



# CARBON DIOXIDE, SOLID

## Safety Data Sheet

### 1. IDENTIFICATION

Product identifier

Product Name CARBON DIOXIDE, SOLID

Other means of identification

Safety data sheet number LIND-P025  
UN/ID no. UN1845  
Synonyms Dry Ice, Carbon Ice, Solid Carbon Dioxide

Recommended use of the chemical and restrictions on use

Recommended Use Industrial and professional use.  
Uses advised against Consumer use

Details of the supplier of the safety data sheet

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Phone: 908-464-8100  
[www.lindeus.com](http://www.lindeus.com)

Linde Gas Puerto Rico, Inc.  
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Barrio Palmas, Catano, PR 00962  
Phone: 787-641-7445  
[www.pr.lindegas.com](http://www.pr.lindegas.com)

Linde Canada Limited  
5860 Chedworth Way  
Mississauga, Ontario L5R 0A2  
Phone: 905-501-2500/905-501-1700  
[www.lindecana.com](http://www.lindecana.com)

\* May include subsidiaries or affiliate companies/divisions.

For additional product information contact your local customer service.

Emergency telephone number

Company Phone Number +1 800-232-4726 (Linde National Operations Center, US) 905-501-0802 (Canada)  
CHEMTREC: 1-800-424-9300 (North America) +1-703-527-3887 (International)

## 2. HAZARDS IDENTIFICATION

### Classification

#### OSHA Regulatory Status

This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200).

|                    |     |
|--------------------|-----|
| Simple asphyxiants | Yes |
|--------------------|-----|

### Label elements

#### Signal word

Warning

#### Hazard Statements

May displace oxygen and cause rapid suffocation

May cause frostbite

May increase respiration and heart rate

#### Precautionary Statements - Prevention

Do not handle until all safety precautions have been read and understood

Avoid breathing gas

Do not get in eyes, on skin, or on clothing

Wear cold insulating gloves, face shield, and eye protection

Use and store only outdoors or in a well ventilated place

Keep out of reach of children

#### Precautionary Statements - Response

IF INHALED: Remove person to fresh air and keep comfortable for breathing. Get medical attention/advice.

IF ON SKIN: Get immediate medical advice/attention. Thaw frosted parts with lukewarm water. Do not rub affected area.

#### Precautionary Statements - Storage

Store in a well-ventilated place

#### Hazards not otherwise classified (HNOC)

Not applicable

## 3. COMPOSITION/INFORMATION ON INGREDIENTS

| Chemical Name  | CAS No.  | Volume % | Chemical Formula |
|----------------|----------|----------|------------------|
| Carbon dioxide | 124-38-9 | 100      | CO <sub>2</sub>  |

## 4. FIRST AID MEASURES

### Description of first aid measures

#### General advice

Show this safety data sheet to the doctor in attendance.

#### 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.

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|                                    |  |
|------------------------------------|--|
| 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                          | Swallowing must be absolutely avoided, since coldness and developing pressure could be dangerous. Immediate medical attention is required.   |
| Self-protection of the first aider | RESCUE PERSONNEL SHOULD BE EQUIPPED WITH SELF-CONTAINED BREATHING APPARATUS.   |

Most important symptoms and effects, both acute and delayed

|          |   |
|----------|---|
| Symptoms | <p>Simple asphyxiant. May cause suffocation by displacing the oxygen in the air. Exposure to oxygen-deficient atmosphere (&lt;19.5%) may cause dizziness, drowsiness, nausea, vomiting, excess salivation, diminished mental alertness, loss of consciousness and death. Exposure to atmospheres containing 8-10% or less oxygen will bring about unconsciousness without warning and so quickly that the individuals cannot help or protect themselves. Lack of sufficient oxygen may cause serious injury or death.</p> <p>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%. Contact with product may cause frostbite.</p> |
|----------|---|

Indication of any immediate medical attention and special treatment needed

|                    |                        |
|--------------------|------------------------|
| Note to physicians | Treat symptomatically. |
|--------------------|------------------------|

## 5. FIRE-FIGHTING MEASURES

Suitable extinguishing media

Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Specific extinguishing methods

Continue to cool fire exposed containers until flames are extinguished.

Specific hazards arising from the chemical

Non-flammable gas. Sealed containers may rupture when heated.

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.

