



# Liquid Carbon Dioxide

SDS No.: HKO-004L

Revision date: 25/11/2022

Version no.: 03

## SECTION 1: Identification of the substance or mixture and of the company

### 1.1 Product Identifier

Product name : Liquid Carbon Dioxide  
Chemical name : Carbon dioxide  
Chemical formula : CO<sub>2</sub>  
CAS no. : 124-38-9

### 1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Industrial and professional. Medical use. Aerosol propellant. Balance gas for mixtures. Beverage applications. Biocidal uses. Blanketing gas. Calibration gas. Carrier gas. Chemical synthesis. Combustion, melting and cutting processes. Fire suppressant gas. Food packaging gas. Freezing, Cooling and heat transfer. Inerting gas. Inflation systems. Laboratory use. Laser gas. Plant growth promoter. Pressure head gas, operational assist gas in pressure systems. Process gas. Refrigerant. Test gas. Consumer use. Beverage applications. Propellant gas. Shielding gas in gas welding. Water treatment. pH/neutralising agent.

It is the responsibility of the end user to ensure that the product as supplied is suitable for its intended use.

### 1.3 Details of the supplier of the safety data sheet

Supplier name : Linde HKO Limited  
Address : 12 Chun Yat Street, Tseung Kwan O Industrial Estate, Tseung Kwan O, Kowloon, Hong Kong  
Phone no. : (852) 2372-2288  
Fax no. : (852) 2372-2508

### 1.3 Emergency telephone number

Emergency no. : (852) 2661 0920 (24 hours)



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## SECTION 2: Hazards identification

### 2.1 Classification of the substance or mixture

#### Classification according to Regulation (EC) No 1272/2008

Gases under pressure (Refrigerated liquefied gas) : H281: Contains refrigerated gas; may cause cryogenic burns or injury.

### 2.2 Label Elements

Pictograms

:



Signal word

: Warning

Hazard statements

: H281: Contains refrigerated gas; may cause cryogenic burns or injury.

Precautionary statements

General

: None

Prevention

: P282: Wear cold insulating gloves and either face shield or eye protection.

Response

: P336+P315: Thaw frosted parts with lukewarm water. Do not rub affected area. Get immediate medical advice/attention.

Storage

: P403: Store in a well-ventilated place.

Disposal

: None

### 2.3 Other hazards

None



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## SECTION 3: Composition/ information on ingredients

### 3.1 Substances

Chemical name	:	Carbon dioxide
Chemical formula	:	CO <sub>2</sub>
CAS no.	:	124-38-9
EC no.	:	204-696-9
INDEX no.	:	----
REACH registration number	:	Listed in Annex IV/V of Regulation (EC) No 1907/2006 (REACH), exempted from registration.

Ingredient(s)	CAS No.	EC no.	Purity
Carbon dioxide	124-38-9	204-696-9	≥99.9%

### 3.2 Mixtures

Not Applicable

## SECTION 4: First Aid Measures

### 4.1 Description of first aid measures

Inhalation	:	In high concentrations may cause asphyxiation. Symptoms may include loss of mobility/consciousness. Victim may not be aware of asphyxiation. Remove victim to uncontaminated area wearing self contained breathing apparatus. Keep victim warm and rested. Call a doctor. Apply artificial respiration if breathing stopped. Low concentrations of CO <sub>2</sub> cause increased respiration and headache.
Eye contact	:	Rinse the eye with water immediately. Remove contact lenses, if present and easy to do. Continue rinsing. Flush thoroughly with water for at least 15 minutes. Get immediate medical assistance. If medical assistance is not immediately available, flush an additional 15 minutes.
Skin Contact	:	Contact with evaporating liquid may cause frostbite or freezing of skin. If clothing is saturated with the liquid and adhering to the skin then the area should be thawed with lukewarm water prior to removing the clothing. Not relevant, due to the form of the product.
Ingestion	:	Ingestion is not considered a potential route of exposure.



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## 4.2 Most important symptoms and effects, both acute and delayed

Respiratory arrest. Contact with liquefied gas can cause damage (frostbite) due to rapid evaporative cooling.

## 4.3 Immediate medical attention and special treatment needed

Respiratory arrest. Contact with liquefied gas can cause damage (frostbite) due to rapid evaporative cooling.

Thaw frosted parts with lukewarm water. Do not rub affected area. Get immediate medical advice/attention.

## SECTION 5: Firefighting Measures

### 5.1 Extinguishing media

Suitable extinguishing media : Material will not burn. In case of fire in the surroundings: use appropriate extinguishing agent.

### 5.2 Special hazards arising from the substance or mixture

None

### 5.3 Advice for firefighters

Special fire fighting procedures : In case of fire, stop leak if safe to do so. Continue water spray from protected position until container stays cool. Use extinguishants to contain the fire. Isolate the source of the fire or let it burn out.

