

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

Other means of identification

UN number 1017
CAS No. 7782-50-5
Synonyms Liquefied chlorine, Liquid chlorine, Diatomic chlorine, Chlorine cylinder (used)
Formula Cl₂

Recommended use of the chemical and restrictions on use

Recommended use Disinfection, water treatment, bleaching, metal recovery, neutralising agent, oxidant.
Uses advised against No information available.

Details of the supplier of the safety data sheet

Supplier

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

Telephone Number: +64 9 368 2700
Facimile: +64 9 368 2710

For further information, please contact

Contact Point Product Safety Department

Emergency telephone number

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 Transport of Dangerous Goods on Land; DANGEROUS GOODS.

Classified as hazardous according to criteria in the Hazardous Substances (Hazard Classification) Notice 2020.

GHS Classification

SIGNAL WORD
Danger

Approval Code: HSR001058

Oxidizing gases	Category 1
Corrosive to metals	Category 1
Acute toxicity - Inhalation (Gases)	Category 1
Skin corrosion/irritation	Category 1 Sub-category A
Serious eye damage/eye irritation	Category 1
Specific target organ toxicity (repeated exposure)	Category 1
Acute aquatic toxicity	Category 1
Chronic aquatic toxicity	Category 2
New Zealand Soil toxicity	Yes

Label elements**Hazard statements**

H270 - May cause or intensify fire; oxidizer
H290 - May be corrosive to metals
H314 - Causes severe skin burns and eye damage
H318 - Causes serious eye damage
H330 - Fatal if inhaled
H372 - Causes damage to organs through prolonged or repeated exposure
H400 - Very toxic to aquatic life
H411 - Toxic to aquatic life with long lasting effects
Hazardous to the soil organisms

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 only in original container
Keep reduction valves free from grease and oil
Do not breathe fume, gas, mist, vapours, spray
Do not eat, drink or smoke when using this product
Wash hands thoroughly after handling
Use only outdoors or in a well-ventilated area
Wear protective gloves / protective clothing / eye protection / face protection
Wear respiratory protection
Avoid release to the environment

Precautionary Statements - Response

Keep/Store away from clothing/ combustible materials
Immediately call a POISON CENTER or doctor/physician
Get medical advice/attention if you feel unwell
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
Immediately call a POISON CENTER or doctor/physician
Remove/Take off immediately all contaminated clothing
Rinse skin with water/shower
Wash contaminated clothing before reuse
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
Immediately call a POISON CENTER or doctor/physician
IF SWALLOWED: Rinse mouth. DO NOT induce vomiting
In case of fire: Stop leak if safe to do so
Absorb spillage to prevent material damage

Collect spillage

Precautionary Statements - Storage

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

Store locked up

Store in corrosive resistant container with a resistant inner liner

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

Corrosive to the respiratory tract

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

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

Emergency telephone number

Poisons Information Center, New Zealand: 0800 764 766
Poisons Information Center, Australia: 13 11 26

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.

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

Irritation/Corrosion. May cause redness and tearing of the eyes. Contact with very cold

material can cause freeze burns. Erythema (skin redness). Coughing and/ or wheezing. Difficulty in breathing.

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.

5. FIRE FIGHTING MEASURES

Suitable Extinguishing Media

Suitable Extinguishing Media Dry chemical, CO2, water spray or regular foam.

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. Cool containers with flooding quantities of water until well after fire is out. Damaged cylinders should be handled only by specialists. 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. Fight fire from maximum distance or use unmanned hose holders or monitor nozzles. Fight fire remotely due to the risk of explosion. Move containers from fire area if you can do it without risk. In case of fire: Wear self-contained breathing apparatus.

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. Do not breathe vapor or mist. Ensure adequate ventilation. Avoid contact with skin, eyes, and clothing. Do not touch or walk through spilled material. Use personal protective equipment as required. Stop leak if you can do it without risk. See section 8 for more information.

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

For emergency responders Remove all sources of ignition. Ventilate the area. Clear area of all unprotected personnel. Use personal protection recommended in Section 8.

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	This material is a liquefied gas. Work up wind or increase ventilation. 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.

Precautions to prevent secondary hazards

Prevention of secondary hazards	Clean contaminated objects and areas thoroughly observing environmental regulations.
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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.
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General hygiene considerations	Avoid contact with skin, eyes, and clothing. Do not breathe vapor or mist. Wash hands and face before breaks and immediately after handling the product.
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Conditions for safe storage, including any incompatibilities

Storage Conditions	Keep containers tightly closed in a dry, cool and well-ventilated place. Keep dry, reacts with water. Keep at temperatures below 50°C / 122°F. Store away from foodstuffs and sources of heat or ignition. Store locked up. Cylinders should be stored upright with valve protection cap in place and firmly secured to prevent falling. Check cylinders regularly for leaks.
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Incompatible materials	Combustible material. Reducing agents. Glass. Aluminium. Copper. Tin.
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8. EXPOSURE CONTROLS/PERSONAL PROTECTION**Control parameters****Exposure Limits**

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

Engineering controls

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

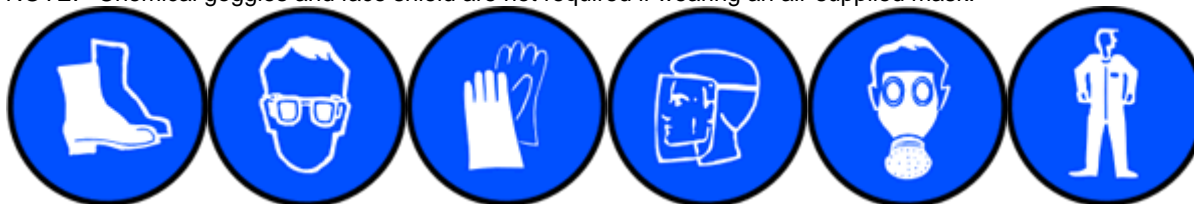
If in the handling and application of this material, safe exposure levels could be exceeded, the use of engineering controls such as local exhaust ventilation must be considered and the results documented. If achieving safe exposure levels does not require engineering controls, then a detailed and documented 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.

