

Reliable and precise disinfection that meets your requirements

Chlorine dioxide systems for a wide range of applications



Disinfection solutions from one source – made to match



Chlorine dioxide – universally effective

Due to its high reactivity, chlorine dioxide must be manufactured using special equipment at the site of use and is not allowed to be transported.

Chlorine dioxide has various advantages over chlorine, which is the most popular choice to disinfect water. Unlike chlorine, its disinfectant effect does not diminish as pH increases. Chlorine dioxide remains stable in piping systems over long periods and provides from many hours up to days of microbiological water protection. Ammonium, which causes considerable chlorine loss, is not attacked by chlorine dioxide so the dosed chlorine dioxide remains fully available for disinfection purposes.

Chlorophenols, strongly smelling compounds which can result from the chlorination of water, are not formed with chlorine dioxide. Chlorine dioxide also does not produce trihalomethanes (THMs) and other carcinogenic chlorinated hydrocarbons.

Biofilms form in all water-carrying pipes and provide an ideal breeding ground for dangerous bacteria such as Legionella. Unlike chlorine, chlorine dioxide not only kills off biofilms but actively removes them. This eliminates the conditions that Legionella bacteria need to survive and offers long-term protection against repeat contamination.

Benefits of chlorine dioxide

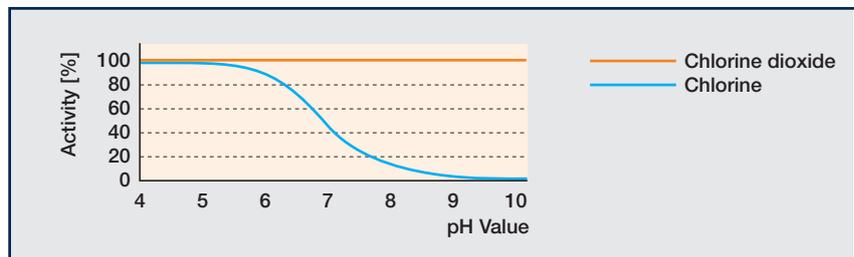
- Disinfectant effect independent of pH
- Sustained-release effect means long-term stability in the piping system
- Destroys biofilms in pipework and tanks, offering reliable protection against Legionella for entire water systems
- Does not react with ammonium
- Does not form chlorophenols and other strong-smelling compounds
- Does not form trihalomethanes (THMs) and other chlorinated hydrocarbons (AOX)



Action and pH dependence of chlorine dioxide

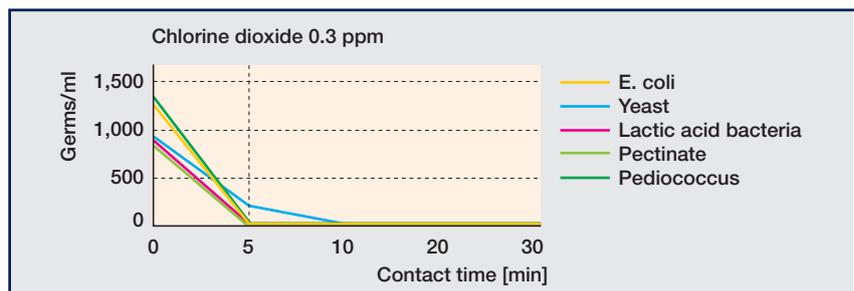
pH dependency

Unlike chlorine, the action of ClO_2 is not affected in the pH range of 4–10, independent of the pH value.



Disinfectant action of chlorine dioxide

Even in low concentrations, ClO_2 has a strong disinfectant effect. At a concentration of 0.3 ppm, for example, it reliably reduces the micro-biological count from around 1,000 CFU/ml to zero in a matter of minutes.



Complete systems for every requirement

Chlorine dioxide systems

Bello Zon® CDLb

The ideal system for batch operation and the discontinuous treatment of small to medium volumes of water with chlorine dioxide production of 1-2 g/l. Ideal for combating Legionella.

The innovative reactor design of the complete system with integrated metering pump and the process controlled one step at a time make the system exceptionally safe and reliable. Thanks to the long-term stability of the chlorine dioxide produced, operation can be stopped for days at a time with no adverse impact. What's more, the reaction is highly efficient and there is no loss of chlorine dioxide from the gas phase.



Bello Zon® CDLb with storage module

The cost-effective solution for operating multiple points of injection with just one system.

The separate gas-tight storage module stores up to 60 g of chlorine dioxide, which can then be distributed to any number of points of injection. This allows multiple points of injection to be operated cost-effectively with just one system.



Chlorine dioxide is increasingly being used as a universal disinfectant.

