

Carbon Dioxide, refrigerated liquid

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SECTION 1. IDENTIFICATION

Product identifier used on the label

: **Carbon Dioxide, refrigerated liquid**

Other means of identification : InnoPure Liquid Carbon Dioxide
InnoPack Liquid Carbon Dioxide

Recommended use of the chemical and restrictions on use

: Industrial use; Medical applications; Food applications.
Recommended restrictions: None Known.

Chemical family

: gas

Name, address, and telephone number
of the supplier:

Innovair Industrial Limited

150 McPhillips Street
Winnipeg, MB, Canada
R3E 2J9

Supplier's Telephone # : 800-667-3344

24 Hr. Emergency Tel # : No information available.

Name, address, and telephone number of
the manufacturer:

Refer to supplier

SECTION 2. HAZARDS IDENTIFICATION

Classification of the chemical

Colourless gas. Odourless.

This material is classified as hazardous under U.S. OSHA regulations (29CFR 1910.1200) (Hazcom 2012) and Canadian WHMIS regulations (Hazardous Products Regulations) (WHMIS 2015).

Hazard classification :

Refrigerated liquefied gas
Simple asphyxiant

Label elements

Hazard pictogram(s)



Signal Word

WARNING!

Hazard statement(s)

Contains refrigerated gas; may cause cryogenic burns or injury.
May displace oxygen and cause rapid suffocation

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Precautionary statement(s)

Wear cold insulating gloves/face shield/eye protection.

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

Store in a well-ventilated place.

Other hazards

None known.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Pure substance

<u>Chemical name</u>	<u>Common name and synonyms</u>	<u>CAS #</u>	<u>Concentration (% by weight)</u>
Carbon dioxide, refrigerated liquid	Carbonic anhydride CO2	124-38-9	100.00

SECTION 4. FIRST-AID MEASURES

Description of first aid measures

- Ingestion* : Not an expected route of entry.
- Inhalation* : Immediately remove person to fresh air. If breathing has stopped, give artificial respiration. If breathing is difficult, give oxygen by qualified medical personnel only. Get medical attention if irritation develops and persists.
- Skin contact* : For exposure to liquid, immediately warm frostbite area with warm water not to exceed temperatures of 105°F/41°C. Maintain skin warming for at least 15 minutes or until normal colouring and sensation have returned to the affected area. In case of massive exposure, remove clothing while showering with warm water. Get medical attention.
- Eye contact* : Flush eyes with water for at least 15 minutes while holding eyelids open. Get medical attention immediately.

Most important symptoms and effects, both acute and delayed

- : Simple asphyxiant - this product does not contain oxygen and may cause asphyxia in confined spaces. Oxygen content in the area must not fall below 19.5% or harmful effects will result. In extremely high concentrations, product may act as an asphyxiant and cause increased breathing and pulse rates, fatigue and unconsciousness. As asphyxiation progresses, nausea, vomiting, prostration and loss of consciousness may result, eventually leading to convulsions, coma and death.

Indication of any immediate medical attention and special treatment needed

- : Provide general supportive measures and treat symptomatically.

SECTION 5. FIRE-FIGHTING MEASURES

Extinguishing media

Suitable extinguishing media

- : Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Unsuitable extinguishing media

- : None known.

Special hazards arising from the substance or mixture / Conditions of flammability

- : Not flammable under normal conditions of use. Closed containers are contained under pressure and may explode if exposed to excess heat for a prolonged period of time. Product is a simple asphyxiant. Asphyxiant, can replace oxygen in confined area. May displace oxygen in breathing air and lead to suffocation and death, particularly in confined spaces.

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Flammability classification (OSHA 29 CFR 1910.106)

: Non-flammable.

Hazardous combustion products

: Oxygen; Carbon monoxide

Special protective equipment and precautions for firefighters

Protective equipment for fire-fighters

: Firefighters should wear proper protective equipment and self-contained breathing apparatus (SCBA) with full face piece operated in positive pressure mode. Do not enter without wearing specialized protective equipment suitable for the situation. Firefighter's normal protective clothing (Bunker Gear) will not provide adequate protection. A full-body encapsulating chemical protective suit with positive pressure self-contained breathing apparatus (NIOSH approved or equivalent) may be necessary.

