



Material Safety Data Sheet

		PRODUCT NAME Carbon monoxide	
		TELEPHONE (415) 977-8500 EMERGENCY RESPONSE INFORMATION ON PAGE 3	
LIQUID AIR CORPORATION ALPHAGAZ DIVISION One California Plaza, Suite 350 2121 N. California Blvd. Walnut Creek, California 94596	TRADE NAME AND SYNONYMS Carbon monoxide		CAS NUMBER: 630-08-0
	CHEMICAL NAME AND SYNONYMS Carbon monoxide		
ISSUE DATE OCTOBER 1, 1985 AND REVISIONS CORPORATE SAFETY DEPT.	FORMULA CO	MOLECULAR WEIGHT 28.0	CHEMICAL FAMILY Nonmetal oxide

HEALTH HAZARD DATA

TIME WEIGHTED AVERAGE EXPOSURE LIMIT

50 Molar PPM; STEL = 400 Molar PPM (ACGIH, 1984-85)

SYMPTOMS OF EXPOSURE Depending on levels and duration of exposure, symptoms may include headache, dizziness, heart palpitations, weakness, confusion and nausea to convulsions, eventual unconsciousness and death.

Because it is a colorless and odorless poisonous gas, there is no warning of its presence other than the above symptoms. Analytical monitors, with alarms, should be employed where the possibility of the release of toxic quantities exists.

TOXICOLOGICAL PROPERTIES The oxygen transport function of the hemoglobin of the blood is reduced since it reacts with inhaled carbon monoxide to form carboxy hemoglobin instead of its normal reaction with the oxygen in the lungs to form oxyhemoglobin. The affinity of hemoglobin for carbon monoxide is 200-300 times greater than its affinity for oxygen.

All of the disorders are due to the markedly reduced cellular respiration and may include central nervous system impairment, cardiovascular collapse, renal insufficiency, coma, etc.

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"/>
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RECOMMENDED FIRST AID TREATMENT

PROMPT MEDICAL ATTENTION IS MANDATORY IN ALL CASES OF OVEREXPOSURE TO CARBON MONOXIDE. RESCUE PERSONNEL SHOULD BE EQUIPPED WITH SELF-CONTAINED BREATHING APPARATUS AND BE COGNIZANT OF EXTREME FIRE AND EXPLOSION HAZARD.

Inhalation: Conscious persons should be assisted to an uncontaminated area and be treated with supplemental oxygen. Quick removal from the contaminated area is most important. Unconscious persons should be moved to an uncontaminated area and be given artificial respiration and oxygen at the same time. The administering of the oxygen at an elevated pressure (up to 2 - 2.5 atmospheres) has shown to be beneficial as has treatment in a hyperbaric chamber. The physician should be informed that the patient has inhaled toxic quantities of carbon monoxide.

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HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES

Carbon monoxide is flammable in air over a very wide range. It reacts violently with oxygen difluoride and barium peroxide.

PHYSICAL DATA

BOILING POINT -312.75°F (-191.53°C)	LIQUID DENSITY AT BOILING POINT 49.23 lb/ft ³ (688.6 kg/m ³)
VAPOR PRESSURE @ 70°F (21.1°C) above the critical temp. of -220.4°F (-140.24°C)	GAS DENSITY AT 70°F 1 atm 0.072 lb/ft ³ (1.15 kg/m ³)
SOLUBILITY IN WATER @ 68°F (20°C) Bunsen coefficient = 0.0265	FREEZING POINT -337.02°F (-205.01°C)
APPEARANCE AND ODOR Colorless, odorless gas. Specific gravity @70°F (Air = 1.0) is .96.	

FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (METHOD USED) Gas	AUTO IGNITION TEMPERATURE 1166°F (630°C)	FLAMMABLE LIMITS % BY VOLUME LEL = 12.5 UEL = 74.0
EXTINGUISHING MEDIA Water, dry chemical, carbon dioxide	ELECTRICAL CLASSIFICATION Class I, Group C	
SPECIAL FIRE FIGHTING PROCEDURES If possible, stop the flow of carbon monoxide. Use water spray to cool surrounding containers.		
UNUSUAL FIRE AND EXPLOSION HAZARDS Carbon monoxide has almost the same density as air. It will not diffuse by rising as with some lighter flammables such as hydrogen or natural gas (methane).		

REACTIVITY DATA

STABILITY Unstable	CONDITIONS TO AVOID
Stable	X
INCOMPATIBILITY (Materials to avoid) Oxidizers	
HAZARDOUS DECOMPOSITION PRODUCTS None	
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 all personnel from affected area. If leak is in user's equipment, be certain to attempt repairs. If leak is in container, Liquid Air Corporation location.	Use appropriate protective equipment. If purge piping with an inert gas prior to or container valve, contact the closest
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) 261-1366
OR CALL CHEMTREC AT (800) 424-9300

RESPIRATORY PROTECTION (Specify type) Positive pressure air line with mask or self-contained breathing apparatus should be available for emergency use.		
VENTILATION Hood with forced ventilation	LOCAL EXHAUST To prevent accumulation above the TWA	SPECIAL
	MECHANICAL (Gen.) In accordance with electrical codes.	OTHER
PROTECTIVE GLOVES Plastic or rubber		
EYE PROTECTION Safety goggles or glasses		
OTHER PROTECTIVE EQUIPMENT Safety shoes, safety shower		

SPECIAL PRECAUTIONS*

SPECIAL LABELING INFORMATION	
DOT Shipping Name: Carbon monoxide	DOT Hazard Class: Flammable gas
DOT Shipping Label: Flammable gas	I.D. No.: UN 1016

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 (<2,000 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.

For additional handling recommendations consult L'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 of non-combustible construction away from heavily trafficked areas and emergency exits. Do not allow the temperature where cylinders are stored to exceed 130F (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. Post "No Smoking or Open Flames" signs in the storage or use area. There should be no sources of ignition in the storage or use area.

For additional storage recommendations consult L'Air Liquide's Encyclopedia de Gaz or Compressed Gas Association Pamphlet P-1.

SPECIAL PACKAGING RECOMMENDATIONS

Carbon monoxide can be handled in all commonly used metals up to approximately 500 psig (3450 kPa). Above that pressure it forms toxic and corrosive carbonyl compounds with some metals. Consult L'Air Liquide's Encyclopedie des Gaz for information on metals to use with high pressure carbon monoxide.

OTHER RECOMMENDATIONS OR PRECAUTIONS

Earth-ground and bond all lines and equipment associated with the carbon monoxide system. Electrical equipment should be non-sparking or explosion proof. 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 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