It is used to disinfect potable water and raw water, wash food, and treat cooling and waste water. Because it works regardless of pH, it achieves biofilm-free systems. It combines effective disinfection with excellent ecological credentials. Safe and reliable system technology that complies with DVGW data sheets W224 and 624, offering global availability teamed with global expertise and service.

Bello Zon® CDVc

Particularly suitable for the treatment of medium to large volumes of water. The system is designed for chlorine dioxide production of 1 to 2,000 g/h.

Continuous treatment is safe and simple thanks to the use of diluted basic chemicals. The PVDF used in the reactor results in higher operating safety and improved purity of the chlorine dioxide.

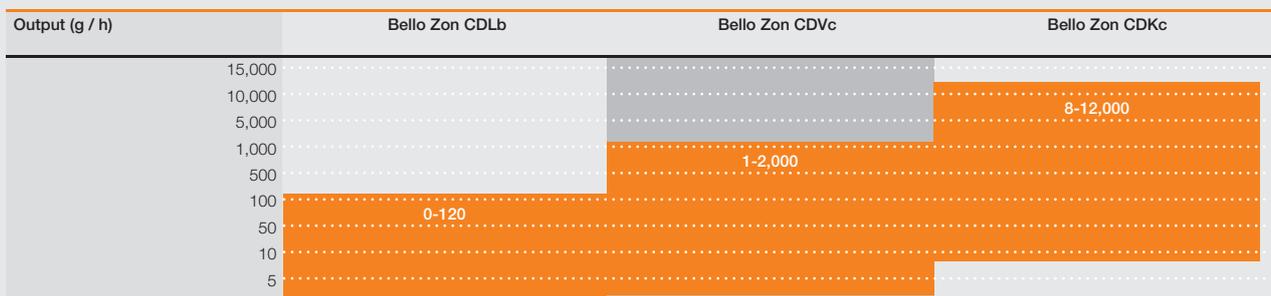
Bello Zon® CDKc

The system produces chlorine dioxide at a rate of up to 12,000 g/h, making it ideal for the treatment of large volumes of water.

The pre-dilution module enables the highly economical use of concentrated chemicals. It also has the significant benefit of a safe, hydraulic chemical dilution mechanism.



Performance overview: Chlorine dioxide systems



Production process

	Bello Zon CDLb	Bello Zon CDVc	Bello Zon CDKc
Production process	Chlorite/acid (diluted) 7.5% NaClO ₂ + 9 % HCl	Chlorite/acid (diluted) 7.5 % NaClO + 9 % HCl	Chlorite acid (concentrated) 24.5% NaClO ₂ + 25-37% HCl

Applications

	Bello Zon CDLb	Bello Zon CDVc	Bello Zon CDKc
Combating legionella	■		
Food and beverage industry	■	■	
Municipal potable water and sewage treatment	■	■	■
Industry (cooling towers, waste/process water etc.)	■	■	■

Bello Zon® CDLb

Chlorine dioxide system

Efficient and reliable in batch operation.

Depending on the type of system, up to 120 g of chlorine dioxide is produced an hour and put into intermediate storage in a concentration of 1,000 or 2,000 mg/l. The outstanding stability of the chlorine dioxide solution generated allows the system to remain switched off for several days without any noticeable loss of activity.

The system meets the high standards stipulated in data sheets W 224 and W 624 published by the German Association for Gas and Water (DVGW).

- Excellent operational safety due to intrinsically safe process control
- High degree of stability of the chlorine dioxide solution
- No ClO₂ loss due to closed gas supply
- Economical operation due to minimal use of chemicals
- Minimal investment costs
- Mainly used for preventing Legionnaire's disease as well as a disinfectant in the food and beverage industry



Type	Preparation capacity g/h	Chlorine dioxide concentration mg/l	Capacity l/h	Back pressure bar	Dimensions (approx.) H x W x D (mm)
CDLb 6	6	1,000	8	7	1,236 x 878 x 306
CDLb 12	12	2,000	8	7	1,236 x 878 x 306
CDLb 22	22	2,000	13	7	1,236 x 878 x 306
CDLb 55	55	2,000	30	7	1,550 x 800 x 345
CDLb 120	120 ¹⁾	2,000	1)	–	1,300 x 880 x 425

¹⁾ In storage module version only

Inputs
2 freely configurable digital inputs for the pause functions, high metering, shock dosing or manual metering, including collective malfunction
4 digital inputs for monitoring (Warning/ empty message) the chemical supply
1 water meter (contact 0.25 - 20 Hz or frequency 10 - 50,000 Hz)

