


SECTION 1: PRODUCT AND COMPANY IDENTIFICATION

Product Name:	Chlorine Dioxide Aqueous Solution (ClO ₂) < 0.4%
Recommended Use:	Biocide
MSDS Number:	98018-4000
Manufacturer:	Boon Industries Inc., 110 Spring Hill Drive, Suite 16, Grass Valley, Ca. 95945
Product Information:	1 (530) 648-1333
Emergency Number:	1 (800) 222-1222

SECTION 2: HAZARDS IDENTIFICATION

GHS Classification:	Skin Irritation: Category 2 Eye Irritation: Category 2B Acute Toxicity – Inhalation: Category 4
Hazard Statements:	Causes Skin Irritation Causes Eye Irritation Harmful if Inhaled
Signal Word:	Warning
Pictogram:	
Unclassified Hazards:	None
Ingredients with Unknown Toxicity:	None
Carcinogenicity:	None of the components present in this material at concentrations equal to or greater than 0.1% are listed by IARC, NTP, or OSHA as a carcinogen.

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

Active Ingredient(s):	Chemical Name:	Chlorine Dioxide
	CAS#:	10049-04-4
	Molecular Formula:	ClO ₂
	Concentration:	0.4% (4,000ppm)
Inert Ingredient(s):	Chemical Name:	Water
	CAS#:	7732-18-5
	Molecular Formula:	H ₂ O
	Concentration:	>99.6% (> 996,000 ppm)

SECTION 4: FIRST AID MEASURES

Skin Contact:	Prolonged contact of concentrated solutions of the material (<1000ppm) may be highly irritating. Take off contaminated clothing and shoes immediately. Wash off with plenty of water and mild soap. If burning or irritation persists, consult a physician.
Eye Contact:	Flush eyes gently with large amounts of water while holding eyelids apart. If there is visual difficulty or if symptoms persist, seek medical attention.
Inhalation:	If symptoms such as shortness of breath or trouble breathing develop, immediately move to fresh air. Seek medical attention and keep person quiet and warm. Provide the injured party with oxygen. If not breathing, administer artificial respiration.
Ingestion:	Call a Poison Control center or a doctor for treatment advice. First Aid is normally not required when small amounts of material have been ingested. If symptoms develop DO NOT induce vomiting. Have the person drink large quantities of water or milk immediately. DO NOT give anything by mouth to an unconscious person.
Note to Physician:	Probable mucosal damage may contraindicate the use of gastric lavage.

SECTION 5: FIRE FIGHTING MEASURES

NFPA Rating:	Health – 1 Flammability – 0 Reactivity – 1
Flammable Properties:	Flash Point: Does not flash Fire and Explosion Hazard: Not a fire or explosion hazard Extinguishing media: Water
Explosive Limit:	Chlorine Dioxide is not explosive. Chlorine Dioxide Gas may spontaneously decompose at concentrations above 10%. Chlorine Dioxide Gas may explode with violent force at concentrations of 30% or greater in the air at standard temperature and pressure.
Firefighting Instructions:	Wear self-contained breathing apparatus (SCBA) with a full-face piece operated in the “positive pressure demand” setting. Wear appropriate chemically resistant protective gear.

SECTION 6: ACCIDENTIAL RELEASE MEASURES

Safeguards:	Evacuate personnel to safe areas. Avoid inhalation. Notify proper authorities of any runoff, as required.
Spill Clean Up:	Prevent runoff to sewers, streams, lakes or other bodies of water. Dilute with water. Absorb liquid with absorbent material like sand, earth, clay, floor absorbent, or other absorbent material and move to containers. Rinse the area with water.
Note:	Review the HANDLING AND STORAGE section along with FIREFIGHTING MEASURES before clean-up. Use appropriate PERSONAL PROTECTIVE EQUIPMENT during clean-up.

