



Carbon dioxide, refrigerated liquid

Safety Data Sheet

according to the Hazardous Products Regulation (February 11, 2015)

Date of issue: 01-01-2016

Revision date: 04-09-2017

SECTION 1: Identification

1.1. Product identifier

Product form : Substance
Name : Carbon dioxide, refrigerated liquid
CAS No : 124-38-9
Formula : CO₂
Other means of identification : Liquid Carbon Dioxide, ,

1.2. Recommended use and restrictions on use

Recommended uses and restrictions : Industrial use
Medical applications
Semiconductor
Use as directed

1.3. Supplier

Josef Gas
201 Basaltic Rd
Concord - Canada L4K 1G4
T 416-658-1212
www.josefgases.com

1.4. Emergency telephone number

Emergency number : 1-613-996-6666 CANUTEC
For routine information, contact your supplier or Josef Gas sales representative.

SECTION 2: Hazard identification

2.1. Classification of the substance or mixture

GHS-CA classification

Simple asphyxiant H380
Refrigerated liquefied gas H281

2.2. GHS Label elements, including precautionary statements

GHS-CA labelling

Hazard pictograms :



GHS04

Signal word : WARNING

Hazard statements : CONTAINS REFRIGERATED GAS; MAY CAUSE CRYOGENIC BURNS OR INJURY
MAY DISPLACE OXYGEN AND CAUSE RAPID SUFFOCATION
MAY CAUSE FROSTBITE
MAY INCREASE RESPIRATION AND HEART RATE

Precautionary statements : Do not handle until all safety precautions have been read and understood
Use and store only outdoors or in a well-ventilated area
Wear cold insulating gloves and either face shield or eye protection
Use a back flow preventive device in the piping
Close valve after each use and when empty
Always keep container in upright position
DO NOT change or force fit connections

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2.3. Other hazards

Other hazards not contributing to the classification : Asphyxiant in high concentrations. Contact with liquid may cause cold burns/frostbite.

2.4. Unknown acute toxicity (GHS-CA)

No data available

SECTION 3: Composition/information on ingredients

3.1. Substances

Name	CAS No.	% (Vol.)	Common Name (synonyms)
Carbon dioxide, refrigerated liquid (Main constituent)	(CAS No) 124-38-9	100	Carbon dioxide

3.2. Mixtures

Not applicable

SECTION 4: First-aid measures

4.1. Description of first aid measures

- First-aid measures after 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.
- First-aid measures after skin contact : The liquid may cause frostbite. For exposure to liquid, immediately warm frostbite area with warm water not to exceed 105°F (41°C). Water temperature should be tolerable to normal skin. Maintain skin warming for at least 15 minutes or until normal coloring and sensation have returned to the affected area. In case of massive exposure, remove clothing while showering with warm water. Seek medical evaluation and treatment as soon as possible.
- First-aid measures after eye contact : Immediately flush eyes thoroughly with water for at least 15 minutes. Hold the eyelids open and away from the eyeballs to ensure that all surfaces are flushed thoroughly. Contact an ophthalmologist immediately. Get immediate medical attention.
- First-aid measures after ingestion : Ingestion is not considered a potential route of exposure.

4.2. Most important symptoms and effects (acute and delayed)

No additional information available

4.3. Immediate medical attention and special treatment, if necessary

Other medical advice or treatment : None.

SECTION 5: Fire-fighting measures

5.1. Suitable extinguishing media

Suitable extinguishing media : Use extinguishing media appropriate for surrounding fire.

5.2. Unsuitable extinguishing media

No additional information available

5.3. Specific hazards arising from the hazardous product

- Explosion hazard : CONTAINS GAS UNDER PRESSURE; MAY EXPLODE IF HEATED.
- Reactivity : No reactivity hazard other than the effects described in sub-sections below.
- Reactivity in case of fire : No reactivity hazard other than the effects described in sub-sections below.

