

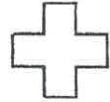
# MATERIAL SAFETY DATA SHEET

L-4574-C  
April 1989



An explanation of the terms used herein may be found in OSHA 29 CFR 1910.1200, available from OSHA regional or area offices.

(Similar to U.S. Department of Labor Form OMB No. 1218-0072 and generally accepted in Canada for information purposes)  
Do Not Duplicate This Form. Request an Original.



<b>PRODUCT</b>	Carbon Dioxide		
<b>CHEMICAL NAME</b>	Carbon Dioxide	<b>SYNONYMS</b>	Carbonic Anhydride, Carbonic Acid Gas
<b>FORMULA</b>	CO <sub>2</sub>	<b>CHEMICAL FAMILY</b>	Acid Anhydride
		<b>MOLECULAR WEIGHT</b>	44.01

**TRADE NAME** Carbon Dioxide

For mixtures of this product request the respective component Material Safety Data Sheets. See Section IX.

MATERIAL (CAS NO.)	Wt (%)	1988-1989 ACGIH TLV-TWA (OSHA-PEL)
Carbon Dioxide (124-38-9)	100	5000 ppm [10,000 ppm, Short Term Exposure Limit (STEL) 15 min. 30,000 ppm]

This product is subject to the Pennsylvania Worker and Community Right-To-Know Act (35 P.S. Sections 7301-7320).

<b>SUBLIMATION POINT, 760 mm. Hg</b>	-78.5°C (-109.3°F)	<b>FREEZING POINT</b>	Not applicable
<b>SPECIFIC GRAVITY (H<sub>2</sub>O = 1)</b>	Not applicable	<b>VAPOR PRESSURE AT 21°C.</b>	830 psig
<b>VAPOR DENSITY (air = 1)</b>	1.522 @ 21°C	<b>SOLUBILITY IN WATER, % by wt.</b>	Slight
<b>PERCENT VOLATILES BY VOLUME</b>	100	<b>EVAPORATION RATE (Butyl Acetate = 1)</b>	High

**APPEARANCE AND ODOR** Colorless gas at normal temperature and pressure; odorless.

IN CASE OF EMERGENCIES involving this material, further information is available at all times:  
In the USA 1-800-UCC-HELP (1-800-822-4357) In Canada 514-640-6400  
For routine information contact your local supplier

Union Carbide Industrial Gases Inc. requests the users of this product to study this Material Safety Data Sheet (MSDS) and become aware of product hazards and safety information. To promote safe use of this product a user should (1) notify its employees, agents and contractors of the information on this MSDS and any product hazards and safety information, (2) furnish this same information to each of its customers for the product, and (3) request such customers to notify their employees and customers for the product of the same product hazards and safety information.

Revised

**UNION CARBIDE INDUSTRIAL GASES INC.  
LINDE DIVISION**

L-4574-C

THRESHOLD LIMIT VALUE: 5,000 ppm—ACGIH (1988-89).

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**EFFECTS OF A SINGLE (ACUTE) OVEREXPOSURE:**

**SWALLOWING** — A highly unlikely route of exposure. Frostbite of the lips and mouth may result from contact with the liquid.

**SKIN ABSORPTION** — No evidence of adverse effects from available information.

**INHALATION** — Asphyxiant. Moderate concentrations may cause headache, drowsiness, dizziness, stinging of the nose and throat, excitation, rapid breathing, excess salivation, vomiting, and unconsciousness. Lack of oxygen can cause death.

**SKIN CONTACT** — No harmful effect expected from vapor. Liquid may cause frostbite.

**EYE CONTACT** — Vapor may cause a stinging sensation; liquid may cause frostbite.

**EFFECTS OF REPEATED (CHRONIC) OVEREXPOSURE:** No evidence of adverse effects from available information.

**OTHER EFFECTS OF OVEREXPOSURE:** Damage to retinal ganglion cells and central nervous system may occur.

**MEDICAL CONDITIONS AGGRAVATED BY OVEREXPOSURE:** A knowledge of the available toxicology information and of the physical and chemical properties of the material suggest that overexposure is unlikely to aggravate existing medical conditions.

**SIGNIFICANT LABORATORY DATA WITH POSSIBLE RELEVANCE TO HUMAN HEALTH HAZARD EVALUATION:** None currently known. One published study has reported an increased incidence of cardiac malformations in offspring of female rats exposed for a single 24 hour interval to 6% carbon dioxide. Although the study suffers from design and reporting flaws, the results must still be considered significant. There is no information available to confirm or refute the effects reported. The relevance of this information to humans is unknown.

**EMERGENCY AND FIRST AID PROCEDURES:**

**SWALLOWING** — This product is a gas at normal temperature and pressure.

**SKIN CONTACT** — For exposure to liquid, immediately warm frostbite area with warm water (not to exceed 105°F). In case of massive exposure, remove clothing while showering with warm water. Call a physician.

**INHALATION** — Remove to fresh air. Give artificial respiration if not breathing. Give oxygen if breathing is difficult. Call a physician.

