



IIoT Ready

Industry 4.0 Ready

Water 4.0 Ready



GENOX SMART DIGITAL CHLORINE DIOXIDE GENERATORS

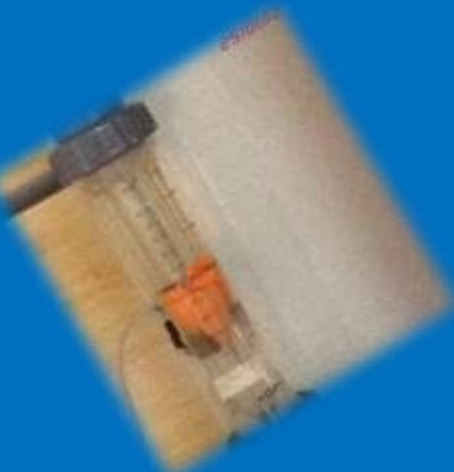


“GENOX”- Smart Digital Chlorine Dioxide Generators

Safe, Reliable Easy to install, configure, operate and monitor!

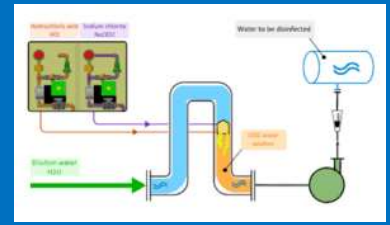


FLOW 78.98M3/hr
RATE 0.1ppm 
GENERATION 
0 7.90Gms/hr 0



1 METHOD – 3 DIFFERENT REACTORS

- EXTERNAL REACTORS
- UNDER WATER REACTOR
- SUBMERGED REACTOR



What is Chlorine Dioxide?

It is a yellowish green gas with high solubility in water and is a very powerful oxidizing chemical. It is highly unstable and hence cannot be stored or transported in bulk. Above certain concentration in air it is explosive and hence needs to be generated at site with due precautions.

There are many methods to produce ClO₂. Most other ClO₂ systems mix chlorine gas and sodium Chlorite or they use acid mixed with Sodium Hypochlorite to release chlorine gas and sodium chlorite. The advantages of Acid- Chlorite system (Ionic offer) compared to other processes are:

1. The amount of free chlorine found in ClO₂ solution is non-existence in the acid systems. This is an important factor in three ways. A) the absence of free chlorine prevents the formation of the chlorate ion – an objectionable disinfection byproduct. B) the absence of free chlorine means that THMs will not be formed in the treated water: and C) no free chlorine means that none of the usual chlorine residual species will be formed in the chlorine dioxide solutions. This eliminates the necessity of identifying these species as part of the chlorine residual analysis- a great time saver. This over comes one of the major difficulties in the use of Chlorine Di oxide.
2. Purity is defined as the ratio of Chlorine Dioxide to the total of all oxidative chlorine compounds produced. Because our process has virtually no excess chlorine or sodium chlorite it generates chlorine Dioxide of much higher purity than either Chlorine/ Chlorite or acid/hypochlorite/Chlorite processes.
3. Chlorine /Chlorite process is less precise which utilizes venturis to pull the components in to water stream. The output must be tested and adjusted to balance yield vs. purity. Balanced yield and purity are operated at a constant flow rate, and usually discharge in to a level-controlled batch tank for later metering in to water, *allowing off-gassing (reducing claimed yield), and conversion to byproduct species such as Chlorite and Chlorates*
4. Chlorine Di Oxide is an extremely effective disinfectant and bactericide equal to superior to Cl₂ on mass dosage basis. It's efficacy has been well documented in the lab, in pilot plant studies and in full-scale studies using potable water and waste water.