5.4. Special protective equipment and precautions for fire-fighters

Firefighting instructions : DANGER! Extremely cold liquid and gas under pressure. Take care not to direct spray onto vents on top of container. Do not discharge sprays directly into liquid; cryogenic liquid can freeze water rapidly

Evacuate all personnel from the danger area. Use self-contained breathing apparatus (SCBA) and protective clothing. Immediately cool containers with water from maximum distance. Stop flow of gas if safe to do so, while continuing cooling water spray. Remove ignition sources if safe to do so. Remove containers from area of fire if safe to do so. On-site fire brigades must comply with their provincial and local fire code regulations.

Protection during firefighting : Compressed gas: asphyxiant. Suffocation hazard by lack of oxygen.

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- Special protective equipment for fire fighters : Use self-contained breathing apparatus. Standard protective clothing and equipment (Self Contained Breathing Apparatus) for fire fighters.
- Specific methods : Stop flow of product if safe to do so. Use fire control measures appropriate for the surrounding fire. Exposure to fire and heat radiation may cause gas containers to rupture. Cool endangered containers with water spray jet from a protected position. Prevent water used in emergency cases from entering sewers and drainage systems. Use water spray or fog to knock down fire fumes if possible. If leaking do not spray water onto container. Water surrounding area (from protected position) to contain fire. Exposure to fire may cause containers to rupture/explode.
- Other information : Cryogenic liquid causes severe frostbite, a burn-like injury. Heat of fire can build pressure in a closed container and cause it to rupture. Venting vapors may obscure visibility. Air will condense on surfaces such as vaporizers or piping exposed to liquid or cold gas. Nitrogen, which has a lower boiling point than oxygen, evaporates first, leaving an oxygen-enriched condensate.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

- General measures : Prevent from entering sewers, basements and workpits, or any place where its accumulation can be dangerous. Evacuate area. Ensure adequate air ventilation. Wear self-contained breathing apparatus when entering area unless atmosphere is proven to be safe. Stop leak if safe to do so.

6.2. Methods and materials for containment and cleaning up

6.3. Reference to other sections

For further information refer to section 8: Exposure controls/personal protection

SECTION 7: Handling and storage

7.1. Precautions for safe handling

- Precautions for safe handling : Wear leather safety gloves and safety shoes when handling cylinders. Protect cylinders from physical damage; do not drag, roll, slide or drop. While moving cylinder, always keep in place removable valve cover. Never attempt to lift a cylinder by its cap; the cap is intended solely to protect the valve. When moving cylinders, even for short distances, use a cart (trolley, hand truck, etc.) designed to transport cylinders. Never insert an object (e.g. wrench, screwdriver, pry bar) into cap openings; doing so may damage the valve and cause a leak. Use an adjustable strap wrench to remove over-tight or rusted caps. Slowly open the valve. If the valve is hard to open, discontinue use and contact your supplier. Close the container valve after each use; keep closed even when empty. Never apply flame or localized heat directly to any part of the container. High temperatures may damage the container and could cause the pressure relief device to fail prematurely, venting the container contents. For other precautions in using this product, see section 16.

7.2. Conditions for safe storage, including any incompatibilities

- Storage conditions : Store in a cool, well-ventilated place. Store and use with adequate ventilation. Store only where temperature will not exceed 125°F (52°C). Firmly secure containers upright to keep them from falling or being knocked over. Install valve protection cap, if provided, firmly in place by hand. Store full and empty containers separately. Use a first-in, first-out inventory system to prevent storing full containers for long periods

OTHER PRECAUTIONS FOR HANDLING, STORAGE, AND USE: When handling product under pressure, use piping and equipment adequately designed to withstand the pressures to be encountered. Never work on a pressurized system. Use a back flow preventive device in the piping. Gases can cause rapid suffocation because of oxygen deficiency; store and use with adequate ventilation. If a leak occurs, close the container valve and blow down the system in a safe and environmentally correct manner in compliance with all international, federal/national, state/provincial, and local laws; then repair the leak. Never place a container where it may become part of an electrical circuit.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Carbon dioxide, refrigerated liquid (124-38-9)		
USA - ACGIH	ACGIH TLV-TWA (ppm)	5000 ppm
USA - ACGIH	ACGIH TLV-STEL (ppm)	30000 ppm
Carbon dioxide, refrigerated liquid (124-38-9)		
USA - OSHA	OSHA PEL (TWA) (mg/m ³)	9000 mg/m ³
USA - OSHA	OSHA PEL (TWA) (ppm)	5000 ppm



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8.2. Appropriate engineering controls

Appropriate engineering controls

: Oxygen detectors should be used when asphyxiating gases may be released. Ensure exposure is below occupational exposure limits (where available).

