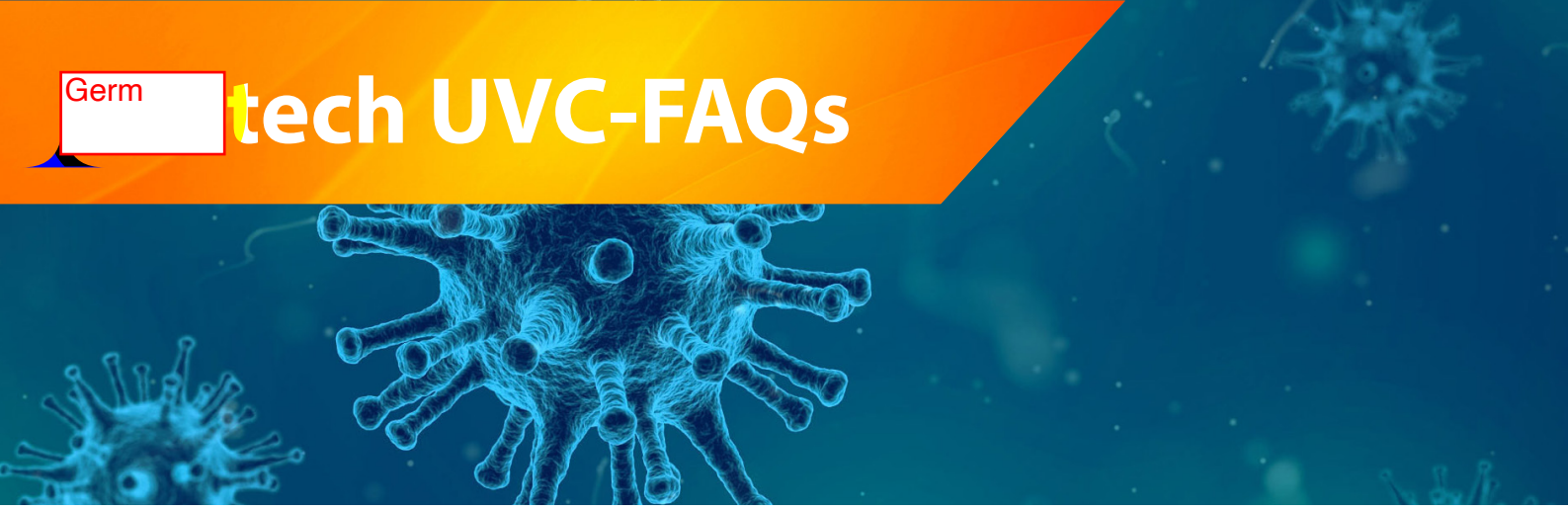
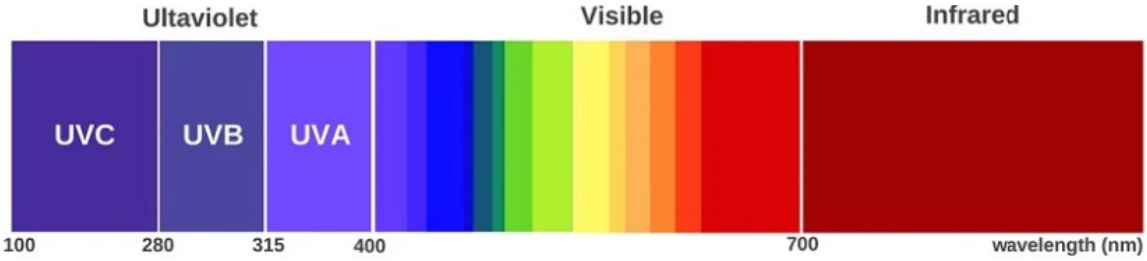
Germtech UVC-FAQs



WHAT ARE GERMICIDAL UV-C ULTRAVIOLET RAYS?

Ultraviolet rays are electromagnetic waves which form part of light spectrum (Fig. 1). Electromagnetic waves are divided into three main wavelength bands, expressed in nanometres (nm): Ultraviolet (UV) rays 100-400 nm Visible (light) rays 400-700 nm Infrared (IR) rays 700-800,000 nm. UV rays in turn are broken down into three bands:

- UV-A (315-400 nm) with tanning properties;
- UV-B (280-315 nm) with therapeutic and vitamin "D" synthesising properties;
- UV-C (100-280 nm) with germicidal properties.



