

GRAIN REFINING & PACKAGING FACILITY

Flooded Facility



A 230,000 ft³ production facility was flooded by a nearby river during a season of heavy rains. The floodwaters completely submerged the first floor, and most of the second floor, carrying a variety of organisms. A mildew odor was prevalent. Microbial remediation was required prior to production being resumed. The facility consisted of a large warehouse, a loading dock, a few processing areas, a packaging area, a break room, maintenance shops, and an office. The floodwater damaged some of the sheetrock walls beyond repair and contaminated the equipment with a number of different organisms. The

sheetrock was removed, and the facility was physically cleaned of soil and debris prior to the fumigation using gaseous chlorine dioxide. The ClorDiSys decontamination process utilizing chlorine dioxide gas eliminating the organisms while providing sporicidal kill of all Biological Indicators placed throughout the facility. All mildew odors were also eliminated.

ASEPTIC JUICE BOTTLING FACILITY

Post-Maintenance

A 25,000 ft³ aseptic juice bottling facility routinely utilizes chlorine dioxide gas to decontaminate after maintenance work and during scheduled plant shutdowns. This process allows the workers more flexibility in performing maintenance knowing that it will undergo complete decontamination before production is resumed. The plant also conducts chlorine dioxide gas decontaminations during its scheduled shutdowns to act as a preventative measure without causing production delays.



DAIRY POWDER PROCESSING FACILITY

Salmonella Remediation + Yearly Preventive Decon



In 2015, a 580,000 ft³ processing and packaging area contaminated with salmonella was decontaminated. ClorDiSys was able to eliminate the salmonella from the facility by treating the area (dryer, production floor, bin room, and packaging room) all at once. Since the initial remediation, the facility has undergone a preventive decontamination every fall during its yearly shutdown period. The decontamination occurs over the course of 2-2.5 days depending on other coinciding maintenance activities.

ASEPTIC JUICE DISTRIBUTION FACILITY

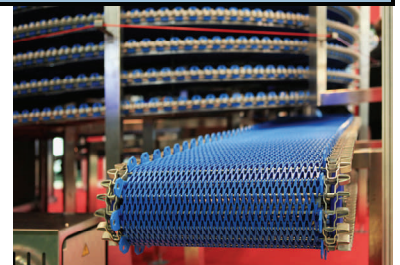
Between Batches

An empty 625,000 gallon aseptic juice holding tank has been routinely decontaminated prior to the delivery and introduction of the next batch of juice. This facility switched to chlorine dioxide gas for the decontamination of the holding tanks to reduce the downtime. Previously, they would fill the tank with an iodophor where it would reside for upwards of a week, but by changing to chlorine dioxide gas, the downtime was reduced to hours.

SPIRAL FREEZER

Listeria Remediation + Quarterly Preventive Decon

A 25,000 ft³ Spiral Freezer used at a frozen sausage production facility had a consistent listeria problem, producing positive environmental swabs time and again. After one treatment with chlorine dioxide gas, the facility reached 16 weeks without a single positive swab for listeria after swabbing 2-3 times per day.



Performance in Real World Operating Conditions

SPICE FACILITY

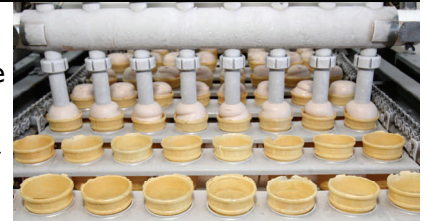
Salmonella Remediation

A 60,000 ft³ processing room at a spice facility had a salmonella contamination that they were unable to eliminate through traditional sanitation methods. The room and the piping system connecting the room to the adjoining space were decontaminated simultaneously using chlorine dioxide gas. The decontamination was accomplished within 1 day, and the salmonella was completely eliminated.

ICE CREAM FACILITY

Listeria Remediation

A 260,000 ft³ Ice Cream Production Facility was contaminated with listeria, and traditional sanitation was unable to eliminate it. Once the facility performed maintenance and repairs to eradicate some harborage sites and update the sanitary design, ClorDiSys was brought in to decontaminate. The entire facility was setup and decontaminated over the course of two days, and production started back up the following day.



