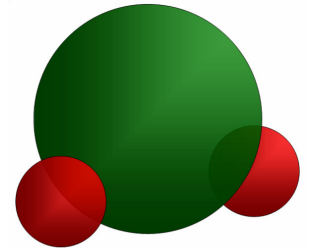


# AlfaSIP™-50D RAPID DISINFECTION KIT

## For use with CONTINUOUS FLOW ULTRACENTRIFUGES and other PROCESSING and LABORATORY EQUIPMENT



Disinfection and Sanitization in Place Without Heat\*

Completely Safe for Operators  
Compatible with Metals, Plastics and Elastomers

The **AlfaSIP-50D** kit produces a >99% pure solution of chlorine dioxide in water. The patented, membrane-based micro-reactor envelope technology ensures that only the pure gas is diffused into the water and the equipment. The production system ensures that no free chlorine can be created.

\* Disinfection = Total kill of bacteria and viruses on all surfaces and within the whole volume in contact with the product.  
Sanitization = Cleaning of a system, so as to remove bacteria and residue such as protein biofilm.

- > At 100 ppm  $\text{ClO}_2$ , **AlfaSIP** is a highly effective disinfectant, sanitizer, and virucide.
- > **Total protection** - Disinfection / Sanitization In Place in a closed system.
- > **Time saving** - Short disinfection / sanitization time (10-20 minutes) with no heating nor cooling cycle.
- > **Safe operation** – Non toxic, nor a contact sensitizer. Used in minute quantities compared to other disinfecting agents.
- > **Broad range ability** - Compatible with stainless steel, most plastics & elastomers..
- > **Simple procedure** for centrifuges, chromatography and ultrafiltration systems and laboratory surfaces generally.

### Simple, Easy-to-Use Method

**AlfaSIP-50D** is supplied in packs of 10 kits. One kit produces a solution of chlorine dioxide gas dissolved in enough water to carry out eight to ten disinfection cycles on an Alfa Wassermann continuous flow ultracentrifuge. Once produced, the solution remains at active strength for a minimum of two weeks, ready for immediate use.

A package containing a membrane envelope is opened and the envelope is immersed in fifty liters of water. The solution is at full strength after ten hours. The concentration can be checked using simple test strips.

Ten to twenty minutes after filling the equipment to be disinfected, the solution can be rinsed out with a small volume of water and the eradication of the chlorine dioxide checked by test strips.

# Highly Effective Disinfection Activity

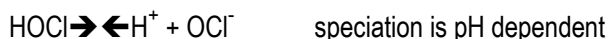
## How does AlfaSIP™ work?

AlfaSIP gas inactivates microorganisms by oxidizing key components in the membrane protein. Cell death is caused by a loss of permeability control and ultimately membrane potential. By oxidizing protein components, chlorine dioxide is reduced to inactive byproducts. Also, since it goes through simple oxidation and does not proceed through electrophilic substitution, as do bleach and other halogenating compounds, no carcinogenic trihalomethanes (THMs) nor haloacetic acids (HAA5) are formed.

When used as directed, this chlorine dioxide-generating product is proven effective as: a **disinfectant** against *Pseudomonas aeruginosa*, *Staphylococcus aureus*, *Salmonella enterica*, methicillin-resistant *S. aureus* (MRSA), vancomycin-resistant *Enterococcus faecalis*, *Mycobacterium bovis* (TB) and *Trichophyton mentagrophytes* (athlete's foot); a **virucide** against Corona virus, Feline Calicivirus, Hepatitis A, Human Immunodeficiency Virus Type 1 (HIV-1), Poliovirus-1, and Rotavirus and a **sanitizer** against *E. coli* (and *E. coli* O157:H7), *S. aureus*, *Salmonella typhimurium* (MDRS), and *Klebsiella pneumonia*.

## What is chlorine dioxide?

It certainly is not chlorine, hypochlorous acid, or bleach. In water, all of these compounds, including chlorine gas, rely on hypochlorous acid for biocidal effects



HOCl is the active biocide

$\text{OCl}^-$  is approximately 1% as effective as HOCl

HOCl reacts with natural organic matter (NOM) through substitution reactions to produce chlorinated byproducts. Some byproducts are hazardous, e.g., trihalomethanes (THMs)

"In contrast to the use of chlorine or hypochlorous acid or bleach, chlorine dioxide is not a chlorinating agent. It does not form chlorinated organic by-products. This is an important distinction between the use of chlorine ( $\text{Cl}_2$ , HOCl,  $\text{OCl}^-$ ), and chlorine dioxide ( $\text{ClO}_2$ ). In reactions with organic materials, chlorine invariably forms volatile chlorine-containing organic by-products."

Observations and Comments on the Use of Chlorine Dioxide for the Decontamination of the Hart Office Building", Gilbert Gordon, Ph.D., Department of Chemistry and Biochemistry, Miami University, Oxford, Ohio, USA.

