



# Ultraviolet and Germicidal Lighting Guide

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# Introduction

At FSG, our number one priority is the safety and wellbeing of all of our customers, our employees, and their families. To that end, FSG is committed to doing everything we can minimize the spread of the COVID-19, while also balancing the needs of our employees to work and our customers to receive our products and services.

FSG has recently begun offering Ultraviolet (UV) & Germicidal Lighting products to businesses in any market. These products have been in use for decades and provide a method of disinfection that has proven to kill 99.9% of viruses and microorganisms.

This guide was created for anyone looking to learn more about these products. This guide provides some answers to frequently asked questions and provides a catalog of product types that FSG is able to sell.

In addition, there is information about our protective shield offerings, and UV safety. Schools, state, county, and local municipal entities, EMS services, and other non-profits are eligible to purchase these products under a cooperative purchasing program from AEPA. Learn more at [www.aepa.lighting](http://www.aepa.lighting)

We are committed to helping essential businesses and helping businesses recover from the COVID-19 pandemic. If you do not find the answers to your questions, you may visit: [www.disinfectionlighting.com](http://www.disinfectionlighting.com)

# What is Ultraviolet & Germicidal Lighting?

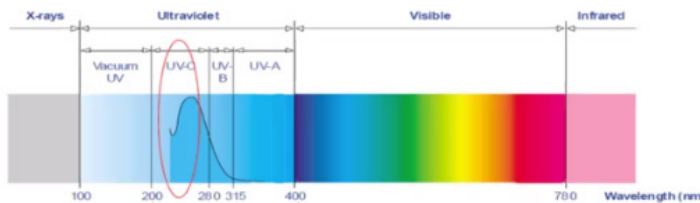
Ultraviolet light is part of the light spectrum, which is classified into three wavelength ranges:

**UV-C** - between 100 nanometers (nm) and 280 nm

**UV-B** - between 280 nm and 315 nm

**UV-A** - between 315 nm and 400 nm

## What is Disinfection Lighting?



- 222nm
- Not visible light
- Virus effect in test
- Kills bacteria
- Does not kill Mold, Fungi
- "90%" Bacterial effectivity
- Exposure time is long
- Technology Infancy
- Lower Exposure and Ozone risks

- 254nm
- Not visible light
- Inactivates viruses
- Kills bacteria
- Kills mold and fungi
- 99.99% effectivity
- Exposure time is short
- Proven Technology
- Exposure Risk known, "Superficial Effects"

- 315nm, 365nm
- Not visible light
- Does not inactivate viruses
- Reduces bacteria
- Exposure time is moderate
- Limited Effectivity (similar to direct sun)
- Proven Technology
- Exposure Risk

- 405nm
- Visible light
- Does not inactivate viruses
- Slows bacteria growth
- Mold and Fungi unknown
- Exposure time is long
- Effectivity is "clinically irrelevant"
- Some Exposure Risks ; Long term effects unknown

### Far UV

Limited Pathogen Effects  
Exposure Risks TBD  
Technology Infancy

### Germicidal UV (GUV)

Superior Pathogen Effect  
Controllable Exposure Risks  
Technology Proven

### UVA/B

Limited Pathogen Effect  
Controllable Exposure Risks  
Technology Proven

### Near-UV

Limited Pathogen Effect  
Limited Exposure Risks  
Technology Infancy

FSG typically deploys either Pulsed Xenon or Fluorescent UV light sources. Both are equally effective at providing UV-C Germicidal results. UV Light prevents microorganisms from reproducing by damaging thier nucleic acids, essentially killing viruses and bacteria.



# Does Ultraviolet Lighting Kill COVID-19?

While no long-term clinical trials have been completed on Covid19 as of yet, the overwhelming sentiment of the scientific community is that COVID-19 will be killed by UV-C as other viruses are. The Illuminating Engineering Society of North America (IESNA) held a webinar with 7 doctors attended by over 3,000 people. Their advice found in Committee Report CR-2-20 states:

## 1.4 Can UV-C effectively inactivate the SARS-CoV-2 virus, responsible for COVID-19?

Yes, if the virus is directly illuminated by UV-C at the effective dose level. UV-C can play an effective role with other methods of disinfection, but it is essential that individuals be protected to prevent UV hazards to the eyes and skin as elaborated in **Section 4**. UV-C should not be used to disinfect the hands!



**Illuminating**  
ENGINEERING SOCIETY

David Brenner, Director of Columbia University's Center for Radiological Research, said that research has not 100% determined that the lights can kill COVID-19, but he noted it would be "inconceivable that it wouldn't kill this particular virus".



