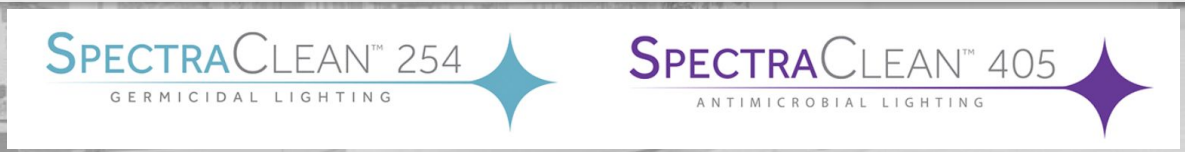
HUBBELL®

HUBBELL Lighting

SpectraClean™ Series

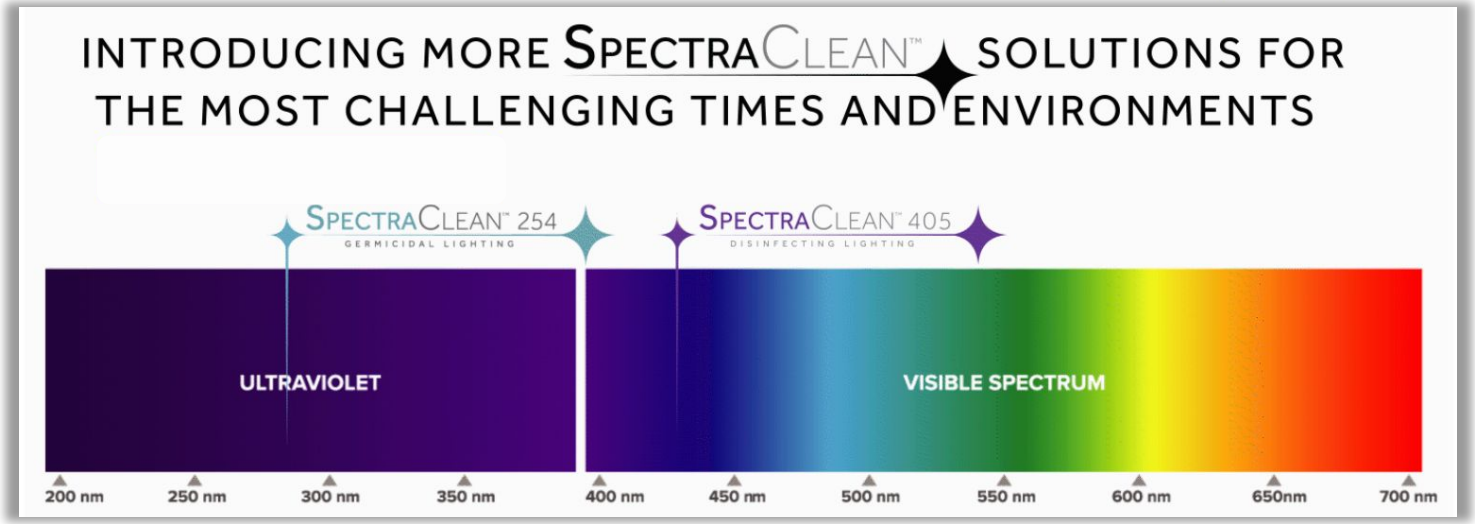


LIGHTING Solutions Center

What is SPECTRACLEAN™

SPECTRACLEAN™ 254
GERMICIDAL LIGHTING

SPECTRACLEAN™ 405
ANTIMICROBIAL LIGHTING



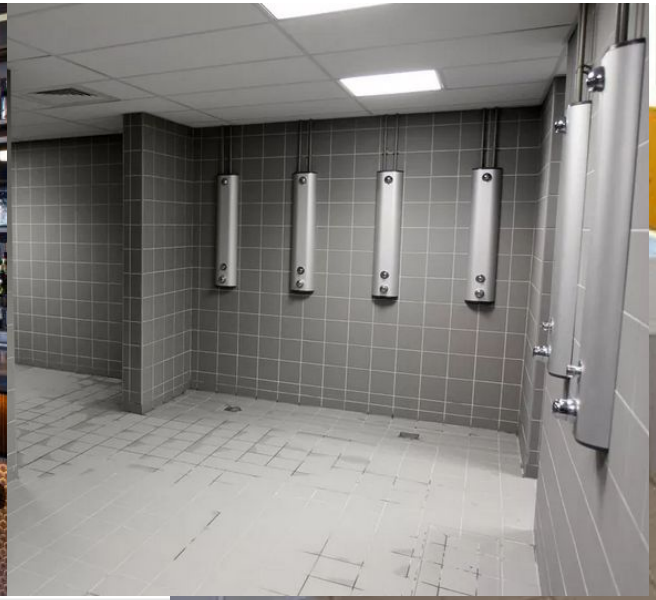
Hubbell Lighting offers both visible blue and UV-C disinfection solutions in both commercial and architectural form factors.

Where is it most effective?

Look for areas with germs that *SpectraClean*™ family has an effect on can thrive…

Food

Water



Soil

Where is it most effective?

Settings where *SpectraClean* is useful might include

Public gathering areas

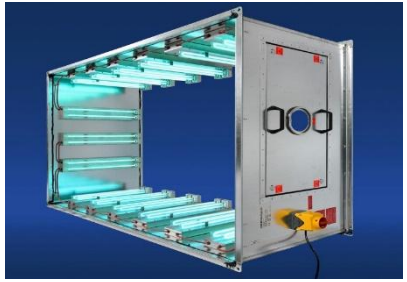
Gymnasiums

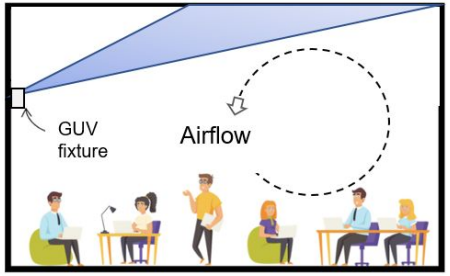
Locker Rooms

How they work: UV-C vs Visible Light