Outputs
1 operating signal relay
1 warning signal relay
1 fault indicating relay
1 voltage output +5 V as supply voltage for water meter with Hall sensor

Bello Zon[®] CDLb

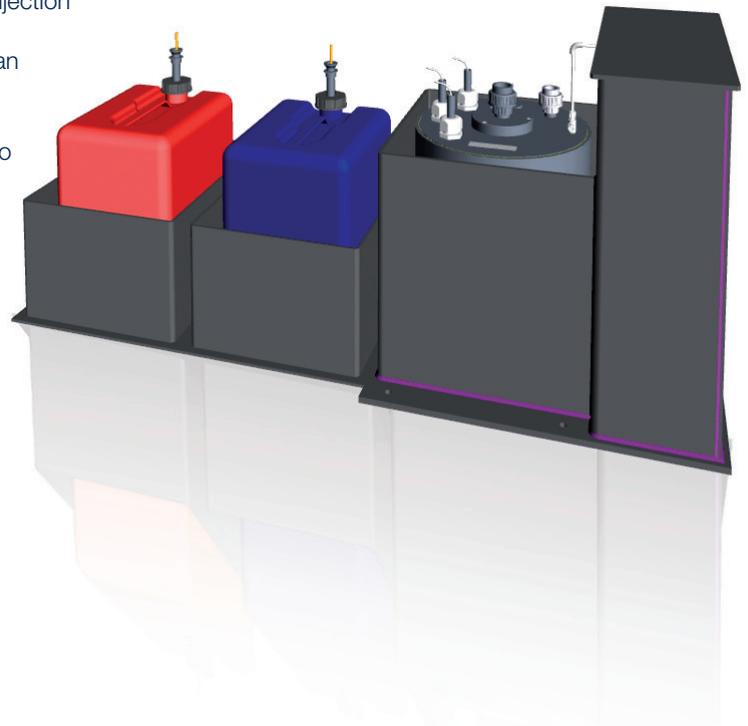
Chlorine dioxide system

Chlorine dioxide distribution made easy

In the storage module design the chlorine dioxide solution is conveyed straight to a storage tank to which any number of metering stations can be connected. The fully automatic filling process is controlled by the CDLb controller. The innovative closed gas circuit prevents chlorine dioxide from escaping during the filling process, reducing environmental impact and cutting chemical consumption by up to 5 % compared with conventional systems.

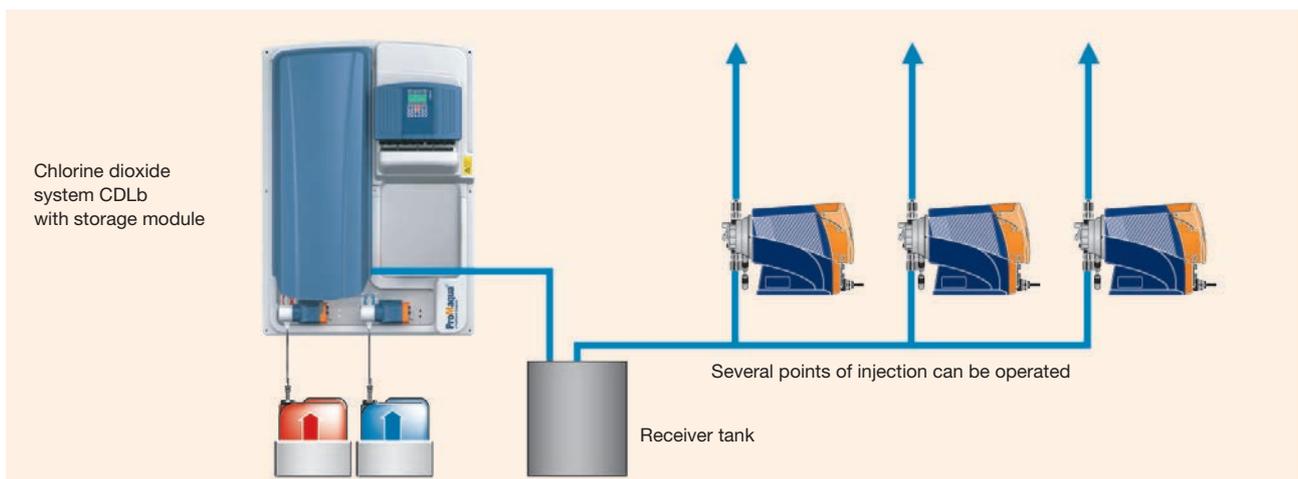
Because the separate storage module can buffer 60 g of chlorine dioxide, plants which are not run continuously can be designed in line with average, rather than peak, consumption. The result: a dramatic reduction in investment costs compared with conventional systems.

