

## FAQ: About TwinOxide and SARS-CoV-2 Disinfection

### What is TwinOxide?

TwinOxide/Chlorine dioxide is registered with the United States Environmental Protection Agency as a disinfectant, sanitizer and sterilizer, which is defined as the ability to eliminate all forms of microbial life including fungi, viruses, and all forms of bacteria and their spores... To date, no organism has proven resistant to TwinOxide, including Coronavirus.

### What is the active ingredient in TwinOxide?

TwinOxide combines sodium chlorite and sodium bisulfite salts to produce ultra-pure chlorine dioxide ( $\text{ClO}_2$ ) gas dissolved in water which acts as the active disinfection agent against viruses, bacteria, algae, fungi, mold, yeast, bacterial spores and other contaminants.

### Is Chlorine Dioxide the same as Chlorine?

No. Chlorine Dioxide is radically different than Chlorine. On a molar basis, Chlorine Dioxide is 2.6 times more effective than Chlorine. However, Chlorine Dioxide will not react with many organic compounds, and as a result,  $\text{ClO}_2$  does not produce carcinogenic chlorinated organic compounds such as trihalomethanes (THMs) and haloacetic acids (HAAs).

### Is TwinOxide on the CDC or EPA COVID-19 approved list?

The TwinOxide EPA registration number is 86054-1 and EPA EST NO. 85158-BEL-001. TwinOxide is currently in process of becoming listed on the EPA List N: Disinfectants for Use Against SARS-CoV-2, the novel coronavirus that causes the disease COVID-19.

### How long does TwinOxide last once applied?

Based on concentration, TwinOxide will rapidly kill within minutes the contaminants on any surface with no residue left behind. As surfaces are exposed to additional contaminants (rate of contamination varies depending on the specific environment), TwinOxide does not provide residual kill over a long period of time. It is designed to kill what exists on the surface at that moment. Surfaces will become re-contaminated and will require additional treatment over time.

### How often is it recommended to spray TwinOxide?

Depending on your environment, you can apply TwinOxide for disinfection as much as needed throughout a given time period. For hotspot areas that involve many human touch points in a given day (school rooms, conference rooms, cafeterias, common rooms, transportation vessels and facilities, etc.) we recommend multiple treatments per day.

### Is it safe for an employee to breath in TwinOxide and make contact with the mist?

Yes, TwinOxide is safe to breath at the commercially available concentration. For fogging applications where humans are present, we recommend diluting the solution down with water in a 1:1 ratio. TwinOxide will not irritate the skin or eyes at commercially available concentration levels.

### Is TwinOxide flammable?

In solution form, TwinOxide is non-flammable. The blending process of TwinOxide can be flammable if proper procedures are not followed. For safety reasons, ATS only provides ready to use solution for commercial use to avoid any safety risks to the public.

### Will TwinOxide cause skin and eye irritation?

At the commercially available solution concentration level of .005%, TwinOxide will not cause skin or eye irritation.

### What will happen if I accidentally spray TwinOxide in my eyes?

No adverse effects are expected in humans or pets if TwinOxide is accidentally sprayed in eyes from a spraying operation. If irritation occurs, rinse eyes with water for several minutes.

### What if someone has an allergic reaction to chlorine? Would diffusing or fogging TwinOxide be an issue?

No. TwinOxide contains an ultrapure 99.9% chlorine dioxide mixture containing 0% free chlorine. TwinOxide is hypo allergenic.

### Will TwinOxide work with electrostatic sprayers?

Yes, TwinOxide will work with any electrostatic sprayer or mister. TwinOxide can be sprayed, misted or fogged via a host of commercially available spraying, misting, diffusing, or fogging devices.

### What foggers does TwinOxide work with?

All foggers tested have been adequate to deliver TwinOxide in a disinfecting capacity. The level of misting varies with different units and needs to be adjusted by the operator to avoid soaking surfaces.

### Do you have to wipe off TwinOxide after applying?

TwinOxide leaves no residual, is not corrosive or destructive to surfaces, and is safe to apply without subsequent wiping effort. However, If users prefer to wipe off TwinOxide after application, be sure to let it sit for 5-10 minutes before wiping to ensure a complete kill of all contaminants on the surface.

### Does TwinOxide off-gas?

Chlorine Dioxide is a non-carcinogenic gas that dissolves in water in a stabilized form. When released and exposed to the air, the gas quickly reacts with the environment and may be slightly detected at a .005% concentration as delivered in commercial solution form when opening a container, such as a 1-gallon jug, for use. The gas at a .005% concentration is safe to humans and animals.

## **Does TwinOxide harm any equipment, chairs or other surfaces? Will it discolor clothing?**

No. TwinOxide at .005% concentration will not discolor clothing like other bleach disinfectant sprays. It is recommended to test any fabric to ensure there is no risk of bleaching. It is safe on all surfaces, is not corrosive nor destructive to metals, plastics, wood and other surfaces.

## **Is TwinOxide corrosive to equipment or metal?**

### **Isn't Chlorine Dioxide an oxidizer?**

At concentrations used in the ready-to-use product, TwinOxide is not corrosive.