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8.3. Individual protection measures/Personal protective equipment

Personal protective equipment : Safety glasses. Face shield. Gloves.



Hand protection : Wear work gloves when handling gas containers.

Eye protection : Wear safety glasses with side shields. Wear goggles and a face shield when transfilling or breaking transfer connections. Select in accordance with the current CSA standard Z94.3, "Industrial Eye and Face Protection", and any provincial regulations, local bylaws or guidelines.

Respiratory protection : **Respiratory protection:** Use respirable fume respirator or air supplied respirator when working in confined space or where local exhaust or ventilation does not keep exposure below TLV. Select in accordance with provincial regulations, local bylaws or guidelines. Selection should be based on the current CSA standard Z94.4, "Selection, Care, and Use of Respirators." Respirators should also be approved by NIOSH and MSHA. For emergencies or instances with unknown exposure levels, use a self-contained breathing apparatus (SCBA).

Thermal hazard protection : Wear cold insulating gloves when transfilling or breaking transfer connections.

Environmental exposure controls : None necessary.

Other information : **Other protection :** Safety shoes for general handling at customer sites. Metatarsal shoes and cuffless trousers for cylinder handling at packaging and filling plants. Select in accordance with the current CSA standard Z195, "Protective Foot Wear", and any provincial regulations, local bylaws or guidelines. For working with flammable and oxidizing materials, consider the use of flame resistant anti-static safety clothing.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state	: Gas
Appearance	: Colorless gas.
Molecular mass	: 44 g/mol
Colour	: Colourless.
Odour	: No odour warning properties.
Odour threshold	: No data available
pH solution	: 3.7 (carbonic acid)
pH solution	: No data available
Relative evaporation rate (butylacetate=1)	: No data available
Relative evaporation rate (ether=1)	: Not applicable.
Melting point	: -78.5 °C
Freezing point	: No data available
Boiling point	: -78.4 °C
Flash point	: No data available
Critical temperature	: 31 °C
Auto-ignition temperature	: Not applicable.
Decomposition temperature	: No data available
Vapour pressure	: 5730 kPa
Vapour pressure at 50 °C	: No data available
Critical pressure	: 7375 kPa
Relative vapour density at 20 °C	: No data available
Relative density	: 0.82
Relative density of saturated gas/air mixture	: No data available
Density	: 762 kg/m ³
Relative gas density	: 1.52
Solubility	: Water: 2000 mg/l Completely soluble.
Log Pow	: 0.83
Log Kow	: Not applicable.

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Viscosity, kinematic	: Not applicable.
Viscosity, dynamic	: Not applicable.
Viscosity, kinematic (calculated value) (40 °C)	: No data available
Explosive properties	: Not applicable.
Oxidizing properties	: None.
Flammability (solid, gas)	: Non flammable

9.2. Other information

Sublimation point	: -78.5 °C
Gas group	: Refrigerated liquefied gas
Additional information	: Gas/vapour heavier than air. May accumulate in confined spaces, particularly at or below ground level

SECTION 10: Stability and reactivity

10.1. Reactivity

Reactivity	: No reactivity hazard other than the effects described in sub-sections below.
Chemical stability	: Stable under normal conditions.
Possibility of hazardous reactions	: None.
Conditions to avoid	: None under recommended storage and handling conditions (see section 7).
Incompatible materials	: Alkali metals, Alkaline earth metals, Acetylide forming metals, Chromium, Titanium > 1022°F (550°C), Uranium (U) > 1382°F (750°C), Magnesium > 1427°F (775°C).
Hazardous decomposition products	: Electrical discharges and high temperatures decompose carbon dioxide into carbon monoxide and oxygen. The welding process may generate hazardous fumes and gases. If using carbon dioxide for welding and cutting, see Josef Gas, Gaseous Carbon Dioxide.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity (oral)	: Not classified
Acute toxicity (dermal)	: Not classified
Acute toxicity (inhalation)	: Not classified