- Cost-effective intermediate storage of 60 g chlorine dioxide
- Several points of injection can be operated
- High peak loads can be managed with small systems
- No ClO₂ loss due to closed gas supply
- High degree of stability of the chlorine dioxide solution



Type	Working volume l	Amount of chlorine dioxide in storage module g	Chlorine dioxide concentration mg/l
CDLb 6	30	30	1,000
CDLb 12-120	30	60	2,000

Inputs & outputs
as Bello Zon [®] CDLb (also see page 6)



Bello Zon[®] CDVc

Chlorine dioxide system

Safe and easy continuous treatment.

Wired ready for connection, complete chlorine dioxide systems Bello Zon[®] CDVc for the production, metering and monitoring of up to 2,000 g/h of chlorine dioxide from diluted source chemicals. A completely newly developed reactor concept ensures the innovative production and metering of chlorine dioxide. This results in higher operating safety and improved purity of the generated chlorine dioxide.

- Efficient operation thanks to production, metering and monitoring of ClO₂ with just one system
- Maximum ClO₂ purity achieved through use of PVDF reactors
- Increased operating safety thanks to stroke length-monitored metering pumps
- Perfect quality management thanks to integrated storage of all operating parameters and measured values (measurement, documentation and representation of ClO₂, chlorite, pH and ORP)
- Automatic monitoring of operating parameters and maintenance intervals
- Simple and safe operation, thanks to clear navigation in plain text
- Control with large colour display, integrated data logger and screen plotter



Type	Capacity		Operating pressure max. bar	Operating temperature °C	Dimensions (approx.) H x W x D (mm)	Weight kg
	min.-max./hr. g/h	min./day g/d				
CDVc 20	1 - 20	6.4	8	10 - 40	1,344 x 1,002 x 200	26
CDVc 45	2 - 45	16.0	8	10 - 40	1,344 x 1,002 x 200	27
CDVc 120	6 - 120	40.0	8	10 - 40	1,344 x 1,002 x 200	28
CDVc 240	12 - 240	80.0	8	10 - 40	1,342 x 1,000 x 248	45
CDVc 600	30 - 600	140.0	8	15 - 40	1,711 x 1,200 x 273	75
CDVc 2000	100 - 2,000	468.0	5	15 - 40	1,900 x 1,400 x 370	120

Inputs
1 water meter (contact 0.25-20 Hz or frequency 10-50,000 Hz)
1 external digital input - pause
1 external digital input - high metering
1 external digital input - measured water monitoring
1 external digital input - malfunction (e.g. for gas detector)
1 external digital input - leak monitoring (e.g. chemical storage tank)
2 standard signal inputs 0/4 - 20 mA, configurable for water meter, interference variable, control variable or measured value (ClO ₂ , chlorite, pH or ORP)

Outputs
1 switched network output for bypass pump
1 operating signal relay
1 warning signal relay
1 fault indicating relay
1 standard signal output (freely configurable)

Bello Zon[®] CDKc

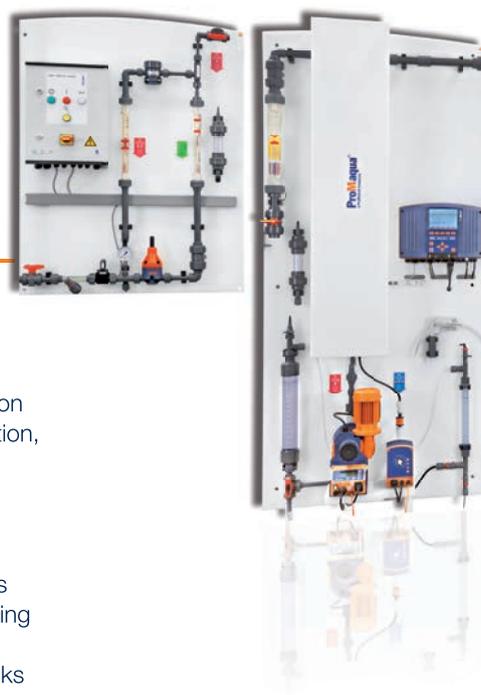
Chlorine dioxide system

The efficient way to meter large volumes. The unique pre-dilution feature ensures reliable operation in accordance with the latest standards.

Bello Zon[®] CDKc is a ready-to-connect chlorine dioxide system for the production, metering and monitoring of up to 12,000 g/h of chlorine dioxide from concentrated source chemicals. A completely newly developed reactor concept ensures the innovative production and metering of chlorine dioxide. This results in higher operating safety and improved purity of the chlorine dioxide generated.

