

Material Safety Data Sheet

Printing date 10/27/2011

Version 6

Reviewed on 10/27/2011

1 Identification of substance

· **Product details**

· **Trade name:** Nitric Oxide

· **Article number:** 047-01-0022

· **Creation date:** 08/16/2006

· **Manufacturer/Supplier:**

Linde Canada Limited

5860 Chedworth Way

Mississauga, Ontario L5R 0A2

Telephone (905) 501-1700

24-HOUR EMERGENCY TELEPHONE NUMBER:

(905) 501-0802

Linde

575 Mountain Avenue

Murray Hill, NJ 07974

Telephone (908) 464-8100

24-HOUR EMERGENCY TELEPHONE NUMBER :

CHEMTREC (800) 424-9300 OR

Linde National Operations Center (800) 232-4726

Pse ensure that this MSDS is received by the appropriate person.

· **Information department:** Customer Service Centre: 1-866-385-5349

2 Composition/Data on components

· **Chemical characterization:**

· **CAS No. Description**

10102-43-9 Nitric Oxide

· **Identification number(s)**

· **EINECS Number:** 233-271-0

· **Index number:** 007-002-00-0

3 Hazards identification

· **Hazard description:**



Toxic
 Corrosive
 Oxidizing

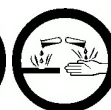
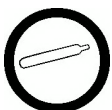
· **WHMIS-symbols:**

A - Compressed gas

C - Oxidizing materials

D1A - Very toxic material causing immediate and serious toxic effects

E - Corrosive material



· **HMIS-ratings (scale 0 - 4)**

HEALTH 3

Health = 3

FIRE 0

Fire = 0

REACTIVITY 3

Reactivity = 3

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· **NFPA ratings (scale 0 - 4)**

Health = 4
Fire = 0
Reactivity = 1

· **Information pertaining to particular dangers for man and environment:**

Contact with combustible material may cause fire.

Toxic by inhalation.

Causes severe burns.

· **Classification system:**

The classification is in line with internationally approved calculation standards. It is expanded, however, by information from technical literature and by information furnished by supplier companies.

· **GHS label elements****Danger**

2.4/1 - May cause or intensify fire; oxidizer.

**Danger**

3.1/2 - Fatal if inhaled.

**Danger**

3.2/1A - Causes severe skin burns and eye damage.

**Warning**

2.5/C - Contains gas under pressure; may explode if heated.

· **Response:**

IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.

IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do.

Continue rinsing.

Immediately call a POISON CENTER or doctor/physician.

Specific treatment is urgent (see on this label).

· **Storage:**

Store locked up.

Protect from sunlight. Store in a well-ventilated place.

· **Disposal:**

Dispose of contents/container in accordance with local/regional/national/international regulations.

* **4 First aid measures**· **General information:**

Immediately remove any clothing soiled by the product.

Remove breathing apparatus only after contaminated clothing have been completely removed.

In case of irregular breathing or respiratory arrest provide artificial respiration.

· **After inhalation:**

Supply fresh air or oxygen; call for doctor.

In case of unconsciousness place patient stably on the body side position.

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- **After skin contact:**
Immediately wash with water thoroughly for at least 15 minutes while removing contaminated clothing and shoes.
Get medical attention immediately
- **After eye contact:** Rinse opened eye for at least 15 minutes under running water. Then consult a doctor.
- **After swallowing:** Not applicable

* 5 Fire fighting measures

- **Suitable extinguishing agents:**
CO2, powder or water spray. Fight larger fires with water spray or alcohol resistant foam.
- **Protective equipment:** Wear self-contained respiratory protective device.

* 6 Accidental release measures

- **Person-related safety precautions:**
Wear protective equipment. Keep unprotected persons away.
Ensure adequate ventilation.
Eliminate ignition sources
Stop leak - ONLY if possible to do so without risk.
- **Measures for environmental protection:**
Prevent seepage into sewage system, workpits and/or cellars.
In case of gas release or seepage into the ground inform responsible authorities.
- **Measures for cleaning/collecting:**
Use neutralizing agent.
Dispose contaminated material as waste according to item 13.
Ensure adequate ventilation.