## 6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures

|                      |  |
|----------------------|--|
| Personal precautions | Evacuate personnel to safe areas. Ensure adequate ventilation, especially in confined areas. Monitor oxygen level. Monitor concentration of released product. Wear self-contained breathing apparatus when entering area unless atmosphere is proved to be safe. |
| Other Information    | Gas/vapor is heavier than air. Prevent from entering sewers, basements and workpits, or any place where accumulation may be dangerous.   |

Environmental precautions

Environmental precautions Prevent spreading of vapors through sewers, ventilation systems and confined areas.

Methods and material for containment and cleaning up

Methods for containment Remove container to outdoor location if this can be done without risk. Ventilate area.

Methods for cleaning up Return container to Linde or an authorized distributor.

## 7. HANDLING AND STORAGE

Precautions for safe handling

Advice on safe handling

Use only with adequate ventilation. Never handle dry ice with bare hands. Always use insulated gloves. Never put containers into trunks of cars or unventilated areas of passenger vehicles. Keep out of reach of children.

For additional storage recommendations, consult Compressed Gas Association's Pamphlets P-1,AV-7, G-6, G-6.1, G-6.2, G6.3, G-6.5, G-6.7, G-6.9, PS-5,TB-10, and SB-2.

Conditions for safe storage, including any incompatibilities

Storage Conditions Carbon dioxide solid should be stored in insulated containers equipped with loose fitting lids which allow escape of vapor caused by sublimation. Do not store in subsurface or enclosed areas. Locate the insulated storage container in an area where there is adequate ventilation so as to prevent the accumulation of carbon dioxide vapors/gas above exposure limits. DO NOT PUT DRY ICE IN A CLOSED CONTAINER WHERE EVOLVED GAS CANNOT ESCAPE! Remove scrap solid (snow or dry ice) to a hood with forced ventilation or take to a remote outside location and allow to sublime. Store in cool, dry, well-ventilated area of non-combustible construction away from heavily trafficked areas and emergency exits. Keep at temperatures below 52°C / 125°F. Always keep container in upright position

Incompatible materials Certain reactive metals, hydrides, moist cesium monoxide, or lithium acetylene carbide diammino may ignite. Passing carbon dioxide over a mixture of sodium peroxide and aluminum or magnesium may explode.

## 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters

Exposure Guidelines

| Chemical Name              | ACGIH TLV                         | OSHA PEL   | NIOSH IDLH  |
|----------------------------|-----------------------------------|--|---|
| Carbon dioxide<br>124-38-9 | STEL = 30000 ppm<br>TWA: 5000 ppm | TWA: 5000 ppm<br>TWA: 9000 mg/m <sup>3</sup><br>(vacated) TWA: 10000 ppm<br>(vacated) TWA: 18000 mg/m <sup>3</sup><br>(vacated) STEL: 30000 ppm<br>(vacated) STEL: 54000 mg/m <sup>3</sup> | IDLH: 40000 ppm<br>TWA: 5000 ppm<br>TWA: 9000 mg/m <sup>3</sup><br>STEL: 30000 ppm<br>STEL: 54000 mg/m <sup>3</sup> |

ACGIH TLV: American Conference of Governmental Industrial Hygienists - Threshold Limit Value. OSHA PEL: Occupational Safety and Health Administration - Permissible Exposure Limits. NIOSH IDLH: Immediately Dangerous to Life or Health

Other Information Vacated limits revoked by the Court of Appeals decision in AFL-CIO v. OSHA, 965 F.2d 962 (11th Cir., 1992).

Appropriate engineering controls

Engineering Controls Local exhaust ventilation to prevent accumulation of high concentrations and maintain air-oxygen levels at or above 19.5%. Oxygen detectors should be used when asphyxiating gases may be

released. Systems under pressure should be regularly checked for leakages.

