

Material Safety Data Sheet



Carbon Dioxide (Liquefied gas)

1. Product and company identification

Product name	: Carbon Dioxide (Liquefied gas)
Synonym	: Dry ice; Carbonic acid gas; Carbon dioxide in coal mines; Carbon dioxide.
Trade name	: ALIGAL™ 2
Material uses	: Various/Special atmospheres for food.
CAS number	: 124-38-9
Supplier/Manufacturer	: Air Liquide Canada Inc. 1250, René-Lévesque West, Suite 1700 Montreal, QC H3B 5E6 www.airliquide.ca 1-800-817-7697
Prepared by	: IHS
In case of emergency	: (514) 878-1667

2. Hazards identification

Physical state	: Gas. [Liquefied gas]
Color	: Colorless.
Odor	: Odorless.
Emergency overview	
Signal word	: CAUTION!
Hazard statements	: GAS REDUCES OXYGEN AVAILABLE FOR BREATHING. AT VERY HIGH CONCENTRATIONS, CAN DISPLACE THE NORMAL AIR AND CAUSE SUFFOCATION FROM LACK OF OXYGEN. MAY CAUSE TARGET ORGAN DAMAGE, BASED ON ANIMAL DATA.
Precautions	: At very high concentrations, can displace the normal air and cause suffocation from lack of oxygen. Do not enter storage areas and confined spaces unless adequately ventilated. Do not breathe gas. Use only with adequate ventilation. Keep container tightly closed and sealed until ready for use.
Routes of entry	: Dermal contact. Eye contact. Inhalation.
Potential acute health effects	
Inhalation	: At very high concentrations, can displace the normal air and cause suffocation from lack of oxygen.
Ingestion	: Ingestion of liquid can cause burns similar to frostbite.
Skin	: Dermal contact with rapidly evaporating liquid could result in freezing of the tissues or frostbite.
Eyes	: Liquid can cause burns similar to frostbite.
Potential chronic health effects	
Chronic effects	: May cause target organ damage, based on animal data.
Carcinogenicity	: No known significant effects or critical hazards.
Mutagenicity	: No known significant effects or critical hazards.
Teratogenicity	: No known significant effects or critical hazards.
Developmental effects	: No known significant effects or critical hazards.

2. Hazards identification

- Fertility effects** : No known significant effects or critical hazards.
- Target organs** : May cause damage to the following organs: lungs, cardiovascular system, upper respiratory tract, central nervous system (CNS).

Over-exposure signs/symptoms

- Inhalation** : No specific data.
- Ingestion** : Adverse symptoms may include the following:
frostbite
- Skin** : Adverse symptoms may include the following:
frostbite
- Eyes** : Adverse symptoms may include the following:
frostbite
- Medical conditions aggravated by over-exposure** : Pre-existing disorders involving any target organs mentioned in this MSDS as being at risk may be aggravated by over-exposure to this product.

3. Composition/information on ingredients

Name	CAS number	%
Carbon dioxide	124-38-9	>99.5

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

4. First aid measures

- Eye contact** : Check for and remove any contact lenses. Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical attention immediately.
- Skin contact** : In case of contact with liquid, warm frozen tissues slowly with lukewarm water. Wash clothing before reuse. Clean shoes thoroughly before reuse. Get medical attention immediately.
- Inhalation** : Move exposed person to fresh air. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention immediately.
- Ingestion** : As this product rapidly becomes a gas when released, refer to the inhalation section.
- Protection of first-aiders** : No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation.

Antidote information

Product/ingredient name	Antidote information
No antidote information known	

- Notes to physician** : No specific treatment. Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.

5. Fire-fighting measures

- Flammability of the product** : Contains gas under pressure. In a fire or if heated, a pressure increase will occur and the container may burst or explode.
- Extinguishing media**
- Suitable** : Use an extinguishing agent suitable for the surrounding fire.
 - Not suitable** : None known.
- Special exposure hazards** : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Contact supplier immediately for specialist advice. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool.
- Hazardous thermal decomposition products** : Decomposition products may include the following materials:
carbon dioxide
carbon monoxide
- Special protective equipment for fire-fighters** : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode. For incidents involving large quantities, thermally insulated undergarments and thick textile or leather gloves should be worn.