**COLUMBIA**

COLUMBIA UNIVERSITY  
CENTER FOR RADIOLOGICAL RESEARCH



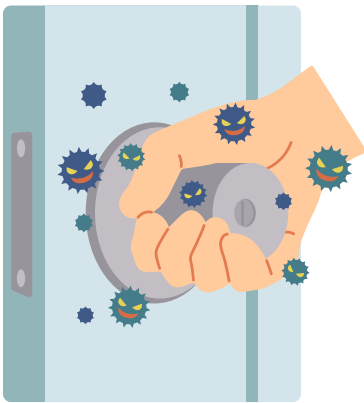
# What is COVID-19 and How is it Transmitted?

COVID-19 is a new type of coronavirus illness that affects your lungs and airways.



It's caused by a virus that's spread in droplets from and mouth and nose when you cough or exhale.

You can get the virus by:



Touching a contaminated surface and then touching your face.



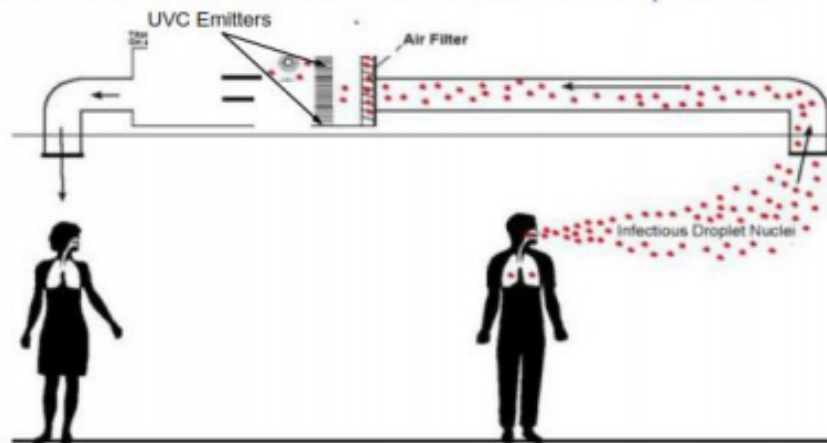
Having close contact with someone with COVID-19 and breathing in droplets exhaled by them.

# Application Guide - Treating the Air

We have several options for treating the air and all of them can be used while people are present in the space.

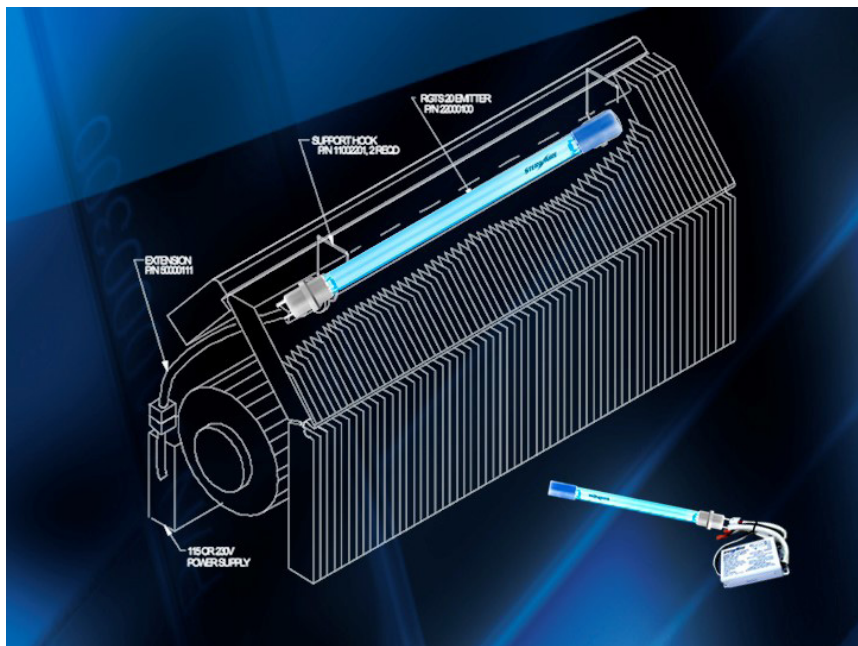
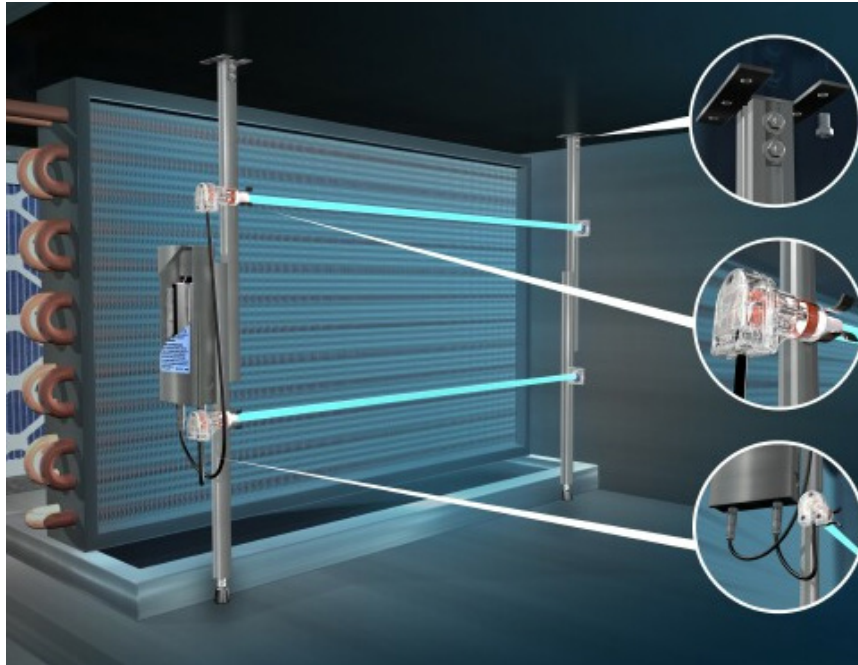
## HVAC Mounted Units