UV-C systems are available using several different delivery techniques

- Direct
- HVAC
- Upper air systems



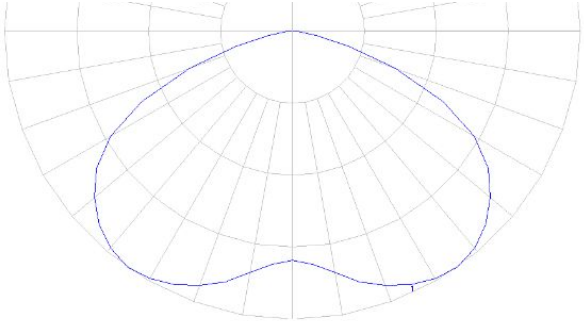


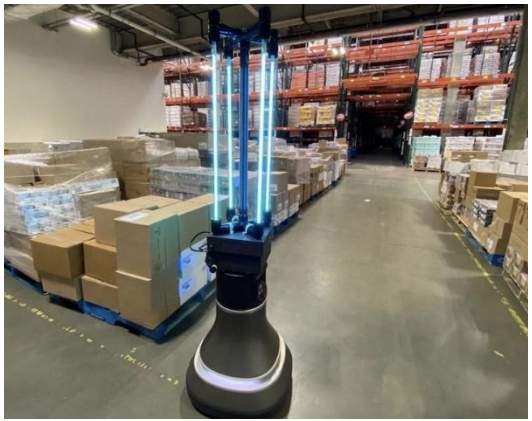
405 nm visible lights are essentially all direct systems. They are however, available in several different modes of operation

- Pure 405 nm blue
- Switchable blue -> white
- Blended white + blue

UV-C direct delivery systems

Direct distribution systems operate as the description implies; by directly irradiating the surface of objects in the space. This approach requires significant safeguards in place to ensure safe application. UL 1598 Annex L, UL 8802 and IEC 62471 apply. When using 254 nm energy, power (dosing) levels must be kept below IEC 62471 guidelines and double redundancy must be in place to prevent accidental exposure to occupants in the space.





