BOC
A Member of The Linde Group

SAFETY DATA SHEET

 # 2358

1. IDENTIFICATION OF THE MATERIAL AND SUPPLIER

1.1 Product identifier

Product name **2 - 2.5% HYDROGEN IN CHLORINE**

Synonym(s) 2358 - SDS NUMBER • BOC 2 - 2.5% HYDROGEN IN CHLORINE • IMPORTED GAS • PRODUCT CODE: 160

1.2 Uses and uses advised against

Use(s) CALIBRATION • INDUSTRIAL APPLICATIONS

1.3 Details of the supplier of the product

Supplier name **BOC LIMITED (AUSTRALIA)**

Address 10 Julius Avenue, North Ryde, NSW, 2113, AUSTRALIA

Telephone 131 262, (02) 8874 4400

Fax 132 427 (24 hours)

Website http://www.boc.com.au

1.4 Emergency telephone number(s)

Emergency 1800 653 572 (24/7) (Australia only)

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

CLASSIFIED AS HAZARDOUS ACCORDING TO SAFE WORK AUSTRALIA CRITERIA

GHS classification(s)
Serious Eye Damage / Eye Irritation: Category 2A
Aquatic Toxicity (Acute): Category 1
Specific Target Organ Systemic Toxicity (Single Exposure): Category 3
Skin Corrosion/Irritation: Category 2
Acute Toxicity: Inhalation: Category 2
Gases Under Pressure: Compressed gas

2.2 Label elements

Signal word **DANGER**

Pictogram(s)

Hazard statement(s)

H280	Contains gas under pressure; may explode if heated.
H315	Causes skin irritation.
H319	Causes serious eye irritation.
H330	Fatal if inhaled.
H335	May cause respiratory irritation.
H400	Very toxic to aquatic life.

Prevention statement(s)

P260	Do not breathe dust/fume/gas/mist/vapours/spray.
P264	Wash thoroughly after handling.
P271	Use only outdoors or in a well-ventilated area.
P273	Avoid release to the environment.
P280	Wear protective gloves/protective clothing/eye protection/face protection.
P284	Wear respiratory protection.

Response statement(s)

P302 + P352	IF ON SKIN: Wash with plenty of soap and water.
P304 + P340	IF INHALED: Remove to fresh air and keep at rest in a position comfortable for breathing.
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.
P320	Specific treatment is urgent - see first aid instructions.
P332 + P337 + P313	If skin or eye irritation occurs: Get medical advice/ attention.
P362	Take off contaminated clothing and wash before re-use.
P391	Collect spillage.

Storage statement(s)

P403 + P233	Store in a well-ventilated place. Keep container tightly closed.
P405	Store locked up.
P410 + P403	Protect from sunlight. Store in a well-ventilated place.

Disposal statement(s)

P501	Dispose of contents/container in accordance with relevant regulations.

2.3 Other hazards

Asphyxiant. Effects are proportional to oxygen displacement.

3. COMPOSITION/ INFORMATION ON INGREDIENTS

3.1 Substances / Mixtures

Ingredient	CAS Number	EC Number	Content (v/v)
CHLORINE	7782-50-5	231-959-5	97.5 to 98%
HYDROGEN	1333-74-0	215-605-7	2 to 2.5%

4. FIRST AID MEASURES

4.1 Description of 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) 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.

First aid facilities No information provided.

4.2 Most important symptoms and effects, both acute and delayed

Fatal if inhaled. Low concentrations may result in itching of the nose and throat, coughing and difficulty breathing. Exposure to high concentrations causes choking, chest pain, vomiting, bronchitis and accumulation of fluid in the lungs. Gas and liquid are extremely irritating and corrosive. Direct contact with the liquefied material or escaping compressed gas may cause frostbite injury.

4.3 Immediate medical attention and special treatment needed

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

5.1 Extinguishing media

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.

5.2 Special hazards arising from the substance or mixture

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.

