

Material Safety Data Sheet

Prepared according to US OSHA, CMA, ANSI and Canadian WHMIS Standards.

Carbon Dioxide (solid)



Section 1. Chemical product and company identification

Commercial name(s).	: Carbon Dioxide (solid)
Synonym	: Dry ice.
MSDS no.	: 10041
Product use	: For refrigeration of perishable foods while in transit; as a cooling agent in many industrial processes; as a coolant in vacuum cold traps and laboratories, hospitals and airplanes; to produce theatrical smoke or fog; and, for general analytical/synthetic chemical uses.
Manufactured/supplied	
Address	: 2700 Post Oak Drive Houston, TX 77056-8229
Emergency telephone number	: CHEMTREC: 1-800-424-9300
Telephone no.	
GENERAL MSDS INFORMATION	: 1-(713)-896-2896
Fax on Demand	: 1-(800)-231-1366

Section 2. Hazards identification

Physical state	: Solid.
OSHA/HCS status	: This material is classified hazardous under OSHA regulations in the United States and the WHMIS Controlled Product Regulation in Canada.
Emergency overview	: USE WITH CARE. Please also refer to the MSDS for carbon dioxide (Gas/Liquid) for more information on the gaseous form of this product. Solid can cause burns similar to frostbite. Gas may accumulate in confined areas.
Routes of entry	: Inhalation. Dermal contact. Eye contact.
Potential acute health effects	
Inhalation	: Inhalation of this product may cause dizziness, an irregular heartbeat, narcosis, nausea or asphyxiation.
Skin	: Dermal contact with the solid could result in freezing of the tissues or frostbite.
Eyes	: Solid can cause burns similar to frostbite.
Ingestion	: Ingestion of solid can cause burns similar to frostbite.
Potential chronic health effects	: Carcinogenic effects: Not classified or listed by IARC, NTP, OSHA, EU and ACGIH. Mutagenic effects: Not available. Teratogenic effects: Not available.
Over-exposure signs/symptoms	
Inhalation	: No specific data.
Ingestion	: No specific data.
Skin	: No specific data.
Eyes	: No specific data.
Medical conditions aggravated by over-exposure	: None known.

See toxicological information (section 11)

Section 3. Composition, Information on Ingredients

	CAS number	mole %
Canada Carbon Dioxide (Dry Ice)	124-38-9	> 99

United States

Chemical name	CAS #	mole %	Occupational exposure limits	IDLH
Carbon Dioxide (Dry Ice)	124-38-9	> 99	ACGIH TLV (United States, 1/2004). STEL: 54000 mg/m ³ 15 minute(s). Form: All forms. TWA: 9000 mg/m ³ 8 hour(s). Form: All forms. NIOSH REL (United States, 12/2001). STEL: 54000 mg/m ³ 15 minute(s). Form: All forms. TWA: 9000 mg/m ³ 10 hour(s). Form: All forms. OSHA PEL (United States, 8/1997). TWA: 9000 mg/m ³ 8 hour(s). Form: All forms. OSHA PEL 1989 (United States, 3/1989). STEL: 54000 mg/m ³ 15 minute(s). Form: All forms TWA: 18000 mg/m ³ 8 hour(s). Form: All forms	40000 ppm

NE: Not Established

C: Ceiling Limit

See Section 16 for possible acronym definitions

See Sections 8, 11, 14 and 15 for details.

Section 4. First aid measures

Prompt medical attention is mandatory in all cases of overexposure to this product. Rescue personnel should wear a self-contained breathing apparatus.

- 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 if symptoms occur.
- Skin contact** : Remove contaminated clothing and rinse affected skin with lukewarm water. Do not rinse with hot water. Provide medical prompt attention, frozen tissue is painless and appear waxy, with a possible yellow color. Frozen tissue will become swollen, painful and prone to infection when thawed.
- Eye contact** : Individual in contact with this product should not wear contact lenses. Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 20 minutes. Get medical attention if symptoms occur.
- Ingestion** : If potentially dangerous quantities of this material have been swallowed, call a physician immediately. Do not induce vomiting unless directed to do so by medical personnel.
- Notes to physician** : The medical doctor must be warned that the person may suffer from anoxia.

