ErcoPure™

International Dioxcide™
AN ERCO WORLDWIDE COMPANY

Nitrification Control

Technical Information

Nitrification excursions in the distribution system are controlled by the use of chlorine dioxide. Chlorine dioxide offers utilities a simple solution to nitrification excursions, without compromising regulatory compliance.

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

Many potable water plants are switching to chloramines asa means of staying in compliance with the Stage One and Stage Two Disinfectant and Disinfection By-Product (DPB) Rules. Chloramination is commonly used for secondary disinfection purposes to control microbial growth in finished water. Chloramine use is expected to increase two-fold, as aresult of the Stage Two DBP Rule.

Nitrification is a microbial process by which reduced nitrogen compounds, which are mainly ammonia, are sequentially oxidized to nitrite and nitrate. The root cause for nitrificationis usually the combination of excess free ammonia as a substrate to nitrifying bacteria and long detention times in the distribution system. Nitrification episodes usually resultin adverse water quality problems, such as decreases in alkalinity, pH, and dissolved oxygen, as well as depleting chloramine residuals and the promotion of bacterial regrowthin the distribution system.

Nitrification mitigation techniques, such as flushing, break-point chlorination, or switching to free chlorine, are all strategies that have been used successfully, but can result in compliance problems. Chlorine dioxide or sodium chlorite fed in low dosages has been shown to be very effective at controlling nitrification episodes, while maintaining compliancewith DBP Rules.

Easy Solution

Chlorine dioxide does not react with ammonia and is fully available to oxidize ammonia and nitrogen oxidizing bacteria (AOB and NOB). This selective chemistry will retain its full capacity, without having to overcome any ammonia-related demand, allowing it to be fed at extremely low dosages. The use of chlorine dioxide allows the utility to continue to feed chloramines for residual microbial protection, while still achieving the intended DBP compliance.

Additionally, the reduction by-product of chlorine dioxide is chlorite ion, which has been proven to inhibit AOB and NOB in the distribution system. This would allow a facilityto utilize chlorine dioxide for a number of disinfection oroxidative purposes on the raw water, along with the benefits of nitrification control from the by-product chlorite ion in the distribution system.

Versatile Disinfectant

Chlorine dioxide's use is not limited to nitrification control in potable water systems. This versatile disinfectant also can be used as a primary disinfectant in potable water, as it reducesor controls bacteria, viruses, cysts, and algae, while being effective over wide temperature and pH ranges. Using chlorine dioxide will help optimize overall treatment efficiencies, including improved coagulation, reduced turbidities, improved particulate removals, improved CT values, and lower trihalomethane (THM) and haloacetic acid (HAA) levels.

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Chlorine dioxide is a powerful oxidant with CT values second only to ozone in biocidal efficacy, but without the high capital expenditures or ozonation by-products. In addition, chlorine dioxide does not have the solids loading problem or lengthy detention times associated with potassium permanganate. Using chlorine dioxide does not result in the formation of chlorinated or brominated disinfection by-products, such as THMs or HAAs. A reduction by-product of chlorine dioxide is chlorite ion, which is regulated under the Stage One and Stage Two DBP Rules at 1.0 mg/L maximum contaminant level (MCL).

At typical dosage rates, chlorine dioxide can be used successfully to help control nitrification problems, without exceeding the MCL.

Low Capital/Easily Implemented

Chlorine dioxide cannot be compressed and shipped in a container and must be generated on-site. An ADOX™ on-site generator produces chlorine dioxide 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. The ADOX™ generators use ERCOPure™ sodium chlorite as the precursor solution to chlorine dioxide, which is available from International Dioxcide. There are numerous types of affordable generators available from International Dioxcide that can be quickly deployed to meet your treatment needs.

Additional Uses

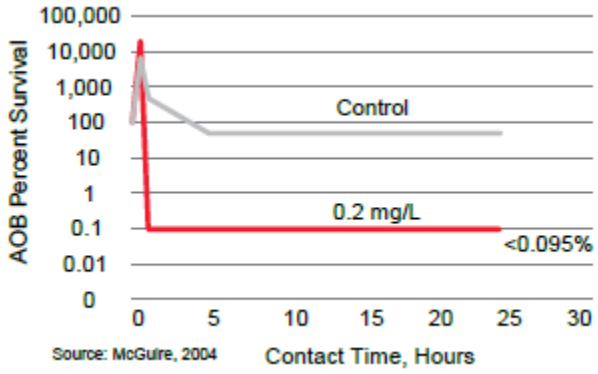
Chlorine dioxide's broad spectrum capabilities enable it to be used in a variety of potable water applications:

- Iron and Manganese Control
- Improved Disinfection Credits (C x T)
- THM and HAA Control
- Color and Algae Control
- Taste and Odor Control
- Cryptosporidium Control
- Zebra Mussel Control

Approvals

The use of chlorine dioxide is approved by the United States Environmental Protection Agency's (U.S. EPA) Office of Ground Water and Drinking Water. The ERCOPure™ sodium chlorite precursor solutions carry U.S. EPA registrations and are ANSI/NSF Standard 60 Drinking Water Additive certified.

Survival of AOB as Affected by Chlorite Ion



Information Available

International Dioxcide, a division of ERCO Worldwide, has specialized in chlorine dioxide technologies for over 70 years, and is a leading supplier of sodium chlorite solutions and generator technology for a wide variety of markets. For additional information please contact the sales office at 1-800-477-6071 or online at idiclo2.com

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Health and Safety Information: Appropriate literature has been assembled which provides information concerning the health and safety precautions that must be observed when handling the International Dioxcide, Inc. products mentioned in this publication. For materials mentioned which are not International Dioxcide, Inc. products, appropriate industrial hygiene and other safety precautions recommended by their manufacturers should be followed. Before working with any of these products, you must read and become familiar with the available information on their hazards, proper use, and handling. This cannot be overemphasized. Information is available in several forms, e.g., safety data sheets and product labels. Consult your International Dioxcide representative or contact the International Dioxcide, Inc. Regulatory Affairs Representative.

The manner in which you use and the purpose to which you put and utilize our products, technical assistance and information (whether verbal, written or by way of production evaluations), including any suggested formulations and recommendations are beyond our control. Therefore, it is imperative that you test our products, technical assistance and information to determine to your own satisfaction whether they are suitable for your intended uses and applications. This application-specific analysis must at least include testing to determine suitability from a technical as well as health, safety, and environmental standpoint. Such testing has not necessarily been done by us. Unless we otherwise agree in writing, all products are sold strictly pursuant to the terms of our standard conditions of sale. All information and technical assistance is given without warranty or guaranteeand is subject to change without notice. It is expressly understood and agreed that you assume and hereby expressly release us from all liability, in tort, contract or otherwise, incurred in connection with the use of our products, technical assistance, and information. Any statement or recommendation not contained herein is unauthorized and shall not bind us. Nothing herein shall be construed as a recommendation to use any product in conflict with patents covering any material or its use. No license is implied or in fact granted under the claims of any patent.

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Note: The information contained in this publication is current as of July 2019. Please contact International Dioxcide, Inc. to determine if this publication has been revised.

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