Special fire-fighting procedures

: Evacuate personnel to safe areas. Avoid inhaling gas. If feasible, stop the flow of gas. Move containers from fire area if safe to do so. Shield personnel to protect from venting or rupturing containers. Cool closed containers exposed to fire with water spray. Stay away from ends of cylinders and withdraw immediately in case of rising sounds or discolouration of containers.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures

: Restrict access to area until completion of clean-up. Keep all other personnel upwind and away from the spill/release. Ensure clean-up is conducted by trained personnel only. All persons dealing with clean-up should wear the appropriate protective equipment including self-contained breathing apparatus. Refer to Section 8, EXPOSURE CONTROLS AND PERSONAL PROTECTION, for additional information on acceptable personal protective equipment.

Environmental precautions : Ensure spilled product does not enter confined areas.

Methods and material for containment and cleaning up

: Ventilate area of release. Do not enter confined spaces unless adequately ventilated. Eliminate all ignition sources. Leaks in lines to equipment set-ups can be identified by painting suspected sites with soapy water. Leaks can be located by bubble formation. Stop spill or leak at source if safely possible. If leak cannot be stopped, move cylinders to an open space. Isolate the area until all gas has dispersed. Notify the appropriate authorities as required.

Special spill response procedures

: If a spill/release in excess of the EPA reportable quantity is made into the environment, immediately notify the National Response Center in the United States (phone: 1-800-424-8802).
US CERCLA Reportable quantity (RQ): None reported.

In Canada: Contact appropriate local and provincial environmental authorities for assistance and/or reporting requirements.

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SECTION 7. HANDLING AND STORAGE

Precautions for safe handling

- : Do not handle until all safety precautions have been read and understood. Before handling, it is very important that engineering controls are operating, and that protective equipment requirements and personal hygiene measures are being followed. People working with this chemical should be properly trained regarding its hazards and its safe use. Simple asphyxiant - this product does not contain oxygen and may cause asphyxia in confined spaces. Oxygen content in the area must not fall below 19.5% or harmful effects will result. Use only in well-ventilated areas. Avoid inhaling gas. Keep away from extreme heat and flame. Keep away from incompatibles. Protect cylinders from damage. Valve protection caps and valve outlet threaded plugs must remain in place unless container is secured with valve outlet piped to use point. Never attempt to lift cylinder by its cap. Open valves slowly to prevent rapid decompression. Shut flow off at cylinder valve and not just at the regulator after use. Do not puncture or incinerate containers.

- Conditions for safe storage** : Cylinders should be stored upright and firmly secured to prevent falling or being knocked over. Store in a cool, dry, well ventilated area, away from heat and ignition sources. Avoid storage of cylinders for more than six months. Do not store in direct sunlight. Storage area should be clearly identified, clear of obstruction and accessible only to trained and authorized personnel. Inspect periodically for damage or leaks.

- Incompatible materials** : Reactive metals; Metal hydrides

SECTION 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

<u>Exposure Limits:</u>					
	<u>Chemical Name</u>	<u>ACGIH TLV</u>		<u>OSHA PEL</u>	
		<u>TWA</u>	<u>STEL</u>	<u>PEL</u>	<u>STEL</u>
Carbon dioxide, refrigerated liquid	5000 ppm	30 000 ppm	5000 ppm (9000 mg/m ³)	N/Av	

Exposure controls

Ventilation and engineering measures

- : Provide exhaust ventilation or other engineering controls to keep the airborne concentration of vapours below their respective threshold limit value. Recommended monitoring procedures: Provide sufficient air exchange and/or exhaust in work rooms. Oxygen content in the area must not fall below 19.5% or harmful effects will result.

- Respiratory protection** : If engineering controls and work practices are not effective in controlling exposure to this material, then wear suitable approved respiratory protection. Confirmation of which type of respirator is most suitable for the intended application should be obtained from respiratory protection suppliers.

- Skin protection** : Wear cold insulating gloves/face shield/eye protection. Wear work gloves and safety shoes when handling cylinders.

- Eye / face protection** : Wear cold insulating gloves/face shield/eye protection.

- Other protective equipment** : An eyewash station and safety shower should be made available in the immediate working area. Other equipment may be required depending on workplace standards.

