

# About Chlorine Dioxide

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**The core chemistry in a majority of Tristel products is the Tristel proprietary chlorine dioxide.**

At Tristel the **core values** driving development of products are the health and safety of users and patients and the highest level of **efficacy** to ensure the **premium standards** in infection control.

Tristel sterilants are based on tried and trusted, low concentration chlorine dioxide solutions which are proven to be safe.

Tristel has been subjected to peer-reviewed, published scientific papers and its efficacy as a biocide is well established.

## Tristel usage in hospitals

Developed initially as a sterilant for the decontamination of endoscopes, Tristel is available in concentrations to meet all routes of transmission of hospital acquired infection, including ENT, radiology, out-patients, cardiology, lung function and bronchoscopy, IVF and gynaecology, urology, oncology, pathology, theatres and endoscopy. Tristel is now the most widely-used sterilant in UK hospitals.

Tristel Technologies Ltd, the sister company of Tristel Solutions Ltd., is specialised in water treatment. Tristel Technologies can provide systems to decontaminate the hospital's water and provide legionella control solutions.

## The Tristel technology

At the heart of the Tristel technology is a sophisticated chemistry which generates chlorine dioxide rapidly and reliably. Chlorine dioxide is a well-documented and highly-effective biocide.

Incorporated in the Tristel technology is a buffering system which stabilises the pH in the close to neutral range of 5 to 5.5 and an inhibitor system which protects sensitive materials.

The Tristel technology is free from all phenolics, aldehydes, peracetic acids and other hazardous chemicals.

## Health, safety and the environment

Tristel is completely and rapidly biodegradable.

A wide range of toxicological studies have been performed both in the UK and USA. These confirm that Tristel is non-hazardous, non-sensitising and is non-irritant. Full details are available on request.



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Tristel products are aqueous solutions of chlorine dioxide. The chemical symbol for chlorine dioxide is ClO<sub>2</sub>.

Chlorine dioxide is generated in aqueous solution via the acidification of sodium chlorite by a blend of organic acids (principally citric acid).

All the Tristel products comprise an activator and a base containing component. The sodium chlorite is the constituent of the activator component and the organic acids, preservatives, buffers and corrosion inhibitors are the constituents of the base-component of the product.

The contents of the activator and base parts are completely inert and are not COSHH substances. Only when activator and base have been mixed does the Tristel solution become active and biocidal. This means that handling the activator and base components is a safe process.

After activation the chlorine dioxide concentration will decline over time.

### What is chlorine dioxide?

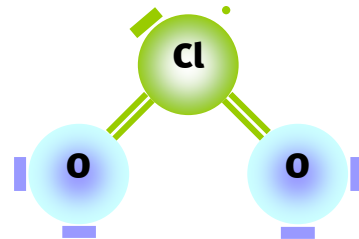
Chlorine dioxide is a powerful oxidising agent – an electron receiver. This means that the chlorine dioxide molecule is in constant search for an additional electron.

### How does it kill pathogenic organisms?

All systems in nature continually move to a position of equilibrium or balance.

When a bacterial cell comes into contact with chlorine dioxide it donates an electron from its cell wall. This creates a breach in the cell wall through which cell contents pass in an attempt to bring the concentrations on either side of the cell membrane to equilibrium. The cell dies through lysis.

Chlorine dioxide is a broad-spectrum biocide with the advantage that bacteria, fungi and viruses do not build up a natural resistance to it, as they do to many biocides. Because of the action by which chlorine dioxide attacks membranes and fundamental cellular processes, mutant strains are not selected.



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### Is chlorine dioxide different to chlorine?

While chlorine dioxide has chlorine in its name, its chemistry is radically different from that of chlorine. Chlorine dioxide is not 'chlorine in disguise'.

Both chlorine dioxide and chlorine are oxidising agents. As noted above, this means that they are electron receivers. Chlorine has the capacity to take in two electrons, whereas chlorine dioxide can absorb five. This is why chlorine dioxide is far more effective than chlorine as a disinfectant.

Environmentally, chlorine dioxide is friendlier to the environment than chlorine. Chlorine dioxide does not form toxic trihalomethanes (THMs) or other chlorinated compounds that are harmful to the environment and associated with chlorine, sodium hypochlorite and hypochlorous acid.

### How long has chlorine dioxide been used?

The disinfecting properties of chlorine dioxide were well established in Belgium at the beginning of the last century. Chlorine dioxide has found wide spread use since the early 1950's in the treatment of drinking water and swimming pools. Today, chlorine dioxide is used by many large cities in Europe, such as Brussels, Zürich, Düsseldorf, Toulouse and Vienna, to sanitize the drinking water supply.

### Chlorine dioxide has many other applications worldwide:

- Pulp and paper industry – Used in preference to chlorine as a bleaching agent. First used in Sweden in 1943
- Food industry – Fruit and vegetable washing Meat and poultry disinfection Sanitizing food process equipment
- Other industry – Cooling systems and towers in the control of legionella
- Personal hygiene – Mouth washes Toothpastes Contact lens cleaners
- Medical – Tristel sterilising solutions for medical instruments

