

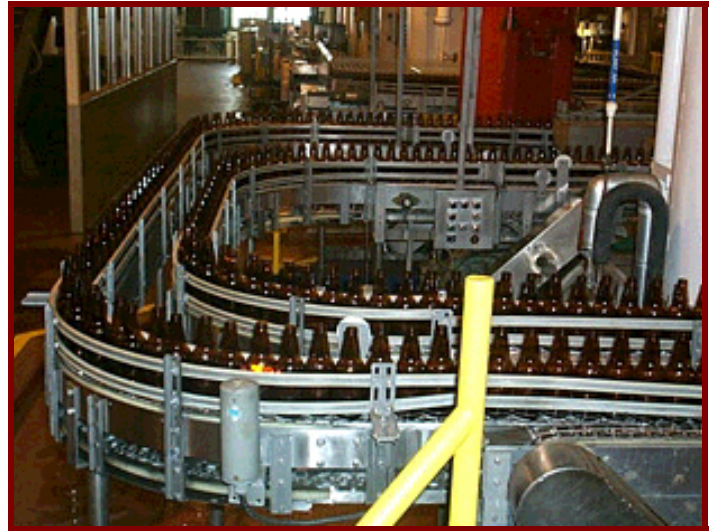
HALOX Case History #2

Microbiological Control In Bottling And Canning

Application: 5,000+ facilities that bottle and can foodstuffs including fruits and vegetables, juices, water, alcoholic beverages (including beer), soft drinks, etc. in the United States

Problem: Water-lubricated conveyor lines are prone to bacterial contamination and biofilm formation

Solution: Halox chlorine dioxide (ClO_2) generator



A major U.S. beer manufacturer operates one of their largest packaging facilities on the east coast. The plant operates 24 hours a day, seven days a week and routinely produces 70 million gallons (265 million liters) of beer per year with a wholesale value of over \$150 million. A Halox distributor provides water treatment at this site.

Bottles and cans are rapidly transported throughout the processing plant on conveyor belts. To prevent foreign materials from falling into containers, they are kept upside down before being filled. Because they are upside down, the conveyor belts cannot be greased in the traditional way for fear of grease getting into the containers. Instead, the belts are lubricated with water, sprayed from dozens of jets located along the line.

Where there is water there is the opportunity for bacteria to grow. The conveyor lines, therefore, are prone to bacterial contamination. Due to the wet conditions and the availability of a nutrient source (beer) microbiological organisms thrive and create a slimy 'biofilm'¹ everywhere. Every three to four days each line would be shut down and cleaned for several hours. This downtime represented:

- a serious loss of productive plant capacity
- increased operating costs

The Approach

Chlorine dioxide is not only a safe biocide, it is also very effective in greatly reducing the formation of biofilm. Halox recommended a very low dose of ClO_2 in the lubricating water to overcome the biofilm fouling problem.

The Specifics

A Halox chlorine dioxide generator with four cassettes, capable of producing 1.1 pounds per day (480 grams) of ClO_2 was installed next to one of the canning lines. The system doses into a holding tank that uses level switches to turn the Halox unit on and off. Chemical dosing pumps are used to add the ClO_2 to the lubrication water.

The Results.

A ClO₂ residual was found in the spray water almost immediately after the system was put into operation. Some of the benefits of using ClO₂ were:

- line shutdown for biofilm cleaning went from every three to four days to several months
- significant recovery of production capacity
- major reduction in operating costs

The Savings

The canning line generally fills 1,600 12-ounce cans (355 mL) per minute. The success of ClO₂ from the Halox H1000 has resulted in increased production of about 288,000 cans of beer every three days. This represents an additional increase in excess of \$5 million in wholesale revenue per year.

Background

Chlorine dioxide has long been recognized as a very effective biocide, sterilizer and bleaching agent. Its unique properties have made it the water treatment chemical of choice for such large-scale applications as industrial process water, food and beverage processing, and pulp and paper production. Chlorine dioxide has been widely tested and used for food applications and approved by the appropriate regulatory agencies in the U. S. and elsewhere. ClO₂ has no adverse effects on food, no adverse taste or odor, and is shown to be very effective at low concentrations. It is approved and recommended by the U. S. Environmental Protection Agency as an environmentally friendly drinking water additive to replace chlorine (which forms carcinogenic byproducts).

However, Federal law prohibits the transportation of ClO₂, it must be produced where it is used. Most traditional generation techniques are unacceptable to small and intermediate size users. These methods produce excessive quantities of ClO₂ (solutions containing 10 to 50 thousand ppm ClO₂). They also involve the use of multiple hazardous reactant chemicals and are difficult and dangerous to operate. The Halox System is a self-contained generator that provides for the safe, continuous production of chlorine dioxide. The Halox System brings economical ClO₂ to a large group of new users for whom the high cost and complexity of generating equipment has been prohibitive.

The Halox System uses an electrolytic method that makes one to five pounds of ClO₂ per day using a single precursor, sodium chlorite. This simple-to-operate system is the perfect solution for small to intermediate sized operations. The patented Halox System is a ClO₂ generating process that requires NO added acid, NO chlorine gas, and NO bleach. Because of its unique ability to perform controlled oxidation, the Halox System generates a very pure product and is cost-effective.

The heart of the Halox system is a patented electrochemical cassette that directly converts sodium chlorite to chlorine dioxide. When operated according to Halox guidelines, this Halox equipment generates a safe, dilute solution at a controlled, measurable rate that contains up to 550 ppm of chlorine dioxide. For specific sizing concentrations, please contact Halox Technical Service.

¹ What is biofilm? When certain microbes land on surfaces, they attach themselves by producing polysaccharide films that are similar to a spider web in design. This film is sticky and very difficult to remove. Channels are formed in this film, through which water flows. This sticky web catches nutrients and other microbes that pass by, providing food and a quick growth mechanism for microorganisms. This sticky web is called biofilm.