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
- Explosion hazards in the presence of various substances** : Not considered to be a product presenting a risk of explosion.
- Fire-fighting media and instructions** : Use an extinguishing agent suitable for the surrounding fire.

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** : EVACUATE ALL PERSONNEL FROM AFFECTED AREA.
Use appropriate protective equipment. If leak is in user's equipment, be certain to purge piping with an inert gas prior to attempting repairs. If leak is on container, contact the closest Air Liquide location.
- Environmental precautions** : In case of a leak, clear the affected area, protect people, eliminate sources of ignition and respond with trained personnel. Adequate fire protection must be provided.
- Methods for cleaning up** : Contact your local Air Liquide Gas supplier for details.

Section 7. Handling and storage

- Handling** : Avoid contact with eyes, skin and clothing. Carbon dioxide is generally delivered as blocks or pellets and should be placed in isolated containers with an upward opening so that sublimation vapors of CO₂ may be released. Dry ice should always be manipulated with pliers (blocks) or with appropriate tools.
- Storage** : Store in a dry, cool and well-ventilated area.

Section 8. Exposure controls/personal protection

- Engineering controls** : Use only in well-ventilated areas. Gas is heavier than air and will therefore accumulate in low lying areas.
- Personal protection**
- Respiratory** : Maintain oxygen levels above 19.5% in the workplace. Use supplied air respiratory protection if oxygen levels are below 19.5% (air purifying respirators will not function) or during emergency response to a release of the gas. During an emergency situation, before entering the area, check for oxygen-deficient atmospheres. If respiratory protection is required, follow the requirements of the Federal OSHA Respiratory Protection Standard (29 CFR 1910.134), or equivalent State standard.
- Hands** : Wear leather gloves when handling containers of this solid. Otherwise, wear glove protection appropriate to the specific operation for which this solid is used.
- Eyes** : Safety glasses with side shields.
- Skin/Body** : Use body protection appropriate for task. Cotton clothing is recommended for use to prevent static electric build-up. Pressurized product may require use of fire retardant clothing.
Metal cap, safety shoes are recommended when handling containers.



Some applications of this product may require additional or other specific protective clothings. Please consult your supervisor.

- Personal protection in case of a major leak** : Safety glasses with side shields, goggles or face shield. Impervious gloves. Protective clothing. Metal cap, safety shoes. Wear MSHA/NIOSH-approved self-contained breathing apparatus or equivalent and full protective gear.

Product name**Exposure limits****Canada**

Carbon Dioxide (Dry Ice)

ACGIH TLV (United States, 1/2005).STEL: 54000 mg/m³ 15 minute(s). Form: All formsTWA: 9000 mg/m³ 8 hour(s). Form: All forms**United States**

Carbon Dioxide (Dry Ice)

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NE: Not Established

Section 9. Physical and chemical properties

Physical state	: Solid.
Color	: White.
Odor	: Odorless.
Molecular weight	: 44.01 g/mole
Molecular formula	: CO ₂
Melting/freezing point	: Sublimation temperature: -78.5°C (-109.3°F)
Critical temperature	: 30.9°C (87.6°F)
Specific gravity	: 1.014 (Air = 1)
Vapor density	: 1.53 [Air = 1]
Solubility	: Partially soluble in the following materials: cold water.

Section 10. Stability and reactivity

Stability and reactivity	: The product is stable.
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**

IDLH	: 40000 ppm
Acute Effects	
Inhalation	: Inhalation of this product may cause dizziness, an irregular heartbeat, narcosis, nausea or asphyxiation.
Skin	: Dermal contact with the solid could result in freezing of the tissues or frostbite.
Eyes	: Solid can cause burns similar to frostbite.
Ingestion	: Ingestion of solid can cause burns similar to frostbite.
Potential chronic health effects	: Carcinogenic effects: Not classified or listed by IARC, NTP, OSHA, EU and ACGIH. Mutagenic effects: Not available. Teratogenic effects: Not available.