5. Chlorine Di Oxide (ClO₂) is effective as both a disinfectant and an oxidant in water treatment. It has several distinct chemical advantages over other disinfectants and oxidants. ClO₂ is highly effective in controlling water borne pathogens while minimizing halogenated disinfectant byproducts. This is a broad-spectrum micro-biocide as effective as Cl₂ against viruses, bacteria and Cryptosporidium. This is also effective control strategy for taste, odour, colour, iron and manganese removal.
6. Chlorine dioxide can kill bacteria, fungi, viruses and spores in contact times ranging from a few seconds to a few minutes. A gas in its natural state, it's 10-20 times more effective than bleach (sodium hypochlorite), highly soluble in water, compatible and effective over a wide pH range. Its use has traditionally been limited to large-volume applications, such as pulp and paper facilities and water treatment plants, which employ costly and elaborate chemical or electronic generating systems. With our unique micro-reactor technology, chlorine dioxide solutions are now available for diverse applications across a wide range of professional, industrial and consumer markets.

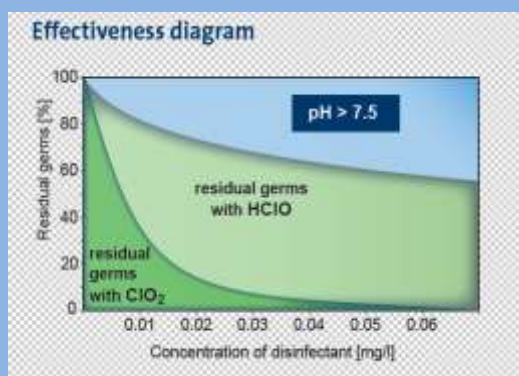
Applications: Chlorine Dioxide is now recognized one of the safest, most effective ideal biocides and sterilizing agent available today. As a result, it is widely used in both large and small scale industrial applications where a potent but environment friendly biocide is required. Many of its uses and applications are US EPA, WHO, FDA, UK and EU government approved: and highly recommended by many researchers and research establishments throughout the world.

- Cooling towers for algae and biofilm control
- Algae control
- Food and Beverage processing
- Drinking water treatment
- Sea water disinfection for SWRO desalination
- Colour removal
- Waste water disinfection
- Waste water advanced oxidation
- Odour control
- Cotton bleaching
- Vegetable washing
- Brewing
- Reverse Osmosis sanitization
- Process water treatment
- Zebra mussel control
- Hydrogen Sulphide destruction
- Phenol destruction
- Cyanide destruction in waste water
- Iron & Manganese Oxidation in water

Salient Features of Chlorine Di Oxide:

There are numerous advantages of chlorine dioxide over disinfectants, notably chlorine, including:

- Chlorine dioxide (ClO₂) has a higher disinfection potential than chlorine and is 2.5 times more powerful than chlorine.
- **No pH dependence**– Chlorine dioxide is an effective disinfectant, even at high pH levels where chlorine loses much of its disinfection potential.
- **No THM formation**– Unlike chlorine, chlorine dioxide does not combine with humic or fulvic acids in surface (river) water to form trihalomethanes, suspected carcinogens.
- **No combination with ammonia**– Chlorine dioxide does not combine with ammonia in water, like chlorine, requiring smaller doses to achieve disinfection.
- **No chlorophenol formation**- Chlorine combines with phenols to form chlorophenols, causing taste and odor problems. Chlorine dioxide destroys phenols, eliminating many taste and odor problems.
- **Oxidization of iron and manganese**- Chlorine dioxide rapidly oxidizes soluble iron and manganese to an insoluble state for flocculation and filtration. Chlorine alone takes days to oxidize manganese, and cannot oxidize chelated iron.
- **Oxidizes sulfides without high pH**-Sulfide oxidation using chlorine requires high pH to prevent formation of colloidal sulfur, which can plug up equipment. Chlorine dioxide may be used over a broad pH range (5-9) without colloidal sulfur formation.
- **No loss due to storage** – Chlorine concentration in a tank of 12.5% sodium hypochlorite solution is subject to varying decay rates based on ambient conditions. Sodium chlorite and hydrochloric acid may be stored for more than a year without significant decay.



Method of Generation of proposed system: -

The system is designed to produce ClO₂ based on acid-chlorite process. This process activates sodium chlorite with hydrochloric acid to generate chlorine Dioxide using the reaction.