## Biocidal Efficacy

Chemical properties and purity make a difference:

Active Agent	Oxidation Potential Volts	Oxidation Capacity Electrons
$\text{O}_3$ Ozone	2.07	2 e <sup>-</sup>
$\text{CH}_3\text{COOOH}$ Peracetic Acid	1.81	2 e <sup>-</sup>
$\text{H}_2\text{O}_2$ Hydrogen Peroxide	1.78	2 e <sup>-</sup>
$\text{NaOCl}$ (bleach) Sodium Hypochlorite	1.49	2 e <sup>-</sup>
$\text{ClO}_2$ Chlorine Dioxide (AlfaSIP)	0.95	5 e <sup>-</sup>

Chlorine Dioxide has less than ½ the oxidation potential of ozone, is 36% lower than bleach and 47% lower than peracetic acid. It is thus safer to use for materials prone to oxidation.

Because it can gain 5 electrons, chlorine dioxide has a much higher oxidation capacity than bleach, ozone, peracetic acid or hydrogen peroxide.

## Properties of Chlorine Dioxide Advantageous in Biopharmaceutical Applications

Pure gas: Decontaminates closed vessels, even in the head space. Able to penetrate and remove established biofilms. Permits quick and easy evacuation.

Rapid flushing from tanks and piping, usually in a few volumes of water.

Accommodates heat-sensitive equipment that cannot currently be effectively disinfected.

Classified as non-toxic and non-hazardous at normal use concentrations produced by the AlfaSIP-50D kit.

Chlorine dioxide presence is easily, accurately measured using cost effective, readily available detectors or test strips.

More user-friendly than other chemical disinfecting solutions. Unused solution can normally be sent to sewer without additional treatment (check first).

Leaves no residue nor film.

Generated on-site without need for capital equipment.

**"Just add water!!!"**

# Safe, Rapid Disinfection Without Heat

**Frequently Asked Questions about the AlfaSIP™-50D kit and pure Chlorine Dioxide, the active ingredient:**

**How many ultracentrifuges will a single AlfaSIP-50D kit treat?**

The kit produces 50 liters of active disinfecting / sanitizing solution. About 5-6 liters are required to sanitize an Alfa Wassermann Continuous Flow Ultracentrifuge so one kit is enough to treat 4-5 machines before and after every run.

**Once the AlfaSIP solution has been made, for how long is it usable?**

The solution remains usable at the correct strength for 15 days after production from the AlfaSIP-50D kit.

**What strength of solution is necessary for disinfection / sanitization?**

Just 100 ppm of chlorine dioxide is produced with the AlfaSIP-50D kit. The activated gas attacks S-S bonds in biological structures and nothing else, so only a minute quantity is required compared to that necessary with other sanitizing / disinfecting agents.

**How about sanitization of ultrafiltration and chromatography systems?**

The solution from the AlfaSIP-50D kit can be used to sanitize ultrafiltration systems and can also remove residual protein from the membranes, thus extending life and avoiding strip-down in many cases. It passes through membranes (even RO) providing simultaneous disinfection on both sides. Depending upon the columns and buffers, the AlfaSIP-50D kit can also be used to sanitize some chromatography systems. For example, Phosphate Buffered Saline, Acetate and TRIS are entirely compatible with AlfaSIP. It is always required that users first check compatibility with the manufacturer of the equipment to be sanitized.

**What other uses does AlfaSIP have?**

The solution from the AlfaSIP-50D kit can be used at 100 ppm to disinfect and sanitize other laboratory equipment such as centrifuges, biosafety cabinets, incubators and cold rooms. At 50 ppm strength, it is used for disinfection of the coolant loop on the AWST ultracentrifuges. At the 20 ppm level, it can be used to keep lab surfaces generally clean.

**Chlorinating products can be harmful and aggressive. What about AlfaSIP?**

AlfaSIP-50D does NOT contain nor produce chlorine, hypochlorous acid nor bleach! In fact, the chemical reaction producing the chlorine dioxide prevents the production of free chlorine.

**Is AlfaSIP toxic?**

The activated solution is NOT considered toxic via the oral or inhalation routes when prepared as directed for normal use concentration. However, it should not be swallowed or inhaled.

LD50 for 650 ppm solution is greater than 5,000 mg/kg (For aspirin: 200 mg/kg; sodium chloride 3,000 mg/kg) ... and the AlfaSIP solution is only 100 ppm...

**Is AlfaSIP a contact sensitizer?**

The activated solution is NOT considered to be a contact sensitizer.

**Many sanitizers are harmful to equipment. How about AlfaSIP?**

Continuous exposure at ambient temperature (22°C) of 304L and 316L stainless steel up to 550 ppm chlorine dioxide, in both welded and non-welded condition, is not expected to produce any discernable corrosion. Chlorine dioxide produced by the AlfaSIP-50D kit is also fully compatible with most plastics and elastomers.

**Does AlfaSIP have to be neutralized at disposal?**

Unlike sodium hydroxide, the solution from the AlfaSIP-50D kit does not need to be neutralized and can usually be drained into local sewers. Check first with your local environmental authority. The small envelope should be sent with other chemicals for disposal.

