

# Material Safety Data Sheet

Printing date 02/16/2012

Version 19

Reviewed on 02/16/2012

## 1 Identification of substance

· **Product details**

· **Trade name: Nitrogen Dioxide**

· **Article number:** 048-01-0009

· **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**

10102-44-0 Nitrogen dioxide

· **Identification number(s)**

· **EINECS Number:** 233-272-6

· **Index number:** 007-002-00-0

## 3 Hazards identification

· **Hazard description:**



Very toxic

· **WHMIS-symbols:**

A - Compressed gas

D1A - Very toxic material causing immediate and serious toxic effects

E - Corrosive material



· **HMIS-ratings (scale 0 - 4)**

HEALTH 4

Health = 4

FIRE 0

Fire = 0

REACTIVITY 0

Reactivity = 0

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**Trade name: Nitrogen Dioxide**

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- **NFPA ratings (scale 0 - 4)**



Health = 4  
Fire = 0  
Reactivity = 0

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

Very toxic by inhalation.

Causes 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**

3.1/1 - Fatal if inhaled.



**Danger**

3.2/1B - 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.

- **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.

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· **After swallowing:** Not applicable

## \* 5 Fire fighting measures

- **Suitable extinguishing agents:**  
CO<sub>2</sub>, 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.  
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)  
Protect cylinders from physical damage. Store in cool, dry, well-ventilated area away from heavily trafficked areas and emergency exits. Do not allow the temperature where cylinders are stored to exceed 125°F (52°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 being stored for excessive periods of time.
- **Information about storage in one common storage facility:**  
Sources of ignition should be removed from storage area.
- **Further information about storage conditions:**  
Keep cylinder valve tightly closed.

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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:**

**10102-44-0 Nitrogen dioxide (23 - 100%)**

EL Short-term value: C 1 ppm

EV Short-term value: 9.4 mg/m<sup>3</sup>, 5 ppmLong-term value: 5.6 mg/m<sup>3</sup>, 3 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**

<b>Form:</b>	Compressed gas
<b>Color:</b>	Red-brown
<b>Odor:</b>	Pungent

- **Change in condition**

**Melting point/Melting range:** -11.2°C

**Boiling point/Boiling range:** 21°C

- **Flash point:** ≤ 21°C

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· **Danger of explosion:** Product does not present an explosion hazard.

## \* 10 Stability and reactivity

- **Thermal decomposition / conditions to be avoided:** No decomposition if used according to specifications.
- **Materials to be avoided:**
- **Dangerous reactions** Reacts with water to form corrosive acids and to cause corrosion to some metals.
- **Dangerous products of decomposition:**  
In case of fire or thermal decomposition toxic nitrogen oxides may be released.

## \* 11 Toxicological information

· **Acute toxicity:**

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

**10102-44-0 Nitrogen dioxide**

Inhalative	LC50/4hr	115 ppm (rat)
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· **Primary irritant effect:**

· **on the skin:** 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:**

Generally not hazardous for water

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: UN1067
- Proper shipping name (technical name): DINITROGEN TETROXIDE (NITROGEN DIOXIDE)
- Label: 2.3

## · Maritime transport IMDG:



- IMDG Class: 2.3
- UN Number: 1067
- Label: 2.3
- Marine pollutant: No
- Proper shipping name: DINITROGEN TETROXIDE (NITROGEN DIOXIDE)

## · Air transport ICAO-TI and IATA-DGR:



- ICAO/IATA Class: 2
- UN/ID Number: 1067
- Label: 2.3
- Proper shipping name: DINITROGEN TETROXIDE (NITROGEN DIOXIDE)

- UN "Model Regulation": UN1067, DINITROGEN TETROXIDE (NITROGEN DIOXIDE), 2.3

## \* 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.

## · Proposition 65

## · Chemicals known to cause cancer:

Substance is not listed.

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

Substance is not listed.

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

Substance is not listed.

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

Substance is not listed.

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

Substance is not listed.

**· NTP (National Toxicology Program)**

Substance is not listed.

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

10102-44-0 Nitrogen dioxide

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**· 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:**

Very toxic

**· Risk phrases:**

Very toxic by inhalation.  
Causes burns.

**· Safety phrases:**

After contact with skin, was immediately with plenty of water  
Keep container in a well-ventilated place.  
In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.  
Wear suitable protective clothing, gloves and eye/face protection.  
In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

**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.

**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

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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).

**GENERAL DISCLAIMER**

For terms and conditions, including limitation of liability, please refer to the purchase agreement in effect between Linde Inc. (or any of its affiliates and subsidiaries) and the purchaser.

· **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

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