General hygiene considerations

- : Avoid inhaling gas. Do not eat, drink or smoke when using this product. Handle in accordance with good industrial hygiene and safety practice.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

- Appearance** : Colourless gas.

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Odour : Odourless.
Odour threshold : Not applicable.
pH : Not applicable.
Melting Point/Freezing point : Not available.

Initial boiling point and boiling range

: - 78.5°C

Flash point : Non-flammable.**Flashpoint (Method)** : Not applicable.**Evaporation rate (BuAe = 1)** : Not applicable.**Flammability (solid, gas)** : Not flammable.**Lower flammable limit (% by vol.)**

: Not applicable.

Upper flammable limit (% by vol.)

: Not applicable.

Oxidizing properties : None known.**Explosive properties** : Not explosive.**Vapour pressure** : 5730 kPa**Vapour density** : (Air = 1) 1.522**Relative density / Specific gravity**

: 0.82

Solubility in water : Completely soluble.**Other solubility(ies)** : Not available.**Partition coefficient: n-octanol/water or Coefficient of water/oil distribution**

: Log P(oct) = 0.92

Auto-ignition temperature : Not applicable.**Decomposition temperature** : Not applicable.**Viscosity** : Not applicable.**Volatiles (% by weight)** : Not applicable.**Volatile organic Compounds (VOC's)**

: Not applicable.

Absolute pressure of container

: Not available.

Flame projection length : Not applicable.**Other physical/chemical comments**: Molecular Weight: 44.1 g/mol
Molecular formula:CO₂
Critical temperature:31.1°C**SECTION 10. STABILITY AND REACTIVITY****Reactivity** : Not normally reactive.**Chemical stability** : Stable under normal conditions.**Possibility of hazardous reactions**

: No dangerous reaction known under conditions of normal use. Hazardous polymerization does not occur.

Conditions to avoid : Avoid contact with incompatible materials. Ensure adequate ventilation, especially in confined areas.**Incompatible materials** : See Section 7 (Handling and Storage) for further details.**Hazardous decomposition products**

: None known, refer to hazardous combustion products in Section 5.

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SECTION 11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure:

Routes of entry inhalation : YES

Routes of entry skin & eye : NO

Routes of entry Ingestion : NO

Routes of exposure skin absorption
: NO

Potential Health Effects:

Signs and symptoms of short-term (acute) exposure

Sign and symptoms Inhalation

: Simple asphyxiant - this product does not contain oxygen and may cause asphyxia in confined spaces. Oxygen content in the area must not fall below 19.5% or harmful effects will result.

In extremely high concentrations, product may act as an asphyxiant and cause increased breathing and pulse rates, fatigue and unconsciousness. As asphyxiation progresses, nausea, vomiting, prostration and loss of consciousness may result, eventually leading to convulsions, coma and death.

Sign and symptoms ingestion

: Not an expected route of entry under normal conditions of use. (gas)

Sign and symptoms skin

: Not an irritant. Contact with liquid or refrigerated gas can cause cold burns and frostbite. Symptoms of frostbite may include numbness, prickling and itching. Symptoms of more severe frostbite include a burning sensation, stiffness of the affected area, blistering, tissue death and gangrene.

Sign and symptoms eyes

: Not an irritant. Contact with liquid may cause frostbite. Symptoms of frostbite may include numbness, prickling and itching.

Potential Chronic Health Effects

: None reported.

Mutagenicity

: Not expected to be mutagenic in humans.

Carcinogenicity

: No components are listed as carcinogens by ACGIH, IARC, OSHA or NTP.

Reproductive effects & Teratogenicity

: Not expected to have other reproductive effects.

Sensitization to material

: Not expected to be a skin or respiratory sensitizer.

Specific target organ effects

: The substance or mixture is not classified as specific target organ toxicant, single exposure.

The substance or mixture is not classified as specific target organ toxicant, repeated exposure.

Medical conditions aggravated by overexposure

: Pre-existing skin, eye and respiratory disorders.

Synergistic materials

: No information available.

Toxicological data

: Not classified for acute toxicity based on available data. See below for toxicological data on the substance.