BEVERAGE PROCESSING TANK

New Equipment Sterilization



A beverage processing facility was installing a new processing tank to help increase production. After the tank had been installed, but before it was put into use, the tank was decontaminated with chlorine dioxide gas in order to make it safe for product to be introduced. Treatment time to complete the decontamination was under 6 hours and the tank went into use the next morning. No rinse or wash down was necessary as ClorDiSys' chlorine dioxide gas does not leave a residue.

CONFECTIONARY

Decontamination of Tented Equipment

A roaster caught fire at a confectionary facility and was extinguished by the fire department. Worried the water used to put out the fire contained organisms which could contaminate their production line, they wanted to clean the equipment before production started again. Some of the equipment's interior was not easily accessible for the in-house sanitation team, so once the majority of cocoa powder was removed, the company opted to decontaminate with chlorine dioxide gas. That equipment was tented and fumigated, as the rest of the room was not deemed a concern. The setup and decontamination of the roughly 8,000 ft³ space took place in 1 day and successfully provided a 6-log sporicidal reduction of all surfaces within the equipment.

TRANSPORTATION TRUCKS

Decontamination of a Vehicle

A food transport truck trailer was determined to have been contaminated with Salmonella from a load of food. The truck was decontaminated with chlorine dioxide gas over the course of 3 hours. Swabbing showed complete eradication of the organisms, and the trailer was put back into service.



CHEESE PRODUCTION FACILITY

Listeria Remediation

A 230,000 ft³ mozzarella cheese processing area was contaminated with listeria. While shutdown, the facility underwent minor renovations, then decontaminated it with chlorine dioxide gas. Prior to the fumigation, forklifts, pallets, parts, and equipment from other areas were brought into the mozzarella processing area in order to maximize the impact of the decontamination. The decontamination took one day, and production started back up the next day.

TORTILLA PRODUCTION AREA

Salmonella Remediation + Routine On-Site Decon

A 50,000 ft³ Tortilla production area was contaminated with salmonella. The space was decontaminated using chlorine dioxide gas, and the salmonella was completely eliminated. Months later, the facility found salmonella at other locations within the facility, but the Tortilla Room remained negative.

When You Have to Get it Right the First Time

BSL-3 LAB

A BSL-3 influenza laboratory undergoes a yearly decontamination using chlorine dioxide gas during a facility shutdown. All equipment is left within the space during the decon, as the gas will reach and contact all surfaces within the lab. Results are shown through the placement of 40 biological indicators at various locations throughout the lab. Some locations include closed drawers, inside and behind Biological Safety Cabinets, underneath tabletop equipment, as well as easy locations such as floors, ceilings and walls.

AMPLICONS

Chlorine dioxide gas was validated by PCR equipment manufacturers and is proven effective against amplicons. CD gas can inactivate them in rooms or on equipment, so there is no risk of cross contamination causing misreads on subsequent analysis. As a true gas, it will reach all areas of your room and equipment surfaces including the inside of most equipment. Equipment can also be sent to Ecosense for treatment. After inactivation, analysis equipment can be used for testing with no risk of contamination or false readings.

HEPA HOUSING

While HEPA filters can block the flow of liquid/vapor based decontamination methods, gasses like chlorine dioxide are able to travel through the HEPA filter with no problem, making the decontamination quick and easy. A BSL3 facility routinely decontaminates their HEPA housing with CD gas. In order to monitor and control the process, a recirculation loop is setup and the gas is injected at the entrance to the HEPA Housing and monitored at the exit to make sure the entire housing reaches the proper dosage.



BETA-LACTAMS

Chlorine dioxide gas is proven effective against Beta-Lactams and validated to inactivate them on equipment or in rooms, so there is no risk of allergic exposure. The validation consisted of testing to achieve a 3-log inactivation of eight different Beta-Lactams. After inactivation, equipment and buildings can be used for non-Beta-Lactam products.

PHARMACEUTICAL FACILITY DISINFECTION POST MAINTENANCE SHUTDOWN

Yearly planned maintenance shutdowns create dirty environments since foreign equipment, tools, and people enter the clean areas. Previously, this 300,000 ft³ facility underwent three cycles of detergent cleaning and water rinse followed by three treatments with Spor-Klenz. This required over a dozen personnel with mops and buckets over multiple shifts and a minimum of a week's worth of time. The process was costly (consumables alone cost approximately \$100,000) and had inherent failures in the process since it was a laborious manual process. The facility switched to chlorine dioxide gas decontamination. The result was a disinfection cost of under \$100,000; a time savings cost of three days, and efficacy improved to a complete 6-log sporidical kill.

