FACILITY SOLUTIONS GROUP

Ultraviolet and Germicidal Lighting Guide

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Introduction

At FSG, our number one priority is the safety and well-being of all of our customers, our employees, and their families. To that end, FSG is committed to doing everything we can to minimize the spread of 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 products that FSG is able to sell.

In addition, there is information about our 'White Glove" Service, Protective Shields, and Cooperative Purchasing Options.

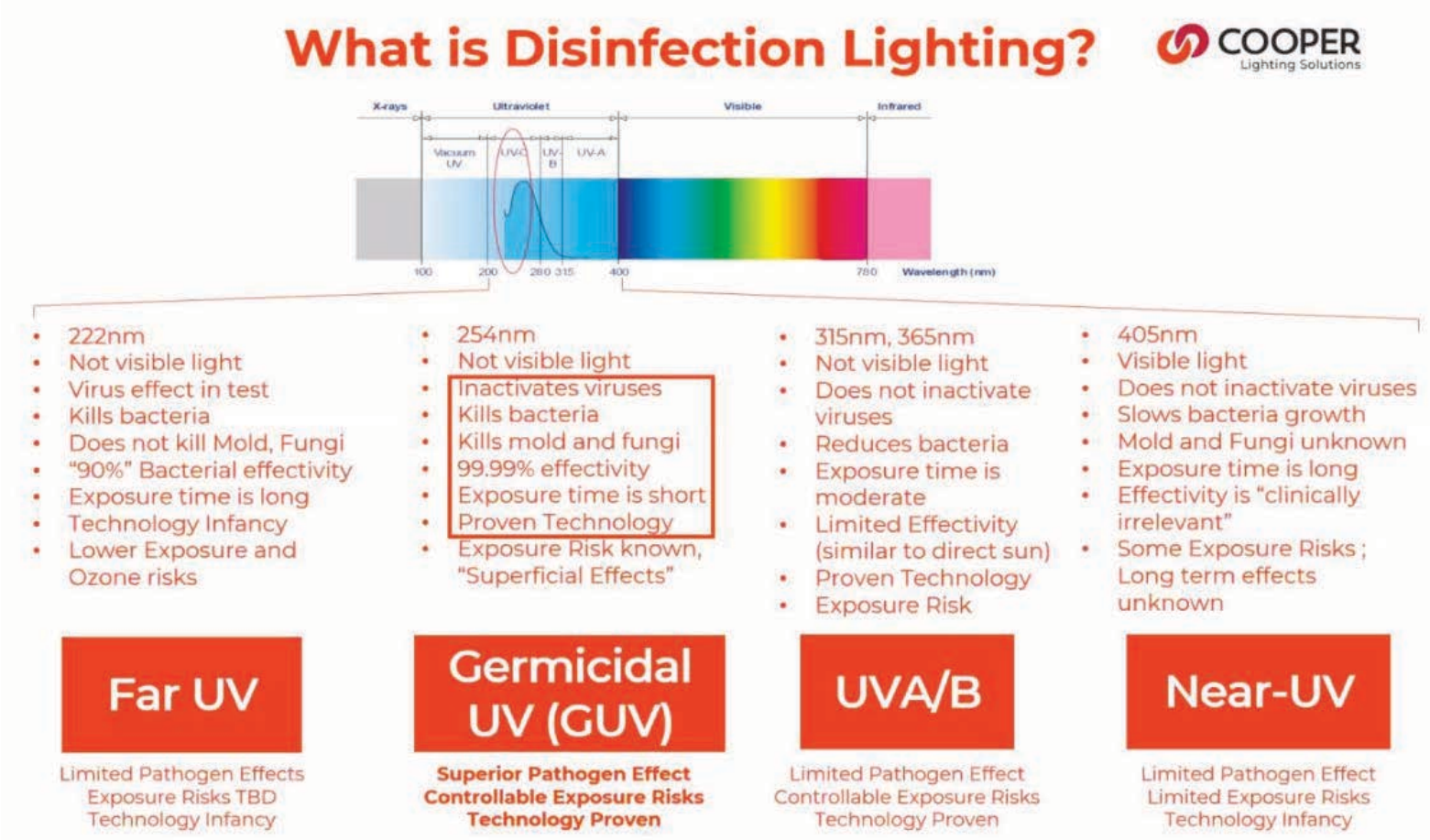
We are committed to helping essential businesses and helping businesses recover from the COVID-19 pandemic. If you do not find the answers to your questions, you may visit:

