

Scotmas Group

Purify • Protect • Perform

Scotmas Bravo MX™

Robust ClO_2 Dosing for High Volume Water Disinfection



www.scotmas.com

www.chlorine-dioxide.com



Why Chlorine Dioxide?



Destroys biofilm completely at source: Biofilm removal is the most important part of an effective water treatment system. Without it, it is simply not possible to have a safe, effective, pathogen free environment.

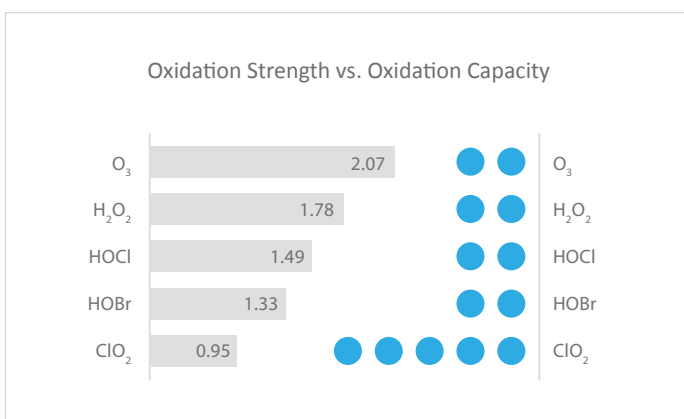
Effective against complex organisms: Chlorine Dioxide has been found to be effective against complex organisms such as cysts and protozoa including Cryptosporidium, Giardia and amoeba.

Lower biocidal concentration: Some biocides require very high concentrations to produce the required disinfection impact. Where Hydrogen Peroxide has been promoted as a biocide for water treatment, dose rates can be up to 30 times the equivalent Chlorine Dioxide dose rate to achieve the same disinfection impact.

Disinfection By-products: High concentrations of certain biocides can cause environmentally persistent, potentially carcinogenic by products to form, including Trihalomethanes, Chlorinated Organics and Bromate. Chlorine Dioxide does not react to form complex organic by-products.

Effective across the PH range: Chlorine dioxide is effective at all pH's below 12. By contrast, Chlorine is almost ineffective above a pH of 8.

Less corrosive: Chlorine Dioxide has a lower oxidation potential than all other widely used biocides, does not hydrolyse to form an acid, and therefore is less corrosive.



Our team of experienced engineers and project managers ensure we provide a system that is exactly suited to your requirements. Bespoke system design, with end to end responsibility for all aspects of process design, HAZID, HAZOP, LOPA, E & I Integration, Construction Supervision and Site Commissioning is a Scotmas specialism. You can be assured that our ClO_2 systems use the latest technology on the market.

Bravo MX™ - Robust ClO₂ Dosing for High Volume Disinfection



The Bravo MX™ is our solution for larger industrial and municipal water supplies, where high volumes of Chlorine Dioxide require to be delivered on a continuous basis. The Bravo MX™ is engineered to have industry WIMES 8.02 specifications and produces Chlorine Dioxide that conforms to BSEN 12671, and thereby Article 10 of the EU Drinking Water Directive 98/83/EC for use in Public Water Supplies. The Bravo MX™ offers a turn-key solution for large industrial and water utility clients seeking to quickly take advantage of the benefits of Chlorine Dioxide using a pre-engineered skid mount solution, with a 20 year service life.

Building on the safety and reliability of our smaller WX range, the Bravo MX™ is designed to the exacting, fail-safe and security requirements of water utilities and heavy industrial clients with PROFIBUS integration, whilst using a flexible, industry standard deployment framework to minimise custom engineering costs and delays. The Bravo MX™ can also be provided as a fully pre-engineered containerised plant room solution for rapid site deployment, and integration with other packaged plant.

The Bravo MX™ is designed to operate using bulk storage tanks of concentrated ClO₂ precursors and provides for built-in control of all bulk chemical transfer pumps, air scrubbers and safety systems associated with the package.

Like other models in the Bravo range, the MX generates ClO₂ efficiently and safely using in-line reactor technology. The Bravo MX™ also offers the ability to dose different levels of ClO₂ independently at up to 10 points throughout the site via an in-line dosing manifold, eliminating the need for intermediate bulk storage of Chlorine Dioxide solutions.

Full duty-standby/rotation capabilities are built into the Bravo MX™ design, allowing for 2 identical models to be easily linked via Ethernet cable to provide for full redundancy capabilities.

BRAVO WX INSTALLATIONS



Iraq Installation: Scotmas containerised generator system installed for river water disinfection for oilfield water injection applications. Chlorine dioxide was deployed on primary river water filtration systems, backwash systems, and on the final injection water.



