

SAFETY DATA SHEET



Revision date: 11-Mar-2022

Revision Number 11

1. IDENTIFICATION OF THE MATERIAL AND SUPPLIER

Product identifier

Product Name CHLORINE
Product Code(s) 000031098201
Synonyms Liquefied chlorine, Liquid chlorine, Diatomic chlorine, Chlorine cylinder (used)
Recommended use Disinfection, water treatment, bleaching, metal recovery, neutralising agent, oxidant.

Supplier

Ixom Central Pacific Ltd
Company Number: 1030
Street Address: Lots 3&4 Wailada Industrial Estate
Lami
Fiji
Telephone Number: +67 9 336 1144
Facsimile: +67 9 336 1500

Emergency telephone number **+61 3 9663 2130 (International, Australia, All Hours)**

Please ensure you refer to the limitations of this Safety Data Sheet as set out in the "Other Information" section at the end of this Data Sheet.

2. HAZARDS IDENTIFICATION

GHS Classification

Classified as dangerous goods in accordance with the Australian Code for the Transport of Dangerous Goods by Road and Rail (ADG).

AU07 UN 1017 CHLORINE has a subsidiary risk 5.1, as well as 8. Despite this, when transported in cylinders, pressure drums, MEGCs or tanks, chlorine gas is not considered incompatible with dangerous goods of Class 8 or 9, or Division 6.1, or combustible liquids.

Classified as a hazardous chemical in accordance with the criteria of Safe Work Australia - Globally Harmonized System (GHS).

Oxidizing gases	Category 1
Gases under pressure	Liquefied gas
Acute toxicity - Inhalation (Gases)	Category 3
Skin corrosion/irritation	Category 2
Serious eye damage/eye irritation	Category 2
Specific target organ toxicity (single exposure)	Category 3
Acute aquatic toxicity	Category 1

SIGNAL WORD

Danger

Label elements

**Hazard statements**

H270 - May cause or intensify fire; oxidizer
 H280 - Contains gas under pressure; may explode if heated
 H315 - Causes skin irritation
 H319 - Causes serious eye irritation
 H331 - Toxic if inhaled
 H335 - May cause respiratory irritation

The following health/environmental hazard categories fall outside the scope of the Workplace Health and Safety Regulations:

H400 - Very toxic to aquatic life

Precautionary Statements - Prevention

Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking
 Keep/Store away from clothing/ combustible materials
 Keep valves and fittings free from oil and grease
 Do not breathe mist, vapours, spray.
 Wash hands thoroughly after handling
 Do not eat, drink or smoke when using this product
 Use only outdoors or in a well-ventilated area
 Wear protective gloves / protective clothing / eye protection / face protection
 Avoid release to the environment

Precautionary Statements - Response

Immediately call a POISON CENTER or doctor/physician
 Specific treatment (see First aid on this SDS)
 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
 If eye irritation persists: Get medical advice/attention
 IF ON SKIN: Wash with plenty of water and soap
 If skin irritation occurs: Get medical advice/attention
 Take off contaminated clothing and wash before reuse
 IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
 Call a POISON CENTER or doctor/physician
 IF SWALLOWED: Rinse mouth. DO NOT induce vomiting
 IF SWALLOWED: Call a POISON CENTER or doctor if you feel unwell
 In case of fire: Stop leak if safe to do so
 Collect spillage

Precautionary Statements - Storage

Store in a well-ventilated place. Keep container tightly closed
 Store locked up

Precautionary Statements - Disposal

Dispose of contents/container in accordance with local, regional, national, and international regulations as applicable

Other hazards which do not result in classification

AUH071 - Corrosive to the respiratory tract
 Contact with evaporating liquid may cause frostbite or freezing of skin.
 Very toxic to aquatic life

General Hazards

Contact with evaporating liquid may cause frostbite or freezing of skin.

