

MEDICAL CARBON DIOXIDE, Refrigerated Liquid (CO2)
ALH057
Warning

SECTION 1. Identification of the substance/mixture and of the company/undertaking
1.1. Product identifier

Trade name : MEDICAL CARBON DIOXIDE, Refrigerated Liquid (CO2)
 SDS Nr : ALH057
 Chemical formula : CO2

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

Relevant identified uses : Industrial and professional. Perform risk assessment prior to use.
 Test gas / Calibration gas. Laboratory use Contact supplier for more uses information
 Use : Medical applications.

1.3. Details of the supplier of the safety data sheet

Company identification : Air Liquide Healthcare Pty Limited
 Unit 5, 476 Gardeners Road
 Alexandria NSW 2015 Australia
 Tel: +61 2 9364 7474
 Fax: +61 2 8338 9797
 ALAEnquiries@AirLiquide.com

1.4. Emergency telephone number

Emergency telephone number : 1800 812 588

SECTION 2. Hazards identification
2.1. Classification of the substance or mixture
Hazard Class and Category Code Regulation EC 1272/2008 (CLP)

• Physical hazards : Gases under pressure - Refrigerated liquefied gas - Warning - (CLP : Press. Gas) - H281

Classification EC 67/548 or EC 1999/45

: Not classified as dangerous substance/mixture.

2.2. Label elements
Labelling Regulation EC 1272/2008 (CLP)

• Hazard pictograms



• Hazard pictograms code : GHS04
 • Signal word : Warning
 • Hazard statements : H281 - Contains refrigerated gas; may cause cryogenic burns or injury.
 • Supplemental hazard information : Asphyxiant in high concentrations.
 • Precautionary statements
 - Prevention : P282 - Wear cold insulating gloves, face shield, 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.

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SECTION 2. Hazards identification (continued)

2.3. Other hazards

: Asphyxiant in high concentrations.

SECTION 3. Composition/information on ingredients

3.1. Substance / 3.2. Mixture

Substance.

Substance name	Contents	CAS No	EC No	Annex No		Classification
Carbon dioxide (refrigerated)	: 100 %	124-38-9	204-696-9	-----	* 1	Not classified (DSD/DPD) Press. Gas (H281)

Contains no other components or impurities which will influence the classification of the product.

* 1: Listed in Annex IV / V REACH, exempted from registration.

* 2: Registration deadline not expired.

* 3: Registration not required: Substance manufactured or imported < 1t/y

Full text of R-phrases see chapter 16. Full text of H-statements see chapter 16

SECTION 4. First aid measures

4.1. Description of first aid measures

First aid measures

- Inhalation : In high concentrations may cause asphyxiation. Symptoms may include loss of mobility/ consciousness. Victim may not be aware of asphyxiation.
Low concentrations of CO2 cause increased respiration and headache.
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/eye contact : Immediately flush eyes thoroughly with water for at least 15 minutes.
In case of frostbite spray with water for at least 15 minutes. Apply a sterile dressing. Obtain medical assistance.
- Skin contact : Adverse effects not expected from this product.
- Eye contact : Direct contact with liquefied gas may cause severe and possibly permanent eye injury due to frostbite from rapid liquid evaporation.
- Ingestion : Ingestion is not considered a potential route of exposure.

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

: Refer to section 11.

4.3. Indication of any immediate medical attention and special treatment needed

: None.

SECTION 5. Fire-fighting measures

5.1. Extinguishing media

Extinguishing media

- Suitable extinguishing media : All known extinguishants can be used.

5.2. Special hazards arising from the substance or mixture

- Specific hazards : Exposure to fire may cause containers to rupture/explode.
- Hazardous combustion products : None.