TRANSPORT VEHICLES

Multiple facilities use chlorine dioxide gas to decontaminate their trucks, vans, and shipping containers. Transport vehicles can be decontaminated in between deliveries to prevent cross-contamination. With CD gas, this process takes just three to four hours from start to finish. Another facility uses shipping containers to decontaminate equipment from their facility as an external decontamination chamber.



MULTI-STORY RESEARCH FACILITY

A new, four floor, 370,000 ft³ facility consisted of laboratories, animal holding rooms, procedure rooms, autoclaves, meeting rooms, office areas, cold rooms, storage rooms, and other areas. All four floors of the facility were decontaminated at the same time using chlorine dioxide gas. Equipment was operated from a single location outside of the barrier on the third floor with tubing transporting the chlorine dioxide gas up to 200 ft away on the other floors. All equipment was in place prior to the decontamination such that it did not need to be autoclaved into the facility.

Your Low Risk Choice When You Require Results Everywhere

USED EQUIPMENT PURCHASE

A pharmaceutical manufacturer purchased a used piece of equipment and needed to insure that the used equipment would not contaminate their aseptic production facility with any harmful microorganisms or beta-lactam contamination. Ecosense tented the equipment and decontaminated it using chlorine dioxide gas a level appropriate for inactivating beta-lactams. Post-treatment, all biological and beta lactam results were negative.



PINWORM EGGS



Pinworm eggs are known to travel very easily throughout rooms and facilities due to their small size and ability to become “airborne.” Chlorine dioxide gas has been proven effective at eliminating pinworm eggs by the University of Tennessee at Knoxville. An 85,000 ft³ facility infected with pinworms was treated with CD Gas in order to inactivate the eggs from the environment and ductwork. Animal racks were left running in order to help circulate the gas through the air plenums, cages, and filters to inactivate all eggs that may have been present. Pinworm eggs require a chlorine dioxide dosage twice the normal sterilization level dosage, so advanced notice of this concern is necessary to plan accordingly.

BSL AND ABSL RESEARCH FACILITY

The Regional Biosafety Laboratory at Tufts University’s North Grafton, MA campus has been decontaminated annually using chlorine dioxide gas since 2012. The approximate 59,000 ft³ facility is decontaminated all at once in order to eliminate any potential for cross-contamination. All 54 biological indicators placed within the facility came back negative for growth after the 36 hour incubation period, illustrating a successful decontamination.

MOUSE BREEDING FACILITY

An approximately 60,000 ft³ mouse breeding facility has been decontaminated on multiple occasions with CD Gas. Situations ranged from renovation to flood damage to contamination remediation. Due to the nature of the operation, chlorine dioxide gas has been used to ensure that the facility is completely sterile and able to breed contamination-free mice.

AFTER RENOVATION

A 35,000 ft³ facility was being completely renovated to update everything from its ventilation system to its equipment and casework. Prior to moving back into the facility, the area was decontaminated in order to provide a guaranteed sterile environment for research. Decontamination took one day and included all rooms, hallways, and supporting ductwork. The floors above and below the facility were occupied throughout the decon with no chlorine dioxide gas detected and no adverse effects seen.



OCCUPIED SPACES SURROUNDED BY ROOMS BEING GASED

A facility had three occupied rooms within its vivarium; a holding room and its adjoining procedure and necropsy rooms. These rooms were surrounded by contaminated holding and procedure rooms being gassed with chlorine dioxide. The occupied rooms were monitored for leakage throughout the decontamination. During the process, no leaks were observed in any of the areas, and all biological indicators were killed.

DUCTWORK

In some cases, facilities are interested in just decontaminating their ductwork and not the accompanying rooms. An eight room HIV lab was built with an undersized HVAC system and was looking to replace it with a correctly sized unit. There was concern as to whether or not the exhaust ductwork was contaminated from the research performed within the lab, so a decontamination was performed. Post treatment, all biological indicators were negative.