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MATERIAL SAFETY DATA SHEET

No. 88

<b>PRODUCT NAME</b> 40% Carbon Dioxide in Carbon Monoxide	<b>CAS #</b> Carbon Dioxide = 124-38-9 Carbon Monoxide = 630-08-0
<b>TRADE NAME AND SYNONYMS</b> Compressed gas, flammable, n.o.s.(D.O.T.); Furnace atmosphere mixture	<b>DOT I.D. No.:</b> UN 1954
<b>CHEMICAL NAME AND SYNONYMS</b> 40 Molar % Carbon Dioxide in Carbon Monoxide	<b>DOT Hazard Class:</b> Division 2.1
<b>ISSUE DATES AND REVISIONS</b> Revised January 1995	<b>Formula</b> 40 Molar % CO <sub>2</sub> in CO
	<b>Chemical Family:</b> Gas Mixture

### HEALTH HAZARD DATA

<p><b>TIME WEIGHTED AVERAGE EXPOSURE LIMIT</b>                  Carbon monoxide is the more hazardous component in the mixture. It's TWA is 25 Molar PPM (ACGIH 1994-1995). OSHA 1993 PEL (8 Hr. TWA) for CO = 50 Molar PPM. SYMPTOMS OF EXPOSURE For carbon monoxide</p>
<p><b>SYMPTOMS OF EXPOSURE</b>                  Depending on levels and duration of exposure, symptoms may include headache, dizziness, heart palpitations, weakness, confusion and nausea to convulsions, eventual unconsciousness and death. (Continued on Page 4)</p>
<p><b>TOXICOLOGICAL PROPERTIES</b>                  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. (Continued on Page 4)</p>
<p><b>RECOMMENDED FIRST AID TREATMENT</b>                  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.  <u>Inhalation:</u> 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, given assisted respiration and supplemental 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.</p>

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 and 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.  
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40% CARBON DIOXIDE IN CARBON MONOXIDE

**HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES**

The mixture is flammable in air.

**PHYSICAL DATA**

BOILING POINT See Page 4	LIQUID DENSITY AT BOILING POINT See Page 4
VAPOR PRESSURE See Page 4	GAS DENSITY AT 70°F, 1 atm .0928 lb/ft <sup>3</sup> (1.487 kg/m <sup>3</sup> )
SOLUBILITY IN WATER CO <sub>2</sub> = Soluble CO = Very slightly	FREEZING POINT See Page 4
EVAPORATION RATE N/A (Gas)	SPECIFIC GRAVITY (AIR=1) @ 70°F (21.1°C) = 1.24
APPEARANCE AND ODOR Colorless, odorless gas	

**FIRE AND EXPLOSION HAZARD DATA**

FLASH POINT (Method used) N/A (Gas)	AUTO IGNITION TEMPERATURE Unknown	FLAMMABLE LIMITS % BY VOLUME (See Page 4) LEL 12.5 UEL 75
EXTINGUISHING MEDIA Water, dry chemical, carbon dioxide		ELECTRICAL CLASSIFICATION Class 1, Group C
SPECIAL FIRE FIGHTING PROCEDURES If possible, stop the flow of burning gas. Use water spray to cool surrounding containers.		
UNUSUAL FIRE AND EXPLOSION HAZARDS None		

**REACTIVITY DATA**

STABILITY Unstable		CONDITIONS TO AVOID None
Stable	X	
INCOMPATIBILITY (Materials to avoid) Oxidizers		
HAZARDOUS DECOMPOSITION PRODUCTS None		
HAZARDOUS POLYMERIZATION May Occur		CONDITIONS TO AVOID
Will Not Occur	X	None

**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 your closest supplier location or call the emergency telephone number listed herein.
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 your closest supplier location or call the emergency telephone number listed herein.

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**SPECIAL PROTECTION INFORMATION**

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

**SPECIAL PRECAUTIONS\***

<b>SPECIAL LABELING INFORMATION</b> DOT Shipping Name: Compressed gas, flammable, n.o.s. DOT Hazard Class: Division 2.1 DOT Shipping Label: Flammable Gas I.D. No.: UN 1954
<b>SPECIAL HANDLING RECOMMENDATIONS</b> 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.  For additional handling recommendations, consult Compressed Gas Association's Pamphlet P-1.
<b>SPECIAL STORAGE RECOMMENDATIONS</b> Protect cylinders from physical damage. Store in cool, dry, well-ventilated area of noncombustible construction away from heavily trafficked areas and emergency exits. Do not allow the temperature where cylinders are stored to exceed 125F (52C). 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 Compressed Gas Association's Pamphlet P-1.
<b>SPECIAL PACKAGING RECOMMENDATIONS</b> At lower pressures this gas mixture may be handled in any common structural material. Above 500 psig (3450 kPa) carbon monoxide forms toxic and corrosive carbonyl compounds with some metals.
<b>OTHER RECOMMENDATIONS OR PRECAUTIONS</b> Earth-ground and bond all lines and equipment associated with the gas mixture 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 or with his (written) consent is a violation of Federal Law (49CFR). (Continued on Page 4)

\*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 will not be reflected in this data sheet. The customer should review these regulations to ensure that he is in full compliance.

## 40% CARBON DIOXIDE IN CARBON MONOXIDE

### SYMPTOMS OF EXPOSURE: (Continued)

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: (Continued)

The State of California has listed carbon monoxide as a compound which is known to cause developmental reproductive toxicity.

Neither carbon dioxide or carbon monoxide are 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 this mixture should not be allowed to work with or handle this product.

### PHYSICAL DATA

BOILING POINT: CO<sub>2</sub> (Sublimation Point) = -109.3°F (-78.5°C)  
CO = -312.7°F (-191.5°C)

LIQUID DENSITY AT BOILING POINT: CO<sub>2</sub> (Solid Density) = 97.5 lb/ft<sup>3</sup> (1562 kg/m<sup>3</sup>)  
CO = 49.5 lb/ft<sup>3</sup> (793 kg/m<sup>3</sup>)

VAPOR PRESSURE: @ 70°F (21.1°C) - CO<sub>2</sub> = 856 psia (5900 kPa)  
CO = Above the critical temperature

FREEZING POINT: CO<sub>2</sub> = -69.8°F (-56.6°C) @ 75.1 psia (518 kPa)  
CO = -337.1°F (-205.1°C)

### SPECIAL PRECAUTIONS

#### OTHER RECOMMENDATIONS OR PRECAUTIONS: (Continued)

Always secure cylinders in an upright position before transporting them. NEVER transport cylinders in trunks of vehicles, enclosed vans, truck cabs or in passenger compartments. Transport cylinders secured in open flatbed or in open pick-up type vehicles.

Reporting under SARA, Title III, Section 313 not required.

NFPA 704 NO. for this mixture = 2 4 0 None