Botswana Installation: A revolutionary new in line water treatment system for rural water systems in developing countries, operating without grid electricity or solar power.

Bravo MX Models

	MX 3,200	MX 12,000	MX 30,000	MX 80,000	MX 120,000
CAPACITY	3,200,000 l/hr water (77MLD) treated @ 1 mg/l ClO ₂	12,000,000 l/hr water (288MLD) treated @ 1 mg/l ClO ₂	30,000,000 l/hr water (720MLD) treated @ 1 mg/l ClO ₂	80,000,000 l/hr water (1920MLD) treated @ 1 mg/l ClO ₂	120,000,000 l/hr water (2880MLD) treated @ 1 mg/l ClO ₂
	Generates 1,700 - 3,200g ClO ₂ /hr	Generates 3,200 - 12,000g ClO ₂ /hr	Generates 12,000 - 30,000g ClO ₂ /hr	Generates 30,000 - 80,000g ClO ₂ /hr	Generates 80,000 - 120,000g ClO ₂ /hr
USER CONTROL	Inputs: 24 digital and 8 analogue				
	Outputs: 24 digital and 8 analogue				
	MODBUS / PROFIBUS / RS485 VNC remote HMI View / Control over Ethernet				
PRECURSORS	25 - 31% sodium chlorite EN938				
	10 - 32% hydrochloric acid				
DISPLAY	15" (380mm) HMI Inductive TFT Touchscreen with SD card and Ethernet				
CONTROL OPTIONS	Proportional with residual trim				
	Manual / batch dosing				
	PID Control				
DELIVERY OPTIONS	Pumped Bypass				
	Dosing Manifold 3, 6 or 10 injection points				
LOGGING	Onboard data logging via SD card and MODBUS / PROFIBUS Feed				
CONFIGURATION	Rittal Industrial Cabinet				
	GRP Vandal Proof Kiosk				
	Skid Mount, optional DNV lifting frame				
	ISO Containerised Plant Room 10', 20' or 40'				

Applications



Oil & Gas

Chlorine Dioxide's high oxidation capacity and low oxidation strength make it the ideal water biocide for a number of hydrocarbon extraction applications, whether for sulphide scavenging, enhanced oil recovery, batch biociding, or injection water treatment. Chlorine Dioxide has low environmental impact, as it does not form chlorinated by-products and degrades to salt in most environments. Our capabilities include full integration with your chemistry, corrosion engineering and environmental teams regarding compatibility. We can also offer a fully managed engineering solution comprising installation and site E&I controls.



Recirculating Cooling Towers

An effective, eco-friendly solution to biofouling, helping to save millions for the industry through better heat transfer efficiency and reduced maintenance costs.

Scotmas ClO₂ systems combine the disinfecting power of chlorine dioxide with state of the art control and monitoring systems to minimise chemical consumption, environmental impact and corrosion risk. Our systems are installed on systems ranging from small pack cooling towers through to power station seawater intakes, and paper mill water handling applications.



Municipal Water

Chlorine Dioxide water treatment was first applied in European drinking water in 1956, as a pre-oxidant to remove iron and manganese contamination from raw water prior to treatment. Today, Chlorine Dioxide is applied throughout the treatment train - from the pre-treatment of raw and reverse osmosis feedstocks, through to the final disinfection and maintenance of a residual in the distribution network.

Scotmas ClO₂ generation technology has been proven by regulators around the World and selected by some of the largest water utilities to deliver unparalleled levels of safety and efficiency.



Seawater Cooling

Chlorine Dioxide applications for seawater can improve energy efficiency in cooling water systems and reduce the environmental impact from chlorinated by-products, associated with chlorine disinfectants.

As chlorine gas and hypochlorite treatments are increasingly decommissioned, electrochlorination is often promoted as a potential alternative treatment. Power costs, depreciation and maintenance costs of seawater electrochlorination systems are often considerably higher than the equivalent Chlorine Dioxide approach, which offers a more effective biocidal treatment with minimal environmental impact.

European Brewer Seeks High Quality, Consistent, Supported Service



Unreliable water treatment equipment, and poor service and support brought a major European brewer to Scotmas.

Based in an area believed to be one of the first locations in Europe where beer fermentation took place, possibly more than a thousand years ago, what started out as a small craft brewery has grown rapidly into one of the most technologically advanced brewing and bottling facilities in the world.

The new water treatment system was designed primarily for beer bottle washing, but also for other downstream process applications, had to be competitively priced, and also include all necessary monitoring of residuals and disinfection by products. Odour control was an obvious top priority for system design.

