



# Nitrogen dioxide

## Safety Data Sheet E-4633

according to the Hazardous Products Regulation (February 11, 2015)

Date of issue: 10-15-1979

Revision date: 07-28-2023

Supersedes: 01-01-2021

Version: 1.1

### SECTION 1: Identification

#### 1.1. Product identifier

Product form	: Substance
Substance name	: Nitrogen dioxide
CAS No	: 10102-44-0
Formula	: NO <sub>2</sub>
Other means of identification	: Nitrito, Nitrogen oxide, Nitrogen peroxide, nitrogen tetroxide, NTO, red oxide of nitrogen
Product group	: Core Products

#### 1.2. Recommended use and restrictions on use

Recommended uses and restrictions : Industrial use, Use as directed.

#### 1.3. Supplier

Linde Canada inc.  
500 — 5015 Spectrum Way  
Mississauga - Canada L4W 0E4  
T 1-905-803-1600 - F 1-905-803-1682  
[www.lindecana.ca](http://www.lindecana.ca)

#### 1.4. Emergency telephone number

Emergency number : 1-800-363-0042  
Call emergency number 24 hours a day only for spills, leaks, fire, exposure, or accidents involving this product.  
For routine information, contact your supplier or Linde sales representative.

### SECTION 2: Hazard identification

#### 2.1. Classification of the substance or mixture

##### GHS-CA classification

Oxidising Gases, Category 1	H270
Gases under pressure : Liquefied gas	H280
Acute toxicity (inhalation:gas) Category 1	H330
Skin corrosion/irritation, Category 1B	H314
Serious eye damage/eye irritation, Category 1	H318

#### 2.2. GHS Label elements, including precautionary statements

##### GHS-CA labelling

Hazard pictograms



Signal word

: DANGER

Hazard statements

: MAY CAUSE OR INTENSIFY FIRE; OXIDIZER  
CONTAINS GAS UNDER PRESSURE; MAY EXPLODE IF HEATED  
CAUSES SEVERE SKIN BURNS AND EYE DAMAGE  
CAUSES SERIOUS EYE DAMAGE  
FATAL IF INHALED

Precautionary statements

: Do not handle until all safety precautions have been read and understood  
Keep away from clothing and other combustible materials  
Keep valves and fittings free from oil and grease  
Do not breathe gas, vapours  
Do not get in eyes, on skin, or on clothing.

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Use and store only outdoors or in a well-ventilated area.  
Wear eye protection, face protection, protective clothing, protective gloves  
IN CASE OF FIRE: Stop leak if safe to do so  
Store locked up  
Dispose of contents/container in accordance with container Supplier/owner instructions  
Protect from sunlight when ambient temperature exceeds 52°C (125°F).  
Use a back flow preventive device in the piping.  
Close valve after each use and when empty.  
Do not open valve until connected to equipment prepared for use.  
When returning cylinder, install leak tight valve outlet cap or plug.  
Open valve slowly.  
Use only with equipment cleaned for oxygen service.

### 2.3. Other hazards

Other hazards which do not result in classification : None.

### 2.4. Unknown acute toxicity (GHS CA)

Not applicable

## SECTION 3: Composition/information on ingredients

### 3.1. Substances

Name	CAS No.	% (Vol.)	Common Name (synonyms)
Nitrogen dioxide (Main constituent)	(CAS No) 10102-44-0	100	Nitrogen oxide (NO2) / Nitrogen oxide / Nitrogen(IV) oxide / Nitrogen peroxide

### 3.2. Mixtures

Not applicable

## SECTION 4: First-aid measures

### 4.1. Description of first aid measures

- First-aid measures after inhalation : Remove to fresh air and keep at rest in a position comfortable for breathing. If not breathing, give artificial respiration. If breathing is difficult, trained personnel should give oxygen. Call a physician. . WARNING: To avoid possible chemical burns, the rescuer should avoid breathing any exhaled air from the victim.
- First-aid measures after skin contact : In case of contact, immediately flush affected areas with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Call a physician. Wash clothing before reuse. Discard contaminated shoes.
- ,The liquid may cause frostbite. For exposure to liquid, immediately warm frostbite area with warm water not to exceed 105°F (41°C). Water temperature should be tolerable to normal skin. Maintain skin warming for at least 15 minutes or until normal coloring and sensation have returned to the affected area. In case of massive exposure, remove clothing while showering with warm water. Seek medical evaluation and treatment as soon as possible.
- First-aid measures after eye contact : Immediately flush eyes thoroughly with water for at least 15 minutes. Hold the eyelids open and away from the eyeballs to ensure that all surfaces are flushed thoroughly. Contact an ophthalmologist immediately.
- First-aid measures after ingestion : Ingestion is not considered a potential route of exposure.

### 4.2. Most important symptoms and effects (acute and delayed)

Symptoms/injuries : No additional information available

### 4.3. Immediate medical attention and special treatment, if necessary

Other medical advice or treatment : CONTACT WITH THIS PRODUCT REQUIRES IMMEDIATE MEDICAL ATTENTION!  
Symptoms may be delayed. Seek medical attention even if no symptoms are present.

## SECTION 5: Fire-fighting measures

### 5.1. Suitable extinguishing media

Suitable extinguishing media : Use extinguishing media appropriate for surrounding fire.

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### 5.2. Unsuitable extinguishing media

No additional information available

### 5.3. Specific hazards arising from the hazardous product

- Fire hazard : Oxidizing agent; vigorously accelerates combustion. Contact with flammable materials may cause fire or explosion.
- Explosion hazard : Heating may cause an explosion. PRESSURISED CONTAINER: MAY BURST IF HEATED.
- Reactivity : Cylinders are **NOT** equipped with a pressure relief valve. MAY CAUSE OR INTENSIFY FIRE; OXIDIZER.
- Reactivity in case of fire : No reactivity hazard other than the effects described in sub-sections below.