Hand protection

Elbow-length impervious gloves.

Skin and body protection

Rubber boots. Overalls. If there is a risk of contact.. Chemical resistant apron.

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
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

Hazardous polymerization Hazardous polymerization does not occur.

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

Conditions to avoid

Conditions to avoid Keep away from open flames, hot surfaces and sources of ignition. Moisture. Keep from any possible contact with water. Contact with foodstuffs. 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

Fatal if inhaled. 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. In high concentration the gas may cause a suffocation. Victim may not be aware of asphyxiation.

Eye contact

Corrosive to the eyes and may cause severe damage including blindness. Contact with product may cause frostbite.

Skin contact

Contact causes severe skin irritation and possible burns. Contact with product may cause frostbite.

Ingestion

Not an expected route of exposure. Can burn mouth, throat, and stomach.

Symptoms

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

Acute toxicity

Numerical measures of toxicity

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 severe burns.

Serious eye damage/eye irritation

Causes serious eye damage.

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

Causes damage to organs through prolonged or repeated exposure.

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. Toxic to aquatic life with long lasting effects.

Terrestrial ecotoxicity There is no data for this product.

Chemical name	Algae/aquatic plants	Fish	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 promelas) LC50: =0.1mg/L (96h, Pimephales promelas)	LC50: =0.017mg/L (48h, Daphnia magna)

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

Other adverse effects No information available.

13. DISPOSAL CONSIDERATIONS

Waste treatment methods

Waste from residues/unused products

Dispose of product in packaging/container in a way that is consistent with the Hazardous Substances (Disposal) Notice 2017 and the Act, and Hazardous Substances (Amendments and Revocations) Notice 2020. Treat the chemical using a method that changes the characteristics or composition of the chemical so that the chemical is no longer a hazardous chemical; or export the chemical from New Zealand as waste. Class 2, 3 and 4 chemicals - may not be disposed of into or onto a landfill or sewage facility. They may only be burnt in certain situations. Class 2.1.1, 3.1 and 4.1.1 chemicals may only be discharged into the environment as waste if the substance will not at any time come into contact with class 1 or class 5 substances; and there will be no ignition source in the vicinity of the disposal site at any time and if the substance were to ignite, no person, or place where a person may legally be, would be exposed to an unsafe level of heat radiation.

Contact supplier for advice. For all Ixom labelled chlorine packages, return directly to Ixom.

Contaminated packaging

For packages that have been in direct contact with hazardous chemicals, the person must

ensure that the package is rendered incapable of containing any chemical. It must be disposed of in a manner that is consistent with the requirements for disposal of the chemical that it contained, taking into account the material the package is manufactured from. Packages may only be reused or recycled if the package has been treated to remove any residual contents of the hazardous chemical (class 1, 2, 3, 4, or 5); or the contents of the residue in the package are below the threshold for the chemical to be classified as hazardous (class 6, 8, or 9 chemical).

14. TRANSPORT INFORMATION

ROAD AND RAIL TRANSPORT Classified as a Dangerous Good according to NZS 5433 Transport of Dangerous Goods on Land; DANGEROUS GOODS.

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

New Zealand

National regulations The 'Health and Safety at Work (Hazardous Substances) Regulations', 'Hazardous substances that require tracking' are applicable to this material.

International Inventories

NZIoC	This material is listed on the New Zealand Inventory of Chemicals.
TSCA	Contact supplier for inventory compliance status.
DSL/NDSL	Contact supplier for inventory compliance status.
EINECS/ELINCS	Contact supplier for inventory compliance status.
ENCS	Contact supplier for inventory compliance status.
IECSC	Contact supplier for inventory compliance status.
KECL	Contact supplier for inventory compliance status.
PICCS	Contact supplier for inventory compliance status.

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

Legend:**NZIoC - New Zealand Inventory of Chemicals****TSCA** - United States Toxic Substances Control Act Section 8(b) Inventory**DSL/NDL** - Canadian Domestic Substances List/Non-Domestic Substances List**EINECS/ELINCS** - European Inventory of Existing Chemical Substances/European List of Notified Chemical Substances**ENCS** - Japan Existing and New Chemical Substances**IECSC** - China Inventory of Existing Chemical Substances**KECL** - Korean Existing and Evaluated Chemical Substances**PICCS** - Philippines Inventory of Chemicals and Chemical Substances**AIIC - Australian Inventory of Industrial 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**

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

Issuing Date: 11-Mar-2022

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

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

Agency for Toxic Substances and Disease Registry (ATSDR)

U.S. Environmental Protection Agency ChemView Database

European Food Safety Authority (EFSA)

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