

# Ultraviolet Technology

## UV Disinfection for Effluent Treatment

### How Does Ultraviolet Work?

Ultraviolet energy causes permanent inactivation of microorganisms by disrupting DNA so that they are no longer able to maintain metabolism or reproduce.

The maximum effectiveness occurs at between 240nm and 280nm, with the most effective wavelength typically at 265nm. The Hanovia Arc Tube produces these wavelengths in abundance.

UV permanently inactivates all bacteria, spores, viruses and protozoa (including Cryptosporidium and Giardia oocysts).



*Bedok Effluent Re-use Plant, Singapore*

### Why do leading water companies choose Hanovia UV?

UV disinfection has gained acceptance as an effective and economic means of disinfecting final effluent prior to discharge without the formation of harmful by-products associated with conventional chemical treatments.

UV treatment is used to meet the high standards set by EC Regulations for discharges into rivers (where aquatic life must be protected) and into the sea (to prevent health risks to bathers) and the environmental impact of untreated discharge of effluent. Enteric viruses, which can survive for long periods in chlorine, are destroyed by UV.

Many factories now handle their own tertiary effluent treatment for example, food, pharmaceutical and chemical plants; naturally these choose UV to achieve microbiological levels within consent limits.

### What is UV Photolysis?

Further developments have seen UV established as the preferred technology for the destruction of impurities and treatment residues. UV photolysis has proven effectiveness in photolysis of chlorine, ozone and Total Organic Carbon (TOC), as required by the United States Pharmacopoeia.

## Why do leading manufacturers choose Hanovia UV?

### Most Efficient

- ▶ UV is effective against all known microorganisms including spores and viruses
- ▶ Germicidal UV intensity monitored effectively and continuously
- ▶ Permanent accurate treatment records are produced - ideal for ISO 9000 series
- ▶ Links easily to process controllers and computers
- ▶ Long term operation with minimal maintenance
- ▶ UV is the most cost effective method of effluent disinfection

### Superior to Alternative Technologies

- ▶ Chlorine is unacceptable because of the formation of by-products toxic to aquatic life
- ▶ Micro-filtration does not remove all viruses from the effluent
- ▶ Long sea outfalls are expensive and still cause pollution
- ▶ UV is a very environmentally friendly technology

### No Detrimental Effects

- ▶ No by-products are formed
- ▶ UV has no harmful effect on marine life
- ▶ Overdosing not possible

### UV Dose

The UV dose required for the plant should be decided in conjunction with a Hanovia specialist, who will also advise on the installation requirements for each specific application.

### Design

The effluent flows through stainless steel chambers, which house quartz sleeves and high intensity Arc Tubes. The number and type of chambers and tubes is determined by the quality and peak flow of the effluent and discharge water quality requirement.

### Lower Running Costs

The number of disinfection chambers and UV power level can be controlled so that the effluent continuously receives the correct dose of UV. Effective life of the Arc Tube is up to one year, so minimal maintenance time is required.

### Cleaning

Automatic wipers ensure that deposits are removed from the surface of the quartz sleeves. Unwiped systems, such as conventional racks of lamps, will suffer quartz sleeve fouling and will need to be manually cleaned, which is expensive, difficult to predict and extends the downtime of the plant. In addition, the automatic wipers will assist in maintaining the correct UV dose.

## Other Systems Available from Hanovia

- ▶ Odour Control
- ▶ Drinking Water Disinfection
- ▶ Organics (TOC) Destruction
- ▶ Pesticide Reduction
- ▶ NDMA Reduction



Hanovia Crossflow system capable of treating up to 10,000m<sup>3</sup>/hr

## Why is Hanovia the leading Supplier?

- ▶ Hanovia has pioneered the use of UV in these applications for over 75 years
- ▶ Hanovia manufactures all its own stainless steel chambers, quartz thimbles and Arc Tubes to the highest standards
- ▶ Hanovia is the only UV systems manufacturer, which also manufactures Medium Pressure Arc Tubes
- ▶ Hanovia has a worldwide network of factory-trained distributors who stock a complete range of spares

### Hanovia Systems are Compact and Easy to Install

- ▶ Conveniently fit into existing pipework vessels in most process areas
- ▶ Minimum site preparation
- ▶ Can interface with flow signal

### Inexpensive and Simple to Maintain

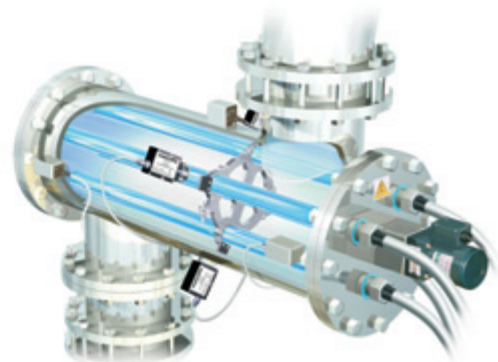
- ▶ Minimal number of moving parts to maintain
- ▶ Simple and safe operation easily understood by operators
- ▶ Designed for remote unattended operation
- ▶ Replacement of Arc Tubes is quick and simple
- ▶ No weekly/periodic visits to site to clean sleeves

### Rigorous Quality Control (ISO 9001)

- ▶ Hanovia Arc Tubes and housings are certified explosion proof
- ▶ Every system fully tested prior to despatch
- ▶ Test certificates always supplied

### All Hanovia Effluent Disinfection Systems Include:

- ▶ Disinfection Chamber
- ▶ Arc Tube
- ▶ Control/Power Supply Cabinet
- ▶ UV Monitor
- ▶ Automatic Cleaning Mechanism
- ▶ On-line Transmittance Monitor (optional)



Hanovia Photon system capable of treating up to 1,500m<sup>3</sup>/hr

# Hanovia

WORLD CLASS UV

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