* 7 Handling and storage

- **Handling:**
- **Information for safe handling:**
Ensure good ventilation/exhaustion at the workplace.
Open and handle cylinder with care.
Handle with care. Avoid jolting, friction, and impact.
Use only in well ventilated areas.
Store container in a secured area. Limit access to authorized personnel only. Report any incidents involving thefts, misuse, or inventory shortages to law enforcement and the supplier. Security shall be provided in accordance with all local, state (provincial) and federal regulations.
- **Information about protection against explosions and fires:**
Keep ignition sources away - Do not smoke.
Keep respiratory protective device available.
Pressurized container: protect from sunlight and do not expose to temperatures exceeding 50°C. Do not pierce or burn, even after use.
- **Storage:**
- **Requirements to be met by storerooms and receptacles:**
Do not expose cylinder to temperatures higher than 50°C (122 °F)
- **Information about storage in one common storage facility:**
Sources of ignition should be removed from storage area.
Store separately from cylinders containing flammables by a minimum distance of 20' or by a barrier of non-combustible material at least 5' high having a fire resistant rating of at least 30minutes.
- **Further information about storage conditions:**
Keep cylinder valve tightly closed.

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Store cylinder in a well ventilated area.
Store in accordance with local fire code and/or building code or any pertaining regulations.

8 Exposure controls and personal protection

· Additional information about design of technical systems:

Adequate local ventilation.
Safety showers and eyewash stations should be nearby.

· Components with limit values that require monitoring at the workplace:

10102-43-9 Nitric Oxide (23 - 100%)

EL	25 ppm
EV	31 mg/m ³ , 25 ppm

· **Additional information:** The lists that were valid during the creation were used as basis.

· Personal protective equipment:

· General protective and hygienic measures:

Keep away from foodstuffs, beverages and feed.
Immediately remove all soiled and contaminated clothing.
Wash hands before breaks and at the end of work.
Store protective clothing separately.
Avoid contact with the eyes and skin.
Protective clothing and PPE should be kept free of oil and grease, generally in clean condition
PPE should be inspected and maintained regularly to retain effectiveness.

· Breathing equipment:

Use atmosphere-supplying respirators (e.g. supplied-air: demand, pressure-demand, or continuous-flow or self-contained breathing apparatus: demand or pressure-demand or combination supplied-air with auxiliary self-contained air supply atmosphere-supplying respirator) in case of insufficient ventilation.

· Protection of hands:



Protective gloves.

· Material of gloves

The selection of the suitable gloves does not only depend on the material, but also on further marks of quality and varies from manufacturer to manufacturer.

· **Eye protection:** Safety glasses

9 Physical and chemical properties

· General Information

Form:	Gaseous.
Color:	Colorless
Odor:	Odorless

· Change in condition

Melting point/Melting range: -163.6°C
Boiling point/Boiling range: -151°C

· **Flash point:** Not applicable.

· **Flammability (solid, gaseous):** Contact with combustible material may cause fire.

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· **Danger of explosion:** Explosive when mixed with combustible material.

10 Stability and reactivity

- **Thermal decomposition / conditions to be avoided:** No decomposition if used according to specifications.
- **Materials to be avoided:**
- **Dangerous reactions**
 - May react violently with reducing agents.
 - Violently oxidises organic substances.
 - May react violently with combustible substances.
- **Dangerous products of decomposition:**
 - In case of fire or thermal decomposition fumes of toxic nitrogen oxides are formed.

11 Toxicological information

· **Acute toxicity:**

· **LD/LC50 values that are relevant for classification:**

10102-43-9 Nitric Oxide

Inhalative	LC50/4hr	115 ppm (rat)
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- **Primary irritant effect:**
- **on the skin:** Strong caustic effect on skin and mucous membranes.
- **on the eye:** Strong caustic effect.
- **Sensitization:** No sensitizing effects known.
- **Additional toxicological information:**
 - Swallowing will lead to a strong caustic effect on mouth and throat and to the danger of perforation of esophagus and stomach.

12 Ecological information

- **Additional ecological information:**
- **General notes:** Must not reach bodies of water or drainage ditch undiluted or unneutralized.

