SECTION 1: Identification

1.1 Product Identifier

Trade name	Carbon Dioxide
MSDS No.	0046
Chemical description	Carbon Dioxide, Refrigerated Liquid
CAS No.	124-38-9
EC No.	204-696-9
Chemical formula	CO_2
Synonyms	LCO2

1.2 Relevant identified uses and uses advised against

Food Freezing Refrigerated Transport

1.3 Details of the supplier

Name	Air Liquide New Zealand Limited
Address	19 Maurice Road, Penrose Auckland 1061, New Zealand
Phone	Phone: (09) 622 3880

1.4 Emergency telephone number

0800 156 516

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification according to HEalth and Safety [Hazardous Substances] Regulations 2017

HSNO classification(s)	2.2 - Not Hazardous Contains gas under pressure; may explode if heated	
Physical Hazards	Gases under pressure: Liquified Gas	H280

2.2 Label Elements

Hazard pictograms

Signal word	Warning
Hazard statements	H280 - Contains gas under pressure; may explode if heated
Precautionary statements	
Prevention	P103 - Read label before use
Response	None allocated
Storage	P410+403 - Protect from sunlight. Store in a well ventilated place.
Disposal	None allocated

2.3 Other Hazards

Asphyxiant in high concentrations.
Wear cold insulating gloves, face shield and eye protection.
Thaw frosted parts with lukewarm water. Do not rub affected area.
Get immediate medical advice/attention.

SECTION 3: Composition/information on ingredients

3.1 Substance/Mixtures

Name	Chemical Formula	%	Product Identifier
Carbon Dioxide	CO_2	100	(Cas No) 124-38-9
			(EC No) 204-696-9

SECTION 4: First-aid measures

4.1 Description of first-aid measures

Inhalation: Remove victim to uncontaminated area wearing self contained breathing apparatus. Keep victim warm and rested. Call a doctor. Apply artificial respiration if breathing stopped.

Skin contact: Liquid Carbon Dioxide can cause severe frostburn upon contact with skin.
In case of frostbite spray with water for at least 15 minutes. Apply a sterile dressing. Obtain medical assistance.

Eye contact: Immediately flush eyes thoroughly with water for at least 15 minutes.

Ingestion: Ingestion is not considered a potential route of exposure.

4.2 Most important symptoms and effects, both acute and delayed

May displace oxygen and cause rapid suffocation. Symptoms may include loss of mobility/consciousness.
Victim may not be aware of asphyxiation.
May increase respiration and heart rate.
May cause frostbite or cold burns.

4.3 Indication of any immediate medical attention and special treatment needed

None

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media: Water spray or fog.

Unsuitable extinguishing media: Do not use water jet to extinguish.

5.2 Specific hazards arising for the substance or mixture

Specific hazards: Exposure to fire may cause containers to rupture/explode.

Hazardous combustion products: None

5.3 Advice for firefighters

Specific methods: Use fire control measures appropriate for the surrounding fire. Exposure to fire and heat radiation may cause gas receptacles to rupture. Cool endangered receptacles with water spray jet from a protected position. Prevent water used in emergency cases from entering sewers and drainage systems.
If possible, stop flow of product.
Use water spray or fog to knock down fire fumes if possible.
Move containers away from the fire area if this can be done without risk.

Special protective equipment for firefighters: Standard protective clothing and equipment (Self Contained Breathing Apparatus) for fire fighters. Do not enter fire area without proper personal protective equipment, including respiratory protection.

Hazchem code: 2T

2 Use fog or fine spray.

T Wear full fire kit and breathing apparatus. Dilute spill and run-off.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Personnel handling liquid carbon dioxide must be provided with safety footwear and leather or PVC gloves. Full cover overalls and safety glasses are recommended.
Stop leak if it can be done without risk. Allow gas to dissipate to atmosphere..

6.2 Environmental precautions

Try to stop release.

