



Dry Ice, Carbon Dioxide, Solid

Safety Data Sheet E-4575

according to the Hazardous Products Regulation (February 11, 2015)

Date of issue: 10-15-1979

Revision date: 01-01-2021

Supersedes: 08-10-2016

SECTION 1: Identification

1.1. Product identifier

Product form	: Substance
Substance name	: Dry Ice, Carbon Dioxide, Solid
CAS No	: 124-38-9
Formula	: CO ₂
Other means of identification	: Dry ice (nuggets, pellets, or blocks), carbonice, carbonic anhydride
Product group	: Core Products

1.2. Recommended use and restrictions on use

Recommended uses and restrictions	: Industrial use
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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.lindecana.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.
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SECTION 2: Hazard identification

2.1. Classification of the substance or mixture

GHS-CA classification

2.2. GHS Label elements, including precautionary statements

GHS-CA labelling

Hazard pictograms	:  None
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Hazard statements	: MAY CAUSE CRYOGENIC BURNS OR INJURY VAPOUR MAY DISPLACE OXYGEN AND CAUSE RAPID SUFFOCATION MAY CAUSE FROSTBITE. MAY INCREASE RESPIRATION AND HEART RATE.
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2.3. Other hazards

Other hazards not contributing to the classification	: Refrigerated solidified gas. CONTACT WITH PRODUCT MAY CAUSE COLD BURNS OR FROSTBITE. Dry ice sublimates to carbon dioxide vapor at -109°F (-78°C). VAPOUR MAY DISPLACE OXYGEN AND CAUSE RAPID SUFFOCATION.
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2.4. Unknown acute toxicity (GHS CA)

No data available

SECTION 3: Composition/information on ingredients

3.1. Substances

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Name	CAS No.	% (Vol.)	Common Name (synonyms)
Dry Ice, Carbon Dioxide, Solid (Main constituent)	(CAS No) 124-38-9	100	Dry ice / 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 : In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes.
- 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 (acute and delayed)

No additional information available

4.3. Immediate medical attention and special treatment, if necessary

Other medical advice or treatment : None.

SECTION 5: Fire-fighting measures

5.1. Suitable extinguishing media

Suitable extinguishing media : Use extinguishing media appropriate for surrounding fire.

5.2. Unsuitable extinguishing media

No additional information available

5.3. Specific hazards arising from the hazardous product

Reactivity : None.
Reactivity in case of fire : None.

5.4. Special protective equipment and precautions for fire-fighters

Firefighting instructions : Evacuate all personnel from danger area. Do not discharge sprays onto solid carbon dioxide. Solid carbon dioxide will freeze water rapidly. NEVER HANDLE SOLID CARBON DIOXIDE WITH YOUR BARE HANDS. USE GLOVES OR DRY ICE TONGS OR A DRY SHOVEL OR SCOOP. Move packages away from fire area if safe to do so. Self-contained breathing apparatus may be required by rescue workers. On-site fire brigades must comply with applicable standards e.g, 29 CFR 1910 Subpart L—Fire Protection in the U.S.).

Protection during firefighting : Self-contained breathing apparatus.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

General measures : Use protective clothing. Wear cold-insulating gloves/face shield/eye protection. Chemical asphyxiant. Exposure to low concentrations for extended periods may result in dizziness or unconsciousness, and may lead to death. Wear self-contained breathing apparatus when entering area unless atmosphere is proven to be safe. NEVER HANDLE SOLID CARBON DIOXIDE WITH YOUR BARE HANDS. USE GLOVES OR DRY ICE TONGS OR A DRY SHOVEL OR SCOOP.

6.2. Methods and materials for containment and cleaning up

6.3. Reference to other sections

For further information refer to section 8: Exposure controls/personal protection

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SECTION 7: Handling and storage

7.1. Precautions for safe handling

Precautions for safe handling : Avoid materials incompatible with cryogenic use; some metals such as carbon steel may fracture easily at low temperature. Vapor can cause rapid suffocation due to oxygen deficiency. Never allow any unprotected part of your body to touch solid carbon dioxide or to touch uninsulated pipes or vessels containing solid or liquid carbon dioxide or cold carbon dioxide gas. Not only can you suffer frostbite, your skin may stick fast to the cold surfaces. Use tongs or insulated gloves when handling solid carbon dioxide or objects in contact cold carbon dioxide in any form. Wear protective clothing and equipment as prescribed in section 8. For other precautions in using carbon dioxide, see section 16.

7.2. Conditions for safe storage, including any incompatibilities

Storage conditions : Store and use with adequate ventilation. Do not store in tight containers or confined spaces. Storage areas should be clean and dry. Solid carbon dioxide is generally delivered to customers in 50-lb (22.7-kg), 1/2-cubic ft (0.0142 cubic meter) blocks (approximate dimensions), wrapped in kraft paper. Small pellets or nuggets are also produced. The product should be stored in insulated containers that open from the top. Lids should fit loosely so the carbon dioxide vapor given off as the solid sublimates can escape into the atmosphere. Carbon dioxide gas is about 1 1/2 times as heavy as air and will accumulate in low-lying areas, so ventilation must be adequate at floor or below grade level.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Dry Ice, Carbon Dioxide, Solid (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/m ³
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/m ³)	54000 mg/m ³
New Brunswick	OEL STEL (ppm)	30000 ppm
New Brunswick	OEL TWA (mg/m ³)	9000 mg/m ³
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

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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
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/m ³)	9000 mg/m ³
Yukon	OEL TWA (ppm)	5000 ppm

8.2. Appropriate engineering controls

Appropriate engineering controls : Oxygen detectors should be used when asphyxiating gases may be released. Ensure exposure is below occupational exposure limits (where available). Systems under pressure should be regularly checked for leakages. Provide adequate general and local exhaust ventilation. Consider work permit system e.g. for maintenance activities.

