BRENNTAG

ConnectingChemistry

TECHNICAL DATA SHEET

Clorious2

TECHNICAL DATA

Product	Clorious2 is a ready to use, highly pure and stable chlorine dioxide solution.
Areas of application	Clorious2 may be used as a disinfectant for the treatment 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
Appearance	Yellowish liquid
Typical properties	pH: 2.1 – 3.5 Density at 20 °C: 1.01 g/cm³ Active substance: Chlorine dioxide (ClO_2) Concentration: 0.6 % w/v Freezing point : 0 °C
Raw materials	Clorious2 is manufactured from substances that meet the requirements of EN 938 and EN 12926.
Antimicrobial efficacy	Clorious2 is proven effective as bactericide in accordance with EN 1276, EN 1041 and EN 13697; as yeasticide in accordance with EN 1650 and EN 13697; as fungicide in accordance with EN 1275.
Notification nr.	NOTIF1085
Shelf life and storage	The chlorine dioxide concentration of the Clorious2 stock solution is dependent on the storage time and prevailing temperature during storage. Under ideal storage conditions, Clorious2 is shelf-stable for up to six months. Protect against light. Keep tightly closed in a dry and cool place. Keep away from heat. Use timely after opening.

Clorious2

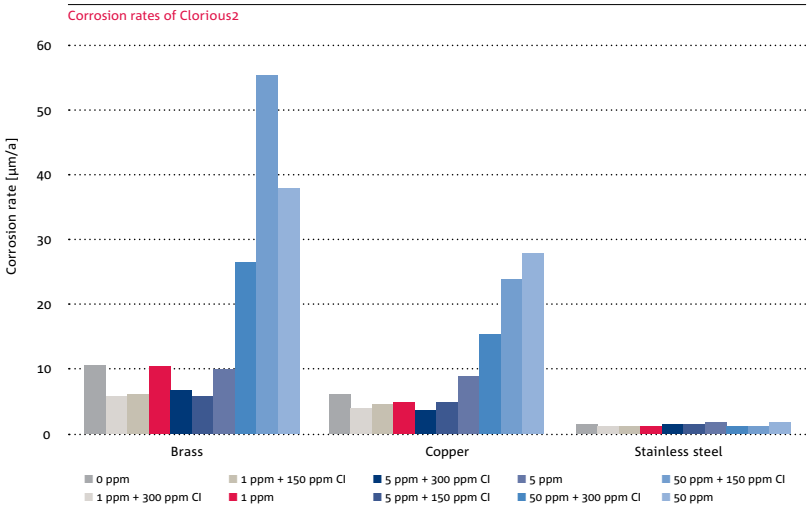
TECHNICAL DATA

Corrosion behaviour and material compatibility

Diluted, Clorious2 does in general not contribute to higher corrosion rates, even at higher dosages (see figure 1). More importantly, Clorious2 exhibits a lower corrosion tendency towards e.g. brass and copper, than chlorine dioxide generated from HCl and $NaClO_2$ (see figures 2 and 3).

Undiluted, Clorious2 is corrosive to metals like aluminum, 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.



Concentration of Clorious2 in ppm active substance, Cl = standard corrosion inhibitor formulation containing polyacrylic acids, phosphonates, triazoles

Fig. 1: Observed corrosion rates Clorious2

Generally an undiluted chlorine dioxide solution is most compatible with fluoropolymers, such as PVDF/Kynar™ and with fluorinated elastomers, such as FKM/Viton™ and PTFE/Teflon™. It also is compatible with vinyl ester-FRP materials.

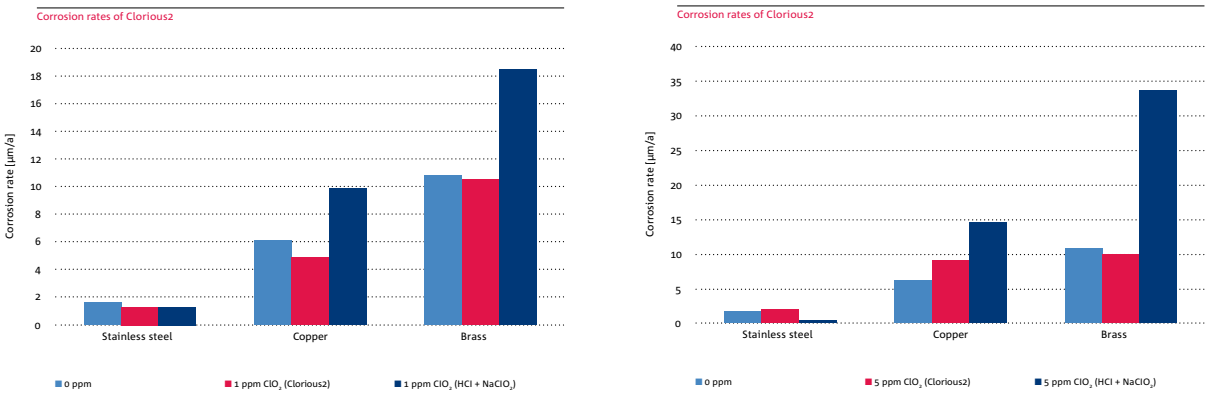


Fig. 2, 3: Corrosion rates of Clorious2 compared with chlorine dioxide generated from sodium chlorite and hydrochloric acid in ppm active substance

Clorious2

TECHNICAL DATA

Clorious2 application methods and dosages

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 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.

Clorious2

TECHNICAL DATA

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.
Packaging	Available in TÜV tested and BAM approved drums (208 kg net) or cans (25 kg net). An extractor with a non-return foot valve is integrated in the packaging.
Safety notes	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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VAT number	BE0405317567	NL001375945B01
recall procedure available	Yes	
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QUALITY SYSTEMS		
ISO 9001	Yes	Yes
ISO 14001	Yes	Yes
ISO 22000	Yes	Yes
FSSC 22000	Yes	Yes
GMP+ -feed	Yes	Yes
OHSAS18001	-	Yes
ESAD	Yes	Yes
other	-	AEO