SECTION 7: HANDLING AND STORAGE

- Handling:** Prevent the accumulation of chlorine dioxide gas by using only in well-ventilated areas. Avoid inhalation or contact with skin, eyes and clothing. Wear protective gloves to avoid skin contact. Wear protective eye wear to avoid eye contact.
- Storage:** Store away from children. Store in a cool dark place away from direct sunlight or heat. Only store in the container it is shipped in and authorized by the manufacturer for storage. Do not expose the material to freezing temperatures. Keep away from strong acids or oxidizing agents. Do not heat the material in excess of 140°F. Above 140°F the gas concentration in the headspace of the container may reach unstable concentrations.

SECTION 8: EXPOSURE CONTROLS / PERSONAL PROTECTION

- OSHA (PEL):** The OSHA permissible exposure limit for ClO₂ gas in the air is 0.1ppm (0.3 mg/m³) as an eight-hour time weighted average. This limit is the same for NIOSH and ACGIH.
- NIOSH & ACGIH:** NIOSH & ACGIH have established short term exposure limits at 0.3ppm (0.83 mg/m³) for periods not to exceed 15 minutes. Short term exposure limits should not be repeated more than four times per day with at least sixty-minute intervals in between exposures.
- Engineering Controls:** Ensure adequate mechanical ventilation, especially in confined areas.
- Eye Protection:** Wear overall splash-proof face and eye protection when the possibility exists for face contact due to splash or spray. Safety glasses should be in compliance with OSHA regulations.
- Skin Protection:** Whenever there is the possibility for skin contact, wear as appropriate impervious gloves, pants, boots, apron, and hood.
- Respiratory Protection:** Ensure adequate ventilation and monitoring to maintain OSHA permissible exposure limits below 0.1ppm. Monitor to assess the proper level of respiratory protection necessary. Refer to requirements established in 29 CFR 1910.134 for the facility's respiratory protection program. Wear a NIOSH/MSHA approved apparatus for leaks and emergencies with concentrations that exceed 5ppm.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

Appearance & Color:	Yellow-green liquid	
Odor & Odor Threshold:	Slight Chlorine Odor	0.1ppm threshold
pH:	2 -8	
Freezing Point:	0°C (32°F)	
Boiling Point:	100°C (212°F)	
Density:	8.41 LB/GAL	
Specific Gravity:	1 – 1.01	
Water Solubility:	Complete	
Flash Point:	Not Applicable	
Flammability:	Not Applicable	
Vapor Pressure:	Not Established	
Viscosity:	0.984 cP (centipoise) at 25°C	

SECTION 10: STABILITY AND REACTIVITY

Stability:	Stable and non-reactive under normal temperatures, storage and use conditions. Decomposes on heating and exposure to light.
Hazardous Reactions:	Contact with reducing agents, acids, organic materials, oxidizing agents will release toxic gases of chlorine and/or chlorine dioxide. Material does not undergo hazardous polymerization.
Incompatibility:	Avoid strong acids, chlorinated compounds, oxidizing agents, and reducing agents. Avoid exposure to light, metals, sulfur compounds, carbon monoxide, excessive heat, phosphorous, mercury and organic materials.
Conditions to Avoid:	Do not store the material at or below freezing (32°F). The solution should not be heated above 140°F.

SECTION 11: TOXICOLOGICAL INFORMATION

Chlorine Dioxide exposure routes are typically through the respiratory system by the inhalation of vapors, skin and eye contact as well as ingestion. The solution is unlikely to cause serious eye irritation or injury. The vapor is a mucous membrane and respiratory tract irritant.

