



Chlorine Dioxide - within Building Services

In the majority of buildings optimum water temperatures cannot be achieved- cold water cannot be kept cold enough; hot water cannot be circulated and maintained hot enough (without the risk of scalding) to prevent opportunist pathogens proliferating the system.

The avoidance of low oxygen level areas - such as “deadlegs”, “low flow areas” - and the temperature range of 20—45°C are also critical in maintaining a well balanced hygiene regime.

Combine these facts with the other issues such as the potential for Legionella and other water borne pathogens, that have found a particular ecological niche in engineered water systems, including cooling towers, showers, taps, wash basins, horticultural misting systems, dental equipment, spa baths and vehicle washes, to quote just a few.

Overwhelming evidence denotes a strong requirement for a regime tailored to the specific needs of building services.

Catalytic Chlorine Dioxide generation provides all the benefits, without the downsides. An “ultra-pure” production of chlorine dioxide with zero' residual chlorite² can be simply and effectively delivered anywhere within water systems.

Chlorine dioxide offers an environmentally friendly alternative - with proven efficacy against biofilms and pathogens. Catalytic Chlorine Dioxide generation meets today's COSHH standards for safe and effective delivery of Chlorine dioxide.

Advances with Tablet, Powder and Sachet delivery mechanisms⁴ delivers chlorine dioxide at point of use - hard surface sanitiser, wipes, odour control, fogging.... etc

As with all water treatment regimes, they require a good monitoring programme. The Clearwater Total Management Package³ provides a comprehensive regime including regular reviews to ensure compliance with statutory requirements.

¹ - Catalytic Chlorine Dioxide generation produces zero residual chlorite. (Confirmed by independant analysis 2003)

² - Chlorite is a by-product that is being currently reviewed by organisations such as the World Health Organisation and NHS Estates. The current requirement is for minimal chlorite

³ - The Clearwater Total Management Package offers a complete “hands-off” approach. This includes monitoring, testing and reporting. It can also include all chemical handling and stock control.

⁴ - In 2000, the Health and Safety Executive published CHLORINE DIOXIDE Risk Assessment document, EH72/14. On page 5, section 3.1 “Occupational Exposure” this document states:- *“The number of persons that may be exposed to Chlorine Dioxide during its use as a sterilising agent for hospital equipment is expected to be thousands as it is slowly replacing the use of gluteraldehyde and sodium hypochlorite”*



Hot & Cold Water Systems
Water Storage Tanks
Heat Exchangers
Calorifiers
Cooling Towers
Humidification Systems
Air Handling Systems
..... etc.



Swimming Pools —
schools, municipal,
hydrotherapy,



From Showers
through to Drinking Water
- Chlorine Dioxide has
been tried and tested over
the last 50 years

Water . Air - Water . Air - Water . Air - Water . Air

Questions and Answers -

Is Chlorine dioxide the same as chlorine?

While chlorine dioxide has chlorine in its name, chlorine dioxide's chemistry is radically different from that of chlorine. One atom makes all the difference (Cl_2 v ClO_2). Chlorine dioxide is not "chlorine in disguise", but a totally different chemical with completely different chemistry.

Where is chlorine dioxide most commonly used?

World-wide, chlorine dioxide is used principally as a primary disinfectant for surface waters with odour and taste problems. It has been disinfecting water streams for over seventy years. It is used by many large cities in Europe such as Brussels, Zurich, Dusseldorf, Berlin, Toulouse and Vienna. Toxicology studies have shown that chlorine dioxide disinfection poses no significant adverse risk to human health.

How does chlorine dioxide affect the environment?

Chlorine dioxide is environmentally friendly and in fact is a pollution protection technology that protects the environment and human health from bacteria and by-products formed from other disinfection methods. For example, in the pulp and paper industry the use of chlorine dioxide has virtually eliminated dioxins in mill waste and has led to a significant improvement in the aquatic eco-system.

What other applications use Chlorine dioxide?

Chlorine dioxide is widely used as a disinfecting agent in the food industry in fruit and vegetable washing, flume water disinfection, meat and poultry disinfection and odour control. In industrial processes, chlorine dioxide is used in industrial water treatment (cooling systems/towers), ammonia plants, pulp mills (slime control, paper machines), oil fields and the electronics industry. It is also widely used within oral healthcare products in everyday life.

Is chlorine dioxide expensive?

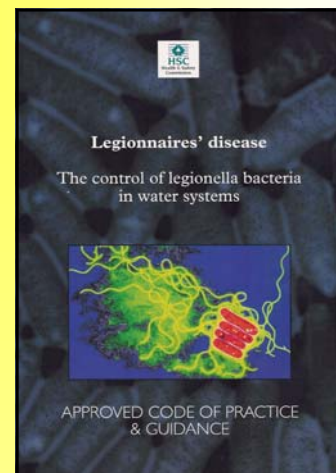
The cost of producing chlorine dioxide is dependant on two factors - the cost of the precursor chemical, and the cost of the equipment to deliver the produced chlorine dioxide at the correct rate, when required.

Catalytic Chlorine dioxide generation is the most cost effective production and delivery mechanism available on the market.

When the costs are offset against reduced maintenance, energy savings, monitoring.....etc., combined with the improved water quality - chlorine dioxide offers a viable solution.

What organisms will chlorine dioxide eradicate?

Chlorine dioxide is a "complete spectrum" anti-microbial agent. In particular, it is effective against - Legionella, Pseudomonas, Listeria, E.coli and Coliforms, Cryptosporidium, Giardia, MRSA,



ACOP says "that the risk from exposure to legionella should be prevented or controlled; precautions should include the use of water treatment techniques.

Extract from Paragraph 172 states:-

"Where biocides are used to treat water systems they, like temperature regime, will require meticulous control if they are to be equally effective. In such situations, if hot water is not needed for other reasons, e.g. for kitchens or laundries, there is no requirement to store hot water at 60°C (or distribute at 50°C)

Extract from Paragraph 173 states:-

Chlorine dioxide is an oxidising biocide capable of reacting with a wide range of organic substances. Levels of 0.5 mg/l can, if properly managed, be effective against planktonic and sessile legionella in hot water systems.

The Drinking Water Inspectorate prescribes a maximum value for total oxidants in drinking water supplies which is the combined chlorine dioxide, chlorite and chlorate concentration. This should not exceed 0.5 mg/l as chlorine dioxide.

 **Clearwater**

Camberley

Bristol

Bromsgrove

Halifax

Scotland

Colchester

FREE PHONE: 08000 937 936

Email: info@clearwater-technology.ltd.uk

www.clearwater.eu.com