

Chlorine Dioxide

EFFECTIVE AND AFFORDABLE DISINFECTANT FOR POTABLE WATER COMPLIANCE

When it comes to potable water treatment, International Dioxide (IDI) offers an effective, reliable solution - chlorine dioxide - a powerful disinfectant that balances purification performance and cost. Its CT values are second only to ozone in biocidal efficacy, but without the high capital expenditures and the ozonation by-products



Versatile Disinfectant

Chlorine dioxide (ClO_2) is a broad-spectrum disinfectant that inactivates spores, viruses, fungi and algae over a wide temperature and pH range. This versatile disinfectant can be used as a primary disinfectant in potable water as it has superior disinfection capabilities versus chlorine and through its selective chemistry reacts quickly to oxidize the organic load in surface water.

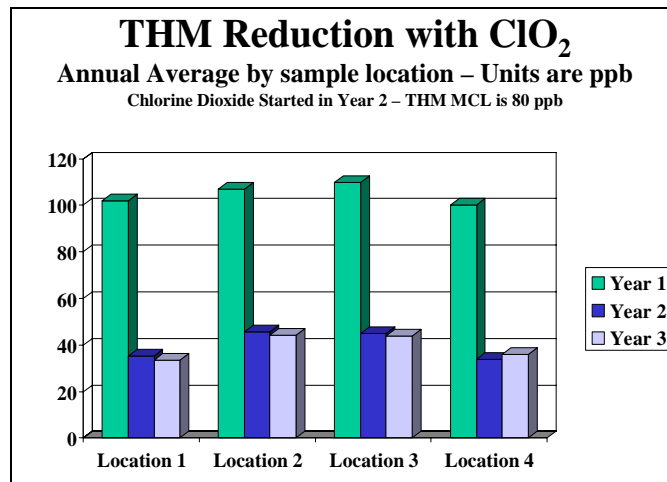
Unlike chlorine, ClO_2 does not react with the contaminants to form trihalomethanes (THMs) or haloacetic acids (HAAs) in any appreciable amount nor does its use form any bromate, which is a concern when using ozone. ClO_2 also oxidizes iron, manganese, algae and bacteria that produce poor quality water in the form of bad taste, odor and color. ClO_2 is excellent at destroying odor-causing biofilms that attach to piping and basins.

Why Use Chlorine Dioxide?

ClO_2 is one of four approved disinfectants for use in drinking water by the U.S. EPA Office of Ground Water and Drinking Water. New regulations in the form of the Stage 1 and the Stage 2 Disinfectant and Disinfection Byproduct (DBP) Rules have put new demands on drinking water facilities to change and improve their treatment processes to address the concerns around microbial risks in potable water while reducing the associated disinfection and its respective byproducts that are used to decrease microbial risks. ClO_2 makes it efficient and feasible for drinking water facilities to comply with the new regulations. ClO_2 is a versatile oxidant /disinfectant with CT values second only to ozone in biocidal efficacy, but without the high capital expenditures and associated byproducts.

The byproduct of chlorine dioxide is chlorite ion, which is a reduction byproduct and is regulated under the Stage One and the Stage Two DBP Rule at 1.0 mg/L maximum contaminant level (MCL). At typical usage rates, ClO_2 can be used to successfully help ensure compliance for pathogen inactivation.

- Low Capital
- Easily implemented and fed to system
- Cost effective alternative
- Broad spectrum antimicrobial activity
- Effective over a wide pH range
- 2.6 times the oxidizing capacity of chlorine
- Does not chlorinate or form halogenated DBPs
- Selective chemistry; no reaction with ammonia
- Not temperature sensitive
- Bacteria, protozoa & virus inactivation



Typical Uses:

- THM & HAA Control
- Iron & Manganese Control
- CT Compliance
- Taste & Odor Control
- Cryptosporidium Control
- Nitrification Control
- Color & Algae Control
- Zebra Mussel Control



The miracles of science™

Chlorine Dioxide

EFFECTIVE AND AFFORDABLE DISINFECTANT FOR POTABLE WATER COMPLIANCE

Generation Methods

Chlorine dioxide cannot be shipped in a drum and must be generated on-site. OXYCHLOR® generators use ADOX® sodium chlorite provided by International Dioxide, Inc. (IDI) as the precursor solution to ClO₂. OXYCHLOR® generators react ADOX® sodium chlorite along with chlorine gas to produce ClO₂ on-site. Alternatively, bleach and acid are used with ADOX® to generate ClO₂ when chlorine gas is not available. The OXYCHLOR® generator systems are modular in design and easily customized to fit a variety of application sizes that adhere to industry safety standards.

