

Safety Data Sheet E-4574

according to the Hazardous Products Regulation (February 11, 2015) Date of issue: 10-15-1979 Revision date: 01-01-2021 Supersedes: 03-05-2019

SECTION 1: Identification	
1.1. Product identifier	
Product form	: Substance
Trade name	: Carbon dioxide, Medipure®, Extendapak 2
CAS No	: 124-38-9
Formula	: CO2
Other means of identification	: Carbon anhydride, Carbonic acid gas, Carbon Dioxide,
Product group	: Core Products
1.2. Recommended use and restrictions of	on use
Recommended uses and restrictions	: Industrial use Medical applications. Food applications. Semiconductor Use as directed.
1.3. Supplier	
Linde Canada inc. 1200 – 1 City Centre Drive Mississauga - Canada L5B 1M2 T 1-905-803-1600 - F 1-905-803-1682 www.lindecanada.ca	
1.4. Emergency telephone number	
Emergency number	 1-800-363-0042 Call emergency number 24 hours a day only for spills, leaks, fire, exposure, or accidents involving this product. For routine information, contact your supplier or Linde sales representative.
SECTION 2: Hazard identification	
2.1. Classification of the substance or mi	xture
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GHS-CA classification Simple asphyxiant H380	
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Use only with equipment rated for cylinder pressure. Approach suspected leak area with caution.

2.3.	Other hazards	
Other h	nazards not contributing to the	

: Asphyxiant in high concentrations. Contact with liquid may cause cold burns/frostbite.

classification 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 (Main cor		(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	s (acute and delayed)
Most Important Symptoms/Effects	: MAY DISPLACE OXYGEN AND CAUSE RAPID SUFFOCATION. MAY INCREASE RESPIRATION AND HEART RATE. MAY CAUSE FROSTBITE. Asphyxiant in high concentrations.
4.3. Immediate medical attention and spec	cial treatment, if necessary
Other medical advice or treatment	: None.

SECT	ION 5: Fire-fighting measures	
5.1.	Suitable extinguishing media	
Suitable	e extinguishing media	: Use extinguishing media appropriate for surrounding fire.
5.2.	Unsuitable extinguishing media	
No addi	tional information available	
5.3.	Specific hazards arising from the	hazardous product
Explosi	on hazard	: CONTAINS GAS UNDER PRESSURE; MAY EXPLODE IF HEATED.
Reactiv	ity	: No reactivity hazard other than the effects described in sub-sections below.
Reactiv	ity in case of fire	: No reactivity hazard other than the effects described in sub-sections below.



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5.4. Special protective equipment and p	recautions 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.
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 mea	sures
6.1. Personal precautions, protective eq	uipment 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.
Personal Precautions, Protective Equipment and Emergency Procedures	: General measures : Ensure adequate ventilation. Personal Precautions, Protective Equipment and Emergency Procedures : EVACUATE ALL PERSONNEL FROM AFFECTED AREA. Use appropriate protective equipment. If leak is on user's equipment, be certain to purge piping before attempting repairs. If leak is on a container or container valve contact the closest Praxair Canada location.
6.2. Methods and materials for containm	nent and cleaning up
For containment	: Try to stop release if safe to do so.
Methods for cleaning up	: Prevent waste from contaminating the surrounding environment. Prevent soil and water pollution. Dispose of contents/container in accordance with local/regional/national/international regulations. Contact supplier for any special requirements.
6.3. Reference to other sections	
For further information refer to section 8: Exp	posure controls/personal protection
SECTION 7: Handling and storage	

	SECTION 7. Handling and Storage	
	7.1. Precautions for safe handling	
protect the valve. When moving cylinders, even for short distances, use a cart (trolley, har truck, etc.) designed to transport cylinders. Never insert an object (e.g, wrench, screwdrive bar) into cap openings; doing so may damage the valve and cause a leak. Use an adjusta strap wrench to remove over-tight or rusted caps. Slowly open the valve. If the valve is ha 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 container. High temperatures may damage the container and could cause the pressure re	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.