5.3. Advice for fire-fighters

- Specific methods : Coordinate fire measure to the surrounding fire. Cool endangered containers with water spray jet from a protected position. Do not empty contaminated fire water into drains.
If possible, stop flow of product.
Move away from the container and cool with water from a protected position.
If leaking do not spray water onto container. Water surrounding area (from protected position)

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SECTION 5. Fire-fighting measures (continued)

- Special protective equipment for fire fighters : to contain fire.
: In confined space use self-contained breathing apparatus.
- Flammable class : Non flammable.

SECTION 6. Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

- Personal precautions : Try to stop release.
: Evacuate area.
Use protective clothing.
Wear self-contained breathing apparatus when entering area unless atmosphere is proved to be safe.
Ensure adequate air ventilation.

6.2. Environmental precautions

- : None.
: Try to stop release.
Prevent from entering sewers, basements and workpits, or any place where its accumulation can be dangerous.

6.3. Methods and material for containment and cleaning up

- Clean up methods : None.
: Ventilate area.

6.4. Reference 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 : Direct contact with liquefied gas may cause severe and possibly permanent eye injury due to frostbite from rapid liquid evaporation.
Use only properly specified equipment which is suitable for this product, its supply pressure and temperature. Contact your gas supplier if in doubt.
Only experienced and properly instructed persons should handle gases under pressure. The product must be handled in accordance with good industrial hygiene and safety procedures.
Do not smoke while handling product.
Ensure the complete gas system was (or is regularly) checked for leaks before use.
- 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.

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SECTION 7. Handling and storage (continued)

- General** : Containers, which contain or have contained flammable or explosive substances, must not be inerted with liquid carbon dioxide. Potential production of solid CO₂ particles must be ruled out. In order to rule out potential electrostatic discharge production, the system must be adequately grounded.
- Handling** : Suck back of water into the container must be prevented.
Do not allow backfeed into the container.
Use only properly specified equipment which is suitable for this product, its supply pressure and temperature. Contact your gas supplier if in doubt.
Refer to supplier's container handling instructions.

7.2. Conditions for safe storage, including any incompatibilities

- : Keep container below 50°C in a well ventilated place.
- Observe all regulations and local requirements regarding storage of containers.
- Containers should not be stored in conditions likely to encourage corrosion.
- Containers should be stored in the vertical position and properly secured to prevent toppling.
- Stored containers should be periodically checked for general condition 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 materials.
- Storage** : Keep container below 50°C in a well ventilated place.

7.3. Specific end use(s)

- : None.

SECTION 8. Exposure controls/personal protection
8.1. Control parameters
Occupational Exposure Limits
Carbon dioxide (refrigerated)

- : Value 8h (CZ) [mg/m³] : 9000
- : ILV (EU) - 8 H - [mg/m³] : 9000
- : ILV (EU) - 8 H - [ppm] : 5000
- : TLV® -TWA [ppm] : 5000
- : TLV® -STEL [ppm] : 30000
- : AGW (8h) - Germany [mg/m³] TRGS 900 : 9100
- : AGW (8h) - Germany [ppm] TRGS 900 : 5000
- : MAK (AU) Tagesmittelwert (ml/m³) : 5000
- : MAK (AU) Tagesmittelwert (mg/m³) : 9000
- : MAK (AU) Kurzzeitwerte (ml/m³) : 10000
- : MAK (AU) Kurzzeitwerte (mg/m³) : 18000
- : VLA-ED - Spain [ppm] : 5000
- : VLA-ED - Spain [mg/m³] : 9150
- : VLA-EC - Spain [ppm] : 15000
- : VLA-EC - Spain [mg/m³] : 27400
- : NGV - [ppm] : 5000
- : NGV - [mg/m³] : 9000
- : KTV - [ppm] : 10
- : KTV - [mg/m³] : 10
- : HTP-vården (FI) - 8 H - [ppm] : 5000
- : HTP-vården (FI) - 8 H - [mg/m³] : 9100
- : Grænserværdier (DK) (ppm) : 5000
- : Grænserværdier (DK) (ppm) : 9000
- : Grænserværdier (DK) : 9000
- : GV Value Limit (Norway) [ppm] : 5000