www.disinfectionlighting.com

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



FSG typically deploys either Pulsed Xenon or Fluorescent UV light sources. Both are equally effective at providing UVC Germicdal results. This means the UVC dmages the viruses nucleic acids and the organism is unable to reproduce. It then dies.

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 UVC 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 it 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 couch or exhale.

You can get the virus by:

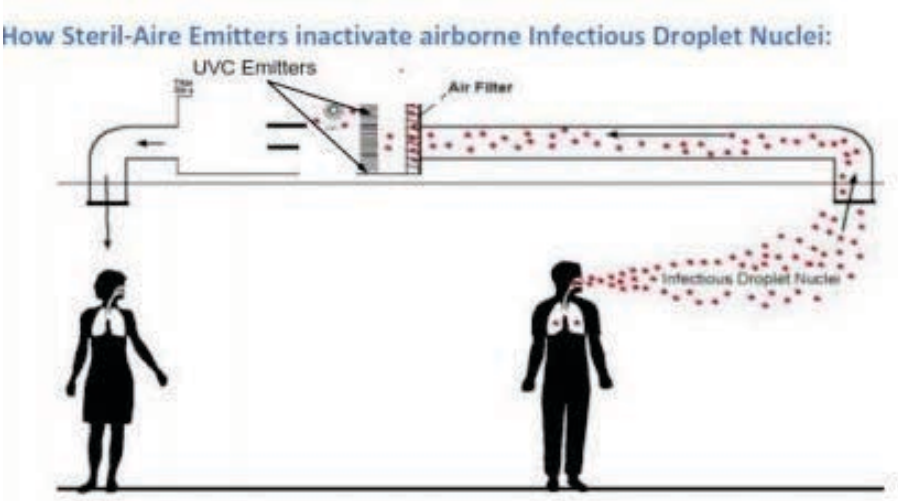
Touching a contaminated surface and then touching your face.

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

Application Guide - Treating the Air

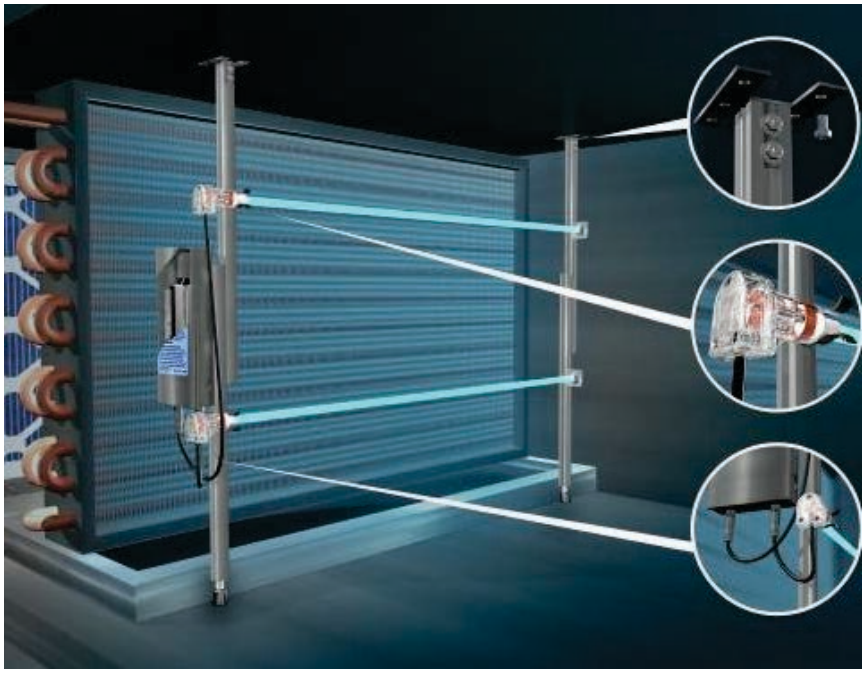
We have several options when treating the air, and all can be used while people are present in the space.