Poisons Schedule (SUSMP)

7

3. COMPOSITION/INFORMATION ON INGREDIENTS**Substance**

Chemical name	CAS No.	Weight-%
Chlorine	7782-50-5	>=99.8

4. FIRST AID MEASURES

Description of first aid measures

General advice	For advice, contact a Poisons Information Centre (e.g. phone Australia 13 11 26; New Zealand 0800 764 766) or a doctor. Immediate medical attention is required. Take a copy of the Safety Data Sheet when going for medical treatment.
Inhalation	Remove to fresh air and keep at rest in a position comfortable for breathing. If breathing is difficult, (trained personnel should) give oxygen. Immediately give oxygen if victim turns blue (lips, ears, fingernails). If breathing has stopped, give artificial respiration. Get medical attention immediately.
Eye contact	Immediately flush with plenty of water. After initial flushing, remove any contact lenses and continue flushing for at least 15 minutes. Keep eye wide open while rinsing. Call a physician immediately.
Skin contact	Immediately flush eyes or skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Seek immediate medical attention/advice. A physician should see the patient promptly if contact with the product has resulted in blistering of the dermal surface or in deep tissue freezing. Caution - material can be very cold. For dermal contact or suspected frostbite, remove contaminated clothing and flush affected areas with lukewarm water. DO NOT USE HOT WATER. Clothing frozen to the skin should be thawed before being removed. Call a physician immediately.
Ingestion	Call a physician immediately. Rinse mouth thoroughly with water. Not an expected route of exposure.
Self-protection of the first aider	Ensure that medical personnel are aware of the material(s) involved, take precautions to protect themselves and prevent spread of contamination. Avoid contact with skin, eyes, and clothing. Do not breathe fume, gas, mist, vapours, spray. Use personal protective equipment as required. See section 8 for more information.

Most important symptoms and effects, both acute and delayed

Symptoms	Contact with very cold material can cause freeze burns. Erythema (skin redness). Irritation. May cause redness and tearing of the eyes. Coughing and/ or wheezing. Difficulty in breathing.
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Indication of any immediate medical attention and special treatment needed

Note to physicians	Treat symptomatically. Material may be very cold and may cause freeze burns. Delayed pulmonary edema may occur. Administration of 5% carbon dioxide/oxygen medical gas mixture to patients with chronic respiratory disease or drug induced respiratory depression is potentially dangerous. 5% carbon dioxide/oxygen medical gas mixture should not be given to acidotic patients.
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5. FIRE FIGHTING MEASURES

Suitable Extinguishing Media

Suitable Extinguishing Media	Dry chemical, CO2, water spray or regular foam.
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Unsuitable extinguishing media No information available.

Specific hazards arising from the chemical

Specific hazards arising from the chemical May cause fire or explosion; strong oxidizer. Cylinders may rupture under extreme heat. Damaged cylinders should be handled only by specialists. In the event of fire and/or explosion do not breathe fumes. Most vapors are heavier than air. Vapors may spread along ground and collect in low or confined areas (sewers, basements, tanks). Corrosive hazard. Wear protective gloves/clothing and eye/face protection. Environmentally hazardous.

Special protective actions for fire-fighters

Special protective equipment for fire-fighters Firefighters should wear self-contained breathing apparatus and full firefighting turnout gear. Heating can cause expansion or decomposition of the material, which can lead to the containers exploding. If safe to do so, remove containers from the path of fire. Fight fire from maximum distance or use unmanned hose holders or monitor nozzles. Cylinders may rupture under extreme heat. Fight fire remotely due to the risk of explosion. Consider evacuation. Damaged cylinders should be handled only by specialists. Use personal protection equipment.

Hazchem code 2XE

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures

Personal precautions Evacuate personnel to safe areas. Keep people away from and upwind of spill/leak. Ensure adequate ventilation. Do not breathe fume, gas, mist, vapours, spray. Avoid contact with skin, eyes and inhalation of vapors. Seek specialist advice. Use personal protective equipment as required. See section 8 for more information.