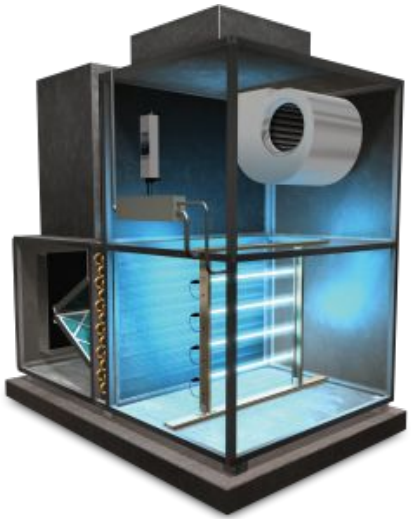
Because of this, a sophisticated network of sensors and controls must be used to ensure user safety.

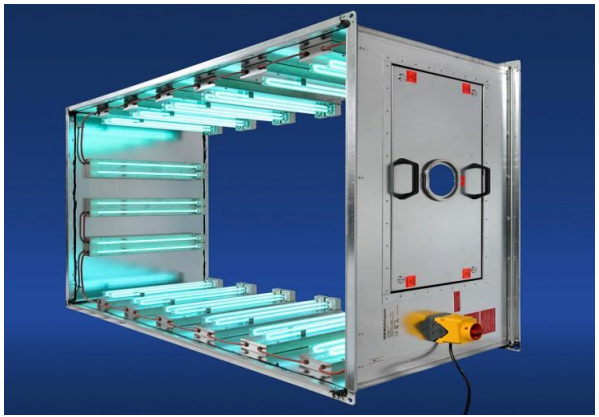
These types of systems cannot be operated while the space is occupied

UV-C HVAC based systems

HVAC based systems mount UVC lamps inside air handling ducts

The high velocity of the air requires very high power systems as the exposure time is typically less than a second. These can also be very pricey to install as access to the ducting that cannot expose occupants may challenging.





SpectraClean 254 is an Upper Air Disinfection System

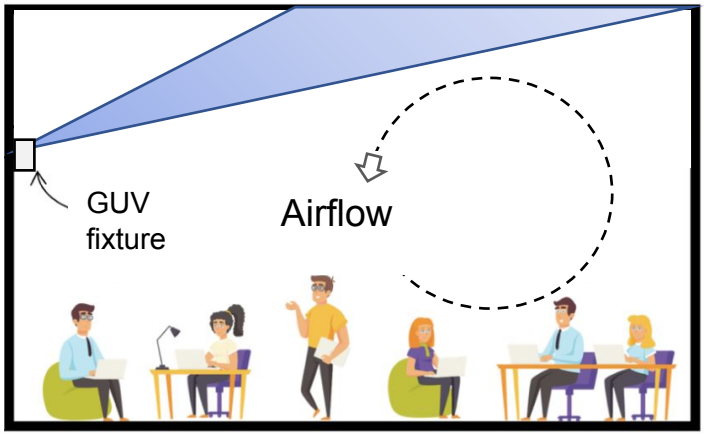
SPECTRACLEAN™ 254
GERMICIDAL LIGHTING

How does it work ?

Pathogens are introduced.

Air circulation moves pathogens into the…

…Germicidal Zone in the upper portion of the room.



Cumulative exposure to UVC lowers illness transmission by reducing pathogen density.

Upper air UVC is safe for occupied areas through control of UVC distribution, dosing time, and ‘on’ cycles.

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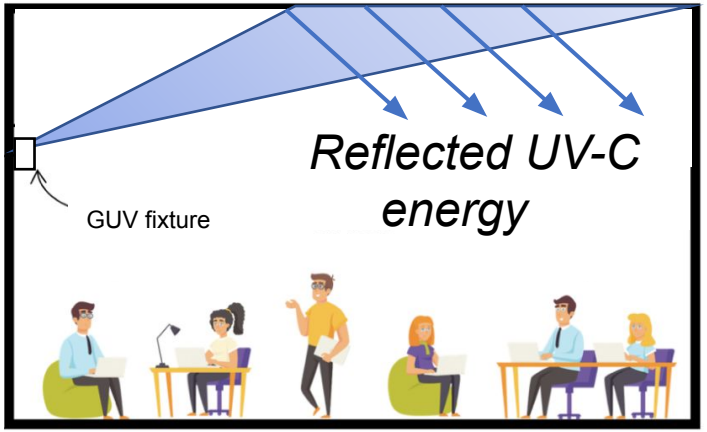
SpectraClean 254 Upper Air Disinfection Systems