6.3 Methods and material for containment and cleaning up

Ventilate area.
Cold vapours are heavier than air. In case of large spillage evacuate nearby trenches, excavations, pits or similar

6.4 References to other sections

See also sections 8 and 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Safe use of the product	The substance must be handled in accordance with good industrial hygiene and safety procedures. Only experienced and properly instructed persons should handle gases under pressure. Consult supplier for specific recommendations. Consider pressure relief device(s) in gas installations. Ensure the complete gas system was (or is regularly) checked for leaks before use. Do not smoke while handling product. Use only properly specified equipment which is suitable for this product, its supply pressure and temperature. Contact your gas supplier if in doubt. Do not breathe gas. Avoid release of product into atmosphere.
Safe handling of the gas receptacle	Refer to supplier's container handling instructions. Do not allow backfeed into the container. Protect cylinders from physical damage; do not drag, roll, slide or drop. When moving cylinders, even for short distances, use a cart (trolley, hand truck, etc.) designed to transport cylinders. Leave valve protection caps in place until the container has been secured against either a wall or bench or placed in a container stand and is ready for use. If user experiences any difficulty operating cylinder valve discontinue use and contact supplier. Never attempt to repair or modify container valves or safety relief devices. Damaged valves should be reported immediately to the supplier. Keep container valve outlets clean and free from contaminants particularly oil and water. Replace valve outlet caps or plugs and container caps where supplied as soon as container is disconnected from equipment. Close container valve after each use and when empty, even if still connected to equipment. Never attempt to transfer gases from one cylinder/container to another. Never use direct flame or electrical heating devices to raise the pressure of a container. Do not remove or deface labels provided by the supplier for the identification of the cylinder contents. Avoid suck back of water, acid and alkalis

7.2 Conditions for safe storage, including any incompatibilities

General	Containers should not be stored in conditions likely to encourage corrosion. Container valve guards or caps should be in place. Containers should be stored in the vertical position and properly secured to prevent them from falling over. Stored containers should be periodically checked for general condition and leakage. Keep container below 50°C in a well ventilated place. Segregate from flammable gases and other flammable materials in store. Store containers in location free from fire risk and away from sources of heat and ignition. Keep away from combustible materials.
Approved handlers/ Location Certificates	No requirements

7.3 Specific use(s)

None

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

OEL (Occupational Exposure Limits)	5,000 ppm v/v
DNEL (Derived-No Effect Level)	30,000 ppm v/v
PNEC (Predicted No-Effect Concentration	No data available

8.2 Appropriate engineering controls

Provide adequate general and local exhaust ventilation.
Systems under pressure should be regularly checked for leakages.
Ensure exposure is below occupational exposure limits (where available).
Oxygen detectors should be used when asphyxiating gases may be released.
Consider work permit system e.g. for maintenance activities.

8.3 Individual protection measures

A risk assessment should be conducted and documented in each work area to assess the risks related to the use of the product and to select the PPE that matches the relevant risk. The following recommendations should be considered:.
PPE compliant to the recommended EN/ISO standards should be selected.

Eye/face protection	Wear safety glasses with side shields.
Skin protection	Wear cryogenic gloves when handling hoses and other equipment Wear safety shoes at all times.
Respiratory protection	Self contained breathing apparatus (SCBA) or positive pressure airline with mask are to be used in oxygen-deficient atmospheres.
Thermal hazards	None necessary.

8.4 Environmental exposure controls

None necessary.

SECTION 9: Physical and chemical properties

9.1 information on basic physical and chemical properties

Appearance	
- Physical state 20°C/101.3kPa	Gas
- Colour	Colourless
Odour	No odour warning properties
Odour threshold	Odour threshold is subjective and inadequate to warn of overexposure.
pH value	Not applicable
Molar mass [g/mol]	44.01 g/mol
Melting point [°C]	-78.5 °C, -56.57 °C
Boiling point [°C]	-56.6 °C
Flash point [°C]	Not applicable for gases and gas mixtures.
Critical temperature [°C]	30.98 °C
Evaporation rate (ether=1)	Not applicable for gases and gas mixtures.
Flammability range	Non flammable
Vapour pressure [20°C]	57.3 bar(a)
Vapour pressure [50°C]	Not applicable
Relative density, gas (air=1)	1.52
Relative density, liquid (water=1)	0.82
Solubility in water [mg/l]	2000 mg/l Completely soluble. Water 90%, Insoluble, 1730
Partition coefficient n-octanol/water [log Kow]	0.83
Autoignition temperature	Not applicable
Viscosity [20°C]	Not applicable
Explosive properties	Not applicable
Oxidising properties	None
Coefficient of oxygen equivalency (Ci)	0

9.2 Other information

Gas/vapour heavier than air. May accumulate in confined spaces, particularly at or below ground level.
Sublimation temperature -78.5 °C

SECTION 10: Stability and reactivity

10.1 Reactivity

No reactivity hazard other than the effects described in subsections below.

10.2 Chemical stability

Stable under normal conditions.

10.3 Possibility of hazardous reactions

None.

10.4 Conditions to avoid

None under recommended storage and handling conditions (see section 7).

