Gard'nClean

DON'T TREAT THE SYMPTOMS.
CURE THE CAUSE.

STRATEGIC HSE
SYSTEMS INC.

INTRODUCING

PURE CHLORINE DIOXIDE

The newest technology in disinfection and odor elimination

As innovators in antimicrobial solutions, Gard'nClean® brings you the world's most versatile and user-friendly choice for surface disinfection, sanitization and space deodorization. This easy to use, just-add-water patented delivery system offers a more intelligent and environmentally sophisticated method for decontamination.

Gard'nClean

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(780) 618 7246 | info@strategichse.com
www.strategichse.com

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WHY HAVEN'T I HEARD OF THIS BEFORE?

Until recently, Chlorine Dioxide generation required large mechanical equipment that came at a huge expense. Gard'nClean® and its patented just-add-water technology requires only tap water to generate pure chlorine dioxide on-site. No hazardous by-products, no expensive infrastructure to purchase and maintain, and no special certifications.

1

The original or "stabilized" version of chlorine dioxide is made from precursor chemicals mixed together, creating low concentrations of ClO_2 but also many harmful chlorinated byproducts including toxic and corrosive chlorates.

2

Then, chlorine dioxide generators were utilized to create a better concentration of ClO_2. These generators are expensive, not mobile and require trained personnel. Corrosive chlorinated by-products remain a concern.

3

Today, Gard'nClean® and its patented ClO2 technology is available, allowing for ultra 99.9% pure chlorine dioxide that's ready to use. It requires no special training, is portable and safe.

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MORE EFFICIENT, SAFER AND MORE EFFECTIVE THAN BLEACH!

Introducing the newest technology in disinfecting and odor elimination from the innovators in microbial solutions.

WHAT ARE THE BENEFITS OF 99.9% PURE CHLORINE DIOXIDE?

IT'S EFFECTIVE

99.9% pure ClO_2 is an oxidizer — plant pathogens are unable to build up a tolerance. It is effective against wide varieties of dangerous microorganisms including: germs, viruses, fungi, spores, mold & mildew, and bacteria

IT'S GENTLE

It's GENTLE Unlike other disinfectants, there are no corrosion concerns at use levels. ClO_2 can be used on food, water and in food preparation areas.

IT'S 99.9% PURE

Our technology is ecofriendly and OMRI organic certified, requiring no special disposal or handling requirements. The activated solution has a neutral pH.

WHY ARE GARD'NCLEAN®'S PRODUCTS SO PURE?

It is because of our patented technology. Simply put, the chemical reaction that generates chlorine dioxide generates harmful by-products. Gard'nClean® traps the harmful by-products in a proprietary membrane until the reaction is complete, so only the chlorine dioxide molecule is released into the solution, resulting in negligible and lower corrosiveness.

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FACT SHEET

WHAT IS GARD'NCLEAN® 99.9% ULTRA-PURE CHLORINE DIOXIDE?

It is the world's most user friendly, point-of-use (just add water) highly effective biocide for environmental sanitation.

WHY USE GARD'NCLEAN® INSTEAD OF CHLORINE OR SIMILAR COMPOUND?

Gard'nClean® 99.9% pure chlorine dioxide is not corrosive to infrastructure, does not create the same toxic compounds, and removes bioslimes and other pathogens at much lower concentrations than similar compounds.

1) Gard'nClean® ultra-pure chlorine dioxide delivers greater than 99.9% pure chlorine dioxide and without unwanted oxychloro species; Gard'nClean® is better than chlorine due of the following:
   a. Negligible toxicity
   b. Superior material compatibility (kills the pathogens, not your equipment)

2) Chlorine dioxide is the world's most powerful and versatile biocide; it retains its chemical characteristics in both air and water and has an ability to kill more pathogens with less concentration (much less) than any form of chlorine

3) Ability to remove bioslime even at low concentrations
   a. Due to its inherent selectivity, neutral charge, and neutral pH, Gard'nClean® 99.9% ultra-pure chlorine dioxide is able to attack bioslime from the inside out (other products simply focus on surface layers of bioslime)

4) Ease of use – just add water, wait, and fully decontaminate! No additional activators are necessary

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FACT SHEET

WHAT IS CHLORINE?

