

Dry Ice (Carbon Dioxide, Solid)

Safety Data Sheet

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

Date of issue: 01-01/2016; Revision date: 04-10-2017

SECTION 1: Identification

1.1. Product identifier

| | |
|-------------------------------|--|
| Product form | : 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 |

1.2. Recommended use and restrictions on use

| | |
|-----------------------------------|------------------|
| Recommended uses and restrictions | : Industrial use |
|-----------------------------------|------------------|

1.3. Supplier

RS Josef Group
 201 Basaltic Rd
 Concord - Canada L4G 1G4
 T 416-658-1212
www.josefgases.com

1.4. Emergency telephone number

| | |
|------------------|---|
| Emergency number | : 1-613-996-6666 CANUTEC For routine information, contact your supplier or RS Josef sales rep. |
|------------------|---|

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



Signal word : DANGER

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

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.

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.

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), ½-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 1½ 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

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| | | |
|-------------|-------------------------------------|------------------------|
| 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 |

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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 respirable fume respirator or 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. Selection should be based on the current CSA standard Z94.4, "Selection, Care, and Use of Respirators." 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.

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| | |
|---|--|
| Odour threshold | : No data available |
| 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 (Sublimation Temperature) |
| 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

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| | |
|-------------------------------|--|
| Persistence and degradability | No ecological damage caused by this product. |
|-------------------------------|--|

12.3. Bioaccumulative potential

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| | |
|---------------------------|--|
| 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. |
| Waste 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 : 200 kg
 Carrying Railway Vehicle Index

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

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Listed on the Canadian DSL (Domestic Substances List)

SECTION 16: Other information

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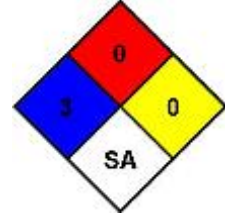
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- NFPA health hazard : 3 - Short exposure could cause serious temporary or residual injury even though prompt medical attention was given.
- NFPA fire hazard : 0 - Materials that will not burn.
- NFPA reactivity : 0 - Normally stable, even under fire 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.

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.