



Emergency Contact: Chemtrec (800) 424-9300
Or Norco (208) 336-1643

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Carbon Monoxide 1 PPM to 1000 PPM, Iso-Pentane 0.0001% to 0.75%, Oxygen 2.0% to 23% in Nitrogen

MATERIAL SAFETY DATA SHEET

Identification

Product Name: Carbon Monoxide 1 to 1000 PPM, Iso-Pentane 0.0001% to 0.75%, Oxygen 2.0% to 23% in Nitrogen

Chemical Name: Not Applicable

Chemical Family: Gas Mixture

CAS Number: N/A

Common Names/Synonyms: Calibration Gas, Bump gas, Cal Gas Mixture, Three Part Mix.

Revision Date: 05/06/04

MSDS Identification Code/Number: 2260

Last Review Date: 07/10/08

Created by: Quality Dept.

Composition, Information on Ingredients

Exposure Limits¹:

Ingredient	% Volume	PEL-OSHA ²	TLV-ACGIH ³	LD ₅₀ or LC ₅₀ Route/Species
Carbon Monoxide Formula: CO CAS Number: 0630-08-0 RTECS #: FG3500000	0.0001% to 0.1%	50 PPM TWA 25 PPM Canada	25 PPM TWA	LC 50 3760 PPM 1 Hr. Time Adj. (Rat)
Iso-Pentane Formula: C ₅ H ₁₂ CAS Number: 0078-78-4 RTECS#: EK4430000	0.0001% to 0.75%	None Established	600 PPM TWA	LC _{LO} : 419 g/m ³ Inhalation/mouse (2 Hr)
Oxygen Formula: O ₂ CAS: 7782-44-7 RTECS#: RS206000	2.0% to 23%	None	None	Not Available
Nitrogen Formula: N ₂ CAS: 7727-37-9 RTECS#: QW9700000	74.4% to 97.9998%	None Established	None Established Simple Asphyxiant	Not Available

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

IDLH (Carbon Monoxide) 1,500 PPM

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

Hazard Identification

Emergency Overview:

Colorless, odorless non-flammable gas. Inhaled carbon monoxide binds to the blood hemoglobin, greatly reducing the red blood cell's ability to transport oxygen to body tissues. Effects may include headaches, dizziness, convulsions, loss of consciousness and death. Mix may or may not have sufficient oxygen content to support life; therefore mix should be treated as a simple asphyxiant. Contents under pressure. Use and store below 125°F (52°C).

Hazards Identification Continued

Route of Entry:

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

Inhalation Effects:

If released in a confined area this product may displace oxygen and result in asphyxia.

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 levels and duration of exposure, symptoms may include headache, dizziness, heart palpitations, weakness, confusion, nausea, and even convulsions, eventual unconsciousness and death.

Some experimental evidence indicates teratogenic and reproductive effects for carbon monoxide.

NFPA Hazard Codes

Health: 2
Flammability: 0
Instability: 0

HMIS Hazard Codes

Health: 2
Flammability: 0
Physical Hazard: 0

Ratings System

0 = No Hazard
1 = Slight Hazard
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-19-2004, *CGA Recommended Hazard Ratings for Compressed Gases, 2nd Edition*.

First Aid Measures

Eyes:

Flush eyes with water for 15 minutes. If irritation persists or frostbite occurs, seek medical attention.

Skin:

Rinse skin thoroughly with water. For skin, immerse skin in lukewarm water. For frostbite or persistent irritation, seek medical attention.

Ingestion:

None required.

First Aid Measures Continued

Inhalation:

PROMPT MEDICAL ATTENTION IS MANDATORY IN ALL CASES OF OVEREXPOSURE TO THIS PRODUCT. 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: Nonflammable		
Flash point: None	Method: Not Applicable	Autoignition Temperature: Not Available
LEL (%): None	UEL None	
Hazardous combustion products: None		
Sensitivity to mechanical shock: None		
Sensitivity to static discharge: Not Available		

Fire and Explosion Hazards:

None. Nonflammable

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 until 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. If leak is in user's equipment, be certain to purge piping with inert gas prior to attempting repairs. If leak is in container or 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 the cylinder 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 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 130°F (54°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 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:

Hood with forced ventilation. Use local exhaust to prevent accumulation above the exposure limit. Use 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:

Positive pressure air line with mask and escape bottle or self-contained breathing apparatus should be available for emergency use.

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)	: Not Available	
Evaporation Point	: Not Available	
Boiling point	: Not Available	
Freezing point	: Not Available	
pH	: Not Available	
Specific gravity	: Not Available	
Oil/water partition coefficient	: Not Available	
Solubility (H ₂ O)	: Very slight	
Odor threshold	: Not Applicable	
Odor and appearance	: Odorless, colorless gas	

Stability and Reactivity

Stability:

Stable.

Incompatible Materials:

None known.

Hazardous Decomposition Products:

Carbon dioxide.

Hazardous Polymerization:

Will not occur.

Toxicological Information

Reproductive:

Inhalation of 150 ppm carbon monoxide for 24 hours by pregnant rats produced cardiovascular and behavioral defects in offspring. Toxic effects to fertility were observed in female rats exposed to 1 mg/m³ for 24 hours. Similar effects observed in other mammalian species.

Mutagenic:

Genetic changes observed in mammalian cell assay systems at exposure of 1500 to 2500 PPM carbon monoxide for 10 minutes.

Other:

Degenerative changes were observed in the brain of rats chronically exposed to 30 mg/m³ carbon monoxide.

Ecological Information

Product does not contain Class I or Class II ozone depleting substances. Not 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.

Transport Information

Parameter	United States DOT	Canada TDG
Proper Shipping name:	Compressed gases, n.o.s., (Nitrogen, Carbon Monoxide)	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 Notification and Information:

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.

SARA Title III – Hazard Classes:

Acute Health hazard
Sudden Release of Pressure Hazard

California Proposition 65: This product contains carbon monoxide, which the State of California has listed as having developmental toxicity.

Other Information

Compressed gas cylinders shall 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.

Disclaimer of Expressed and Implied Warranties:

Although reasonable care has been taken in the preparation of this document, we extend no warranties and make no representations as to the accuracy or completeness of the information contained herein, and assume no responsibility regarding the suitability of this information for the user's intended purposes or for the consequences of its use. Each individual should make a determination as to the suitability of the information for their particular purpose(s).