

Safety Data Sheet



1. IDENTIFICATION OF THE MATERIAL AND SUPPLIER

Product Name: CHLORINE

Other name(s): Liquefied chlorine, Liquid chlorine, Diatomic chlorine, Chlorine cylinder (used)

Recommended Use of the Chemical and Restrictions on Use Disinfection, water treatment, bleaching, metal recovery, neutralising agent, oxidant.

Supplier: Ixom Operations Pty Ltd (Incorporated in Australia)
NZBN: 9429041465226
Street Address: 166 Totara Street
Mt Maunganui South
New Zealand

Telephone Number: +64 9 368 2700
Facsimile: +64 9 368 2710
Emergency Telephone: 0 800 734 607 (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

Classified as a Dangerous Good according to NZS 5433:2012 Transport of Dangerous Goods on Land.

Classified as hazardous according to criteria in the Hazardous Substances (Minimum Degrees of Hazard) Notice 2017 and the Hazardous Substances (Classification) Notice 2017.

SIGNAL WORD: DANGER

Subclasses:

Subclass 5.1.2 Category A (Oxidising Substances that are gases) - Oxidising Substances.
Subclass 6.1 Category A - Substances which are acutely toxic.
Subclass 6.9 Category A - Substances that are toxic to human target organs or systems.
Subclass 8.1 Category A - Substances that are corrosive to metals.
Subclass 8.2 Category A - Substances that are corrosive to dermal tissue.
Subclass 8.3 Category A - Substances that are corrosive to ocular tissue.
Subclass 9.1 Category A - Substances that are very ecotoxic in the aquatic environment.
Subclass 9.2 Category A - Substances that are very ecotoxic in the soil environment.

The 'Hazardous Substances (Tracking) Regulations 2001' are applicable to this material.

Approval Number: HSR001058



Hazard Statement(s):

H270 May cause or intensify fire; oxidizer.
H290 May be corrosive to metals.
H330 Fatal if inhaled.
H314 Causes severe skin burns and eye damage.
H372 Causes damage to organs through prolonged or repeated exposure.
H400 Very toxic to aquatic life.
H421 Very toxic to the soil environment.

Product Name: CHLORINE
Substance No: 000031098201

Issued: 27/02/2018
Version: 10

Safety Data Sheet



Precautionary Statement(s):

Prevention:

P102 Keep out of reach of children.
P260 Do not breathe mist/vapours/spray.
P264 Wash hands thoroughly after handling.
P270 Do not eat, drink or smoke when using this product.
P271 Use only outdoors or in a well-ventilated area.
P280 Wear protective gloves/protective clothing/eye protection/face protection.
P284 Wear respiratory protection.
P273 Avoid release to the environment.

Response:

P301+P330+P331 IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
P303+P361+P353 IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.
P363 Wash contaminated clothing before re-use.
P320 Specific treatment is urgent (see First Aid Measures on the Safety Data Sheet).
P304+P340 IF INHALED: Remove to fresh air and keep at rest in a position comfortable for breathing.
P314 Get medical advice/attention if you feel unwell.
P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P310 Immediately call a POISON CENTER or doctor/physician.
P391 Collect spillage.

Storage:

P403+P233 Store in a well-ventilated place. Keep container tightly closed.
P405 Store locked up.

Disposal:

P501 In case of a substance that is in compliance with a HSNO approval other than a Part 6A (Group Standards) approval, a label must provide a description of one or more appropriate and achievable methods for the disposal of a substance in accordance with the Hazardous Substances (Disposal) Notice 2017. This may also include any method of disposal that must be avoided.

Other Hazards:

Corrosive to the respiratory tract.
Contact with evaporating liquid may cause frostbite or freezing of skin.

3. COMPOSITION AND INFORMATION ON INGREDIENTS

| Components | CAS Number | Proportion | Hazard Codes |
|------------|------------|------------|----------------------------------|
| Chlorine | 7782-50-5 | >=99.8% | H270 H331 H319 H335 H315 H400 |

4. FIRST AID MEASURES

For advice, contact a Poisons Information Centre (e.g. phone Australia 131 126; New Zealand 0800 764 766) or a doctor at once.

