

# 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 level of reactivity, chlorine dioxide needs to be manufactured on demand in special systems wherever it is to be used and cannot 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 microbiological water protection for any length of time from several hours to days. 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

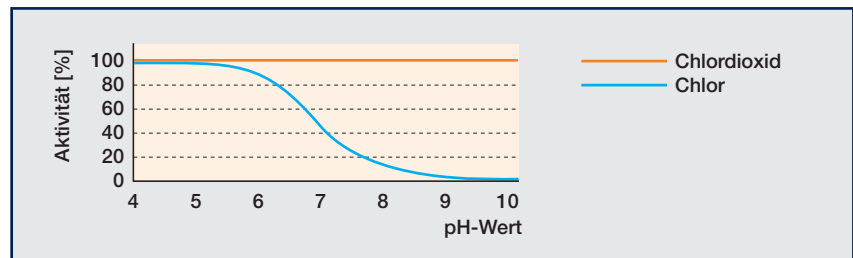
- Disinfectant effect independent of pH
- Sustained-release effect means long-term stability in the piping system
- Degradation of biofilms in pipework and tanks, thus reliable protection of entire water systems against infestation by legionella
- Does not react with ammonium
- Does not form chlorophenols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



## Action and pH dependence of chlorine dioxide

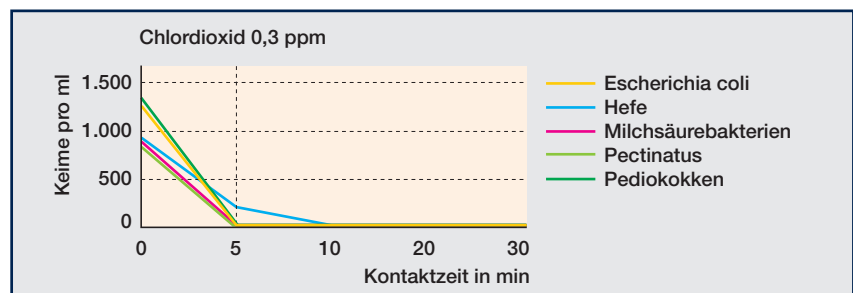
### pH dependency

Unlike chlorine, the action of  $\text{ClO}_2$  is not affected by pH in the pH range of 4–10.



### Disinfectant action of chlorine dioxide

Even in low concentrations,  $\text{ClO}_2$  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.

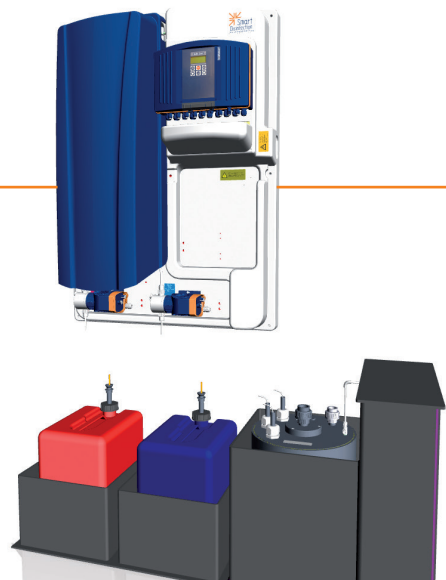
The innovative reactor design of the complete system with integrated metering pump and the fact that the process is controlled one step at a time make the system exceptionally safe and reliable. Thanks to the long-term stability of the chlorine dioxide produced, operation can be stopped for days at a 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® CDEb

The system produces up to 200 g/h of chlorine dioxide and impresses customers with its ultra-simple operation and clearly laid out design.

The ready-to-use chlorine dioxide system continually produces chlorine dioxide following the acid / chlorite procedure using diluted chemicals.



### Bello Zon® CDVd

Particularly suitable for the treatment of medium to large volumes of water. The system is designed for chlorine dioxide production of 5 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® CDKd

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.



# Bello Zon® CDLd

## 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 liquid 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).

- Outstanding operating safety and reliability, thanks to intrinsically safe process control
- High degree of stability of the chlorine dioxide liquid
- No ClO<sub>2</sub> loss due to closed gas supply
- Economical operation due to minimal use of chemicals
- Minimal investment costs
- Used specifically for legionella prevention and 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 <sup>1)</sup>	2,000	<sup>1)</sup>	–	1,300 x 880 x 425