How Steril-Aire Emitters inactivate airborne Infectious Droplet Nuclei:



UV-C sterilization has been in use in HVAC units for many years. These systems have the benefit of treating all of the air in the space on a constant basis. They are sized based on the CFM of your unit as well as the coil size. The Steril-Aire units FSG sells have the added benefit of improving the efficiency of your HVAC systems, and even have received rebates for energy savings from some utilities. They come in various configurations based on your system.

# Application Guide - Treating the Air (cont.)



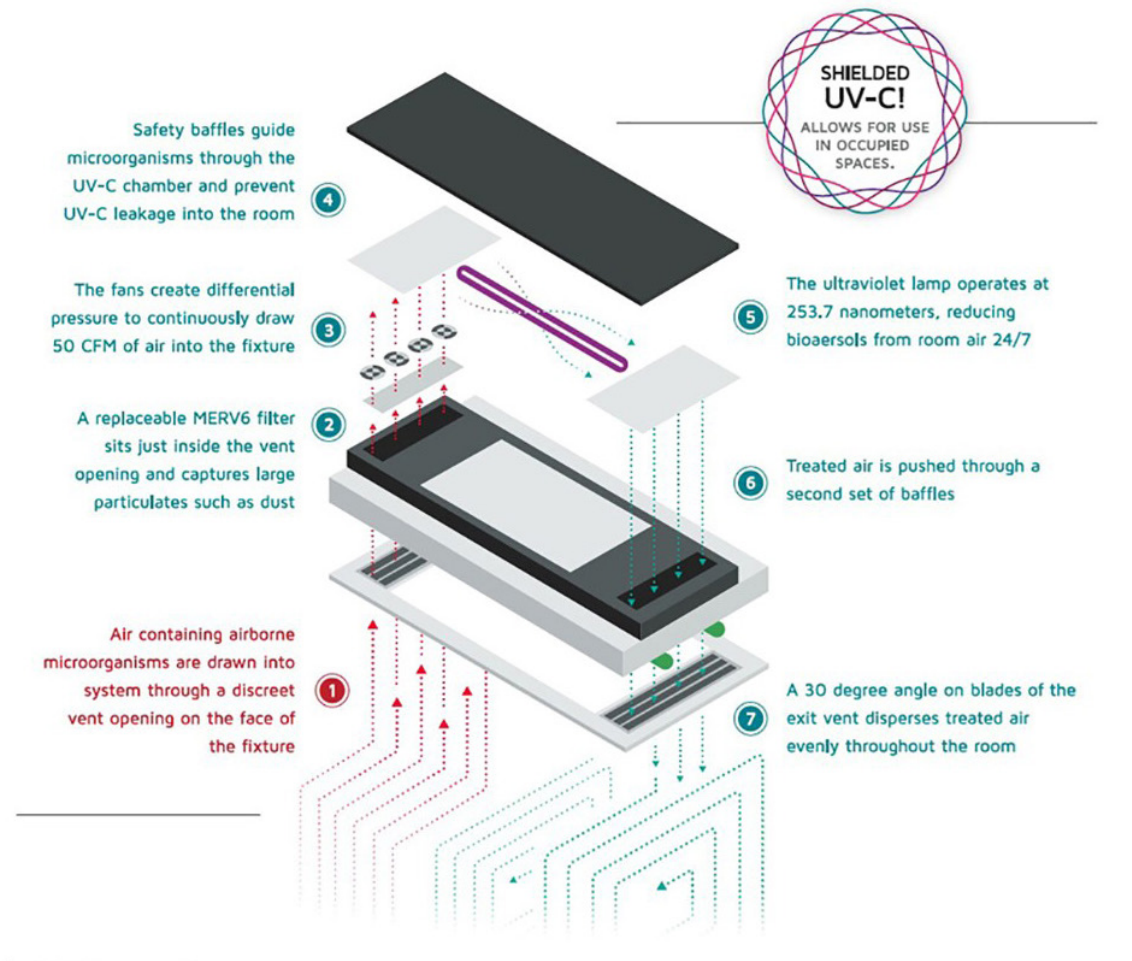
We will need the model number of your unit, and your coil dimensions, if possible, to size your unit properly. ASHRAE has weighed in on UV-C Sterilization of coils, stating they have found a kill ratio of 90% or higher with this technology.



