

Nitrogen Dioxide 0.0002% to 0.0100% in Air

SDS Number: 2220

Revision Date: 8/3/2015

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1 PRODUCT AND COMPANY IDENTIFICATION

Manufacturer

Norlab - A Division of Norco, Inc.
898 Gowen Rd.
Boise, ID 83705

Contact: Quality Department
Phone: (208) 336-1643
Web: www.norlab-gas.com

Product Name: Nitrogen Dioxide 0.0002% to 0.0100% in Air
Revision Date: 8/4/2015
Version: 1
SDS Number: 2220
CAS Number: MIXTURE
Chemical Family: Gas Mixture
Chemical Formula: NO₂ in Air
Synonyms: Calibration Gas Mixture, Cal Gas, NO_x Gas Mix
Emergency Telephone Number: (800) 424-9300 (CHEMTREC)

2 HAZARDS IDENTIFICATION

Inhalation: Inhalation of nitrogen dioxide in low concentrations produces an irritating effect on the mucous membranes of the eyes, nose, throat, and lungs. Acute exposure through inhalation may result in dryness and irritation of the nose and throat, choking, coughing, and bronchospasm. Severe overexposure may cause death through systemic, delayed pulmonary edema. Exposure to high concentrations may also cause unconsciousness, and under some circumstances, death. Symptoms may be delayed for up to 72 hours.

Mixture contains sufficient oxygen to support life.

Skin Contact: Repeated exposure may irritate the skin. 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: Ingestion is unlikely. Gas at room temperature.

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NFPA:
HMIS III:

Health = 1, Fire = 0, Reactivity = 0
H1/F0/PH3



HMIS III	
HEALTH	□ 1
FLAMMABILITY	0
PHYSICAL HAZARDS	3
PERSONAL PROTECTION B I Safety Glasses, Gloves,	

PERSONAL PROTECTION INDEX			
A		G	
B		H	
C		I	
D		J	
E		K	
F		X	Consult your supervisor or S.O.P. for "SPECIAL" handling directions
A		n	
O		P	
Q		R	
S		Additional Information	
t		U	
W		Y	
Z			

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:

P260 - Do not breathe dust/fume/gas/mist/vapors/spray.
P271 - Use only outdoors or in a well-ventilated area.
P280 - Wear protective gloves/protective clothing/eye protection/face protection..
P304+340 - IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
P312 - Call a POISON CENTER or doctor/physician if you feel unwell.
P403+233 - 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 constructions.

Additional Hazard Statements (USA):

Simple Asphyxiant - May displace oxygen and cause rapid suffocation.

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This product is a colorless gas with a slight acrid odor. At higher concentrations nitrogen dioxide has a reddish brown color. Nitrogen dioxide is extremely toxic by inhalation, and symptoms of over-exposure may not become apparent for up to 72 hours. Overexposures to this gas may result in severe irritation and burns of eyes, skin, mucous membranes, and any other exposed tissue. If high concentrations of nitrogen dioxide (>100 ppm) are inhaled, delayed pulmonary damage and breathing difficulty may occur. Mixture contains sufficient oxygen to support life. Contents under pressure. Use and store below 125 °F (52 °C).

IDHI: 20 ppm (NO2)

3 COMPOSITION/INFORMATION ON INGREDIENTS

Ingredients:

Cas #	I Percentage	I Chemical Name
N/A	99.9900-99.9998%	Air
10102-44-0	0.0002-0.0100%	Nitrogen dioxide

4 FIRST AID MEASURES

- 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.
- Delayed onset of life-threatening symptoms is likely to occur. Victim(s) must be taken for medical attention.
- Victims should be carried (not assisted) to an uncontaminated area and inhale fresh air supplemented with oxygen. Quick removal from the contaminated area is most important. Keep patient warm, quiet and under competent medical observation until the danger of delayed pulmonary edema has passed (at least 72 hours). Any physical exertion during this period should be discouraged as it may increase the severity of the pulmonary edema or chemical pneumonitis. Bed rest is indicated. Unconscious persons should be moved to an uncontaminated area, given artificial resuscitation and supplemental oxygen. Once respiration has been restored, they should be treated as above.
- Skin Contact:** Remove contaminated clothing and flush affected area with large quantities of water. If irritation persists or symptoms occur, seek medical attention. If frostbite has occurred, seek medical attention immediately; do NOT rub the affected areas or flush them with water. In order to prevent further tissue damage, do NOT attempt to remove frozen clothing from frostbitten areas.
- Eye Contact:** PERSONS WITH POTENTIAL EXPOSURE TO NITROGEN DIOXIDE SHOULD NOT WEAR CONTACT LENSES. Flush eyes with large amounts of water for at least 15 minutes, holding eyelids open to ensure adequate rinsing. If irritation persists, seek immediate medical attention.
- Ingestion:** None anticipated; product is a gas.

Most important symptoms and effects, both acute and delayed:
The most important known symptoms and effects are described in the labeling (see Section 2) and/or Section 11.