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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 (124-38-9)		
USA - ACGIH	ACGIH TLV-TWA (ppm)	5000 ppm
USA - ACGIH	ACGIH TLV-STEL (ppm)	30000 ppm
USA - OSHA	OSHA PEL (TWA) (mg/m ³)	9000 mg/m³
USA - OSHA	OSHA PEL (TWA) (ppm)	5000 ppm
Canada (Quebec)	VECD (mg/m ³)	54000 mg/m ³
Canada (Quebec)	VECD (ppm)	30000 ppm
Canada (Quebec)	VEMP (mg/m ³)	9000 mg/m ³
Canada (Quebec)	VEMP (ppm)	5000 ppm
Alberta	OEL STEL (mg/m ³)	54000 mg/m ³
Alberta	OEL STEL (ppm)	30000 ppm
Alberta	OEL TWA (mg/m ³)	9000 mg/m ³
Alberta	OEL TWA (ppm)	5000 ppm
British Columbia	OEL STEL (ppm)	15000 ppm
British Columbia	OEL TWA (ppm)	5000 ppm
Manitoba	OEL STEL (ppm)	30000 ppm
Manitoba	OEL TWA (ppm)	5000 ppm
New Brunswick	OEL STEL (mg/m³)	54000 mg/m ³
New Brunswick	OEL STEL (ppm)	30000 ppm
New Brunswick	OEL TWA (mg/m ³)	9000 mg/m³
New Brunswick	OEL TWA (ppm)	5000 ppm
New Foundland & Labrador	OEL STEL (ppm)	30000 ppm
New Foundland & Labrador	OEL TWA (ppm)	5000 ppm
Nova Scotia	OEL STEL (ppm)	30000 ppm
Nova Scotia	OEL TWA (ppm)	5000 ppm
Nunavut	OEL STEL (ppm)	30000 ppm
Nunavut	OEL TWA (ppm)	5000 ppm
Northwest Territories	OEL STEL (ppm)	30000 ppm
Northwest Territories	OEL TWA (ppm)	5000 ppm
Ontario	OEL STEL (ppm)	30000 ppm
Ontario	OEL TWA (ppm)	5000 ppm
Prince Edward Island	OEL STEL (ppm)	30000 ppm



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Carbon dioxide (124-38-9)		
Prince Edward Island	OEL TWA (ppm)	5000 ppm
Québec	VECD (mg/m ³)	54000 mg/m ³
Québec	VECD (ppm)	30000 ppm
Québec	VEMP (mg/m ³)	9000 mg/m ³
Québec	VEMP (ppm)	5000 ppm
Saskatchewan	OEL STEL (ppm)	30000 ppm
Saskatchewan	OEL TWA (ppm)	5000 ppm
Yukon	OEL STEL (mg/m ³)	27000 mg/m ³
Yukon	OEL STEL (ppm)	15000 ppm
Yukon	OEL TWA (mg/m³)	9000 mg/m ³
Yukon	OEL TWA (ppm)	5000 ppm
8.2. Appropriate engineer	ing controls	
Appropriate engineering controls	the worker's breathing zone acceptable if it can maintain carbon dioxide above abo monitoring with alarms to in	with sufficient flow velocity to maintain an adequate supply of air in . Mechanical (general): General exhaust ventilation may be an adequate supply of air. WARNING: Concentration levels of ut 1 percent are dangerous. Praxair recommends continuous dicate unsafe conditions before and during potential personnel nonitoring devices to ensure a safe oxygen level (minimum of 19.5 dioxide level.
8.3. Individual protection	measures/Personal protective equipment	
Personal protective equipment	: Safety glasses. Face shield	
Hand protection	: Wear work gloves when handling containers. Wear heavy rubber gloves where contact with product may occur.	
Eye protection		nield when transfilling or breaking transfer connections. Select in CSA standard Z94.3, "Industrial Eye and Face Protection", and bocal bylaws or guidelines.
Respiratory protection	local exhaust or ventilation of provincial regulations, local	se air supplied respirator when working in confined space or where does not keep exposure below TLV. Select in accordance with bylaws or guidelines. Respirators should also be approved by ergencies or instances with unknown exposure levels, use a self- tus (SCBA).
Thermal hazard protection	: Wear cold insulating gloves	when transfilling or breaking transfer connections.
Environmental exposure controls		
Other information	cuffless trousers for cylinder the current CSA standard Z	hoes for general handling at customer sites. Metatarsal shoes and r handling at packaging and filling plants. Select in accordance with 195, "Protective Foot Wear", and any provincial regulations, local orking with flammable and oxidizing materials, consider the use of

9.1. Information on basic physical and chemical properties Physical state : Gas Appearance : Colourless gas. Molecular mass : 44 g/mol
Appearance : Colourless gas.
Molecular mass : 44 g/mol
Colour : Colourless.
Odour : No odour warning properties.
Odour threshold : No data available
pH : 3.7 (carbonic acid)
pH solution : No data available
Relative evaporation rate (butylacetate=1) : No data available



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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.
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

Additional information

Gas group

: -78.5 °C

: Refrigerated liquefied gas : Gas/vapour heavier than air. May accumulate in confined spaces, particularly at or below ground level.

