Heraeus

Heraeus UV disinfection reactor

Reliable and efficient UV solutions for clean air

The Heraeus solution.

Combination of mechanical filters and UV light.

Microorganisms circulating in the air make food perishable – especially in tanks and silos.

Microorganisms such as bacteria, viruses and mold spores are very small. They are in the water, in the soil and in the air. Sometimes, they are a welcome addition and are used to make food non-perishable.

However, microorganisms that can cause disease in humans or spoil food are undesirable.

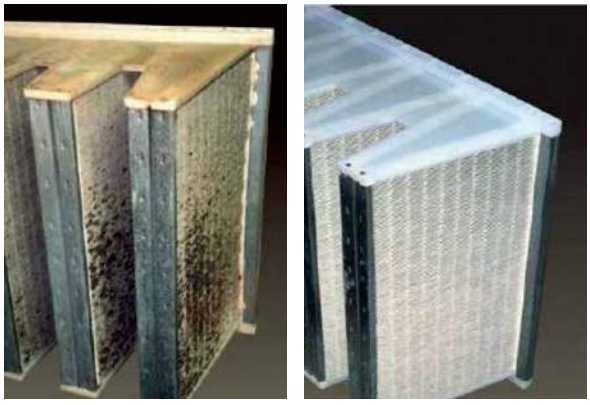
This happens primarily because microorganisms are in the air around us and settle on the food. These airborne viruses and bacteria can also have a negative effect on human health. Therefore, modern building technology requires filter systems to clean the room air.

The problem

Even the best mechanical filters cannot catch all viruses, bacteria or mold spores.

If we inhale air from ventilation systems in buildings, unclean air can cause infections such as Legionnaires' disease. Therefore, triggered by the so-called Legionnaires' disease outbreaks, Germany has even introduced a regulation requiring annual inspections.

Moreover, a filter can be a breeding ground for mold fungi that clog the filter. On heat exchangers, an insulating layer forms that impedes the heat transfer function. This has a considerable effect on energy consumption. The mildew layer causes loss of pressure or heat. The fan must compensate the pressure loss, which may cause the energy costs to rise by up to 30 %.



Comparison between a MERV 13 filter without application of UV light (left) and with a Heraeus UV Disinfection Reactor (right).

Heraeus UV Disinfection Reactor.

The solution: Heraeus UV light systems

A combination of mechanical filters and exposure of the circulating air to UV radiation inside the ventilation system keeps the air free from bacteria, viruses and mold spores. This substantially extends the service life of the filters and the pathogens in the air are rendered harmless.

Heraeus Noblelight has developed an air disinfection system that can be integrated into any industrial process. - **The Heraeus UV Disinfection Reactor.**

Several major European original manufacturers of air treatment equipment have already ordered and installed this technology.

Areas of application

Wherever air is supplied, the Heraeus UV Disinfection Reactor can be adjusted to special customer requirements due to flexible connections and dimensions.

The technology is ideal for the following applications:

- In tanks and silos containing liquids, e.g.:
  - Wine
  - Syrup
  - Milk
  - Glucose solutions
- In buildings where ventilation systems are installed (e.g. heat exchangers)

Components of the UV Disinfection Reactor

- Before and after filtration (F7 and F9)
- Control unit
- 1 to 8 ozone-free lamps
- Made of especially long-life stainless steel
- Connection dimensions can be tailored to customer requirements

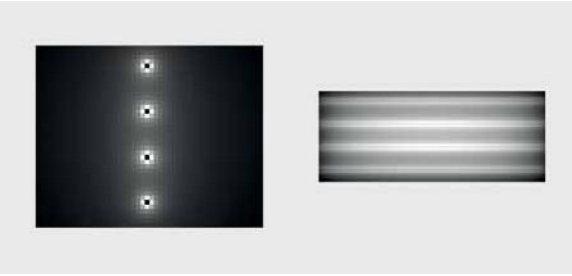
UV light is an effective weapon against germs

Studies show that filters cannot absorb a considerable portion of the microorganisms. The reason is that microorganisms have the most varied sizes.

Large microorganisms such as fungal spores are caught by the filter. They breed and deposit at the filter and cause pressure loss or get into the breathing air.

In contrast, smaller microorganisms such as bacteria and viruses can pass the filter mesh. They hence get into the ambient and process air, cause health problems or settle on perishable products, causing a reduction of their shelf-life.

Exposure to UV light inactivates both the large and in particular also the small organisms that the filter alone cannot intercept. In this way, UV light provides protection where filters are ineffective.



Heraeus calculation software identifies ideal positions of UV lamps at various room conditions.

Efficiently integrated UV lamps in an air duct.

Unique safety - Heraeus uses innovative calculation software

An additional service to customers: Heraeus is the only manufacturer of UV lamps having developed a scientifically validated software that can precisely calculate the customer's individual requirements. The number and alignment of the lamps which have to be used to achieve an optimal and reliable result are calculated based on the spatial situation. The data which is used for this includes the size of the channel, the lamp's UVC intensity, the air flow and the lamp's positioning. The empirically proven mathematical formula was created based on data from measurements taken in the accredited Heraeus measuring laboratory and experience with successful installations.

Your benefits?

- **No test loops:** The prior calculation eliminates the need for test loops and subsequent improvement.
- **Energy saving:** The optimal number of lamps makes safety buffers unnecessary and the lamps are optimally positioned.
- **Faster internal decision-making processes:** A statement about feasibility, system dimensioning and costs can be made within a few minutes.
- **High process reliability:** Calculating effective radiation levels guarantees reliable inactivation of microorganisms even for challenging geometries. This protects personnel and processed products.
- **Your company's image at customers and authorities:** We offer to provide diagrams and calculations, so you can present them to your customers and authorities.

Alternative solutions

In the case of purely mechanical filtration, all filters must be replaced at frequent intervals. This is very expensive because replacement parts, disposal of used filters and downtime of the ventilation system add cost.

An additional problem are spores populating behind the filter and contaminating it. Chemicals added to the air are supposed to mitigate these issues. However, high concentrations may likewise cause health problems and there is the danger of the microorganisms becoming resistant to the chemicals. A delicate issue especially in the case of contact with food or the air in buildings.

UV Control Unit is available in various sizes and for different UV lamps.

Your advantages when using the UV Disinfection Reactor

Application in tanks

- In a tank, disinfection takes place even if the tank is half-full because only the air is exposed to radiation in the process. Other suppliers expose the tank itself to radiation. This means that the products perish faster because disinfection can take place only when the tank is empty.
- In many countries, direct exposure of food related raw materials to radiation is not permitted. With the Heraeus UV solution, only the supplied air is exposed to radiation. In this way, beneficial microorganisms that may be contained in the food are not destroyed.
- Reduces maintenance and material costs.

Application in ventilation systems

- When installed in buildings, energy consumption is significantly reduced because coolers and compressors need less power.
- The quality of the room air is improved.
- Reduces maintenance and material costs for HVAC filters.

Heraeus UV Control System	
Electrical consumption	max. 2,000 W
Cable length to lamp	30 m
Ambient temperature	< 35 °C
Size	max. 600 × 760 × 210 mm
Protection class	IP 54

Lamp specifications	
Lamp type	ozone-free
Use at ambient temperature	up to 80° C
UV emission	254 nm
Electrical power	50 - 300 W
Lighting length	25 - 150 cm
Typical service life	up to 16,000 h

1 to 8 extremely efficient and reliable lamps are mounted within one Heraeus UV solution.