



ADDITIONAL DATA

Material Safety Data Sheet

<p>LIQUID AIR CORPORATION One California Plaza, Suite 350 2121 N. California Blvd. Walnut Creek, California 94596</p> <p>ISSUE DATE: OCTOBER 1, 1985 AND REVISIONS: CORPORATE SAFETY DEPT.</p>	<p>PRODUCT NAME Carbon Dioxide</p> <p>TELEPHONE (415) 977-6500 EMERGENCY RESPONSE INFORMATION ON PAGE 2</p> <p>TRADE NAME AND SYNONYMS Carbon Dioxide, Carbonic Anhydride</p> <p>CHEMICAL NAME AND SYNONYMS Carbon Dioxide, Carbonic Anhydride</p> <p>FORMULA CO₂</p> <p>MOLECULAR WEIGHT 44.01</p> <p>CAS NUMBER 124-38-9</p> <p>CHEMICAL FAMILY Carbonate</p>
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HEALTH HAZARD DATA

TIME WEIGHTED AVERAGE EXPOSURE LIMIT 5,000 Molar PPM. Its STEL is proposed to be changed from 15,000 Molar PPM to 30,000 Molar PPM (ACGIH, 1984-85).

SYMPTOMS OF EXPOSURE

Inhalation: Low concentrations (3-5 molar %) cause increased respiration and headache. Eight to 15 molar % concentrations cause headache, nausea and vomiting which may lead to unconsciousness if not moved to open air or given oxygen.

Higher concentrations cause rapid circulatory insufficiency leading to coma and death.

TOXICOLOGICAL PROPERTIES

Carbon dioxide is the most powerful cerebral vasodilator known. Inhaling large concentrations causes rapid circulatory insufficiency leading to coma and death. Chronic, harmful effects are not known from repeated inhalation of low (3-5 molar %) concentrations.

Rat, inhalation LC₅₀ 657,190 ppm for 15 minutes.

Rat (10 days preg.), inhalation TC_{Lo} 60,000 ppm, 24 hours teratogenic effects.

Human, inhalation TC_{Lo} 2,000 ppm pulmonary effects.

Frostbite effects are a change in the color of the skin to gray or white possibly followed by blistering.

Listed as Carcinogen	Yes <input type="checkbox"/>	I.A.R.C.	Yes <input type="checkbox"/>	OSHA	Yes <input type="checkbox"/>
or Potential Carcinogen	No <input checked="" type="checkbox"/>	Program	Monographs	No <input checked="" type="checkbox"/>	No <input checked="" type="checkbox"/>

RECOMMENDED FIRST AID TREATMENT

PROMPT MEDICAL ATTENTION IS MANDATORY IN ALL CASES OF OVEREXPOSURE TO CARBON DIOXIDE. RESCUE PERSONNEL SHOULD BE EQUIPPED WITH SELF-CONTAINED BREATHING APPARATUS.

Inhalation: Conscious persons should be assisted to an uncontaminated area and inhale fresh air. Quick removal from the contaminated area is most important. Unconscious persons should be moved to an uncontaminated area, given mouth-to-mouth resuscitation and supplemental oxygen. Assure that vomited material does not obstruct the airway by use of positional drainage. Medical assistance should be sought immediately.

Judgements as to the suitability of information herein for purchaser's purposes are necessarily purchaser's responsibility. Therefore, although reasonable care has been taken in the preparation of such information, Liquid Air Corporation makes no warranties, makes no representations, and assumes no responsibility as to the accuracy or suitability of such information for application to purchaser's particular purposes or consequences of its use. Since Liquid Air Corporation has no control over the use of this product, it assumes no liability for damage or loss of product resulting from improper use, misapplication or application of this product. Data Sheets may be changed from time to time. Be sure to consult the latest edition.

HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES

Forms carbonic acid in the presence of water.

PHYSICAL DATA

BOILING POINT Sublimation point = -109.3°F (-78.5°C)
 VAPOR PRESSURE @ 70°F (21.1°C) = 844.7psia
 SOLUBILITY IN WATER @ 68°F (20°C) Bunsen
 COEFFICIENT = .8704
 APPEARANCE AND ODOR Colorless, odorless gas.
 Specific gravity @70°F (Air = 1.0) is 1.53.

FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (METHOD USED) N/A
 AUTO IGNITION TEMPERATURE N/A
 FLAMMABLE LIMITS % BY VOLUME N/A
 ELECTRICAL CLASSIFICATION Nonhazardous
 Nonflammable, inert gas
 SPECIAL FIRE FIGHTING PROCEDURES N/A

UNUSUAL FIRE AND EXPLOSION HAZARDS N/A

REACTIVITY DATA

STABILITY Stable
 UNSTABLE
 INCOMPATIBILITY (Materials to avoid) X
 NONE
 HAZARDOUS DECOMPOSITION PRODUCTS Carbon monoxide
 HAZARDOUS POLYMERIZATION May Occur
 Will Not Occur X
 CONDITIONS TO AVOID

SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED
 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 in container or container valve, contact the closest liquid Air Corporation location.

WASTE DISPOSAL METHOD
 Do not attempt to dispose of residual or unused quantities. Return in the shipping container properly labeled, with any valve outlet plugs or caps secured and valve protection cap in place to liquid Air Corporation for proper disposal. For emergency disposal, contact the closest liquid Air Corporation location.

EMERGENCY RESPONSE INFORMATION
 IN CASE OF EMERGENCY INVOLVING THIS MATERIAL, CALL DAY OR NIGHT (800) 231-1366
 OR CALL CHEMTREC AT (800) 424-9300

SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (Specify type) Positive pressure air line with mask or self-contained breathing apparatus should be available for emergency use.
 VENTILATION Local exhaust to prevent accumulation above the TWA.
 PROTECTIVE GLOVES See local exhaust
 ANY MATERIAL ABOVE PROTECTION MECHANICAL (Gen.)
 SAFETY GOGGLES OR GLASSES OTHER
 OTHER PROTECTIVE EQUIPMENT
 Safety shoes

SPECIAL PRECAUTIONS*

SPECIAL LABELING INFORMATION
 DOT Shipping Name: Carbon Dioxide DOT Hazard Class: Nonflammable gas
 DOT Shipping Label: Nonflammable gas I.D. No.: UN 1013
 SPECIAL HANDLING RECOMMENDATIONS
 Use only in well-ventilated areas. Valve protection caps must remain in place unless container is secured with valve outlet piped to use point. Do not drag, slide or roll cylinders. Use a suitable hand truck for cylinder movement. Use a pressure reducing regulator when connecting cylinder to lower pressure (<1500 psig) piping or systems. Do not heat cylinder by any means to increase the discharge rate of product from the cylinder. Use a check valve or trap in the discharge line to prevent hazardous back flow into the cylinder.

For additional handling recommendations consult 'Air Liquide's Encyclopedia de Gaz or Compressed Gas Association Pamphlet P-1
SPECIAL STORAGE RECOMMENDATIONS
 Protect cylinders from physical damage. Store in cool, dry, well-ventilated area away from heavily trafficked areas and emergency exits. Do not allow the temperature of cylinders to exceed 130° (54C). Cylinders should be stored upright and firmly secured to prevent falling or being knocked over. Full and empty cylinders should be segregated. Use a "first in-first out" inventory system to prevent full cylinders being stored for excessive periods of time.

Do not store cylinders in sub-surface or closed areas. Carbon dioxide is heavier than air and leaking gas could accumulate in low areas and cause suffocation.
 For additional storage recommendations consult 'Air Liquide's Encyclopedia de Gaz or Compressed Gas Association Pamphlet P-1
SPECIAL PACKAGING RECOMMENDATIONS
 Dry carbon dioxide can be handled with most common structural materials. Moist carbon dioxide is corrosive by its formation of carbonic acid. For these applications, 316, 309 and 310 stainless steels may be used as well as Hastelloy A, B & C and Monel. Ferrous nickel alloys are slightly corroded.
 At normal temperatures carbon dioxide is compatible with most plastics and elastomers.

OTHER RECOMMENDATIONS OR PRECAUTIONS

Compressed gas cylinders should not be refilled except by qualified producers of compressed gases. Shipment of a compressed gas cylinder which has not been filled by the owner or with his (written) consent is a violation of Federal Law (49CFR).

*Various Government agencies (i.e. Department of Transportation, Occupational Safety and Health Administration, Food and Drug Administration and others) may have specific regulations concerning the transportation, handling, storage or use of this product, which may not be contained herein. The customer or user of this product should be familiar with these regulations.