

Material Safety Data Sheet

Material: Chlorine Dioxide 0.3% Aqueous Solution
Company: CDG Environmental, LLC
MSDS No. CD-004
Date of Preparation: May 28, 2008
Revision: 004

Section 1 – Chemical Product and Company Identification

Chemical Name: Chlorine Dioxide Aqueous Solution
General Class: Class 8 - Corrosive Liquid¹
Packing Group: 3
General Purpose: Biocide
Synonyms: Chlorine Oxide Solution
Chlorine Peroxide Solution
Chlorine (IV) Oxide Solution
Chloroperoxyl Solution
UN ID 1760 Corrosive liquid NOS
Company Name & Address: CDG Environmental, LLC
205 Webster Street
Bethlehem, PA 18015

Section 2 – Composition / Information on Ingredients

Hazardous component(s):

¹ *CDG Solution 3000* is a “corrosive material” (Class 8), solely because it is corrosive to steel and aluminum. It is not highly corrosive to skin. It MUST be packaged and shipped in containers that will not react dangerously with or be degraded by the *CDG Solution 3000* (e.g., plastic).

Chemical name Chlorine Dioxide
Molecular formula ClO₂
Concentration 0.3% (3,000 ppm)

Non-hazardous component(s):

Chemical name Water
Molecular formula H₂O
Concentration ≥ 99.7% (≥ 997,000 ppm)

Section 3 – Hazard Identification

Potential Health Effects – General:

Chlorine dioxide gas is a mucous membrane and respiratory tract irritant.

Swallowing large amounts of this material may be harmful.

Respiration/protection should be worn if concentrations exceed applicable standards.

Primary Route(s) of Exposure:

The primary routes of exposure to this material are ingestion; inhalation; and eye and skin contact

Signs and Symptoms of Exposure

Ingestion

Signs and symptoms of exposure to this material through swallowing include stomach or intestinal upset (nausea, vomiting, diarrhea)

Inhalation

Signs and symptoms of exposure to this material through inhalation of its vapors include coughing, sore throat, breathing difficulty

Eye and Skin contact

Signs and symptoms of exposure to this material through skin contact include skin irritation and redness. Signs and symptoms of exposure to this material through eye contact include eye irritation, tearing and redness.

Section 4 – First Aid Measures

Eyes

If symptoms develop, move patient away from the source of exposure and into fresh air. Flush eyes gently with large amounts of water while holding eyelids apart. If symptoms persist or there is any visual difficulty, seek medical attention.

Skin

First aid is not normally required. However, concentrated solutions of the material (> 1000 ppm) may be highly irritating, especially on prolonged contact. Remove contaminated clothing immediately. Immediately flush exposed skin with large amounts of water. Wash thoroughly with mild soap. Consult a physician if irritation or burning persists. Contaminated clothing must be laundered before re-use. Lower concentrations (<1000) ppm may cause some irritation with very-prolonged exposure.

Swallowing

First aid is not normally required when small amounts of the material are ingested. If symptoms develop or if large amounts of material have been ingested, DO NOT induce vomiting. DO NOT give anything by mouth if the patient is unconscious. Drink large quantities of water. Consult a physician immediately. Neutralization and use of activated charcoal are not recommended.

Inhalation

If symptoms develop, immediately move individual away from exposure and into fresh air. Seek immediate medical attention; keep person warm and quiet. If person is not breathing, begin artificial respiration. If breathing is difficult, administer oxygen. Monitor the patient closely for delayed development of pulmonary edema, which may occur up to 72 hours after inhalation.

Notes to Physicians

No data

Section 5 – Fire-Fighting Measures

NFPA Rating

Health – 1
Flammability – 0
Reactivity – 1

Flash Point

Not applicable

Auto-ignition Temperature

Not applicable

Explosive Limit

Chlorine dioxide solution is not explosive. Chlorine dioxide gas, which may evolve from chlorine dioxide solution, may spontaneously decompose with a mild energy release at concentrations of 10% in air or greater at standard temperature and pressure (i.e., 76 mm Hg partial pressure).

Chlorine dioxide gas may explode with violent force at concentrations of 30% or greater in air at standard temperature and pressure (i.e., 228 mm Hg partial pressure)

Hazardous Products of Combustion

May form chlorine, hydrochloric acid gas, oxygen on combustion or decomposition

Fire and Explosion Hazards

There are no special fire hazards known to be associated with the material.