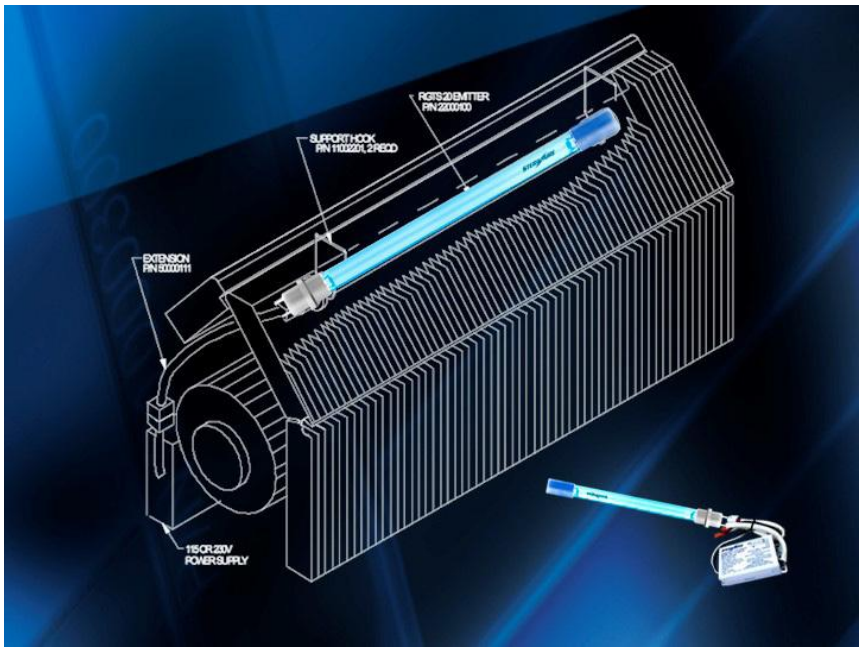
HVAC Mounted Units



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-Air 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.)