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<u>Chemical name</u>	<u>LC₅₀(4hr)</u> <u>inh, rat</u>	<u>LD₅₀</u>	
		<u>(Oral, rat)</u>	<u>(Rabbit, dermal)</u>
Carbon dioxide, refrigerated liquid	200 000 ppm/2H (141 421 ppm/4H)	N/Ap(gas)	N/Ap(gas)

Other important toxicological hazards

: None known.

SECTION 12. ECOLOGICAL INFORMATION

Ecotoxicity : No information available. Measured ecotoxicity data are not available for the aquatic toxicity endpoints for these gases. These chemicals are gases at standard temperature and pressure and are expected to partition primarily to air, therefore aquatic toxicity tests may not be relevant.

Ecotoxicity data:

<u>Ingredients</u>	<u>CAS #</u>	<u>Toxicity to Fish</u>		
		<u>LC50 / 96h</u>	<u>NOEC / 21 day</u>	<u>M Factor</u>
Carbon dioxide, refrigerated liquid	124-38-9	N/Ap	N/Ap	N/Ap

<u>Ingredients</u>	<u>CAS #</u>	<u>Toxicity to Daphnia</u>		
		<u>EC50 / 48h</u>	<u>NOEC / 21 day</u>	<u>M Factor</u>
Carbon dioxide, refrigerated liquid	124-38-9	N/Ap	N/Ap	N/Ap

<u>Ingredients</u>	<u>CAS #</u>	<u>Toxicity to Algae</u>		
		<u>EC50 / 96h or 72h</u>	<u>NOEC / 96h or 72h</u>	<u>M Factor</u>
Carbon dioxide, refrigerated liquid	124-38-9	N/Ap	N/Ap	N/Ap

Persistence and degradability

: No information available. The methods for determining biodegradability are not applicable to inorganic substances.

Bioaccumulation potential

: No information available.

<u>Components</u>	<u>Partition coefficient n-octanol/water (log Kow)</u>	<u>Bioconcentration factor (BCF)</u>
Carbon dioxide, refrigerated liquid (CAS 124-38-9)		no bioaccumulation

Mobility in soil : No information available.

Other Adverse Environmental effects

: No information available.

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SECTION 13. DISPOSAL CONSIDERATIONS

- Handling for Disposal** : Handle in accordance with good industrial hygiene and safety practice. See Section 7 (Handling and Storage) for further details. Allow to safely dissipate into atmosphere. Do not puncture or incinerate containers.
- Methods of Disposal** : Return to vendor with cylinder valve tightly closed and valve cap in place. Dispose in accordance with all applicable federal, state, provincial and local regulations.
- RCRA** : If this product, as supplied, becomes a waste in the United States, it may meet the criteria of a hazardous waste as defined under RCRA, Title 40 CFR 261. It is the responsibility of the waste generator to determine the proper waste identification and disposal method. For disposal of unused or waste material, check with local, state and federal environmental agencies.

SECTION 14. TRANSPORT INFORMATION

Regulatory Information	UN Number	UN proper shipping name	Transport hazard class(es)	Packing Group	Label
49CFR/DOT	UN2187	Carbon dioxide, refrigerated liquid	2.2	none	
49CFR/DOT Additional information	None.				
TDG	UN2187	CARBON DIOXIDE, REFRIGERATED LIQUID	2.2	none	
TDG Additional information					

Special precautions for user : Keep away from extreme heat and flame. Appropriate advice on safety must accompany the package.

Environmental hazards : This substance does not meet the criteria for an environmentally hazardous substance according to the IMDG Code. See ECOLOGICAL INFORMATION, Section 12.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

: This information is not available.

SECTION 15 - REGULATORY INFORMATION

US Federal Information:

Components listed below are present on the following U.S. Federal chemical lists:

Ingredients	CAS #	TSCA Inventory	CERCLA Reportable Quantity (RQ) (40 CFR 117.302):	SARA TITLE III: Sec. 302, Extremely Hazardous Substance, 40 CFR 355:	SARA TITLE III: Sec. 313, 40 CFR 372, Specific Toxic Chemical	
					Toxic Chemical	de minimus Concentration
Carbon dioxide, refrigerated liquid	124-38-9	Yes	None.	None.	No	N/Ap

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SARA TITLE III: Sec. 311 and 312, SDS Requirements, 40 CFR 370 Hazard Classes: Physical hazards (Refrigerated liquefied gas ;Simple Asphyxiant).Under SARA Sections 311 and 312, the EPA has established threshold quantities for the reporting of hazardous chemicals. The current thresholds are 500 pounds or the threshold planning quantity (TPQ), whichever is lower, for extremely hazardous substances and 10,000 pounds for all other hazardous chemicals.