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SECTION 8. Exposure controls/personal protection (continued)

	: GV Value Limit (Norway) [mg/m ³] : 9000
	: 8-Hour TWA (PL) (NDS) (mg/m ³) : 9000
	: 15-Minute STEL (PL)(NDSCh) (mg/m ³) : 27000
	: Valori Limite di Soglia (IT) 8 ore [ppm] : 5000
	: Valori Limite di Soglia (IT) 8 ore [mg/m ³] : 9000
	: TLV-TWA (Belgium) (ppm) : 5000
	: TLV-STEEL (Belgium) (ppm) : 30000
	: Value 15min. (CZ) [mg/m ³] : 45000
DNEL: Derived no effect level	: None available.
PNEC: Predicted no effect concentration	: None available.

8.2. Exposure controls

8.2.1. Appropriate engineering controls	: Systems under pressure should be regularly checked for leakages. Provide adequate general and local exhaust ventilation. Consider work permit system e.g. for maintenance activities.
8.2.2. Individual protection measures, e.g. personal protective equipment	: 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. Wear safety glasses with side shields Wear leather safety gloves and safety shoes when handling cylinders.
Personal protection	: Ensure adequate ventilation. Protect eyes, face and skin from liquid splashes.
8.2.3. Environmental exposure controls	: Refer to local regulations for restriction of emissions to the atmosphere. See section 13 for specific methods for waste gas treatment.

SECTION 9. Physical and chemical properties

9.1. Information on basic physical and chemical properties

Appearance	
- Physical state at 20°C / 101.3kPa	: Liquefied gas.
- Colour	: Colourless.
Odour	: No odour warning properties.
Odour threshold	: Odour threshold is subjective and inadequate to warn for overexposure.
pH value	: Not applicable.
Molar mass [g/mol]	: 44.01
Melting point [°C]	: -56.6
Boiling point [°C]	: -78.5 (s)
Critical temperature [°C]	: 30
Flash point [°C]	: Not flammable.
Evaporation rate (ether=1)	: Not applicable for gas-mixtures.
Flammability range [vol% in air]	: Non flammable.
Vapour pressure [20°C]	: 57.3 bar
Relative density, gas (air=1)	: 1.52
Relative density, liquid (water=1)	: 1.03
Solubility in water [mg/l]	: 2000
Partition coefficient n-octanol/water	: Not applicable for gas-mixtures.
Viscosity at 20°C [mPa.s]	: Not applicable.
Explosive Properties	: Not applicable.

9.2. Other information

Other data	: Gas/vapour heavier than air. May accumulate in confined spaces, particularly at or below ground level.
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SECTION 9. Physical and chemical properties (continued)

SECTION 10. Stability and reactivity

10.1. Reactivity

Stability and reactivity

- : No reactivity hazard other than the effects described in sub-sections below.
- : Stable under normal conditions.
- Liquid spillages can cause embrittlement of structural materials.

10.2. Chemical stability

- : Stable under normal conditions.

10.3. Possibility of hazardous reactions

- : None.

10.4. Conditions to avoid

- : Liquid spillages can cause embrittlement of structural materials.

10.5. Incompatible materials

- : None.

10.6. Hazardous decomposition products

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

SECTION 11. Toxicological information

11.1. Information on toxicological effects

Toxicity information

- : In high concentrations cause rapid circulatory insufficiency even at normal levels of oxygen concentration. Symptoms are headache, nausea and vomiting, which may lead to unconsciousness and death

Acute toxicity

- : No known toxicological effects from this product.

Rat inhalation LC50 [ppm/4h]

- : No data available.

Skin corrosion/irritation

- : No known effects from this product.

Serious eye damage/irritation

- : Direct contact with liquefied gas may cause severe and possibly permanent eye injury due to frostbite from rapid liquid evaporation.

