Material Safety Data Sheet

Chlorine

Version 3 | Revision Date 07/30/2009 | Print Date 07/30/2009

SECTION 1. PRODUCT AND COMPANY IDENTIFICATION

Product name	:	Chlorine
MSDS Number	:	10000019
Synonyms	:	None
Chemical Family	:	Halogen
Molecular formula	:	Cl2
Product Use Description	:	Chlorinating and oxidizing agent, Water treatment chemical, pharmaceutical, Synthesis, Disinfectants and general biocidal products, Plastics

Company

Olin Chlor Alkali Products
490 Stuart Road, NE
Cleveland, Tennessee 37312

Pioneer Americas, LLC
d/b/a Olin Chlor Alkali Products
490 Stuart Road, NE
Cleveland, Tennessee 37312

PCI Chemicals Canada Company
d/b/a Olin Chlor Alkali Products
2020 University, Suite 2190
Montreal, Quebec H3A 2A5

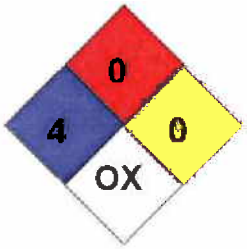
Emergency Phone Number : **US: 1-800-424-9300 - CHEMTREC**
CANADA: 1-800-567-7455

SECTION 2. HAZARDS IDENTIFICATION

HMIS Classification : Health Hazard: 3
Flammability: 0
Physical hazards: 0

HMIS	
Health Hazard	3
Flammability	0
Physical hazards	0

NFPA Classification : Health Hazard: 4
Fire Hazard: 0
Reactivity Hazard: 0
Specific hazards: OX



Emergency Overview

OSHA Hazards	:	CORROSIVE, TOXIC BY INHALATION., COMPRESSED GAS, OXIDIZER
Immediately Dangerous to Life or Health	:	10 ppm

Potential Health Effects

Primary Routes of Entry	:	Ingestion, Eyes, Inhalation, Skin Absorption
Aggravated Medical Condition	:	Asthma, Respiratory disorders, Heart disease
Inhalation	:	Toxic by inhalation. Inhalation of vapours is irritating to the respiratory system, may cause throat pain and cough. Inhaled corrosive substances can lead to a toxic oedema of the lungs. Higher exposure may cause lung oedema, circulatory collapse and unconsciousness. There is no evidence that acute inhalation of chlorine at low to moderate

levels will cause permanent lung damage. At high levels, chlorine is corrosive to the respiratory tract and may cause lung damage.

Skin : May cause skin irritation and/or dermatitis.
Contact with liquid chlorine may cause burns with prolonged contact causing destruction of the dermis with impairment of the skin at site of contact to regenerate.

Eyes : Causes serious eye irritation.
Blurred vision
May cause permanent eye injury.

Ingestion : Ingestion or inhalation of high concentrations may cause injuries to gastrointestinal tract, liver, kidneys and central nervous system.
Ingestion may cause gastrointestinal irritation, nausea, vomiting and diarrhoea.
Ingestion is not an applicable route of exposure for gases.

Chronic Exposure : Effects from chronic skin exposure would be similar to those from single exposure except for effects secondary to tissue destruction.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.
IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.
OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.
ACGIH: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Hazardous components

Component	CAS-No.	Weight %
chlorine	7782-50-5	98.00 - 100.00

SECTION 4. FIRST AID MEASURES

First aid procedures

Eye contact :
- IMMEDIATELY flush eyes with plenty of water holding eyelids apart for at least 15 minutes
- Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye.
- Get medical attention IMMEDIATELY.

Skin contact :
- Take off contaminated clothing.
- Rinse skin immediately with plenty of water for 15-20 minutes.
- Call a poison control center or doctor for treatment advice.

