

1216



CARDOX® CORPORATION
DIVISION OF LIQUID AIR CORPORATION

Material Safety Data Sheet

	PRODUCT NAME Carbon Dioxide, Refrigerated Liquid	
	TELEPHONE (415) 977-6500 EMERGENCY RESPONSE INFORMATION ON PAGE 2	
CARDOX CORPORATION DIVISION OF LIQUID AIR CORPORATION One California Plaza, Suite 350 2121 N. California Blvd. Walnut Creek, California 94596	TRADE NAME AND SYNONYMS See last page.	CAS NUMBER 124-38-9
	CHEMICAL NAME AND SYNONYMS Carbon Dioxide, Carbonic Anhydride	
ISSUE DATE OCTOBER 1, 1985 AND REVISIONS CORPORATE SAFETY DEPT.	FORMULA CO ₂	MOLECULAR WEIGHT 44.01 CHEMICAL FAMILY Carbonate

HEALTH HAZARD DATA (SEE NOTE ON LAST PAGE)

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 Nervous system control of respiration is dependent on the CO ₂ level breathed in air. By reducing the oxygen level in air, CO ₂ can cause suffocation. Symptoms of overexposure include headache, dizziness, shortness of breath, muscular weakness, drowsiness and ringing in the ears. High concentrations produce a faint acid taste and can cause paralysis of the breathing control centers of the nervous system: 2% by volume in the atmosphere will cause a 50% increase in breathing rate; 3%, a 100% rate increase; >4% produces labored breathing and is dangerous for even a few (continued on last page)
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 LCLo 657,190 ppm for 15 minutes. Rat (10 days preg.), inhalation TCLo 60,000 ppm, 24 hours teratogenic effects. Human, inhalation TCLo 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 or Potential Carcinogen National Toxicology Program Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> I.A.R.C. Monographs Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> OSHA Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
RECOMMENDED FIRST AID TREATMENT PROMPT MEDICAL ATTENTION IS MANDATORY IN ALL CASES OF OVER-EXPOSURE 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. Frostbite: Flush affected areas with lukewarm water. DO NOT USE HOT WATER. A physician should see the patient promptly if the cryogenic "burn" has resulted in blistering of the dermal surface or deep tissue freezing.

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, Cardox Corporation extends no warranties, makes no representations, and assumes no responsibility as to the accuracy or suitability of such information for application to purchaser's intended purposes or consequences of its use. Since Cardox Corporation has no control over the use of this product, it assumes no liability for damage or loss of product resulting from proper (or improper) use or application of the 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. See REACTIVITY DATA Section.

PHYSICAL DATA

BOILING POINT Sublimation point = -109.3°F (-78.5°C)	LIQUID DENSITY AT BOILING POINT @ 0°F Liquid Density = 63.65 lb/ft ³ (1020 kg/m ³)
VAPOR PRESSURE @ 70°F (21.1°C) = 844.7 psia (5824 kPa)	GAS DENSITY AT 70°F 1 atm @ 70°F (21.1°C) = .1144 lb/ft ³ (1.832 kg/m ³)
SOLUBILITY IN WATER @68°F (20°C) Bunsen Coefficient = .8704	FREEZING POINT -69.83°F (-56.57°C) @ 75.1 psia (518 kPa)
APPEARANCE AND ODOR Colorless, odorless gas.	

FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (METHOD USED) N/A	AUTO IGNITION TEMPERATURE N/A	FLAMMABLE LIMITS % BY VOLUME N/A
EXTINGUISHING MEDIA Nonflammable, inert gas.		ELECTRICAL CLASSIFICATION Nonhazardous.
SPECIAL FIRE FIGHTING PROCEDURES Extinguishing media: Use water spray to cool fire-exposed containers to prevent rupture. This material is non-combustible. It can be used as a fire extinguishing agent primarily for its smothering effect (reduction of oxygen concentration to the point where the immediate atmosphere cannot support combustion).		
UNUSUAL FIRE AND EXPLOSION HAZARDS It is not effective for use on fires involving chemicals that have their own oxygen supply (i.e., cellulose nitrate); or on fires involving reactive metals (such as, potassium, sodium, magnesium, aluminum, titanium, and zirconium), or their hydrides as these materials can decompose carbon dioxide.		

REACTIVITY DATA

STABILITY Unstable	CONDITIONS TO AVOID CO ₂ is stable under ordinary conditions of use and storage. It does not polymerize. It does cause violent
Stable X	polymerization of acrylaldehyde or ethyleneimine. It decomposes to CO and O ₂ when heated above (continued on last page)
INCOMPATIBILITY (Materials to avoid) An explosion can occur when CO ₂ contacts mixtures of sodium peroxide with aluminum or magnesium. Reactive metals (continued on last page)	
HAZARDOUS DECOMPOSITION PRODUCTS Carbon monoxide.	
HAZARDOUS POLYMERIZATION May Occur	CONDITIONS TO AVOID
Will Not Occur X	

SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED Evacuate area of major spill or release of CO ₂ . Notify safety personnel. Provide ventilation. Clean-up personnel need special training and protection against contact with very cold materials or excessive inhalation of gaseous CO ₂ .
WASTE DISPOSAL METHOD Allow gas to bleed off at a moderate rate or solid to sublime to a well ventilated area.

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