The generators are available in 2 versions. Smaller capacity models use dilute 9% HCl and 7.5 % NaClO₂ and the larger models use concentrated chemical of 32% HCl & 25 % NaClO₂. Dilution Water is added to keep the concentration in the reactor low. The Chlorine DiOxide solution will have 2% concentration.

Operating principle: -

The generation method will be either flow proportional to mains water flow or flow proportional PID combined measured value. The required dosage level is preset in the advanced control system and the generation of ClO₂ will be controlled by insertion inline magnetic flow transmitter that will be installed in the mains flow.

A bypass pump connected to the mains pipe line will take the dilution water to the Chlorine Dioxide generator. This will be continuously monitored by a flow switch mounted on the bypass Rota meter that is part of the generator. In the absence of mains flow or bypass water flow the generator will automatically stop generation of ClO₂. When the mains flow resumes the generator will start automatically.

Ionic's unique GENOX-SUW underwater submerged chlorine dioxide generators in which Chlorine Dioxide is safely generated making the whole process 100% safe. It means the formation of chlorine dioxide takes place only in the water and it is not present in any other part of the plant. We can say it is 100% safe generator because there is no possibility for Chlorine Dioxide to be released to the atmosphere.

In normal chlorine dioxide generators you will find in the market the chlorine dioxide is a reaction chamber having a bigger volume and hence safety concerns of leakage and explosion is a great concern. The reactor is not submerged and hence the leakage of concentrated chlorine dioxide solution is a strong possibility and hence associated explosion hazard.

In the underwater U Tube reactor and submerged reactors the generation of ClO₂ will happen safely inside water.

Audio – Visual alarms are provided with clear English text display.

Features and key benefits of the system

The system offered uses repeatable highly accurate Smart Intelligent Digital Diaphragm type Metering pumps with integrated flow monitor to deliver the components through a reactor vessel. This is a very unique feature of our ClO₂ generator.

We offer one process and 3 different reactor configurations. Standard reactors inside a safety cabinet for small capacities up to 500 gms/h and under water and submerged reactors for medium and large capacities as they are inherently safe and no chance of ClO₂ gas or liquid leaking to the atmosphere.

In addition to this, the smart digital generators provide the following benefits

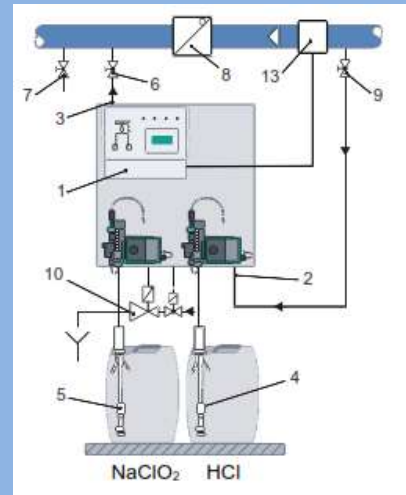
- Flow control with selective fault diagnosis prevents process break downs – like Over pressure, Discharge line burst, air bubbles in the dosing head, cavitation at the suction side, suction valve leakage, discharge valve leakage
- Internal Pressure monitoring to adjust the dosing rate with respect to change in the back pressure
- Auto flow adapt to ensure only required quantity of chemical is dosed
- Dosing quantity counter to check the chemical consumption
- Dosing Flow measurement
- Smooth continuous dosing
- Automatic degassing of liquids like Sodium Hypochlorite/ acids etc.
- Calibration facility
- Self-explanatory user-interface, comparable to car-radio system
- Plain-text display for failure indication: no need for time –consuming fault analysis.

Process / Equipment/Operator Safety:

The most important thing for equipment that too for equipment handling highly dangerous chemicals like Cl₂, ClO₂, Ozone etc. is the safety. Our system comes with the following safety features which are a must to prevent accidents.