Low Capital / Easily Implemented

An IDI Oxychlor® on-site generator produces ClO₂ solution safely under vacuum and delivers the solution to the point of application. Chlorine dioxide is fed similarly to existing chlorine disinfection treatment systems often using the existing feed piping. There are numerous types of affordable generators available from IDI that can normally be installed in 1 - 2 days to meet your treatment needs. Typical OXYCHLOR® systems cost \$ 25,000 and can normally be installed in 1 - 2 days. Typical chemical operating costs will be in the \$.03 - .08 per 1,000 gal of treated water.

Engineering Considerations / Economics

IDI provides the required technological and analytical capabilities needed to assess and design specific treatment needs as well as the total ongoing customer assistance necessary to support a new application. The high efficiency, cost-effective control systems are easy to maintain. Working with IDI, brings a large resource capabilities that include:

- ClO₂ Demand Studies
- ClO₂ Site Audits
- ClO₂ Pilot & Full-Scale Trials
- Assistance with ClO₂ Designs & Specs
- ClO₂ Analytical training and Support
- ClO₂ Preventative Maintenance Programs
- ClO₂ Equipment Upgrades
- Sodium chlorite Supply (EPA,ANSI/NSF 60 registered)

Approvals

The use of chlorine dioxide is approved by U.S. EPA's Office of Ground Water and Drinking Water. The ADOX® sodium chlorite precursor solutions carry U.S. EPA registrations and are ANSI/NSF Standard 60 Drinking Water Additive certified.

Information Available

International Dioxide, Inc., a DuPont Company, is a world-leading provider of chlorine dioxide products and related technology for disinfecting, sanitizing and odor control applications. IDI has specialized in chlorine dioxide technologies for over 60 years and is a leading supplier of chlorine dioxide technologies for a wide variety of markets. For additional information about IDI's OXYCHLOR® chlorine dioxide generator systems and ADOX® sodium chlorite precursor solutions, please contact IDI's sales office.

Disinfectants	Residual Maintenance	Information on By-products	Color Removal	Removal of Common Odors
Chlorine	Good	Adequate	Good	Good
Chloramines	Good	Limited	Unacceptable	Poor
Chlorine dioxide	Good	Adequate	Good	Good
Ozone	Unacceptable	Limited	Excellent	Excellent
Ultraviolet	Unacceptable	Nil	N/A	N/A

Sales Office:
International Dioxide, Inc.
A DuPont Company
40 Whitecap Drive
North Kingstown, RI 02852
Phone: 401.295.8800
Toll Free: 800.477.6071
Fax: 401.295.7108
Website: www.idiclo2.com

INTERNATIONAL DIOXIDE ("IDI") MAKES NO WARRANTY, EITHER EXPRESS OR IMPLIED WITH RESPECT TO THESE PRODUCTS, AND SPECIFICALLY DISCLAIMS ALL OTHER WARRANTIES, INCLUDING, WITHOUT LIMITATION, WARRANTIES FOR MERCHANTABILITY, NON-INFRINGEMENT AND FITNESS FOR ANY PARTICULAR PURPOSE. IDI'S SOLE OBLIGATION AND LIABILITY FOR PRODUCT DEFECTS SHALL BE, AT IDI'S OPTION, TO REPLACE SUCH DEFECTIVE PRODUCT OR REFUND TO BUYER THE AMOUNT PAID BY BUYER THEREFOR. IN NO EVENT SHALL IDI'S LIABILITY EXCEED THE BUYER'S PURCHASE PRICE.

In no event shall IDI be liable to the buyer or to any third party for any indirect, incidental, special, consequential, punitive or exemplary damages (including without limitation lost profits, lost savings, or loss of business opportunity) arising out of or relating to any product or service provided or to be provided by IDI, even if IDI has been advised of the possibility of such damages.

The DuPont Oval Logo, DuPont™, The miracles of science™, OXYCHLOR® and ADOX® are trademarks or registered trademarks of DuPont or its affiliates.

©2007 E. I. du Pont de Nemours and Company. All rights reserved. K-16662 (06/07)



The miracles of science™