

MATERIAL SAFETY DATA SHEET

This MSDS is supplied by Halox Technologies, Inc. as a service rather than as a supplier of chlorine dioxide. For emergency information contact your sodium chlorite supplier.

SECTION I. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: Chlorine dioxide

CHEMICAL FORMULA: ClO₂

CHEMICAL NAME: Chlorine dioxide

CHEMICAL FAMILY: Inorganic compound

Halox Technologies, Inc.
Bridgeport, CT 06610
www.haloxtech.com
MKT-TDS-0032

CHEMICAL TYPE: Chlorine dioxide gas absorbed
in water solution. Antimicrobial.

**EMERGENCY TELEPHONE NUMBER AND
TELEPHONE NUMBER FOR INFO: CON-
TACT YOUR SODIUM CHLORITE SUPPLIER.**

Date Prepared: 21 June 2004

Spsds: 15 April 2002

SECTION II. HAZARD INGREDIENTS/IDENTITY INFORMATION

CHEMICAL NAME	CAS NUMBER	PRODUCT ID NO.	WT. %
Chlorine dioxide	10049-04-4	NA 9191	0.054 (540 mg/l) ¹

This product is not considered hazardous by 29 CFR 1910.1200.

EXPOSURE LIMITS: Chlorine dioxide (Note: Limits are for concentration in air, not aqueous solution.)

OSHA PEL- TWA	OSHA PEL- STEL	NIOSH REL- TWA	NIOSH REL- STEL	ACGIH TLV- TWA	ACGIH TLV- STEL
0.1 ppm	0.3 ppm	0.1 ppm	0.3 ppm	0.1 ppm	0.3 ppm

SECTION III. PHYSICAL/CHEMICAL CHARACTERISTICS**AQUEOUS SOLUTION**

APPEARANCE/ODOR: Pale yellow to yellow/chlorine-like.

VAPOR PRESSURE: ~5mm Hg at 25 °C (ClO₂)

BOILING POINT: Same as water.

MELTING POINT: Same as water.

EVAPORATION RATE: Not applicable

SPECIFIC GRAVITY: 1.0 at 0 °C

ODOR THRESHOLD: No data

CHLORINE DIOXIDE GAS

ODOR: Chlorine-like

BOILING POINT: 11 °C

SOLUBILITY IN WATER: 3.01 g/l at 25 °C and 34.5 mm Hg (partial pressure)

SPECIFIC GRAVITY: Not available.

MELTING POINT: -59 °C (as 100% ClO₂)

% VOLATILE: 100%

pH: 2.5 –3.5 (for Halox generated 540 ppm solution).

SECTION IV. FIRE AND EXPLOSION HAZARD DATA

Dilute chlorine dioxide solutions do not present a fire hazard.

EXTINGUISHING MEDIA: Water. Use water spray to reduce vapors.

UNSUITABLE EXTINGUISHING MEDIA: Dry chemical, CO₂, halon.

SPECIAL PROTECTIVE EQUIPMENT: Protect from respiratory exposure.

SPECIAL EXPOSURE HAZARDS: None.

FLASH POINT: Not applicable.

AUTOIGNITION: Not applicable.

UPPER/LOWER FLAMMABILITY LIMITS: None.

HAZARDOUS COMBUSTION: None

FIRE/EXPLOSION HAZARDS: None.

SENSITIVITY TO MECHANICAL/STATIC DISCHARGE: None known.

SECTION V. REACTIVITY DATA

STABILITY: Stable under ambient conditions. Avoid contact with direct sunlight and excessive heat.

HAZARDOUS REACTIONS: None known.

CONDITIONS TO AVOID: Avoid elevated temperatures to reduce/avoid evolution of ClO₂ gas.

INCOMPATIBILITY: Corrosive to steel, stainless steel, and many other materials. Avoid contact with reducing agents.

HAZARDOUS DECOMPOSITION: When chlorine dioxide gas is heated to decomposition, chlorine gas is produced. Chlorine gas creates hydrochloric acid when mixed with water or steam.

SECTION VI. HEALTH HAZARD DATA

ROUTES OF ENTRY: Inhalation, ingestion, skin and eye contact.

TARGET ORGANS: Eyes, skin, respiratory tract and mucous membranes.

ACUTE HEALTH EFFECTS

INGESTION: Not a normal route of exposure. Harmful if swallowed. Can cause irritation to mouth, esophagus, stomach, and mucous membranes.

SKIN CONTACT: Corrosive. May cause redness and irritation.

EYE CONTACT: Contact causes redness, irritation, pain, blurred vision, tearing, corneal injury and burns.

INHALATION: Harmful if inhaled. Coughing, headaches, labored breathing, nausea, shortness of breath, pulmonary edema.

CHRONIC HEALTH EFFECTS

May have effects on lungs, resulting in chronic bronchitis and permanent lung damage (with chronic exposure).

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: May aggravate existing skin and respiratory conditions.

EMERGENCY AND FIRST AID PROCEDURES

EYES: In case of contact, immediately flush with water for at least 15 to 20 minutes. Lift upper and lower lids and rinse well under them. Get immediate medical attention.

SKIN: Immediately rinse excess material off skin with large amounts of water; remove contaminated clothing and shoes; then wash with soap and water. If heavy contamination has occurred, then discard the clothing in a manner that limits further exposure. Otherwise, thoroughly clean contaminated clothing and shoes before reuse. Get medical attention.