6. Accidental release measures

- Personal precautions** : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Avoid breathing gas. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment (see Section 8). If leak is in user's equipment, be certain to purge piping with an inert gas prior to attempting repairs. Never fix a leak while the system is under pressure. If leak is on container or container valve, contact the closest Air Liquide Canada location.
- Environmental precautions** : Ensure emergency procedures to deal with accidental gas releases are in place to avoid contamination of the environment. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).
- Methods for cleaning up**
- Small spill** : Immediately contact emergency personnel. Stop leak if without risk.
 - Large spill** : Immediately contact emergency personnel. Stop leak if without risk. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

7. Handling and storage

- Handling** : Put on appropriate personal protective equipment (see Section 8). Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. Contains gas under pressure. Do not get in eyes or on skin or clothing. Avoid breathing gas. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Valve protection caps must remain in place unless cylinder is secured with valve outlet piped to usage point. Do not drag, slide or roll cylinders. Use a suitable hand truck for cylinder movement. Use a pressure regulator when connecting cylinder to lower pressure piping or systems. Do not heat cylinder by any means to increase the discharge rate of product from the cylinder. Use a check valve or trap in the discharge line to prevent hazardous back flow to the cylinder. Do not tamper with (valve) safety

7. Handling and storage

device. Close valve after each use and when empty.

Storage

- Protect cylinders from physical damage. Store in cool, dry, well-ventilated area of non combustible construction away from heavily trafficked areas and emergency exits. Do not allow the temperature where cylinders are stored to exceed 52°C/125°F. Cylinders must be stored upright and firmly secured to prevent falling or being knocked over. Full and empty cylinders should be segregated. Use a "first in - first out" inventory system to prevent full cylinders being stored for excessive periods of time. Store in accordance with local regulations. Store in a segregated and approved area. Store in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10). Protect from sunlight. Keep container tightly closed and sealed until ready for use.

8. Exposure controls/personal protection

Occupational exposure limits		TWA (8 hours)			STEL (15 mins)			Ceiling			
Ingredient	List name	ppm	mg/m ³	Other	ppm	mg/m ³	Other	ppm	mg/m ³	Other	Notations
Carbon dioxide	US ACGIH 6/2013	5000	9000	-	30000	54000	-	-	-	-	[2]
	AB 4/2009	5000	9000	-	30000	54000	-	-	-	-	
	BC 7/2013	5000	-	-	15000	-	-	-	-	-	
	ON 1/2013	5000	9000	-	30000	54000	-	-	-	-	
	QC 12/2012	5000	9000	-	30000	54000	-	-	-	-	

[2]Oxygen Depletion [Asphyxiant]

Consult local authorities for acceptable exposure limits.

Recommended monitoring procedures

- If this product contains ingredients with exposure limits, personal, workplace atmosphere or biological monitoring may be required to determine the effectiveness of the ventilation or other control measures and/or the necessity to use respiratory protective equipment. Reference should be made to appropriate monitoring standards. Reference to national guidance documents for methods for the determination of hazardous substances will also be required.

Engineering measures

- Use only with adequate ventilation. Use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits.

Hygiene measures

- Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Personal protection

Respiratory

- Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. If operating conditions cause high gas concentrations to be produced or any recommended or statutory exposure limit is exceeded, use an air-fed respirator or self-contained breathing apparatus. The gas can cause asphyxiation without warning by replacing the oxygen in the air. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

8. Exposure controls/personal protection

- Hands** : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. If contact with the liquid is possible, insulated gloves suitable for low temperatures should be worn. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated.
- Eyes** : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: safety glasses with side-shields.
- Skin** : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.
- Environmental exposure controls** : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

9. Physical and chemical properties

- Physical state** : Gas. [Liquefied gas]
- Flash point** : Not available.
- Auto-ignition temperature** : Not available.
- Flammable limits** : Not available.
- Color** : Colorless.
- Odor** : Odorless.
- Molecular weight** : 44.01 g/mole
- Molecular formula** : C-O₂
- pH** : Not available.
- Boiling/condensation point** : -78.55°C (-109.4°F)
- Melting/freezing point** : Sublimation temperature: -78.5°C (-109.3°F)
- Critical temperature** : 30.9°C (87.6°F)
- Relative density** : 1.56
- Density** : Not available.
- Vapor pressure** : 5720 kPa (42903.49 mm Hg) [room temperature]
- Vapor density** : 1.53 [Air = 1]
- Odor threshold** : Not available.
- Evaporation rate** : Not available.
- Viscosity** : Not available.
- Solubility** : Partially soluble in the following materials: cold water.
- Water solubility (g/l)** : 1.64 g/l
- LogK_{ow}** : 0.83

10. Stability and reactivity

- Chemical stability** : The product is stable.
- Conditions to avoid** : No specific data.
- Incompatible materials** : No specific data.
- Hazardous decomposition products** : Under normal conditions of storage and use, hazardous decomposition products should not be produced.
- Possibility of hazardous reactions** : Under normal conditions of storage and use, hazardous reactions will not occur.
- Under normal conditions of storage and use, hazardous polymerization will not occur.

