5 to 25 PPM NO2, 0.0001% to 2.5% CH4, 0.0001% to0.1 % CO, 2% to 23% O2 in Nitrogen

(M)SDS Number: NLB 3320 Revision Date: 6/25/2014

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: 5 to 25 PPM NO2, 0.0001% to 2.5% CH4, 0.0001% to0.1 % CO, 2% to 23% O2 in Nitrogen
Revision Date: 6/25/2014
Version: 1
(M)SDS Number: NLB 3320
Common Name: Nitrogen Dioxide Quad Mix
CAS Number: Not Available - Gas Mixture
EPA Number: Not Availble
RCRA Number: Not Applicable
Chemical Family: Gas Mixture
Chemical Formula: NO2 + CH4 + CO + O2 IN N2
Synonyms: Bump Gas, Calibration Gas, Four Part Mix
Product Use: Calibration of analyitical instrumentation

For Transportation Emergency Contact CHEMTREC: 800-424-9300

2 HAZARDS IDENTIFICATION

Route of Entry: Eyes; Inhalation; Skin;

Target Organs: Cardiovascular system; Central nervous system; Eyes; Lungs; Blood; Respiratory system;

Inhalation: 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.

Gas mixture contains less than 500 ppm nitrogen dioxide, which can irritate the pulmonary tract. Initial symptoms may include eye and throat irritation, chest tightness, headache, and nausea. Inhalation of high concentrations may cause swelling and fluid retention in the lungs, which can be fatal. Symptoms may be delayed for up to 72 hours following exposure.

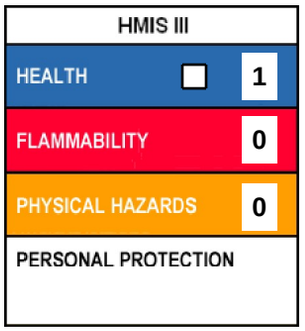
Mixture may or may not contain suffecient oxygen to suppoet resperation.

Skin Contact: May cause irritation. 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 = 1, Fire = 0, Reactivity = 0
HMIS III: H1/F0/PH0



GHS Signal Word:
WARNING

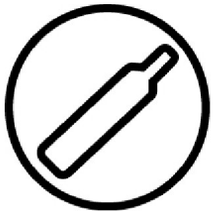
GHS Hazard Pictograms:

GHS Classifications:
Physical, Gases Under Pressure, Compressed Gas
Health, Acute toxicity, 5 Inhalation

GHS Phrases:
H280 - Contains gas under pressure; may explode if heated
H333 - May be harmful if inhaled

GHS Precautionary Statements:

P202 - Do not handle until all safety precautions have been read and understood.
P260 - Do not breathe gas.
P244 - Keep reduction valves free from grease and oil.
P370+376 - In case of fire: Stop leak if safe to do so.
P403 - Store in a secure, well ventilated place.
P412 - Do not expose to temperatures exceeding 50 °C/122 °F



3 COMPOSITION/INFORMATION ON INGREDIENTS

Ingredients:

Cas #	Percentage	Chemical Name
10102-44-0	0.0005-0.0025	Nitrogen Dioxide
74-82-8	0.0001-2.5%	Methane
630-08-0	0.0001-0.1%	Carbon monoxide
7782-44-7	2.0-23%	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. Seek immediate medical attention. The phyxician should be informed that the patient has inhaled small quantities of nitrogen dioxide and carbon monoxide.

Skin Contact: Remove contaminated clothing and flush affected area with large quantities of water. If irritation persists or frostbite is suspected, seek medical attention.

Eye Contact: Flush with large amounts of water. 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

Stop the flow of gas or remove cylinder to outdoor location if this can be done without risk. Evacuate all personnel from affected area. Ventilate enclosed areas. 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:

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 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:

Local exhaust ventilation as necessary to limit exposure below the acceptable exposure limits and maintain oxygen levels above 19.5%.

Personal Protective Equip:

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

Skin Protection:
Protective gloves of material appropriate for the job.

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

Other/General Protection:
Safety shoes.

