MATERIAL SAFETY DATA SHEET

1. Product and Company Identification

Material name	**Carbon Dioxide**
Revision date	04-27-2011
Version #	01
CAS #	124-38-9
MSDS Number	604
Product use	This product is intended for use as a refinery feedstock, fuel or for use in engineered processes. Use in other applications may result in higher exposures and require additional controls, such as local exhaust ventilation and personal protective equipment.
Synonym(s)	CO2, Beverage grade carbon dioxide See section 16 for complete information.
Manufacturer/Supplier	Valero Marketing & Supply Company and Affiliates P.O. Box 696000 San Antonio, TX 78269-6000 General Assistance 210-345-4593
Emergency	24 Hour Emergency 866-565-5220 1-800-424-9300 (CHEMTREC USA)

2. Hazards Identification

Physical state	Gas.
Appearance	Colorless liquefied gas. May also be supplied as solid, white flakes or cubes.
Emergency overview	CAUTION High pressure gas. Gas reduces oxygen available for breathing. Contact with liquefied gas might cause frostbites, in some cases with tissue damage. In a fire or if heated, a pressure increase will occur and the container may burst or explode.
OSHA regulatory status	This product is hazardous according to OSHA 29 CFR 1910.1200.
Potential health effects	
Routes of exposure	Inhalation. Eyes. Skin.
Eyes	Exposure to rapidly expanding gas or vaporizing liquid may cause frostbite ("cold burn").
Skin	Exposure to rapidly expanding gas or vaporizing liquid may cause frostbite ("cold burn").
Inhalation	Suffocation (asphyxiant) hazard - if allowed to accumulate to concentrations that reduce oxygen below safe breathing levels. Nasal and respiratory tract irritation, central nervous system effects including excitation, euphoria, contracted eye pupils, dizziness, drowsiness, blurred vision, fatigue, nausea, headache, loss of reflexes, tremors, convulsions, seizures, loss of consciousness, coma, respiratory arrest and sudden death could occur as a result of long term and/or high concentration exposure to vapors. May also cause anemia and irregular heart rhythm.
Ingestion	This material is a gas under normal atmospheric conditions and ingestion is unlikely.
Target organs	Respiratory tract. Eyes. Central nervous system.
Chronic effects	May cause central nervous system effects. Components have been shown to be weak cardiac sensitizers which can result in cardiac arrhythmia and ventricular fibrillation.
Potential environmental effects	Not expected to be harmful to aquatic organisms.

3. Composition / Information on Ingredients

Components	CAS #	Percent
Carbon dioxide	124-38-9	100

4. First Aid Measures

First aid procedures

Eye contact	Immediately flush eyes with plenty of water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get medical attention immediately.

Skin contact	Wash frost-bitten areas with plenty of water. Do not remove clothing. Get medical attention immediately.
Inhalation	Move to fresh air. If breathing is difficult, give oxygen. If not breathing, give artificial respiration. Call a physician or poison control center immediately.
Ingestion	Ingestion is not a typical route of exposures for gases or liquefied gases.
Notes to physician	Treat symptomatically.

5. Fire Fighting Measures

Flammable properties This product is not flammable.

Extinguishing media

Suitable extinguishing media Use fire-extinguishing media appropriate for surrounding materials.

Fire fighting equipment/instructions Self-contained breathing apparatus, operated in positive pressure mode and full protective clothing must be worn in case of fire.

Move container from fire area if it can be done without risk.

Promptly isolate the scene by removing all persons from the vicinity of the incident. No action shall be taken involving any personal risk or without suitable training. For fires involving this material, do not enter any enclosed or confined fire space without proper protective equipment, including self-contained breathing apparatus. Stop flow of material. Use water to keep fire exposed containers cool and to protect personnel effecting shutoff.

Hazardous combustion products Not applicable.

6. Accidental Release Measures

Personal precautions Evacuate the area promptly. No action shall be taken involving any personal risk or without suitable training. Keep unnecessary personnel away.

Ensure adequate ventilation. In case of inadequate ventilation, use respiratory protection. Wear appropriate personal protective equipment (See Section 8).

Environmental precautions Prevent further leakage or spillage if safe to do so.

Methods for cleaning up Ventilate well, stop flow of gas or liquid if possible. Immediately contact emergency personnel.

7. Handling and Storage

Handling Wear appropriate personal protective equipment (See Section 8). Eating, drinking, and smoking should be prohibited in areas where this material is handled, stored, and processed. Do not breathe gas. Do not get in eyes, on skin, on clothing. Use only with adequate ventilation.