Indication of any immediate medical attention and special treatment needed:
No data available.

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5 FIRE FIGHTING MEASURES

Flammability:	Not flammable
Flash Point:	NA
Flash Point Method:	NA
Burning Rate:	Not determined
Autoignition Temp:	Not determined
LEL:	NA
UEL:	NA

Extinguishing Media:

Use as appropriate for surrounding material.

Special Hazards Arising From the Substance or Mixture:

Nitrogen Oxides (NOx)
Oxygen gas

Advice for Firefighters:

Stop the flow of gas if it can be done without risk. Use water spray to cool surrounding containers. Continue to cool surrounding containers until well after flames are extinguished. Firefighters should wear a full-face piece, NIOSH/MSHA-approved self-contained breathing apparatus (SCBA) operated in positive pressure mode and full turnout gear.

Further Information:

If incinerated, may release toxic fumes.

Use water spray to cool unopened containers.

Nitrogen dioxide can slowly react with water to form a corrosive solution of nitric acid. Nitric acid is corrosive to skin and metal.

Cylinders may rupture violently from pressure when involved in a fire situation.

See Section 7 for more information on safe handling.

See Section 8 for more information on personal protection equipment.

See Section 13 for disposal information.

6 ACCIDENTAL RELEASE MEASURES

Personal Precautions, Protective Equipment and Emergency Procedures:

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 nitrogen dioxide 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.

Environmental Precautions:

Prevent further release (leakage/spillage) if safe to do so.

Methods and Materials for Containments and Cleaning Up:

Contact the appropriate emergency telephone number listed in Section 1 or call your closest Norco/Norlab location. Ensure adequate ventilation.

Reference to Other Sections:

See Section 7 for information on safe handling.

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See Section 8 for information on personal protection equipment.

See Section 13 for information on proper disposal.

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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 reducing regulator when connecting cylinder to lower pressure 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.

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:

Non-hazardous. Ensure adequate ventilation. This gas mixture is non-corrosive. Nitrogen dioxide content may cause some corrosion of copper and copper alloys. Teflon is the preferred gasket material for pure nitrogen dioxide.

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 128 °F (82 °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 Pamphlet P-1.

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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.

Personal Protective Equip:

Eye/face protection:

When using material use safety glasses, gloves and vapor respirator according to HMIS PP, G. Use of a face shield according to HMIS PP, O is also highly recommended. All safety equipment should be tested and approved under appropriate government standards such as NIOSH (US) or EN 166 (EU).

Skin protection:

Handle with protective gloves as appropriate for the job (rubber or Teflon for pure nitrogen dioxide). Gloves must be inspected prior to use. Dispose of contaminated gloves according to applicable laws and workplace practices.

Body Protection:

Chemically resistant gloves, safety glasses and face shield are recommended. Type of protective equipment should be selected based on concentration amount and conditions of use of this material. Use safety shoes.

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Respiratory protection:

A vapor respirator may be required as backup to engineering controls when proper engineering controls are not in place to keep TLV and PEL limits below defined thresholds. A NIOSH/MSHA-approved full-face piece SCBA operated in positive mode and/or any supplied air respirator with a full-face piece and operated in a positive pressure mode in combination with an auxiliary self contained breathing apparatus operated in positive pressure mode should be used for high or unknown concentrations. Respirators should be stored in an area not likely to be contaminated.

Control of environmental exposure:

Prevent leakage or spillage if safe to do so.

Components with workplace control parameters:

Component(s): Air; Nitrogen dioxide

CAS No(s): N/A; 10102-44-0

USA NIOSH (ST/REL): 1.0 ppm, 1.8 mg/m³

USA ACGIH (TWA/TLV): 0.2 ppm

USA ACGIH (STEL/TLV): 5.0 ppm

USA OSHA Occupational Exposure Limits Table Z-1 Limits for Air Contaminant (C): 5.0 ppm, 9.0 mg/m³

Biological occupational exposure limits:

Contains no substances with biological occupational exposure limit values.

9 PHYSICAL AND CHEMICAL PROPERTIES

Appearance:	Clear, colorless to red-brown gas	Odor:	Acrid, acidic
Physical State:	Gas	Molecular Formula:	MIXTURE
Odor Threshold:	0.1 - 0.4 ppm (as NO ₂)	Solubility:	(b/v @ 0.0 °C (32.0 °F), 1 atm): 0.023
Particle Size:	Not determined	Softening Point:	Not determined
Spec Grav./Density:	Not determined	Percent Volatile:	100%
Viscosity:	Not determined	Heat Value:	Not determined
Sat. Vap. Conc.:	Not determined	Freezing/Melting Pt.:	-209.9 °C (-348.9 °F)
Boiling Point:	-195.8 °C (-320.4 °F)	Flash Point:	DNA
Flammability:	(solid, gas): Not flammable	Octanol:	Not determined
Partition Coefficient:	Not determined	Vapor Density:	(air = 1): 0.906
Vapor Pressure:	Not determined	VOC:	DNA
pH:	Not determined	Bulk Density:	DNA
Evap. Rate:	Not determined	Auto-Ignition Temp:	Not determined
Molecular weight:	MIXTURE	UFI/IFI:	DNA
Decomp Temp:	Not determined		

10 STABILITY AND REACTIVITY

Stability:	Product is stable under normal conditions.
Conditions to Avoid:	Incompatibilities, flames, ignition sources.
Materials to Avoid:	Strong bases, strong oxidizers, alkali metals, alkali earth metals and powdered metals.
Hazardous Decomposition:	No further information available.
Hazardous Polymerization:	Will not occur.

