



INTERNATIONAL INDUSTRIAL GASES LTD

Safety Data Sheet

CARBON DIOXIDE

Material Safety Data Sheet

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1. PRODUCT AND COMPANY IDENTIFICATION

Product Name: CARBON DIOXIDE
Manufacturer's Registered Office: 146 Andul Road, Howrah - 711103, India
Manufacturer's Website: www.iigas.com · www.thegases.com
Telephone Number: (+91 033) 2668 4725

2. HAZARDS IDENTIFICATION

WARNING!

EMERGENCY OVERVIEW

Non-flammable liquefied gas under pressure.

Asphyxiant — at high concentrations causes rapid circulatory insufficiency, unconsciousness and death.

Heavier than air — accumulates in pits, cellars and low-lying or confined areas.

Contact with liquid or rapidly expanding gas may cause frostbite (dry ice burns).

Keep at temperatures below 52°C / 125°F.

Appearance / State / Odor: Colorless | Physical State: Liquefied Compressed Gas | Odor: Odorless (slightly pungent at high concentration)

POTENTIAL HEALTH EFFECTS:

Principal Routes of Exposure: Inhalation

Inhalation: Carbon dioxide is both an asphyxiant and, at higher levels, physiologically active. Concentrations of 2–3% cause shortness of breath and headache; 5% causes laboured breathing and dizziness; above about 10% unconsciousness can occur rapidly; very high concentrations can be fatal within minutes.

Eyes: Contact with liquid, dry ice or rapidly expanding gas may cause freezing injury.

Skin: Contact with liquid, dry ice or rapidly expanding gas may cause frostbite.

Ingestion: None under normal use.

Chronic Effects: None known at occupational exposure levels.

Environmental Hazard: See Section 12 for additional Ecological Information.

3. COMPOSITION / INFORMATION ON INGREDIENTS

Chemical Name	CAS-No	Volume %	Chemical Formula
Carbon dioxide	124-38-9	>99	CO ₂

4. FIRST AID MEASURES

Eye Contact: For frostbite from liquid/dry-ice contact, flush gently with lukewarm water and get medical attention.

Skin Contact: For frostbite, warm the affected area gently with lukewarm water — do not rub. Get medical attention.

Inhalation: Move victim to fresh air immediately. If breathing has stopped, give artificial respiration; if breathing is difficult, qualified personnel may give oxygen. Seek immediate medical attention.

Ingestion: None under normal use.

Notes to Physician: Treat symptomatically.

5. FIRE-FIGHTING MEASURES

Flammable Properties: Non-flammable. Does not support combustion — CO₂ is itself an extinguishing agent.

Suitable Extinguishing Media: Use extinguishing measures appropriate to local circumstances and the surrounding environment.

Specific Hazards: Cylinders may rupture under extreme heat. Continue to cool fire-exposed cylinders until flames are extinguished. Damaged cylinders should be handled only by specialists.

Protective Equipment for Firefighters: As in any fire, wear self-contained breathing apparatus (SCBA), pressure-demand, NIOSH approved or equivalent, and full protective gear.

6. ACCIDENTAL RELEASE MEASURES

Evacuate personnel from low-lying areas and ensure adequate ventilation. Monitor CO₂ and oxygen levels — do not enter unless the atmosphere is safe. Stop the flow of gas or remove the cylinder outdoors if this can be done without risk. Return cylinder to IIGAS.

7. HANDLING AND STORAGE

Handling

Dry carbon dioxide is non-corrosive; in the presence of moisture it forms carbonic acid, which attacks ordinary carbon steel — use stainless steel or other resistant materials in wet CO₂ service. Liquid withdrawal lines must be fitted with relief devices between shut-off valves to prevent dangerous hydrostatic pressure rise.

Use only in well-ventilated areas. Never attempt to lift a cylinder by its valve protection cap. Protect cylinders from physical damage; do not drag, roll, slide or drop. When moving cylinders, even for a short distance, use a cart designed to transport cylinders. Use equipment rated for cylinder pressure. Use a backflow preventive device in the piping. Never insert an object (e.g., wrench, screwdriver, pry bar) into valve cap openings — doing so may damage the valve and cause a leak.

