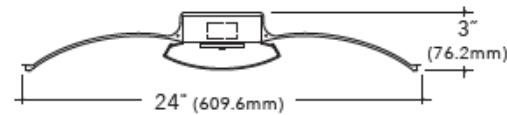
NON-UV

ANTI-MICROBIAL 2X2 OPTION



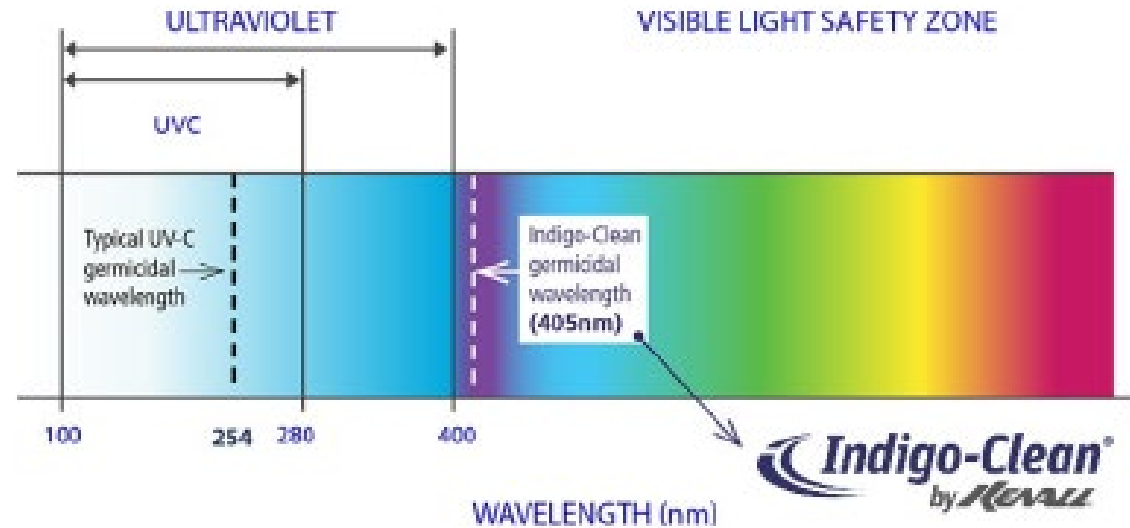
ADEO AD22

2x2 Architectural Recessed



Key Features

- Boards and driver are specifically for Indigo Clean®
- Indigo Clean® emits 405nm light which targets bacteria & produces intra-cellular Reactive Oxygen Species (ROS)
- Standard, white luminaire that provides on-demand disinfection when light is on
- Laboratory-tested disinfection
- Unlike UV disinfection, light is safe for occupants
- Proven effectiveness per independent lab test results
- Provides a cleaner, safer environment, even in areas normal cleaning doesn't reach



NON-UV

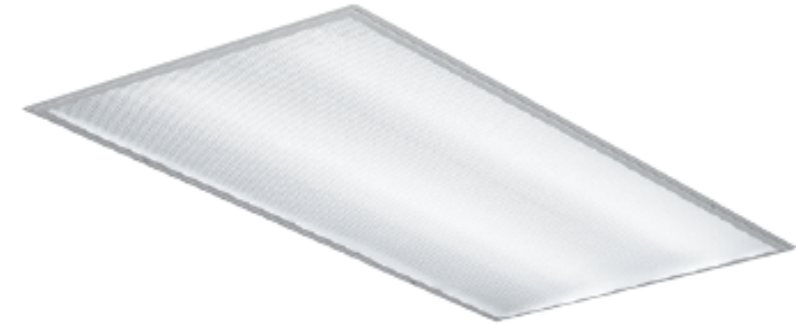
SCLT

LENSED TROFFER WITH SPECTRACLEAN™ ANTIMICROBIAL LIGHTING

FEATURES

- Option 1: Blended — SpectraClean enhanced white light for ambient lighting with continuous disinfection
- Option 2: Blended Plus — SpectraClean enhanced white light with a high intensity, Dedicated SpectraClean mode for scheduled maximum disinfection
- Option 3: Independent — Alternates between pure white light and Dedicated SpectraClean mode for scheduled maximum disinfection
- Hinged optical system allows easy access to LED modules and electrical from below the ceiling
- All models standard with IC rating

SPECTRACLEAN™
ANTIMICROBIAL LIGHTING

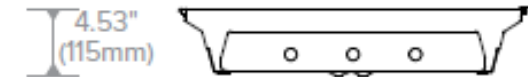


- Option from Hubbell Lighting
- Must be used with Hubbell Controls

END VIEW, 1X4



END VIEW, 2X2



END VIEW, 2X4



WARRANTY

- 5 year warranty



*We would be happy to discuss associated lighting layouts,
lighting controls, availability, and pricing for your specific
wants and needs.*

Contact your Salesperson or

Heather.Barninger@CapitolLight.com for more information!