## **Will TwinOxide leave an odor after applying to a surface?**

No. TwinOxide will not leave residual odors to surfaces after application.

## **Does TwinOxide deliver any proprietary advantages over other common disinfectants?**

Yes. TwinOxide delivers a faster speed of kill, leaves no residue and requires no post-application wiping. Speed and ease of treatment is a significant advantage and requires no personal protection equipment (PPE) to apply. Spray and walk away with no rinse required. More disinfection with less chemistry using TwinOxide, which provides greater safety and less skin and eye irritation. TwinOxide can also be fogged or misted with people present for continuous disinfection. No carcinogen forming THM or HAA compounds are created as a byproduct of the disinfection with TwinOxide.

## **Does TwinOxide deliver advantages**

### **over other Chlorine Dioxide based disinfectants?**

Yes. ATS uses a batch process to produce a consistent, reliable, stable and scalable solution of safe .005% Chlorine Dioxide solution. We leverage an ultra-pure 99.9% ClO<sub>2</sub> mixture which contains 0% pure chlorine. We guarantee no carcinogen formation (TTHM & HAAs) in our mixture. It adheres to green chemistry standards, is eco-friendly, leaves no residues, and is human, animal and marine safe. There is not an organism that has tested resistant to our formulation. It does not cause eye or skin irritation.

## **Are there any precautions TwinOxide users must take for use of the solution?**

Yes. TwinOxide must be kept away from sunlight and from exposure to any form of UV light. TwinOxide should be stored out of sunlight in a cool, dark area where possible. If spray bottles are refilled, high-density polyethylene containers (HDPE) are recommended. Do not let the TwinOxide solution freeze.

## **What is the air exposure limit for Chlorine Dioxide when fogging contained spaces?**

The exposure limit for Chlorine Dioxide is 0.1 ppm in the air for 8 hours of continuous exposure (time weighted average), or 0.3 ppm for 15-minutes (short term exposure limit), and 3 ppm for immediate danger to life or health.

## **Can this air exposure limit be reached in typical spraying applications?**

No. To achieve this level of exposure for that length of time would require a very small room, no ventilation or air changes and fogging with the full-strength TwinOxide concentrate for a significant time period. The full-strength concentrate is not available in a ready-to-use product.

## **How much area square footage will 1 gallon of TwinOxide cover in a spray application?**

Generally speaking, 1-gallon of TwinOxide will provide thorough coverage for approximately 3,500 square feet depending on the variation of volume sprayed.

## **How long does TwinOxide need to disinfect surfaces?**

TwinOxide reacts quickly against all microbes and provides complete kill within a few minutes of contact time.

## **What is the shelf life of TwinOxide?**

TwinOxide is best used within 3 months of the manufactured date and expires after 1 year of the manufactured date.

## **What if TwinOxide gets on my food?**

TwinOxide is certified as a spray-on, leave-on food additive and approved for use as a primary disinfectant in purification of drinking water. Washing produce with TwinOxide extends the shelf life of the produce you have at home.

## **Can I drink TwinOxide?**

TwinOxide is approved for surface disinfection of surfaces and is not approved for use in humans internally to kill bacteria or viruses.

## **What will happen if I accidentally spray TwinOxide in my mouth?**

No adverse effects are expected in humans or pets if TwinOxide is accidentally ingested from a spraying operation.

## **Proof of application for non-food surfaces**

See excerpt from the approved labeling below.

## **Proof of application for food surfaces**

See excerpt from the approved labeling below.

## **Can I get a sample of TwinOxide?**

8 oz spray bottle samples are available upon request for qualified opportunities. TwinOxide user references can also be supplied upon request.

## **Can I blend TwinOxide myself or buy the concentrate for additional dilution?**

No. The blending process requires specialized equipment, instrumentation, chemical blending tanks, safety certifications and a precise process. Therefore, ATS does not provide TwinOxide to customers to blend down themselves. Likewise, for safety reasons, ATS does not provide more concentrated solution to be further blended down. The product comes ready to use with no mixing or blending required.

## **What are the container sizes of TwinOxide?**

The solution is made available in different container formats and is more cost-effective on a per gallon basis when purchased in higher volume containers. Currently TwinOxide is available in the following container sizes:

CONTAINER SIZE	PACK SIZE
32 oz	12-Pack
1-Gallon	4 Pack
2.5 Gallon	2 Pack
55 Gallon Drum	4 Pack

**Does ATS use a distribution model for TwinOxide?**

Yes. ATS distributors purchase TwinOxide inventory and provide logistical fulfillment to wholesale and retail customers. The best market pricing for TwinOxide is available through authorized ATS distributors.

**What are the lead-times for TwinOxide upon order placement?**

Lead times can vary based on container sizes, but generally orders are fulfilled within days. Vallen carries stock inventory for immediate shipment depending on volume. In general, orders for 1-gallon, 2.5-gallon, and 55-gallon containers are available within days, while 32 oz spray bottle packs may require additional time.

**What is ATS Innova's manufacturing capacity for TwinOxide?**

ATS manufactures tens of thousands of units per day and is continuously expanding manufacturing throughput.

