

SAFETY DATA SHEET

036

Product Name **CHLORINE**

1. IDENTIFICATION OF THE MATERIAL AND SUPPLIER

Supplier Name BOC LIMITED (AUSTRALIA)
Address 10 Julius Avenue, North Ryde, NSW, AUSTRALIA, 2113
Telephone 131 262, (02) 8874 4400
Fax 132 427 (24 hours)
Emergency 1800 653 572 (24/7) (Australia only)
Web Site <http://www.boc.com.au/>
Synonym(s) 036 - MSDS NUMBER · BOC CHLORINE · PRODUCT CODES: 160, 208, 231
Use(s) ANALYTICAL CHEMISTRY · CHEMICAL REAGENT · INDUSTRIAL APPLICATIONS · MANUFACTURING
SDS Date 01 June 2012

2. HAZARDS IDENTIFICATION

CLASSIFIED AS HAZARDOUS ACCORDING TO SAFE WORK AUSTRALIA CRITERIA

RISK PHRASES

R23 Toxic by inhalation.
R36/37/38 Irritating to eyes, respiratory system and skin.
R50 Very toxic to aquatic organisms.

SAFETY PHRASES

S7/9 Keep container tightly closed and in a well ventilated place.
S45 In case of accident or if you feel unwell seek medical advice immediately (show the label where possible).
S61 Avoid release to the environment. Refer to special instructions/safety data sheets.

CLASSIFIED AS A DANGEROUS GOOD BY THE CRITERIA OF THE ADG CODE

UN Number	1017	DG Division	2.3
Packing Group	None Allocated	Subsidiary Risk(s)	5.1 / 8
Hazchem Code	2XE		

3. COMPOSITION/ INFORMATION ON INGREDIENTS

Ingredient	Identification	Classification	Content (v/v)
CHLORINE	CAS: 7782-50-5 EC: 231-959-5	T;R23 Xi;R36/37/38 N;R50	>99.5%

4. FIRST AID MEASURES

Eye Cold burns: Immediately flush with tepid water or with sterile saline solution. Hold eyelids apart and irrigate for 15 minutes. Seek medical attention.

Inhalation If inhaled, remove from contaminated area. To protect rescuer, use an Air-line respirator or Self Contained Breathing Apparatus (SCBA). Be aware of possible explosive atmospheres. Apply artificial respiration if not breathing. Give oxygen if available. For advice, contact a Poison Information Centre on 13 11 26 (Australia Wide) or a doctor.

Skin Cold burns: Remove contaminated clothing and gently flush affected areas with warm water (30°C)

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for 15 minutes. Apply sterile dressing and treat as for a thermal burn. For large burns, immerse in warm water for 15 minutes. DO NOT apply any form of direct heat. Seek immediate medical attention.

Ingestion

Due to product form and application, ingestion is considered unlikely.

Advice to Doctor

Management of pulmonary oedema. Treatment for inhalation is of priority if patient also has skin or mucus membrane contact. Prolonged irrigation is required for eye contact. Local anaesthetic drops may be instilled (aqueous type). Care with administration of oils or oily ointment. Treatment for cold and chemical burns if contact with liquid.

5. FIRE FIGHTING MEASURES

Flammability

Non flammable but acts as a strong oxidising agent and will vigorously accelerate fires. Protect from sources of heat, organic material and lubricants which may self ignite in combination with chlorine. Cylinders and manifolds should be located in areas with good natural ventilation or areas having adequate local ventilation.

Fire and Explosion

Temperatures in a fire may cause cylinders to rupture. Cool cylinders or containers exposed to fire by applying water from a protected location. Do not approach cylinders or containers suspected of being hot. Remove cool cylinders from the path of the fire. Evacuate area if unable to keep cylinders cool. Ensure work area is thoroughly ventilated before re-entry.

Extinguishing

Stop flow of gas if safe to do so, such as by slowly closing the cylinder valve. Await arrival of emergency services or manufacturer's advisor. Drench and cool cylinders with water spray from protected area at a safe distance.

Hazchem Code

2XE

- 2 Water Fog (or fine water spray if fog unavailable)
- X Full protective clothing including Self Contained Breathing apparatus.
- E Evacuation of people in the vicinity of the incident should be considered.