Other information Refer to protective measures listed in Sections 7 and 8.

For emergency responders Clear area of all unprotected personnel. Ventilate the area. Work up wind or increase ventilation. Use personal protective equipment as required. Use personal protection recommended in Section 8. Seek specialist advice.

Environmental precautions

Environmental precautions Should not be released into the environment. Local authorities should be advised if significant spillages cannot be contained. Prevent entry into waterways, sewers, basements or confined areas. Prevent product from entering drains. Keep out of waterways.

Methods and material for containment and cleaning up

Methods for containment Stop leak if you can do it without risk.

Methods for cleaning up Work up wind or increase ventilation. This material is a liquefied gas. For a major leak which cannot be isolated use water fog to disperse vapour. DO NOT direct water onto liquid chlorine or leaking container. SMALL SPILLS: Small spills are allowed to evaporate provided there is adequate ventilation. LARGE SPILLS: Contain - prevent run off into drains and waterways. Use absorbent (soil, sand or other inert material). If safe to do so, cover with a large plastic sheet. Notify emergency services.

7. HANDLING AND STORAGE

Precautions for safe handling

Advice on safe handling	Do not breathe vapor or mist. Avoid contact with skin, eyes, and clothing. Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Protect cylinders from physical damage; do not drag, roll, slide or drop. Contents under pressure. Use personal protection equipment. Keep out of reach of children.
General hygiene considerations	Avoid contact with skin, eyes, and clothing. Do not breathe fume, gas, mist, vapours, spray. Keep away from food, drink and animal feeding stuffs. Handle in accordance with good industrial hygiene and safety practice.
<u>Conditions for safe storage, including any incompatibilities</u>	
Storage Conditions	Keep containers tightly closed in a cool, well-ventilated place. Keep dry, reacts with water. Store locked up. Keep at temperatures below 50°C / 122°F. Store away from foodstuffs and sources of heat or ignition. Cylinders should be stored upright with valve protection cap in place and firmly secured to prevent falling. Check cylinders regularly for leaks. This material is a Scheduled Poison and must be stored, maintained and used in accordance with the relevant regulations.
Incompatible materials	Combustible material. Reducing agents. Glass. Aluminium. Copper. Tin.
Poisons Schedule (SUSMP)	7

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters

Exposure Limits

Chlorine: Peak Limitation = 3 mg/m³ (1 ppm)

As published by Safe Work Australia Workplace Exposure Standards for Airborne Contaminants.

Peak Limitation - a maximum or peak airborne concentration of a particular substance determined over the shortest analytically practicable period of time which does not exceed 15 minutes.

These Workplace Exposure Standards are guides to be used in the control of occupational health hazards. All atmospheric contamination should be kept to as low a level as is workable. These workplace exposure standards should not be used as fine dividing lines between safe and dangerous concentrations of chemicals. They are not a measure of relative toxicity.

Appropriate engineering controls

Engineering controls

Ventilation systems. Ensure adequate ventilation, especially in confined areas. Apply technical measures to comply with the occupational exposure limits.

If in the handling and application of this material, safe exposure levels could be exceeded, the use of engineering controls such as local exhaust ventilation must be considered and the results documented. If achieving safe exposure levels does not require engineering controls, then a detailed and documented risk assessment using the relevant Personal Protective Equipment (PPE) (refer to PPE section below) as a basis must be carried out to determine the minimum PPE requirements.

Individual protection measures, such as personal protective equipment

The selection of PPE is dependent on a detailed risk assessment. The risk assessment should consider the work situation, the

physical form of the chemical, the handling methods, and environmental factors.

OVERALLS, CHEMICAL GOGGLES, RUBBER BOOTS, AIR MASK , GLOVES (Long), APRON.

NOTE: Chemical goggles and face shield are not required if wearing an air-supplied mask.