Chlorine is a disinfectant that is available in many forms. These forms include:

Chlorine gas, sodium hypochlorite "bleach" & calcium hypochlorite HTH tablets / granules, and organo-chloro compounds which can release chlorine on contact with water.

Regardless of the form of chlorine, the disinfecting agent is hypochlorous acid, which is pH dependent for microbial efficacy

WHY USE CHLORINE?

It is a strong oxidizer with end-user familiarity. It is very cost effective. What are some of the current options or respective forms?

1) Gayden Dlo is a 0.7% sodium hypochlorite solution
2) Klorfasil or granulated tablets
3) Dlo lavi is a 0.94% sodium hypochlorite
4) Aquatabs is sodium dichloroisocyanurate that dissoves into solution to release hypochlorous acid

WHAT ARE THE DISADVANTAGES OF USING TRADITIONAL CHLORINE OR SIMILAR COMPOUNDS?

A) **HIGHLY CORROSIVE** (all forms); free chlorine and chlorite will likely be present

B) **HIGHLY TOXIC** (all forms); due to its volatility, the biggest cause for concern when using a chlorine compound is the formation of carcinogens (cancer causing agents);

   a. A study by the U.S. Council of Environmental Quality showed that the cancer risk among people drinking chlorinated water is 93% higher than among those whose water does not contain chlorine.

C) Inability to efficiently remove bioslime at low concentrations; bioslime is the 'home' for microbe colony forming units (CFUs)

D) Changes odor and taste of food stuffs when used in food processing and/or water purification applications

E) Currently banned substances, such as DDT and PCBs, have a distinct similarity: chlorine

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Gard'nClean QUICK REFERENCE

Pure (and only pure) chlorine dioxide offers many benefits from other common and well-known disinfectants. Unlike stabilized (dirty) chlorine dioxide, bleach and acids, pure chlorine dioxide from Gard'nClean®, is far more powerful and offers much greater efficacy. Even with all of its power, pure chlorine dioxide demonstrates a negligible toxicity profile. Aside from highly efficacious mold remediation and attendant deodorization, the biggest differences you will get with use of Gard'nClean® and its patented, pure chlorine dioxide technology, especially as measured against many commonly known disinfection products, are the following benefits:

Pure ClO_2 is many times more powerful than bleach as a disinfectant and sanitizer

Pure ClO_2 is non-corrosive as compared to bleach or other disinfectants

- Pure ClO_2 is not a dermal sensitizer
- Pure ClO_2 may be used on food, water and food preparation surfaces

Pure ClO_2 is a very powerful oxidizer so germs and bacteria are unable to build up tolerance

Pure ClO_2 is effective against wide varieties of dangerous microorganisms:

- Germs
- Viruses
- Spores
- Molds and fungi
- Bacteria (gram negative and gram positive bacteria)

Pure ClO_2 from Gard'nClean® is easy to use

- Just add water
- Spray and walk away
- Offers superior material compatibility
- Pour any unused solution down any drain
- Throw used packages in any trash receptacle
- No special handling or disposal training necessary

Pure ClO_2 is also a powerful deodorizer

- Pure ClO_2 has higher kill capacity as compared to any other major oxidizer (2.5x)
- Pure ClO_2 offers superior ability to remove bio-slime
- Gas phase and aqueous application

GARD'NCLEAN® TRAPS THE HARMFUL BY-PRODUCTS IN A PROPRIETARY MEMBRANE UNTIL THE REACTION IS COMPLETE, SO ONLY THE CHLORINE DIOXIDE MOLECULE IS RELEASED INTO THE SOLUTION

