

SAFETY DATA SHEET

Section 1: Identification

Product identifier

Product Name • Liquefied Carbon Dioxide

Relevant identified uses of the substance or mixture and uses advised against

Recommended use • Consult manufacturer for the recommended product use

Details of the supplier of the safety data sheet

Manufacturer • Dakota Gasification
420 County Road 26
Beulah, ND 58523-9400
United States
www.dakotagas.com

Telephone (General) • 701-873-2100

Emergency telephone number

Manufacturer • (701) 873-6600

Manufacturer • 800-424-9300 - CHEMTREC

Section 2: Hazard Identification

United States (US)

According to: OSHA 29 CFR 1910.1200 HCS

Classification of the substance or mixture

OSHA HCS 2012 • Refrigerated Liquefied Gas
Simple Asphyxiant

Label elements

OSHA HCS 2012

WARNING



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

Precautionary statements

Prevention • Wear cold insulating gloves, face shield and/or eye protection.

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

Storage/Disposal • Store in a well-ventilated place.

Other hazards

- Under United States Regulations (29 CFR 1910.1200 - Hazard Communication Standard), this product is considered hazardous.

Canada

According to: WHMIS 2015

Classification of the substance or mixture

- WHMIS 2015**
- Refrigerated Liquefied Gas
 - Simple Asphyxiants 1

Label elements

WHMIS 2015

WARNING



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

Precautionary statements

- Prevention**
- Wear cold insulating gloves and either face shield or eye protection.
- Response**
- Thaw frosted parts with lukewarm water. Do not rub affected area. Get immediate medical advice/attention.

- Storage/Disposal**
- Store in a well-ventilated place.

Other hazards

- WHMIS 2015**
- In Canada, the product mentioned above is considered hazardous under the Workplace Hazardous Materials Information System (WHMIS).

Section 3 - Composition/Information on Ingredients

Substances

Composition					
Chemical Name	Identifiers	%	LD50/LC50	Classifications According to Regulation/Directive	Comments
Carbon dioxide	CAS:124-38-9	100%	NDA	OSHA HCS 2012: Press. Gas - Refr. Liq.; Simp. Asphyx. WHMIS 2015: Press. Gas - Refr. Liq.; Simp. Asphyx.	NDA

Mixtures

- Material does not meet the criteria of a mixture.

Section 4: First-Aid Measures

Description of first aid measures

- Inhalation**
- IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Administer oxygen if breathing is difficult. Give artificial respiration if victim is not breathing. If signs/symptoms continue, get medical attention.
- Skin**
- If frostbite has occurred, seek medical attention immediately; do NOT rub the affected area(s) or flush them with water. In order to prevent further tissue damage, do NOT attempt to remove frozen clothing

from frostbitten areas. If frostbite has not occurred, immediately and thoroughly wash contaminated skin with soap and water.

- Eye**
- If eye tissue is frozen, seek medical attention immediately; if tissue is not frozen, immediately and thoroughly flush the eyes with large amounts of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. If irritation, pain, swelling, lacrimation or photophobia persist, get medical attention as soon as possible.
- Ingestion**
- If frostbite has occurred, seek medical attention immediately; do NOT rub the affected area(s) or flush them with water. Never give anything by mouth to an unconscious person. Do NOT induce vomiting.

Most important symptoms and effects, both acute and delayed

- Refer to Section 11 - Toxicological Information.

Indication of any immediate medical attention and special treatment needed

- Notes to Physician**
- All treatments should be based on observed signs and symptoms of distress in the patient. Consideration should be given to the possibility that overexposure to materials other than this product may have occurred.

Section 5: Fire-Fighting Measures

Extinguishing media

Suitable Extinguishing Media • Use extinguishing agent suitable for type of surrounding fire.

Unsuitable Extinguishing Media • No data available

Special hazards arising from the substance or mixture

Unusual Fire and Explosion Hazards • Material is non-combustible and is not expected to pose a fire or explosion hazard.

Hazardous Combustion Products • No data available

Advice for firefighters

- Structural firefighters' protective clothing provides limited protection in fire situations ONLY; it is not effective in spill situations where direct contact with the substance is possible. Always wear thermal protective clothing when handling refrigerated/cryogenic liquids. Wear positive pressure self-contained breathing apparatus (SCBA).

