

**HONG KONG SPECIALTY GASES CO., LTD.**

2/F., Blk. B, Wing Cheong Fty. Bldg., 121 King Lam St.,
Cheung Sha Wan, Kln., Hong Kong.

MATERIAL
SAFETY
DATA SHEET

PRODUCT NAME Carbon Dioxide	CAS# 124-38-9
TRADE NAME AND SYNONYMS Carbon Dioxide; Carbonic Anhydride	DOT I.D. NO. UN 1013
CHEMICAL NAME AND SYNONYMS Carbon Dioxide	DOT HAZARD CLASS Division 2.2
ISSUE DATE AND REVISIONS Revised March 2001	FORMULA CO ₂
	CHEMICAL FAMILY Carbonate

HEALTH HAZARD DATA

TIME WEIGHTED AVERAGE EXPOSURE LIMIT 5000 Molar PPM; STEL=30000 Molar PPM(ACGIH 1990-1991). OSHA 1989 TWA=10000 Molar PPM; STEL=30000 Molar PPM.
SYMPTOMS OF EXPOSURE <u>Inhalation:</u> Low concentrations (3-5 molar %) cause increased respiration and headache. High concentrations (>15 molar %) 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 concentrations. Carbon Dioxide is not listed in the IARC, NTP or by OSHA as a carcinogen or potential carcinogen. Persons in ill health where such illness would be aggravated by exposure to Carbon Dioxide should not be allowed to work with or handle this product.
RECOMMENDED FIRSTAID TREATMENT PROMPT MEDICAL ATTENTION IS MANDATORY IN ALL CASES OF OVEREXPOSURE TO CARBON DIOXIDE. RESCUE PERSONNEL SHOULD BE EQUIPPED WITH SELF-CONTAINED BREATHING APPARATUS. <u>Inhalation:</u> 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 assisted respiration and supplemental oxygen. Further treatment should be symptomatic and supportive.

HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES

Forms carbonic acid in the presence of water.

PHYSICAL DATA

BOILING POINT -78.5°C	CRITICAL TEMPERATURE 31.0°C
VAPOR PRESSURE (21.1°C) 5900kPa	CRITICAL PRESSURE 73.82 bar abs
SOLUBILITY IN WATER Very Soluble	CRITICAL VOLUME 2.137dm ³ /kg
EVAPORATION RATE N/A	SPECIFIC GRAVITY (AIR=1) 1.65 at 21.1°C
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 LEL N/A UEL N/A	
EXTINGUISHING MEDIA Nonflammable, inert gas		ELECTRICAL CLASSIFICATION Nonhazardous	
SPECIAL FIRE FIGHTING PROCEDURES N/A			
UNUSUAL FIRE AND EXPLOSION HAZARDS If cylinders are involved in a fire, safely relocate or keep cool with water spray.			

REACTIVITY DATA

STABILITY		CONDITIONS TO AVOID	
Unstable		N/A	
Stable	X		
INCOMPATIBILITY (Materials to avoid) None			
HAZARDOUS DECOMPOSITION PRODUCTS Carbon Monoxide			
HAZARDOUS POLYMERIZATION		CONDITIONS TO AVOID	
May Occur		N/A	
Will Not Occur	X		

SPECIAL PROTECTION INFORMATION

RESPIRTORY PROTECTION (Specify type) Positive pressure air line with mask or self-contained breathing apparatus should be available for emergency use.	
VENTILATION See Local Exhaust	SPECIAL N/A
MECHANICAL (Gen.) N/A	OTHER N/A
LOCAL EXHAUST To prevent accumulation of high concentrations so as to reduce the oxygen level in the air to less than 18 molar percent.	
PROTECTIVE GLOVES Any material	
EYE PROTECTION Safety goggles or glasses	
OTHER PROTECTIVE EQUIPMENT Safety shoes	

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 container or container valve, contact HSG for special advice.

WASTE DISPOSAL METHOD

Do not attempt to dispose of waste 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 your supplier. For emergency disposal assistance, contact HSG for special advice.

SPECIAL PRECAUTIONS*

SPECIAL LABELING INFORMATION

DOT Shipping Name: Carbon Dioxide

DOT Shipping Label: Nonflammable Gas

DOT Hazard Class: Division 2.2

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 (<3,000 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.

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 where cylinders are stored to exceed 125°F (52°C). 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.

SPECIAL PACKING 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, stainless steels may be used.

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 Law.

Information contained in this material safety data sheet is offered without charge for use by technically qualified personnel at their discretion and risk. All statements, technical information and recommendations contained herein are based on tests and data which we believe to be reliable, but the accuracy or completeness thereof is not guaranteed no warranty of any kind is made with respect thereto. This information is not intended as a license to operate under or a recommendation to practice or infringe any patent of this Company or others covering any process, composition of matter or use.

Since the Company shall have no control of the use of the product described herein, the Company assumes no liability for loss or damage incurred from the proper or improper use of such product.