Ingestion :
- Call a poison control center or doctor immediately for treatment advice.
- Have person sip a glass of water if able to swallow.
- Do not induce vomiting unless told to do so by the poison control center

		or doctor. • Do not give anything by mouth to an unconscious person.
Inhalation	:	• Move person to fresh air. • If person is not breathing, call 911 or an ambulance, then give artificial respiration, preferably by mouth-to-mouth, if possible. • Call a physician or poison control center IMMEDIATELY.
General advice	:	• Have the product container or label with you when calling a poison control center or doctor or going for treatment. • Show this safety data sheet to the doctor in attendance.

Notes to physician

Comments	:	• Probable mucosal damage may contraindicate the use of gastric lavage.

SECTION 5. FIRE-FIGHTING MEASURES

Flammable properties

Flash point	:	not applicable
Lower explosion limit	:	not applicable
Upper explosion limit	:	not applicable

Fire fighting

Suitable extinguishing media	:	• Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.
Unsuitable extinguishing media	:	• Direct water spray • Direct water spray jet
Further information	:	• Contact with reactive metals e.g., aluminum, zinc and tin may result in the generation of flammable hydrogen gas. • Cool containers / tanks with water spray. • Water spray on active leak may promote accelerated corrosion of container and accelerate rate of leakage

Protective equipment and precautions for firefighters

Specific hazards during fire fighting	:	• Corrosive • compressed liquefied gas • poison
Special protective equipment for fire-fighters	:	• Additional protective clothing must be worn to prevent personal contact with this material. Those items include but are not limited to: boots gloves, hard hat, splash-proof goggles, full face shield and impervious clothing, i.e. chemically impermeable suit. • Compatible materials for response to this material are neoprene and butyl rubber. • For response to Chlorine gas it is recommended to use as a minimum level "B " protection that is compatible to Chlorine. • For Liquid spills it is recommended to utilize as a minimum enhanced level "B" (Enhanced Level "B" is the addition of a splash hood).

- Responders can reference Chlorine Institute pamphlet #65 on PPE.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions	:	Restrict access to affected area. Use personal protective equipment. Use NIOSH approved respiratory protection. Keep people away from and upwind of spill/leak. Vapours can accumulate in low areas In the case of hazardous fumes, wear self contained breathing apparatus.
Methods for containment / Methods for cleaning up	:	Do not allow material to contaminate ground water system. Try to prevent the material from entering drains or water courses. Prevent further leakage or spillage if safe to do so. Inform the responsible authorities in case of gas leakage, or of entry into waterways, soil or drains. The liquid form is heavier than water. (Will form hazardous reaction products) Pay attention to the spreading of gases especially at ground level (heavier than air) and to the direction of the wind. Retain and dispose of contaminated wash water.
Additional advice	:	• Dispose of as hazardous waste in compliance with local, province, state and federal regulations. • You are requested to contact the emergency numbers listed below before beginning any such operation.

FOR ALL ACCIDENTS, CALL CHEMTREC AT 800-424-9300 OR CANADA AT 1-800-567-7455.

SECTION 7. HANDLING AND STORAGE

Handling

Handling	:	Personnel working with this chemical should be trained on its hazards. Avoid inhalation, ingestion and contact with skin and eyes.

Storage

Requirements for storage areas and containers	:	Keep in a dry, cool and well-ventilated place.
Store at temperatures not exceeding	:	131 F (55 C)
Other data	:	For the above specified temperature the system pressure is 225 psig (1551kPa)

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Exposure Guidelines

Components with workplace control parameters

Components	CAS-No.	Value	Control parameters	Update	Basis
chlorine	7782-50-5	TWA	0.5 ppm	1996-05-18	ACGIH

			1.5 mg/m3		
		STEL	1 ppm 2.9 mg/m3	1996-05-18	ACGIH
		CEIL	1 ppm 3 mg/m3	1993-06-30	OSHA P1

Engineering measures

Engineering measures : Use local exhaust ventilation to maintain levels to below the PEL.

Personal protective equipment

Eye protection : Ensure that eyewash stations and safety showers are close to the workstation location.