Inhalation:

Remove victim from area of exposure - avoid becoming a casualty. Remove contaminated clothing and loosen remaining clothing. Allow patient to assume most comfortable position and keep warm. Keep at rest until fully recovered. If patient finds breathing difficult and develops a bluish discolouration of the skin (which suggests a lack of oxygen in the blood - cyanosis), ensure airways are clear of any obstruction and have a qualified person give oxygen through a face mask. Apply artificial respiration if patient is not breathing. Seek immediate medical advice.

Safety Data Sheet



Skin Contact:

If skin or hair contact occurs, immediately remove any contaminated clothing and wash skin and hair thoroughly with running water. If swelling, redness, blistering or irritation occurs seek medical assistance. For skin burns, cover with a clean, dry dressing until medical help is available. Launder contaminated clothing before reuse.

Eye Contact:

If in eyes, hold eyelids apart and flush the eye continuously with running water. Continue flushing until advised to stop by a Poisons Information Centre or a doctor, or for at least 15 minutes.

Ingestion:

Immediately rinse mouth with water. If swallowed, do NOT induce vomiting. Give a glass of water. Seek immediate medical assistance.

Indication of immediate medical attention and special treatment needed:

Treat symptomatically. Effects may be delayed. Delayed pulmonary oedema may result. May be fatal if inhaled.

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.

5. FIRE FIGHTING MEASURES

Suitable Extinguishing Media:

Not combustible, however, if material is involved in a fire use: Fine water spray, normal foam, dry agent (carbon dioxide, dry chemical powder).

Hazchem or Emergency Action Code: 2XE

Specific hazards arising from the chemical:

Non combustible, but will support combustion of other materials. Oxidizing substance. Gas/vapour is heavier than air; may accumulate in confined spaces. Environmentally hazardous.

Special protective equipment and precautions for fire-fighters:

Not combustible, however will support the combustion of other materials. Keep containers cool with water spray. 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. Only move cool cylinders. Do not approach cylinders suspected to be hot. Fire fighters to wear self-contained breathing apparatus and suitable protective clothing if risk of exposure. If unable to keep cylinders cool, evacuate area.

6. ACCIDENTAL RELEASE MEASURES

Emergency procedures/Environmental precautions:

Clear area of all unprotected personnel. Evacuate personnel from downwind areas. Wear protective equipment to prevent skin and eye contact and inhalation of vapours/dusts. Avoid breathing in vapours. Work up wind or increase ventilation. Wear self contained breathing apparatus. Shut off leak if possible without risk. Work up wind. Use water spray to disperse vapour. DO NOT spray water directly on the leak, liquid chlorine or chlorine container. If safe to do so, rotate container so that gas and not liquid escapes. SMALL SPILLS: Allow liquid to evaporate.

Seek specialist advice. For large spills notify the Emergency Services. Do not allow container or product to get into drains, sewers, streams or ponds.

Chlorine gas only becomes visible at high concentrations.

Safety Data Sheet



Personal precautions/Protective equipment/Methods and materials for containment and cleaning up:

Clear area of all unprotected personnel. Wear protective equipment to prevent skin and eye contact and breathing in vapours. Avoid breathing in vapours. Work up wind or increase ventilation. Air-supplied masks are recommended to avoid inhalation of toxic material. For gas leak, DO NOT spray water directly on the leak or chlorine container. Use fire hoses equipped with fog nozzles to disperse gas downwind. For liquid: Contain - prevent run off into drains and waterways. Use fog nozzles as before. Do NOT allow any water to fall onto a pool of liquid chlorine as this will increase gas cloud. If safe to do so, cover with large plastic sheet. Where possible vapour knock down water should be contained.

7. HANDLING AND STORAGE

Precautions for safe handling: Avoid all contact. When using do not eat, drink or smoke. Only experienced and properly instructed persons should handle gases under pressure. Use only properly specified equipment which is suitable for this product, its supply pressure and temperature. 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. Never attempt to transfer gases from one container to another.

Conditions for safe storage, including any incompatibilities: Store in a well ventilated area. Store below 50°C. Store away from foodstuffs. Store away from combustible materials. Store away from incompatible materials described in Section 10. Keep dry - reacts with water. Cylinders should be securely restrained so that they are kept upright at all times. Drums should be stored horizontally. Keep containers closed when not in use - check regularly for leaks.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Chlorine: WES-TWA 0.5 ppm, 1.5 mg/m³; WES-STEL 1 ppm, 2.9 mg/m³

As published by the New Zealand Workplace Health & Safety Authority.