**We tried stabilized chlorine dioxide but it was not very effective and we had problems with chlorites. What about AlfaSIP?**

The term stabilized chlorine dioxide is misleading, and products thus named are formulations that contain sodium chlorite and activating agents that are combined to slowly release chlorine dioxide. These products produce high levels of the chlorite ion ( $\text{ClO}_2^-$ ) that remain after reaction and produce low concentrations of  $\text{ClO}_2$ . AlfaSIP is much more effective and safe:

Stabilized $\text{ClO}_2$	2.5% $\text{ClO}_2$	134 ppm Chlorite	pH 3.4
<b>AlfaSIP</b>	<b>&gt;99%</b> $\text{ClO}_2$	<b>0.6 ppm</b> Chlorite	<b>pH 6.9</b>

The small quantity of chlorites produced with the AlfaSIP-50D kit remain inside the envelope and cannot escape to react.

**With what conditions is AlfaSIP not compatible?**

The conditions to avoid (those which can degrade AlfaSIP) are:

- The presence of readily oxidizable substances
- A pH of <3 or >10.5
- The presence of reducing agents such as  $\text{NaHSO}_4$
- Temperatures above 35°C

# Disinfection of Lab & Processing Equipment

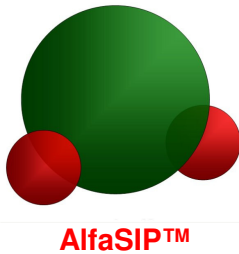
## Simple Operation

AlfaSIP fluid is prepared 10 hours before required use and makes a 100 ppm concentration of pure chlorine dioxide in water.

An AlfaSIP-50D envelope is removed from the sealed packet and placed in 50 liters of WFI or distilled water in a sealable container, leaving outside the removal line attached to the envelope. A sticker is placed on the container, to record the time and date when the envelope must be removed from the reservoir. – this is between 10 hours and 48 hours after immersion.

The concentration of ClO<sub>2</sub> must be checked to ensure that it has achieved the concentration level, using AlfaSIP™ Wide Range Test Strips.

The solution can be used up to 15 days after activation.



## General Use

*"Just add water!!!"*

AlfaSIP can be used as a disinfectant and sanitizer for stainless steel and other hard, non-porous surfaces such as centrifuges, ultrafiltration and chromatography systems, tile floors, walls, ceilings, stainless steel cold rooms and walk-in incubators in the laboratory.

The suitability of pure chlorine dioxide for a specific instrument should always be checked with the manufacturer before use.

## Disinfection / Sanitization Method for the Rotor System of an Alfa Wassermann Ultracentrifuge

Recommended for use before and after every run and should be carried out at least every day using AlfaSIP at 100 ppm concentration

After ensuring that the fluid line is free from obstruction by large particles, AlfaSIP 100 ppm solution is pumped through until the rotor and fluid lines are full of solution.

Ten minutes from the start of filling, either drain and introduce pure water to rinse the system, then switching to buffer, or buffer can be introduced directly.

AlfaSIP™ UltraLow Range Test Strips are used to check that the level of ClO<sub>2</sub> has dropped to the required level or zero concentration by comparing the color after immersion with a standard chart..

## Disinfection / Sanitization Method for the Cooling Loop of an Alfa Wassermann Ultracentrifuge

Recommended frequency: Daily if water is used as cooling fluid or every 5-30 runs if glycol is used as cooling fluid (more runs are permitted if frequent)

The coolant loop fluid reservoir is emptied, then the fluid is replaced by AlfaSIP at 50 ppm concentration, filling the reservoir to 2/3 full. The rotor is filled with water or buffer. The centrifuge is started, held at 5000 rpm for 30 minutes, then the run is stopped.

The AlfaSIP solution in the reservoir is replaced with distilled water or WFI then flushed. AlfaSIP Ultra Low Range Test Strips are used to check that the level of ClO<sub>2</sub> has dropped to below the required level. The water is then replaced with cooling fluid and the system flushed.

Depending on the intended use of the product, specific Instructions for Use will apply. Please contact the AWST support group.

## AlfaSIP-50D Kits

Sealed foil-packed kits in a 10-pack carton

AS-50D-10-EU	10 AlfaSIP-50D Kits – EU / International
AS-50D-10-US	10 AlfaSIP-50D Kits – US / N. America

## AlfaSIP Test Strips

Sealed canister of 50 chlorine dioxide test strips

AS-TS-WR-50	50 Wide Range Test Strips	0-500 ppm
AS-TS-UR-50	50 UltraLow Range Test Strips	0-10 ppm

**ALFA WASSERMANN**  
Separation Technologies

[www.alfasip.info](http://www.alfasip.info)  
[www.awst.com](http://www.awst.com)  
[sales@awst.com](mailto:sales@awst.com)

Alfa Wassermann  
Separation Technologies LLC  
4 Henderson Drive  
West Caldwell, NJ 07006  
USA  
Tel: 1-800-220-4488  
Fax: 1-973-276-0383

Alfa Wassermann B.V.  
Separation Technologies  
Pompomolenlaan 24  
3447 GK Woerden  
The Netherlands  
Tel: +31 348 487 300  
Fax: +31 348 433 000

An ISO 9001:2000  
Registered Company