

# MSDS

## MATERIAL SAFETY DATA SHEET

### 1. PRODUCT AND COMPANY INFORMATION

**Chemical name:** CHLORINE DIOXIDE AQUEOUS SOLUTION, ClO<sub>2</sub>, 2 %

**Producer:** Water Specialist Supply Co.,Ltd. ( WSS )

140/224 Moo 9 Phudhamonton Sai 2 Rd. Bangpai Bangkai

Bangkok 10160 Tel. 0-2887-0293-4 Fax. 0-2887-0293-4 (114)

### 2. COMPOSITION/INFORMATION ON INGREDIENTS

<u>Chemical name</u>	<u>Concentration</u>	<u>CAS Number</u>	<u>EG Number</u>	<u>Hazard labelling</u>	<u>R phrases</u>
Chlorine dioxide	2%	10049-04-4	233-162-8	T (toxic)	R25
				C (corrosive)	R34
				N (environmental hazard)	R50

### 3. HAZARDS IDENTIFICATION

**Human health effects:** Harmful if swallowed. Chlorine dioxide gas is highly toxic.

**Environmental hazards:** Harmful to plants and animals, with aquatic organisms being particularly sensitive. At concentrations of more than 3%, the solution is highly toxic to aquatic organisms.

**Other hazards:** Chlorine dioxide gas is toxic and explosive at concentrations of more than 12% in air.

### 4. FIRST-AID MEASURES

**Inhalation:** Ensure access to fresh air if chlorine dioxide has been inhaled.  
Provide the injured party with oxygen in the event of severe breathing difficulties and seek immediate hospital treatment.

Protective measures

- Ensure that gas masks/gas filters are available.
- Ensure that emergency shower facilities are available.

Safe handling advice

- Avoid contact with the chemicals and materials indicated in paragraph 10 (incompatible substances).
- Avoid inhalation and skin and eye contact.
- Avoid contact between chlorine dioxide solution and sources of ignition or heat.

**Storage:**Technical measures

See below.

Storage conditions

Chlorine dioxide solution should be stored at the lowest possible temperature in ventilated tanks equipped with an explosion hatch. Increased temperature may cause gas vaporisation and may lead to decomposition.

Incompatible substances

Chlorine dioxide aqueous solution should be stored separate from organic material and reducing agents, e.g. sulphur and chlorides.

**8. EXPOSURE CONTROLS/PERSONAL PROTECTION**

**Limit value:**  $0.3 \text{ mg/m}^3 = 0.1 \text{ ppm}$

**Technical measures:** Efficient ventilation in buildings in which chlorine dioxide is handled.

**Personal protective equipment/measures:**

- Avoid all unnecessary exposure.
- Respiratory protection: use respiration filter at concentrations of up to 1 ppm and gas mask at concentrations above this.

***Skin contact:***

Wash the skin with soap and water; if required, wash inside the clothing also. Remove and wash contaminated clothing.

***Eye contact:***

Rinse immediately with water and seek medical attention.

***Ingestion:***

Rinse out the mouth and drink a few glasses of water or milk immediately, but only if the person is fully conscious. Do not induce vomiting! Seek hospital treatment if more than a minimal amount has been swallowed.

Emergency Response Center for more detailed information, Tel. 0-2887-0293-4 (110)

**5. FIRE-FIGHTING MEASURES*****Extinguishing media:***

Water is recommended since chlorine dioxide is soluble in water and the toxic effects are reduced on dilution.

***Specific hazards:***

Chlorine dioxide has highly toxic characteristics. Use a gas mask as a preventive measure, if there is any risk of chloride dioxide in the air.

**6. ACCIDENTAL RELEASE MEASURES*****Personal precautions:***

Gas mask, safety goggles and safety gloves are necessary when dealing with major spills. Possible sources of ignition must be removed.

***Environmental precautions:*** Spills of chlorine dioxide solutions should be diluted to a low concentration using copious amounts of water.

***Methods for cleaning up:***

Dilute with copious amounts of water. Contact expert assistance in the event of major releases. Inform the local emergency services.

**7. HANDLING AND STORAGE*****Handling:*****Technical measures**

Ensure necessary ventilation in work areas in which chlorine dioxide is being used. Use local exhaust ventilation at point of vapour emissions.

