

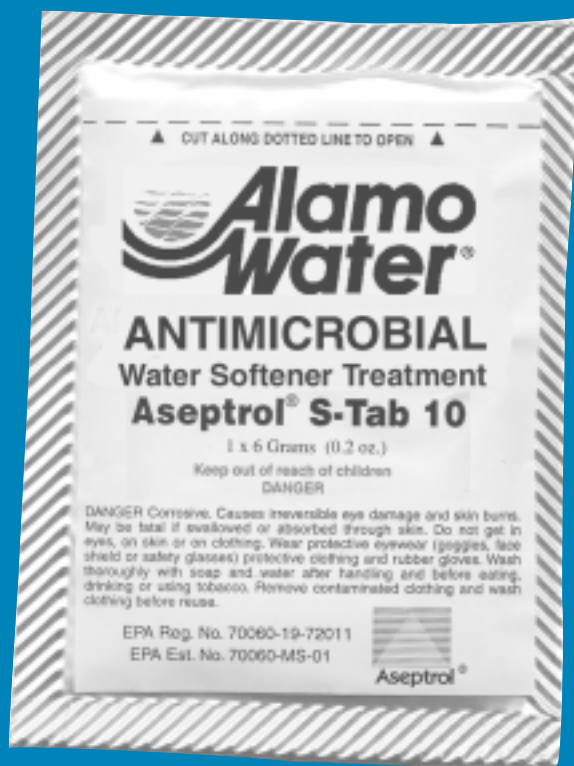
By Michael Cochran, Engelhard Corp.

Advanced Technology Brings the Power of

Chlorine Dioxide

to New Water Treatment Applications

Water Softener Product Features Chlorine Dioxide Powder



The first water quality product to feature the chlorine dioxide powder technology is Alamo Water Refiners' new Aseptrol S-Tabs for eliminating microbial buildup in the resin beds of home water softeners. Alamo is offering two versions, Aseptrol S-Tab 2 tablets for consumer use and Aseptrol S-Tab 10 tablets for use by Alamo dealers in regular softener maintenance schedules. According to Alamo, the new tablets are 2.5 times more effective than chlorine and result in no residual chlorine at the tap. The tablets are simply dropped into a water softener's brine well to begin their antimicrobial action.

Chlorine dioxide is an extremely effective and powerful biocide that has been used for many years as a bleaching agent and slimicide in the pulp and paper industry, as a disinfectant in municipal water treatment and in many other industrial water treatment operations. However, significant capital and operating costs have limited the use of chlorine dioxide to large-scale applications. New technology now makes it practical to use the biocide in a wider range of water treatment applications.

The technology, called Aseptrol, delivers chlorine dioxide in a safe, stable, easy-to-use powder. The powder features a patented, controlled sustained-release mechanism that allows precise control of the concentration, strength and rate of release of chlorine dioxide. This capability enables the expanded use of the powerful biocide to a wide variety of applications previously deemed impractical.

The Ideal Biocide

Chlorine dioxide has been called the "ideal" biocide for a number of reasons.

- It works against a wide variety of bacteria, yeasts, viruses, fungi, protozoa, spores, molds, mildews and other microbes.
- It exhibits rapid kill of target organisms, often in seconds.
- It is effective at low concentrations and over a wide pH range.
- It biodegrades in the environment.
- Unlike chlorine, it does not generate harmful byproducts.

The biocide has been used in municipal water treatment for more than 50 years in Europe and almost that long in North America. Its use has been growing in other areas as well. For example, in the pulp and paper industry, chlorine dioxide has replaced chlorine as a bleaching agent because of its environmental benefits. (Although the two biocides share the name "chlorine" their chemistries are very different, as are the byproducts from use.)

Chlorine dioxide works by penetrating bacteria cell walls and reacting with vital amino acids in the cytoplasm of the cell to kill the organism. The byproduct of this reaction is chlorite, a material that is not known to pose significant environmental or human health risks.

Other commercial uses of the material include control of microbial growth in cooling towers and in the food processing industries, slimicide in paper-making machines, odor control in rendering and other food-processing plants and sulfide treatment in the oil and gas industry.

On-Site Generation

For most applications, chlorine dioxide must be produced and used at the same location. This is because chlorine dioxide gas is unstable and large quantities cannot be stored or transported. On-site chemical or electrochemical generation is required. Most often, chlorine dioxide is generated by reacting sodium chlorite with chlorine or reacting sodium hypochlorite with hydrochloric acid.

Investment in generating systems and precursor chemicals can be significant. Financial and time investments also must be made to train employees to operate the systems. Obviously this approach is

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impractical for small-scale water treatment applications such as home water softeners, pools, spas and car wash recycle water.

New Technology Means New Applications

This technology advancement from Engelhard Corp. allows delivery of chlorine dioxide in a safe, stable powder form.

Aseptrol powders are impregnated at selected sites with proprietary activators that combine with chlorite salt contained in the powders to generate chlorine dioxide. The powders produce chlorine dioxide only when they come into contact with water or when they are exposed to moisture in ambient air. Water or moisture provides the reaction bridge between the chlorite salt and the activator, allowing the generation of chlorine dioxide to proceed. When sealed in airtight containers, the powders can be stored and used when needed.

The powders can be custom formulated to deliver different levels of chlorine dioxide and to release the biocide at specific rates. For solution applications, the product is available in dissolvable tablets and sachets. Both product forms are U.S. EPA-registered antimicrobials for hard surfaces, water surfaces, car wash recycle water and cooling towers. Aseptrol tablets also can be used in residential swimming pools. These tablets are EPA-registered to treat white water mold and pink slime, both of which grow in the plumbing systems of pools.

Tablets and sachets used in solutions are designed to begin releasing chlorine dioxide up to five minutes after being combined with water and to continue releasing the biocide for up to two hours. Powders designed for dry applications offer a wider range of controlled release parameters.

All of the powders release chlorine dioxide independent of solution pH and volume. After the biocide is activated, the material safely reduces into common salts.

Commercial Uses

Chlorine dioxide powders are featured in several new water treatment products. These include sachets to control slime-forming and odor-causing bacteria and fungi in commercial ice machines; tablets to prevent and control algae bloom in non-chlorine swimming pools; and tablets to eliminate microbial buildup in resin beds of home water softeners. (See sidebar).

The Aseptrol technology is one of the first commercial technologies to offer long-term or residual control

of microbial contamination such as unwanted slime and molds. For example, the ice-machine product will control slime in ice machines for up to 30 days. Other products are in development and additional regulatory approvals are being sought for emergency drinking water use.

The commercial applications for this new method of delivering chlorine dioxide promise to be many and varied. **WQP**

About the Author

Michael Cochran is the business development manager for the Aseptrol technology at Engelhard Corp., a material science and surface chemistry company based in Iselin, N.J.

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