Nitrogen Dioxide
OSHA PEL: 5 PPM Ceiling
ACGIH PEL: 3 PPM TWA 5 PPM STEL
LC_{50} 115 PPM Inhalation Rat (1 Hr Time Adj.)
RTECS #: QW9800000
IDLH: 20 PPM

Methane
OSHA PEL: None Established

ACGIH PEL: 1000 PPM
LC_{50}: Not Available
RTECS #: TX2275000
IDLH: Not Available

Carbon Monoxide
OSHA PEL: 50 PPM TWA
ACGIH PEL: 25 PPM TWA
LC_{50} or LD_{50} : 3760 PPM Inhlation/rat 1 Hr. time adj.
RTECS #: FG3500000
IDLH:1200 PPM

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:**	Slight acidic odor
Odor Threshold:	0.1 to 0.4 PPM for Nitrogen Dioxide	**Molecular Formula:**	NO2+CH4+CO+O2 IN N2
Particle Size:	Not Applicable	**Solubility:**	Slightly Soluble
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:	Nitrogen dioxide is not compatible with strong bases, strong oxidizers, alkali metals, alkali earth metals and powdered metals. Flammable Materials
Hazardous Decomposition:	Not known.
Hazardous Polymerization:	Will not occur.

11 TOXICOLOGICAL INFORMATION

Carbon Monoxide
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.

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/m^3 carbon monoxide.

Nitrogen Dioxide
Skin and Eye:
Nitrogen dioxide concentrations of 10-20 ppm have caused mild eye, nose, and upper respiratory irritation.

Inhalation:
Pure nitrogen dioxide is a highly toxic and corrosive gas, which can cause delayed lung injury. The 1-hour LC_{50} for nitrogen dioxide in the rat is 115 ppm.

Other:
Monkeys exposed to 10 ppm NO_2 for 1 month or 5 ppm NO_2 for 2 months showed marked decrease in resistance to infection.

The incidences of chronic lung effects from long-term exposures to low concentrations of nitrogen dioxide are not well defined. No chronic effects were reported in animals (dogs, rabbits, guinea pigs, rats, hamsters, and mice) exposed for 16-18 months to concentrations of 1 ppm (no mice), 5 ppm, or 25 ppm(no dogs or mice) nitrogen dioxide.

Experimental evidence indicates that nitrogen dioxide may have mutagenic effects; however, results have been equivocal.

12 ECOLOGICAL INFORMATION

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

13 DISPOSAL CONSIDERATIONS

Dispose of in accordance with local regulations. 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.

14 TRANSPORT INFORMATION

DOT Class: Non-Flammable Gas (2.2) #2.2
UN #: UN 1956, Class: 2, Proper Shipping Name: Compressed gas, n.o.s.

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

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

15 REGULATORY INFORMATION

COMPONENT / (CAS/PERC) / CODES
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*Nitrogen dioxide (10102440 0.0005-0.0025%) ACUTERCRA, CERCLA, CSWHS, EHS302, MASS, NJEHS, NJHS, OSHAPSM, OSHAWAC, PA, TSCA, TXAIR, TXHWL

*Methane (74828 0.0001-2.5%) MASS, NJHS, PA, TSCA, TXAIR

*Carbon monoxide (630080 0.0001-0.1%) MASS, NJEHS, OSHAWAC, PA, PROP65, TSCA, TXAIR

*Oxygen (7782447 2.0-23%) MASS, PA, TSCA

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

SARA Title III - Supplier Notification:
This product does not contain 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:

SARA Title III Notification and Information:

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

CERCLA, Section 304 SARA Title III
Releases of Nitrogen Dioxide in quantities equal to or greater than the reportable quantity (RQ) of 10 pounds are subject to reporting to the National Response Center.

EPCRA Section 302:
This product containsNitrogen Dioxide a designated extremely hazardous substance (EHS) with a Threshold Planning Quantity (TQP) of 100 pounds. The presence of EHSs in quantities in excess of the TQP requiers certain emergency planning activities to be conducted.

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

REGULATORY KEY DESCRIPTIONS

ACUTERCRA = RCRA Acute Hazardous Wastes (P-List)
CERCLA = Superfund clean up substance
CSWHS = Clean Water Act Hazardous substances
EHS302 = Extremely Hazardous Substance
MASS = MA Massachusetts Hazardous Substances List
NJEHS = NJ Extraordinarily Hazardous Substances
NJHS = NJ Right-to-Know Hazardous Substances
OSHAPSM = OSHA Chemicals Requiring process safety management
OSHAWAC = OSHA Workplace Air Contaminants
PA = PA Right-To-Know List of Hazardous Substances
TSCA = Toxic Substances Control Act
TXAIR = TX Air Contaminants with Health Effects Screening Level
TXHWL = TX Hazardous Waste List

PROP65 = CA Prop 65

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).