

# Chlorine Dioxide

## TASTE & ODOR CONTROL

**Low threshold odor compounds associated with potable water are effectively oxidized and controlled by chlorine dioxide addition. Chlorine dioxide offers utilities a simple solution to taste and odor problems without compromising regulatory compliance.**



Many potable water plants have experienced unpleasant tastes and odors in finished waters with descriptions such as medicinal, musty, earthy, fishy, metallic or rotten egg. These odor causing compounds have been identified as Geosmin, 2-methylisoborneol (MIB), pyrazine chlorophenols, actinomycetes, sulfur species or other odorous by-products of microscopic organisms. These substances generally are produced in raw waters by various algae or bacterial micro-organisms.

Chlorine dioxide is effective at oxidizing low-threshold-odor compounds like Geosmin and MIB at typical treatment dosages. Chlorine dioxide has an advantage in that its use for controlling tastes and odors will not chlorinate organics.

New regulations like the Stage One and Stage Two Disinfectant and Disinfection Byproduct (DBP) Rules, limiting trihalomethanes (THMs) and haloacetic acids (HAAs) levels, have severely curtailed the use of traditional chlorine treatment resulting in the need to reevaluate taste and odor treatment strategies to include chlorine dioxide.

### Easy Solution

Chlorine dioxide's selective chemistry allows it to instantaneously react with oxidizable material to kill algae and bacteria that produce bad taste and odors in water. Chlorine dioxide is also excellent at destroying odor-causing biofilms that are not removed by chlorine treatment, and attach to piping and basins. In some cases, properly designed chlorine dioxide programs may not always show measured reductions of specific odorous substances but many systems report improved taste and odor characteristics resulting from the removal of micro-organisms that produce the particular odor versus the traditional chlorination treatment of these odorous substances.

### Versatile Disinfectant

Chlorine dioxide's use is not limited to just taste and odor problems in potable water systems. This versatile disinfectant also can be used as a primary disinfectant in potable water, as it reduces or 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, increased CT values and lower THMs and HAAs.

Chlorine dioxide, when used as an oxidant for taste and odor problems in potable water treatment, is a powerful oxidant with CT values second only to ozone in biocidal efficacy, but without the high capital expenditures and the ozonation byproducts. In addition, chlorine dioxide does not have the solids loading problem and the lengthy detention times associated with potassium permanganate. Using chlorine dioxide does not result in the formation of chlorinated or brominated disinfection byproducts like THMs or HAAs. A reduction byproduct of chlorine dioxide is chlorite ion, which is regulated under the Stage One and the Stage Two Disinfectant and Disinfection Byproduct (DBP) Rules at 1.0 mg/L maximum contaminant level (MCL). At typical dosage rates, chlorine dioxide can be used successfully to help control taste and odor problems without exceeding the MCL.

- **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**
- **Easily implemented and fed to system**
- **Not temperature sensitive**
- **Residuals easily analyzed**
- **Bacteria, protozoa & virus inactivation**
- **Cost effective alternative**



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### Low Capital / Easily Implemented

Chlorine dioxide cannot be shipped in a drum and must be generated on-site. An International Dioxide, Inc. (IDI), OXYCHLOR® 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 OXYCHLOR® generators use ADOX® sodium chlorite as the precursor solution to chlorine dioxide, which is available from IDI. There are numerous types of affordable generators available from IDI that can normally be installed in 1 - 2 days 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 Oxidation
- Improved Disinfection Credits (C x T)
- Trihalomethane (THMs) and Haloacetic Acids (HAAs) Control
- Color Removal and Algae Control
- Cryptosporidium Inactivation
- Nitrification Control
- Zebra Mussel Control

### 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 International Dioxide'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

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