

Carbon Dioxide

Safety Data Sheet 906849

according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

Date of issue: 08/29/2016

Version: 2.0

SECTION 1: Identification

1.1. Identification

Product form	: Substance
Substance name	: Carbon Dioxide
Chemical name	: Carbon Dioxide
CAS-No.	: 124-38-9
Product code	: SG-1001-07262
Formula	: CO ₂

1.2. Recommended use and restrictions on use

Use of the substance/mixture	: Protective Atmosphere for Food and Beverages
Use of the substance/mixture	: Semiconductor Purposes Manufacture of substances

1.3. Supplier

Air Liquide USA LLC and its affiliates
9811 Katy Freeway, Suite 100
Houston, TX 77024 - USA
T 1-800-819-1704
www.us.airliquide.com

1.4. Emergency telephone number

Emergency number	: Chemtrec: 1-800-424-9300
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SECTION 2: Hazard(s) identification

2.1. Classification of the substance or mixture

GHS-US classification

Gases under pressure	H280	Contains gas under pressure; may explode if heated
Liquefied gas		

Full text of H statements : see section 16

2.2. GHS Label elements, including precautionary statements

GHS-US labeling

Hazard pictograms (GHS-US) :



GHS04

Signal word (GHS-US)

: Warning

Hazard statements (GHS-US)

: H280 - Contains gas under pressure; may explode if heated
OSHA-H01 - May displace oxygen and cause rapid suffocation
CGA-HG01 - May cause frostbite
CGA-HG03 - May increase respiration and heart rate

Precautionary statements (GHS-US)

: P202 - Do not handle until all safety precautions have been read and understood.
P261 - Avoid breathing gas.
P271 - Use only outdoors or in a well-ventilated area.
P280 - Wear eye protection, face protection, protective gloves, protective clothing.
P302 - IF ON SKIN: Thaw frostbitten parts with lukewarm water. Do not rub affected area, Get immediate medical advice/attention.
P305+P351+P338 - If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
P308+P313 - If exposed or concerned: Get medical advice/attention.
P403 - Store in a well-ventilated place.
P501 - Dispose of contents/container in accordance with local/regional/national/international regulations
P304+P340 - If inhaled: Remove person to fresh air and keep comfortable for breathing
CGA-PG02 - Protect from sunlight when ambient temperature exceeds 52°C/125 °F
CGA-PG05 - Use a back flow preventive device in the piping

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CGA-PG06 - Close valve after each use and when empty
CGA-PG10 - Use only with equipment rated for cylinder pressure
CGA-PG14 - Approach suspected leak area with caution
CGA-PG21 - Open valve slowly

2.3. Other hazards which do not result in classification

No additional information available

2.4. Unknown acute toxicity (GHS US)

Not applicable

SECTION 3: Composition/Information on ingredients

3.1. Substances

Name : Carbon Dioxide
CAS-No. : 124-38-9

Name	Product identifier	%	GHS-US classification
Carbon Dioxide	(CAS-No.) 124-38-9	<= 99.9	Press. Gas (Liq.), H280

Full text of hazard classes and H-statements : see section 16

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 fresh air and keep at rest in a position comfortable for breathing. If you feel unwell, seek medical advice.
- First-aid measures after skin contact : Thaw frosted parts with lukewarm water. Do not rub affected area. Get immediate medical advice/attention.
- First-aid measures after eye contact : Immediately flush eyes thoroughly with water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get immediate medical advice/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)

- Symptoms/effects after inhalation : May displace oxygen and cause rapid suffocation. May increase respiration and heart rate.
- Symptoms/effects after skin contact : May cause frostbite.
- Symptoms/effects after eye contact : Contact with the product may cause cold burns or frostbite.
- Symptoms/effects after ingestion : Ingestion is not considered a potential route of exposure.
- Symptoms/effects upon intravenous administration : Not known.
- Chronic symptoms : Adverse effects not expected from this product.

4.3. Immediate medical attention and special treatment, if necessary

If you feel unwell, seek medical advice. If breathing is difficult, give oxygen.

SECTION 5: Fire-fighting measures

5.1. Suitable (and unsuitable) extinguishing media

- Suitable extinguishing media : Use extinguishing media appropriate for surrounding fire.
- Unsuitable extinguishing media : Do not use water jet to extinguish.

