

# Clorious2

## Ready-to-use chlorine dioxide solution

### Product description

Clorious2 is a transportable, ready-to-use and storage-stable chlorine dioxide solution, produced using a modified chlorite/ peroxodisulphate process.

### Intended uses

Clorious2 is used as a biocidal product for the disinfection of:

- Surfaces, materials, and equipment which are not used for direct contact with food or feeding stuffs
- Closed CIP systems including filler rooms and lines used in the production, storage, transport and distribution of food and beverage
- Materials and surfaces associated with the housing or transportation of animals
- Drinking water and swimming pool water
- Mains water used in the food and beverage industry
- Cooling water, process water, rinsing and washing water and wastewater
- Biofilm formation (prevention and control) on materials, equipment and structures used in industrial processes

### Physical-chemical properties<sup>1</sup>

<b>Active substance</b>	Chlorine dioxide (ClO <sub>2</sub> )
<b>Chemical characterisation</b>	Aqueous solution
<b>Appearance</b>	Yellowish liquid

<sup>1</sup> These properties are typical, but do not constitute a specification and are not binding.

<b>pH Value</b>	2.1 - 3.5
<b>Density:</b>	1.01 g/cm <sup>3</sup> (20° C)
<b>Concentration</b>	0.6 % w/v
<b>Melting point</b>	0 °C

### Specifications of the raw materials

The raw materials used in the production of Clorious2 fulfil the requirements of DIN EN 938 and DIN EN 12926.

### Antimicrobial mechanism of action

Chlorine dioxide is known as a strong oxidising agent and reacts quickly with organic compounds in cell membranes.

### Microbiological effectiveness

The microbiological effectiveness of Clorious2 has been proven as follows: against bacteria according to DIN EN 1276, DIN EN 1041, DIN EN 13697, DIN EN 13623 (Legionella) and against viruses according to DIN EN 14476.

### Shelf life and storage

The active substance concentration of Clorious2 depends on the storage time and the prevailing temperature. Under ideal storage conditions and in sealed original containers, Clorious2 can be stored for up to three months for drinking water and six months for other applications. Store in a

cool place, protect from frost and direct light.  
Use up opened containers as soon as possible.

## Material compatibility

Diluted, Clorious2 does in general not contribute to higher corrosion rates, even at higher dosages

Undiluted, Clorious2 is corrosive to metals like aluminium, brass, bronze, carbon and stainless steels, copper, iron and zinc. It is generally compatible with titanium and Hastelloy C.

Undiluted, it is also incompatible with many plastics and elastomers. Many standard polymers (including PVC, CPVC, and HDPE) become brittle over time as a result of oxidative chain degradation.

## Application methods and application concentrations<sup>2</sup>

### General directions for use

Clorious2 is dosed undiluted. The product is dosed into the system at a point which guarantees good mixing and uniform distribution. The feed point should be well beneath the water surface in order to prevent the chlorine dioxide from gassing off.

### Directions for use to treat water intended for technical usage (PT 2)

Clorious2 can be used as a biocide for the disinfection of water not used for human or animal consumption or surfaces, materials and equipment which are not used for direct contact with food or feeding stuffs. The required feed rate of Clorious2 depends on the conditions and level of contamination of the target water and the degree of disinfection desired. For most applications, dosage rates for chlorine dioxide as a disinfectant vary between 0.5 and 5.0 ppm.

### Directions for use to treat water used in the food and beverage industry (PT 4)

Clorious2 is very effective when used as a terminal sanitizer in CIP, including filler rooms and lines used in food and beverage preparation, storage, transfer and dispensing. The product may be used at a concentration of 1-15 ppm chlorine dioxide in systems with low to medium contamination and up to 50 ppm chlorine dioxide in heavily contaminated systems. Clorious2 is dosed undiluted into the CIP system at the common injector point as with any conventional CIP agent.

### Directions for use to treat water intended for animal consumption (PT 5)

Prior to treatment and if farming practices allow to remove all animals from the premises, it is recommended to have an 8 – 10 hour overnight soaking of the drinker lines with 25 ppm chlorine dioxide. Run water and flush afterwards. This water shall not be consumed by humans or animals. For continuous treatment, dose Clorious2 to secure a residual of 0.2 ppm chlorine dioxide at the farthest drinker. This residual is typically achieved by a feed rate of 0.5 – 1.0 ppm chlorine dioxide, depending on flow rate, raw water quality and remaining contamination in the lines.