Extinguishing Media

Water

Fire Fighting Instructions

Wear a self-contained breathing apparatus (SCBA) with a full face piece operated in the “positive pressure demand” setting. Use SCBA in conjunction with appropriate chemically resistant personal protective gear. Refer also to the personal protective equipment section of this MSDS.

Section 6 – Accidental Release Measures

Large Spill

In the event of a large spill of the material, prevent runoff to sewers, streams, lakes or other bodies of water. If run-off occurs, notify proper authorities of any runoff, as required, Persons not wearing protective equipment should be excluded from area of spill until clean-up has been completed. Stop spill at source, dike area around spill to prevent spreading, and pump liquid to salvage tank. Remaining liquid may be taken up on sand,

clay, earth, vermiculite, floor absorbent, or other absorbent material and shoveled into containers. Flush with water the area from which the bulk of the spill has been removed.

Small Spill

Absorb liquid on vermiculite, floor absorbent or other absorbent material. Flush area with water.

Section 7 – Handling and Storage

Handling

In order to prevent the evolution of chlorine dioxide gas into the breathing zones of workers, agitation of the material should be minimized, and the material should not be stirred, mixed turbulently, sprayed or splashed.

Storage

The material should be stored indoors, only in the containers in which it is shipped, or in containers authorized by the manufacturer for such storage. Storage temperatures should be maintained above 50°F and below 110°F. The material should not be stored outside or exposed to freezing temperatures (below 32°F). The material should not be heated to temperatures in excess of 140°F. At temperatures above 140°F, the gas concentration in the headspace of the container may reach high, energetically unstable concentrations.

Section 8 – Exposure Controls / Personal Protection

The OSHA permissible exposure limit (PEL) for ClO₂ gas in air is 0.1 ppm (0.3 mg/m³) as an 8-hour time weighted average. NIOSH recommended exposure limits (REL) and ACGIH threshold limit values (TLV) are also 0.1 ppm.

NIOSH and ACGIH short-term exposure limits (STEL) are 0.3 ppm (0.83 mg/m³) for periods not to exceed 15 minutes. The STEL concentration should not be repeated more than 4 times per day and should be separated by intervals of at least 60 minutes.

Exposure Guidelines (vapor)

OSHA PEL 0.100 ppm – TWA

ACGIH TLV 0.100 ppm – TWA

ACGIH TLV 0.300 ppm - STEL

Eye Protection

Wear splash-proof face and eye protection (PVC is preferred) where chlorine dioxide solution may splash or spray. Safety glasses should be in compliance with OSHA regulations.

Skin Protection

Wear waterproof protective clothing (PVC is preferred) where chlorine dioxide solution may splash or spray. Wear resistant gloves, such as Neoprene, to prevent skin contact, wear impervious clothing and boots. Other protective equipment: eyewash station, emergency shower.

Respiratory Protection

Exposures in the workplace should be monitored to determine if worker exposure exceeds the facility-specified exposure "action level" or the use of the material produces adverse health effects or symptoms of exposure. Provide adequate ventilation to maintain all work areas at concentrations below 0.1 ppm chlorine dioxide concentration. If the generation of vapors or mists is possible, use local ventilation. Where gas concentration may exceed 0.1 ppm, only a NIOSH/MSHA approved full-face acid gas respirator should be used. Monitoring results must be used to assess the proper level or respiratory protection necessary. Proper engineering and/or administrative controls should be used to reduce worker exposure. The facility's respiratory protection program must meet the requirements established in 29 CFR 1910.134, which includes a program for medical evaluation. A NIOSH/MSHA approved self-contained breathing apparatus, with full face piece, is required for leaks and emergencies where the concentration may exceed 5 ppm.

Engineering Controls

Provide sufficient mechanical ventilation-- general and/or local exhaust-- to maintain exposure below allowable limits.

Section 9 – Physical and Chemical Properties

Ap Appearance and odor

Yellow-green liquid, with sharp, pungent odor

Liquid specific gravity

1.0 at 0° C

Boiling Point

100° C (212° F)

Odor threshold of gas

0.1 ppm

Section 10 – Stability and Reactivity

Hazardous Polymerization

Material does not undergo hazardous polymerization.