CHLORINE DIOXIDE (SOLUTION)

Repeated Dose Toxicity:	Inhalation Multiple species Target Organs: Respiratory system Respiratory tract irritation, inflammation, lung damage Oral – drinking water Multiple species Target Organ: Blood Abnormal decrease in number of red blood cells., Abnormal decrease in red blood cell hemoglobin (hemoglobinemia)
Oral LD50:	94 mg/kg, rat
Inhalation LC50:	32 ppm, rat Target Organs: Respiratory Tract Symptoms: Respiratory tract irritation
Mutagenicity:	Did not show mutagenic effects in animal experiments. Did not cause genetic damage in cultured bacterial cells.
Reproductive Effects:	Evidence suggest that the solution is not a reproductive toxin in animals even at very high exposure levels.
Teratogenicity:	Animal testing has shown effects on embryo-fetal development at levels below those causing maternal toxicity. Reduced growth and behavioral effects in offspring.
Cancer Effects:	This solution is not listed as a carcinogen by the National Toxicology Program, or the Occupational Safety and Health Administration, the International Agency for Research on Cancer, The United States Environmental Protection Agency or the American Conference of Industrial Hygienists.

SECTION 12: ECOLOGICAL INFORMATION

Chlorine Dioxide (Solution) Biodegradability:	Readily biodegradable and degradable.
Aquatic Toxicity Chlorine Dioxide (Solution):	96 H LC50: Pimephales promelas (fathead minnow) 0.02 mg/l 48 H LC50: Daphnia magna (Water flea) 0.026 mg/l

SECTION 13: DISPOSAL CONSIDERATIONS

Waste Disposal:	Disposal of all materials should be in accordance with all applicable Federal, State, and local rules, regulations and requirements.
Environmental Hazards:	Used or empty containers should be recycled or disposed of at an approved waste handling site.

SECTION 14: TRANSPORT INFORMATION

Transportation of this solution should be in accordance with all applicable Federal, State, and local rules, regulations and requirements. Reference the rules and regulations of the US Department of Transportation, including all applicable packaging and labeling requirements.

DoT Information:	Reference UN 1760 Regulated as a hazardous material when shipped by motor vehicle or rail car.
Hazard Label:	CORROSIVE
Technical Name:	0.4% Chlorine Dioxide Aqueous Solution
Proper Shipping Name:	Corrosive Liquid, N.O.S.
Class:	Class 8 – Corrosive ¹
Packaging Group:	III (must not ship or store in metal containers)

¹ DiOx+ is a Class 8 – Corrosive material only because it is corrosive to aluminum and steel. It is not highly corrosive to skin. Some packaging may react dangerously or be degraded by the solution. Product must be packaged and shipped in the original containers from the manufacturer.

SECTION 15: REGULATORY INFORMATION

EPA FIFRA Information:	This solution is exempted from registration with the Federal EPA under section 25(b) of FIFRA.
SARA 313 Regulated Chemicals:	Chlorine Dioxide CAS# 10049-04-4 0.4% (4,000ppm)
CERCLA RQ:	40 CFR 302.4(a)
SARA 302 Components:	40 CFR 355 Appendix A
OSHA:	Process Safety Management 29 CFR 1910
California Prop 65:	This product does not contain any chemicals known to the State of California to cause cancer, birth defects, or any other reproductive harm.
Toxic Substance Control Act:	No known restrictions

SECTION 16: OTHER INFORMATION

DISCLAIMER: The information provided in this material safety data sheet is correct to the best of our knowledge and believed to be accurate. However, NO WARRANTY IS EXPRESSED OR IMPLIED REGARDING THE ACCURACY OF ANY OF THE INFORMATION, ORIGINATED BY THE COMPANY OR BY OTHERS. NO WARRANTY OR GUARANTEE OF ANY OTHER KIND, EXPRESS OR IMPLIED, IS MADE REGARDING PERFORMANCE, SAFETY, SUITABILITY, STABILITY OR OTHERWISE. BOON INDUSTRIES INC., ASSUMES NO RESPONSIBILITY TO INJURY TO THE OPERATOR OR OTHERS NEARBY CAUSED BY THE MATERIAL IF REASONABLE SAFETY PROCEDURES ARE NOT ADHERED TO AS STIPULATED IN THE MATERIAL SAFETY DATA SHEET. Operators assume risk in their use of the material. Those receiving this material safety data sheet are advised to confirm, in advance of any need, that the information is current, applicable, and suitable to their circumstances.

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