WES - TWA (Workplace Exposure Standard - Time Weighted Average) - The eight-hour, time-weighted average exposure standard is designed to protect the worker from the effects of long-term exposure.

WES - STEL (Workplace Exposure Standard - Short Term Exposure Limits) - The 15 minute average exposure standard. Applies to any 15 minute period in the working day and is designed to protect the worker against adverse effects of irritation, chronic or irreversible tissue change, or narcosis that may increase the likelihood of accidents. The WES-STEL is not an alternative to the WES-TWA; both short-term and eight-hour, time-weighted average exposures should be determined.

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:

Ensure ventilation is adequate to maintain air concentrations below Workplace Exposure Standards. Vapour heavier than air - prevent concentration in hollows or sumps. DO NOT enter confined spaces where vapour may have collected.

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.

Safety Data Sheet



Individual protection measures, such as Personal Protective Equipment (PPE):

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, SAFETY SHOES, FACE SHIELD OR AIR MASK, GLOVES (Long).

* Not required if wearing air supplied mask.



Wear overalls, chemical goggles, full face shield, elbow-length impervious gloves. Use with adequate ventilation. If determined by a risk assessment an inhalation risk exists, wear an air-supplied mask meeting the requirements of AS/NZS 1715 and AS/NZS 1716. Always wash hands before smoking, eating, drinking or using the toilet. Wash contaminated clothing and other protective equipment before storage or re-use.

9. PHYSICAL AND CHEMICAL PROPERTIES

| | |
|---|--|
| Physical state: | Gas / Liquefied gas |
| Colour: | Greenish - Yellow (high concentrations) ; Clear/invisible (low concentrations) |
| Odour: | Pungent , Irritating |
| Odour Threshold: | 1 ppm (approx) |
| Molecular Formula: | Cl ₂ |
| Specific Gravity: | 1.468 (liquid); 1.56 (@ -35°C). |
| Relative Vapour Density (air=1): | 2.4 |
| Vapour Pressure (20 °C): | 666 kPa |
| Flash Point (°C): | Not applicable. |
| % Volatile by Volume: | ca. 100 |
| Solubility in water (g/L): | 5.1 @30°C |
| Boiling Point/Range (°C): | -34 |
| Freezing Point/Range (°C): | -101 |

10. STABILITY AND REACTIVITY

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|--|---|
| Reactivity: | 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: | Reactive chemical. Corrosive in the presence of moisture. |
| Possibility of hazardous reactions: | Oxidizing agent. Supports combustion of other materials and increases intensity of a fire. Corrosive to some metals in the presence of moisture. (brass, copper, lead, nickel, steel and stainless steel) Heating can cause expansion or decomposition of the material, which can lead to the containers exploding. Can react with acids and some nitrogen or phosphorous compounds. Hazardous polymerisation will not occur. |
| Conditions to avoid: | Avoid exposure to heat, sources of ignition, and open flame. Avoid contact with combustible chemicals. Do not allow water to come into contact with liquid chlorine. |

Safety Data Sheet



Incompatible materials: Incompatible with combustible materials. Incompatible with heat and hot surfaces. Incompatible with reducing agents. Incompatible with glass.

Hazardous decomposition products: Oxides of chlorine. Chlorine compounds.

11. TOXICOLOGICAL INFORMATION

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

Ingestion: Not a likely route of exposure, however, swallowing liquid 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.

Eye contact: A severe eye irritant. Corrosive to eyes; contact can cause corneal burns. Contamination of eyes can result in permanent injury. Liquid splashes or spray may cause freeze burns to the eye.

Skin contact: Liquid chlorine is corrosive to skin. Contact with skin will result in irritation. Liquid splashes or spray may cause freeze burns.

Inhalation: Material is irritant to the mucous membranes of the respiratory tract (airways). May cause coughing and shortness of breath. May cause adverse lung effects if high concentrations are inhaled. Inhalation of vapours may cause severe breathing difficulties and lung oedema. Delayed (up to 48 hours) fluid build up in the lungs may occur. Severe exposure may cause lung damage. Overexposure may result in death.