Section 12. Ecological information

Products of degradation : This gas is released as is in the atmosphere.

Section 13. Disposal considerations

Disposal : Residual materials contained in customer-owned containers should be disposed of in accordance with Federal, State and Local regulations on waste management. For residual materials contained in containers owned by Air Liquide, contact Sales or Customer Service to determine appropriate disposal. Do not return containers without authorization from Air Liquide.

14 . Transport information

AERG : 120

Regulatory information	Proper shipping name	Class	UN number	PG	Label
UN / IMDG / IATA Classification	CARBON DIOXIDE, Solid (Dry ice)	9	UN1845	III	
DOT Classification	CARBON DIOXIDE, Solid (Dry ice)	9	UN1845	III	
TDG Classification	CARBON DIOXIDE, Solid (Dry ice)	9	UN1845	III	
Additional information	UN	IMDG	IATA	DOT	TDG
	-	-	Passenger and Cargo Aircraft Quantity limitation: 200 kg	Limited quantity Yes.	Special provisions 18
			Cargo Aircraft Only Quantity limitation: 200 kg	Packaging instruction Passenger aircraft Quantity limitation: 0 kg	
				Cargo aircraft Quantity limitation: 0 kg	

Section 15. Regulatory information

Canada

WHMIS (Canada)

: Not controlled under WHMIS (Canada).
Canada inventory: Listed on inventory.
CEPA Toxic substances: This material is not 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.

United States

OSHA HAZARD COMMUNICATION STANDARD (29CFR PART 1910.1200).

Not regulated.

SARA 302/304 emergency planning and notification: No products were found.

SARA 311/312 MSDS distribution - chemical inventory - hazard identification: Carbon Dioxide: Sudden release of pressure, Immediate (acute) health hazard, Delayed (chronic) health hazard

CERCLA: Hazardous substances.: No products were found.

US INVENTORY (TSCA)

TSCA 8(b) inventory: All components listed.

State regulations

California prop. 65: No products were found.

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 not listed.

Michigan Critical Material: This material is not listed.

Minnesota Hazardous Substances: This material is not listed.

New Jersey Hazardous Substances: This material is not 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 not listed.

Rhode Island Hazardous Substances: This material is not listed.

Section 16. Other information

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

Health	3
Fire hazard	0
Reactivity	0
Personal protection	G

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



Consult an Industrial Hygienist or other trained person when you make your safety evaluation of the end product. Remember, gases and liquids have properties which can cause serious injury or death.

Further information about gas mixtures can be found in pamphlets published by: Compressed Gas Association Inc (CGA), 4221 Walney Road, 5th floor, Chantilly, VA 20151-2923 Telephone: (703) 788-2700.

Acronyms

- : ACGIH: American Conference of Governmental Industrial Hygiene.
- IARC: International Agency for Research on Cancer.
- NIOSH: National Institute of Occupational Safety and Health.
- OSHA: Occupational Safety and Health Administration
- NTP: National Toxicology program.
- OECD: Organisation for Economic Co-operation and Development.
- PEL: Permissible Exposure Limit.
- IDLH: Immediately Dangerous to Life and Health.
- NE: Not established.
- C: Ceiling Limit.
- DSL: Domestic Substance List.
- NDSL: Non-Domestic Substance List.
- CFR: Code of Federal Regulations.
- TSCA: Toxic Substance Control Act.

Date of issue : 12/31/2007
Date of previous issue : 06/30/2006
Version : 4

Notice to reader

This Material Safety Data Sheet is offered pursuant to OSHA's Hazard Communication Standard, 29 CFR, 1910.1200, American National Standard Institute Z400.1, 2004, the Canadian Workplace Hazardous Material Information Systems (WHMIS). Other government regulations must be reviewed for applicability to this gas mixture. To the best of Air Liquide's knowledge, the information contained herein is reliable and accurate as of this date; however, accuracy, suitability or completeness are not guaranteed and no warranties of any type, either express or implied, are provided. The information contained herein relates only to this specific product. If this gas mixture is combined with other materials, all component properties must be considered. Data may be changed from time to time. Be sure to consult the latest edition.