5.2. Specific hazards arising from the chemical

- Fire hazard : The product is not flammable.
- Explosion hazard : Product is not explosive. Heat may build pressure, rupturing closed containers, spreading fire and increasing risk of burns and injuries.
- Reactivity : None known.
- Hazardous combustion products : None

5.3. Special protective equipment and precautions for fire-fighters

- Firefighting instructions : In case of fire: Evacuate area. Fight fire remotely due to the risk of explosion. Use water spray or fog for cooling exposed containers. Exercise caution when fighting any chemical fire.
- Protection during firefighting : Standard protective clothing and equipment (e.g. Self Contained Breathing Apparatus) for fire fighters. Do not enter fire area without proper protective equipment, including respiratory protection.

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SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

General measures : Ensure adequate ventilation.

6.1.1. For non-emergency personnel

Protective equipment : Wear protective equipment consistent with the site emergency plan.

Emergency procedures : Evacuate personnel to a safe area. Close doors and windows of adjacent premises. Keep containers closed. Mark the danger area. Seal off low-lying areas. Keep upwind.

6.1.2. For emergency responders

Protective equipment : Standard protective clothing and equipment (e.g. Self Contained Breathing Apparatus) for fire fighters. Equip cleanup crew with proper protection.

Emergency procedures : Evacuate and limit access. Ventilate area.

6.2. Environmental precautions

Try to stop release if without risk.

6.3. Methods and material for containment and cleaning up

For containment : Try to stop release if without risk.

Methods for cleaning up : Dispose of contents/container in accordance with local/regional/national/international regulations.

6.4. Reference to other sections

See also Sections 8 and 13.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Additional hazards when processed : Pressurized container: Do not pierce or burn, even after use. Use only with equipment rated for cylinder pressure. Close valve after each use and when empty.

Precautions for safe handling : Do not handle until all safety precautions have been read and understood. Use only outdoors or in a well-ventilated area.

Hygiene measures : Do not eat, drink or smoke when using this product.

7.2. Conditions for safe storage, including any incompatibilities

Technical measures : Comply with applicable regulations.

Storage conditions : Do not expose to temperatures exceeding 52 °C/ 125 °F. Keep container closed when not in use. Protect cylinders from physical damage; do not drag, roll, slide or drop. Store in well ventilated area.

Incompatible products : None known.

Incompatible materials : None known.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Carbon Dioxide (124-38-9)		
ACGIH	ACGIH TWA (ppm)	5000 ppm
ACGIH	ACGIH STEL (ppm)	30000 ppm
OSHA	OSHA PEL (TWA) (mg/m³)	9000 mg/m³
OSHA	OSHA PEL (TWA) (ppm)	5000 ppm
IDLH	US IDLH (ppm)	40000 ppm
NIOSH	NIOSH REL (TWA) (mg/m³)	9000 mg/m³
NIOSH	NIOSH REL (TWA) (ppm)	5000 ppm
NIOSH	NIOSH REL (STEL) (mg/m³)	54000 mg/m³
NIOSH	NIOSH REL (STEL) (ppm)	30000 ppm

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8.2. Appropriate engineering controls

- Appropriate engineering controls
- : Ensure exposure is below occupational exposure limits (where available). Provide adequate general and local exhaust ventilation. Systems under pressure should be regularly checked for leakages. Oxygen detectors should be used when asphyxiating gases may be released. Consider the use of a work permit system e.g. for maintenance activities.
- Environmental exposure controls
- : Refer to local regulations for restriction of emissions to the atmosphere. See section 13 for specific methods for waste gas treatment.

8.3. Individual protection measures/Personal protective equipment

Hand protection:

Wear working gloves when handling gas containers. 29 CFR 1910.138: Hand protection

Eye protection:

Wear safety glasses with side shields. 29 CFR 1910.133: Eye and Face Protection

Skin and body protection:

Wear suitable protective clothing, e.g. lab coats, coveralls or flame resistant clothing.

Respiratory protection:

None necessary during normal and routine operations. See Sections 5 & 6.

Thermal hazard protection:

None necessary during normal and routine operations.

Other information:

Wear safety shoes while handling containers. 29 CFR 1910.136: Foot Protection.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state	: Gas
Appearance	: Clear, colorless gas.
Color	: Colorless
Odor	: Odorless
Odor threshold	: No data available
pH	: No data available
Melting point	: No data available
Freezing point	: -56.6 °C
Boiling point	: No data available
Critical temperature	: 31.1 °C
Critical pressure	: 7381.8 kPa
Flash point	: Not applicable (non-flammable gas)
Relative evaporation rate (butyl acetate=1)	: No data available
Relative evaporation rate (ether=1)	: Not applicable
Flammability (solid, gas)	: See Section 2.1 and 2.2
Vapor pressure	: 5730 kPa
Relative vapor density at 20 °C	: No data available
Relative density	: 0.82
Molecular mass	: 44.01 g/mol
Relative gas density	: 1.52 Heavier than air
Solubility	: Water: 90 %
Log Pow	: No data available
Auto-ignition temperature	: Not applicable
Decomposition temperature	: No data available
Viscosity, kinematic	: Not applicable

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Viscosity, dynamic	: Not applicable
Explosion limits	: Not applicable (non-flammable gas)
Explosive properties	: Not applicable (non-flammable gas).
Oxidizing properties	: None.

