0.0001% to 0.0999% Nitric Oxide in Nitrogen

1 PRODUCT AND COMPANY IDENTIFICATION

Product Identifier:	**0.0001% to 0.0999% Nitric Oxide in Nitrogen**
Synonyms:	**Calibration Gas Mixture, NOx Gas Mixture**
Common Name:	**Nitric Oxide in Nitrogen**
SDS Number:	**NLB 2140**
Revision Date:	**7/25/2018**
Version:	**3**
CAS Number:	**Not Available - Gas Mixture**
EPA Number:	**Not Available**
RCRA Number:	**Not Available**
Chemical Family:	**Gas Mixture**
Chemical Formula:	**NO in N2**
Product Use:	**Calibration of analyitical instrumentation**
Supplier Details:	**NorLab a division of Norco 898 W. Gowen Rd. Boise, ID 83705**
Contact:	**Quality Dept.**
Phone:	**208-336-1643**
Fax:	**208-433-6160**
Internet:	**www.norlab-gas.com**

For Transportation Emergency Contact CHEMTREC: 800-424-9300

2 HAZARDS IDENTIFICATION

Classification of Substance

GHS Classification in Accordance with 29 CFR 1910 (OSHA HCS):
Physical, Gases Under Pressure, Compressed Gas
Health, Acute toxicity, 5 Inhalation

GHS Label Elements, Including Precautionary Statements

GHS Signal Word: WARNING

GHS Hazard Pictograms:

GHS Hazard Statements:

H280 - Contains gas under pressure; may explode if heated
H333 - May be harmful if inhaled
OSHA-H01 - MAY DISPLACE OXYGEN AND CAUSE RAPID SUFFOCATION.

GHS Precautionary Statements:

P202 - Do not handle until all safety precautions have been read and understood.
P260 - Do not breathe dust/fume/gas/mist/vapours/spray.
P262 - Do not get in eyes, on skin, or on clothing.
P271 - Use only outdoors or in a well-ventilated area.
P280 - Wear protective gloves/protective clothing/eye protection/face protection.
P304 + P340 - IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P308 + P313 - IF exposed or concerned: Get medical advice/ attention.
P403 + P233 - Store in a well-ventilated place. Keep container tightly closed.
CGA-PG02 - Protect from sunlight when ambient temperature exceeds 52 °C (125 °F).
CGA-PG05 - Use a back flow preventive device in the piping.
CGA-PG06 - Close valve after each use and when empty.
CGA-PG10 - Use only with equipment rated for cylinder pressure.
CGA-PG20 - Use only equipment of compatible materials of construction.

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Hazards not Otherwise Classified (HNOC) or not Covered by GHS

Route of Entry: Inhalation;

Target Organs: Respiratory system;

Inhalation: The toxicity of this gas mixture depends upon the amount of nitric oxide present. Generally the only symptoms occurring at the time of exposure are slight cough, fatigue, and nausea. Very concentrated fumes may cause coughing, choking, nausea, headache, abdominal pain and tightness, and burning in the chest. Severe symptoms may be delayed (possibly for several hours) and include cyanosis, increased difficulty in breathing (from hypoxia), irregular respiration, lassitude and eventual death due to pulmonary edema in untreated cases.

Repeated exposure to nitric oxide may cause a permanent decrease in pulmonary function (Silo Filler's Disease) or chronic irritation of the respiratory tract with cough, headache, loss of appetite, dyspepsia, tooth corrosion and gradual loss of strength.

Nitrogen acts as a simple asphyxiate. Accumulation of high concentrations can displace oxygen content in the air necessary to support life.

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.

3 COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Ingredients

CAS#	%	Chemical Name
10102-43-9	0.0001-0.0999%	Nitric oxide
7727-37-9	99.9001-99.9999 %	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. The physician should be informed the patient has inhaled quantities of nitric oxide.

Skin Contact: Remove contaminated clothing and flush affected area with large quantities of water. For frostbite immerse skin in lukewarm water. DO NOT USE HOT WATER. If irritation persists or frostbite occurs, seek medical attention.

Eye Contact: PERSONS WITH POTENTIAL EXPOSURE TO NITRIC OXIDE SHOULD NOT WEAR CONTACT LENSES. Flush eyes with large amounts of water for at least 15 minutes, holding eyelids open to ensure adequate rinsing. Seek immediate medical attention as soon as possible. If frostbite is suspected, flush eyes with cool water for 15 minutes and obtain immediate medical attention.

Ingestion: None anticipated. Product is a gas at normal temperatures and conditions.