<sup>1)</sup> In storage module version only

# Bello Zon<sup>®</sup> CDLb

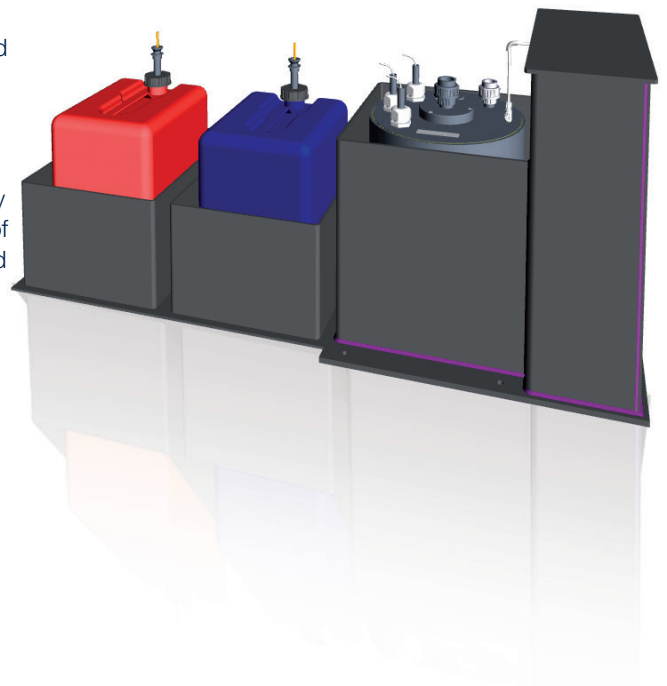
## Chlorine dioxide system

### Chlorine dioxide distribution made easy

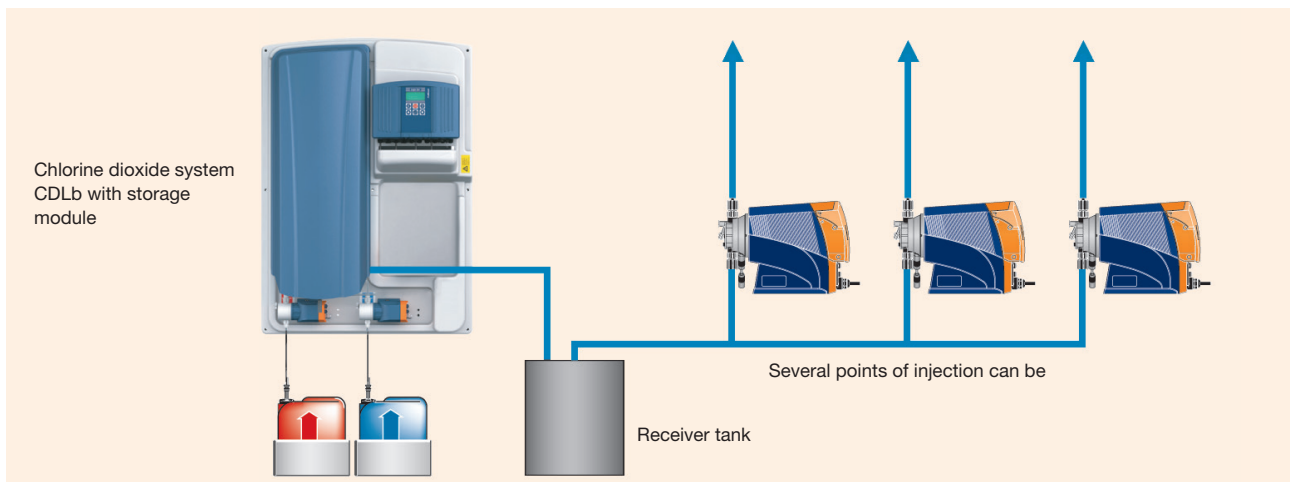
In the storage module design, the chlorine dioxide liquid is conveyed straight to a storage tank to which any number of metering stations can be connected. The fully automatic filling process is controlled by the CDLb controller. The innovative closed gas circuit prevents chlorine dioxide from escaping 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 ClO<sub>2</sub> loss due to closed gas supply
- High degree of stability of the chlorine dioxide liquid



Type	Working volume l	Amount of chlorine dioxide in storage module g	Chlorine dioxide concentration mg/l	Inputs & outputs
CDLb 6	30	30	1,000	as Bello Zon <sup>®</sup> CDLb (also see page 6)



# Bello Zon® CDEb

## Chlorine dioxide system

Bello Zon® CDEb impresses customers with its ultra-simple operation and clearly laid out design.

A ready-to-use chlorine dioxide system for the continuous production and metering of chlorine dioxide with diluted chemicals. The emphasis is on ultra-simple operation and clearly laid out system design with standard components. The stroke lengths of the metering pumps are continuously monitored. This rules out inadmissible operating statuses arising from incorrect pump stroke length adjustments. The system is extremely easy to operate and, alongside a central Start-Stop key, also has LEDs of different colours to display all the operating statuses. The system can be controlled in an analogue or manual manner or via contacts.