US State Right to Know Laws:

The following chemicals are specifically listed by individual States:

<u>Ingredients</u>	CAS #	California Proposition 65		State "Right to Know" Lists					
		Listed	Type of Toxicity	CA	MA	MN	NJ	PA	RI
Carbon dioxide, refrigerated liquid	124-38-9	No	N/Ap	Yes	Yes	Yes	Yes	Yes	Yes

Canadian Information:

Canadian Environmental Protection Act (CEPA) information: All ingredients listed appear on the Domestic Substances List (DSL).

WHMIS information: Refer to Section 2 for a WHMIS Classification for this product.

International Information:

Components listed below are present on the following International Inventory list:

<u>Ingredients</u>	CAS #	European EINECS	Australia AICS	Philippines PICCS	Japan ENCS	Korea KECI/KECL	China IECSC	NewZealand IOC
Carbon dioxide, refrigerated liquid	124-38-9	204-696-9	Present	Present	(1)-310; (1)-169	KE-04683	Present	HSR001018

SECTION 16. OTHER INFORMATION

Legend

- : ACGIH: American Conference of Governmental Industrial Hygienists
- AICS: Australian Inventory of Chemical Substances
- CA: California
- CAS: Chemical Abstract Services
- CERCLA: Comprehensive Environmental Response, Compensation, and Liability Act of 1980
- EC50: Effective Concentration 50%
- EINECS: European Inventory of Existing Commercial chemical Substances
- ENCS: Existing and New Chemical Substances
- EPA: Environmental Protection Agency
- HSDB: Hazardous Substances Data Bank
- IARC: International Agency for Research on Cancer
- IECSC: Inventory of Existing Chemical Substances
- Inh: Inhalation
- IOC: Inventory of Chemicals
- KECI: Korean Existing Chemicals Inventory
- KECL: Korean Existing Chemicals List
- LC: Lethal Concentration
- LD: Lethal Dose
- MA: Massachusetts
- MN: Minnesota
- N/Ap: Not Applicable
- N/Av: Not Available

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NIOSH: National Institute of Occupational Safety and Health
 NJ: New Jersey
 NOEC: No observable effect concentration
 NTP: National Toxicology Program
 OECD: Organisation for Economic Co-operation and Development
 OSHA: Occupational Safety and Health Administration
 PA: Pennsylvania
 PEL: Permissible exposure limit
 PICCS: Philippine Inventory of Chemicals and Chemical Substances
 RCRA: Resource Conservation and Recovery Act
 RI: Rhode Island
 RQ: Reportable Quantity
 RTECS: Registry of Toxic Effects of Chemical Substances
 SARA: Superfund Amendments and Reauthorization Act
 SCBA: Self-Contained Breathing Apparatus
 STEL: Short Term Exposure Limit
 TDG: Canadian Transportation of Dangerous Goods Act & Regulations
 TLV: Threshold Limit Values
 TSCA: Toxic Substance Control Act
 TWA: Time Weighted Average
 WHMIS: Workplace Hazardous Materials Identification System

- References** :
1. ACGIH, Threshold Limit Values for Chemical Substances and Physical Agents & Biological Exposure Indices
 2. ECHA - European Chemical Agency
 3. Canadian Centre for Occupational Health and Safety, CCHInfoWeb databases
 4. Safety Data Sheets from manufacturer.
 5. US EPA Title III List of Lists
 6. California Proposition 65 List
 7. OECD - The Global Portal to Information on Chemical Substances - eChemPortal

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Other special considerations for handling

: Provide adequate information, instruction and training for operators.

<p><u>Prepared for:</u> Innovair Industrial Limited 150 McPhillips Street Winnipeg, MB R3E 2J9 Telephone: 800-667-3344</p>	
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product or in any other process.

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