SAFETY DATA SHEET

Material Name: Carbon Dioxide Refrigerated Liquid

Section 1 – Product and Company Identification	
Product Identifier:	CARBON DIOXIDE, Refrigerated Liquid
Other means of identification:	Liquid Carbon Dioxide, Carbon Dioxide Liquid, LC02
Product Uses:	Industrial and professional use. Food and Beverage. Calibration/test gas.
Supplier Details:	Western Gasco Cylinders Ltd. 2169 Peardonville Road Abbotsford BC V2T 6J7
Emergency Phone Number:	(613) 996-6666

Section 2 – Hazards Identification	
Classification in accordance with paragraph (d) of §1910.1200	Gas Under Pressure – Refrigerated Liquid gas - Simple asphyxiant
Signal word Hazard statement(s) Symbol Precautionary statement	Warning Gas in pipelines may be under pressure, cylinders may explode if heated May displace oxygen and cause rapid suffocation . May cause frostbite. May increase respiration and heart rate  Do not handle until all safety precautions have been read and understood Use and store only outdoors or in a well ventilated place Wear cold insulating gloves, face shield, and eye protection Use a backflow preventive device in piping Do NOT change or force fit connections Close valve after each use and when empty Always keep container in upright position
Precautionary Statement – Response	IF INHALED: Remove person to fresh air and keep comfortable for breathing. Get medical attention/advice.

	IF ON SKIN:. Thaw frosted parts with lukewarm water. Do not rub affected area. Get immediate medical advice/attention.IF ON SKIN:. Get immediate medical advice/attention. Thaw frosted parts with lukewarm water. Do not rub affected area.
Hazards not otherwise classified	None

Section 3 – Compositions / Information of Ingredients	
Chemical Name & Formula	Carbon Dioxide, Co2
Common Name and Synonyms	Carbon Dioxide, Co2
CAS Number	124-38-9
Purity	>99

Section 4 – First Aid Measures	
Inhalation	Remove to fresh air and keep comfortable for breathing. If breathing is difficult, give oxygen. If breathing has stopped, give artificial respiration. Get medical attention immediately
Skin Contact	For dermal contact or suspected frostbite, remove contaminated clothing and flush affected areas with lukewarm water. DO NOT USE HOT WATER. A physician should see the patient promptly if contact with the product has resulted in blistering of the dermal surface or in deep tissue freezing
Eye Contact	If frostbite is suspected, flush eyes with cool water for 15 minutes and obtain immediate medical attention.
Ingestion	Not an expected route of exposure.
Most important symptoms, effects, acute and delayed	Depending on concentration and duration of exposure to carbon dioxide may cause increased respirations, headache, mild narcotic effects, increased blood pressure and pulse, and asphyxiation. Symptoms of overexposure become more apparent when atmospheric oxygen is decreased to 15-17%. Concentrations of 10%or more can produce unconsciousness and death. May

	cause asphyxiation in high concentrations. Direct contact with liquid can cause severe frostbite
Immediate medical attention and special treatment needed	Treat symptomatically

Section 5 – Fire Fighting Measures	
Suitable extinguishing media	Use extinguishing measures that are appropriate to local circumstances and the surrounding environment. Unsuitable extinguishing media - None.
Special hazards arising (e.g. nature of any hazardous combustion process)	Non-flammable gas. Cylinders may rupture under extreme heat. Do not direct water at source of leak or safety devices; icing may occur.
Special protective equipment and precautions for firefighters	As in any fire, wear self-contained breathing apparatus pressure-demand, NIOSH (approved or equivalent) and full protective gear

Section 6 – Accidental Release Measures	
Personal precautions, protective equipment, emergency procedures	Evacuate personnel to safe areas. Ensure adequate ventilation, especially in confined areas. Monitor concentration of released product. Monitor oxygen level. Wear self-contained breathing apparatus when entering area unless atmosphere is proved to be safe. Use personal protection recommended in Section 8. Liquid spill will vaporize and expand rapidly to a large volume of gas creating risk of oxygen deficient atmosphere. A fog cloud of condensed moisture in the air may obscure visibility. Gas/vapor is heavier than air. Prevent from entering sewers, basements and work pits, or any place where accumulation may be dangerous. When in contact with refrigerated/cryogenic liquids, many materials become brittle and are likely to break without warning.
Methods and materials for containment and clean up	Stop the flow of gas or remove cylinder to outdoor location if this can be done without risk. If leak is in container or container valve, contact the appropriate emergency telephone number in Section 1 or call your closest Messer location. If system leak, close source valves and safely vent pressure before attempting any repairs