6. ACCIDENTAL RELEASE MEASURES

Spillage

If the cylinder is leaking, evacuate area of personnel. Inform manufacturer/supplier of leak. Use personal protective equipment. Carefully move material to a well ventilated remote area, then allow to discharge. Do not attempt to repair leaking valve or cylinder safety devices.

7. STORAGE AND HANDLING

Storage

Do not store near sources of ignition or incompatible materials. Cylinders should be stored below 45°C in a secure area, upright and restrained to prevent cylinders from falling. Cylinders should also be stored in a dry, well ventilated area constructed of non-combustible material with firm level floor (preferably concrete), away from areas of heavy traffic and emergency exits.

Handling

Use of safe work practices are recommended to avoid eye or skin contact and inhalation. Do not drag, drop, slide or roll cylinders. The uncontrolled release of a gas under pressure may cause physical harm. Use a suitable hand truck for cylinder movement.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Exposure Standards

Ingredient	Reference	TWA		STEL	
		ppm	mg/m ³	ppm	mg/m ³
Chlorine (Peak limitation)	SWA (AUS)	1	3	--	--

Biological Limits

No biological limit allocated.

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Engineering Controls Avoid inhalation. Use in well ventilated areas. Where an inhalation risk exists, mechanical extraction ventilation is recommended. Maintain vapour levels below the recommended exposure standard.

PPE

Eye / Face Wear safety glasses.

Hands Wear leather gloves.

Body Wear coveralls and safety boots. When using large quantities or where heavy contamination is likely, wear impervious coveralls.

Respiratory Wear a Type B (Inorganic gases and vapours) respirator. At high vapour levels, wear Self Contained Breathing Apparatus (SCBA) or an Air-line respirator.



9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	GREEN/YELLOW GAS (LIQUEFIED UNDER PRESSURE)
Odour	SUFFOCATING ODOUR
Flammability	NON FLAMMABLE
Flash point	NOT RELEVANT
Boiling point	-34.05°C
Melting point	NOT AVAILABLE
Evaporation rate	NOT APPLICABLE
pH	NOT APPLICABLE
Vapour density	NOT AVAILABLE
Specific gravity	NOT APPLICABLE
Solubility (water)	4.61 cm ³ /cm ³
Vapour pressure	670 kPa @ 25°C
Upper explosion limit	NOT RELEVANT
Lower explosion limit	NOT RELEVANT
Autoignition temperature	NOT AVAILABLE
Decomposition temperature	NOT AVAILABLE
Viscosity	NOT AVAILABLE
Partition coefficient	NOT AVAILABLE
Critical temperature	144°C
Critical pressure	7710 kPa
% Volatiles	100 %
Density	2.47 (Air =1)

10. STABILITY AND REACTIVITY

Chemical Stability	Unstable. Reacts violently with water.
Conditions to Avoid	Avoid moisture.
Material to Avoid	Incompatible with oil, many organic materials and most lubricants. Moist chlorine requires special materials.
Hazardous Decomposition Products	This material will not decompose to form hazardous products other than that already present.
Hazardous Reactions	Polymerization will not occur.

11. TOXICOLOGICAL INFORMATION

Health Hazard Summary	Highly corrosive - toxic. Over exposure to high concentrations causes rapid onset of pulmonary oedema which may have fatal termination. Olfactory fatigue may occur. Repeated or prolonged exposure at 5 ppm may result in respiratory effects, inflammation of the nose and corrosion of tooth enamel. No dose-response correlation was found between exposure to chlorine and the occurrence of colds, breathing difficulties, abnormal heartbeat or chest pain.
Eye	Highly corrosive. Gas and liquid are extremely irritating and corrosive. Mild concentrations of vapour will cause irritation, higher concentrations may cause burns, inflammation and swelling of the eyes with possible loss of vision. Persons with potential exposure should not wear contact lenses.