Upper air UVC is safe for occupied areas

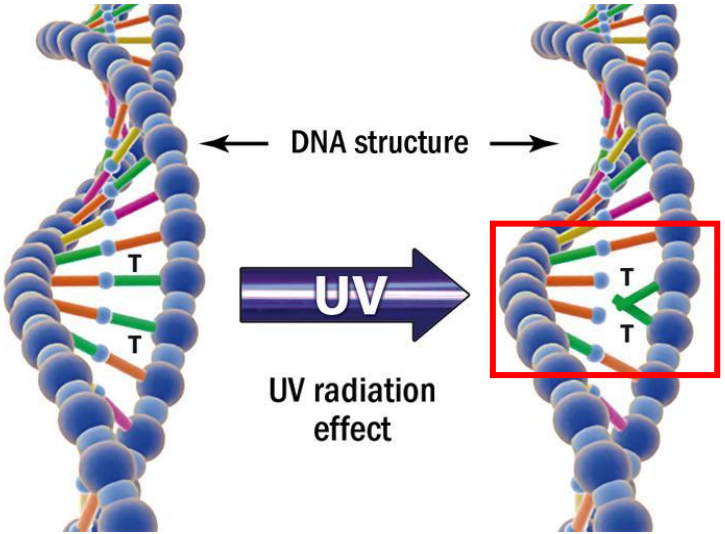
By managing the amount of light reflected back into the space the TLV's can be maintained, making the space safe to occupy even while the system is operating.

This is done by managing both the distribution of the UV-C energy (the "dragonfly" distribution pattern) as well as the duty cycle or "on" time of the system. Surface reflectivity comes into play, and ultimately the installation must be *verified via an audit* as part of the commissioning process.

UV-C Disinfection

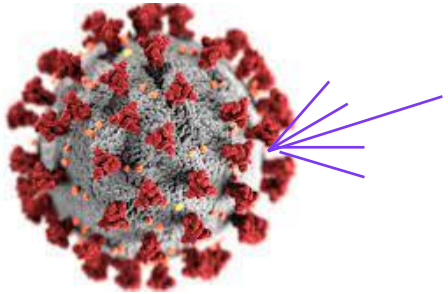
UV-C energy at or near 265 nm is strongly germicidal and is effective on many types of pathogens, including bacteria, mold and ***even many viruses including COVID19***

UVC at or near 265 nm disinfects by destroying nucleic acids and disrupting the DNA or RNA of pathogens. This leaves them unable to perform vital functions, leading to inactivation.



Graphic courtesy of Steril-Aire

222nm vs 254 nm; both UV-C, but act differently



While also in the UVC range, 222 nm energy works by ***breaking down proteins*** in the pathogen, causing inactivation.