11. Toxicological information

Acute toxicity

Not available.

Chronic toxicity

Not available.

Irritation/Corrosion

Not available.

Sensitizer

Not available.

Carcinogenicity

Classification

Not available.

Mutagenicity

Not available.

Teratogenicity

Not available.

Reproductive toxicity

Not available.

12. Ecological information

- Ecotoxicity** : This product shows a low bioaccumulation potential.

Aquatic ecotoxicity

Not available.

Persistence/degradability

Not available.

- Partition coefficient: n-octanol/water** : 0.83

- Bioconcentration factor** : Not available.

- Mobility** : Not available.

12. Ecological information

Toxicity of the products of biodegradation : Not available.

Other adverse effects : No known significant effects or critical hazards.




13. Disposal considerations

Waste disposal : The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Empty pressure vessels should be returned to the supplier. Waste packaging should be recycled.

Disposal should be in accordance with applicable regional, national and local laws and regulations.

Refer to Section 7: HANDLING AND STORAGE and Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION for additional handling information and protection of employees.

14. Transport information

Regulatory information	UN number	Proper shipping name	Classes	PG*	Label	Additional information
TDG Classification	UN2187	CARBON DIOXIDE, REFRIGERATED LIQUID	2.2	-		Explosive Limit and Limited Quantity Index 0.12 Passenger Carrying Road or Rail Index 50
IMDG Class	UN2187	CARBON DIOXIDE, REFRIGERATED LIQUID	2.2	-		Emergency schedules (EmS) F-C, S-V
IATA-DGR Class	UN2187	Carbon dioxide, refrigerated liquid	2.2	-		Passenger and Cargo Aircraft Quantity limitation: 50 kg Packaging instructions: 202 Cargo Aircraft Only Quantity limitation: 500 kg Packaging instructions: 202 Limited Quantities - Passenger Aircraft Quantity limitation: Forbidden Packaging instructions: Forbidden

PG* : Packing group

15. Regulatory information

United States inventory (TSCA 8b) : This material is listed or exempted.

WHMIS (Canada) : Class A: Compressed gas.

Canadian lists

Canadian NPRI : This material is not listed.

CEPA Toxic substances : This material is listed.

Canada inventory : This material is listed or exempted.

15. Regulatory information

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all the information required by the Controlled Products Regulations.

International regulations

- International lists**
- Australia inventory (AICS):** This material is listed or exempted.
 - China inventory (IECSC):** This material is listed or exempted.
 - Japan inventory:** This material is listed or exempted.
 - Korea inventory:** This material is listed or exempted.
 - Malaysia Inventory (EHS Register):** Not determined.
 - New Zealand Inventory of Chemicals (NZIoC):** This material is listed or exempted.
 - Philippines inventory (PICCS):** This material is listed or exempted.
 - Taiwan inventory (CSNN):** This material is listed or exempted.

Chemical Weapons : Not listed

Convention List Schedule I Chemicals

Chemical Weapons : Not listed

Convention List Schedule II Chemicals

Chemical Weapons : Not listed

Convention List Schedule III Chemicals

16. Other information

Label requirements : GAS REDUCES OXYGEN AVAILABLE FOR BREATHING. AT VERY HIGH CONCENTRATIONS, CAN DISPLACE THE NORMAL AIR AND CAUSE SUFFOCATION FROM LACK OF OXYGEN. MAY CAUSE TARGET ORGAN DAMAGE, BASED ON ANIMAL DATA.

Hazardous Material Information System (U.S.A.) :

Health	*	0
Flammability		0
Physical hazards		2
Personal protective equipment		X

Caution: HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks. Although HMIS® ratings are not required on MSDSs under 29 CFR 1910.1200, the preparer may choose to provide them. HMIS® ratings are to be used with a fully implemented HMIS® program. HMIS® is a registered mark of the National Paint & Coatings Association (NPCA). HMIS® materials may be purchased exclusively from J. J. Keller (800) 327-6868.

The customer is responsible for determining the PPE code for this material.

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Indicates information that has changed from previously issued version.

[Notice to reader](#)

16. Other information

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Notes

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