HOW DO GERMICIDAL UV-C RAYS WORK?

UV-C rays (100-280 nm) have a strong germicidal effect and reach their maximum efficacy at the 265 nm wavelength. The germicidal effect of UV-C radiation covers bacteria, viruses, spores, fungi, moulds and mites; this is mainly due to the destructive effect of the UV-C rays on their DNA, which damage their reproductive system and prevent them from replicating.

ARE UV-C RAYS VISIBLE?

These lamps have an emission of around 90% over the 253.7 nm wavelength. This frequency is invisible to the human eye and has a strong germicidal power. The remaining 10% of the lamp's emission is visible (typically appearing as a blueish light).

ARE UV-C RAYS FOUND IN NATURE?

Yes, UV-C rays are found in nature as they are generated by the sun, but the ozone layer in the atmosphere acts as a shield which stops them from reaching the earth's surface.

WHAT ARE THE MAIN ADVANTAGES OF USING GERMICIDAL UV-C LAMPS?

Bacteria, viruses, spores, fungi, moulds and mites are all sensitive to UV-C rays and can be eliminated by UV-C rays however, Microbes (a microorganism, especially a bacterium causing disease or fermentation) cannot acquire resistance to UV-C rays, which only occurs using chemical disinfectants and antibiotics.

UV rays are eco-friendly. When using normal disinfectants, environmental pollution is inevitable. Disinfectants also carry severe risks from the direct inhalation of vapours or the ingestion of foods contaminated after coming into direct contact with chemical disinfectants.

Where the use of chemical disinfectants is unavoidable (food/pharmaceutical/healthcare industries, etc.), the use of ultraviolet rays in the disinfection process can reduce the amount of chemical disinfectant required, which allows for significant cost savings and is better for the environment, while maintaining and, most of the time, improving - disinfection quality.

UV-C ray devices can be installed in most environments and machinery and can be programmed to maintain the same level of disinfection 24hours a day, ensuring ideal conditions of hygiene without any fluctuation in quality. In contrast, chemical disinfectants are most effective at the time of use.

LAFtech UV-C devices offer low running costs and are maintenance-free, besides normal bulb replacement. These powerful and highly durable systems provide exceptional value for money. For this reason, eliminating germs using UV-C as opposed to (or together with) other systems offers excellent results at a low cost.

IS THIS DISINFECTION SYSTEM BOTH SAFE AND EFFECTIVE?

UV-C rays really work. The difference between an ineffective application and a quality project lies in our in-depth knowledge and long-term experience in the area. Since 1987, Light Progress has successfully completed projects all over the world and built-up a portfolio of clients, including companies from all industries that require verified conditions of hygiene to produce quality products or services. Ultraviolet (UVC) Radiation Hazard. Any exposure will cause significant eye damage and may cause skin damage. Do not look into UV light source. Wear UV eye and skin protection. Access panels and warning signs must be in place during appliance operation

WHO RECOMMENDS USING UV-C RAYS?

Multiple organisations and boards with a global reach, such as WHO, EPA, CDC, ASHRAE and many others recommend using UV-C rays to disinfect water, environments and air-conditioning systems. Our Manufacturer Light Progress Europe is a member of the IUVA (International Ultraviolet Association), a global organisation that collects and gives users access to all available information and which organises various international meetings each year. Having collected all this information, the IUVA has also published a document which lays the foundations for designing different UVGI (Ultraviolet Germicidal Irradiation) systems and applications.

WHO USES UV-C RAYS?

UV-C rays are used every day, primarily in:

Food and pharmaceutical industries, for disinfecting air and surfaces in production spaces, disinfecting product containers (packaging), isolating "protected" areas for product manufacturing and packaging areas (such as clean rooms), and areas at risk of contamination. These procedures significantly increase the safety and conservation of the products we purchase and provide multiple health benefits since they leave no residue and help reduce or even eliminate the need for chemical disinfectants, which can leave harmful residues on products.

