Wallace & Tiernan® Generators Millennium III™ CUBE Batch Chlorine Dioxide Generator

The Millennium III™ CUBE Batch Generator is a flexible, mobile chlorine dioxide system with a small installed foot print specifically designed for small scale and pilot chlorine dioxide demonstrations.

The generator produces chlorine dioxide under vacuum conditions to generate chlorine dioxide safely and efficiently. Either molecular chlorine gas is reacted directly with a 25% aqueous sodium chlorite solution or it is generated in situ as part of the generation process by the reaction of a 12.5% solution of sodium hypochlorite with a 15% solution of hydrochloric acid. In the second stage the chlorine gas produced in situ is reacted with a 25% sodium chlorite solution to produce chlorine dioxide.

The Millennium III™ CUBE Batch generators are available in a range of capacities from a few pounds per day to 150 pounds per day all utilizing a standard modular design.

Key Benefits:

- Direct flow path of motive water and chemical precursors provide for minimal pressure losses and improved flexibility.
- New injector design improves overall performance.
- Rotameters and check valves are designed specifically for their intended uses.
- Materials of construction are compatible with chlorine dioxide and chemical precursors.
- Same compact footprint for larger capacity units.
- The safe generation of chlorine dioxide continues to be a primary design consideration. Generation under vacuum is used to minimize and control the reactions and concentrations. The design ensures safe shut down of the generator during component failure or loss of motive water that drives the injector.
- Efficiency and yield is maximized by reaction of chemical reactants in their concentrated form. These reaction conditions favor the immediate formation of chlorine dioxide, thereby minimizing byproduct formation found in other types of generators.

Product Sheet

Water Technologies

SIEMENS

Equipment Description

Generator:

- The same basic generator is used for all models, from simple manual units to the most complex automatic model
- Simple design reduces operational difficulties. The process does not require pH control or excess chlorine addition. The result is lower operating costs, less maintenance, simplified operator control and precise calibration of the feed system. The pH of the chlorine dioxide exiting the generator is typically between 4-7.
- Reaction Column: The reaction column disperses the chemical reactants allowing for intimate contact and immediate reaction. The reaction column is designed to maximize generator yield of chlorine dioxide.
- Flowmeters: A metering tube design calibrated for each chemical reactant is available in units reading in 0-150 mm. All generators are supplied with custom feed rate charts correlating pounds per day of chlorine dioxide with flow meter settings.
- Injector Requirements: Water passing through the injector generates the vacuum required to pull the feed chemicals into the reaction column of the chlorine dioxide generator assembly. A multi-stage centrifugal booster pump boosts the incoming water pressure to ensure consistent generation of chlorine dioxide. A safety flow switch protects the pump in the event of water and power loss. Water temperature requirements are < 100°F/ 37°C. If high temperature water is used (> 100°F/ 37°C), injector performance will be impaired due to decreased solubility of the chlorine dioxide gas.
- Batch Tank: The batch tank is constructed of HDPE. The batch tank is fitted with a four-way level control system set for optimum conditions. A safety float in the tank prevents overflow.
- Distribution: The generator is fitted with a peristaltic, diaphragm, or centrifugal pump that allows maximum versatility in injection rates.
- Power Requirements: Each system is supplied with a 110 VAC single phase electrical control box incorporating an ON/OFF controls for both power and pump controls.

Assembly:

- All components are securely mounted on a specially designed stainless steel skid with a small footprint allowing placement in space constricted areas.
- Casters allow easy movement of the unit to other locations. Retractable feet are lowered when the unit is in service.

Typical Specifications

Chlorine dioxide feed equipment shall be manufactured by Siemens.

C-CUBE

Shall be comprised of a chlorine dioxide generation process utilizing 25% sodium chlorite solution and chlorine gas based on the following stoichiometric reaction:

$$2NaClO_2 + Cl_2 \rightarrow 2ClO_2 + 2NaCl$$

T-CUBE

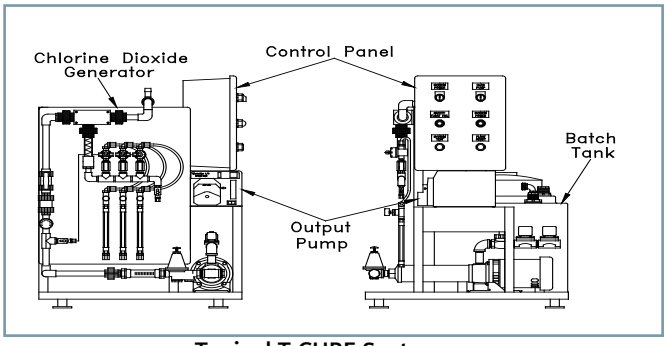
Shall be comprised of a process for chlorine dioxide generation utilizing 25% sodium chlorite solution, 12.5% sodium hypochlorite solution and 15% hydrochloric acid solution from a two stage reaction. The first stage combines the sodium hypochlorite solution with the hydrochloric acid solution under vacuum according to the reaction:

$$NaOCl + 2HCl \rightarrow Cl_2 + NaCl + H_2O$$

And the subsequent reaction between the sodium chlorite solution and chlorine gas under vacuum according to the reaction:

$$2NaClO_2 + Cl_2 \rightarrow 2ClO_2 + 2NaCl$$

The reaction of sodium chlorite solution and chlorine gas shall take place under vacuum without the use of a separate mineral acid feed or the excess chlorine method (adding chlorine in excess of the stoichiometric chlorine requirements in order to lower the process pH). Excess chlorine shall be considered as any amount greater than 5% of the chlorine feed that remains in the generator product as unreacted chlorine.



Typical T-CUBE System

Siemens
Water Technologies

USA
+1 856 507 9000
wtus.water@siemens.com

Literature No.: WT.085.270.013.UA.PS.0609