NorLAB
A DIVISION OF NORCO, INC.

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

1125 West Amity Road
Boise, ID 83705
(208) 336-1643

Carbon Monoxide in Nitrogen 0.0001% to 20.0%

MATERIAL SAFETY DATA SHEET

Identification

Product Name: Carbon Monoxide in Nitrogen 0.0001% to 20.0%
Chemical Name: Carbon Monoxide in Nitrogen
Chemical Family: Gas Mixture
CAS Number: N/A
Common Names/Synonyms: N/A
MSDS Identification Code/Number: 2070
Prepared by: Quality Dept.

Revision Date: 05-01-03
Last Review Date: 03/04/13

Composition, Information on Ingredients

Exposure Limits[1]

Ingredient	% Volume	PEL-OSHA [2]	TLV-ACGIH [3]	LD_{50} or LC_{50} Route/Species
Nitrogen Formula: N_2 CAS Number: 7727-37-9 RTECS #: QW9700000	80.0 to 99.9999	None Established	Simple Asphyxiant	Not Available
Carbon Monoxide Formula: CO CAS Number: 630-08-0 RTECS#: FG3500000	0.0001 to 20.0	50 PPM TWA 25 PPM Canada	25 PPM TWA	LC 50 3760 PPM RAT Time Adj.

[1] Refer to individual state or provincial regulations, as applicable, for limits which 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

Hazard Identification

Emergency Overview:
Non-flammable, colorless, odorless gas. Nitrogen acts as a simple asphyxiant, displacing atmospheric oxygen and may cause asphyxiation if released in a confined area. Carbon monoxide acts as a chemical asphyxiant, binding 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. Contents under pressure. Use and store below 125^0 F (52^0 C).

Route of Entry:

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

Health Effects:

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

Hazards Identification Continued

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:
Depending on the concentration of the carbon monoxide present, this product may act as a simple asphyxiant or a chemical asphyxiant.

Inhaled carbon monoxide binds with blood hemoglobin to form carboxyhemoglobin. Carboxyhemoglobin can not 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.

Medical Conditions Aggravated by Exposure:
Recovery from carbon monoxide may be adversely affected by obesity, alcoholism, and chronic heart disease.

NFPA Hazard Codes		**HMIS Hazard Codes**		**Ratings System**
Health:	1	Health:	1	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 Data from: *CGA P-19-2004, CGA Recommended Hazard Ratings for Compressed Gases, Second edition*

First Aid Measures

Eyes:
Never introduce ointment or oil into the eyes without medical advice! Remove victim from the source of contamination. Flush eyes with water for 15 minutes. If pain is present, refer the victim to an ophthalmologist for treatment and follow up. If the victim cannot tolerate light, protect the eyes with a light bandage. If frostbite is suspected, flush 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 medical attention.

Ingestion:
None required.

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. Administration of 100% oxygen by tight fitting face mask reduces the biological half-life of CO.

First Aid Measures Continued

FOR SEVERELY POISNED PATIENTS, HYPERBARIC OXYGEN THERAPY SHOULD BE CONSIDERED. 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: Not Available	Method: Not Available	Autoignition Temperature: Not Available
LEL(%): 12.5 (CO)	UEL(%) 74.0 (CO)	
Hazardous combustion products: None		
Sensitivity to mechanical shock: None		
Sensitivity to static discharge: Not Available		

Fire and Explosion Hazards:
Non-flammable. Concentrations of carbon monoxide less than or equal to 20% in nitrogen are considered non-flammable (CGA P-23, 1995).

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

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

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 a 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 $125^{O}F$ ($52^{O}C$). 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.

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.

Exposure Controls, Personal Protection Continued

Eye/Face Protection:
Safety goggles or glasses as appropriate for the job.

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.

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	
	: Not Available	
Freezing point	: Not Available	
	: Not Available	
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	: Odorless, colorless gas	

Stability and Reactivity

Stability:
Stable.

Incompatible Materials:
None known.

Hazardous Decomposition Products:
Carbon dioxide.

Hazardous Polymerization:
Will not occur.

Toxicological Information

Inhalation:
LC50: 3670 ppm inhalation/rat (Time Adj.).

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/m^3 for 24 hours. Similar effects observed in other mammalian species.

Toxicological Information Continued

Mutagenic:
Genetic changes observed in mammalian cell assay systems at exposures of 1500 to 2500 ppm for 10 minutes.

Other:
Degenerative changes were observed in the brain of rats chronically exposed to 30 mg/m^3 carbon monoxide.

Ecological Information

Product does not contain Class I or Class II ozone depleting substances. Not expected to 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., (Carbon Monoxide, Nitrogen)	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:

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 CFR 372.

SARA Title III – Hazard Classes:
Acute Health hazard
Fire 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).