SECTION 10: Stability and reactivity	ty
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 Praxair SDS P-4574, Gaseous Carbon Dioxide.

SECTION 11: Toxicological information

11.1.	Information on toxicological effects	
Acute toxicity (oral)		: Not classified
Acute toxicity (dermal)		: Not classified
Acute to	xicity (inhalation)	: Not classified



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Carbon dioxide (\f)124-38-9	
LC50 inhalation rat (ppm)	LC50 Not available
Additional information	Low concentrations of CO2 cause increased respiration and headache
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.
12.2. Persistence and degradability	
Carbon dioxide (124-38-9)	
Persistence and degradability	No ecological damage caused by this product.
12.3. Bioaccumulative potential	
Carbon dioxide (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 (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.
	None.
Global warming potential [CO2=1]	1
	When discharged in large quantities may contribute to the greenhouse effect.
SECTION 13: Disposal considerations	
13.1. Disposal methods	
Product/Packaging disposal recommendations	Do not attempt to dispose of residual or unused quantities. Return container to supplier.

SECTION 14: Transport information



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14.1. Basic shipping description		
In accordance with TDG		
TDG		
UN-No. (TDG)	: UN1013	
TDG Primary Hazard Classes	: 2.2 - Class 2.2 - Non-Flammable, Non-Toxic Gas.	
Proper shipping name	: CARBON DIOXIDE	
Explosive Limit and Limited Quantity Index	: 0.125 L	
Passenger Carrying Road Vehicle or Passenger	: 75 L	
Carrying Railway Vehicle Index		
14.3. Air and sea transport		
IMDG		
UN-No. (IMDG)	: 1013	
Proper Shipping Name (IMDG)	: CARBON DIOXIDE	
Class (IMDG)	: 2 - Gases	
MFAG-No	: 120	
ΙΑΤΑ		
UN-No. (IATA)	: 1013	
Proper Shipping Name (IATA)	: Carbon dioxide	
Class (IATA)	: 2	
SECTION 15: Regulatory information		
15.1. National regulations		
Carbon dioxide (124-38-9)		
Listed on the Canadian DSL (Domestic Substa	nces List)	
15.2. International regulations		
Carbon dioxide (124-38-9)		
Listed on the AICS (Australian Inventory of Che	amical Substances)	
Listed on IECSC (Inventory of Existing Chemic		
	n Inventory of Existing Commercial Chemical Substances)	
Listed on the Japanese ENCS (Existing & New Listed on the Japanese ISHL (Industrial Safety		
Listed on the Korean ECL (Existing Chemicals		
Listed on NZIoC (New Zealand Inventory of Chemicals)		
Listed on PICCS (Philippines Inventory of Chemicals and Chemical Substances) Listed on the United States TSCA (Toxic Substances Control Act) inventory		
Listed on INSQ (Mexican National Inventory of		
SECTION 16: Other information	. 15/10/1070	
Date of issue Revision date	: 15/10/1979	
Revision date Supersedes	: 01/01/2021 : 05/03/2019	
Superseues	. 05/05/2013	
Indication of changes:		
Training advice	: The hazard of asphyxiation is often overlooked and must be stressed during operator training.	



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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. Linde asks users of this product to study this SDS and become aware of the product hazards and safety information. To promote safe use of this product, a user should (1) notify employees, agents, and contractors of the information in this SDS and of any other known product hazards and safety information, (2) furnish this information to each purchaser of the product, and (3) ask each purchaser to notify its employees and customers of the product hazards and safety information.
	The opinions expressed herein are those of qualified experts within Linde Canada Inc. We believe that the information contained herein is current as of the date of this Safety Data Sheet. Since the use of this information and the conditions of use are not within the control of Linde Canada Inc, it is the user's obligation to determine the conditions of safe use of the product. Linde Canada Inc, SDSs are furnished on sale or delivery by Linde Canada Inc, or the independent distributors and suppliers who package and sell our products. To obtain current SDSs for these products, contact your Linde sales representative, local distributor, or supplier, or download from www.lindecanada.ca. If you have questions regarding Linde SDSs, would like the document number and date of the latest SDS, or would like the names of the Linde suppliers in your area, phone or write Linde Canada Inc, (Phone: 1-888-257-5149; Address: Linde Canada Inc, 1 City Centre Drive, Suite 1200, Mississauga, Ontario, L5B 1M2).
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 instability	: 0 - Normally stable, even under fire exposure conditions, and are not reactive with water.
NFPA specific hazard	: SA - This denotes gases which are simple asphyxiants.
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.

SDS Canada (GHS) - Linde

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.