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11 TOXICOLOGICAL INFORMATION

Component(s): Air; Nitrogen dioxide
CAS No(s): N/A; 10102-44-0

Acute Toxicity:
LC50 Inhalation - Rat: 115 ppm (1 h)

Skin Corrosion/Irritation: No data available.

Serious Eye Damage/Eye Irritation: No data available.

Respiratory or Skin Sensitation: 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 a carcinogen or potential 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 carcinogen or potential 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.

Specific Target Organ Toxicity - Single Exposure: No data available.

Specific Target Organ Toxicity - Repeated Exposure: No data available.

Aspiration Hazard: No data available.

Additional Information:

Component: Air; RTECS: N/A

Component: Nitrogen dioxide; RTECS: QW9800000

12 ECOLOGICAL INFORMATION

Component(s): Air; Nitrogen dioxide
CAS No(s): N/A; 10102-44-0

Toxicity:

Toxicity to fish:

IC80 - Tinca tinca (Tench): 19.6 mg/l (96 h)

Toxicity to daphnia and other aquatic invertebrates:

No data available.

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Persistence and Degradability:

This gas mixture will be dissipated rapidly in well-ventilated areas. Complex reactions of nitrogen dioxide occur in the atmosphere which contribute to air pollution. Nitrogen dioxide will hydrolyze to nitric acid when in contact with water.

Bioaccumulative potential:

Log K_{OW} = Not applicable

Not expected to bioaccumulate due to the log K_{OW} (log K_{OW} < 4).

Mobility in Soil:

No data available.

Results of PBT and vPvB assessment:

Not required/conducted.

Other Adverse Effects:

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal. Harmful to aquatic life. Product does not contain Class I or Class II ozone depleting substances.

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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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TRANSPORT INFORMATION

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

UN #: UN 1956, Class: 2, Proper Shipping Name: Compressed gas, n.o.s. (Nitrogen dioxide, Air)

DOT (US)

UN Number: 1956

Class: 2.2

ERG #: 126

Proper Shipping Name: Compressed gas, n.o.s. (Nitrogen dioxide, Air)

IMDG

UN Number: 1956

Class: 2

EMS-No: F-C, S-V

Proper Shipping Name: Compressed gas, n.o.s. (Nitrogen dioxide, Air)

IATA

UN Number: 1956

Class: 2

Proper Shipping Name: Compressed gas, n.o.s. (Nitrogen dioxide, Air)

Canada TDG

UN Number: 1956

Class: 2.2

Proper Shipping Name: Compressed gas, n.o.s. (Nitrogen dioxide, Air)

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15 REGULATORY INFORMATION

COMPONENT / (CAS/PERC) / CODES

*Air (N/A 99.9900-99.9998%) MASS, NJHS, PA, SARA311/312, TSCA

*Nitrogen dioxide (10102440 0.0002-0.0100%) ACUTERCRA, CERCLA, CSWHS, EHS302, MASS, NJEHS, NJHS, OSHAPSM, OSHAWAC, PA, SARA311/312, TSCA, TXAIR, TXHWL

The presence of nitrogen dioxide in quantities in excess of the threshold planning quantity (TPQ) of 100 pounds requires certain emergency planning activities to be conducted.

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 under CERCLA, Section 304 SARA Title III.

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
- OSHA PSM = OSHA Chemicals Requiring process safety management
- OSHA wAC = OSHA workplace Air Contaminants
- PA = PA Right-To-Know List of Hazardous Substances
- SARA311/312 = SARA 311/312 Toxic Chemicals
- TSCA = Toxic Substances Control Act
- TXAIR = TX Air Contaminants with Health Effects Screening Level
- TXHWL = TX Hazardous waste List

16 OTHER INFORMATION

Disclaimer:

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The data in this Safety Data Sheet relates only to the specific material designated herein and does not relate to use in combination with any other material in any process. The information set forth herein is furnished free of charge and is based on technical data that Norlab believes to be reliable. It is intended for use by persons having technical skill and at their own discretion and risk. Since conditions of use are outside of Norlab's control, Norlab makes no warranties, expressed or implied, and assumes no liability in connection with any use of this information. Nothing herein is to be taken as a license to operate under, or a recommendation to infringe upon, any patents.