N-Hexane 0.0001% to 0.6%, Oxygen 0.0001% to 23.5% in Nitrogen

MSDS Number: NLB 2830 Revision Date: 6/23/2014

1 PRODUCT AND COMPANY IDENTIFICATION

Manufacturer

NorLab a division of Norco
898 W. Gowen Rd.
Boise, ID 83705

Contact: Quality Dept.
Phone: 208-336-1643
Fax: 208-433-6160
Web: www.norlabgas.com

Product Name: N-Hexane 0.0001% to 0.6%, Oxygen 0.0001% to 23.5% in Nitrogen
Revision Date: 6/23/2014
Version: 1
MSDS Number: NLB 2830
Common Name: N- Hexane & Oxygen in Nitrogen
CAS Number: Not Available - Gas Mixture
EPA Number: Not Availble
RCRA Number: Not Applicable
Chemical Family: Gas Mixture
Chemical Formula: C6H14 + O2 in N2
Synonyms: Two Gas Mixture, Calibration Gas
Product Use: Calibration of analyitical instrumentation

2 HAZARDS IDENTIFICATION

Route of Entry: Skin; Eyes; Inhalation;

Target Organs: Respiratory system; Eyes;

Inhalation: High concentrations of vapors may have a narcotic effect. Symptoms may include dizziness, headache and nausea. Mixtures which contain < 19.5% oxygen may act as simple asphyxiants. Effects of oxygen deficiency resulting from simple asphyxiants may include: rapid breathing, diminished mental alertness, impaired muscular coordination, faulty judgment, depression of all sensations, emotional instability, and fatigue. As asphyxiation progresses, nausea, vomiting, prostration, and loss of consciousness may result, eventually leading to convulsions, coma, and death.

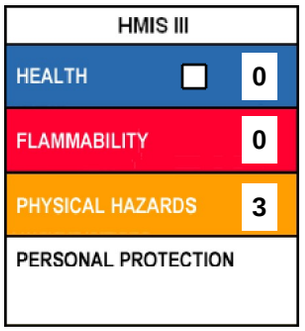
Oxygen deficiency during pregnancy has produced developmental abnormalities in humans and experimental animals.

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

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

Ingestion: Not anticipated. Product is a gas at normal conditions.

NFPA: Health = 0, Fire = 0, Reactivity = 0
HMIS III: H0/F0/PH3



GHS Signal Word:
WARNING

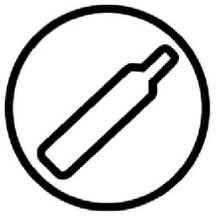
GHS Hazard Pictograms:

GHS Classifications:
Physical, Gases Under Pressure, Compressed Gas

GHS Phrases:
H280 - Contains gas under pressure; may explode if heated

GHS Precautionary Statements:

P244 - Keep free from grease and oil.
P260 - Do not breathe gas.
P403 - Store in a well ventilated place.
P410+412 - Protect from sunlight. Do not expose to temperatures exceeding 50 °C/122 °F
P411 - Container temperature should not exceed 52°C/122°F.
P202 - Do not handle until all safety precautions have been read and understood.



3 COMPOSITION/INFORMATION ON INGREDIENTS

Ingredients:

Cas #	Percentage	Chemical Name
110-54-3	0.0001-0.6%	Hexane
7782-44-7	0.0001-23.5%	Oxygen
7727-37-9	Balance	Nitrogen

4 FIRST AID MEASURES

Inhalation: PROMPT MEDICAL ATTENTION IS MANDATORY IN ALL CASES OF OVEREXPOSURE TO PRODUCT. RESCUE PERSONNEL SHOULD BE EQUIPED WITH SELF-CONTAINED BREATHING APPARATUS. 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 (artificial) respiration and supplemental oxygen. Further treatment should be symptomatic and supportive.

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

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

Ingestion: Not a direct hazard.

5 FIRE FIGHTING MEASURES

Flammability: Not Flammable
Flash Point: None
Flash Point Method: Not Applicable
Burning Rate: Not Applicable
Autoignition Temp: None
LEL: None
UEL: None

Fire and Explosion Hazards:
Nonflammable. Cylinders may rupture violently or vent rapidly from pressure when involved in a fire situation.

Extinguishing Media:
None required. Use as appropriate for surrounding materials

Fire Fighting Instructions:
Firefighters should wear respiratory protection (SCBA) and full turnout or Bunker gear. Continue to cool fire-exposed cylinders until well after flames are extinguished.

6 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.

7 HANDLING AND STORAGE

Handling Precautions: 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 backflow into the cylinder.

For additional recommendations, consult Compressed Gas Association Pamphlets P-1.

Never carry a compressed gas cylinder or a container of a gas in cryogenic liquid from in an enclosed space such as a car trunk, van or station wagon. A leak can result in a fire, explosion, asphyxiation or a toxic exposure.

Storage Requirements: Protect cylinders from physical damage. Store in cool, dry, well-ventilated area away from heavy traffic areas and emergency exits. Do not allow the temperature where cylinders are stored to exceed 125 degrees F (52 degrees 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" sign in the storage or use area.

8 EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls: Use local exhaust in combination with general ventilation as necessary to prevent accumulation of high concentrations and maintain air oxygen levels at or above 19.5%.

Personal Protective Equip: Steel boots; Safety spectacles with unperforated sideshields; Positive pressure air line with full-face mask and escape bottle or self-contained breathing apparatus should be available for emergency use.