Section 6 - Accidental Release Measures

Personal precautions, protective equipment and emergency procedures

Personal Precautions • Ventilate the area before entry. Do not walk through spilled material. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing.

Emergency Procedures • Keep unauthorized personnel away. Keep out of low areas. Stay upwind. Do not direct water at spill or source of leak. Stop leak if you can do it without risk.

Environmental precautions

- Prevent entry into waterways, sewers, basements or confined areas.

Methods and material for containment and cleaning up

Containment/Clean-up Measures

- Do not direct water at spill or source of leak. Isolate area until gas has dispersed. Use water spray to reduce vapors; do not put water directly on leak, spill area or inside container. Allow substance to evaporate. If possible, turn leaking containers so that gas escapes rather than liquid.

Section 7 - Handling and Storage

Precautions for safe handling

Handling • Use only in well ventilated areas. Be aware of any signs of dizziness or fatigue, especially if work is done in a poorly ventilated area; exposures to fatal concentrations of this gas mixture could occur without any significant warning symptoms, due to olfactory fatigue or oxygen deficiency. Wear appropriate personal protective equipment. Avoid breathing mist, vapours and/or spray. Avoid contact with skin and eyes. Empty containers retain product residue and can be hazardous. Do not cut, weld, puncture or incinerate container.

Conditions for safe storage, including any incompatibilities

Storage • Keep container closed. Store in a cool, dry, well-ventilated place. Protect cylinders against physical damage. Cylinders should be firmly secured to prevent falling or being knocked-over.

Section 8 - Exposure Controls/Personal Protection

Control parameters

Exposure Limits/Guidelines				
	Result	ACGIH	NIOSH	OSHA
Carbon dioxide (124-38-9)	TWAs	5000 ppm TWA	5000 ppm TWA; 9000 mg/m ³ TWA	5000 ppm TWA; 9000 mg/m ³ TWA
	STELs	30000 ppm STEL	30000 ppm STEL; 54000 mg/m ³ STEL	Not established

Exposure controls

Engineering Measures/Controls • Good general ventilation should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level.

Personal Protective Equipment

Respiratory • In case of insufficient ventilation, wear suitable respiratory equipment. Follow the OSHA respirator regulations found in 29 CFR 1910.134 Use a NIOSH/MSHA approved respirator if exposure limits are exceeded or symptoms are experienced.

Eye/Face • Wear safety glasses.

Skin/Body • Wear appropriate gloves.

Environmental Exposure Controls • Follow best practice for site management and disposal of waste. Controls should be engineered to prevent release to the environment, including procedures to prevent spills, atmospheric release and release to waterways.

Key to abbreviations

ACGIH = American Conference of Governmental Industrial Hygiene

STEL = Short Term Exposure Limits are based on 15-minute exposures

NIOSH = National Institute of Occupational Safety and Health

TWA = Time-Weighted Averages are based on 8h/day, 40h/week exposures

OSHA = Occupational Safety and Health Administration

Section 9 - Physical and Chemical Properties

Information on Physical and Chemical Properties

Material Description			
Physical Form	Gas	Appearance/Description	Colorless, liquefied gas.
Color	Colorless	Odor	No data available
Odor Threshold	No data available		
General Properties			
Boiling Point	-1381 °F(-785 °C)	Melting Point/Freezing Point	-70 °F(-56.6667 °C)
Decomposition Temperature	No data available	pH	No data available
Specific Gravity/Relative Density	No data available	Water Solubility	Slightly Soluble 2 g/L
Viscosity	No data available		
Volatility			

Vapor Pressure	831.04 psia @ 68 °F(20 °C)	Vapor Density	No data available
Evaporation Rate	No data available		
Flammability			
Flash Point	No data available	UEL	No data available
LEL	No data available	Autoignition	No data available
Flammability (solid, gas)	No data available		
Environmental			
Octanol/Water Partition coefficient	No data available		

Section 10: Stability and Reactivity

Reactivity

- No dangerous reaction known under conditions of normal use.