**EYE CONTACT** — In case of splash contamination, immediately flush eyes thoroughly with water for at least 15 minutes. See a physician, preferably an ophthalmologist, immediately.

**NOTE TO PHYSICIAN:** *There is no specific antidote. Treatment of overexposure should be directed at the control of symptoms and the clinical condition.*

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<b>FLASH POINT</b> (test method)	Not applicable	<b>AUTOIGNITION</b> <b>TEMPERATURE</b>	Not applicable
<b>FLAMMABLE LIMITS</b> <b>IN AIR, % by volume</b>	<b>LOWER</b> Not applicable	<b>UPPER</b> Not applicable	

**EXTINGUISHING MEDIA:** Carbon Dioxide cannot catch fire. Use media appropriate for surrounding fire.

**SPECIAL FIRE FIGHTING PROCEDURES:** Evacuate all personnel from danger area. Immediately deluge containers with water spray from maximum distance until cool, then move containers away from fire area if without risk.

**UNUSUAL FIRE AND EXPLOSION HAZARDS:** Gas cannot catch fire. Container may rupture due to heat of fire. No part of a container should be subjected to a temperature higher than 52°C (approximately 125°F). Most containers are provided with a pressure relief device designed to vent contents when they are exposed to elevated temperature.

<b>STABILITY</b>		<b>CONDITIONS TO AVOID:</b> See Section IX.
<b>UNSTABLE</b>	<b>STABLE</b>	
	X	

**INCOMPATIBILITY (materials to avoid):** Alkali metals, alkaline earth metals, metal acetylides, chromium, titanium above 550°C uranium above 750°C.

**HAZARDOUS DECOMPOSITION PRODUCTS:** In the presence of an electrical discharge, carbon dioxide is decomposed to form carbon monoxide and oxygen.

<b>HAZARDOUS POLYMERIZATION</b>		<b>CONDITIONS TO AVOID:</b> None currently known.
<b>May Occur</b>	<b>Will not Occur</b>	
	X	

#### STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED

Evacuate all personnel from danger area. Use self-contained breathing apparatus where needed. Shut off leak if without risk. Ventilate area of leak or move leaking container to well-ventilated area. Test area, especially confined areas, for sufficient oxygen content prior to permitting re-entry of personnel.

**WASTE DISPOSAL METHOD:** Slowly release into atmosphere outdoors. Discard any product, residue, disposable container or liner in an environmentally acceptable manner, in full compliance with federal, state and local regulations.

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**RESPIRATORY PROTECTION (specify type)** — Select in accordance with OSHA 29 CFR 1910.134 and ANSI Z88.2. For concentrations up to 10 times the applicable exposure limit any NIOSH/MSHA approved supplied air respirator is recommended. Up to 50 times a NIOSH/MSHA approved respirator with a full face piece or self-contained breathing apparatus is recommended. For higher concentrations use only self-contained breathing apparatus operated in the pressure-demand mode.

VENTILATION	LOCAL EXHAUST — Preferred
	MECHANICAL (general) — Acceptable
	SPECIAL — Not applicable
	OTHER — Not applicable

**PROTECTIVE GLOVES:** Insulated Neoprene

**EYE PROTECTION:** Select in accordance with OSHA 29 CFR 1910.133

**OTHER PROTECTIVE EQUIPMENT:** Metatarsal shoes for cylinder handling. Select in accordance with OSHA 29 CFR 1910.132 and 1910.133.

**CAUTION:** High pressure liquefied gas. Use piping and equipment adequately designed to withstand pressures to be encountered. Can cause rapid suffocation due to oxygen deficiency. Store and use with adequate ventilation. Close valve when not in use and when empty. Carbon dioxide, being heavier than air, tends to accumulate near the floor of an enclosed space displacing the air upward and creates an oxygen-deficient atmosphere. Ventilate space before entry. Verify sufficient oxygen concentration.

**MIXTURES:** When two or more gases, or liquefied gases are mixed, their hazardous properties may combine to create additional, unexpected hazards. Obtain and evaluate the safety information for each component before you produce the mixture. 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.

Be sure to read and understand all labels and other instructions supplied with all containers of this product.

For safety information on general handling of compressed gas cylinders, obtain a copy of pamphlet P-1, "Safe Handling of Compressed Gases in Containers" from the Compressed Gas Association, Inc., 1235 Jefferson Davis Highway, Arlington, VA 22202.

**OTHER HANDLING AND STORAGE CONDITIONS:** Never work on a pressurized system. If there is a leak, close the cylinder valve, blow down the system by venting to a safe place, then repair the leak. Store in well ventilated, cool dark place.

The opinions expressed herein are those of qualified experts within Union Carbide Industrial Gases Inc. We believe that the information contained herein is current as of the date of this Material Safety Data Sheet. Since the use of this information and these opinions and the conditions of use of the product are not within the control of Union Carbide Industrial Gases Inc., it is the user's obligation to determine the conditions of safe use of the product.

**UNION CARBIDE INDUSTRIAL GASES INC.  
LINDE DIVISION**

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