Additional information	Low concentrations of CO2 cause increased respiration and headache
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Skin corrosion/irritation	: Not classified pH: 3.7 (carbonic acid)
Serious eye damage/irritation	: Not classified pH: 3.7 (carbonic acid)
Respiratory or skin sensitization	: Not classified
Germ cell mutagenicity	: Not classified
Carcinogenicity	: Not classified
Reproductive toxicity	: Not classified
Specific target organ toxicity (single exposure)	: Not classified
Specific target organ toxicity (repeated exposure)	: Not classified
Aspiration hazard	: Not classified

SECTION 12: Ecological information

12.1. Toxicity

Ecology - general	: No ecological damage caused by this product.
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12.2. Persistence and degradability

Carbon dioxide, refrigerated liquid (124-38-9)	
Persistence and degradability	No ecological damage caused by this product.

12.3. Bioaccumulative potential

Carbon dioxide, refrigerated liquid (124-38-9)	
BCF fish 1	No bioaccumulation
Log Pow	0.83
Log Kow	Not applicable.
Bioaccumulative potential	No ecological damage caused by this product.

12.4. Mobility in soil

Carbon dioxide, refrigerated liquid (124-38-9)	
Mobility in soil	No data available.
Log Pow	0.83
Log Kow	Not applicable.
Ecology - soil	No ecological damage caused by this product.

12.5. Other adverse effects

Other adverse effects	: Can cause frost damage to vegetation.
Effect on the 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

SECTION 13: Disposal considerations

13.1. Disposal methods

Waste disposal recommendations : Do not attempt to dispose of residual or unused quantities. Return container to supplier.

SECTION 14: Transport information

14.1. Basic shipping description

In accordance with TDG

TDG

UN-No. (TDG) : UN2187
 TDG Primary Hazard Classes : 2.2 - Class 2.2 - Non-Flammable, Non-Toxic Gas.
 Proper shipping name : CARBON DIOXIDE, REFRIGERATED LIQUID

Explosive Limit and Limited Quantity Index : 0.125 L
 Passenger Carrying Ship Index : Forbidden
 Passenger Carrying Road Vehicle or
 Passenger Carrying Railway Vehicle Index : 50 L

14.3. Air and sea transport

IMDG

UN-No. (IMDG) : 2187
 Proper Shipping Name (IMDG) : CARBON DIOXIDE, REFRIGERATED LIQUID
 Class (IMDG) : 2 - Gases
 MFAG-No : 120

IATA

UN-No. (IATA) : 2187
 Proper Shipping Name (IATA) : CARBON BIOXIDE, REFRIGERATED LIQUID
 Class (IATA) : 2

SECTION 15: Regulatory information

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15.1. National regulations

Carbon dioxide, refrigerated liquid (124-38-9)

Listed on the Canadian DSL (Domestic Substances List)

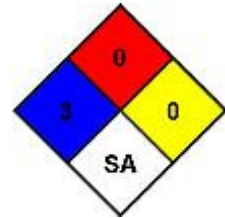
SECTION 16: Other information

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Indication of changes:

Training advice : The hazard of asphyxiation is often overlooked and must be stressed during operator training.
Other information : When you mix two or more chemicals, you can create additional, unexpected hazards. Obtain and evaluate the safety information for each component before you produce the mixture. Consult an industrial hygienist or other trained person when you evaluate the end product. Before using any plastics, confirm their compatibility with this product

NFPA health hazard : 3 - Short exposure could cause serious temporary or residual injury even though prompt medical attention was given.
NFPA fire hazard : 0 - Materials that will not burn.
NFPA reactivity : 0 - Normally stable, even under fire exposure conditions, and not reactive with water.
NFPA specific hazard : SA - This denotes gases which are simple asphyxiants.





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HMIS III Rating

Health	: 3 Serious Hazard - Major injury likely unless prompt action is taken and medical treatment is given
Flammability	: 0 Minimal Hazard - Materials that will not burn
Physical	: 2 Moderate Hazard - Materials that are unstable and may undergo violent chemical changes at normal temperature and pressure with low risk for explosion. Materials may react violently with water or form peroxides upon exposure to air.

This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product.