Hospitals, for preventing the transmission, and therefore contagion, of dangerous bacteria or viruses that may be found in the air or carried following contact with infected persons or visitors, such as TBC and Legionella.

Air conditioning systems, for preventing the problematic and harmful build-up of mould and bacteria in air treatment systems or ducts, which can cause a myriad of illnesses inclusive of

- Building Related Illnesses (BRI)
- Extrinsic allergic
- Alveolitis,
- Viral and Fungal infections
- Bronchial Asthma
- Humidifier fever
- Pontiac fever and Legionnaire's disease
- Sick Building Syndrome.

Many armies use UV-C systems to prevent biological attacks such as the dispersal of anthrax in pipelines.

There are no limits to the possible applications of UV-C rays. Even in domestic environments, they are used to prevent build-up of mould on walls, eliminate mites from bedrooms, keep room air healthy and treat water.

WHICH MICROORGANISMS ARE ELIMINATED BY UV-C RAYS?

Bacteria, viruses, spores, fungi, moulds and mites are all sensitive to and eliminated by UV-C radiation.

WHAT IS THE MINIMUM UV-C RAY EXPOSURE TIME TO ELIMINATE MICROBES?

Each bacterium, virus, yeast, mould or mite requires a different UV-C dose to be deactivated or eliminated.

There are widely recognised documents which report these levels. To give an approximate idea regarding the application times of UV-C rays, these can range from fractions of a second to several seconds.

HOW DO UV-C RAYS DISINFECT THE AIR?

Viruses, bacteria and mould, animal waste, mites and pollens are among the main causes of dangerous infections and allergies.

Each of these contaminants is dispersed in a different way: mites,parasites, spores, bacteria and mould, for example, are continuously transported by air, while other bacteria and viruses are "grouped" into solid particles, such as spores or drops of moisture, and then inhaled by humans.

In air conditioning systems, when contaminants get inside the air treatment unit (ATU) and air distribution ducts, the system, which is dark and moist, becomes a breeding ground for them to grow and multiply, making the air we breathe unsafe.

The air also contains concentrations of chemical pollutants which are dangerous if inhaled in large quantities or on a continuous basis.

Irradiating air in a central system or installing an air purifier complete with UV-C lamps and a TiOx titanium dioxide filter greatly reduces the likelihood that these pollutants (whether microbiological or physicochemical) will result in health problems that often can only be diagnosed after many years.

HOW DO UV-C RAYS DISINFECT SURFACES?

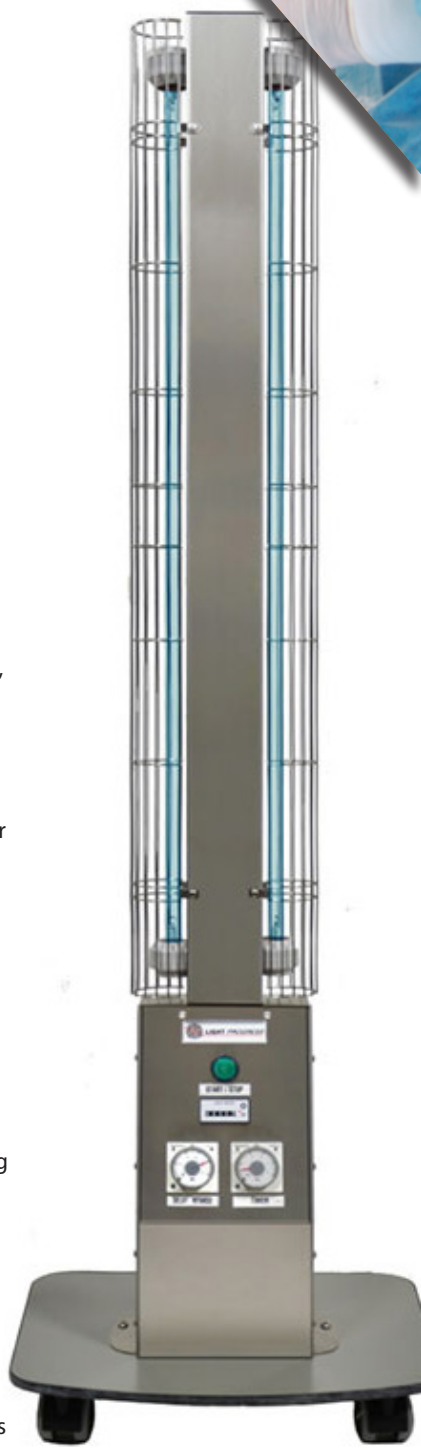
When a UV-C light is turned on, the number of microbes in the air and on all surfaces reached by the UV rays is reduced significantly. For example, in just a few minutes the bacteria Bacillus, Coli, Clostridium, Legionella, Vibrio, Salmonella, Listeria, Pseudomonas, Staphylococcus, Streptococcus, etc. can be reduced by 99% at a distance of 3 m from the device.