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COMPETITIVE ADVANTAGES OF PURE CHLORINE DIOXIDE

PURE CHLORINE DIOXIDE VS. ACIDIFIED SODIUM CHLORITE

Chlorine dioxide (ClO2) is a highly versatile and highly compatible gas molecule that retains its chemical characteristics in both air and water, and it is widely used in many industries as a decontaminating agent. Unlike chlorine gas, chlorine dioxide does not hydrolyze in water to form ionic impurities, nor does chlorine dioxide form harmful byproducts, like chlorine bleach. As many products claim to generate pure chlorine dioxide probably due, it is important to differentiate use of ultra-pure chlorine dioxide and acidified sodium chlorite (a.k.a. stabilized chlorine dioxide or impure chlorine dioxide). Stabilized chlorine dioxide products yield very little to zero actual chlorine dioxide, and instead deliver vast amounts of corrosive oxychloro species, chlorites and chlorates. Ultra-pure chlorine dioxide solutions are superior at removing bio-slime and cleaning head space (unwetted surfaces), while also rinsing away from lines, tanks, and distributions systems in only one flush. Gard'nClean® ultra-pure chlorine dioxide at the point of use, offers a very user-friendly (just add water), highly compatible, and environmentally-aware method to harness the decontamination power of the ClO2 molecule. This is accomplished through its patented membrane technology, which permits a true gas exchange, and delivers >99% pure chlorine dioxide in solution.

It is important to distinguish between pure or nearly-pure solutions of chlorine dioxide, including Gard'nClean® line of products, and the acidified sodium chlorite products on the market sold under various names including "stabilized chlorine dioxide" or acidified sodium chlorite.

To illustrate the differences between pure chlorine dioxide and acidified sodium chlorite, generated solutions using the product of a leading supplier of the stabilized chlorine dioxide formulations and compared it to a solution of Gard'nClean® ultra-pure chlorine dioxide. The stabilized solution was activated using citric acid, as per the manufacturer's directions. The key results are presented in the chart on the right.

Typical of acidified sodium chlorite formulations, this particular product included high concentrations of chlorite and chlorate compounds, a low conversion rate to chlorine dioxide, and an acidic pH. The large background of oxidizing ionic species (chlorites, chlorates) coupled with the low pH are reasons why stabilized solutions generally have material compatibility issues and are virtually ineffective at cleaning head space and removing bio-slime. This is not true of Gard'nClean® pure chlorine dioxide where application and product usage are vast and superior to other leading disinfection and deodorization methods.

CHLORINE DIOXIDE VS. CHLORINE (BLEACH)

Gard'nClean® products include safe generation of pure chlorine dioxide at the point-of-use. Only tap water needs to be added to advanced micro-reactor sachet technology in order to generate ultra-pure chlorine dioxide. This results in specific concentrations of chlorine dioxide without corrosive residuals and at a neutral pH.

WHAT IS CHLORINE?

Chlorine comes in a number of forms*:

- Chlorine gas
- Sodium hypochlorite "bleach" & calcium hypochlorite HTH tablets/granules
- Organo chloro compounds which can release chlorine on contact with water; eg dichlorodiisocyanurate

*Regardless of the form of chlorine, the disinfecting agent is hypochlorous acid (HOCl)

ADVANTAGES OF CLO_2

- Strong oxidizer
- End-user familiarity
- Cost effective disinfectant

DISADVANTAGES OF BLEACH

- It is highly corrosive (in all forms)
- It is very weak at removing bioslime
- It's efficacy against microbial organisms is very pH dependent
- It produces an unpleasant working environment due to potential health hazards
- It is highly reactive and hence affected by suspended solids and organics in water
- It is toxic (in all forms); HOCl can produce disinfection byproducts, which are carcinogenic
- It is important to know the difference between "free" chlorine and "combined" chlorine. Free chlorine relates to

HOCl in the pH range of 7 – 7.5 and combined chlorine relates to the OCL - ion or reaction solutions, e.g., chloramines. The latter (OCLand chloramines) have VERY POOR disinfectant capabilities.

pH	% HOCl PRESENT IN WATER
6.0	100
7.0	75
7.5	50
8.0	24
8.5	9
9.0	3

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