

# Wallace & Tiernan® Generators Millennium III™ 2 Chemical C-Auto Series Chlorine Dioxide Generator

The Millennium III™ Series automatic generators are the next generation in chlorine dioxide technology combining high performance with durability, simplicity of use and easy maintenance.

The Millennium III™ C-Auto Series generators combine a 25% sodium chlorite solution with chlorine gas under vacuum conditions to generate chlorine dioxide safely and efficiently. As a free-standing auto configuration with touch screen controls, the option of an integral chlorine dioxide production analyzer and SCADA interface capability is available.

The Millennium III™ C-Auto Series generators are available in a range of capacities all utilizing a standard modular design and a smaller installed footprint than other currently available automatic generators. Options available include a multi-port ClO<sub>2</sub> batch injection skid, SFC / MFC series controller with Depolox® 5 flow cell and Micro/2000® real time ion specific chlorine dioxide residual analyzer, ORP and pH monitors, and GMS + chlorine dioxide in-air monitors.



Standard configuration shown

#### Key Benefits:

- Direct flow path of motive water and chemical precursors provide for minimal pressure losses and improved flexibility.
- Injector design improves overall performance.
- Rotameters and check valves are maintenance free and 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.
- Efficiency and yield is maximized by reaction of chemical precursors 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

## Automatic Control Benefits

- State-of-the-art control valves specifically designed for low flow control of sodium chlorite and chlorine gas.
- Flow controls include PID loop for sodium chlorite.
- Touch screen interface allows for maximum performance, ease in set up, parameter changes and troubleshooting.
- Real time generator effluent analysis using an in-line (full flow) chlorine dioxide analyzer allows self-tuning and performance display.

## 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.
- Standard features for raw material flow measurement and control include:
  - Wallace & Tiernan® S10K rotameters with Wallace & Tiernan® LVN-2000 auto-metering control valves.
  - Siemens Magmeter on chlorite flow and water flow.

### Automatic Controls:

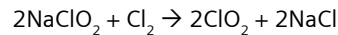
- One state-of-the-art process controller performs all functions including generator self-tuning.
- Flow pace application (including dosage control), alarm monitoring and more.
- Parameters (for generator sizing, flow meter set-up, etc.) are accessible from easy to access and understand touch screen displays.
- Significant program changes can be made utilizing removable memory modules that allow for quick changes and updates.
- Industrial control valves and flow meters are utilized throughout to insure continuous trouble-free operation.
- Standard features on control components are industry accepted, compatible and include either:
  - Allen-Bradley® Micrologix 1500 with 10" Color Automation Direct Cmore touch screen.
  - Siemens SIMATIC modular controller with 10" Color Siemens SIMATIC touch screen panel.
- Option available for Modicon® Momentum control panel system or Modicon® Quantum PLC control panel system to be configured as part of design.

### Assembly:

- All components are securely mounted on a specially designed stainless steel skid with a smaller footprint that will allow placement in areas previously not considered.
- The skid construction is heavy duty, allowing location in operating areas that are subject to severe service conditions.
- Each valve and flow meter is secured to the frame to minimize vibration and flow related stresses. Piping runs are designed to insure a simple and safe flow path.
- Components requiring maintenance are easily accessible.

## Typical Specifications

Chlorine dioxide feed equipment shall be manufactured by Siemens and shall be comprised of a process or chlorine dioxide generation utilizing 25% sodium chlorite solution and chlorine gas. The feed system shall be arranged with equipment to suit plant requirements. The generator shall maintain a minimum yield efficiency of 95% chlorine dioxide from the reaction of sodium chlorite solution and chlorine gas. The yield efficiency shall be based on the stoichiometric reaction as follows:



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 10% of the stoichiometric chlorine requirement that remains in the generator product stream as unreacted chlorine. Yield shall be defined as the ratio of chlorine dioxide generated to the theoretical stoichiometric maximum. The theoretical maximum shall be determined from the feed rates of the chemical reactants. They shall be confirmed by an Amperometric analysis capable of differentiating between chlorine, chlorine dioxide, chlorite and chlorate ions. Analysis shall be confirmed by the procedure as described in Standard Methods for the Examination of Water and Wastewater, APHA-AWWAWEF, 20th edition 1998, Amperometric Method II, 4500-CIO2E.



Shown with upgraded custom stainless steel panel

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