Architectural UV-C Disinfection Products

SPECTRACLEAN™ 254
GERMICIDAL LIGHTING

LITECONTROL
making light work™

59L-P-ID-SC254
ARCOS 59 LED INDIRECT/DIRECT WITH SPECTRACLEAN™ GERMICIDAL TECHNOLOGY

59L-P-I-SC254
ARCOS 59 LED INDIRECT WITH SPECTRACLEAN™ GERMICIDAL TECHNOLOGY

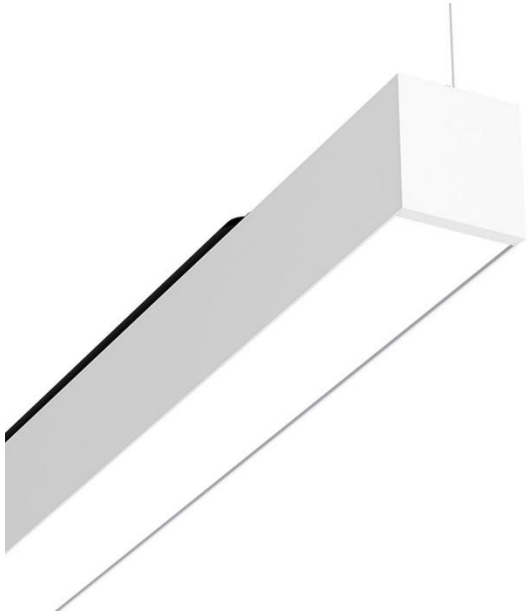
59L-W-SC254
ARCOS 59 WALL WITH SPECTRACLEAN™ GERMICIDAL TECHNOLOGY

LIGHTING
Solutions Center

Architectural UV-C Disinfection Products

SPECTRACLEAN™ 254
GERMICIDAL LIGHTING

LITECONTROL
making light work™



4L-P-D-SC254

MOD™ 4 LED PENDANT DIRECT WITH
SPECTRACLEAN™ GERMICIDAL TECHNOLOGY

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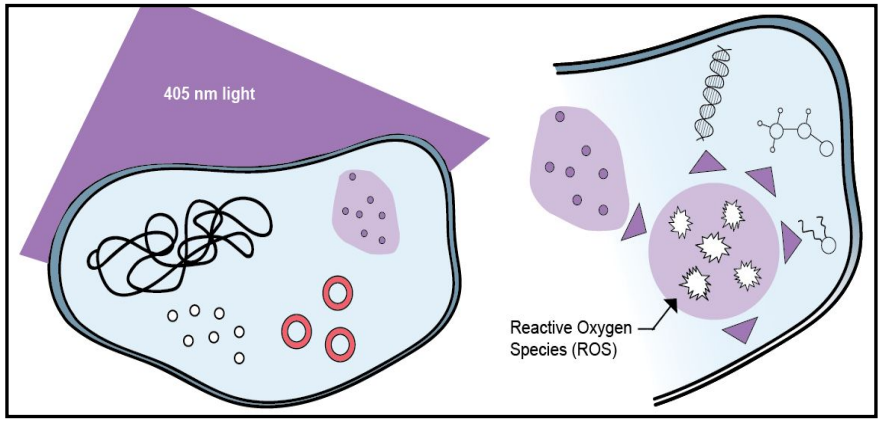
Visible light (405 nm) disinfection

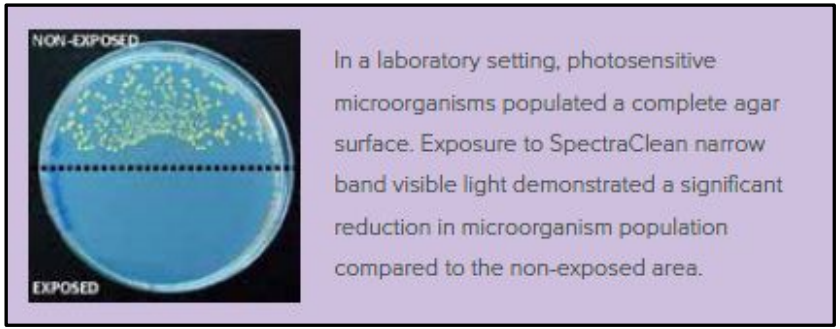
SPECTRACLEAN™ 405
ANTIMICROBIAL LIGHTING

Photosensitive pathogens absorb High Intensity Narrow Spectrum (HINS) light.



HINS light accelerates the creation of damaging reactive oxygen species (ROS).

Cell damage leads to *cell inactivation*.



Visible light (405 nm) disinfection

SPECTRACLEAN™ 405
ANTIMICROBIAL LIGHTING

Is proven effective For:

Foodborne Safety

Food poisoning - Campylobacter jejuni
E coli
Salmonella - Salmonella enteritidis
Listeria - Listeria monocytogenes
Clostridium difficile
Shigella sonnei
Bacillus cereus
Clostridium perfringens
MRSA

Surface Contamination

MRSA - Staphylococcus aureus
Staph – Staphylococcus epidermidis
Staph - Staphylococcus hyicus
Strep Throat - Streptococcus pyogenes
Thrush - Candida albicans
Skin Infections - Mycobacterium terrae
Proteus vulgaris
Serrati spp

Airborne Pathogens

Pneumoniae - Klebsiella pneumoniae
Corynebacterium striatum
Acinetobacter baumannii
Serrati spp
Pseudomonas aeruginosa
FCV - Feline calicivirus

