

Ultraviolet Technology

UV Disinfection In Cooling Water Systems

How Does Ultraviolet Work?

Ultraviolet energy causes permanent inactivation of microorganisms by disrupting DNA (the reproductive material) so that it is no longer able to maintain metabolism or reproduce.

The maximum effectiveness occurs between 240 and 280 nm, depending on the organism. Hanovia Arc Tube produces these wavelengths in abundance.

UV kills all bacteria, fungi and moulds as well as spores and viruses.

Health & Safety Executive (HSE) recommends UV

UV disinfection is used extensively and increasingly throughout the world in many water treatment applications. UV is one of the biocides recommended by HSE in order to prevent the occurrence of Legionella bacteria in cooling water systems.

Further benefits

Keeping the microbiological activity under control, will **prevent the formation of biofilms** on the large surface areas of the system, which if untreated can cause the following problems:

- Reduction in heat transfer
- Highly localised microbial corrosion
- Interference with the effectiveness of corrosion inhibitors
- Particulate matter trapped, increasing the problem of fouling
- Disruption of water distribution within the tower

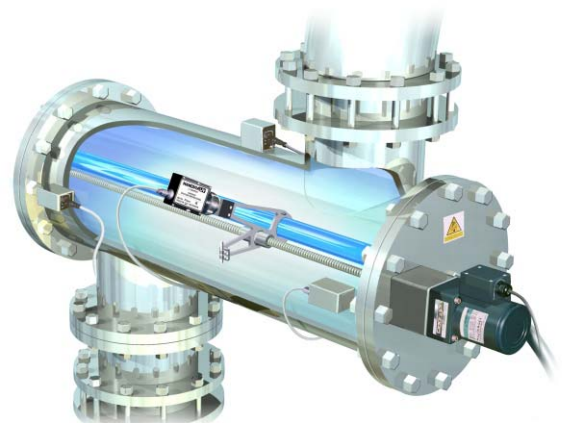


Applications

- ▶ Re-circulation cooling system
- ▶ Cooling system water reuse
- ▶ Cooling systems waste water

Most Efficient

- ▶ Bacteria, viruses, moulds, spores and protozoa are all inactivated by UV.
- ▶ Treatment is effectively monitored and fully automatic.
- ▶ UV works instantly: no contact tank is required.



UV in Cooling Water Systems

- ▶ Recommendations on the use of biocides in cooling water systems are detailed in the UK's HSE L8 guidelines.
- ▶ There are 3 types of recommended biocides: UV, oxidising (Chlorine or Bromine based) and non oxidising
- ▶ It is recommended that 2 different biocides are used in cooling water systems, therefore if UV is used then only one other biocide is required.
- ▶ UV is usually used as the Primary biocide with either an oxidising or a non oxidising biocide used as the Secondary treatment.
- ▶ Chlorine and Bromine based biocides are corrosive. It is therefore important to maintain control of their concentration (typically 2 ppm) using a Redox controller. Higher concentrations are very corrosive notably to the cooling tower.
- ▶ Non oxidising biocides are generally incompatible with UV but can also be used as the second biocide. When non oxidising biocides are used, the UV system is switched off for the 'half-life' of the biocide, this is typically 6 hours after which the UV system can be switched back on again.
- ▶ Non oxidising biocides are used intermittently. The frequency of use can be from every 2 days to once per week.
- ▶ Oxidising biocides are maintained continuously at the controlled concentration.
- ▶ UV is installed post filtration.
- ▶ Proper design of the UV chamber takes into account the light absorbed or scattered by dissolved and suspended materials: a test of the UV transmittance of the water is always carried out by Hanovia prior to making a proposal.
- ▶ An optional automated wiping system is used for keeping the quartz surface free of deposits so that UV effectiveness is maximised.

Superior to Alternatives

- ▶ UV is an environmentally friendly way to eliminate microorganisms, without chemicals.
- ▶ UV is the most cost effective method of water disinfection, requiring minimal servicing.
- ▶ No contact tanks are needed with UV so footprint is small.
- ▶ UV is simple to install and operate and can be easily fitted into existing plant rooms.
- ▶ Low capital, operational and maintenance costs.

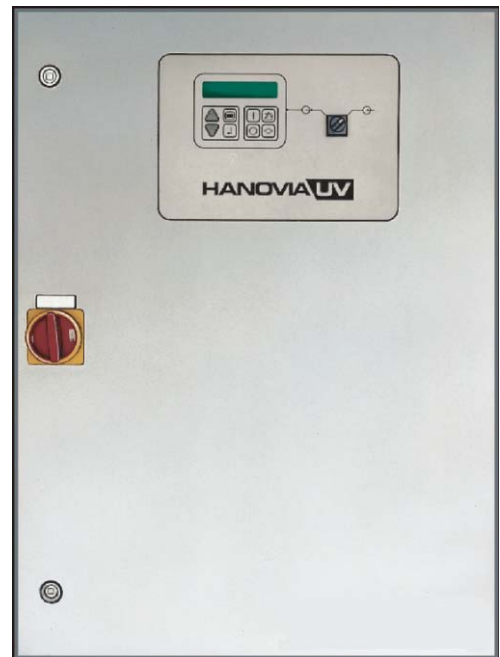
No Detrimental Effects

- ▶ UV leaves no residue.
- ▶ Overdosing is not possible.



Controls

- ▶ Treatment is achieved by UV dose. This is computed from the UV intensity measured by the monitors, the maximum set water flow rate and the transmittance
- ▶ An on-line microprocessor, providing continuous and precise management information so the central control can operate the entire system



Customer Services

Annual service contracts available

Safety

- ▶ No hazardous chemicals are required.
- ▶ No toxic by-products are produced.

Experience

- ▶ Hanovia has over 80 years experience in UV and has designed and supplied UV systems worldwide.

Arc Tubes

- ▶ Specially manufactured for disinfection and photolysis
- ▶ High output lamps

Hanovia

WORLD CLASS UV

Hanovia Limited
145 Farnham Road
Slough SL1 4XB
England

t +44 (0)1753 515300
f +44 (0)1753 534277
e sales@hanovia.com
w www.hanovia.com



A
HALMA GROUP
COMPANY