Storage Store in accordance with local, regional, national, and international regulations. Secure cylinders in an upright position at all times, close all valves when not in use. Store in a cool, dry, well-ventilated place. Keep container tightly closed and sealed until ready for use. Protect cylinders from damage.

8. Exposure Controls / Personal Protection

Occupational exposure limits

US. ACGIH Threshold Limit Values

Components	Type	Value
Carbon dioxide (124-38-9)	STEL	30000 ppm
	TWA	5000 ppm

US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)

Components	Type	Value
Carbon dioxide (124-38-9)	PEL	5000 ppm 9000 mg/m3

Canada. Alberta OELs (Occupational Health & Safety Code, Schedule 1, Table 2)

Components	Type	Value
Carbon dioxide (124-38-9)	STEL	54000 mg/m3 30000 ppm
	TWA	9000 mg/m3

Canada. Alberta OELs (Occupational Health & Safety Code, Schedule 1, Table 2)

Components	Type	Value
		5000 ppm

Canada. British Columbia OELs. (Occupational Exposure Limits for Chemical Substances, Occupational Health and Safety Regulation 296/97, as amended)

Components	Type	Value
Carbon dioxide (124-38-9)	STEL	15000 ppm
	TWA	5000 ppm

Canada. Ontario OELs. (Ministry of Labor - Control of Exposure to Biological or Chemical Agents)

Components	Type	Value
Carbon dioxide (124-38-9)	STEL	54000 mg/m3 30000 ppm
	TWA	9000 mg/m3 5000 ppm

Canada. Quebec OELS. (Ministry of Labor - Regulation Respecting the Quality of the Work Environment)

Components	Type	Value
Carbon dioxide (124-38-9)	STEL	54000 mg/m3 30000 ppm
	TWA	9000 mg/m3 5000 ppm

Mexico. Occupational Exposure Limit Values

Components	Type	Value
Carbon dioxide (124-38-9)	STEL	27000 mg/m3 15000 ppm
	TWA	9000 mg/m3 5000 ppm

Engineering controls Use process enclosures, local exhaust ventilation, or other engineering controls to control airborne levels below recommended exposure limits. The engineering controls also need to keep gas, vapor, or dust concentrations below any lower explosive limits.

Personal protective equipment

Eye / face protection Wear approved safety glasses or goggles.

Skin protection Wear protective clothing appropriate for the risk of exposure.

Respiratory protection If engineering controls do not maintain airborne concentrations below recommended exposure limits (where applicable) or to an acceptable level (in countries where exposure limits have not been established), an approved respirator must be worn.

General hygiene considerations Do not eat, drink or smoke when using the product. Wash thoroughly after handling. Provide eyewash station and safety shower. Handle in accordance with good industrial hygiene and safety practices.

9. Physical & Chemical Properties

Appearance Colorless liquefied gas. May also be supplied as solid, white flakes or cubes.

Color Colorless or white.

Odor Odorless.

Odor threshold Not available.

Physical state Gas.

Form Compressed liquefied gas. May also be supplied as solid flakes or cubes.

pH Not available.

Melting point Not available.

Freezing point -109.3 °F (-78.5 °C) Sublimes.

Boiling point -109.4 °F (-78.55 °C)

Flash point Not applicable.

Evaporation rate Not available.

Flammability limits in air, upper, % by volume	Not applicable.
Flammability limits in air, lower, % by volume	Not applicable.
Vapor pressure	Not available.
Vapor density	1.53
Specific gravity	1.56
Solubility (water)	Not available.
Partition coefficient (n-octanol/water)	Not available.
Auto-ignition temperature	Not applicable.
Decomposition temperature	Not available.
Molecular weight	44.01 g/mol
Molecular formula	C-O2

10. Chemical Stability & Reactivity Information

Chemical stability	Stable under normal temperature conditions and recommended use.
Conditions to avoid	In a fire or if heated, a pressure increase will occur and the container may burst or explode.
Incompatible materials	None known.
Hazardous decomposition products	None known.
Possibility of hazardous reactions	Polymerization will not occur.

11. Toxicological Information

Acute effects	Suffocation (asphyxiant) hazard - if allowed to accumulate to concentrations that reduce oxygen below safe breathing levels. Exposure to rapidly expanding gas or vaporizing liquid may cause frostbite ("cold burn").
Chronic effects	May cause central nervous system effects.
Carcinogenicity	Not listed by ACGIH, IARC, NIOSH, NTP or OSHA.