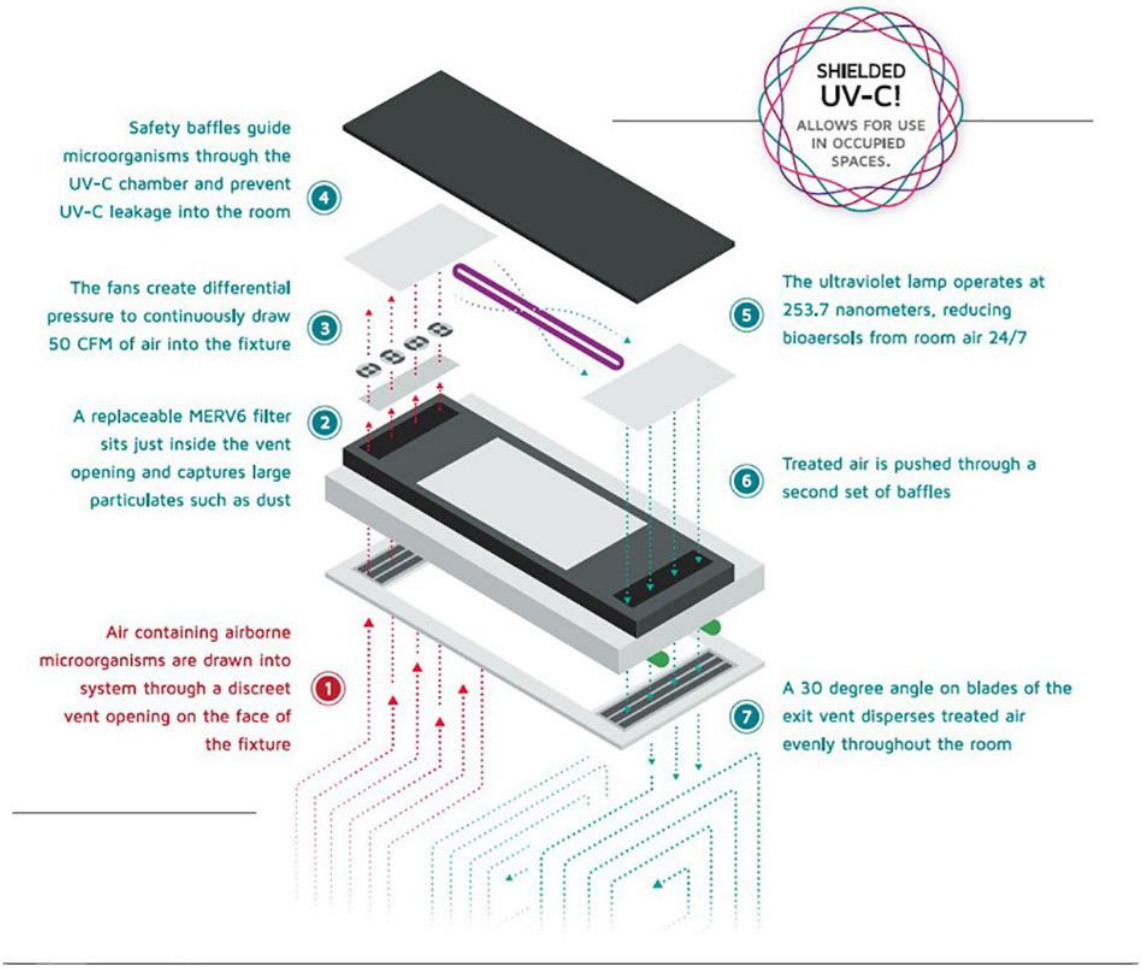


We will need the model number of your unit, and hopefully your coil dimensions to size your unit properly. ASHRAE has weighed in on UV C Sterilization of coils, stating they have found a kill ratio of 90% or higher with this technology.

Application Guide - Treating the Air (cont.)

Non HVAC Mounted Units

For a less invasive approach, you can also mount UVC 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 50CFM can treat a volume of air equivalent to a 10X10X8 room four times an hour.



Application Guide - Treating the Air (cont.)

Upper Air Disinfection

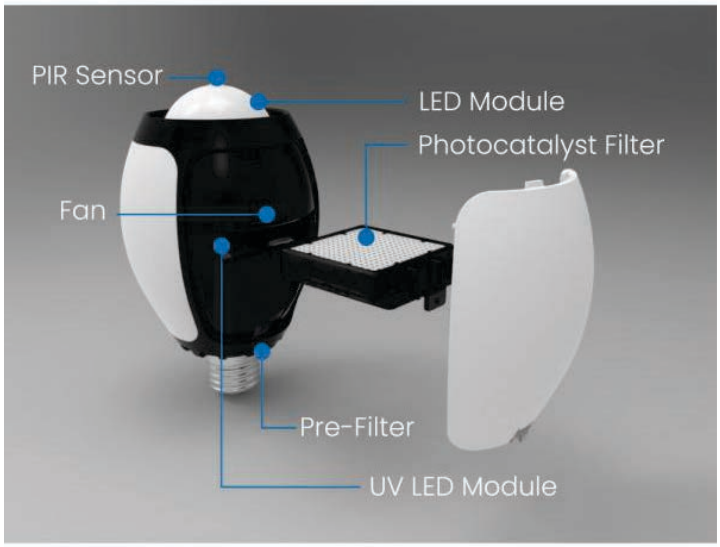
Upper air disinfection has been in use to combat airborne pathogens since the 1930's . LumenFocus has both wall mounted and ceiling mounted units. These units would face upwards, disinfecting the air as it travels naturally through the room. The have an added safety feature option of a built in presence detector, 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 UVC cart that is rated at 360CFM. This unit can change 2,000 sq feet of air in 40 minutes, and is less than 50 dBa.