Individual protection measures, such as personal protective equipment

|                                |   |
|--------------------------------|---|
| Eye/face protection            | Wear safety glasses with side shields (or goggles). Face-shield.  |
| Skin and body protection       | Wear cold insulating gloves. Safety shoes.  |
| 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.   |

## 9. PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

|                           |   |
|---------------------------|---|
| Physical state            | Solid                                     |
| Appearance                | A white solid liberating a colorless gas. |
| Odor                      | Odorless.                                 |
| Odor threshold            | No information available                  |
| pH                        | No data available                         |
| Melting point             | -56.6 °C / -69.8 °F                       |
| Evaporation rate          | Not applicable                            |
| 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          | 0.145 g/ml @ 25°C                         |
| Partition coefficient     | No data available                         |
| Kinematic viscosity       | Not applicable                            |

Component Level Information:

| Chemical Name  | Molecular weight | Boiling point          | Vapor Pressure               | Vapor density (air =1) | Gas Density kg/m <sup>3</sup> @20°C | Critical Temperature |
|----------------|------------------|------------------------|------------------------------|------------------------|-------------------------------------|----------------------|
| Carbon dioxide | 44.01            | -78.5 °C<br>(Sublimes) | 838 psig (5778 kPa) @ 21.1°C | 1.522                  | 1.839                               | 31.1 °C              |

## 10. STABILITY AND REACTIVITY

Reactivity

Not reactive under normal conditions

Chemical stability

Stable under normal conditions.

Explosion data

|                                  |       |
|----------------------------------|-------|
| Sensitivity to Mechanical Impact | None. |
| Sensitivity to Static Discharge  | None. |

Possibility of Hazardous Reactions

None under normal processing.

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. Passing carbon dioxide over a mixture of sodium peroxide and aluminum or magnesium may explode.

Hazardous Decomposition Products

Oxygen. Carbon monoxide (CO).

## 11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure

|              |   |
|--------------|---|
| 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. |
| Skin contact | Contact with product may cause frostbite.   |
| Eye contact  | Contact with product may cause frostbite.   |
| Ingestion    | Swallowing must be absolutely avoided, since coldness and developing pressure could be dangerous.   |

Information on toxicological effects

|          |  |
|----------|--|
| Symptoms | 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 and immediate effects as well as chronic effects from short and long-term exposure

|                          |   |
|--------------------------|---|
| Irritation               | Not classified.   |
| Sensitization            | Not classified.   |
| Germ cell mutagenicity   | Not classified.   |
| Carcinogenicity          | This product does not contain any carcinogens or potential carcinogens listed by OSHA, IARC or NTP. |
| Reproductive toxicity    | Not classified.   |
| STOT - single exposure   | Not classified.   |
| STOT - repeated exposure | Not classified.   |
| Chronic toxicity         | Chronic harmful effects are not known from repeated inhalation of concentrations below PEL/TLV.     |
| Target Organ Effects     | Central Vascular System (CVS), Respiratory system.  |
| Aspiration hazard        | Not applicable.   |

Numerical measures of toxicity

## Component Level Information:

| Chemical Name              | Oral LD50 | Dermal LD50 | Inhalation LC50   | Inhalation LC50<br>(CGA P-20) |
|----------------------------|-----------|-------------|-------------------|-------------------------------|
| Carbon dioxide<br>124-38-9 | -         | -           | 470,000 ppm (Rat) | -                             |

## Product Information

|                 |   |
|-----------------|---|
| Oral LD50       | No information available                            |
| Dermal LD50     | No information available                            |
| Inhalation LC50 | TCLo - 10,000 ppm (Rat) 24 hours/30 days-continuous |

## 12. ECOLOGICAL INFORMATION

### Ecotoxicity

No known acute aquatic toxicity.

### Persistence and degradability

Not applicable.

### Bioaccumulation

Not applicable

Global warming potential (GWP) 1

## 13. DISPOSAL CONSIDERATIONS

### Waste treatment methods

Disposal of wastes Do not attempt to dispose of residual waste or unused quantities. Return in the shipping container to Linde or authorized distributor for proper disposal. Allow to sublime (evaporate) in a well-ventilated area.

## 14. TRANSPORT INFORMATION

### DOT

|                                 |                                  |
|---------------------------------|----------------------------------|
| UN/ID no.                       | UN1845                           |
| Proper shipping name            | Carbon dioxide, solid            |
| Hazard Class                    | 9                                |
| Description                     | UN1845, Carbon dioxide, solid, 9 |
| Emergency Response Guide Number | 120                              |

### TDG

|                      |                                       |
|----------------------|---------------------------------------|
| UN/ID no.            | UN1845                                |
| Proper shipping name | Carbon dioxide, solid                 |
| Hazard Class         | 9                                     |
| Packing Group        | III                                   |
| Description          | UN1845, Carbon dioxide, solid, 9, III |