N-Hexane
OSHA PEL: 500 PPM TWA
ACGIH PEL: 50 PPM TWA
LC_{50}: 48,000 PPM, Inhalation Rat (4 Hr.)
RTECS#: MN9275000
IDLH: 1100 PPM (10% LEL)

Oxygen
OSHA PEL: Not Available
ACGIH PEL: Not Available
LC_{50} : Not Available
RTECS#: RO206000
IDLH: Not Available

Nitrogen
OSHA PEL: None Established
ACGIH PEL: Simple Asphyxiant
LC_{50} or LD_{50}: Not Available
RTECS#: QW9700000
IDLH: None Established

9 PHYSICAL AND CHEMICAL PROPERTIES

Appearance:	Colorless Gas		
Physical State:	Gas	**Odor:**	Faint ethereal and sweetish odor.
Odor Threshold:	65 to 248 ppm N-Hexane	**Molecular Formula:**	C6H14, O2 In N2
Particle Size:	Not Applicable	**Solubility:**	Negligible
Spec Grav./Density:	Not Available	**Softening Point:**	Not Applicable
Viscosity:	Not Applicable	**Percent Volatile:**	100%

10 STABILITY AND REACTIVITY

Stability:	Stable
Conditions to Avoid:	None known
Materials to Avoid:	None
Hazardous Decomposition:	Combustion will produce carbon dioxide and, possibly toxic chemicals such as carbon monoxide.
Hazardous Polymerization:	Will not occur.

11 TOXICOLOGICAL INFORMATION

In humans, inhalation of 5000 PPM n-hexane for 10 minutes produced dizziness and giddiness while 2000 PPM caused no effects.
No evidence of eye or mucous membrane irritation was reported following exposure of unacclimated human subjects to 5000 PPM n-hexane.
Repeated exposure to n-hexane can cause slow-developing bilateral, symmetrical, peripheral and sensimotor neuropathy. The minimum levels on n-hexane which are neurotoxic to humans have not been established.

Studies indicate that n-hexane can adversely affect the fetus at maternally toxic levels. Toxicity was observed in newborn following experimental 10,000 ppm, 7 hour exposure in female rats. Toxic effects were observed in embryo and fetus following 5000 ppm, 20 hour exposure in female rats. Although progressive testicular toxicity has been induced in rats at subneurotoxic doses of the main toxic metabolite of n-hexane (2, 5-hexanedione), no reports of human reproductive toxicity or sterility have been associated with n-hexane exposure. Genetic effects have been observed in mammalian cell analysis system.

Toxic effects observed to respiratory system, nervous systems in experimental exposures mammalian species. Effects include changes in brain weight, body weight and peripheral nervous system changes.

12 ECOLOGICAL INFORMATION

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

13 DISPOSAL CONSIDERATIONS

Do not attempt to dispose of residual waste or unused quantities in returnable containers. Return in shipping container, properly labeled, with any valve outlet plugs or caps secured and valve protection cap in place to Norco for proper disposal.

14 TRANSPORT INFORMATION

DOT Class: Non-Flammable Gas (2.2) #2.2
UN #: UN1956

Proper Shipping Name US:
UN 1956, Compressed Gas N.O.S., N-Hexane, Nitrogen), 2.2

Proper Shipping Name Canada:
UN1956, Compressed Gas, N.O.S., 2.2

15 REGULATORY INFORMATION

COMPONENT / (CAS/PERC) / CODES
---
*Hexane (110543 0.0001-0.6%) CERCLA, HAP, MASS, OSHAWAC, PA, SARA313, TSCA, TXAIR

*Oxygen (7782447 0.0001-23.5%) MASS, PA, TSCA

*Nitrogen (7727379 n/a%) MASS, PA, TSCA

SARA Title III Notification and Information:

SARA Titile III - Hazard Clases
Acute Healt Hazard
Sudden Release of Pressure Hazard

SARA Title III - Supplier Notification:
This product coontains the following toxic chemicals subject to the reporting requierments of secion 313 of the Emergency Planning and Community Right-To-Know Act (EPCRA) of 1986 and for 40 CFR372:

CAS Number	Ingredient Name	Percent by volume
110-54-3	N-Hexane	0.0001% to 0.6%

CERCLA, Section 304 SARA Title III
Releases of N-Hexane in quantities equal to or greater than the reportable quantity (RQ) of 5000 pounds are subject to reporting to the National Response Center.

California Proposition 65:
This product does not contain ingredient(s) known to the State of California to cause cancer of reproductive toxicity.

REGULATORY KEY DESCRIPTIONS

CERCLA = Superfund clean up substance
HAP = Hazardous Air Pollutants
MASS = MA Massachusetts Hazardous Substances List
OSHAWAC = OSHA Workplace Air Contaminants
PA = PA Right-To-Know List of Hazardous Substances
SARA313 = SARA 313 Title III Toxic Chemicals

TSCA = Toxic Substances Control Act
TXAIR = TX Air Contaminants with Health Effects Screening Level

16 OTHER INFORMATION

Disclaimer:
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).