Special protective equipment for firefighters : Firefighters must use standard protective equipment including flame retardant coat, helmet with face shield, gloves, rubber boots, and Self-Contained Breathing Apparatus (SCBA).

## SECTION 6: Accidental Release Measures

### 6.1 Personal precautions, protective equipment and emergency procedures

Evacuate area. Provide adequate ventilation. Prevent from entering sewers, basements and workpits, or any place where its accumulation can be dangerous. Wear self-contained breathing apparatus when entering area unless atmosphere is proved to be safe.

### 6.2 Environmental Precautions

Prevent further leakage or spillage if safe to do so.



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## 6.3 Methods and material for containment and cleaning up

Provide adequate ventilation. Liquid spillages can cause embrittlement of structural materials.

## 6.4 Reference to other sections

See also sections 8 and 13.

## SECTION 7: Handling and Storage

### 7.1 Precautions for safe handling

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. Refer to supplier's handling instructions. The substance must be handled in accordance with good industrial hygiene and safety procedures. Protect containers from physical damage; do not drag, roll, slide or drop. Do not remove or deface labels provided by the supplier for the identification of the container contents. When moving containers, even for short distances, use appropriate equipment eg. trolley, hand truck, fork truck etc. Secure cylinders in an upright position at all times, close all valves when not in use. Provide adequate ventilation. Suck back of water into the container must be prevented. Do not allow backfeed into the container. Avoid suckback of water, acid and alkalis. Keep container below 50°C in a well ventilated place. Observe all regulations and local requirements regarding storage of containers. When using do not eat, drink or smoke. Store in accordance with local/regional/national/international regulations. Never use direct flame or electrical heating devices to raise the pressure of a container. 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. Damaged valves should be reported immediately to the supplier. Close container valve after each use and when empty, even if still connected to equipment. Never attempt to repair or modify container valves or safety relief devices. Replace valve outlet caps or plugs and container caps where supplied as soon as container is disconnected from equipment. Keep container valve outlets clean and free from contaminants particularly oil and water. If user experiences any difficulty operating container valve discontinue use and contact supplier. Never attempt to transfer gases from one container

### 7.2 Conditions for safe storage, including any incompatibilities

Containers should not be stored in conditions likely to encourage corrosion. Stored containers should be periodically checked for general conditions and leakage. Container valve guards or caps should be in place. Store containers in location free from fire risk and away from sources of heat and ignition. Keep away from combustible material.

### 7.3 Specific end uses

None



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## SECTION 8: Exposure Controls/Personal Protection

### 8.1 Control parameters

- Occupational Exposure Limits : 5,000 ppm (8 hour TWA), 30,000 ppm (STEL)  
 Source: Code of Practice on Control of Air Impurities (Chemical Substances) in the Workplace. (Published by the Labour Department, Hong Kong)
- Biological limits : No biological limits have been established for this product.

### 8.2 Exposure controls

- Appropriate engineering controls : Consider a work permit system e.g. for maintenance activities. Ensure adequate air ventilation. Oxygen detectors should be used when asphyxiating gases may be released. Provide adequate ventilation, including appropriate local extraction, to ensure that the defined occupational exposure limit is not exceeded. Systems under pressure should be regularly checked for leakages. Preferably use permanent leak tight connections (eg. welded pipes). Do not eat, drink or smoke when using the product. CO<sub>2</sub> detectors should be used when CO<sub>2</sub> may be released.

Individual protection measures, such as personal protective equipment.

- Eye protection : Wear safety glasses.
- Hand Protection : Wear leather gloves or insulated gloves.
- Body protection : Wear coveralls.
- Respiratory Protection : Where an inhalation risk exists, wear Self Contained Breathing Apparatus (SCBA) or an Air-line respirator.



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## SECTION 9: Physical and Chemical Properties

### 9.1 Information on basic physical and chemical properties

#### Appearance

Physical state	: Gas
Form	: Liquefied gas
Colour	: Colorless
Odour	: Odourless
Odour Threshold	: No data available.
pH	: 3.2 - 3.7 The pH of saturated CO <sub>2</sub> solutions varies from 3.7 at 101 kPa (1 atm) to 3.2 at 2370 kPa (23.4 atm)
Melting Point	: -56.6 °C
Boiling Point	: -78.5 °C
Sublimation Point	: -78.5 °C
Critical Temp. (°C)	: 31.0 °C
Flash Point	: No data available.
Evaporation Rate	: No data available.
Flammability (solid, gas)	: This product is not flammable
Flammability limit - upper (%)	: No data available.
Flammability limit - lower (%)	: No data available.
Vapour pressure	: 45.1 bar (10 °C)
Vapour density (air=1)	: 1.522 (21 °C)
Relative density	: 1.512 (-56.6 °C)
Solubility (in Water)	: 2.900 mg/l (25 °C)
Partition coefficient (n-octanol/water)	: 0.83
Autoignition Temperature	: No data available.
Decomposition Temperature	: No data available.
Viscosity	
Kinematic viscosity	: No data available.
Dynamic viscosity	: 0.07 mPa.s (20 °C)
Explosive properties	: No data available.
Oxidising Properties	: No data available.