### MEX

|                      |                                       |
|----------------------|---------------------------------------|
| UN/ID no.            | UN1845                                |
| Proper shipping name | Carbon dioxide, solid                 |
| Hazard Class         | 9                                     |
| Packing Group        | III                                   |
| Description          | UN1845, Carbon dioxide, solid, 9, III |

### IATA

|                      |                                  |
|----------------------|----------------------------------|
| UN/ID no.            | UN1845                           |
| Proper shipping name | Carbon dioxide, solid            |
| Hazard Class         | 9                                |
| Packing Group        | P904                             |
| ERG Code             | 9L                               |
| Special Provisions   | A48, A151, A805                  |
| Description          | UN1845, Carbon dioxide, solid, 9 |

IMDG

|                      |                                  |
|----------------------|----------------------------------|
| UN/ID no.            | UN1845                           |
| Proper shipping name | Carbon dioxide, solid            |
| Hazard Class         | 9                                |
| Packing Group        | P003                             |
| EmS-No.              | F-C, S-V                         |
| Description          | UN1845, Carbon dioxide, solid, 9 |

ADR

|                         |                                  |
|-------------------------|----------------------------------|
| UN/ID no.               | UN1845                           |
| Proper shipping name    | Carbon dioxide, solid            |
| Hazard Class            | 9                                |
| Classification code     | M11                              |
| Tunnel restriction code | (C/E)                            |
| Special Provisions      | 584, 653                         |
| Description             | UN1845, Carbon dioxide, solid, 9 |

**15. REGULATORY INFORMATION**International Inventories

|               |          |
|---------------|----------|
| TSCA          | Complies |
| DSL/NDSL      | Complies |
| EINECS/ELINCS | Complies |

Legend:

TSCA - United States Toxic Substances Control Act Section 8(b) Inventory

DSL/NDSL - Canadian Domestic Substances List/Non-Domestic Substances List

EINECS/ELINCS - European Inventory of Existing Chemical Substances/European List of Notified Chemical Substances

US Federal RegulationsSARA 313

Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product does not contain any chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372.

SARA 311/312 Hazard Categories

|                                   |     |
|-----------------------------------|-----|
| Acute Health Hazard               | Yes |
| Chronic Health Hazard             | No  |
| Fire Hazard                       | No  |
| Sudden release of pressure hazard | No  |
| Reactive Hazard                   | No  |

CERCLA

This material, as supplied, does not contain any substances regulated as hazardous substances under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302) or the Superfund Amendments and Reauthorization Act (SARA) (40 CFR 355). There may be specific reporting requirements at the local, regional, or state level pertaining to releases of this material.

Clean Air Act, Section 112 Hazardous Air Pollutants (HAPs) (see 40 CFR 61)

This product does not contain any substances regulated as hazardous air pollutants (HAPS) under Section 112 of the Clean Air Act Amendments of 1990.

CWA (Clean Water Act)

This product does not contain any substances regulated as pollutants pursuant to the Clean Water Act (40 CFR 122.21 and 40 CFR 122.42)

Risk and Process Safety Management Programs

This material, as supplied, does not contain any regulated substances with specified thresholds under 40 CFR Part 68. This product does not



contain any substances regulated as Highly Hazardous Chemicals pursuant to the 29 CFR Part 1910.110.

### US State Regulations

#### California Proposition 65

This product does not contain any Proposition 65 chemicals

#### U.S. State Right-to-Know Regulations

| Chemical Name              | New Jersey | Massachusetts | Pennsylvania |
|----------------------------|------------|---------------|--------------|
| Carbon dioxide<br>124-38-9 | X          | X             | X            |

| Chemical Name  | Carcinogenicity | Exposure Limits  |
|----------------|-----------------|--|
| Carbon dioxide | -               | Mexico: TWA= 5000 ppm<br>Mexico: TWA= 9000 mg/m <sup>3</sup><br>Mexico: STEL= 15000 ppm<br>Mexico: STEL= 27000 mg/m <sup>3</sup> |

## 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-19-2009, CGA Recommended Hazard Ratings for Compressed Gases, 3rd Edition.

Issue Date                      01-Jun-2015  
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Revision Note                      SDS sections updated; 1

#### General Disclaimer

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End of Safety Data Sheet