

Material Safety Data Sheet



Carbon Dioxide (Dry Ice)

Section 1. Chemical product and company identification

Product name : Carbon Dioxide (Dry Ice)
Supplier : AIRGAS INC., on behalf of its subsidiaries
259 North Radnor-Chester Road
Suite 100
Radnor, PA 19087-5283
1-610-687-5253
Synonym : carbonice ; dry ice 6
MSDS # : 001091
Date of Preparation/Revision : 12/12/2008.
In case of emergency : 1-866-734-3438

Section 2. Hazards identification

Physical state : Solid. [WHITE SNOW-LIKE SOLID]
Emergency overview : WARNING!
MAY CAUSE TARGET ORGAN DAMAGE, BASED ON ANIMAL DATA.
May cause target organ damage, based on animal data.
Target organs : May cause damage to the following organs: cardiovascular system, upper respiratory tract, skin.
Potential acute health effects
Eyes : No known significant effects or critical hazards.
Skin : Extremely cold material. Can cause burns similar to frostbite.
Inhalation : Acts as a simple asphyxiant.
Ingestion : No known significant effects or critical hazards.
Potential chronic health effects : **CARCINOGENIC EFFECTS:** Not available.
MUTAGENIC EFFECTS: Not available.
TERATOGENIC EFFECTS: Not available.
Medical conditions aggravated by over-exposure : Pre-existing disorders involving any target organs mentioned in this MSDS as being at risk may be aggravated by over-exposure to this product.

See toxicological information (section 11)

Section 3. Composition, Information on Ingredients

United States

carbon dioxide

124-38-9

100

Exposure limits

ACGIH TLV (United States, 1/2008).

STEL: 54000 mg/m³ 15 minute(s).

STEL: 30000 ppm 15 minute(s).

TWA: 9000 mg/m³ 8 hour(s).

TWA: 5000 ppm 8 hour(s).

NIOSH REL (United States, 6/2008).

STEL: 54000 mg/m³ 15 minute(s).

STEL: 30000 ppm 15 minute(s).

TWA: 9000 mg/m³ 10 hour(s).

TWA: 5000 ppm 10 hour(s).

OSHA PEL (United States, 11/2006).

TWA: 9000 mg/m³ 8 hour(s).

TWA: 5000 ppm 8 hour(s).

OSHA PEL 1989 (United States, 3/1989).

STEL: 54000 mg/m³ 15 minute(s).

STEL: 30000 ppm 15 minute(s).

TWA: 18000 mg/m³ 8 hour(s).

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TWA: 10000 ppm 8 hour(s).

Section 4. First aid measures

- Eye contact** : Check for and remove any contact lenses. Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical attention immediately.
- Skin contact** : In case of contact, immediately flush skin with plenty of water. Remove contaminated clothing and shoes. Wash clothing before reuse. Clean shoes thoroughly before reuse. Get medical attention.
Frostbite : Try to warm up the frozen tissues and seek medical attention.
- Inhalation** : Move exposed person to fresh air. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention immediately.
- Ingestion** : Wash out mouth with water. Do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention immediately.

Section 5. Fire fighting measures

- Flammability of the product** : Non-flammable.
- Products of combustion** : Decomposition products may include the following materials:
carbon dioxide
carbon monoxide
- Extinguishing media**
- Suitable** : Use an extinguishing agent suitable for the surrounding fire.
- Not suitable** : None known.
- Special exposure hazards** : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training.
No specific fire or explosion hazard.
- Special protective equipment for fire-fighters** : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

Section 6. Accidental release measures

- Personal precautions** : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment (see section 8).
- Environmental precautions** : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).
- Methods for cleaning up** : Move containers from spill area. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Vacuum or sweep up material and place in a designated, labeled waste container. Dispose of via a licensed waste disposal contractor. Note: see section 1 for emergency contact information and section 13 for waste disposal.

Section 7. Handling and storage

- Handling** : Wash thoroughly after handling. Use with adequate ventilation.
- Storage** : Keep container closed. Keep container in a cool, well-ventilated area.

Section 8. Exposure controls/personal protection

- Recommended monitoring procedures** : If this product contains ingredients with exposure limits, personal, workplace atmosphere or biological monitoring may be required to determine the effectiveness of the ventilation or other control measures and/or the necessity to use respiratory protective equipment.
- Engineering measures** : No special ventilation requirements. Good general ventilation should be sufficient to control worker exposure to airborne contaminants. If this product contains ingredients with exposure limits, use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure below any recommended or statutory limits.
- Hygiene measures** : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.
- Personal protection**
- Eyes** : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists or dusts.
- Skin** : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.
- Respiratory** : Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.
- Hands** : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Insulated gloves suitable for low temperatures
- Personal protection in case of a large spill** : Self-contained breathing apparatus (SCBA) should be used to avoid inhalation of the product.

Product name

Exposure limits

United States

carbon dioxide

ACGIH TLV (United States, 1/2008).

STEL: 54000 mg/m³ 15 minute(s).

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Section 9. Physical and chemical properties

- Physical state** : Solid. [WHITE SNOW-LIKE SOLID]
- Color** : WHITE
- Molecular weight** : 44.01 g/mole
- Molecular formula** : C-O₂
- Melting/freezing point** : Sublimation temperature: -78.5°C (-109.3°F)
- Critical temperature** : 31°C (87.8°F)
- Specific gravity** : 1.56 (Water = 1)

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Section 10. Stability and reactivity

- Stability and reactivity** : The product is stable.
- Incompatibility with various substances** : Not considered to be reactive according to our database.
- Hazardous decomposition products** : Under normal conditions of storage and use, hazardous decomposition products should not be produced.
- Hazardous polymerization** : Under normal conditions of storage and use, hazardous polymerization will not occur.