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- Safety goggles or safety visor.
  - Safety gloves made of butyl rubber, neoprene or PVC.
  - Protective clothing made of polyester or acrylic.
  - Eye bath.

**Special measures:** Emergency showers or baths must be made available.

## 9. PHYSICAL AND CHEMICAL PROPERTIES

The following physical data applies to pure chlorine dioxide.

<b>Appearance and odour:</b>	Yellowish green to orange gas with a strong, pungent smell at room temperature, weak green colour in aqueous solution
<b>pH in solution:</b>	2-3 at 8 g/l
<b>Freezing point (1 atm):</b>	-59°C
<b>Boiling point (1 atm):</b>	11°C
<b>Flash point:</b>	Not applicable
<b>Explosion range:</b>	>12% in air
<b>Relative gas density:</b>	2.4 (air = 1)
<b>Density (0°C):</b>	1.54 kg/dm <sup>3</sup>
<b>Solubility in water:</b>	8 g/l at 15°C

## 10. STABILITY AND REACTIVITY

Chlorine dioxide aqueous solution is an oxidising agent, which is stable as long as the solution is stored in cold and dark conditions. Chlorine dioxide can decompose to chlorine gas and oxygen gas.

**Conditions to avoid:**

- High temperatures. Gaseous chlorine dioxide is emitted on heating. The gas can de-compose and react with flammable material.
- UV light sources. UV light causes decomposition – explosion may occur.
- Static electricity.
- Any open fires or other sources of ignition.



**Materials to avoid:**

- Iron, copper and their alloys.
- Chlorides and other reducing agents.
- Mixtures with organic material are highly flammable. In the event of contact with oils, the reaction is very violent and explosion may occur.
- Chlorine dioxide gas can be ignited or made to explode by means of friction or impact.

**11. TOXICOLOGICAL INFORMATION**

Chlorine dioxide solution in concentrations of between 0.3 and 3% is classified as a substance hazardous to human health and irritating to the eyes. Chlorine dioxide is quickly broken down into other chlorine derivatives such as chlorate, chlorite and chloride. High concentrations of chlorine dioxide may occur in air during manufacture.

**Acute toxicity:**

LD50 (orally, rat) = 39-113 mg/kg

Chlorine dioxide is a reacting and oxidising gas, which oxidises haemoglobin in the blood to methaemoglobin. This leads to a lack of oxygen in body tissue since methaemoglobin does not have the same ability to transport oxygen.

Symptoms (chlorine dioxide gas)

Initially, chlorine dioxide affects the eyes, skin and airways. Normal symptoms of over-exposure are coughing, pallid skin, headache, fatigue, nausea, breathing difficulties and irritation to the eyes, skin and mucous membranes. The first symptoms appear immediately.

Acute over-exposure can cause bronchitis, pneumonia and pulmonary oedema.

**Local effects:**Inhalation

Inhalation causes irritation of the mucous membranes.

Skin and eyes

Chlorine dioxide aqueous solution is an eye and skin irritant.

**Long term toxicity:** Chronic exposure may lead to lung damage and damage to the teeth.

## 12. ECOTOXICOLOGICAL INFORMATION

**Mobility:** Chlorine dioxide absorbed into water has low volatility.

**Persistence/decomposability:** Chlorine dioxide is quickly decomposed forming chlorate, chlorite and chloride.

**Bioaccumulation:** Chlorine dioxide is quickly converted into the products of its decomposition. There is no evidence to show bioaccumulation in animals.

**Ecotoxicity:** Chlorine dioxide is toxic to aquatic organisms.

Lowest specification for fish is  $LC50=0.02 \text{ mg/dm}^3$  (96 h, *Pimephales promelas*)

## 13. DISPOSAL CONSIDERATIONS

**Waste:** Small quantities can be disposed of in the drainage system after dilution with large volumes of water.

**Contaminated packaging:** Packaging must be cleaned with water.

**General:** Consult the public authorities for information in the event of major volumes of waste.

## 14. TRANSPORT INFORMATION

Chlorine dioxide aqueous solution in concentrations of 2 % has not been classified as hazardous goods.

## 15. REGULATORY INFORMATION

### Classification and labelling

**Hazard class:** Irritant

**Hazard code:** Xi

**Labelling:** Irritant (CHLORINE DIOXIDE SOLUTION, 2 %)

### Risk phrases (R36)

Irritating to eyes.