# Application Guide - Treating the Air (cont.)

## Non HVAC Mounted Units

For a less invasive approach, you can also mount UV-C air handling units into your ceiling grid. FSG offers recessed units with or without lighting, so that installing a unit in a room can be as simple as swapping out a light fixture. The Bovie UV24 at 50 CFM can treat a volume of air equivalent to a 10 x 10 x 8 room four times an hour.



# Application Guide - Treating the Air (cont.)

## Upper Air Disinfection

Upper air disinfection has been in use to combat airborne pathogens since the 1930's. LumenFocus has both wall mounted and ceiling mounted units. These units face upwards, disinfecting the air as it travels naturally through the room. They have an added safety feature of an optional built in presence sensor, that will shut the unit off if someone puts their head above the fixture.



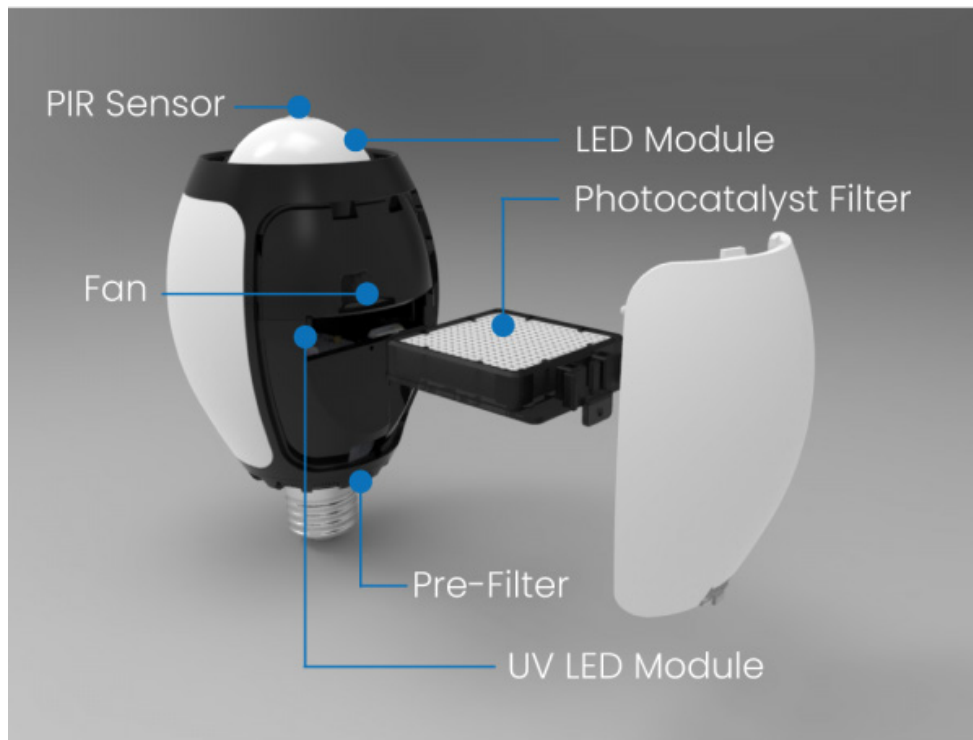
## Portable & Screw-In Units

For larger areas, such as ballrooms, gymnasiums and open plan office space, you can use a 1000W portable UV-C cart that is rated at 360 CFM. This unit can change 2,000 square feet of air in 40 minutes, and is less than 50 dBa.



