PREGNANCY CATEGORIES B
DIRECTIONS FOR USE - cont

Some examples of industrial applications of chlorine dioxide include:
- Potable water disinfection and removal of sulfide.
- Control of bacterial slime and algae and mollusks in industrial recirculating and one-pass cooling systems.
- Biocontrol in food processing fluids, water-using equipment, cooling water, and recycled waters.
- Disinfection of sewage and plant wastes.
- Destruction of phenolics, simple cyanides and sulfides by chemical oxidation.
- Bacterial slime control in water paper mill systems.
- Biological control in oil well and petroleum systems.

See product bulletins (or Technical Data Sheets) for specific application instructions. Your Garratt-Callahan representative can guide you in the application techniques.

Method of Feed: Large amounts of chlorine dioxide can be generated by several common methods, including:
1. The chlorine method which utilizes a Sodium Chlorite solution and chlorine gas, or
2. The hypochlorite method which utilizes a Sodium Chlorite solution, a hypochlorite solution, and an acid, or
3. The Acid-chlorite method which utilizes a Sodium Chlorite solution and an acid, or
4. The electrolytic method which utilizes a Sodium Chlorite solution, with sodium chloride added as needed.

Your Garratt-Callahan representative can guide you in the selection, installation and operation for feed systems. Consult product bulletin and also the instructions on the chlorine dioxide generation system before using Formula 3000.

User is responsible for compliance with applicable Federal, state and local laws regarding proper use and disposal of the chlorine dioxide generated.

Directions for Use in Controlling Microbial Population in Poultry Processing Water
Chlorine dioxide generated from Formula 3000 may be used as an antimicrobial agent in water containing this product to sewer systems without previously notifying the local sewage treatment plant authority. For guidance contact your State Board or Regional Office of the EPA.

- Bacterial control in oil well and petroleum systems.
- Bacterial slime control in white water paper mill systems.
- Destruction of phenolics, simple cyanides and sulfides by chemical oxidation.
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Mollusc Control in Water Systems

Chlorine dioxide generated from sodium chlorite may be used for mollusc control in commercial and industrial recirculating and one-pass cooling water systems. The required dosages will vary with the system type, system conditions, the degree of water contamination present and the desired level of control. Depending on the extent of the contamination, sodium chlorite may be applied either continuously or intermittently through a chlorine dioxide generating system to achieve the necessary chlorine dioxide residual concentration.

__VELGER CONTROL:__ Maintain a constant chlorine dioxide residual concentration of 0.1 to 0.5 ppm.

__INTERMITTENT DOSE:__ Apply chlorine dioxide to obtain a chlorine dioxide residual concentration of 0.2 to 0.25 ppm. Repeat as necessary to maintain control.

__CONTINUOUS DOSE:__ Maintain a chlorine dioxide residual concentration of up to 2 ppm.

Bacterial Control in Oil Wells and Petroleum Systems

Chlorine dioxide is effective in the remediation of bacterial and sulfide contamination commonly found in oilfield production, injection and disposal fluids. The required dosages will vary with process conditions. Sodium chlorite may be applied either continuously or intermittently through a chlorine dioxide generating system to oil well production water as it is separated from the oil, and before it is re-injected into the well.

For continuous feeds, chlorine dioxide may be applied at dosages slightly higher than sulfide's oxidative demand as determined by a demand study. For intermittent treatment, chlorine dioxide should be applied at a shock dosage of 200 - 3000 ppm.

Wastewater Treatment

Chlorine dioxide (ClO₂) is effective as both a disinfectant and an oxidant in wastewater treatment. The required dosages will vary with water conditions and the degree of contamination present. For most municipal and public wastewater systems, a chlorine dioxide residual concentration of up to 2 ppm is sufficient to provide adequate disinfection. Residual disinfectant and disinfection byproducts must be monitored as required by the National Primary Drinking Water Regulations (40 CFR Part 141) and state drinking water standards.

Bacterial Slime Control in Paper Mills

Chlorine dioxide generated from sodium chlorite is effective for use in controlling microbiological growth in white water paper mill systems. The required dosages will vary with the degree of microbiological and process contamination present. Depending on the specific requirements of the system, sodium chlorite should be applied continuously or intermittently through a chlorine dioxide generating system to achieve a chlorine dioxide residual concentration between 0.1 and 0.5 ppm. Intermittent treatments should be repeated as often as necessary to maintain control.

Aqueous Disinfection Systems for CIP Cleaning: If the concentration of chlorine dioxide generated from FORMULA 3000 exceeds 5.0 ppm, a potable water rinse should follow treatment. Care should be taken to ensure the biological and chemical quality of the potable water.

Industrial Cooling Water Treatment

For control of bacterial slime and algae in industrial recirculating and one-pass cooling systems, the required dosages will vary depending on the exact application and the degree of contamination present. The required chlorine dioxide residual concentrations range between 0.1 and 5 ppm. Chlorine dioxide may be applied either continuously or intermittently. The typical chlorine dioxide residual concentration range is 0.1 - 1.0 ppm for continuous feeds, and 0.1 - 5.0 ppm for intermittent feeds. The minimum acceptable residual concentration of chlorine dioxide is 0.1 ppm for a minimum one minute contact time.

Potable Water Treatment

Chlorine dioxide (ClO₂) is used as both an oxidant and a disinfectant in drinking water treatment. The required dosages will vary with source water conditions and the degree of contamination present. For most municipal and public potable water systems, a chlorine dioxide residual concentration of up to 2 ppm is sufficient to provide adequate disinfection. Residual disinfectant and disinfection byproducts must be monitored as required by the National Primary Drinking Water Regulations (40 CFR Part 141) and state drinking water standards.

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