- Minimal training required thanks to extremely simple operation
- Minimal investment costs
- Short delivery time
- Excellent operating safety
- Simple process integration



Type	Chlorine dioxide capacity		Operating pressure max. bar	Operating temperature °C	Connector dimensions of metering pumps Chlorite and acid	Dimensions H x W x D (mm)	Weight kg
	min.-max./hr. g/h	min./day g/d					
CDEb 30	5-30	10.0	7 / 8 **	15-40	6 x 4	958 x 700 x 250	23
CDEb 75	10-75	20.0	7 / 8 **	15-40	6 x 4	958 x 700 x 250	24
CDEb 200	20-200	40.0	7 / 8 **	15-40	8 x 5	958 x 700 x 250	27



# Bello Zon® CDKd

## Chlorine dioxide system



### Safe and easy continuous treatment.

There is an intrinsically safe pre-dilution station for concentrated hydrochloric acid in this chlorine dioxide system.

The consumption of hydrochloric acid can therefore be automatically adapted on site to the individual operating conditions by means of a patented process. Savings of up to a quarter of the hydrochloric acid volume are possible. The chemicals are mixed perfectly in a reactor made from food-safe PVDF. You thereby benefit from maximum output with the lowest possible consumption of chemicals and maximum operating safety.

- Cost savings through optimised acid consumption
- Various communication options via BUS, web server or DULCOnneX
- System does not stop due to empty starting feed chemical tanks, thanks to precise level indicator displays
- Cost-effective operation thanks to use of inexpensive concentrated starting chemicals
- Automatic monitoring of operating parameters and maintenance intervals
- Maximum operating safety and purity of the ClO<sub>2</sub> produced by PVDF reactors and three-stage safety concept

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				
CDKd 150	15-150	56	8	10-40	1,300 x 1,000 x 250	89
CDKd 400	40-400	140	8	10-40	1,675 x 900 x 460	119
CDKd 900	90-900	300	8	10-40	1,920 x 920 x 520	131
CDKd 2000	200-2,000	700	5	10-40	1,880 x 1,320 x 570	201
CDKd 2800	280-2,800	700	5	15-40	1,880 x 1,320 x 570	201
CDKd 7300	790-7,300	1,750	3	15-40	2,250 x 1,850 x 500	216
CDKd 12000	600-12,000	1,750	2	18-40	2,250 x 1,850 x 500	216

# Bello Zon® CDVd

## Chlorine dioxide system

### The efficient way to meter large volumes.

The special reactor concept generates chlorine dioxide safely and simply. Food-compatible PVC is used instead of the PVC generally used in the industry.

You benefit from maximum output with the lowest possible consumption of chemicals and maximum operating safety.

Communication via popular bus systems, via web server and our DULCOneX platform fulfils all the requirements set by the Industry 4.0 standards of tomorrow.

The system meets all the requirements of the DVGW specifications W 224 and W 624 with regard to construction and operation and is intended for operation with diluted chemicals Bello Zon® chlorite (7.5% NaClO<sub>2</sub>) and acid (9 % HCl).

- Maximum operating safety and purity of the ClO<sub>2</sub> produced by PVDF reactors and three-stage safety concept
- Various communication interfaces via BUS, web server or DULCOneX
- Ultra-simple and safe operation thanks to intuitive menu guidance
- System does not stop due to empty starting feed chemical tanks, thanks to precise level indicator displays
- Automatic monitoring of operating parameters and maintenance intervals



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				
CDVd 45	4.5-45	16	8	10-40	1,300 x 1,000 x 250	55
CDVd 120	12-120	40	8	10-40	1,300 x 1,000 x 250	55
CDVd 240	24-240	80	8	10-40	1,300 x 1,000 x 250	59
CDVd 600	60-600	140	8	15-40	1,525 x 1,160 x 253	84
CDVd 2000	200-2,000	468	5	15-40	2,000 x 1,320 x 290	129

# 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

## Worldwide contacts

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### Ready for you. Any time, anywhere.

ProMinent is at home in more than 100 countries across the globe. This guarantees the worldwide availability of our products and comprehensive expertise on the ground with short distances to our customers. We offer the same high quality standards for our solutions and services all over the world. And we work day in, day out to keep our promise: Ready for you. Any time, anywhere.

You can find the contact details of local branches and agencies at [www.prominent.com/en/locations](http://www.prominent.com/en/locations)

You can find the ProMinent app for iPad and iPhone in the iTunes App Store or at [www.prominent.com/app](http://www.prominent.com/app)



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