5 FIRE FIGHTING MEASURES

Flammability: Not Flammable

Flash Point:	**Not Applicable**
Flash Point Method:	**Not Applicable**
Burning Rate:	**Not Applicable**
Autoignition Temperature:	**Not Applicable**
Lower Explosive Limit:	**Not Applicable**
Upper Explosive Limit:	**Not Applicable**

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:
Use water spray to cool adjacent cylinders and areas. 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

Isolate hazard area, evacuate personnel and deny entry to unauthorized/unprotected individuals. Extinguish all ignition sources and ventilate closed spaces and low areas. Personnel entering area should wear appropriate protective equipment including respiratory protection suitable for unknown concentrations. Personnel should not reenter hazard area until hydrogen sulfide and carbon monoxide has sufficiently dispersed and adequate oxygen re-established. 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 of container valve, contact the appropriate emergency telephone number listed in Section1or call your closest Norco/NorLab location.

7 HANDLING AND STORAGE

Handling Precautions:

Isolate hazard area, evacuate personnel and deny entry to unauthorized/unprotected individuals. Extinguish all ignition sources and ventilate closed spaces and low areas. Personnel entering area should wear appropriate protective equipment, including respiratory protection suitable for unknown concentrations. Personnel should not re-enter an area until nitric oxide has sufficiently dispersed and adequate oxygen re-established. 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 valve, contact the appropriate emergency telephone number listed in Section 1 or call your closest Norco/Norlab location.

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.

8 EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls:

All ventilation should be designed in accordance with OSHA standard (29 CFR 1910.94). Use local exhaust at filling zones and where leakage and dust formation is probable. Use mechanical (general) ventilation for storage areas. Use appropriate ventilation as required to keep Exposure limits in Air below TLV & PEL limits. Maintain atmospheric Oxygen content at or above 19.5%

Personal Protective Equipment:

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Nitrogen cas#:(7727-37-9) [99.9001-99.9999%]

Personal protective equipment

Respiratory protection: Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type AXBEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of

protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Hand protection: Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching gloves outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands. Full contact Material: butyl-rubber Minimum layer thickness: 0.3 mm Break through time: 480 min Material tested:Butoject (KCL 897 / Aldrich Z677647, Size M)

Splash protection: Material: Chloroprene Minimum layer thickness: 0.6 mm Break through time: 30 min Material tested:Camapren (KCL 722 / Aldrich Z677493, Size M) data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374 If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an Industrial Hygienist familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Eye protection: Tightly fitting safety goggles. Faceshield (8-inch minimum). Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin and body protection: Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Hygiene measures: Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product.

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Components with workplace control parameters

TWA 25 ppm USA. Occupational Exposure Limits (OSHA) - Table Z- 1 - Limits for Air ContaminantsLimits for Air Contaminants
30 mg/m3
The value in mg/m3 is approximate.

TWA 25 ppm USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.10001910.1000
30 mg/m3

TWA 25 ppm USA. ACGIH Threshold Limit Values (TLV)
Upper Respiratory Tract irritation Hypoxia/cyanosis Nitrosyl-hemoglobin formation

TWA 25 ppm USA. NIOSH Recommended Exposure Limits
30 mg/m3

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9 PHYSICAL AND CHEMICAL PROPERTIES

Appearance:	**Colorless Gas**		
Physical State:	**Gas**	**Odor:**	**Acrid, acidic**
Odor Threshold:	**Not Determined**	**Molecular Formula:**	**NO + N2**
Particle Size:	**Not Applicable**	**Solubility:**	**Very slightly soluble**
Viscosity:	**Not Applicable**	**Softening Point:**	**Not Applicable**
Flammability:	**Not Flammable**	**Percent Volatile:**	**100%**
Vapor Pressure:	**Not Determined**	**Vapor Density:**	**Not Determined**
Molecular weight:	**Mixture**	**Upper Flammability Limit and Lower Flammability Limit:**	**Not Applicable**

10 STABILITY AND REACTIVITY

Chemical Stability: **Product is stable under normal conditions.**

Conditions to Avoldentification: **Incompatibilities, flames, ignition sources.**

Materials to Avoldentification: **Strong oxidizing agents, strong reducing agents, halides, organic materials, alcohols, hydrocarbons, and oxygen. Reacts vigorously with fluorine, fluorine oxides and chlorine in the presence of moisture.**

Hazardous Decomposition: **Nitric Oxides (NOx)**

Hazardous Polymerization: **Will not occur.**

11 TOXICOLOGICAL INFORMATION

Nitric oxide cas#:(10102-43-9) [0.0001-0.0999%]

Information on toxicological effects
Acute toxicity:
Oral LD50 no data available
Inhalation LC50 LC50 Inhalation - rat - 4 h - 1,068 mg/m3
Dermal LD50
Other information on acute toxicity
Skin corrosion/irritation: no data available
Serious eye damage/eye irritation: no data available
Respiratory or skin sensitization: no data available
Germ cell mutagenicity: no data available