# Application Guide - Treating the Air (cont.)

For the simplest of solutions, The Aleddra de-Odorization lamp screw into a standard socket, and treats the air while also providing light output



# Application Guide - Treating the Air & Surface

## Portable Carts

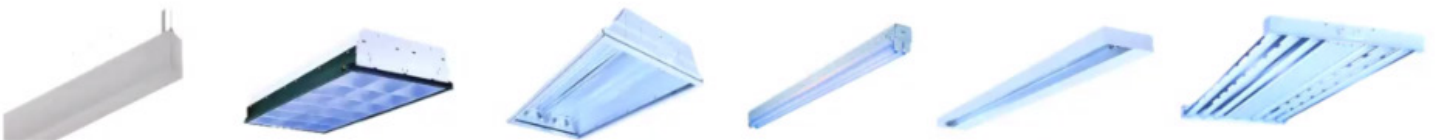
Portable units are one of the best ways to stretch your budget dollars. FSG has portable cart units from manufacturers such as Cello, Puro, Xtralite and others. These units disinfect both the air and surfaces, and leverage your spend by allowing you to use them as you move them from room to room. They feature reverse occupancy sensing as a safety feature, so if anyone enters the area, they will automatically shut off. FSG offers units with delayed timers, hand held remotes, and online connectivity. Units with WiFi access can be operated via mobile app, and can log usage on the web. Some units talk to your Building Automation System (BAS) as well.



# Application Guide - Air & Surface (cont.)

## Permanent Fixtures

Mounting permanent fixtures in your space allows for disinfection on demand. We have custom fixture solutions for all applications. They are available with reverse occupancy detection sensors for extra safety, turning fixtures off if someone enters the room. While both pulsed Xenon and fluorescent fixtures are available, the biggest selection comes in the fluorescent technology. Since UV-C does not travel through glass or plastic, lamps cannot be covered. You can purchase strips, recessed fixtures, high bays and more, from a variety of manufacturers. You will need to also purchase controls such as a key switch, timer or control panel. FSG can help you select the best fixture for your application, and calculate exactly how many you will need.

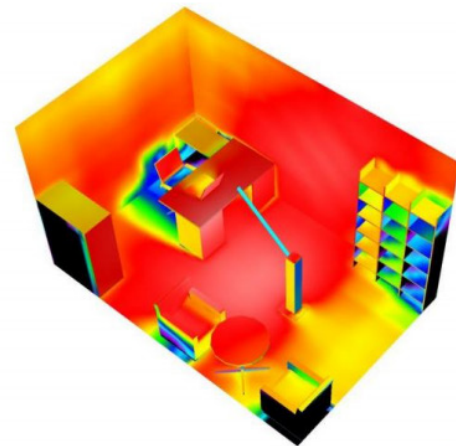
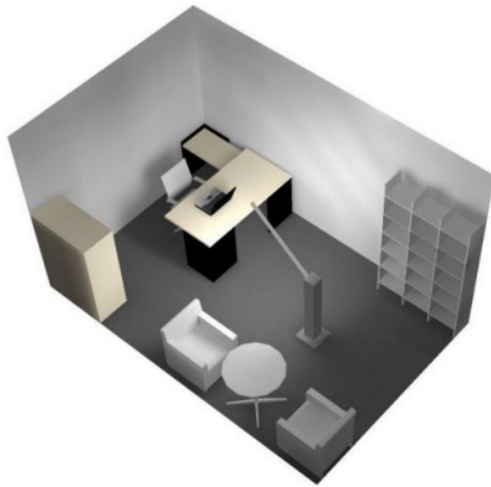
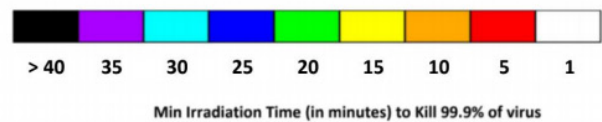


# Application Guide - Air & Surface (cont.)

## VIRA© - Visual Irradiation Room Analysis

Utilizing our unique VIRA© software, FSG can help calculate how much UV you will need to disinfect to 99.99%, and how long you will need to operate your units. FSG takes the guesswork out of UV Disinfection.