10.5 Incompatible materials

None.

10.6 Hazardous decomposition products

None

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity	In high concentrations causes rapid circulatory insufficiency. Symptoms are headache, nausea and vomiting, which may lead to unconsciousness. Unlike simple asphyxiants, carbon dioxide has the ability to cause death even when normal oxygen levels (20-21%) are maintained. 5% CO_2 has been found to act synergistically to increase the toxicity of certain other gases (CO, NO_2). CO_2 has been shown to enhance the production of carboxy- or met-hemoglobin by these gases possibly due to carbon dioxide's stimulatory effects on the respiratory and circulatory systems.
Skin corrosion/irritation	No known effects from this product.
Serious eye damage/irritation	No known effects from this product.
Respiratory/skin sensitisation	
Germ cell mutagenicity	No known effects from this product.
Carcinogenicity	No known effects from this product.
Toxic for reproduction: Fertility	No known effects from this product.
Toxic for reproduction: Unborn child	No known effects from this product.
Specific target organ toxicity - Single exposure	No known effects from this product.
Specific target organ toxicity - Repeated exposure	No known effects from this product.
Aspiration hazard	Not applicable for gases and gas mixtures.

SECTION 12: Ecological information

12.1 Toxicity

No ecological damage caused by this product.

12.2 Persistence and degradability

No ecological damage caused by this product.

12.3 Bioaccumulative potential

No ecological damage caused by this product.

12.4 Mobility in soil

No ecological damage caused by this product.

12.5 Results of PBT and vPvB assessment

Not classified as PBT or vPvB.

12.6 Other adverse effects

Effect on ozone layer	None.
Global warming potential [CO_2=1]	1
Effect on global warming	When discharged in large quantities may contribute to the greenhouse effect. Contains greenhouse gas(es) not covered by Regulation (EC) 842/2006.

SECTION 13: Disposal consideration

13.1 Waste treatment methods

Cylinders should be returned to the manufacturer for disposal of contents
Vent to atmosphere in a well ventilated place. Do not discharge into any place where its accumulation could be dangerous.
Discharge to atmosphere in large quantities should be avoided.

13.2 Additional information

None.

SECTION 14: Transport information

2.2 Non-flammable, non-toxic gases

14.1 Land transport

Land Transport Rule: Dangerous Goods 2005: NZS 5433:2012

UN Number	2187
UN proper shipping name	CARBON DIOXIDE
Transport hazard class(es)	2.2
Packing group	Not applicable
Environmental hazards	None

14.2 Transport by sea

IMDG - International Maritime Dangerous Goods

UN Number	2187
UN proper shipping name	CARBON DIOXIDE
Transport hazard class(es)	2.2
Packing group	Not applicable
Environmental hazards	None
Emergency Schedule (EmS)	Fire F-C Spillage S-V

14.3 Transport by air

ICAO - International Civil Aviation Organisation/IATA - International Air Transport Association

UN Number	2187
UN proper shipping name	CARBON DIOXIDE
Transport hazard class(es)	2.2
Packing group	Not applicable
Environmental hazards	None

14.4 Special precautions for user

Hazchem code	2T
Special transport information	Avoid transport on vehicles where the load space is not separated from the driver's compartment. Ensure vehicle driver is aware of the potential hazards of the load and knows what to do in the event of an accident or an emergency. Before transporting product containers: Ensure there is adequate ventilation. Ensure that containers are firmly secured. Ensure cylinder valve is closed and not leaking. Ensure valve outlet cap nut or plug (where provided) is correctly fitted. Ensure valve protection device (where provided) is correctly fitted.

SECTION 15: Regulatory information

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

HSNO approval code HSR001018

Listed on the New Zealand Inventory of Chemicals (NZIoC)

15.2 Chemical safety assessment

A chemical safety assessment does not need to be carried out for this product.

SECTION 16: Other information

16.1 Indication of changes

Update to reflect GHS requirements

Date of first issue	May 2014
Revised date	April 2019
Superseeds	Version 9
Version	10

16.2 Training advice

The hazard of asphyxiation is often overlooked and must be stressed during operator training.

16.3 Full text of H-statements

H280 Contains gas under pressure; may explode if heated

16.4 Cylinder features

Not Applicable

16.5 Disclaimer of liability

Before using this product in any new process or experiment, a thorough material compatibility and safety study should be carried out.
Details given in this document are believed to be correct at the time of going to press.
Whilst proper care has been taken in the preparation of this document, no liability for injury or damage resulting from its use can be accepted.