Eye/face protection	Tight sealing safety goggles. If there is a risk of contact: Face protection shield.
Skin and body protection	Rubber boots. Overalls. If there is a risk of contact: Chemical resistant apron.
Hand protection	Elbow-length impervious gloves.
Respiratory protection	If determined by a risk assessment an inhalation risk exists, wear an air supplied respirator meeting the requirements of AS/NZS 1715 and AS/NZS 1716.
Environmental exposure controls	No information available.
Thermal hazards	Caution - material can be very cold. Avoid contact with escaping gas.

9. PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

Physical state	Gas
Appearance	Liquefied gas
Color	Greenish - Yellow (high concentrations) , Colourless (low concentrations)
Odor	Pungent , Irritating
Odor threshold	ca. 1 ppm

<u>Property</u>	<u>Values</u>	<u>Remarks • Method</u>
pH	No data available	None known
pH (as aqueous solution)	No data available	None known
Melting point / freezing point	-101 °C	None known
Boiling point / boiling range	-34 °C	None known
Flash point	Not applicable	None known
Evaporation rate	No data available	None known
Flammability (solid, gas)	No data available	None known
Flammability Limit in Air		None known
Upper flammability or explosive limits	No data available	
Lower flammability or explosive limits	No data available	
Vapor pressure	666 kPa @20°C	None known
Vapor density	2.4 (air=1)	None known
Relative density	1.468 (liquid); 1.56 @ -35°C.	None known
Water solubility	5.1 g/L @ 30 °C	None known
Solubility(ies)	No data available	None known
Partition coefficient	No data available	None known
Autoignition temperature	No data available	None known
Decomposition temperature	No data available	None known
Kinematic viscosity	No data available	None known
Dynamic viscosity	No data available	None known

Other information

Molecular formula Cl₂

10. STABILITY AND REACTIVITY

Reactivity

Reactivity Chlorine reacts violently with many organic chemicals (e.g. mineral oils, greases), hydrocarbons, silicones, and finely divided metals. Forms explosive mixtures with alcohols, glycols, ammonia and its compounds, and hydrogen over a wide range of concentrations.

Chemical stability

Stability Corrosive to metals in the presence of moisture.

Explosion data

Sensitivity to mechanical impact None.

Sensitivity to static discharge No information available.

Possibility of hazardous reactions

Possibility of hazardous reactions Oxidizing agent. Supports combustion of other materials and increases intensity of a fire.

Hazardous polymerization Hazardous polymerization does not occur.

Conditions to avoid

Conditions to avoid Keep away from open flames, hot surfaces and sources of ignition. Loss of containment. Moisture. Keep from any possible contact with water. Do not contaminate food or feed stuffs. Avoid contact with combustible substances.

Incompatible materials

Incompatible materials Combustible material. Reducing agents. Glass. Aluminium. Copper. Tin.

Hazardous decomposition products

Hazardous decomposition products Chlorine oxides. Chlorine compounds.

11. TOXICOLOGICAL INFORMATION

Acute toxicity

Information on likely routes of exposure

Product Information No adverse health effects expected if the chemical is handled in accordance with this Safety Data Sheet and the chemical label. Symptoms or effects that may arise if the chemical is mishandled and overexposure occurs are:

Inhalation Toxic if inhaled. Corrosive to the respiratory tract. Inhalation of corrosive fumes/gases may cause coughing, choking, headache, dizziness, and weakness for several hours. Pulmonary edema may occur with tightness in the chest, shortness of breath, bluish skin, decreased blood pressure, and increased heart rate. Large exposures may be fatal. In high concentration the gas may cause a suffocation. Victim may not be aware of asphyxiation.

Eye contact Causes serious eye irritation. When cold: Contact with product may cause frostbite. Can result in permanent injury.

Skin contact Causes skin irritation. Caution - material can be very cold. Contact with product may cause frostbite.