5.3 Advice for firefighters

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.

5.4 Hazchem code

2RE

2 Fine Water Spray.

R Wear liquid-tight chemical protective clothing and breathing apparatus. Dilute spill and run-off.

E Evacuation of people in and around the immediate vicinity of the incident should be considered.

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

If the cylinder is leaking, evacuate area of personnel. Inform manufacturer/supplier of leak. Use Personal Protective Equipment (PPE) as detailed in Section 8 of the SDS.

6.2 Environmental precautions

Prevent from entering sewers, basements and workpits, or any place where its accumulation can be dangerous.

6.3 Methods of cleaning up

Carefully move material to a well ventilated remote area, then allow to discharge if safe to do so. Do not attempt to repair leaking valve or cylinder safety devices.

6.4 Reference to other sections

See Sections 8 and 13 for exposure controls and disposal.

7. HANDLING AND STORAGE

7.1 Precautions for safe 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.

7.2 Conditions for safe storage, including any incompatibilities

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.

7.3 Specific end use(s)

No information provided.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

8.1 Control parameters

Exposure standards

Ingredient	Reference	TWA		STEL	
		ppm	mg/m³	ppm	mg/m³
Chlorine (Peak limitation)	SWA (AUS)	1	3	--	--
Hydrogen	SWA (AUS)	Asphyxiant			

Biological limits

No biological limit values have been entered for this product.

8.2 Exposure controls

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

9.1 Information on basic physical and chemical properties

Appearance	GREEN/YELLOW GAS (LIQUEFIED UNDER PRESSURE)
Odour	CHARACTERISTIC SUFFOCATING ODOUR
Flammability	NON FLAMMABLE
Flash point	NOT RELEVANT
Boiling point	NOT AVAILABLE
Melting point	NOT AVAILABLE
Evaporation rate	NOT APPLICABLE
pH	NOT APPLICABLE
Vapour density	NOT AVAILABLE
Specific gravity	NOT APPLICABLE
Solubility (water)	NOT AVAILABLE
Vapour pressure	689 kPa @ 21°C
Upper explosion limit	NOT RELEVANT
Lower explosion limit	NOT RELEVANT
Partition coefficient	NOT AVAILABLE
Autoignition temperature	NOT AVAILABLE
Decomposition temperature	NOT AVAILABLE
Viscosity	NOT AVAILABLE
Explosive properties	NOT AVAILABLE
Oxidising properties	NOT AVAILABLE
Odour threshold	NOT AVAILABLE

9.2 Other information

% Volatiles	100 %

10. STABILITY AND REACTIVITY

10.1 Reactivity

Carefully review all information provided in sections 10.2 to 10.6.

10.2 Chemical stability

Unstable. Reacts violently with water.

10.3 Possibility of hazardous reactions

Polymerization will not occur.

10.4 Conditions to avoid

Avoid moisture.

10.5 Incompatible materials

Incompatible with oil, many organic materials and most lubricants. Moist chlorine requires special materials.

10.6 Hazardous decomposition products

May evolve oxides of chlorine when heated to decomposition.

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity	Fatal if inhaled. Over exposure to high concentrations causes rapid onset of pulmonary oedema which may have fatal termination. Olfactory fatigue may occur. Repeated or prolonged exposure to low concentrations may result in respiratory effects, inflammation of the nose and corrosion of tooth enamel.
Skin	Irritating to the skin. Contact may result in irritation, redness, rash and dermatitis. Severe exposure may result in chemical burns leading to cell death (necrosis) and tissue damage (ulceration). Direct contact with the liquefied material or escaping compressed gas may cause frost-bite injury and/or chemical burns.
Eye	Irritating to the eyes. Contact may result in burning discomfort, spasmodic blinking (blepharospasm) or involuntary closing of the eyelids, redness, inflammation of the eye's membranes (conjunctivitis), and tear production (lacrimation). Severe eye exposure may result in corneal burns leading to cell death (necrosis) and tissue damage (ulceration). Direct contact with the liquefied material or escaping compressed gas may cause frost-bite injury and/or chemical burns.
Sensitization	Not classified as causing skin or respiratory sensitisation.
Mutagenicity	Not classified as a mutagen.
Carcinogenicity	Not classified as a carcinogen.
Reproductive	Not classified as a reproductive toxin.
STOT – single exposure	Toxic - corrosive. Over exposure may result in irritation of the nose and throat, coughing and shortness of breath (dyspnoea). High level exposure damages the respiratory system resulting in ulceration of the respiratory tract, lung tissue damage, symptoms and signs of accumulation of fluid in the lung (pulmonary oedema).
STOT – repeated exposure	Repeated exposure may result in chronic bronchitis and shortness of breath.
Aspiration	Not classified as causing aspiration.