10' x 15' (300W Cart)



# Application Guide - Specialty Solutions

## Elevators

Elevators are key to reopening offices. We have both pulsed Xenon and fluorescent units available that will disinfect automatically whenever your elevator is vacant. Units are less than 3" deep and can be surface mounted or recessed.



**Ceiling Mount**



**Wall Mount**



## Escalators



### Continuous sterilization

Strong and continuous sterilization along with escalator drive



### Easy installation

Maintain existing facilities as they are



### Compact and safe design

No interruption to the passenger



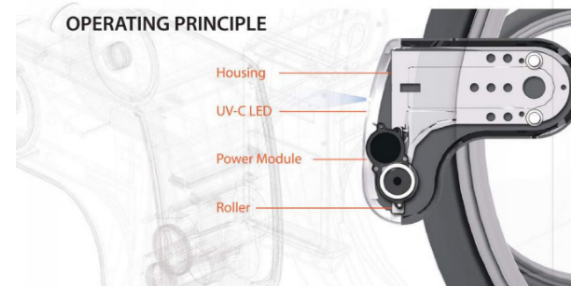
### UV sterilization

98% UV sterilization - most suitable method for handrails



### Self generation

Safe self generation method without the danger of electrical hazards



*Non-Powered*

Escalator Handrail Sterilizer



# Application Guide - Specialty Solutions (cont.)

## Bathroom Sinks

### SteriLumen™ Disinfecting Mirror

- UVC light destroys 99.99% of pathogens
- Validated by independent laboratory tests
- Fully automated, no human intervention
- Built-in patient safety / motion detector
- Actionable data critical to administrators



## Entry Portal



Patent Pending

UV light source is not visible and distribution shown is a depiction of coverage only.



# Application Guide - Specialty Solutions (cont.)

## Temperature Scanning and Facial Recognition



### Intelli-Temp

- Facial Recognition Temperature Scanner
- 8-inch LCD display
- Water and dust proof
- Multiple mounting options
- Compatible and accurate with facial masks
- Facial recognition processing of less than 1 second with 99% accuracy
- Supports a facial database of up to 50,000 people
- Temperature reading capabilities of up to 3 feet
- Temperature accuracy:  $\pm 0.5$  ° F
- Adjustable temperature alarm setting
- Green and Red LED indicator light

# Application Guide - Specialty Solutions (cont.)

## Protective Shields

### STAND ALONE SHIELDS

Many retailers have greeters or security guards at their front door. The risk to this employee is great as they may encounter far more people than a cashier or service employee. Stand Alone Shields are simply a three sided plastic shield that is easy to move and stand up. The employee stands behind the acrylic so they have a full view of the things they need to see, while still gaining the protection that comes from a reduced physical interaction with those walking by their station.



# Application Guide - Specialty Solutions (cont.)

## Protective Shields

### PROACTIVE PROTECTIVE SHIELDS

Help maintain social distancing and protect your employees without compromising the connection they have with your customers.

Other sizes, application, and installation options are available.



# Safety

It is extremely important to be safe while using Ultraviolet lighting. Accidental exposure to UV lighting can cause harm to the skin and the eyes.

One side effect is Photokeratitis, also known as “welder’s flash” or “snowblindness”. Symptoms feel like getting sand in the eyes. It affects the cornea of the eyes.

Erythema is a reddening of the skin caused by exposure. It can be severe if UV-B penetrates skin. (Sunburn), but it is milder with UV-C, since minimal UV-C is absorbed into the skin.



# Frequently Asked Questions

**Does UV-C Light fade fabrics or yellow plastic?**

No

**Is UV safe to use around food?**

Yes, UV-C is used to kill bacteria on fruit and vegetables

**Has UV-C sterilization been around long?**

UV-C has been used safely for sterilization since the 1930's. Far UV-C is a more recent development.

**Do you sell UV-A products?**

Yes, we represent several lines of UV-A fixtures. These are most effective against bacteria, as part of an overall cleaning regiment

**Are there a lot of examples of UV-C being used for killing germs outside of the healthcare industry?**

While there are some, pre-COVID-19 UV was mostly used by hospitals and healthcare. We are developing use case examples in all verticals in this new environment

For answers to more FAQ, please visit our educational webinars:  
[www.uvwebinars.com](http://www.uvwebinars.com)