Carcinogenicity:
IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.
ACGIH: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.
NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.
OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity: no data available
Teratogenicity: no data available
Specific target organ toxicity - single exposure (Globally Harmonized System):no data available
Specific target organ toxicity - repeated exposure (Globally Harmonized System):no data available
Aspiration hazard: no data available
Potential health effects: Inhalation Toxic if inhaled. Material is extremely destructive to the tissue of the mucous membranes and upper respiratory tract. Ingestion May be harmful if swallowed. Skin May be harmful if absorbed through skin. Causes skin burns. Eyes Causes eye burns.
Signs and Symptoms of Exposure: Material is extremely destructive to tissue of the mucous membranes and upper respiratory tract, eyes, and skin., spasm, inflammation and edema of the larynx, spasm, inflammation and edema of the bronchi, pneumonitis, pulmonary edema, Nausea, Vomiting, Weakness, Dizziness, Vertigo, Headache, Sweating, loss of appetite
Synergistic effects: no data available
Additional Information:RTECS: QX0525000

Nitrogen cas#:(7727-37-9) [99.9001-99.9999%]

Information on toxicological effects
Acute toxicity:
Oral LD50 no data available
Inhalation LC50
Dermal LD50
Other information on acute toxicity
Skin corrosion/irritation: no data available
Serious eye damage/eye irritation: no data available
Respiratory or skin sensitization: no data available
Germ cell mutagenicity: no data available

Carcinogenicity:
IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.
ACGIH: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.
NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.
OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity: no data available
Teratogenicity: no data available
Specific target organ toxicity - single exposure (Globally Harmonized System):no data available
Specific target organ toxicity - repeated exposure (Globally Harmonized System):no data available
Aspiration hazard: no data available
Potential health effects: Inhalation May be harmful if inhaled. May cause respiratory tract irritation. Ingestion May be harmful if swallowed. Skin May be harmful if absorbed through skin. May cause skin irritation. Eyes May cause eye irritation.
Signs and Symptoms of Exposure: May be harmful., Nausea, Headache, Vomiting
Synergistic effects: no data available
Additional Information:RTECS: QW9700000

12 ECOLOGICAL INFORMATION

Nitric oxide cas#:(10102-43-9) [0.0001-0.0999%]

Information on ecological effects
Toxicity: no data available
Persistence and degradability: no data available
Bioaccumulative potential: no data available
Mobility in soil: no data available
PBT and vPvB assessment: no data available
Other adverse effects: no data available

Nitrogen cas#:(7727-37-9) [99.9001-99.9999%]

Information on ecological effects
Toxicity: no data available
Persistence and degradability: no data available
Bioaccumulative potential: no data available
Mobility in soil: no data available
PBT and vPvB assessment: no data available
Other adverse effects: no data available

13 DISPOSAL CONSIDERATIONS

Product and Contaminated Packaging: Do not attempt to dispose of residual waste or unused quantities in returnable containers. 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

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14 TRANSPORT INFORMATION

UN1956, Compressed gas, n.o.s., 2.2, (Nitric Oxide, Nitrogen)

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

Proper Shipping Name Canada:
UN1956, Compressed Gas, N.O.S., (Nitric Oxide, Nitrogen), 2.2

15 REGULATORY INFORMATION

Component (CAS#) [%] - CODES

RQ(10LBS), Nitric oxide (10102-43-9) [0.0001-0.0999%] ACUTERCRA, CERCLA, EHS302, MASS, NJEHS, NJHS, OSHAPSM, OSHAWAC, PA, TSCA, TXAIR, TXHWL

Nitrogen (7727-37-9) [99.9001-99.9999%] MASS, PA, TSCA

Regulatory CODE Descriptions

RQ = Reportable Quantity
ACUTERCRA = RCRA Acute Hazardous Wastes (P-List)
CERCLA = Superfund clean up substance
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

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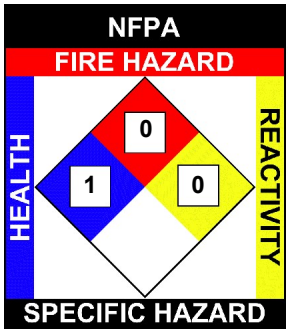
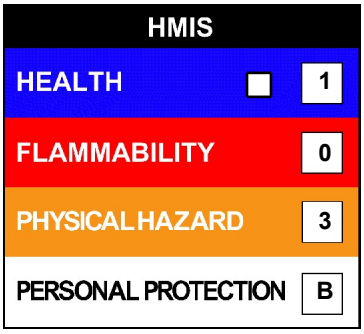
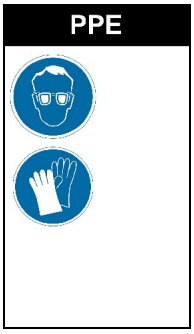
16 OTHER INFORMATION

NFPA: Health = 1, Fire = 0, Reactivity = 0, Specific Hazard = n/a
HMIS III: Health = 1, Fire = 0, Physical Hazard = 3
HMIS PPE: B - Safety Glasses, Gloves







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