Wound Infection Risks

Enterococcus faecium
MRSA - Staphylococcus aureus
Klebsiella pneumoniae
Acinetobacter baumannii
Pseudomonas aeruginosa
E Coli



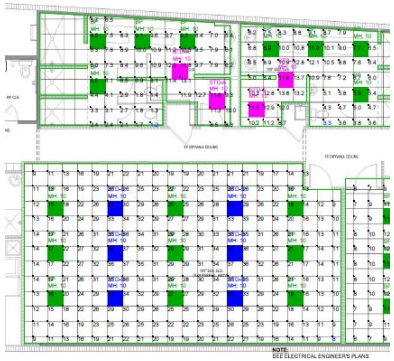


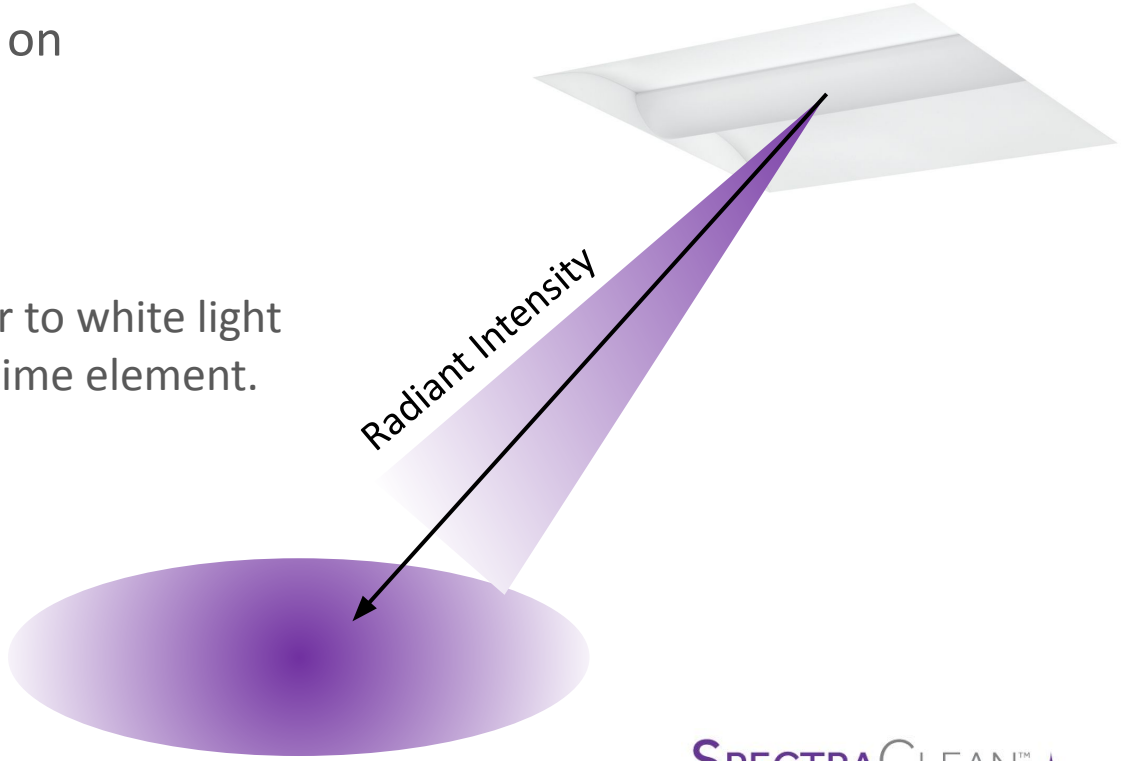
SpectraClean in Application

Disinfection efficacy is dependent on

- Radiant Intensity
- Distance
- Time

Dosing simulation methods are similar to white light layouts (energy/area) with an added time element.





SPECTRACLEAN™
ANTIMICROBIAL LIGHTING

Product Portfolio

SpectraClean 405 features 4 distinct modes of operation

Blended

SpectraClean Blended white light.

One luminaire, one mode of operation.

Dedicated

SpectraClean Dedicated mode.

One luminaire, one mode of operation.