Ingestion

Not a likely route of exposure, however, swallowing liquid chlorine will result in freeze burns of the mouth, throat, and stomach. Swallowing can result in chemical burns to the mouth, throat and abdomen; perforation of the gastrointestinal tract and vomiting of blood and eroded tissue.

Symptoms

Irritation. Erythema (skin redness). Burning. May cause redness and tearing of the eyes. Coughing and/ or wheezing. Difficulty in breathing.

Numerical measures of toxicity - Product Information

Chemical name	Oral LD50	Dermal LD50	Inhalation LC50
Chlorine	= 6800 mg/kg (Rat) = 5800 mg/kg (Rat)	-	= 293 ppm (Rat) 1 h

See section 16 for terms and abbreviations

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Skin corrosion/irritation	Causes skin irritation.
Serious eye damage/eye irritation	Causes serious eye irritation.
Respiratory or skin sensitization	No information available.
Germ cell mutagenicity	No information available.
Carcinogenicity	Not listed as carcinogenic according to IARC. (IARC - International Agency for Research on Cancer).
Reproductive toxicity	No information available.
STOT - single exposure	Corrosive to the respiratory tract.
STOT - repeated exposure	No information available.
Aspiration hazard	No information available.
Chronic effects:	Repeated low-level contact with chlorine may cause erosion of the teeth and chloracne.

12. ECOLOGICAL INFORMATION**Ecotoxicity**

Ecotoxicity Keep out of waterways. Very toxic to aquatic life.

Chemical name	Algae/aquatic plants	Fish	Toxicity to microorganisms	Crustacea
Chlorine	-	LC50: =0.44mg/L (96h, Lepomis macrochirus) LC50: =0.014mg/L (96h, Oncorhynchus mykiss) LC50: 0.104 - 0.168mg/L (96h, Oncorhynchus mykiss) LC50: =0.08mg/L (96h, Pimephales	-	LC50: =0.017mg/L (48h, Daphnia magna)

		promelas) LC50: =0.1mg/L (96h, Pimephales promelas)		
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Persistence and degradability

Persistence and degradability Not readily biodegradable.

Bioaccumulative potential

Bioaccumulation Material does not bioaccumulate.

Mobility

Mobility in soil Very toxic to the soil environment.

Other adverse effects**13. DISPOSAL CONSIDERATIONS****Waste treatment methods**

Waste from residues/unused products Contact supplier for advice. For all Ixom labelled chlorine packages, return directly to Ixom. Dispose of in accordance with local regulations. Dispose of waste in accordance with environmental legislation.

14. TRANSPORT INFORMATION**ADG**

Classified as Dangerous Goods by the criteria of the Australian Dangerous Goods Code (ADG Code) for Transport by Road and Rail; DANGEROUS GOODS.

AU07 UN 1017 CHLORINE has a subsidiary risk 5.1, as well as 8. Despite this, when transported in cylinders, pressure drums, MEGCs or tanks, chlorine gas is not considered incompatible with dangerous goods of Class 8 or 9, or Division 6.1, or combustible liquids.

UN number	1017
Proper shipping name	CHLORINE
Hazard class	2.3
Subsidiary hazard class	5.1
Subsidiary hazard class 2	8
Hazchem code	2XE

IATA

TRANSPORT PROHIBITED under the International Air Transport Association (IATA) Dangerous Goods Regulations for transport by air in Passenger and Cargo Aircraft, and Cargo Aircraft Only.

Subsidiary hazard class 2 8

IMDG

Classified as Dangerous Goods by the criteria of the International Maritime Dangerous Goods Code (IMDG Code) for transport by sea; DANGEROUS GOODS.

UN number	1017
UN proper shipping name	CHLORINE
Transport hazard class(es)	2.3
Subsidiary hazard class	5.1

Subsidiary hazard class 2	8
IMDG EMS Fire	F-C
IMDG EMS Spill	S-U
Marine pollutant	Yes

15. REGULATORY INFORMATION

Safety, health and environmental regulations/legislation specific for the substance or mixture

National regulations

Australia

Classified as dangerous goods in accordance with the Australian Code for the Transport of Dangerous Goods by Road and Rail (ADG).