Skin and body protection : Wear as appropriate: Full protective suit Hard hat with brim Boots. Wear protective gloves and eye/face protection. Refer to Chlorine Institute Pamphlet #65 for specific personal protection equipment requirements

Respiratory protection : When workers are facing concentrations above the exposure limit they must use appropriate certified respirators. Wear NIOSH approved full-face respirator equipped with chemical cartridges for chlorine gas.

Hygiene measures : • General industrial hygiene practice.

Suitable material	Boots.	Gloves	Protective suit
	• Neoprene • butyl-rubber	• Neoprene • butyl-rubber	• Chemical Resistant Suit

The listed materials are guidelines only and there are numerous PPE alternatives depending on the site specifics of where the chemical is used. You should always consult with your PPE supplier for the correct tested material. **Before using this chemical you should be aware of its hazards and be knowledgeable of emergency procedures in the event of a spill.**

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance

Form : compressed liquefied gas
Color : yellow green
Odor : pungent

Safety data

Flash point : not applicable
Lower explosion limit : not applicable
Upper explosion limit : not applicable
Oxidizing properties : yes

Autoignition temperature : not applicable
Molecular Weight : 71 G/MOL
pH : not applicable
Melting point/range : -150 F (-101 C) at 1,013 hPa (760 mmHg)
Freezing point : no data available

Boiling point/boiling range	:	-29 F (-34 C) at 1,013 hPa (760 mmHg)
Vapor pressure	:	7,790 hPa (779 kPa) at 77 F (25 C) 6,399 hPa (4,800 mmHg) at 77 F (25 C) 7,791 hPa (113 PSIA) at 77 F (25 C)
Density	:	0.7632 lb/ft3 at 32 F (0 C) (3,689.38 hPa (53.51 PSIA)
Bulk density	:	88.76 lb/ft3 at 59.8 F (15.6 C)
Water solubility	:	completely miscible
Specific gravity	:	not applicable
Evaporation rate	:	Heat of vaporization: 123.9 BTU per pound

SECTION 10. STABILITY AND REACTIVITY

Conditions to avoid	:	• Titanium will react vigorously, resulting in spontaneous ignition, when contacted by Dry Chlorine. • Combustion will be supported in carbon steel systems and equipment containing a Chlorine environment at temperatures greater than 480 °F. • Properly purge systems and equipment PRIOR to conducting Hot Work.
Materials to avoid	:	• Reducing agents, Organic materials, Alkalis
Hazardous decomposition products	:	hydrogen chloride hypochlorous acid
Thermal decomposition	:	Stable under normal conditions.
Hazardous polymerization	:	Does not occur.

SECTION 11. TOXICOLOGICAL INFORMATION

Human Threshold Response

Odor threshold	:	approximately 1.7 mg/m3 (0.3 ppm)
Irritation Threshold	:	approximately 0.5 ppm
Immediately Dangerous to Life or Health	:	10 ppm

Animal Toxicology

Acute oral toxicity	:	LD50 not applicable Product is a gas at room temperature.
Acute dermal toxicity	:	LD50 not applicable Product is a gas at room temperature.
Acute inhalation toxicity	:	LC50 rat Exposure time: 1 HOUR Dose: 293 ppm

SECTION 12. ECOLOGICAL INFORMATION

Acute Fish toxicity	:	LC50 Bluegill sunfish: 0.44 mg/L

Exposure time: 96 HOUR

LC50 Perca flavescens (Yellow Perch): 0.88 mg/L
Exposure time: 1 HOUR

LC50 Ictalurus catus (catfish): 0.07 mg/L
Exposure time: 96 HOUR

LC50 Daphnia magna (Water flea): 0.017 mg/L
Exposure time: 46 HOUR

LC50 Crassostrea gigas (Pacific oyster): 637.50 mg/L
Exposure time: 1 HOUR

LC50 Growth Myriophyllum spicatum (Water-milfoil): 20.00 mg/L
Exposure time: 2,304 HOUR

SECTION 13. DISPOSAL CONSIDERATIONS

Waste Classification	:	If this product becomes a waste, it meets the criteria of a hazardous waste as defined under 40 CFR 261 and would have the following: D003, D001
Further information	:	• If this product becomes a hazardous waste, it will be a hazardous waste which is subject to the Land Disposal Restrictions under 40 CFR 268 and must be managed accordingly. • Dispose of as hazardous waste in compliance with local, province, state and federal regulations.