13 Disposal considerations

- **Product:**
- **Recommendation:** Unused product should be returned to vendor.
- **Uncleaned packagings:**
- **Recommendation:**
 - Cylinder and unused product should be returned to vendor. Disposable cylinder must be disposed of in accordance with local regulations.
- **Recommended cleansing agent:** None applicable.

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* **14 Transport information**

· TDG and DOT regulations:



- Hazard class: 2
- Identification number: UN1660
- Packing group: -
- Proper shipping name (technical name): NITRIC OXIDE, COMPRESSED
- Label: 2.3+5.1+8
- Packaging group: -

· Maritime transport IMDG:



- IMDG Class: 2.3
- UN Number: 1660
- Label: 2.3+5.1+8
- Packaging group: -
- EMS Number: F-C,S-W
- Marine pollutant: No
- Proper shipping name: NITRIC OXIDE, COMPRESSED

· Air transport ICAO-TI and IATA-DGR:



- ICAO/IATA Class: 2
- UN/ID Number: 1660
- Label: 2.3+5.1+8
- Packaging group: -
- Proper shipping name: NITRIC OXIDE, COMPRESSED

- UN "Model Regulation": UN1660, NITRIC OXIDE, COMPRESSED, 2.3 (5.1+8)

* **15 Regulations**

· Sara

· Section 355 (extremely hazardous substances):

Substance is listed.

· Section 313 (Specific toxic chemical listings):

Substance is not listed.

· TSCA (Toxic Substances Control Act):

Substance is listed.

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· **Proposition 65**· **Chemicals known to cause cancer:**

Substance is not listed.

· **Chemicals known to cause reproductive toxicity for females:**

Substance is not listed.

· **Chemicals known to cause reproductive toxicity for males:**

Substance is not listed.

· **Chemicals known to cause developmental toxicity:**

Substance is not listed.

· **Carcinogenicity categories**· **EPA (Environmental Protection Agency)**

Substance is not listed.

· **NTP (National Toxicology Program)**

Substance is not listed.

· **TLV (Threshold Limit Value established by ACGIH)**

Substance is not listed.

· **NIOSH-Ca (National Institute for Occupational Safety and Health)**

Substance is not listed.

· **OSHA-Ca (Occupational Safety & Health Administration)**

Substance is not listed.

· **Canadian substance listings:**· **Canadian Domestic Substances List (DSL)**

Substance is listed.

· **Canadian Ingredient Disclosure list (limit 0.1%)**

Substance is not listed.

· **Canadian Ingredient Disclosure list (limit 1%)**

Substance is listed.

· **Product related hazard informations:**

The product was classified in accordance with the hazard criteria of the Canadian Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR.

· **Hazard symbols:**

Toxic
Corrosive
Oxidizing

· **Risk phrases:**

Contact with combustible material may cause fire.
Toxic by inhalation.
Causes severe burns.

· **Safety phrases:**

Keep in a cool place.
Keep away from living quarters.
Keep container in a well-ventilated place.
Keep away from combustible material.
When using do not eat or drink.

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Do not breathe gas/fumes/vapour/spray (appropriate wording to be specified by the manufacturer).

16 Other information

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

Please refer to the section 3 for NFPA and HMIS Hazard Codes.

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GENERAL DISCLAIMER

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· **Department issuing MSDS:** Customer Service Centre: 1-866-385-5349

· Abbreviations and Acronyms:

ACGIH: American Conference of Governmental Industrial Hygienists

CAS: Chemical Abstract Service (Division of the American Chemical Society)

DOT: US Department of Transportation

EINECS: European Inventory of Existing Commercial Chemical Substances

GHS: Globally Harmonized System of Classification and Labelling of Chemicals

HMIS: Hazardous Material Identification System

IATA: International Air Transportation Association

IATA-DGR: Dangerous Goods Regulations by the "International Air Transportation Association"

ICAO: International Civil Aviation Association

ICAO-TI: Technical Instructions by the "International Civil Aviation Organization (ICAO)"

IMDG: International Marine Code for Dangerous Goods

WHIMS: Workplace Hazardous Material Information System

LC50: Lethal Concentration, 50 Percent

LD50: Lethal Dose, 50 Percent

N/A: Not Applicable

CDN