Hazardous Decomposition

Gas-phase vapors that evolve from the material may decompose on exposure to light, on contact with incompatible materials (see below), or spontaneously at concentrations above 10% in air at standard temperature and pressure (76mm Hg). On decomposition, material may form: Chlorine, hydrochloric acid gas and oxygen.

Chemical stability

The material, as solution, is stable in the dark. On exposure to light, the solution may decompose to an aqueous solution of chloride and chlorate ions. In regard to vapor (gas) that may evolve from the material, see “Hazardous Decomposition” above.

Incompatibility

Avoid exposure to light. Avoid contact with: metals, reducing agents, strong oxidizing agents, sulfur compounds or sulfur-containing components, carbon monoxide, excessive heat, mercury, organic materials, phosphorus.

Section 11 – Toxicological Information

Chlorine dioxide gas is a mucous membrane and respiratory tract irritant. Primary routes of exposure include ingestion, skin and eye contact and inhalation of vapors which may evolve from the material.

Target Organ Effects

Eye

This material may cause mild eye irritation; it is unlikely to cause serious eye irritation or injury.

Digestive Tract

This material may cause nausea, vomiting and diarrhea; it is unlikely to cause serious digestive tract injury. Chlorine dioxide given daily in drinking water at 1-100 ppm caused a decrease in blood glutathione, altered the morphology of erythrocytes, and caused osmotic fragility in laboratory animals.

Respiratory Tract

The fumes from this material may cause respiratory tract irritation, wheezing and difficulty breathing. In extreme cases, it may cause pulmonary damage and death.

Developmental/Reproductive Effects

Available information is insufficient to assess risk to the fetus from maternal exposure to this material during pregnancy. Chlorine dioxide did not cause birth defects in laboratory animals even at very high exposure levels.

Cancer Effects

Available information is insufficient to assess cancer risk (i.e., carcinogenicity) associated with exposure to this material. This material is not listed as a carcinogen by the International Agency for Research on Cancer (IARC), the National Toxicology Program (NTP), or the Occupational Safety and Health Administration (OSHA) United States Environmental Protection Agency (EPA) or American Conference of Industrial Hygienists (ACGIH).

Other Health Effects

No data available on other possible health effects

Section 12 – Ecological Information

No data available.

Section 13 – Disposal Considerations

Disposal of this material should be in accordance with all applicable Federal, State and local rules, regulations and requirements.

Section 14 – Transport Information

Transport of this material should be in accordance with all applicable Federal, State and local rules, regulations and requirements, including, without limitation, the rules and regulations of the US Department of Transportation, including all applicable packaging and labeling requirements.

DOT Information: Not regulated as a hazardous material when shipped by motor vehicle or rail car. (see 49 C.F.R. § 173.154(d)(1-2), **Exceptions for Class 8 Materials**)

Proper shipping name: chlorine dioxide solution (0.3%)
Class: Class 8 – Corrosive.
Packing group: III (must not ship or store in metal containers)
Hazard label: CORROSIVE

Section 15 – Regulatory Information

US Federal Regulations

TSCA (Toxic Substances Control Act) Status - United States

The intentional ingredients of this material are listed.

CERCLA RQ- 40 CFR 302.4(a)

None listed

SARA 302 Components - 40 CFR 355 Appendix A

None

Section 311/312 Hazard Class-40 CFR 370.2

Immediate ()
Delayed ()
Fire ()
Reactive ()
Sudden Release of Pressure ()

SAARA 313 Components - 40 CFR 372.65

Section 313 Components	CAS Number	Percent (%)
Chlorine dioxide	10049-04-4	0.03

OSHA Process Safety Management 29 CFR 1910

PSM Component(s)	Condition	TQ (lbs)
CHLORINE DIOXIDE		100

EPA Accidental Release Prevention 40 CFR 68

PSM Component(s)	Condition	TQ (lbs)
CHLORINE DIOXIDE Chlorine Oxide (ClO ₂)		100

International Regulations

Not determined

State and Local Regulations

California Proposition 65

None

Section 16 – Other Information

The information set forth herein is believed to be accurate. However, NO WARRANTY IS GIVEN AS TO THE ACCURACY OF ANY OF THE INFORMATION, WHETHER ORIGINATED BY THE COMPANY OR BY OTHERS. Recipients of this MSDS are advised to confirm, in advance of any need, that the information is current, applicable, and suitable to their circumstances.