

Ultraviolet Technology

UV Disinfection of Drinking Water

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. The Hanovia medium pressure Arc Tube produces these wavelengths in abundance. The most effective wavelength occurs at 265 nm.

UV kills all bacteria, fungi and moulds as well as spores and viruses. Research undertaken by Hanovia has demonstrated that *Cryptosporidium* oocysts are effectively de-activated using UV.

Leading Water Authorities Choose UV Treatment

UV disinfection is used extensively and increasingly throughout the world and by most major water companies in the UK.

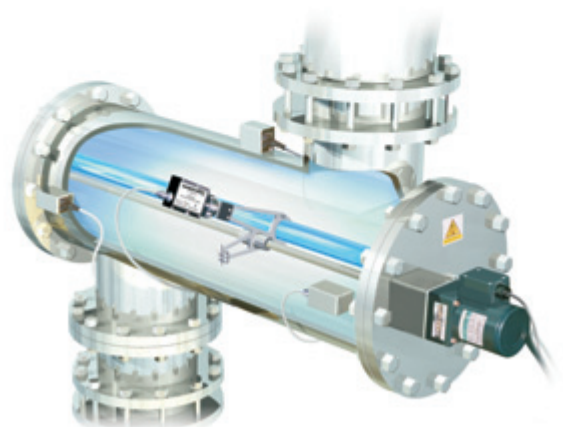


Application

- ▶ Primary disinfection prior to marginal chlorination or chloramination.
- ▶ Total and sole treatment where water is of high quality and where regulations do not impose a residual treatment.
- ▶ Major installations for major cities and large towns, fully automated and linked to control centre via telemetry.
- ▶ Simple, fully automatic installations for remote wells or villages.

Most Efficient

- ▶ Bacteria, viruses, moulds, spores and protozoa are all inactivated by UV.
- ▶ Treatment is effectively monitored and fully automatic.
- ▶ Permanent accurate treatment records can be produced, so all treatment can be traced.
- ▶ UV works instantly: no contact tank is required.



Superior to Alternatives

- ▶ Chlorine is becoming less acceptable because of harmful by-products and handling problems
- ▶ UV is an environmentally friendly way to eliminate bacteria etc, 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 has no effect on taste, odour or pH
- ▶ UV leaves no residue
- ▶ Overdosing is not possible

Safety

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

Experience

- ▶ Hanovia has over 75 years experience in UV and has designed and supplied UV systems worldwide

Arc Tubes

- ▶ Specially manufactured for disinfection and photolysis
- ▶ High output medium pressure lamps
- ▶ Over 15,000 lamps manufactured per annum
- ▶ In-field lamp failure rate below 0.3%
- ▶ Output optimised with over 20% germicidal output (200-300nm)

Constant Wattage Power Supplies

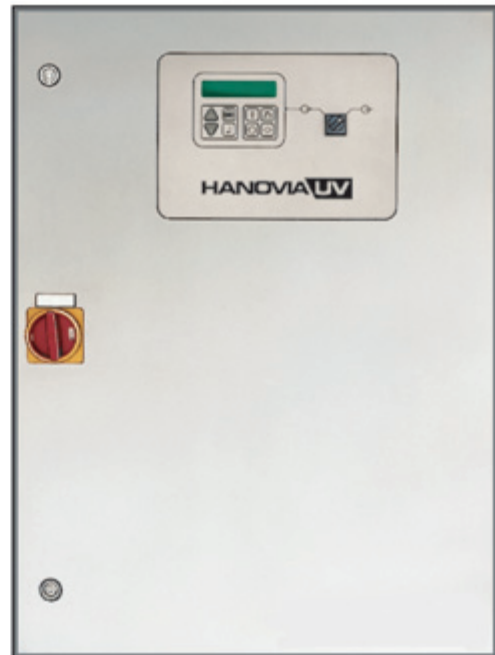
- ▶ Designed and built by Hanovia, this type of power supply has demonstrated in excess of 5 million hours mtbf (mean time between failure)
- ▶ Output variation of <1.5% is guaranteed, even when input voltage varies by 20%
- ▶ With inferior power supplies, the necessary minimum UV dose would not be maintained in the event of a power dip, e.g. when an adjacent pump starts

Water quality

- ▶ UV disinfection can be designed for almost any water, and is therefore not restricted to high quality borehole or surface waters
- ▶ 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, on line transmittance monitor is optional
- ▶ An optional automated wiping system is used for keeping the quartz surface free of deposits so that UV effectiveness is maximised
- ▶ An on-line transmittance monitor continuously monitors the transmittance of the disinfected water

Controls

- ▶ Treatment is achieved by UV dose. This is computed from the UV intensity measured by the monitors, the water flow rate and the on line measured transmittance
- ▶ Power to the Arc Tube can be varied to ensure that the desired dose is obtained at all times, while keeping running costs to a minimum
- ▶ An on-line microprocessor, providing continuous and precise management information so the central control can operate the entire system
- ▶ System will automatically switch to standby unit when required
- ▶ Valve activation stream selection is automatic
- ▶ Lamp output is flow and dose paced



Hanovia Project Engineering

- ▶ Hanovia's experienced in-house team includes design engineers, programmers and project managers
- ▶ Design and installation service includes pipework, valves, mechanical and electrical installations, and purpose built enclosures where appropriate

Major Installation

- ▶ Can be standard modules or purpose-engineered systems
- ▶ Crossflow systems are capable of treating 10,000m³/hr



Hanovia Crossflow system capable of treating up to 10,000m³/hr

Hanovia

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