**SANITIZER FOR HARD, NON-POROUS, FOOD-CONTACT SURFACES:** Effective food contact surface sanitizer at 0.1 to 5.0 ppm. an exposure time of 1 minute. Product may be used on previously cleaned food preparation surfaces; fountain drink and beverage dispensers; glassware, plates and eating utensils; food processing equipment, including beer processing equipment and lines, and food conveyor belts. Make up TwinOxide@ using Components A and B per container label instructions to produce a 3,000 ppm stock solution. Use a dilution device or sprayer to achieve a solution between 2.0 to 20 ppm depending on degree of disinfection required. If diluting by hand, use 1 part TwinOxide to 149 parts water; To create a 2.0 ppm solution, use 1 part TwinOxide to 1499 parts water.

**FOR USE ON HARD, NON-POROUS, NON-FOOD-CONTACT SURFACES:** Effective non-food contact surface sanitizer at 2.0 to 20 ppm depending on degree of disinfection with an exposure time of 5 minutes. Product may be used on non-food contact surfaces, including floors, walls, and furnishings. Make up TwinOxide per label instructions to produce a 3,000 ppm standard solution. Dilute as necessary to produce a 2.0 to 20 ppm working solution. If diluting by hand, use 1 part TwinOxide to 149 parts water to produce a 20 ppm solution; To create a 2.0 ppm solution, use 1 part TwinOxide to 1499 parts water. See Technical Bulletin for alternative dilution instructions and application specifics.

**FOR HARD, NON-POROUS, NON-FOOD-CONTACT SURFACES:** Product may be used at 20 to 100 ppm with an exposure time of 10 minutes on hard surfaces in residences, hotels, offices, ships, hospitals, schools, factories, nurseries, sick rooms, laundry rooms, eating establishments, medical veterinary clinics or any other location that may be contaminated. Make up TwinOxide per label instructions to produce a 3,000 ppm standard solution. Dilute as necessary to produce a 20 to 100 ppm working solution. If diluting by hand, use 1 part TwinOxide to 149 parts water to create a 20 ppm solution; To create a 100 ppm solution, use 1 part TwinOxide to 29 parts water.

**DOMESTIC APPLICATIONS:** TwinOxide@ may be used as a general purpose cleaner on general environmental surfaces, including floors, walls, bathrooms, toilets, kitchen surfaces, sinks, showers. For non-porous surfaces such as ceramic tile, clean surfaces to remove visible dirt and scum. Rinse surfaces thoroughly with a dosage of 200 ppm TwinOxide. Allow solution to remain in surface contact for 2 minutes. To disinfect toilets, flush toilet. Pour 200ppm solution of TwinOxide into bowl. Brush bowl thoroughly. Clean under toilet rim. Let solution stand for 2 minutes. Flush again. Beginning with a 3,000 ppm TwinOxide standard solution per TwinOxide label instructions, use a dilution device or sprayer to achieve an appropriate dilution Of 200 ppm solution depending on degree of disinfection required. If diluting by hand, use 1 part TwinOxide to 14 parts water.

**SPECIAL INSTRUCTIONS FOR CLEANING SURFACES AND OBJECTS PREVIOUSLY SOILED WITH BLOOD/BODY FLUIDS**

**POTENTIALLY CONTAINING HUMAN IMMUNODEFICIENCY VIRUS:** Wear protective barriers such as disposable latex gloves, gowns, masks, and eye coverings when handling items soiled with blood or body fluids. Blood and other body fluids must be thoroughly cleaned from surfaces and objects before application of TwinOxide solution. Blood, other body fluids, and contaminated cleaning materials should be autoclaved and disposed of according to local regulations for infectious waste disposal.

**SANITIZING AND DEODORIZING GARBAGE CANS, DIAPER**

**PAILS AND WASTE BINS:** Make up TwinOxide per label instructions to produce a 3,000 ppm standard solution. Dilute as necessary to make up working solution Of 200 ppm. If diluting by hand, use 1 part TwinOxide to 14 parts water. Clean garbage can, diaper pail or waste bin and rinse with water. Drain. Spray in solution TwinOxide. Allow to stand for 2 minutes. Air dry. Repeat as necessary.

**GENERAL ALGAESTAT AND FUNGISTAT FOR HORTICULTURAL AND GREENHOUSE APPLICATIONS:**

For horticultural applications, this may be used at (100 ppm/10 minutes or 50 ppm/20 minutes) and sanitize (20 ppm/5 minutes) hard, non-porous surfaces; to treat, control, and prevent fungi (5.0 ppm/1 hour) attendant slimes, rusts and leaf spot; and to remove slimes (50 ppm/12 hours- overnight) & inhibit reemergence (0.25 ppm/ continuous treatment) in irrigation and other non-potable water systems. Beginning with a 3,000 ppm solution: for 100 ppm, use a dilution device or sprayer with a 1:30 dilution (1 part solution to 29 parts water); for 50 ppm, use a 1 dilution (1 part solution to 59 parts water); for 20 ppm use a 1:120 dilution (one part solution to 119 parts water); for 5 ppm, use a 1 :300 dilution.