### 9.2 Other information

Additional information : Gas/vapor heavier than air. May accumulate in confined spaces, particularly at or below ground level.



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## SECTION 10: Stability and Reactivity

### 10.1 Reactivity

No reactivity hazard other than the effects described in sub-section below.

### 10.2 Chemical Stability

Stable under normal conditions.

### 10.3 Possibility of Hazardous Reactions

None

### 10.4 Conditions to Avoid

None

### 10.5 Incompatible Materials

Cryogenic liquids can cause embrittlement of some metals and alter the physical properties of other materials.  
No reaction with any common materials in dry or wet conditions.

### 10.6 Hazardous decomposition products

Under normal conditions of storage and use, hazardous decomposition products should not be produced.





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## SECTION 11: Toxicological Information

### 11.1 Information on toxicological effects

#### Acute toxicity

Oral	:	Based on available data, the classification criteria are not met.
Inhalation	:	Based on available data, the classification criteria are not met.
Dermal	:	Based on available data, the classification criteria are not met.
Skin Corrosion/Irritation	:	Based on available data, the classification criteria are not met.
Serious Eye Damage/Eye Irritation	:	Based on available data, the classification criteria are not met.
Respiratory or Skin Sensitisation	:	Based on available data, the classification criteria are not met.
Germ Cell Mutagenicity	:	Based on available data, the classification criteria are not met.
Carcinogenicity	:	Based on available data, the classification criteria are not met.
Reproductive toxicity	:	Based on available data, the classification criteria are not met.
Specific Target Organ Toxicity		
Single Exposure	:	Based on available data, the classification criteria are not met.
Repeated Exposure	:	Based on available data, the classification criteria are not met.
Aspiration Hazard	:	Not applicable to gases and gas mixtures.

## SECTION 12: Ecological Information

### 12.1 Toxicity

No ecological damage caused by this product.

### 12.2 Persistence and Degradability

Not applicable.

### 12.3 Bioaccumulative Potential

The subject product is expected to biodegrade and is not expected to persist for long periods in an aquatic environment.

### 12.4 Mobility in Soil

Because of its high volatility, the product is unlikely to cause ground or water pollution.

### 12.5 Other Adverse Effects

No ecological damage caused by this product.



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## SECTION 13: Disposal Considerations

### 13.1 Waste treatment methods

Disposal method : Do not discharge into any place where its accumulation could be dangerous. Cylinders should be returned to the supplier for disposal of contents.

## SECTION 14: Transport Information

### ADR/RID

14.1 UN Number : UN 2187  
 14.2 UN proper shipping name : CARBON DIOXIDE, REFRIGERATED LIQUID  
 14.3 Transport Hazard Class(es)  
     Class : 2  
     Label(s) : 2.2: Non-flammable, non-toxic gases  
     Classification Code : 3A  
     Hazard No. : 22  
 14.4 Packaging group : None  
 14.5 Environmental hazards : Not Applicable  
 14.6 Special precautions for user : None

### IMDG

14.1 UN Number : UN 2187  
 14.2 UN proper shipping name : CARBON DIOXIDE, REFRIGERATED LIQUID  
 14.3 Transport Hazard Class(es)  
     Class : 2.2  
     Label(s) : 2.2: Non-flammable, non-toxic gases  
 14.4 Packaging group : None  
 14.5 Environmental hazards : Not Applicable  
 14.6 Special precautions for user : None



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## IATA

14.1 UN Number	:	UN 2187
14.2 UN proper shipping name	:	CARBON DIOXIDE, REFRIGERATED LIQUID
14.3 Transport Hazard Class(es)		
Class	:	2.2
Label(s)	:	2.2: Non-flammable, non-toxic gases
14.4 Packaging group	:	None
14.5 Environmental hazards	:	Not Applicable
14.6 Special precautions for user	:	None
Other information		
Passenger and cargo aircraft	:	Allowed
Cargo aircraft only	:	Allowed

## 14.7 Transport in bulk according to Annex II of MARPOL and the IBC Code

Not Applicable

## 14.8 Additional information

Transport precautions	:	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 that they are firmly secured. Ensure that the container valve is closed and not leaking. Container valve guards or caps should be in place. Ensure adequate air ventilation.
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## SECTION 15: Regulatory information

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

Local legislation	:	Dangerous Goods Ordinance (Chapter 295)
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## SECTION 16: Other Information

- Other information : Before using this product in any new process or experiment, a thorough material compatibility and safety study should be carried out. Ensure adequate air ventilation. Ensure all national/local regulations are observed. 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.
- Revision date : 25/11/2022
- Disclaimer : The above information is believed to be correct. This information should be used to make an independent determination of the methods to safeguard workers and the environment.

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