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Very toxic to aquatic organisms.

12.2 Persistence and degradability

Not applicable.

12.3 Bioaccumulative potential

This product is not expected to bioaccumulate.

12.4 Mobility in soil

No information provided.

12.5 Other adverse effects

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.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

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)
14.1 UN Number	1955	1955	1955
14.2 Proper Shipping Name	COMPRESSED GAS, TOXIC, N.O.S. (Contains chlorine)	COMPRESSED GAS, TOXIC, N.O.S. (Contains chlorine)	COMPRESSED GAS, TOXIC, N.O.S. (Contains chlorine)
14.3 Transport hazard class	2.3	2.3	2.3
14.4 Packing Group	None Allocated	None Allocated	None Allocated

14.5 Environmental hazards No information provided

14.6 Special precautions for user

Hazchem code 2RE

GTEPG 2B1

EMS F-C, S-U

Other information Ensure cylinder is separated from driver and foodstuffs.

15. REGULATORY INFORMATION

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

Poison schedule Classified as a Schedule 7 (S7) Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP).

Classifications Safework Australia criteria is based on the Globally Harmonised System (GHS) of Classification and Labelling of Chemicals.

The classifications and phrases listed below are based on the Approved Criteria for Classifying Hazardous Substances [NOHSC: 1008(2004)].

Hazard codes

N	Dangerous for the environment
T+	Very toxic
Xi	Irritant

Risk phrases

R26	Very 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.

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 isothiourea 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). Also incompatible with diborane (explodes on contact at ambient temperatures), dichloromethylarsine (possible explosion), diethyl ether (explodes), diethylzine (ignition), dimethylformamide (explosion hazard), dimethyl phosphormidate (may form explosive nitrogen trichloride), dioxygen difluoride (ignition or explosive reaction), disiyl 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 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.

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
EMS	Emergency Schedules (Emergency Procedures for Ships Carrying Dangerous Goods)
GHS	Globally Harmonized System
GTEPG	Group Text Emergency Procedure Guide
IARC	International Agency for Research on Cancer
LC50	Lethal Concentration, 50% / Median Lethal Concentration
LD50	Lethal Dose, 50% / Median Lethal Dose
mg/m³	Milligrams per Cubic Metre
OEL	Occupational Exposure Limit
pH	relates to hydrogen ion concentration using a scale of 0 (high acidic) to 14 (highly alkaline).
ppm	Parts Per Million
STEL	Short-Term Exposure Limit
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
SWA	Safe Work Australia
TLV	Threshold Limit Value
TWA	Time Weighted Average

Revision history

Revision	Description
2.1	Standard SDS Review
2.0	Standard SDS Review
1.0	Initial SDS creation

Report status

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

It is based on information concerning the product which has been provided to RMT by the manufacturer, importer or supplier 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, importer or supplier.

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.

Prepared by

Risk Management Technologies
5 Ventnor Ave, West Perth
Western Australia 6005
Phone: +61 8 9322 1711
Fax: +61 8 9322 1794
Email: info@rmt.com.au
Web: www.rmt.com.au.

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