Respiratory or skin sensitisation

- : No known effects from this product.

STOT-single exposure

- : No known effects from this product.

STOT-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 data available.

12.2. Persistence - degradability

- : No data available.

12.3. Bioaccumulative potential

- : No data available.

12.4. Mobility in soil

- : No data available.

12.5. Results of PBT and vPvB assessment

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SECTION 12. Ecological information (continued)

: No data available.

12.6. Other adverse effects

Ecological effects information : When discharged in large quantities may contribute to the greenhouse effect.
Can cause frost damage to vegetation.

Effect on the global warming : Contains greenhouse gas(es) not covered by 842/2006/EC

Global warming potential [CO2=1] : 1

SECTION 13. Disposal considerations

13.1. Waste treatment methods

General : May be vented to atmosphere in a well ventilated place.
Do not discharge into any place where its accumulation could be dangerous.
Refer to the code of practice of EIGA (Doc. 30/10 "Disposal of Gases, downloadable at <http://www.eiga.org>) for more guidance on suitable disposal methods
Contact supplier if guidance is required.

Do not discharge into any place where its accumulation could be dangerous.
Discharge to atmosphere in large quantities should be avoided.
Contact supplier if guidance is required.

13.2. Additional information

: None.

SECTION 14. Transport information

UN number : 2187

Labelling ADR, IMDG, IATA



: 2.2 : Non flammable, non toxic gas.

Land transport (ADR/RID)

H.I. nr : 22

UN proper shipping name : CARBON DIOXIDE, REFRIGERATED LIQUID

Transport hazard class(es) : 2

Classification code : 3 A

Packing Instruction(s) : P203

Tunnel Restriction : C/E Tank carriage: Passage forbidden through tunnels of category C, D and E; Other carriage: Passage forbidden through tunnels of category E

HAZCHEM - Emergency Action Code : 2T
2 = Fine water spray.
T = Recommended personal protective equipment : Full fire kit and breathing apparatus.
Appropriate measures : dilute.

Sea transport (IMDG)

Proper shipping name : CARBON DIOXIDE, REFRIGERATED LIQUID

Class : 2.2

Emergency Schedule (EmS) - Fire : F-C

Emergency Schedule (EmS) - Spillage : S-V

Packing instruction : P203

Air transport (ICAO-TI / IATA-DGR)

Proper shipping name (IATA) : CARBON DIOXIDE, REFRIGERATED LIQUID

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SECTION 14. Transport information (continued)

Class : 2.2
Passenger and Cargo Aircraft : Allowed.

Special precautions for user

: 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.

Labelling ADR : 2.2 : Non flammable, non toxic gas.

Other 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 that containers are firmly secured.
- Ensure there is adequate ventilation.
- Compliance with applicable regulations.

SECTION 15. Regulatory information
15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture
EU legislation

Seveso directive 96/82/EC : Not covered.

National legislation

: Ensure all national/local regulations are observed.

15.2. Chemical Safety Assessment

: A CSA does not need to be carried out for this product.

SECTION 16. Other information

Indication of changes : Revised safety data sheet in accordance with commission regulation (EU) No 453/2010

Training advice : Asphyxiant in high concentrations.
Receptacle under pressure.
May cause frostbite.
Keep container in a well-ventilated place.
Ensure all national/local regulations are observed.
The hazard of asphyxiation is often overlooked and must be stressed during operator training.

List of full text of H-statements in section 3. : H281 - Contains refrigerated gas; may cause cryogenic burns or injury.

Further information : Classification in accordance with calculation methods of regulation (EC) 1272/2008 CLP / (EC) 1999/45 DPD.
This Safety Data Sheet has been established in accordance with the applicable European Union legislation.

Note : This Safety Data Sheet has been established in accordance with the applicable European Union legislation.

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.

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The contents and format of this SDS are in accordance with EC Commission Directive 2001/58/EC.

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