AU07 UN 1017 CHLORINE has a subsidiary risk 5.1, as well as 8. Despite this, when transported in cylinders, pressure drums, MEGCs or tanks, chlorine gas is not considered incompatible with dangerous goods of Class 8 or 9, or Division 6.1, or combustible liquids.

Classified as a hazardous chemical in accordance with the criteria of Safe Work Australia - Globally Harmonized System (GHS).

See section 8 for national exposure control parameters

Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP)

Classified as a scheduled poison according to the Standard for Uniform Scheduling of Medicines and Poisons (SUSMP)

Poisons Schedule (SUSMP) 7

Major hazard (accident/incident planning) regulation

Verify that license requirements are met

Chemical name	Threshold quantity (T)
Chlorine - 7782-50-5	25 tonne TQ

National pollutant inventory

Subject to reporting requirement

Chemical name	National pollutant inventory
Chlorine - 7782-50-5	10 tonne/yr Threshold category 1

International Inventories

AIIC

This material is listed on the Australian Inventory of Industrial Chemicals.

NZIoC

This material is listed on the New Zealand Inventory of Chemicals.

Legend:

AIIC - Australian Inventory of Industrial Chemicals

NZIoC - New Zealand Inventory of Chemicals

International Regulations

The Montreal Protocol on Substances that Deplete the Ozone Layer Not applicable

The Stockholm Convention on Persistent Organic Pollutants Not applicable

The Rotterdam Convention Not applicable

16. OTHER INFORMATION

Reason(s) For Issue: 5 Yearly Revised Primary SDS

Issuing Date: 11-Mar-2022

This Safety Data Sheet has been prepared by Ixom Operations Pty Ltd (Toxicology and SDS Services).

Revision Note:

The symbol (*) in the margin of this SDS indicates that this line has been revised.

Key or legend to abbreviations and acronyms used in the safety data sheet

Legend Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

TWA	TWA (time-weighted average)	STEL	STEL (Short Term Exposure Limit)
Ceiling	Maximum limit value	*	Skin designation
C	Carcinogen		

Key literature references and sources for data used to compile the SDS

EPA (Environmental Protection Agency)
Acute Exposure Guideline Level(s) (AEGl(s))
U.S. Environmental Protection Agency Federal Insecticide, Fungicide, and Rodenticide Act
U.S. Environmental Protection Agency High Production Volume Chemicals
Food Research Journal
Hazardous Substance Database
International Uniform Chemical Information Database (IUCLID)
Japan GHS Classification
Australian Industrial Chemicals Introduction Scheme (AICIS)
NIOSH (National Institute for Occupational Safety and Health)
National Library of Medicine's ChemID Plus (NLM CIP)
National Library of Medicine's PubMed database (NLM PUBMED)
National Toxicology Program (NTP)
New Zealand's Chemical Classification and Information Database (CCID)
Organization for Economic Co-operation and Development Environment, Health, and Safety Publications
Organization for Economic Co-operation and Development High Production Volume Chemicals Program
Organization for Economic Co-operation and Development Screening Information Data Set
RTECS (Registry of Toxic Effects of Chemical Substances)
World Health Organization

Disclaimer

This SDS summarises to our best knowledge at the date of issue, the chemical health and safety hazards of the material and general guidance on how to safely handle the material in the workplace. Since Ixom Operations Pty Ltd cannot anticipate or control the conditions under which the product may be used, each user must, prior to usage, assess and control the risks arising from its use of the material.

If clarification or further information is needed, the user should contact their Ixom representative or Ixom Operations Pty Ltd at the contact details on page 1.

Ixom Operations Pty Ltd's responsibility for the material as sold is subject to the terms and conditions of sale, a copy of which is available upon request.

End of Safety Data Sheet