

# Material Safety Data Sheet

Carbon Dioxide

## Section 1. Chemical product and company identification

**Product Name** : Carbon Dioxide  
**Supplier** : DRY ICE TECHNOLOGY CO.,LTD.  
No.45 ,Chaipu Rd., Shueishang Tsuen, Shueishang Shiang ,Chiayi County 608, Taiwan (R.O.C)  
**Product use** : Synthetic/Analytical chemistry.  
**MSDS#** : 001013  
**Date of Preparation/Revision** : 2010/01/25  
**In case of emergency** : 886-5-2600963

## Section 2. Composition, Information on Ingredients

<u>Name</u>	<u>CAS number</u>	<u>% Volume</u>	<u>Exposure limits</u>
Carbon Dioxide	124-38-9	100	<b>ACGIH TLV (United States, 9/2004).</b> STEL: 54000 mg/m <sup>3</sup> 15 minute(s). Form: All forms STEL: 30000 ppm 15 minute(s). Form: All forms TWA: 9000 mg/m <sup>3</sup> 8 hour(s). Form: All forms TWA: 5000 ppm 8 hour(s). Form: All forms <b>NIOSH REL (United States, 6/2001).</b> STEL: 54000 mg/m <sup>3</sup> 15 minute(s). Form: All forms STEL: 30000 ppm 15 minute(s). Form: All forms TWA: 9000 mg/m <sup>3</sup> 10 hour(s). Form: All forms TWA: 5000 ppm 10 hour(s). Form: All forms <b>OSHA PEL (United States, 6/1993).</b> TWA: 9000 mg/m <sup>3</sup> 8 hour(s). Form: All forms TWA: 5000 ppm 8 hour(s). Form: All forms

## Section 3. Hazards identification

**Physical state** : Gas.  
**Emergency overview** : Warning!  
CONTENTS UNDER PRESSURE.  
CAUSES DAMAGE TO THE FOLLOWING ORGANS: LUNGS, CARDIOVASCULAR SYSTEM, SKIN, EYES, CENTRAL NERVOUS SYSTEM, EYE, LENS OR CORNEA. MAY CAUSE RESPIRATORY TRACT, EYE AND SKIN IRRITATION.  
Avoid contact with skin and clothing. Avoid breathing gas. Do not puncture or incinerate container. Keep container closed. Use only with adequate ventilation. Wash thoroughly after handling.  
Contact with rapidly expanding gas, liquid, or solid can cause frostbite.

**Routes of entry** : Inhalation,Dermal,Eyes  
**Potential acute health effects**  
**Eyes** : Moderately irritating to the eyes.  
**Skin** : Moderately irritating to the skin.  
**Inhalation** : Moderately irritating to the respiratory system.  
**Ingestion** : Ingestion is not a normal route of exposure for gases

## Carbon Dioxide

### Potential chronic health effects

**CARCINOGENIC EFFECTS** Not available.  
**MUTAGENIC EFFECTS** Not available.

### Medical conditions aggravated by overexposure

**TERATOGENIC EFFECT** : Not available.

Acute or chronic respiratory conditions may be aggravated by overexposure to this gas.

See toxicological Information (section 11)

## Section 4. First aid measures

No action shall be taken involving any personal risk or without suitable training. If fumes are still suspected to be present, the rescuer should wear an appropriate mask or a self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation.

### Eye contact

: In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. 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. Thoroughly clean shoes before reuse. Get medical attention.

### Frostbite

: Try to warm up the frozen tissues and seek medical attention.

### Inhalation

: If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

### Ingestion

: Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention if symptoms appear.

## Section 5. Fire fighting measures

**Flammability of the product** : Non-flammable.

### Fire fighting media and instructions

: Use an extinguishing agent suitable for surrounding fires.

If involved in fire, shut off flow immediately if it can be done without risk. Apply water from a safe distance to cool container and protect surrounding area.

No specific hazard.

### Special protective equipment for fire-fighters

: Fire fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full facepiece operated in positive pressure mode.

## Section 6. Accidental release measures

### Personal precautions

: Immediately contact emergency personnel. Keep unnecessary personnel away. Use suitable protective equipment (Section 8). Shut off gas supply if this can be done safely. Isolate area until gas has dispersed.

### Environmental precautions

: Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

## Section 7. Handling and storage

### Handling

: Avoid contact with eyes, skin and clothing. Keep container closed. Use only with adequate ventilation. Do not puncture or incinerate container. Wash thoroughly after handling. High pressure gas. Use equipment rated for cylinder pressure. Close valve after each use and when empty. Protect cylinders from physical damage; do not drag, roll, slide, or drop. Use a suitable hand truck for cylinder movement. Never allow any unprotected part of the body to touch uninsulated pipes or vessels that contain cryogenic liquids. Prevent entrapment of liquid in closed systems or piping without pressure relief devices. Some materials may become brittle at low temperatures and will easily fracture.