Application Guide - Treating the Air (cont.)

For the simplest of solutions, The Alledra de-Odorization lamp screw into a standard socket, and treats the air while providing light as well.



ADD TREATING SURFACE AND AIR HERE

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 a phone app, and can log usage on the web. Some units talk to your Building Automation System (BAS) as well!

Application Guide - Treating Surface and Air (cont.)

Application Guide - Treating Surface and Air (cont.)

Permanent Fixtures

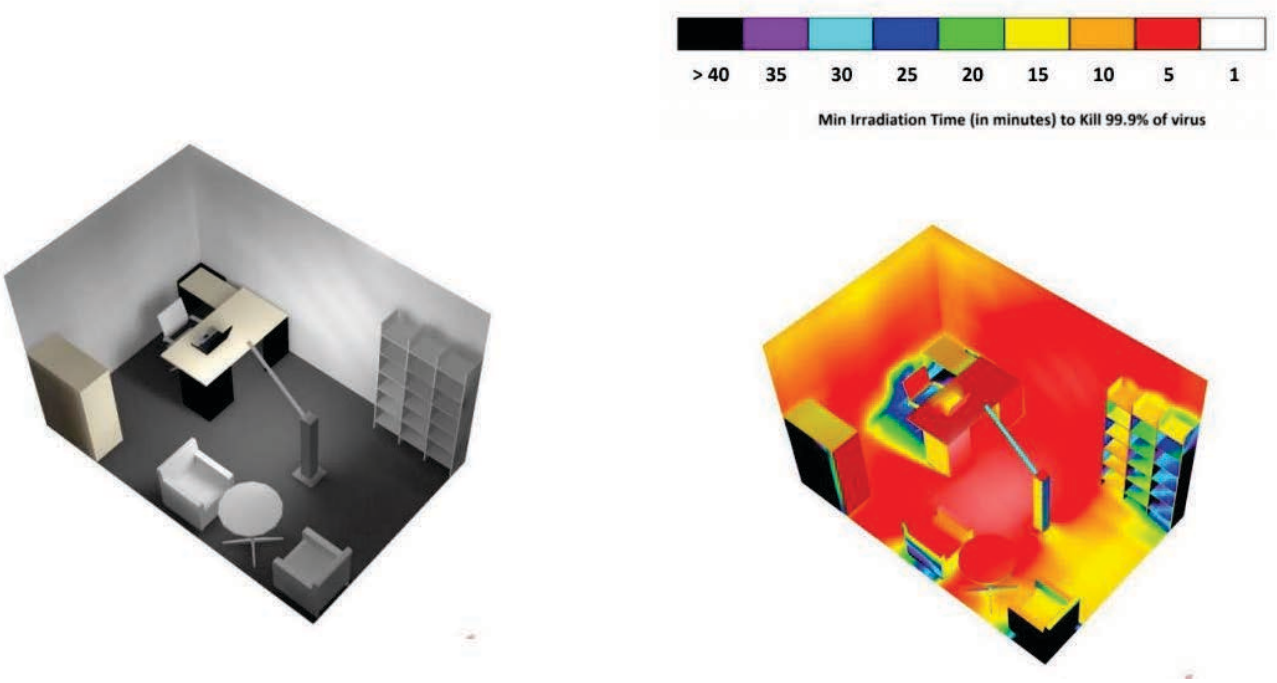
Mounting permanent fixtures in your space allows for disinfection on demand. We have custom fixture solutions for all applications. They are available with reverse presence detection sensors for extra safety, turning fixtures off if someone enters the room. While both pulsed Xenon and fluorescent fixtures are available, the biggest selection comes in the fluorescent technology. Since UVC 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- Treating Surface and Air (cont.)

