

Wallace & Tiernan® Process Systems

DIOX-A 5000 Chlorine dioxide generator

The Wallace & Tiernan® DIOX-A 5000 chlorine dioxide generator was developed for the preparation of chlorine dioxide 2500 to 5000 g/h. It produces an aqueous solution of chlorine dioxide of a constant strength. As basic chemicals for the generation of chlorine dioxide this unit uses commercial grade hydrochloric acid (30 – 38 % HCl) and Nadolyt C25 (sodium chlorite, 24,5 % NaClO₂).

Applications

- **Potable water**
Primary and Secondary Disinfection; Assists in Cryptosporidium and Giardia control; Reduced formation of AOX, protection of long distribution mains; THM and THAA (or HAA5) reduction; Aids in Manganese and Iron removal; Particle Count reduction; Biofilm control
- **Beverage industry and breweries**
- **Cooling water**
Fighting of algae and slime forming micro-organisms; Zebra mussel control
- **Wastewater**
Disinfection and reduction of odour causing substances

General

Chlorine dioxide is a powerful disinfectant and oxidising agent, excellent at destroying odours. It has been found to be superior to chlorine as a disinfectant. This chemical can achieve destruction of organic substances such as bacteria, spores and viruses which are not attacked by chlorine. When applied at the same dose, chlorine dioxide is more effective than chlorine. One of the exceptional properties of chlorine dioxide is that its use does not result in the formation of undesirable trihalo-methanes. In water treatment, odour compounds found in water such as phenols, algae and their decomposition products.

The biocidal effectiveness of chlorine dioxide is much less pH dependent than chlorine. Chlorine dioxide does not react with ammonia or ammonia

Benefits:

- Preparation of large quantities of chlorine dioxide
- Proven transfer system for bulk tanks to level controlled intermediate tanks
- Facility to meter solution by speed controlled centrifugal pumps or metering pumps
- No air pad in the reaction tank (no danger of explosion)
- Skid-mounted unit
- Operating and alarm conditions indicated by LEDs on a mimic diagram



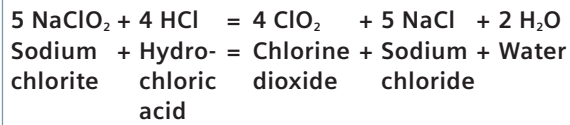
Product Sheet

Water Technologies

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compounds. This is an important difference when compared with chlorine which forms chloramines, which in turn may have a negative influence on disinfection and the taste of treated water. Chlorine dioxide is capable of maintaining an active residual for a longer time than chlorine. This advantage of stability often dictates its use to protect remote sections of distribution systems or reservoirs and to prevent bacterial regrowth. Prior to their reaction, sodium chlorite and hydrochloric acid are automatically diluted. This method overcomes the problem of dilution on site and the hazards inherent in such an operation.

The chemical equation of this reaction is:



By the reaction of hydrochloric acid, sodium chlorite generates chlorine dioxide and sodium chloride (common salt).

Technical data

Minimum operating water pressure: 7 bar g

Power supply: 1/N/PE AC 230 V, 50 Hz

Power Consumption: approx. 200 VA

Fuse: max. 16 A

Theory of operation

The basic chemicals hydrochloric acid and Nadolyt C25 are prediluted in an aspirator-type injector and discharged into a reaction tower. Vacuum control valves are installed at the suction inlets of the aspirator-type injector. This design ensures that the two basic chemicals cannot be mixed unless a minimum quantity of injector operating water is available. This arrangement also prevents the aspiration of only one of the basic chemicals since the absence of the second chemical would result in a failure of the operating vacuum and an automatic shutdown of the unit, as well as the release of an alarm. In the reaction tower a chlorine dioxide solution of approximately 15 g/l ClO₂ is generated. After the reagents have fully reacted the chlorine dioxide solution is immediately diluted with water to 2 g/l ClO₂. The feed rates of the basic chemicals and of the dilution water are regulated by ball control valves and are indicated on their respective flowmeters.

The generator operates on a batch cycle which is controlled by level probes installed in the chlorine dioxide solution storage tank. Chlorine dioxide vapours resulting from the partial degassing of the solution during the generating process are aspirated by a water operated vent injector. Adjustable alarm switches installed on the flowmeters for Nadolyt, hydrochloric acid, injector operating water and dilution water monitor the preset flow rates. Hydraulic and electrical interlocks prevent any malfunction of the fully automatic generator. The operating and alarm conditions are displayed on a mimic diagram.

Maximum capacities*	2500 g/h ClO ₂	5000 g/h ClO ₂
Reaction tower	30 l	70 l
Chlorine dioxide storage tank	100 l	200 l
Flowmeters for Injector operating water	50 – 500 l/h	
Dilution water	200 – 2000 l/h	300 – 3000 l/h
Sodium chlorite solution	3 – 27 l/h	4 – 42 l/h
Hydrochloric acid	3 – 27 l/h	4 – 42 l/h
Dimensions (W x H x D)	1500 x 1900 x 530 mm	2000 x 1900 x 530 mm
Weight	150 kg	340 kg

* For higher capacities consult

Installation and maintenance

The chlorine dioxide generator is delivered preassembled and prewired. All that remains on site is to connect up operating water and the tanks for the basic chemicals, to provide electricity supply and to install the dosing pumps or other metering equipment.

In accordance with the safety regulations the plant must be checked by an approved expert prior to being commissioned and thereafter in regular intervals. Siemens Water Technologies can provide complete installation service including commissioning and regular maintenance of the installation.

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