Blended Plus

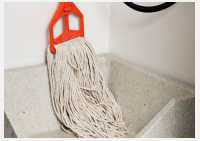
Blended white and Dedicated modes.

One luminaire, two modes of operation.

Independent

White light and Dedicated SpectraClean modes.

One luminaire, two modes of operation.



ANSI/ASHRAE/IES 90.1-2016: In dual function luminaires, the antimicrobial mode is exempt from the Lighting Power Allowance.

SPECTRACLEAN™ 405
ANTIMICROBIAL LIGHTING

Product Portfolio

SpectraClean 405 features 4 distinct form factors

SCCT | SpectraClean™ Contemporary Architectural Troffer
Office| Education| Transportation| Food Service

- LED troffer with high efficiency acrylic center lens features linear prisms for performance without pixilation
- High performance reflector with matte white paint
- Available in 2'x4', 2'x2' and 1'x4'

B B+ N

SCLT | SpectraClean™ Lensed Troffer
Office| Education| Transportation|Retail| Food Service

- Full Distribution LED troffer with acrylic lens for light diffusion without compromise to light output
- Luminaire housing, end caps and reflectors are die formed code gauge cold rolled steel
- Available in 2'x4', 2'x2' and 1'x4'

B B+ N

SCST | SpectraClean™ Striplight
Storage| Utility| Food Preparation

- LED lensed striplight with heavy die-formed steel channel, 100% acrylic formed lens to eliminate pixilation and reduce glare
- Available in 4' and 8' lengths

B B+ N D

SCVW | SpectraClean™ Linear Vaportight (wide and medium)
Storage| Utility | Food processing| Food Preparation

- Enclosed and gasketed wide body linear varportite with impact resistant lens options
- Smooth fiberglass housing with F1 weatherability rating
- IP67 rated 4' luminaire
- -40°C (-104°F) minimum operating temperature
- UL Sanitation Certified per NSF Standards

N D

Note that power delivered varies with form factor, with the Vaportights having the highest output. Contact Hubbell for more details

SPECTRACLEAN™ 254
GERMICIDAL LIGHTING

SPECTRACLEAN™ 405
ANTIMICROBIAL LIGHTING

SPECTRACLEAN™ 254 GERMICIDAL LIGHTING

Summary
- Upper air disinfection system
- Floods the space above occupants to address aerosolized particles
- Does not act upon surfaces

Pros
- Works on all pathogens, even viruses
- Requires shorter exposure time to deactivate pathogens
- Multiple commercial and architectural form factors
- Available “piggybacked” onto architectural form factors

Cons
- Requires significant controls
- Mandatory post installation audit to ensure safety

SPECTRACLEAN™ 405 ANTIMICROBIAL LIGHTING

Summary
- Visible light disinfection system
- Acts directly upon surfaces
- 4 modes of operation

Pros
- Safe to be under at all times
- Multiple form factors and modes of operation
- Very simple control requirement
- No post installation audit required

Cons
- Does not address viruses
- Requires longer exposure time to be effective

Both SpectraClean series of products qualify for Hubbell’s “Compare in the Air” program. Contact Hubbell for more details

SPECTRACLEAN™ 254
GERMICIDAL LIGHTING

SPECTRACLEAN™ 405
ANTIMICROBIAL LIGHTING

SPECTRACLEAN™ 254
GERMICIDAL LIGHTING

Where best to use

Indoor congregation areas where may people may be gathering and creating aerosolized particles.

- Clubhouses
- Gyms
- Lobbies
- Hallways

SPECTRACLEAN™ 405
ANTIMICROBIAL LIGHTING

Where best to use

Areas where water, soil, food and multiple touch points are.

- Clubhouses
- Gyms
- Food preparation
- Entryways/common space doorways

It is entirely practical to use both types within a given space

UVC Research & Resources

The following web searches will lead to information reinforcing the science

Search the following: “NIOSH 2009-105”

The National Institute of Occupational Safety and Health

Search the following: “NEMA UVC”

Search the following: “IES CR-2-20 ”

Search the following: “Global Lighting Assoc UVC”

Search the following: “IUVA SARS”

https://hubbellcdn.com/brochure/SC_Food-Beverage_B.pdf