9.2. Other information

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

SECTION 10: Stability and reactivity

10.1. Reactivity

None known.

10.2. Chemical stability

Stable under normal conditions.

10.3. Possibility of hazardous reactions

None known.

10.4. Conditions to avoid

None under recommended storage and handling conditions (see section 7).

10.5. Incompatible materials

None known.

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

Acute toxicity : Not classified

Carbon Dioxide (124-38-9)

LC50 inhalation rat (ppm)	820000 ppm/4h
ATE US (gases)	820000.000 ppmV/4h

Carbon Dioxide (124-38-9)

LC50 inhalation rat (ppm)	820000 ppm/4h
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Skin corrosion/irritation : Not classified

Serious eye damage/irritation : Not classified

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

Symptoms/effects after inhalation : May displace oxygen and cause rapid suffocation. May increase respiration and heart rate.

Symptoms/effects after skin contact : May cause frostbite.

Symptoms/effects after eye contact : Contact with the product may cause cold burns or frostbite.

Symptoms/effects after ingestion : Ingestion is not considered a potential route of exposure.

Symptoms/effects upon intravenous administration : Not known.

Chronic symptoms : Adverse effects not expected from this product.

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SECTION 12: Ecological information

12.1. Toxicity

No additional information available

12.2. Persistence and degradability

Carbon Dioxide (124-38-9)

Persistence and degradability	No ecological damage caused by this product.
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12.3. Bioaccumulative potential

Carbon Dioxide (124-38-9)

BCF fish 1	(no bioaccumulation)
Log Pow	0.83
Bioaccumulative potential	No ecological damage caused by this product.

12.4. Mobility in soil

Carbon Dioxide (124-38-9)

Ecology - soil	No ecological damage caused by this product.
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12.5. Other adverse effects

Effect on ozone layer : No known effects from this product.

Effect on global warming : No known effects from this product.

GWPmix comment : No known effects from this product.

SECTION 13: Disposal considerations

13.1. Disposal methods

Waste treatment methods	: Contact supplier if guidance is required. Do not discharge into any place where its accumulation could be dangerous. Ensure that the emission levels from local regulations or operating permits are not exceeded.
Product/Packaging disposal recommendations	: Refer to the CGA Pamphlet P-63 "Disposal of Gases" available at www.cganet.com for more guidance on suitable disposal methods.

SECTION 14: Transport information

Department of Transportation (DOT)

In accordance with DOT

Transport document description : UN1013 Carbon dioxide, 2.2

UN-No.(DOT) : UN1013

Proper Shipping Name (DOT) : Carbon dioxide

Class (DOT) : 2.2 - Class 2.2 - Non-flammable compressed gas 49 CFR 173.115

Hazard labels (DOT) : 2.2 - Non-flammable gas



DOT Packaging Non Bulk (49 CFR 173.xxx) : 302;304

DOT Packaging Bulk (49 CFR 173.xxx) : 302;314;315

DOT Packaging Exceptions (49 CFR 173.xxx) : 306

DOT Quantity Limitations Passenger aircraft/rail (49 CFR 173.27) : 75 kg

DOT Quantity Limitations Cargo aircraft only (49 CFR 175.75) : 150 kg

DOT Vessel Stowage Location : A - The material may be stowed "on deck" or "under deck" on a cargo vessel and on a passenger vessel.

Emergency Response Guide (ERG) Number : 120

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Other information : No supplementary information available.