This enables the system to reach areas that would otherwise be unreachable with solid objects such as cleaning products and disinfectants, like hidden areas in flooring and furniture.

Where chemical disinfectants must be used, irradiating the surfaces prevents black-out areas, does not generate resistant species and can be used both day and night (without human presence), avoiding rapid re-contamination of surfaces and keeping them constantly in optimal microbiological conditions.

HOW CAN THE EFFICACY OF LIGHT PROGRESS SYSTEMS BE EVALUATED?

The efficacy of disinfection systems can easily be tested through microbiological analysis, or simply using buffers to check for the presence of microorganisms on the surfaces being tested. However, accurately verifying the quantity of microbial load found on a surface, in air or in water before and after treatment requires laboratory tests, such as HACCP. Ask us about our UVC irradiation contact intensity indicators.



QUESTIONS ABOUT THE EFFECTS OF UV-C RAYS ON MATERIALS

CAN UV-C RAYS PENETRATE SOLID BODIES (IONISATION)?

UV-C rays cannot penetrate solid bodies, unlike ionising radiation such as x-rays and gamma rays, both of which are highly dangerous to humans, even at low doses. To eliminate microorganisms using UV-C rays, they must be present on the surface of an object or transported by the air.

ARE THERE ANY MATERIALS THAT CAN BE PENETRATED BY UV-C RAYS?

There are very few materials that will not block the passage of the UV-C germicidal wavelength (253.7 nm, invisible), including quartz and certain plastics such as PE or tetrafluoro-derivatives, but only if these are just a few microbes thick.

Regular window glass, polycarbonate and other transparent materials through which it is possible to see the bluish light of UV-C lights completely nullify their germicidal effect, acting as a screen.

WHAT EFFECT DO UV-C RAYS HAVE ON THE HUMAN BODY?

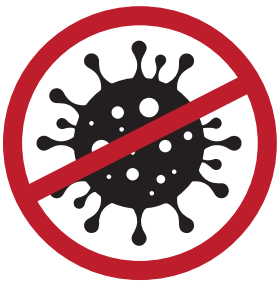
Continuous irradiation of the eyes and skin could cause erythema and conjunctivitis, which normally clear up in a few hours. In any case, it is sensible to avoid direct, close-up exposure to sources of UV-C rays even for short periods of time. To avoid direct exposure simply cover the area to be protected using any material that is not transparent to visible light (cotton or woollen clothing or overalls) or using glass or transparent plastics (masks, helmets, glasses, etc.).

ARE THERE ANY WAYS TO PROTECT AGAINST FALLING FRAGMENTS FROM THE UV-C LAMP?

Yes. Light Progress Europe offers a number solutions.A special plastic material called Uvlon Frame and Uvlon Pipe. Uvlon Frame is made from a film which is attached to the device and collects any fragments deriving from breakage. Uvlon Pipe is a casing that is thermally applied to the UV-C tube in the factory which increases its mechanical strength (car windscreen effect) and collects and retains any broken fragments inside. Where the product clearly requires further protection of delicate lamps we provide mechanical physical protection by means of SS grid.

WHAT EFFECT TO UV-C RAYS HAVE ON PLASTIC SURFACES?

UV-C rays are similar to solar rays, but do not transmit heat. However, like solar rays, they tend have a yellowing effect on plastics that are exposed for long periods of time (especially white plastics).



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