Close the valve after each use and when empty. If a user experiences any difficulty operating the cylinder valve, discontinue use and contact the supplier. Never put cylinders into trunks of cars or unventilated areas of passenger vehicles. Never attempt to refill a compressed gas cylinder without the owner's written consent. Never strike an arc on a compressed gas cylinder or make a cylinder part of an electrical circuit.

For additional recommendations consult rules 18 & 20 of the Gas Cylinder Rules, 2016.

Storage

Protect from physical damage. Cylinders should be stored upright with the valve protection cap in place and firmly secured to prevent falling. Store in a cool, dry, well-ventilated area of non-combustible construction away from high-traffic areas and emergency exits. Keep at temperatures below 52°C / 125°F.

Full and empty cylinders should be segregated. Use a "First-In-First-Out (FIFO)" inventory system to prevent full cylinders from being stored for excessive periods. Always store and handle compressed gas cylinders in accordance with rule 21 of the Gas Cylinder Rules, 2016.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Exposure Guidelines: ACGIH TLV-TWA: 5,000 ppm. ACGIH STEL: 30,000 ppm. OSHA PEL: 5,000 ppm.

Ventilation: Use local exhaust with general ventilation to keep CO₂ below exposure limits, especially in low-lying and confined areas.

Eye/Face Protection: Safety glasses; face shield when handling liquid or dry ice.

Skin and Body Protection: Insulated gloves when handling liquid or dry ice; work gloves and safety shoes when handling cylinders.

Respiratory Protection: SCBA or positive-pressure airline with mask for atmospheres above exposure limits or oxygen-deficient atmospheres.

Hygiene Measures: Handle in accordance with good industrial hygiene and safety practices.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	Colorless
Odor	Odorless; slightly pungent at high concentration

Physical State	Liquefied compressed gas
Molecular Weight	44.01
Sublimation Point	-78.5 °C / -109.3 °F @ 1 atm
Vapor Density	1.833 kg/m ³ (0.114 lb/ft ³) @ 21.1 °C — heavier than air
Specific Volume @ 21.1 °C & 1 atm	8.74 ft ³ /lb
Critical Temperature	31.1 °C / 88 °F
Critical Pressure	1,070 psia
Water Solubility	Soluble (forms carbonic acid)
Flammability Limits in Air	Not applicable (non-flammable)

10. STABILITY AND REACTIVITY

Stability: Stable.

Incompatible Products: Alkali metals, strong bases, metal acetylides, amines. Wet CO₂ is corrosive to carbon steel.

Conditions to Avoid: None known.

Hazardous Decomposition Products: Carbon monoxide at very high temperatures.

Hazardous Polymerization: Does not occur.

11. TOXICOLOGICAL INFORMATION

CO₂ is physiologically active at elevated concentrations: 2–3% causes breathlessness and headache; ~5% laboured breathing and dizziness; ≥10% can cause unconsciousness and death. Contains no ingredient listed as a carcinogen.

12. ECOLOGICAL INFORMATION

Ecotoxicity: Will not bioconcentrate. CO₂ is a natural component of the atmosphere; large releases contribute to greenhouse effect.

13. DISPOSAL CONSIDERATIONS

Waste Disposal Methods: Do not attempt to dispose of residual waste or unused quantities. Return in the shipping container properly labelled, with any valve outlet plugs or caps secured and valve protection cap in place, to IIGAS for proper disposal.

14. TRANSPORT INFORMATION

DOT / ADR

Proper Shipping Name: Carbon dioxide

Hazard Class: 2.2

UN-Number: UN1013

Description: UN1013, Carbon dioxide, 2.2

Labels: 2.2 Non-flammable, non-toxic gas

15. REGULATORY INFORMATION

SARA 311/312 Hazard Categories

Acute Health Hazard: Yes **Chronic Health Hazard:** No **Fire Hazard:** No

Sudden Release of Pressure Hazard: Yes **Reactive Hazard:** No

Store, transport and handle in accordance with the Gas Cylinder Rules, 2016 and other applicable national / local regulations.

16. OTHER INFORMATION

General: Ensure all national / local regulations are observed.

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