Acute toxicity:
Inhalation LC50 (rat): 146.5 ppm/4hr.

Skin corrosion/irritation: Corrosive (rabbit).
Serious eye damage/irritation: Severe irritant (rabbit).
Respiratory or skin sensitisation: Not classified.

Chronic effects: Not listed as carcinogenic according to the International Agency for Research on Cancer (IARC).

Mutagenicity: Not classified.
Carcinogenicity: Not classified.
Reproductive toxicity: Not classified.
Specific Target Organ Toxicity (STOT) - single exposure: Severe corrosion to the respiratory tract at high concentrations.
Specific Target Organ Toxicity (STOT) - repeated exposure: Not classified.
Aspiration hazard: Not applicable.

12. ECOLOGICAL INFORMATION

Ecotoxicity Avoid contaminating waterways.

Persistence/degradability: Not readily biodegradable.

Safety Data Sheet



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|-----------------------------------|--|
| Bioaccumulative potential: | Does not bioaccumulate. |
| Mobility in soil: | Low mobility in soil. |
| Aquatic toxicity: | Very toxic to aquatic organisms. |
| 48hr LC50 (Daphnia magna): | 0.15 mg/L (Static) Remarks: Mortality. |
| 96hr LC50 (fish): | 0.014 mg/L |
| Terrestrial toxicity: | Very ecotoxic in the soil environment. |

13. DISPOSAL CONSIDERATIONS

Disposal methods:

Refer to local government authority for disposal recommendations. Dispose of material through a licensed waste contractor. Contact supplier for advice. For all Ixom labelled chlorine packages, return directly to Ixom.

14. TRANSPORT INFORMATION

Road and Rail Transport

Classified as a Dangerous Good according to NZS 5433:2012 Transport of Dangerous Goods on Land.



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|--|---------------------|
| UN No: | 1017 |
| Transport Hazard Class: | 2.3 Toxic Gas |
| Subrisk 1: | 5.1 Oxidising Agent |
| Subrisk 2: | 8 Corrosive |
| Proper Shipping Name or Technical Name: | CHLORINE |
| Hazchem or Emergency Action Code: | 2XE |

Marine Transport

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

| | |
|--|---------------------|
| UN No: | 1017 |
| Transport Hazard Class: | 2.3 Toxic Gas |
| Subrisk 1: | 5.1 Oxidising Agent |
| Subrisk 2: | 8 Corrosive |
| Proper Shipping Name or Technical Name: | CHLORINE |
| IMDG EMS Fire: | F-C |
| IMDG EMS Spill: | S-U |

Marine Pollutant Yes

Air Transport

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.

15. REGULATORY INFORMATION

Classification:

Classified as hazardous according to criteria in the Hazardous Substances (Minimum Degrees of Hazard) Notice 2017 and the Hazardous Substances (Classification) Notice 2017.

Subclasses:

Subclass 5.1.2 Category A (Oxidising Substances that are gases) - Oxidising Substances.
Subclass 6.1 Category A - Substances which are acutely toxic.
Subclass 6.9 Category A - Substances that are toxic to human target organs or systems.
Subclass 8.1 Category A - Substances that are corrosive to metals.
Subclass 8.2 Category A - Substances that are corrosive to dermal tissue.
Subclass 8.3 Category A - Substances that are corrosive to ocular tissue.
Subclass 9.1 Category A - Substances that are very ecotoxic in the aquatic environment.
Subclass 9.2 Category A - Substances that are very ecotoxic in the soil environment.

The 'Hazardous Substances (Tracking) Regulations 2001' are applicable to this material.

Approval Number: HSR001058

Hazard Statement(s):

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H290 May be corrosive to metals.
H330 Fatal if inhaled.
H314 Causes severe skin burns and eye damage.
H372 Causes damage to organs through prolonged or repeated exposure.
H400 Very toxic to aquatic life.
H421 Very toxic to the soil environment.

16. OTHER INFORMATION

Supplier Safety Data Sheet; 10/ 2015.

This safety data sheet has been prepared by Ixom Operations Pty Ltd Toxicology & SDS Services.

Maximum use rate for potable water treatment is 30 mg/L (as per NSF certification)

Reason(s) for Issue:

5 Yearly Revised Primary SDS

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.