CARE MUST BE TAKEN TO PREVENT ENVIRONMENTAL CONTAMINATION FROM THE USE OF THIS MATERIAL. THE USER OF THIS MATERIAL HAS THE RESPONSIBILITY TO DISPOSE OF UNUSED MATERIAL, RESIDUES AND CONTAINERS IN COMPLIANCE WITH ALL RELEVANT LOCAL, PROVINCE, STATE AND FEDERAL LAWS AND REGULATIONS REGARDING TREATMENT, STORAGE AND DISPOSAL FOR HAZARDOUS AND NON HAZARDOUS WASTES.

SECTION 14. TRANSPORT INFORMATION

DOT	Proper shipping name	:	Chlorine
	UN-Number	:	UN1017
	Class	:	2.3
	Hazard Labels/Placard	:	2.3 (8)
	Emergency Response Guidebook Number	:	124
	Reportable Quantity	:	10 LB (Per 49 CFR 172.101, Appendix) Hazard zone B
TDG CLR	Proper shipping name	:	Chlorine
	UN-Number	:	UN1017
	Class	:	2.3
	Hazard Labels/Placard	:	2.3 (8)
IATA	UN-Number	:	UN1017

	Class	: 2.3 Not permitted for transport
IMDG	UN-Number	: UN1017
	Description of the goods	: Chlorine
	Class	: 2.3
	IMDG-Labels	: 2.3 (8)
	Marine pollutant	: yes

See regulations for further information.

FOR ALL ACCIDENTS, CALL CHEMTREC AT 800-424-9300 OR CANADA AT 1-800-567-7455.

SECTION 15. REGULATORY INFORMATION

CANADIAN CLASSIFICATION

WHMIS Classification : A Compressed Gas
D1A Very Toxic Material Causing Immediate and Serious Toxic Effects
D2A Very Toxic Material Causing Other Toxic Effects
E Corrosive Material

NPRI Components : Chlorine 7782-50-5

This product has been classified according to the hazard criteria of the CPR and the MSDS contains all of the information required by the CPR.

US CLASSIFICATION

OSHA Hazards : Corrosive, Toxic by inhalation., Compressed Gas, Oxidizer

SARA 302 Reportable Quantity : 10 lbs

SARA 311/312 Hazards : Acute Health Hazard
Chronic Health Hazard
Fire Hazard
Sudden Release of Pressure Hazard
Reactivity Hazard

ECPRA - Emergency Community Planning Right-to-Know

SARA 302 Components : Chlorine 7782-50-5

SARA 313 Components : Chlorine 7782-50-5

US STATE REGULATIONS

Massachusetts Right To Know Components : Chlorine 7782-50-5
1991-07-01

Pennsylvania Right To Know Components	:	Chlorine 1991-07-01	7782-50-5
New Jersey Right To Know Components	:	Chlorine 1991-07-01	7782-50-5

GLOBAL INVENTORIES

The components of this product are reported in the following inventories:

EINECS	On the inventory, or in compliance with the inventory
TSCA	On TSCA Inventory
AICS	On the inventory, or in compliance with the inventory
DSL	All components of this product are on the Canadian DSL list.
ENCS	On the inventory, or in compliance with the inventory
KECI	On the inventory, or in compliance with the inventory
PICCS	On the inventory, or in compliance with the inventory
IECSC	On the inventory, or in compliance with the inventory
NZIoC	On the inventory, or in compliance with the inventory

SECTION 16. OTHER INFORMATION

Further information

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

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