8.3. Individual protection measures/Personal protective equipment

Personal protective equipment : Safety glasses. Insulated gloves.



Hand protection : Wear work gloves when handling containers. Wear heavy rubber gloves where contact with product may occur.

Eye protection : Wear safety glasses with side shields. Select in accordance with the current CSA standard Z94.3, "Industrial Eye and Face Protection", and any provincial regulations, local bylaws or guidelines.

Respiratory protection : **Respiratory protection:** Use air supplied respirator when working in confined space or where local exhaust or ventilation does not keep exposure below TLV. Select in accordance with provincial regulations, local bylaws or guidelines. Respirators should also be approved by NIOSH and MSHA. For emergencies or instances with unknown exposure levels, use a self-contained breathing apparatus (SCBA).

Thermal hazard protection : Wear cold insulating gloves.

Environmental exposure controls : None necessary.

Other information : **Other protection :** Safety shoes for general handling at customer sites. Metatarsal shoes and cuffless trousers for cylinder handling at packaging and filling plants. Select in accordance with the current CSA standard Z195, "Protective Foot Wear", and any provincial regulations, local bylaws or guidelines. For working with flammable and oxidizing materials, consider the use of flame resistant anti-static safety clothing.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state : Solid

Appearance : Opaque. White crystalline solid.

Molecular mass : 44 g/mol

Colour : White.

Odour : No odour warning properties.

Odour threshold : No data available

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pH	: 3.7 (carbonic acid)
pH solution	: No data available
Relative evaporation rate (butylacetate=1)	: No data available
Relative evaporation rate (ether=1)	: Not applicable.
Melting point	: -78.5 °C
Freezing point	: No data available
Boiling point	: -78.4 °C
Flash point	: Not applicable.
Critical temperature	: 30 °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	: 1562 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)	:

9.2. Other information

Sublimation point	: -78.5 °C Expansion ratio for solid to gas at sublimation point is 1 to 554.
Additional information	: Gas/vapour heavier than air. May accumulate in confined spaces, particularly at or below ground level.

SECTION 10: Stability and reactivity

10.1. Reactivity

Reactivity	: None.
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.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity (oral)	: Not classified
Acute toxicity (dermal)	: Not classified
Acute toxicity (inhalation)	: Not classified

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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

Dry Ice, Carbon Dioxide, Solid (124-38-9)	
Persistence and degradability	No ecological damage caused by this product.

12.3. Bioaccumulative potential

Dry Ice, Carbon Dioxide, Solid (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

Dry Ice, Carbon Dioxide, Solid (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.
Effect on the ozone layer	: None.
Global warming potential [CO ₂ =1]	: 1
Effect on global warming	: When discharged in large quantities may contribute to the greenhouse effect.

SECTION 13: Disposal considerations

13.1. Disposal methods

Waste treatment methods	: See Section 6.
Product/Packaging disposal recommendations	: Dispose of contents/container in accordance with local/regional/national/international regulations. Contact supplier for any special requirements.

SECTION 14: Transport information

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14.1. Basic shipping description

In accordance with TDG

TDG

UN-No. (TDG) : UN1845
TDG Primary Hazard Classes : 9 - Class 9 - Miscellaneous Products, Substances or Organisms
Proper shipping name : CARBON DIOXIDE, SOLID

Explosive Limit and Limited Quantity Index : 0
Passenger Carrying Road Vehicle or Passenger Carrying Railway Vehicle Index : 200 kg

14.3. Air and sea transport

IMDG

UN-No. (IMDG) : 1845
Proper Shipping Name (IMDG) : CARBON DIOXIDE, SOLID (DRY ICE)
Class (IMDG) : 9 - Miscellaneous dangerous substances and articles

IATA

UN-No. (IATA) : 1845
Proper Shipping Name (IATA) : Carbon dioxide, solid
Class (IATA) : 9 - Miscellaneous Dangerous Goods

SECTION 15: Regulatory information

15.1. National regulations

Dry Ice, Carbon Dioxide, Solid (124-38-9)

Listed on the Canadian DSL (Domestic Substances List)

15.2. International regulations

Dry Ice, Carbon Dioxide, Solid (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 EEC inventory EINECS (European Inventory of Existing Commercial Chemical Substances)
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 United States TSCA (Toxic Substances Control Act) inventory
Listed on INSQ (Mexican National Inventory of Chemical Substances)

SECTION 16: Other information

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Indication of changes:



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Other information

: 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.lindecana.com. 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

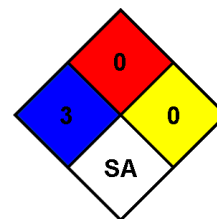
: 0 - Materials that will not burn.

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

: 0 Minimal Hazard - Materials that are normally stable, even under fire conditions, and will NOT react with water, polymerize, decompose, condense, or self-react. Non-Explosives.

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.

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