Transportation of Dangerous Goods

Transport document description : UN1013 CARBON DIOXIDE, 2.2
UN-No. (TDG) : UN1013
Proper Shipping Name : CARBON DIOXIDE
TDG Primary Hazard Classes : 2.2 - Class 2.2 - Non-Flammable, Non-Toxic Gas.
TDG Special Provisions : 148 - (1) Part 5 (Means of Containment) does not apply to radiation detectors that contain these dangerous goods in non-refillable pressure receptacles if (a)the working pressure in each receptacle is less than 5 000 KPa; (b)the capacity of each receptacle is less than 12 L; (c)each receptacle has a minimum burst pressure of (i)at least 3 times the working pressure, when the receptacle is fitted with a relief device, or (ii)at least 4 times the working pressure, when the receptacle is not fitted with a relief device; (d)each receptacle is manufactured from material that will not fragment upon rupture; (e)each detector is manufactured under a quality assurance program; ISO 9001:2008 is an example of a quality assurance program. (f)the detectors are transported in strong outer means of containment; and (g)a detector in its outer means of containment is capable of withstanding a 1.2 m drop test without breakage of the detector or rupture of the outer means of containment. (2)Part 5 (Means of Containment) does not apply to radiation detectors that contain these dangerous goods in non-refillable pressure receptacles and that are included in equipment, if (a)the conditions set out in paragraphs (1)(a) to (e) are met; and (b)the equipment is contained in a strong outer means of containment or the equipment affords the detectors with protection that is equivalent to that provided by a strong outer means of containment. (3)These Regulations, except for Part 1 (Coming into Force, Repeal, Interpretation, General Provisions and Special Cases) and Part 2 (Classification), do not apply to radiation detectors that contain these dangerous goods in non-refillable pressure receptacles, including detectors in radiation detection systems, if the detectors meet the requirements of subsection (1) or (2), as applicable, and the capacity of the receptacles that contain the detectors is less than 50 mL. SOR/2014-306
Explosive Limit and Limited Quantity Index : 0.125 L
Passenger Carrying Road Vehicle or Passenger Carrying Railway Vehicle Index : 75 L

Transport by sea

Transport document description (IMDG) : UN 1013 CARBON DIOXIDE, 2.2
UN-No. (IMDG) : 1013
Proper Shipping Name (IMDG) : CARBON DIOXIDE
Class (IMDG) : 2 - Gases
Limited quantities (IMDG) : 120 ml

Air transport

Transport document description (IATA) : UN 1013 Carbon dioxide, 2.2
UN-No. (IATA) : 1013
Proper Shipping Name (IATA) : Carbon dioxide
Class (IATA) : 2

SECTION 15: Regulatory information

15.1. US Federal regulations

Carbon Dioxide (124-38-9)

Listed on the United States TSCA (Toxic Substances Control Act) inventory

15.2. International regulations

CANADA

Carbon Dioxide (124-38-9)

Listed on the Canadian DSL (Domestic Substances List)

EU-Regulations

Carbon Dioxide (124-38-9)

Listed on the EEC inventory EINECS (European Inventory of Existing Commercial Chemical Substances)

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National regulations

Carbon Dioxide (124-38-9)

Listed on the AICS (Australian Inventory of Chemical Substances)
Listed on IECSC (Inventory of Existing Chemical Substances Produced or Imported in China)
Listed on the Japanese ENCS (Existing & New Chemical Substances) inventory
Listed on the Japanese ISHL (Industrial Safety and Health Law)
Listed on the Korean ECL (Existing Chemicals List)
Listed on NZIoC (New Zealand Inventory of Chemicals)
Listed on PICCS (Philippines Inventory of Chemicals and Chemical Substances)
Listed on the Canadian IDL (Ingredient Disclosure List)
Listed on INSQ (Mexican National Inventory of Chemical Substances)
Listed on CICR (Turkish Inventory and Control of Chemicals)
Listed on the TCSI (Taiwan Chemical Substance Inventory)

15.3. US State regulations

Carbon Dioxide (124-38-9)

U.S. - Massachusetts - Right To Know List
U.S. - New Jersey - Right to Know Hazardous Substance List
U.S. - Pennsylvania - RTK (Right to Know) List

SECTION 16: Other information

Other information

: This Safety Data Sheet is offered pursuant to OSHA's Hazard Communication Standard, 29 CFR, 1910.1200. Other government regulations must be reviewed for applicability to this product.

Full text of H-phrases:

H280	Contains gas under pressure; may explode if heated
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SDS US (GHS HazCom 2012)

This Safety Data Sheet is offered pursuant to OSHA's Hazard Communication Standard, 29 CFR, 1910.1200. Other government regulations must be reviewed for applicability to this product. To the best of Air Liquide USA LLC and its affiliates' knowledge, the information contained herein is reliable and accurate as of this date; however, accuracy, suitability or completeness are not guaranteed and no warranties of any type, either express or implied, are provided. The information contained herein relates only to this specific product. If this product is combined with other materials, all component properties must be considered. Data may be changed from time to time. Be sure to consult the latest edition.