VIRAadd copyright symbol - 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 and Escalators

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

Application Guide - Specialty Solutions

Bathroom Sinks

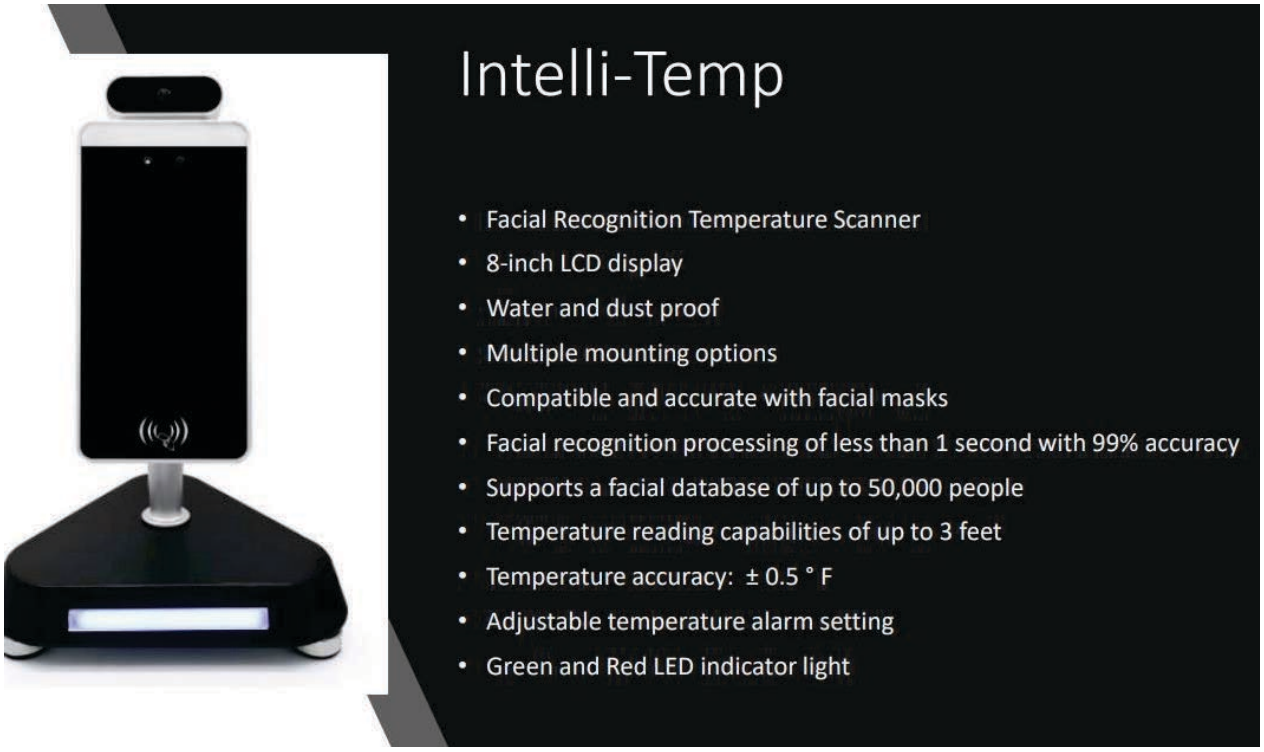
SteriLumen™ Disinfecting Mirror

- 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

Application Guide - Specialty Solutions

Temperature Scanning and Facial Recognition



Application Guide - Specialty Solutions

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

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 “snowblindedness”. Symptoms feel like getting sand in the eyes. Affects the cornea of the eyes.

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

Frequently Asked Questions

Does UVC Light fade fabrics or yellow plastic?

No

Is UV safe to use around food?

Yes, UVC 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 UVA 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 heathcare industry?

While there are some, pre-Covid19 UV was mostly used by hospitals and healthcare. We are developing use case examples in all verticals in this new environment