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Inhalation	Toxic - corrosive. Slight itching of the nose can occur at 0.2 ppm. At 1 ppm, scratchiness and dryness of the throat, coughing and minor breathing difficulties can occur. Severe shortage of breath and violent headache can occur after exposure to 1 ppm for 30 minutes. Above 25 ppm, intense coughing, choking, chest pain and vomiting occur. Bronchitis and accumulation of fluid in the lungs may develop after severe exposure. A few breathes at 1,000 ppm can cause death.	
Skin	Irritant. Low temperature evaporating liquid can cause cold burns.	
Ingestion	Ingestion is considered unlikely due to product form. However, ingestion of liquid may result in burns to the mouth and throat.	
Toxicity Data	CHLORINE (7782-50-5)	
	LC50 (inhalation)	293 ppm/1 hour (rat)
	LCLo (inhalation)	500 ppm/5 minutes (man)
	TCLo (inhalation)	0.9 mg/m ³ (human)

12. ECOLOGICAL INFORMATION

Environment	Chlorine has very low stability in natural water as it readily oxidises inorganic and organic compounds. Chlorine is highly toxic to all forms of aquatic life. There is no potential for bioaccumulation or bioconcentration.
Ecotoxicity	Very toxic to aquatic organisms.

13. DISPOSAL CONSIDERATIONS

Waste Disposal	Cylinders should be returned to the manufacturer or supplier for disposal of contents.
Legislation	Dispose of in accordance with relevant local legislation.

14. TRANSPORT INFORMATION

CLASSIFIED AS A DANGEROUS GOOD BY THE CRITERIA OF THE ADG CODE



	LAND TRANSPORT (ADG)	SEA TRANSPORT (IMDG / IMO)	AIR TRANSPORT (IATA / ICAO)
UN Number	1017	1017	1017
Proper Shipping Name		CHLORINE	
DG Class/ Division	2.3	2.3	2.3
Subsidiary Risk(s)	5.1 / 8	5.1 / 8	5.1 / 8
Packing Group	None Allocated	None Allocated	None Allocated
Specific EPG	2.2.002		
Hazchem Code	2XE		
Other Information	Ensure cylinder is separated from driver and foodstuffs.		

15. REGULATORY INFORMATION

Poison Schedule	Classified as a Schedule 7 (S7) Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP).
Inventory Listing(s)	AUSTRALIA: AICS (Australian Inventory of Chemical Substances) All components are listed on AICS, or are exempt.

16. OTHER INFORMATION

Additional Information

Incompatible with acetylene (explosive reaction), alcohols (formation of explosive alkyl hypochlorites), alkyl isothiurea salts (formation of explosive nitrogen trichloride), ammonia (explodes when heated), antimony (ignition reaction), arsenic (spontaneous ignition), n-arylsulphinamides (possible violent reaction), benzene (explosive reaction catalysed by light), boron (ignites on contact), bromine pentafluoride (explosive reaction), calcium chlorite (forms explosive chlorine dioxide), calcium nitride (incandescent reaction), carbon activated (ignites on contact), carbon disulphide (explosive reaction in the presence of an iron catalyst), cesium nitride (attached by chlorine), 3-chloropropyne (possible explosion), chromyl chloride + carbon (possible explosion), combustible materials (contact with the liquid is likely to result in an explosion), contact with the gas may result in ignition or an explosion, diborane (explodes on contact at ambient temperatures), dichloromethylarsine (possible explosion), diethyl ether (explodes), diethylzinc (ignition), dimethylformamide (explosion hazard), dimethyl phosphorimidate (may form explosive nitrogen trichloride), dioxygen difluoride (ignition or explosive reaction), disilyl oxide (explosive reaction), 4,4'-dithiodimorpholine (may form explosive compound), ethylene (explosive reaction in the presence of light or catalysts), ethylene imine (formation of explosive 1-chloroethylene imine), ethylphosphine (explosion on contact), flammable compounds (contact with the liquid is likely to result in an explosion), fluorine (ignition followed by explosion on sparking, hexachlorodisilane (ignition above 300°C with possible explosion), hydrazine (ignition reaction), hydrocarbons (contact with the liquid is likely to result in an explosion. Addition of a Lewis acid to chlorine-hydrocarbon mixtures will result in the release of large volumes of hydrogen chloride. Also incompatible with hydrogen (explosive mixtures), hydrogen peroxide + potassium hydroxide (luminescent reaction), hydroxylamine (spontaneous ignition), iodine (violent reaction), iron carbide (incandescent reaction), lithium silicide (incandescent reaction when heated), metals and alloys (ignition on contact; some metals may be corroded in the presence of moisture), metal acetylides (ignition reaction), metal hydrides (ignition), metal oxides (vigorous reaction and possible ignition), metal phosphides (ignition), nitrogen compounds (may form explosive nitrogen trichloride), nitrogen triiodide (explosive reaction on contact), non-metal hydrides (ignite on contact), oxygen (explosive on heating), oxygen difluoride (explodes on warming), phenylmagnesium bromide (possible explosion), phosphorus (explosive reaction on contact with the liquid; ignition on contact with the gas), phosphorus compounds (ignition), phosphorus isocyanate (vigorous reaction), polychlorobiphenyl (exothermic reaction), (poly)oxomonosilane (ignition), potassium halides (ignition), silicon (ignites on contact with gaseous chlorine at ambient temperatures), siloxanes (possible explosion on heating), sodium hydroxide (violent reaction), stannous fluoride (reaction occurs with flaming), stibine (explosive reaction if heated), sulphamic acid (may form explosive nitrogen trichloride), (sulphides (ignition), tellurium (incandescent reaction), tetramethyldiarsine (spontaneous ignition), tetramethylsilane (possible explosion in the presence of a catalyst), tetraselenium tetranitride (explosion on contact), trialkylboranes (ignition reaction), trimethyl thionophosphate (possible explosion) and vanadium powder (explosion on contact with the liquid). The storage of significant quantities of gas cylinders must comply with AS4332 The storage and handling of gases in cylinders.

