NorLAB
A DIVISION OF NORCO, INC.

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Or Norco (208) 336-1643

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Carbon Monoxide in Air 0.0001% to 6.0%

MATERIAL SAFETY DATA SHEET

Identification

Product Name: Carbon Monoxide in Air 0.0001% to 6.0%
CAS Number: N/A
Chemical Family: Gas Mixture
Chemical Formula: N/A
Synonyms: N/A
MSDS Identification Code/Number: NLB 2060
Prepared By: Quality Dept.

Revision Date: 02/09/05
Last Review Date: 02/16/11

Composition, Information on Ingredients

Exposure Limits[1]:

INGREDIENT	% VOLUME	PEL-OSHA[2]	TLV-ACGIH[3]	LD_{50} or LC_{50} Route/Species
Air Formula: N/A CAS Number: N/A RTECS #: N/A	94.0 to 99.999%	Not Applicable	Not Applicable	Not Applicable
Carbon Monoxide Formula: CO CAS Number: 630-08-0 RTECS#: FG3500000	0.0001% to 6.0%	50 PPM TWA	25 PPM TWA	LC_{50} 3760 ppm Inhalation/rat 1 Hr. time adj.

[1] Refer to individual state or provincial regulations, as applicable, for limits that may be more stringent than those listed here.
[2] As stated in 29 CFR 1910, Subpart Z (revised July 1, 1993).
[3] As stated in the ACGIH 2007 Threshold Limit Values for Chemical Substances and Physical Agents.

OSHA Regulatory Status: This material is classified as hazardous under OSHA regulations.
IDLH: 1200 PPM

Hazards Identification

Emergency Overview:
Nonflammable, colorless, odorless gas. This product contains up to 6% carbon monoxide. Inhalation of carbon monoxide can reduce the ability of the blood to carry oxygen to the body and may adversely affect fetal development. Effects depend on the level of exposure and may include headaches, dizziness, convulsions, loss of consciousness and death. Product contains sufficient oxygen to support respiration and combustion. Contents under pressure. Use and store below 125^0F. (52^0C).

Route of Entry:

Skin Contact	Skin Absorption	Eye Contact	Inhalation	Ingestion
No	No	No	Yes	No

Hazards Identification Continued

Health Effects:

Exposure Limits Yes	Irritant No	Sensitization No
Teratogen Yes	Reproductive Hazard Yes	Mutagen Yes
Synergistic Effects None reported.		

Carcinogenicity: NTP: No IARC: No OSHA: No

Eye Effects:
Contact with rapidly expanding gas near the point of release may cause frostbite.

Skin Effects:
Contact with rapidly expanding gas near the point of release may cause frostbite with redness, skin color change to gray or white, and blistering.

Ingestion Effects:
None known. Ingestion is unlikely as product is a gas at room temperature.

Inhalation Effects:
This product contains up to 6% carbon monoxide. Inhalation of relative high concentrations of this gas may cause symptoms of carbon monoxide exposure.

Carbon monoxide is a chemical asphyxiant. Inhaled carbon monoxide binds with blood hemoglobin to form carboxyhemoglobin. Carboxyhemoglobin cannot take part in normal oxygen transport, greatly reducing the blood's ability to transport oxygen. Depending on concentration of carbon monoxide and duration of exposure, symptoms may include headache, dizziness, heart palpitations, weakness, confusion, nausea, and even convulsions, eventual unconsciousness and death. Lack of oxygen from carbon monoxide over exposure may produce immediate as well as delayed neurological effects. Carbon monoxide may also adversely affect fetal development.

Medical Conditions Aggravated by Exposure:
None known. Recovery from carbon monoxide may be adversely affected by obesity, alcoholism, and chronic heart disease.

Potential Environmental Effects:
Ecotoxicity values were unavailable. Toxic effects are expected to be similar to those seen in humans and test animals.

NFPA Hazard Codes		**HMIS Hazard Codes**		**Ratings System**
Health:	0	Health:	0	0 = No Hazard
Flammability:	0	Flammability:	0	1 = Slight hazard
Instability:	0	Physical Hazard:	3	2 = Moderate Hazard
				3 = Serious Hazard
				4 = Severe Hazard

Hazard ratings were assigned in accordance with Compressed Gas Association (CGA) guidelines as published in CGA Pamphlet P-19-2009, *CGA Recommended Hazard Ratings for Compressed Gases, 3rd Edition.*

First Aid Measures

Eye:
None required for gas. If frostbite is suspected, flush eyes with cool water for 15 minutes and obtain immediate medical attention.

Skin:
None required for gas. For frostbite, immerse skin in lukewarm water. DO NOT USE HOT WATER. Obtain immediate medical attention.

First Aid Measures Continued

Ingestion:
None required

Inhalation:
PROMPT REMOVAL FROM THE CONTAMINATED AREA AND IMMEDIATE MEDICAL ATTENTION IS MANDATORY IN ALL CASES OF OVEREXPOSURE. RESCUE PERSONNEL SHOULD BE EQUIPPED WITH SELF-CONTAINED BREATHING APPARATUS. 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 to 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.

Fire Fighting Measures

Conditions of Flammability: Not flammable		
Flash point: None	Method: Not Applicable	Autoignition Temperature: None
LEL (%): 12.5% for Carbon Monoxide	UEL (%): 74.0% for Carbon Monoxide	
Hazardous combustion products: None		
Sensitivity to mechanical shock: None		
Sensitivity to static discharge: None		

Fire and Explosion Hazards:
Nonflammable This product contains concentrations of carbon monoxide (up to 6.0%) below the LEL of 12.5% for carbon monoxide in air. This gas mixture contains sufficient oxygen to support combustion. Cylinder may vent rapidly or rupture violently from pressure when involved in a fire situation.