Chemical stability

- Stable under normal temperatures and pressures.

Possibility of hazardous reactions

- Hazardous polymerization will not occur.

Conditions to avoid

- No data available

Incompatible materials

- Carbon Steel.

Hazardous decomposition products

- No data available

Section 11 - Toxicological Information

Information on toxicological effects

Components		
Carbon dioxide (100%)	124-38-9	Acute Toxicity: Inhalation-Mouse LC50 • 200000 ppm 2 Hour(s); Inhalation-Human TCLo • 0.25 pph; <i>Lungs, Thorax, or Respiration</i> : Dyspnea ; <i>Vascular</i> : Other changes ; Reproductive: Inhalation-Mouse TCLo • 2 pph 8 Hour(s)(10D preg); <i>Reproductive Effects</i> : Effects on Fertility : Post-implantation mortality ; <i>Reproductive Effects</i> : Specific Developmental Abnormalities : Musculoskeletal system

GHS Properties	Classification
Acute toxicity	OSHA HCS 2012 •No data available WHMIS 2015 •No data available
Skin corrosion/Irritation	OSHA HCS 2012 •No data available WHMIS 2015 •No data available
Serious eye damage/Irritation	OSHA HCS 2012 •No data available WHMIS 2015 •No data available
Skin sensitization	OSHA HCS 2012 •No data available WHMIS 2015 •No data available
Respiratory sensitization	OSHA HCS 2012 •No data available WHMIS 2015 •No data available
Aspiration Hazard	OSHA HCS 2012 •No data available WHMIS 2015 •No data available
Carcinogenicity	OSHA HCS 2012 •No data available WHMIS 2015 •No data available

Germ Cell Mutagenicity	OSHA HCS 2012•No data available WHMIS 2015•No data available
Toxicity for Reproduction	OSHA HCS 2012•No data available WHMIS 2015•No data available
STOT-SE	OSHA HCS 2012•No data available WHMIS 2015•No data available
STOT-RE	OSHA HCS 2012•No data available WHMIS 2015•No data available

Potential Health Effects

Inhalation

Acute (Immediate) • This material is a simple asphyxiant. May displace or reduce oxygen available for breathing especially in confined spaces. If this material is released in a small, poorly ventilated area (i.e. an enclosed or confined space), an oxygen-deficient environment may occur. Individuals breathing such an atmosphere may experience symptoms which include headaches, ringing in ears, dizziness, drowsiness, unconsciousness, nausea, vomiting, and depression of all the senses. Under some circumstances of over-exposure, death may occur. The following effects associated with decreased levels of oxygen: increase in breathing and pulse rate, emotional upset, abnormal fatigue, nausea, vomiting, collapse, loss of consciousness, convulsive movements, respiratory collapse and death.

Chronic (Delayed) • No data available

Skin

Acute (Immediate) • Contact with gas or liquefied gas will cause burns, severe injury and/or frostbite.

Chronic (Delayed) • No data available

Eye

Acute (Immediate) • Contact with gas or liquefied gas will cause burns, severe injury and/or frostbite.

Chronic (Delayed) • No data available

Ingestion

Acute (Immediate) • Ingestion can cause burns similar to frostbite.

Chronic (Delayed) • No data available

Key to abbreviations

LC = Lethal Concentration

TC = Toxic Concentration

Section 12 - Ecological Information

Toxicity

- Non-mandatory section - information about this substance not compiled for this reason.

Persistence and degradability

- Non-mandatory section - information about this substance not compiled for this reason.

Bioaccumulative potential

- Non-mandatory section - information about this substance not compiled for this reason.

Mobility in Soil

- Non-mandatory section - information about this substance not compiled for this reason.

Other adverse effects

- Non-mandatory section - information about this substance not compiled for this reason.

Section 13 - Disposal Considerations

Waste treatment methods

Product waste • Dispose of content and/or container in accordance with local, regional, national, and/or international regulations.

Packaging waste • Dispose of content and/or container in accordance with local, regional, national, and/or international regulations.