INHALATION: Remove from exposure. If individual is not breathing, administer cardiopulmonary resuscitation (CPR) and get immediate medical attention. If individual is breathing, but with difficulty, get medical attention.

INGESTION: Do not induce vomiting. Do not give anything by mouth to an unconscious person. Get medical attention.

TOXICOLOGY INFORMATION

ACUTE ORAL TOXICITY: No information.

ACUTE DERMAL TOXICITY: No information.

INHALATION EFFECTS: Strong respiratory irritant.

IRRITATION TO SKIN: Irritant. Can give transient pain and redness.

IRRITATION TO EYES: Strong irritant.

SENSITIZATION DATA: No information.

REPRODUCTIVE TOXICITY: Chlorine dioxide did not cause birth defects in laboratory animals, even at exceptionally high exposure levels.

CARCINOGENICITY: This product does NOT contain compounds known to cause cancer according to NTP, IARC or OSHA.

MUTAGENICITY: Chlorine dioxide did test positive in a small fraction of mutagenesis assays conducted, however, in a two year mouse bioassay there was no clear evidence of carcinogenicity.

TERATOGENICITY: No information.

LD₅₀ (oral) rats: 292 mg/kg

LC_{LO} (inhalation) rats: 500 ppm/15 min. (Note: This refers to ppm in air NOT in solution)

IRRITATION (rabbit): Moderate irritant to eyes.

AQUATIC TOXICITY:

LC₅₀ (96 hrs) Fathead minnow, juvenile: 0.02 mg/l

LC₅₀ (96 hrs) Fathead minnow, adult: 0.17 mg/l

LC₅₀(96 hrs) Bluegill, young of the year: 0.15 mg/l

SECTION VII. PRECAUTIONS FOR SAFE HANDLING AND USE

STORAGE: Store aqueous solution in a cool, dry environment in suitable storage containers. Solutions in pure water can be maintained for months in closed, UV protected containers.

LARGE SPILL: Isolate hazard area and deny entry to unnecessary or unprotected personnel. Keep combustibles away from spill. Ventilate area of spill or leak. Remove gas with a fine water spray. Stop leak if you can do it without risk. Wear a self-contained breathing apparatus. Contain spilled liquid with sand or earth. Place in a disposal container. Avoid runoff into storm sewers and ditches that lead to waterways. Never discharge directly into a lake, pond, stream, river, or other natural body of water.

SMALL SPILL: Rinse with large amounts of water..

HANDLING: Wear appropriate protective clothing. Avoid prolonged contact with skin and clothing. Avoid breathing vapors. Wash with soap and water after handling

RESPIRATORY PROTECTION: Use general room ventilation or local exhaust ventilation to keep airborne exposure below the PEL. If ventilation is not adequate, wear an approved respirator.

SKIN PROTECTION: Wear impervious gloves, boots and apron. .

EYE PROTECTION: Always wear safety glasses with side shields or a full face shield.

PERSONNEL PROTECTION: Air-purifying full-face respirator. Chemical-resistant gloves, safety glasses with side shields or chemical goggles. Eye wash facility and emergency shower should be in close proximity.

UNSUITABLE HANDLING/STORAGE MATERIALS: Avoid contact with oxidizable organic materials. Avoid concentrating the vapors as extremely highly concentrated vapors (10% (w/w) in air) may explosively decompose on shock, friction, concussion or materials.

TRANSPORTATION AND REGULATORY INFORMATION

Shipping chlorine dioxide is not allowed.

TRANSPORTATION DESCRIPTION

DOT/TDG: Not determined

UN ID NO.: Not applicable

IMDG/SFA: Not determined

PROPER SHIPPING NAME: Not applicable

AIR (ICAO/IATA-DGR): Not determined

REGULATORY INFORMATION

CANADA DSL: In compliance

US TSCA: In compliance

WHMIS CLASSIFICATION: Not determined

OSHA REGULATED: Non hazardous. Corrosive as defined in 29 CFR 1910.1200

HMIS RATING: Not rated

NFPA RATING: Not rated

SARA 302: Not subject to SARA Section 302

SARA 311/312: Not subject to SARA Section 311/312

SARA 313: Subject to SARA Section 313

CALIFORNIA PROPOSITION 65: Not subject to California Proposition 65

CERCLA REPORTABLE QUANTITIES: Not subject to CERCLA.

DISPOSAL CONSIDERATIONS

PRODUCT DISPOSAL: In accordance with municipal, provincial, state and federal regulations.

RCRA: D002.

ECOLOGICAL INFORMATION

BIODEGRADABILITY: No data.

OTHER INFORMATION: None.

Information given herein is offered in good faith as accurate, but without guarantee. Conditions of use and suitability of the product for particular uses are beyond our control; all risks of use of the product are therefore assumed by the user and we expressly disclaim all warranties of every kind and nature, including warranties of merchantability and fitness for a particular purpose in respect to the use or suitability of the product. Nothing is intended as a recommendation for uses, which infringe valid patents, or as extending license under valid patents. Appropriate warnings and safe handling procedures should be provided to handlers and users.

¹ 540 mg/l is the concentration obtained under ideal conditions at the Halox testing facility. This is based on multiple data points from non-consecutive days with all variables and parameters under scrupulous control.