Extinguishing Media:
None Required. Use media appropriate for surrounding materials.

Fire Fighting Instructions:
If possible, stop the flow of gas supply. Use water spray to cool adjacent cylinders and areas well after flames are extinguished. Firefighters should wear respiratory protection (SCBA) and full turnout or Bunker gear.

Accidental Release Measures

Evacuate all personnel from affected area. Use appropriate protective equipment. Stop the flow of gas or remove cylinder to outdoor location if this can be done without risk. Ventilate enclosed areas. If a 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 appropriate emergency telephone number listed in Section 1 or call your closest Norco/NorLab location.

Handling and Storage

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. Carbon steels, aluminum alloys, copper and copper alloys, low carbon stainless steels and nickel-based alloys such as Hastelloy A, B & C are recommended for higher pressure applications.

Use only in well ventilated areas. Valve protection caps must remain in place unless cylinder is secured with valve outlet piped to use point. Do no drag, slide, or roll cylinders. Use a suitable hand truck for cylinder movement. Use a pressure regulator when connecting cylinder to lower pressure (, 3000 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.

Protect cylinders from physical damage. Store in cool, dry, well-ventilated area of non-combustible construction, away from heavy traffic areas and emergency exits. Do not allow the temperature where cylinders are stored to exceed 125^0F (52^0C). Cylinders should

Handling and Storage Continued

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 from being stored for excessive periods of time. Post "NO SMOKING OR OPEN FLAMES" signs in the storage or use area.

For additional recommendations, consult Compressed Gas Association's Pamphlet P-1.

Exposure Controls, Personal Protection

Engineering Controls:
Use local exhaust to prevent accumulation above the exposure limit. Use general mechanical ventilation in accordance with electrical codes.

Eye/Face Protection:
Safety goggles or glasses

Skin Protection:
Protective gloves made of any suitable material

Respiratory Protection:
For emergency release, use a positive pressure NIOSH approved air-supplying respirator system (SCBA or airline/escape bottle) using at a minimum Grade D air.

Other/General Protection:
Safety shoes, safety shower, eyewash "fountain"

Physical and Chemical Properties

PARAMETER	VALUE	UNITS
Physical state (gas, liquid, solid)	: Gas	
Vapor pressure	: Not Available	
Vapor density (Air = 1)	: ~ 1	
Evaporation point	: Not Available	
Boiling point	: Not Available	^{O}F
	: Not Available	^{O}C
Freezing point	: Not Available	^{O}F
	: Not Available	^{O}C
pH	: Not Available	
Specific gravity	: Not Available	
Oil/water partition coefficient	: Not Available	
Solubility (H_2O)	: Very slight	
Odor threshold	: Not Applicable	
Odor and appearance	: Colorless, odorless gas.	

Stability and Reactivity

Stability:
Stable

Incompatible Materials:
None known

Hazardous Decomposition Products:
None known

Hazardous Polymerization:
Will not occur

Toxicological Information

Inhalation:
The 4 hour LC 50 for carbon monoxide is 1807 ppm (rat)

Skin and Eye:
Does not cause skin or eye irritation.

Other:
Mice exposed to concentrations of carbon monoxide at 65 ppm and higher demonstrated dose-dependent effects on the fetus (i.e.: increased mortality and decreased weight) with no signs of maternal toxicity. Off spring of rats exposed to 150 ppm carbon monoxide had minor reductions in birth weight and persistent memory deficits which became more pronounced in adulthood. Fetal carboxyhemogolbin levels are generally 10 – 15% higher than maternal levels. Overexposure to carbon monoxide may also decrease the likelihood of successful pregnancy. In rats treated with carbon monoxide, the rate of successful pregnancy in the control group was 1005 whereas the rate of successful pregnancy in animals treated with 30 and 90 ppm carbon monoxide was 69% and 38% respectively.

Genetic changes were observed in mammalian cell assay systems at exposures of 1500 to 2500 ppm carbon monoxide for 10 minutes and degenerative changes to the brain were noted in rats chronically exposed to 26 ppm (30 mg/m^3).

Ecological Information

Product does not contain Class I or Class II ozone depleting substances. Not highly toxic. Will not bioconcentrate.

Disposal Considerations

Do not attempt to dispose of waste or unused quantities in returnable cylinders. Return in the shipping container, *properly labeled, with any valve outlet plugs or caps secure and valve protection cap in place* to NorLab for proper disposal. Non-refillable containers should be vented in a well-ventilated area then disposed of in compliance with local regulations, or returned to NorLab.

Transportation Information

Parameter	United States DOT	Canada TDG
Proper Shipping Name:	Compressed Gases, N.O.S., (Carbon Monoxide, Air)	Compressed Gases, N.O.S.
Hazard Class:	2.2	2.2
Identification Number:	UN 1956	UN 1956
Shipping Label:	Non-flammable Gas	Non-flammable Gas

Regulatory Information

SARA Title III Notifications and Information:

SARA Title III – Hazard Classes:
Acute Health Hazard
Sudden Release of Pressure Hazard

SARA Title III- Section 313 Supplier Notification:
This product does not contain toxic chemicals subject to the reporting requirements of section 313 of the Emergency Planning and Community Right-To-Know Act (EPCRA) of 1986 and 40 CFR 372.

California Proposition 65:
This product contains ingredient(s) (carbon monoxide) known to the State of California to cause birth defects or other reproductive harm.

Other Information

Compressed gas cylinders must not be refilled without the express written permission of the owner. Shipment of a compressed gas cylinder which has not been filled by the owner or with his/her (written) consent is a violation of transportation regulations.

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