Rather than buying a Chlorine Dioxide Generator, the brewery were seeking suppliers who could provide a full package, including equipment, servicing, technical support and chemical supply. This would release a huge amount of staff resource from the testing, problem solving, and supplier contact that were inherent with the previous system.

Our Engineers specified the Bravo MX Chlorine Dioxide Generator, with chlorite monitoring. Scotmas' water jacketed technology gave the Bravo MX a distinct advantage over competitive products, precise measurement of chlorine dioxide and chlorite species using highly reliable amperometric technology gave the customer the certainty they needed in adopting the Bravo MX.

The service package was bespoke designed to fit the system and has been highly effective in minimising the customer input.

Targeting Trihalomethane (THM) Concentrations in Chlorine Dioxide Pilot Trials



A UK based water utility company, supplying drinking water to more than 1 million people and serving approximately 35,000 commercial customers, installed a Bravo MX Chlorine Dioxide Generator for a recent trial. The company covers an area in excess of 1,500km, and 60% of the water used is generated from two surface water sources.

There were two key purposes for the trial: to investigate the impact of Chlorine Dioxide on water quality when used to target the reduction of Trihalomethane (THM) concentrations, and to assess the impact that Chlorine Dioxide has on Clostridia Perfringens.

Previously the water had been treated with Sodium Hypochlorite, created from an Electro Chlorination process,

however THM concentrations were becoming of concern and an alternative solution was sought.

Our Engineers specified the Bravo MX Chlorine Dioxide Generator, with the dosing applied at the pre-clarification stage of the water treatment process. Precisely controlled application of Chlorine Dioxide at this stage of the treatment process destabilises the colloidal particles electrostatic charge, enhancing the coagulation stage of the treatment process. This benefit is in addition to the guaranteed biocidal and virucidal impact of Chlorine Dioxide; a benefit provided without the creation of potentially harmful disinfection by products.

Test results were extremely positive. The initial target was a measurable and consistent reduction in THM concentrations, a target reached quickly after the installation of the Bravo MX Generator. In addition, Clostridia Perfringens levels were more effectively controlled, and measurable improvements were identified in coagulation performance. Improvements in coagulation performance had 'knock on' benefits for the subsequent stages in the treatment process.

Project Management

Successful implementation of a Chlorine Dioxide system in complex municipal and industrial processes depends on specialist expertise being available at an early stage of the project. Scotmas have successfully worked with consultants, EPC's and water treatment specialists to design and implement Chlorine Dioxide treatment regimes for some of the world's largest industrial processes.

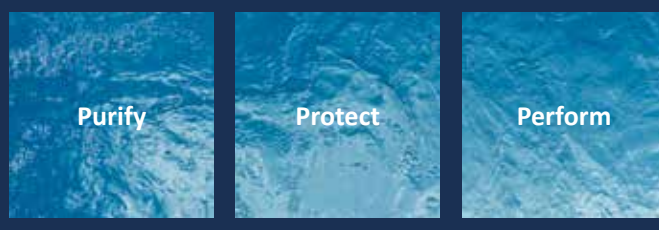
Our practical approach, combined with our extensive global experience means we are well placed to provide early stage support to FEED studies, and back-up scientific support where jar testing and side stream trials are required.

Upon project commencement, our commitment to quality and safety is embodied by our longstanding accreditation to the OHS18001, ISO14001 and ISO9000 safety, environmental and quality standards.

Diagnostic analysis can be supplied by our support technicians to ensure that you select the most appropriate ClO₂ dosage and monitoring strategy. Both planned and reactive maintenance can be catered for by a wide range of service options, provided on a "full service" or "parts only" basis.



Our experienced team of engineers and support technicians are accredited to the Global OHS18001 Health & Safety Standard, and have experience working in demanding environments such as offshore oil installations, power stations and healthcare environments. As such, you can expect the highest standards of professionalism and service from our personnel in order to complete your ClO₂ installation quickly, efficiently and above all, safely. Our specialist engineers are experienced in HAZID, HAZOP and LOPA/SIL analyses, and are well placed to provide supporting reference information from previous projects to support your design outcomes.



Scotmas Group are world leading manufacturers of Chlorine Dioxide products and dosing systems. Scotmas were the first Company to produce simple, easy to use Chlorine Dioxide products and equipment. With over 30 years' experience, our friendly and approachable team of chemists, microbiologists, engineers and project managers are able to provide "off the shelf" products or a complete turnkey service.

Choose Scotmas for expertise in Chlorine Dioxide solutions.

Scotmas Group

Purify • Protect • Perform

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Use biocides safely. Always read the label and product information before use.