### Storage

: Keep container tightly closed. Keep container in a cool, well-ventilated area. Cylinders should be stored upright, with valve protection cap in place, and firmly secured to prevent falling or being knocked over. Cylinder temperatures should not exceed 52 °C (125 °F).

## Section 8. Exposure Controls, Personal Protection

**Engineering controls** : Use only with adequate ventilation. Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits.

### 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.

When working with cryogenic liquids, wear a full face shield.

**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** : Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. 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.

The applicable standards are (US) 29 CFR 1910.134 and (Canada) Z94.4-93

**Hands** : Chemical-resistant, impervious gloves or gauntlets 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** : A self-contained breathing apparatus should be used to avoid inhalation of the product.

**Consult local authorities for acceptable exposure limits.**

## Section 9. Physical and chemical properties

**Molecular weight** : 44.01 g/mole

**Molecular formula** : CO<sub>2</sub>

**Boiling/condensation point** : -78.55°C (-109.4°F)

**Melting/freezing point** : Sublimation temperature: -78.5°C (-109.3°F)

**Critical temperature** : 30.9°C (87.6°F)

**Vapor pressure** : 830 psig

**Vapor density** : 1.53 (Air = 1)

**Specific Volume (ft<sup>3</sup>/lb)** : 8.77193

**Gas Density (lb/ft<sup>3</sup>)** : 0.114

**Physical chemical comments** : Not available.

## Section 10. Stability and reactivity

**Stability and reactivity** : The product is stable.

## Section 11. Toxicological information

### Toxicity data

**IDLH** : 40000 ppm

**Chronic effects on humans** : Causes damage to the following organs: lungs, cardiovascular system, skin, eyes, central nervous system (CNS), eye, lens or cornea.

**Other toxic effects on humans** : No specific information is available in our database regarding the other toxic effects of this material for 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

- Products of degradation** : These products are carbon oxides (CO, CO<sub>2</sub>).
- Toxicity of the products of biodegradation** : The product itself and its products of degradation are not toxic.
- Environmental fate** : Not available.
- Environmental hazards** : No known significant effects or critical hazards.
- Toxicity to the environment** : Not available.

## Section 13. Disposal considerations

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
<b>DOT Classification</b>	UN1013 UN2187	CARBON DIOXIDE Carbon dioxide, refrigerated liquid	2.2	Not applicable (gas).		<b>Limited quantity</b> Yes.  <b>Packaging instruction</b> <b>Passenger Aircraft</b> Quantity limitation: 75 kg  <b>Cargo Aircraft</b> Quantity limitation: 150 kg
<b>TDG Classification</b>	UN1013 UN2187	CARBON DIOXIDE Carbon dioxide, refrigerated liquid	2.2	Not applicable (gas).		<b>Explosive Limit and Limited Quantity Index</b> 0.125  <b>Passenger Carrying Road or Rail Index</b> 75
<b>Mexico Classification</b>	UN1013 UN2187	CARBON DIOXIDE Carbon dioxide, refrigerated liquid	2.2	Not applicable (gas).		-

## Section 15. Regulatory information

### United States

- U.S. Federal regulations** : TSCA 8(b) inventory: Carbon Dioxide  
 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: Sudden Release of Pressure, 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.

- State regulations** : Pennsylvania RTK: Carbon Dioxide: (generic environmental hazard)  
 Massachusetts RTK: Carbon Dioxide  
 New Jersey: Carbon Dioxide

### Canada

- WHMIS (Canada)** : Class A: Compressed gas.  
 CEPA DSL: Carbon Dioxide

## Section 16. Other information

### United States

- Label Requirements** : CONTENTS UNDER PRESSURE.  
 CAUSES DAMAGE TO THE FOLLOWING ORGANS: LUNGS, CARDIOVASCULAR SYSTEM, SKIN, EYES, CENTRAL NERVOUS SYSTEM, EYE, LENS OR CORNEA.  
 MAY CAUSE RESPIRATORY TRACT, EYE AND SKIN IRRITATION.

### Canada

- Label Requirements** : Class A: Compressed gas.

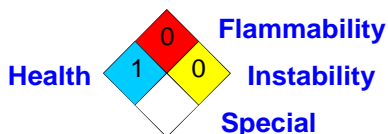
### Hazardous Material Information System (U.S.A.)

Health	*	1
Fire hazard		0
Reactivity		0
Personal protection		C

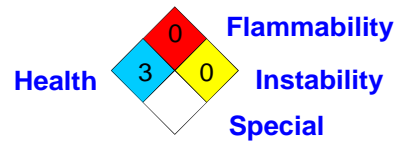
#### liquid:

Health		3
Fire hazard		0
Reactivity		0
Personal protection		

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



liquid:



**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.