1. Remote start/stop
2. Emergency stop
3. Flow monitors for all dosed components (HCl/NaClO₂/H₂O)
4. Bypass Pump failure signal
5. Chemical/water low level switch
6. Bypass dilution water monitor
7. Drip tray level switches
8. Mains no flow interlock
9. Input for ClO₂ gas warning device
10. Input for ClO₂ residual levels
11. Audio Visual Alarm
12. Password protection of system settings
13. Auto preventive maintenance alert

Typical general arrangement



Legend

1 Process controller 2 Connection for bypass water input 3 Connection for the ClO₂ solution line output to the injection unit 4 Suction line for the HCl dosing pump 5 Suction line for the NaClO₂ dosing pump 6 Shut-off valve (supplied by customer) 7 Sample extraction (by customer) 8 Check valve (by customer) for operation with an internal bypass pump 9 Shut-off valve for bypass water extraction(supplied by customer) 10 Exhaust system for supporting rack (option)(not for front installation systems) 11 Dilution tank with level monitoring (option) for batch operation 12 Pressure loading valves (by customer) for system backpressure < 1 bar 13 Inductive flowmeter 4-20 mA or contact water meter for proportional control of the system

Optional:

1. Mains flow indicator, transmitter
2. Mains inlet valve
3. Tank high level switch
4. ClO₂ test kit
5. ClO₂ gas warning device
6. ClO₂ online residual analyser
7. Online Residual Chlorite analyser
8. IIoT enabled Remote monitoring
9. Bulk chemical storage and handling system

Note: Contact us for application guideline and questionnaire related to your application.

GENOX- SR- GENERATOR USING PREDILUTED CHEMICALS

MODEL	CAPACITY	MAX.OP.PRESSURE	POWER REQ.T.
GENOX-2DC-100	100 gms/h	16 bar	3Ø 415 V AC
GENOX-2DC-200	200 gms/h	16 bar	
GENOX-2DC-300	300 gms/h	16 bar	
GENOX-2DC-400	400 gms/h	10 bar	
GENOX-2DC-500	480 gms/h	10 bar	

GENEOX-SR - GENERATORS WITH REAL TIME REMOTE MONITORING FEATURES

GENOX-2DC-RM-100	100 gms/h	16 bar	3Ø 415 V AC
GENOX-2DC-RM-200	200 gms/h	16 bar	
GENOX-2DC-RM-300	300 gms/h	16 bar	
GENOX-2DC-RM-400	400 gms/h	10 bar	
GENOX-2DC-RM-500	480 gms/h	10 bar	

GENOX-UW/SW UNDER WATER /SUBMERGED GENERATOR USING CONCENTRATED CHEMICALS

GENOX-2CC-UW-0.5	0.5 Kgs /h	16 bar	3Ø 415 V AC
GENOX-2CC-UW-1.0	1.0 Kgs /h	10 bar	
GENOX-2CC-UW-2.0	2.0 Kgs /h	7 bar	
GENOX-2CC-UW-5.0	5.0 Kgs /h	4 bar	
GENOX-2CC-UW-10.0	10.0 Kgs /h	4 bar	
GENOX-2CC-UW-20.0	20.0 Kgs /h	4 bar	

GENOX -UW/SW GENERATORS WITH REMOTE MONITORING FEATURES

GENOX-2CC-UW-RM-0.5	0.5 Kgs /h	16 bar	3Ø 415 V AC
GENOX-2CC-UW-RM-1.0	1.0 Kgs /h	10 bar	
GENOX-2CC-UW-RM-2.0	2.0 Kgs /h	7 bar	
GENOX-2CC-UW-RM-5.0	5.0 Kgs /h	4 bar	
GENOX-2CC-UW-RM-10.0	10.0 Kgs /h	4 bar	
GENOX-2CC-UW-RM-20.0	20.0 Kgs /h	4 bar	

Note: Pl. contact us for

- For other operating voltages and frequencies
- For specific power consumption and connected load
- For specific chemical consumptions and operating cost

Contact:



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