Section 11. Toxicological information

Toxicity data

| Product/ingredient name | Result | Species | Dose | Exposure |
|-------------------------|----------------------|---------|------------|------------|
| carbon dioxide | LC50 Inhalation Gas. | Rat | 470000 ppm | 30 minutes |

- IDLH** : 40000 ppm
- Chronic effects on humans** : May cause damage to the following organs: cardiovascular system, upper respiratory tract, skin.
- Other toxic effects on humans** : No specific information is available in our database regarding the other toxic effects of this material to humans.
- Specific effects**
- Carcinogenic effects** : No known significant effects or critical hazards.
 - Mutagenic effects** : No known significant effects or critical hazards.
 - Reproduction toxicity** : No known significant effects or critical hazards.

Section 12. Ecological information

Aquatic ecotoxicity

Not available.


- Products of degradation** : Products of degradation: carbon oxides (CO, CO₂).

Section 13. Disposal considerations

- Waste disposal** : The generation of waste should be avoided or minimized wherever possible. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe way. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

Product removed from the cylinder must be disposed of in accordance with appropriate Federal, State, local regulation. Return cylinders with residual product to Airgas, Inc. Do not dispose of locally.

Section 14. Transport information

| Regulatory information | UN number | Proper shipping name | Class | Packing group | Label | Additional information |
|---------------------------|-----------|----------------------------------|-------|---------------|---|---|
| DOT Classification | UN1845 | CARBON DIOXIDE, SOLID OR DRY ICE | 9 | III |  | Limited quantity Yes. Packaging instruction Passenger aircraft Quantity limitation: 200 kg |

| Carbon Dioxide (Dry Ice) | | | | | | |
|----------------------------------|--------|--------------------------------------|---|-----|--|---|
| | | | | | | Cargo aircraft Quantity limitation: 200 kg |
| TDG Classification | UN1845 | CARBON DIOXIDE, SOLID; OR DRY ICE | 9 | III | | Explosive Limit and Limited Quantity Index 5 Passenger Carrying Ship Index 200 Special provisions 18 |
| Mexico Classification | UN1845 | CARBON DIOXIDE, SOLID OR DRY ICE | 9 | III | | Limited quantity Yes. Packaging instruction Passenger aircraft Quantity limitation: 200 kg Cargo aircraft Quantity limitation: 200 kg |
| | | | | | | |
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Section 15. Regulatory information

United States

- HCS Classification** : Target organ effects
- U.S. Federal regulations** : **United States inventory (TSCA 8b):** This material is listed or exempted.
SARA 302/304/311/312 extremely hazardous substances: No products were found.
SARA 302/304 emergency planning and notification: No products were found.
SARA 302/304/311/312 hazardous chemicals: carbon dioxide
SARA 311/312 MSDS distribution - chemical inventory - hazard identification:
carbon dioxide: Immediate (acute) health hazard, Delayed (chronic) health hazard
Clean Water Act (CWA) 307: No products were found.
Clean Water Act (CWA) 311: No products were found.
Clean Air Act (CAA) 112 accidental release prevention: No products were found.
Clean Air Act (CAA) 112 regulated flammable substances: No products were found.
Clean Air Act (CAA) 112 regulated toxic substances: No products were found.

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State regulations :

- Connecticut Carcinogen Reporting:** This material is not listed.
- Connecticut Hazardous Material Survey:** This material is not listed.
- Florida substances:** This material is not listed.
- Illinois Chemical Safety Act:** This material is not listed.
- Illinois Toxic Substances Disclosure to Employee Act:** This material is not listed.
- Louisiana Reporting:** This material is not listed.
- Louisiana Spill:** This material is not listed.
- Massachusetts Spill:** This material is not listed.
- Massachusetts Substances:** This material is listed.
- Michigan Critical Material:** This material is not listed.
- Minnesota Hazardous Substances:** This material is not listed.
- New Jersey Hazardous Substances:** This material is listed.
- New Jersey Spill:** This material is not listed.
- New Jersey Toxic Catastrophe Prevention Act:** This material is not listed.
- New York Acutely Hazardous Substances:** This material is not listed.
- New York Toxic Chemical Release Reporting:** This material is not listed.
- Pennsylvania RTK Hazardous Substances:** This material is listed.
- Rhode Island Hazardous Substances:** This material is not listed.

Canada

WHMIS (Canada) :

- Class A: Compressed gas.
- CEPA Toxic substances:** This material is listed.
- Canadian ARET:** This material is not listed.
- Canadian NPRI:** This material is not listed.
- Alberta Designated Substances:** This material is not listed.
- Ontario Designated Substances:** This material is not listed.
- Quebec Designated Substances:** This material is not listed.

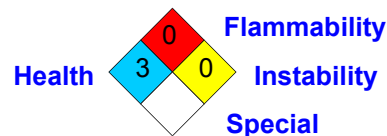
Section 16. Other information

Label requirements : MAY CAUSE TARGET ORGAN DAMAGE, BASED ON ANIMAL DATA.

Hazardous Material Information System (U.S.A.)

| | | |
|------------------|---|---|
| Health | * | 3 |
| Flammability | | 0 |
| Physical hazards | | 0 |
| | | |

National Fire Protection Association (U.S.A.)



Notice to reader

To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein.

Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.