12. Ecological Information

Ecotoxicity	Not expected to be harmful to aquatic organisms.
Persistence and degradability	Not available.
Bioaccumulation / Accumulation	No data available.
Partition coefficient (n-octanol/water)	Not available.
Mobility in environmental media	No data available.

13. Disposal Considerations

Disposal instructions	Dispose in accordance with all applicable regulations. Empty containers may contain product residues. Do not puncture or incinerate even when empty. This material and/or its container must be disposed of as hazardous waste. Return the empty cylinder to the supplier.

14. Transport Information

DOT

Basic shipping requirements:

UN number	UN1013
Proper shipping name	Carbon dioxide
Hazard class	2.2
Labels required	2.2
Additional information:	
Packaging exceptions	306

Packaging non bulk	302, 304
Packaging bulk	302, 314, 315
ERG number	120

DOT BULK

Basic shipping requirements:

UN number	UN1013
Proper shipping name	Carbon dioxide
Hazard class	2.2
Labels required	2.2
Additional information:	
Packaging exceptions	306
Packaging non bulk	302, 304
Packaging bulk	302, 314, 315
ERG number	120

IATA

Basic shipping requirements:

UN number	1013
Proper shipping name	Carbon dioxide
Hazard class	2.2
Additional information:	
ERG code	2L

IMDG

Basic shipping requirements:

UN number	1013
Proper shipping name	CARBON DIOXIDE
Hazard class	2.2
EmS No.	F-C, S-V

TDG

Basic shipping requirements:

Proper shipping name	CARBON DIOXIDE
Hazard class	2.2
UN number	UN1013

15. Regulatory Information

US federal regulations This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.
All components are on the U.S. EPA TSCA Inventory List.

TSCA Section 12(b) Export Notification(40 CFR 707, Subpt. D)

Not regulated.

CERCLA (Superfund) reportable quantity (lbs) (40 CFR 302.4)

None

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Hazard categories	Immediate Hazard - Yes Delayed Hazard - No Fire Hazard - No Pressure Hazard - Yes Reactivity Hazard - No
Section 302 extremely hazardous substance (40 CRF 355, Appendix A)	No
Section 311/312 (40 CFR 370)	No

Drug Enforcement Administration (DEA) (21 CFR 1308.11-15) Not controlled

Canadian regulations This product has been classified in accordance with the hazard criteria of the CPR and the MSDS contains all the information required by the CPR.

WHMIS status Controlled

WHMIS classification A - Compressed Gas

WHMIS labeling

Inventory status

Country(s) or region	Inventory name	On inventory (yes/no)*
Australia	Australian Inventory of Chemical Substances (AICS)	Yes
Canada	Domestic Substances List (DSL)	Yes
Canada	Non-Domestic Substances List (NDSL)	No
China	Inventory of Existing Chemical Substances in China (IECSC)	Yes
Europe	European Inventory of Existing Commercial Chemical Substances (EINECS)	Yes
Europe	European List of Notified Chemical Substances (ELINCS)	No
Japan	Inventory of Existing and New Chemical Substances (ENCS)	Yes
Korea	Existing Chemicals List (ECL)	Yes
New Zealand	New Zealand Inventory	Yes
Philippines	Philippine Inventory of Chemicals and Chemical Substances (PICCS)	Yes
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

*A "Yes" indicates that all components of this product comply with the inventory requirements administered by the governing country(s)

State regulations This product does not contain a chemical known to the State of California to cause cancer, birth defects or other reproductive harm.

US - California Hazardous Substances (Director's): Listed substance

Carbon dioxide (CAS 124-38-9) Listed.

US - Massachusetts RTK - Substance: Listed substance

Carbon dioxide (CAS 124-38-9) Listed.

US - New Jersey RTK - Substances: Listed substance

Carbon dioxide (CAS 124-38-9) Listed.

US - Pennsylvania RTK - Hazardous Substances: Listed substance

Carbon dioxide (CAS 124-38-9) Listed.

16. Other Information

Further information HMIS® is a registered trade and service mark of the NPCA.

Other information Note: This Material Safety Data Sheet applies to the listed products and synonym descriptions for Hazard Communication purposes only. Technical Specifications vary greatly depending on the products and are not reflected in this document. Consult specification sheets for technical information.

HMIS® ratings Health: 1
Flammability: 0
Physical hazard: 0

NFPA ratings Health: 1
Flammability: 0
Instability: 0

Disclaimer

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