



***FIRE SERVICE
TRAINING***

Safety Data Sheet

Do not write in booklet

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, neutralizing agent, oxidant.

Supplier: OSU – FST
Street Address: 1723 W Tyler,
Stillwater, OK 74078
USA

Telephone Number: 405-744-5727
Facsimile: 405-744-7377
Emergency Telephone: **1-800-304-5727 (ALL HOURS)**

2. HAZARDS IDENTIFICATION

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

This material is hazardous according to Safe Work Australia; HAZARDOUS SUBSTANCE.

Classification of the substance or mixture:

Oxidizing Gases - Category 1
Gases under pressure - Liquefied Gas
Skin Irritation - Category 2
Eye Irritation - Category 2A
Acute Inhalation Toxicity - Category 3
Specific target organ toxicity (single exposure) - Category 3

The following health/environmental hazard categories fall outside the scope of the Workplace Health and Safety Regulations:
Acute Aquatic Toxicity - Category 1

SIGNAL WORD: DANGER



Hazard Statement(s):

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.
H400 Very toxic to aquatic life.

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Precautionary Statement(s):

Prevention:

- P220 Keep / Store away from clothing / incompatible materials / combustible materials.
- P244 Keep valves and fittings free from oil and grease.
- P261 Avoid breathing dust / fume / gas / mist / vapors / spray.
- P271 Use only outdoors or in a well-ventilated area.
- P264 Washhands thoroughly after handling.
- P280 Wear protective gloves / protective clothing / eye protection / face protection.
- P273 Avoid release to the environment.

Response:

- P302+P352 IF ON SKIN: Washwith plenty of soap and water.
- P332+P313 If skin irritation occurs: Get medical advice/attention.
- P362 Take off contaminated clothing and washbefore reuse.
- P321 Specific treatment (see FirstAid Measures on Safety Data Sheet).
- P304+P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing.
- P311 Call a POISON CENTER or doctor/physician.
- P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes.Remove contact lenses,if present and easy to do. Continue rinsing.
- P337+P313 If eye irritation persists: Get medical advice/attention.
- P312 Call a POISON CENTER or doctor/physician if you feel unwell.
- P370+P378 In case of fire: Use extinguishing media as outlined in Section 5 of this Safety Data Sheet to extinguish.
- P391 Collect spillage.

Storage:

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

Disposal:

- P501 Dispose of contents/container in accordance with local/regional/national/international regulations.

Poisons Schedule (SUSMP): S7 Dangerous Poison.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Components	CAS Number	Proportion	Hazard Codes
Chlorine	7782-50-5	>=99.8%	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 discoloration 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.

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.

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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 edema may result.

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 substance or mixture:

Noncombustible, but will support combustion of other materials. Oxidizing substance.

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 vapors/dusts. Avoid breathing in vapors. 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 vapor. 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.

Chlorine gas only becomes visible at high concentrations.

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 vapors. Avoid breathing in vapors. 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 vapor knock down water should be contained.

7. HANDLING AND STORAGE

This material is a Scheduled Poison S7 and must be stored, maintained and used in accordance with the relevant regulations.

Precautions for safe handling:

Avoid skin and eye contact and breathing in vapor. Avoid all contact.

Conditions for safe storage, including any incompatibilities:

Store in a well ventilated area. 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: 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:

Ensure ventilation is adequate to maintain air concentrations below Workplace Exposure Standards. If inhalation risk exists: Use with local exhaust ventilation or while wearing air supplied mask. Vapor heavier than air - prevent concentration in hollows or sumps. DO NOT enter confined spaces where vapor may have collected.

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.

Orica Personal Protection Guide No. 1, 1998: I - 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 inhalation risk exists, wear 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 / Liquid
Color: Greenish - Yellow (high concentrations); Clear/invisible (low concentrations)
Odor: Pungent, Irritating
Odor Threshold: 1 ppm (approx)
Molecular Formula: Cl₂

Product Name: CHLORINE
Substance No: 000031098201

Issued: 26/08/2013
Version: 9

9. PHYSICAL AND CHEMICAL PROPERTIES

Specific Gravity:	1.468 (liquid); 1.56 (@ -35°C).
Relative Vapor Density (air=1):	2.4
Vapor Pressure (20 °C):	666 kPa
Flash Point (°C):	Not applicable.
% Volatile by Volume:	ca. 100
Solubility in water (g/L):	7300 mg/L
Boiling Point/Range (°C):	-34
Freezing Point/Range (°C):	-101

10. STABILITY AND REACTIVITY

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 polymerization will not occur.
Conditions to avoid:	Avoid exposure to heat, sources of ignition, and open flame. Avoid contact with combustible substances. Do not allow water to come into contact with liquid chlorine.
Incompatible materials:	Incompatible with combustible materials. Incompatible with heat and hot surfaces. Incompatible with reducing agents.
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 vapors may cause severe breathing difficulties and lung edema. Delayed (up to 48 hours) fluid buildup in the lungs may occur. Severe exposure may cause lung damage. Overexposure may result in death.

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Acute toxicity:

Inhalation LC50 (rat): 293 ppm/1hr.
Inhalation LC50 (mice): 137 ppm/1hr.

Skin corrosion/irritation: Corrosive (rabbit).
Serious eye damage/irritation: Severe irritant (rabbit).
Chronic effects: No information available for the product.

12. ECOLOGICAL INFORMATION

Eco toxicity Avoid contaminating waterways.
Persistence/degradability: Does not accumulate in organisms. The material is not expected to bio concentrate.
Aquatic toxicity: Very toxic to aquatic organisms.
96hr LC50 (fish): 0.014 mg/L
Terrestrial toxicity: Very eco toxic in the soil environment.

13. DISPOSAL CONSIDERATIONS

Disposal methods:
Refer to Waste Management Authority. Dispose of material through a licensed waste contractor. Contact supplier for advice.
For all Orica labelled chlorine packages, return directly to Orica.

14. TRANSPORT INFORMATION

Road and Rail Transport

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



UN No: 1017
Transport Hazard Class: 2.3 Toxic Gas
Sub risk 1: 5.1 Oxidizing Agent
Sub risk 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
Product Name: CHLORINE
Substance No: 000031098201

Issued: 26/08/2013
Version: 9

Transport Hazard Class:
Sub risk 1:
Sub risk 2:

2.3 Toxic Gas
5.1 Oxidizing Agent
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 aircraft and cargo aircraft.

15. REGULATORY INFORMATION

Classification:

This material is hazardous according to Safe Work Australia; HAZARDOUS SUBSTANCE.

Classification of the substance or mixture:

Oxidizing Gases - Category 1
Gases under pressure - Liquefied Gas
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Poisons Schedule (SUSMP): S7 Dangerous Poison.

This material is listed on the Australian Inventory of Chemical Substances (AICS).

16. OTHER INFORMATION

'Registry of Toxic Effects of Chemical Substances'. Ed. D. Sweet, US Dept. of Health & Human Services: Cincinnati, 2012.

This safety data sheet has been prepared by Orica Toxicology & SDS Services.

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

Reason(s) for Issue:

Change in Handling & Storage Requirements

This SDS summarizes 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 Orica Limited 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 Orica representative or Orica Limited at the contact details on page 1.

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