PERSONAL PROTECTIVE EQUIPMENT GUIDELINES:

The recommendation for protective equipment contained within this ChemAlert report is provided as a guide only. Factors such as method of application, working environment, quantity used, product concentration and the availability of engineering controls should be considered before final selection of personal protective equipment is made.

HEALTH EFFECTS FROM EXPOSURE:

It should be noted that the effects from exposure to this product will depend on several factors including: frequency and duration of use; quantity used; effectiveness of control measures; protective equipment used and method of application. Given that it is impractical to prepare a ChemAlert report which would encompass all possible scenarios, it is anticipated that users will assess the risks and apply control methods where appropriate.

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Abbreviations	ACGIH	American Conference of Governmental Industrial Hygienists
	CAS #	Chemical Abstract Service number - used to uniquely identify chemical compounds
	CNS	Central Nervous System
	EC No.	EC No - European Community Number
	GHS	Globally Harmonized System
	IARC	International Agency for Research on Cancer
	LD50	Lethal Dose, 50% / Median Lethal Dose
	mg/m ³	Milligrams per Cubic Metre
	PEL	Permissible Exposure Limit
	pH	relates to hydrogen ion concentration using a scale of 0 (high acidic) to 14 (highly alkaline).
	ppm	Parts Per Million
	REACH	Regulation on Registration, Evaluation, Authorisation and Restriction of Chemicals
	STOT-RE	Specific target organ toxicity (repeated exposure)
	STOT-SE	Specific target organ toxicity (single exposure)
	SUSMP	Standard for the Uniform Scheduling of Medicines and Poisons
	TLV	Threshold Limit Value
	TWA/OEL	Time Weighted Average or Occupational Exposure Limit

Revision History**Report Status**

This document has been compiled by RMT on behalf of the manufacturer of the product and serves as the manufacturer's Safety Data Sheet ('SDS').

It is based on information concerning the product which has been provided to RMT by the manufacturer or obtained from third party sources and is believed to represent the current state of knowledge as to the appropriate safety and handling precautions for the product at the time of issue. Further clarification regarding any aspect of the product should be obtained directly from the manufacturer.

While RMT has taken all due care to include accurate and up-to-date information in this SDS, it does not provide any warranty as to accuracy or completeness. As far as lawfully possible, RMT accepts no liability for any loss, injury or damage (including consequential loss) which may be suffered or incurred by any person as a consequence of their reliance on the information contained in this SDS.

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End of SDS