The pre-dilution module allows the hydrochloric acid concentration to be preset and adjusted to the individual operating conditions. This makes the CDKc system unusually economical and prevents dangerous contact between undiluted chemicals.

- Increased safety due to pre-dilution
- Efficient operation by the production, metering and monitoring of ClO₂ with only one system
- Maximum ClO₂ purity achieved through use of PVDF reactors
- Increased operating safety thanks to stroke length-monitored metering pumps
- Perfect quality management thanks to integrated storage of all operating parameters and measured values (measurement, documentation and representation of ClO₂, chlorite, pH and ORP)
- Simple and safe operation, thanks to clear navigation in plain text
- Control with large colour display, integrated data logger and screen plotter



	Capacity	Max. operating pressure	Operating temperature
Type	g/h	bar	°C
CDKc 150	8-150	8	10-40
CDKc 400	20-400	8	10-40
CDKc 900	45-900	8	10-40
CDKc 2000	100-2,000	5	15-40
CDKc 2800	140-2,800	5	15-40
CDKc 7300	365-7,300	3	15-40
CDKc 12000	600-12,000	2	18-40

Inputs
1 water meter (contact 0.25-20 Hz or frequency 10-50,000 Hz)
1 external digital input - pause
1 external digital input - high metering
1 external digital input - measured water monitoring
1 external digital input - malfunction (e.g. for gas detector)
1 external digital input - leak monitoring (e.g. chemical storage tank)
2 standard signal outputs 0/4-20 mA, configurable for water meter, interference variable, control variable or measured value (ClO ₂ , chlorite, pH or ORP)

Outputs
1 switched network output for bypass pump
1 operating signal relay
1 warning signal relay
1 fault indicating relay
1 standard signal output (freely configurable)

Applications & industries



Applications for chlorine dioxide

With every new project, our engineers draw on experience that we have accumulated since 1976 in the following applications:

Food and beverage industry

- Disinfection of product and process water
- Bottle cleaning, rinsers and pasteurisers
- Filler disinfection
- Disinfection in CIP (cleaning in place) systems
- Water vapour treatment (condensation) in the dairy industry
- Water disinfection for processing of fruit, vegetables, seafood, fish and poultry

Industry

- Cooling water treatment
- Combating legionella in cooling water circuits
- Disinfection of process water
- Removal of odorous substances in air scrubbers
- Slime control in the paper industry

Municipal potable water and waste water companies

- Disinfection of potable water
- Disinfection of waste water

Hotels, hospitals, care homes, sports centres etc.

- Combating legionella in cold and hot water systems
- Water disinfection in the cooling towers of air conditioning systems

Market gardening

- Disinfection of irrigation water in plant cultivation

Swimming pools

- Regular disinfection of swimming pool filters
- Combating legionella in cold and hot water systems

Chlorine dioxide **protects** the places where we live and work



Optimum **potable water quality** to the tap

Koerich waterworks near the city of Luxembourg is one of the largest water companies in the Grand Duchy of Luxembourg. A new elevated tank with a capacity of 15,000 m³ and an extra volume of 2,000 m³ was built for storage purposes.

ProMinent was tasked with designing and building a system to provide safe, reliable disinfection of the potable water 365 days a year.

For efficient disinfection without affecting the smell or taste of the water, ProMinent delivered a metering and supply concept with chemical storage tanks, a chlorine dioxide production system, a storage module for intermediate storage of the stock solution and volume-proportional metering with Sigma pumps. We spoke to Technical Director Tom Levy to find out what he thought of the concept.

Mr Levy, what is your opinion of the ProMinent solution?

Tom Levy: "The technically mature disinfection system was professionally planned and implemented."

What advantages does the system offer?

Tom Levy: "It guarantees reliable disinfection and long-term water quality without negative impact on odour or taste thanks to the sustained-release effect of chlorine dioxide. Points of injection with diaphragm valves and complete system monitoring by the PLC ensure maximum safety. The continuous automatic operation of the system also reduces costs."

What water quality is available to consumers?

Tom Levy: "Local residents are supplied with potable water that is neutral in taste without any need to worry about contamination. Potable water quality is guaranteed right to the householder's tap."

Contact worldwide



Experts in Chemical Feed and Water Treatment

ProMaqua, a brand of the ProMinent group of companies, is at home in over 100 countries across the globe. We supply products, systems and service solutions with the same standards all

over the world: maximum quality and reliability. All our experience and expertise in water treatment and chemical feeding is at your disposal – any time, anywhere.

ProMinent Group

info@prominent.com

www.prominent.com