Section 14 - Transport Information

	UN number	UN proper shipping name	Transport hazard class(es)	Packing group	Environmental hazards
DOT	UN2187	Carbon dioxide, refrigerated liquid	2.2	NDA	NDA
TDG	UN2187	CARBON DIOXIDE, REFRIGERATED LIQUID	2.2	NDA	NDA

Special precautions for user

- None specified.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code • No data available

Section 15 - Regulatory Information

Safety, health and environmental regulations/legislation specific for the substance or mixture

SARA Hazard Classifications

- Acute, Pressure(Sudden Release of)

Inventory			
Component	CAS	Canada DSL	Canada NDSL
Carbon dioxide	124-38-9	Yes	No

Canada

Labor

Canada - WHMIS 1988 - Classifications of Substances

•Carbon dioxide 124-38-9 A; Uncontrolled product according to WHMIS classification criteria (solid)

Canada - WHMIS 1988 - Ingredient Disclosure List

•Carbon dioxide 124-38-9 1 %

Environment

Canada - CEPA - Priority Substances List

•Carbon dioxide 124-38-9 Not Listed

United States

Labor

U.S. - OSHA - Process Safety Management - Highly Hazardous Chemicals

•Carbon dioxide 124-38-9 Not Listed

U.S. - OSHA - Specifically Regulated Chemicals

•Carbon dioxide 124-38-9 Not Listed

Environment

U.S. - CAA (Clean Air Act) - 1990 Hazardous Air Pollutants

•Carbon dioxide 124-38-9 Not Listed

U.S. - CERCLA/SARA - Hazardous Substances and their Reportable Quantities

•Carbon dioxide 124-38-9 Not Listed

U.S. - CERCLA/SARA - Radionuclides and Their Reportable Quantities		
•Carbon dioxide	124-38-9	Not Listed
U.S. - CERCLA/SARA - Section 302 Extremely Hazardous Substances EPCRA RQs		
•Carbon dioxide	124-38-9	Not Listed
U.S. - CERCLA/SARA - Section 302 Extremely Hazardous Substances TPQs		
•Carbon dioxide	124-38-9	Not Listed
U.S. - CERCLA/SARA - Section 313 - Emission Reporting		
•Carbon dioxide	124-38-9	Not Listed
U.S. - CERCLA/SARA - Section 313 - PBT Chemical Listing		
•Carbon dioxide	124-38-9	Not Listed
Inventory - United States - Section 8(b) Inventory (TSCA) - PMN Number to EPA Accession Number Link		
•Carbon dioxide	124-38-9	Not Listed

United States - California

Environment

U.S. - California - Proposition 65 - Carcinogens List		
•Carbon dioxide	124-38-9	Not Listed
U.S. - California - Proposition 65 - Developmental Toxicity		
•Carbon dioxide	124-38-9	Not Listed
U.S. - California - Proposition 65 - Maximum Allowable Dose Levels (MADL)		
•Carbon dioxide	124-38-9	Not Listed
U.S. - California - Proposition 65 - No Significant Risk Levels (NSRL)		
•Carbon dioxide	124-38-9	Not Listed
U.S. - California - Proposition 65 - Reproductive Toxicity - Female		
•Carbon dioxide	124-38-9	Not Listed
U.S. - California - Proposition 65 - Reproductive Toxicity - Male		
•Carbon dioxide	124-38-9	Not Listed

Section 16 - Other Information

Revision Date	• 24/August/2016
Preparation Date	• 24/August/2016
Disclaimer/Statement of Liability	• The information contained in this Safety Data Sheet (SDS) is believed to be correct since it was obtained from sources we believe are reliable. However no representation, guarantees or warranties of any kind are made as to its accuracy, suitability for particular applications, hazards connected with the use of the material, or the results to be obtained from the use thereof. User assumes all risks and liability of any use, processing or handling of any material, variations in methods, conditions and equipment used to store, handle, or process the material and hazards connected with the use of the material are solely the responsibility of the user and remain at his sole discretion. Compliance with all applicable federal, state, and local laws and regulations remains the responsibility of the user, and the user has the responsibility to provide a safe work place to examine all aspects of its operation and to determine if or where precautions, in addition to those described herein, are required.

Key to abbreviations

NDA = No Data Available