### Directions for use to treat water intended for human consumption (PT 5)

Typical feed rates for chlorine dioxide as a drinking water disinfectant vary between 0.2 and 0.5 ppm. The treatment dose depends upon the raw water composition and the demand for chlorine dioxide thereof, and the desired residual concentration in distribution. Therefore, it is recommended to conduct a chlorine dioxide demand study prior to full scale employment. A protocol to determine the chlorine dioxide demand of the water to be treated is available upon request. National drinking water regulations regarding minimum/maximum chlorine dioxide feed rates at the plant outlet

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<sup>2</sup> All dosing quantities mentioned are to be regarded as guide values and are subject to review depending on the situation on site.

and/or minimum/maximal chlorine dioxide residual levels at the sample point shall be observed. The maximum concentration of residual chlorite/chlorate should be observed such that it is in compliance with applicable national regulations.

#### **Directions for use to treat water used in cooling and processing systems (PT 11)**

The dosage required for controlling biofilm and algae in cooling systems and re-cooling units, air washers and condensers, depends on the application and, the degree of contamination and deposits. The required residual concentration of chlorine dioxide in the cooling system is in the range of 0.1 – 5.0 ppm. Chlorine dioxide may be dosed either continuously or intermittently. With continuous dosing, the typical residual concentration is 0.1 – 1.0 ppm, with intermittent dosing, it is 0.1 – 5.0 ppm. The recommended minimal residual of chlorine dioxide in the system is 0.1 ppm, with a contact time of at least 60 seconds.

### **Dosing and control**

Clorious2 is extracted from the packaging by a dedicated dispensing system which ensures dry coupling and decoupling with no exposure to the chemical.

Clorious2 is dosed to water at the supplied concentration by means of a metering pump. To ensure reliability in dosing all wetted parts of the pump head shall be PTFE/Teflon™ (diaphragm, gasket), PVC (pump head), and ceramic (valve ball). Seals and O-rings shall be made of fluorinated elastomers, such as FKM /Viton™ or PTFE/Teflon™. Tubing used in dosing lines shall be flexible PTFE/Teflon™ and need to be replaced every 12 months.

Typically, dosing will be controlled by a signal from a flow-metering device on the main water stream. However, dosing may also be controlled by periodic injection on a regular time interval. The electronic controls on the pump shall be selected in accordance with the control scheme that will keep levels of chlorine dioxide stable in the water stream.

For monitoring residual chlorine dioxide concentrations substantiated methods which are specific for chlorine dioxide must be used. Brenntag recommend the ChlordioXense by Palintest, a precision instrument used with unique pre-calibrated disposable sensors. It offers a simple, rapid, reagent-free method of analysing water for chlorine dioxide without interference from other oxidants or contaminants.

### **Registrations and authorisations**

Brenntag supports Clorious2 biocidal products under Regulation (EU) No 528/2012 (Biocidal Products Regulation) for industrial and professional applications with its own active substance dossier. In Belgium, Clorious2 is authorised as a biocidal product under notification number NOTIF1085.

### **Delivery form**

The product is available in bung drums with a net content of 208 kg and canisters with a net content of 25 kg. The containers have been tested by TÜV and approved by BAM for the transport of hazardous goods. They are equipped with built-in suction lance.

### **Toxicology, ecology and labelling**

Information on toxicology and ecology, classification and labelling of Clorious2 can be found in the safety data sheet.

### **Safety instructions**

When handling Clorious2 the instructions of the safety data sheet, this technical data sheet and the safety training shall be followed.

Employees handling chemicals should be trained according to local rules and regulations on hazardous materials; for Clorious2 this can be done using your SOP and the safety data sheet.

Wear protective goggles and gloves. A good ventilation and suction of the room is required. If

you perceive an odour of chlorine dioxide when entering the storage room, provide sufficient ventilation. Spilled chlorine dioxide solution can be quickly rendered harmless using a reduction agent (e.g. sodium bisulphite solution).

Repacking Clorious2 is not allowed. Brenntag does not assume liability for any losses or damages which may occur from repacking, shipping, storing and using the product in a manner which is inconsistent with the instructions and directions given in our safety data sheet and this technical data sheet.

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**Use biocidal products safely. Always read the label and product information before use.**

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