Section 7 – Handling and Storage	
Precautions for safe handling	Never allow any unprotected part of the body to touch uninsulated pipes or vessels that contain cold fluids. The extremely cold metal will cause moist flesh to stick fast and tear when one attempts to withdraw from it. Do NOT change or force fit connections For applications with moist Carbon Dioxide, 316, 309 and 310 stainless steels may be used as well as Hastelloy® A, B, & C and Monel®. Ferrous nickel alloys are slightly susceptible to corrosion. At normal temperatures carbon dioxide is compatible with most plastics and elastomers. Protect cylinders from physical damage; do not drag, roll, slide or drop. When moving cylinders, even for short distance, use a cart designed to transport cylinders. Never attempt to lift a cylinder by its valve protection cap. Never insert an object (e.g. wrench, screwdriver, pry bar, etc.) into valve cap openings. Doing so may damage valve, causing leak to occur. Use an adjustable strap wrench to remove over-tight or rusted caps. If user experiences any difficulty operating cylinder valve discontinue use and contact supplier. Use only with adequate ventilation. Use a backflow preventive device in piping. Close valve after each use and when empty. Ensure the complete gas system has been checked for leaks before use. Never put cylinders into trunks of cars or unventilated areas of passenger vehicles. Never strike an arc on a compressed gas cylinder or make a cylinder a part of an electrical circuit. Never attempt to refill a compressed gas cylinder without the owner's written consent. Only experienced and properly instructed persons should handle gases under pressure. Always store and handle compressed gas cylinders in accordance with Compressed Gas Association, publication CGA-P1, Safe Handling of Compressed Gases in Containers. Use only with equipment rated for cylinder pressure. For additional recommendations, consult Compressed Gas Association's publicationsG-6,G-6.1, G-6.2, G-6.3, G-6.5, G-6.7, G-6.12,, P-76 and NFPA 55.

Conditions for safe storage, including any incompatibilities	Store in cool, dry, well-ventilated area of non-combustible construction away from heavily trafficked areas and emergency exits. Cylinders should be stored upright with valve protection cap in place and firmly secured to prevent falling. Keep at temperaturesbelow52°C / 125°F. Full and empty cylinders should be segregated. Use a "first in-first out" inventory system to prevent full cylinders from being stored for excessive periods of time. Stored containers should be periodically checked for general condition and leakage.
Incompatible materials	Certain reactive metals, hydrides, moist cesium monoxide, or lithium acetylene carbide diamino may ignite. Passing carbon dioxide over a mixture of sodium peroxide and aluminum or magnesium may explode.

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Section 8 – Exposure Controls / Personal Protection	
Engineering Controls	Controls Provide general ventilation, local exhaust ventilation, process enclosure or other engineering controls to maintain airborne levels below recommended exposure limits and to maintain oxygen levels above 19.5%. Consider installation of leak detection systems in areas of use and storage. Carbon dioxide detectors should be installed where there is potential for hazardous concentrations. Do not depend on oxygen monitors as carbon dioxide can be present at hazardous levels even when there is adequate oxygen level. Oxygen detectors should be used when asphyxiating gases may be released.
Individual protection measures / personal protective equipment	**Eye/face protection**- Wear safety glasses with side shields (or goggles). If there is potential for exposure to liquid, wear Goggles face-shield over either safety glasses with side shields or safety goggles. **Skin and body protection**- Work gloves and safety shoes are recommended when handling cylinders. Wear loose fitting, cold insulating gloves and suitable clothing to prevent skin contact with liquid, cold gas and cold equipment or piping. **Respiratory protection-** Use positive pressure airline respirator with escape cylinder or self contained breathing apparatus for oxygen-deficient atmospheres (<19.5%). If exposure limits are exceeded or irritation is experienced, NIOSH approved respiratory protection should be worn. Positive pressure supplied air respirators may be required for high airborne contaminant concentrations. Respiratory protection must be provided in accordance with current local regulations.
General Hygiene Considerations	Handle in accordance with good industrial hygiene and safety practice. Do not get in eyes, on skin, or on clothing.

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Exposure Guidelines

Chemical Name	ACGIH TLV	OSHA PEL	NIOSH IDLH
CARBON DIOXIDE 124-38-9	STEL: 30000 ppm TWA: 5000 ppm	TWA: 5000 ppm TWA: 9000 mg/m³ (vacated) TWA: 10000 ppm (vacated) TWA: 18000 mg/m³ (vacated) STEL: 30000 ppm (vacated) STEL: 54000 mg/m³	IDLH: 40000 ppm TWA: 5000 ppm TWA: 9000 mg/m³ STEL: 30000 ppm STEL: 54000 mg/m³

Section 9 Physical and Chemical Properties

Material Name: Carbon Dioxide, Refrigerated Liquid

Information on basic physical and chemical properties

Physical state	Refrigerated liquefied gas
Appearance	Colorless
Odor	Odorless
Odor threshold	No information available
pH	Not applicable
Melting/freezing point	Not applicable
Boiling point / boiling range	(Sublimes) -78.5 °C / -109.3 °F
Evaporation rate	Not applicable
Flammability (solid, gas)	Non-flammable gas
Lower flammability limit:	Not applicable
Upper flammability limit:	Not applicable
Flash point	Not applicable
Autoignition temperature	No data available
Decomposition temperature	No data available
Water solubility	Very soluble
Partition coefficient	No data available
Kinematic viscosity	Not applicable

Component Level Information:

Chemical Name	Molecular weight	Boiling point/range	Vapor Pressure	Vapor density (air =1)	Gas Density kg/m³@20°C	Critical Temperature
CARBON DIOXIDE	44.01	-78.5 °C (Sublimes)	57780 hPa @ 21.1°C	1.522	1.839	31.1 °C

Section 10 Stability and Reactivity

Reactivity	Not reactive under normal conditions
Chemical Stability	Stable at normal temperatures and pressures
Possibility of Hazardous Reactions	None
Conditions to Avoid	Due to the presence of Carbon dioxide, Carbonic acid is formed in the presence of moisture

Incompatible Materials	Certain reactive metals, hydrides, moist cesium monoxide, or lithium acetylene carbide diammino may ignite. Passingcarbondioxide over a mixture of sodium peroxide and aluminum or magnesium may explode.
Hazardous Decomposition Products	Oxygen. Carbon monoxide.

Section 11 Toxicology Information	
Information on likely routes of exposure	No chemical toxicity Inhalation – Acidosis, adrenal cortical exhaustion, and other metabolic stresses have resulted from prolonged continuous exposure to 1-2% carbon dioxide (10,000 ppm-20,000 ppm). The ACGIH TLV of 5,000 ppm is expected to provide a good margin of safety from asphyxiation and undue metabolic stress provided sufficient oxygen levels are maintained in the air. Increased physical activity, duration of exposure, and decreased oxygen content can affect systemic and respiratory effects resulting from exposure to carbon dioxide. Ingestion – not an expected route Skin – Direct contact with extremely cold liquid will cause severe and immediate burns to unprotected skin. Contact with evaporating liquid may cause cold burns/frostbite. Eye – Direct contact with extremely cold liquid will cause severe and immediate burns to unprotected eyes. Contact with evaporating liquid may cause cold burns/frostbite.
Symptoms related to physical, chemical, toxicological characteristics	Depending on concentration and duration of exposure to carbon dioxide may cause increased respirations, headache, mild narcotic effects, increased blood pressure and pulse, and asphyxiation. Symptoms of overexposure become more apparent when atmospheric oxygen is decreased to 15-17%
Delayed, Immediate, chronic effects from short and long term exposure	As a simple asphyxiant, the immediate effects of high concentrations causing oxygen deficiency in air include dizziness, drowsiness, nausea, unconsciousness, and death.
Numerical measures of toxicity	LD50 – not available LC50 – not available

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Carcinogen Listing	This product does not contain any carcinogens or potential carcinogens listed by OSHA, IARC or NTP.

Section 12 – Ecological Information	
Ecotoxicity	None
Persistence and degradability	No information available
Bio-accumulative potential	No information available
Global warming potential (GWP)	1
Other Adverse effects	No known other effects

Section 13 Disposal Considerations

Waste residues and disposal guidelines	Do not attempt to dispose of residual waste or unused quantities. Return in the shipping container PROPERLY LABELED WITH ANY VALVE OUTLET PLUGS ORCAPSSECURED AND VALVE PROTECTION CAP IN PLACE

Section 14 – Transport Information	
US DOT UN ID Number	UN2187
UN Proper Shipping Name	Carbon Dioxide, Refrigerated Liquid
DOT Transportation Hazard Class	DOT Class 2.2 (Non-Flammable compressed gas) Emergency Response Guide 120 

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Packing Group	Not Applicable
Environmental Hazards	None
Transport Bulk Codes	Not Applicable
Special Precautions	Ensure vehicle driver is aware of the potential hazards of the load and knows what to do in the event of an accident or an emergency. Because gas is denser than air, it can cause oxygen deficiency in low areas, with gas spreading along the ground, isolate area to avoid personnel exposure or other vehicles entering the area. High pressure gas cylinders should have outlet valves closed, with plugs/valve caps secured in place. Load space must be separated from driver compartment. Cylinders should be firmly secured from moving or falling during transport.

Section 15 - Regulatory Information
US Federal TSCA Toxic Substance Control Act - exempted US EPA SARA Title III Section 312 hazard Category: Sudden release of pressure hazard US States Right-To-Know Lists: Massachusetts, New Jersey, Pennsylvania

Section 16 Other Information

NFPA Health hazards 3
Flammability 0
Instability 0
Physical and Chemical Properties Simple asphyxiant

Note: Ratings were assigned in accordance with Compressed Gas Association (CGA) guidelines as published in CGA Pamphlet P-19-2019, CGA Recommended Hazard Ratings for Compressed Gases, 4th Edition.

USE OF THIS INFORMATION:
Western Gasco Cylinders Inc. offers this information to promote the safe use of this product through awareness of hazards and safety information. Those who use or transport or sell this product to others should: 1) Disseminate this information internally to all workplace areas, employees, agents and contractors likely to encounter this product

2) Provide supplemental hazards awareness, safety information, operation and maintenance procedures to the workplace areas and employees, agents and contractors likely to encounter this product

3) Furnish this information to all their customers who purchase this product

4) Ask each purchaser or user of the product to notify its employees and customers of the product hazards and safety information.

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