### 5.4. Special protective equipment and precautions for fire-fighters

- Firefighting instructions : **DANGER: Toxic, oxidizing, corrosive liquid and gas under pressure.**
- Evacuate all personnel from the danger area. Use self-contained breathing apparatus (SCBA) and protective clothing. Immediately cool containers with water from maximum distance. Stop flow of gas if safe to do so, while continuing cooling water spray. Remove ignition sources if safe to do so. Remove containers from area of fire if safe to do so. On-site fire brigades must comply with their provincial and local fire code regulations.
- Special protective equipment for fire fighters : Standard protective clothing and equipment (Self Contained Breathing Apparatus) for fire fighters.
- Specific methods : Use fire control measures appropriate for the surrounding fire. Exposure to fire and heat radiation may cause gas containers to rupture. Cool endangered containers with water spray jet from a protected position. Prevent water used in emergency cases from entering sewers and drainage systems.
- Stop flow of product if safe to do so.
- Use water spray or fog to knock down fire fumes if possible.
- Other information : Cylinders are **NOT** equipped with a pressure relief valve.

## SECTION 6: Accidental release measures

### 6.1. Personal precautions, protective equipment and emergency procedures

- General measures : **DANGER: Toxic, oxidizing, corrosive liquid and gas under pressure.** Immediately evacuate all personnel from danger area. Do not approach area without self-contained breathing apparatus and protective clothing. If cylinders are leaking, reduce toxic vapors with water spray or fog. Reverse flow into cylinder may cause rupture. (See section 16.) Shut off flow if without risk. Ventilate area or move cylinder to a well-ventilated area.

### 6.2. Methods and materials for containment and cleaning up

- For containment : Prevent runoff from contaminating the surrounding environment.
- Methods for cleaning up : This material is a Toxic Gas. Any leaks should be handled by Emergency Response personnel. For assistance call your supplier.

## SECTION 7: Handling and storage

### 7.1. Precautions for safe handling

- Precautions for safe handling : Do not breathe gas/vapour. Avoid all contact with skin, eyes, or clothing. Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure.
- Wear leather safety gloves and safety shoes when handling cylinders. Protect cylinders from physical damage; do not drag, roll, slide or drop. While moving cylinder, always keep in place removable valve cover. Never attempt to lift a cylinder by its cap; the cap is intended solely to protect the valve. When moving cylinders, even for short distances, use a cart (trolley, hand truck, etc.) designed to transport cylinders. Never insert an object (e.g. wrench, screwdriver, pry bar) into cap openings; doing so may damage the valve and cause a leak. Use an adjustable strap wrench to remove over-tight or rusted caps. Slowly open the valve. If the valve is hard to open, discontinue use and contact your supplier. Close the container valve after each use; keep closed even when empty. Never apply flame or localized heat directly to any part of the container. High temperatures may damage the container and could cause the pressure relief device to fail prematurely, venting the container contents. For other precautions in using this product, see section 16.

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### 7.2. Conditions for safe storage, including any incompatibilities

Storage conditions

: Avoid oil, grease and all other combustible materials.

Store only where temperature will not exceed 52 °C (125 °F). Post "No Smoking/No Open Flames" signs in storage and use areas. There must be no sources of ignition. Separate packages and protect against potential fire and/or explosion damage following appropriate codes and requirements (e.g.: CSA, TSSA, or NFPA Codes), or according to the provincial requirements determined by the Authority Having Jurisdiction (AHJ). Always secure containers upright to keep them from falling or being knocked over. Install valve protection cap, if provided, firmly in place by hand when the container is not in use. Store full and empty containers separately. Use a first-in, first-out inventory system to prevent storing full containers for long periods. For other precautions in using this product, see section 16.

**OTHER PRECAUTIONS FOR HANDLING, STORAGE, AND USE:** When handling product under pressure, use piping and equipment adequately designed to withstand the pressures to be encountered. Never work on a pressurized system. Use a back flow preventive device in the piping. Gases can cause rapid suffocation because of oxygen deficiency; store and use with adequate ventilation. If a leak occurs, close the container valve and blow down the system in a safe and environmentally correct manner in compliance with all international, federal/national, state/provincial, and local laws; then repair the leak. Never place a container where it may become part of an electrical circuit.

## SECTION 8: Exposure controls/personal protection

### 8.1. Control parameters

Nitrogen dioxide (10102-44-0)		
USA - ACGIH	ACGIH OEL TWA [ppm]	0.2 ppm
USA - OSHA	OSHA PEL C	9 mg/m <sup>3</sup>
USA - OSHA	OSHA PEL (Ceiling) (ppm)	5 ppm
Canada (Quebec)	VEMP (OEL TWA)	5.6 mg/m <sup>3</sup>
Canada (Quebec)	VEMP (OEL TWA) [ppm]	3 ppm
Alberta	OEL STEL	9.4 mg/m <sup>3</sup>
Alberta	OEL STEL [ppm]	5 ppm
Alberta	OEL TWA	5.6 mg/m <sup>3</sup>
Alberta	OEL TWA [ppm]	3 ppm
British Columbia	OEL C [ppm]	1 ppm
Manitoba	OEL TWA [ppm]	0.2 ppm
New Brunswick	OEL STEL	9.4 mg/m <sup>3</sup>
New Brunswick	OEL STEL [ppm]	5 ppm
New Brunswick	OEL TWA	5.6 mg/m <sup>3</sup>
New Brunswick	OEL TWA [ppm]	3 ppm
New Foundland & Labrador	OEL TWA [ppm]	0.2 ppm
Nova Scotia	OEL TWA [ppm]	0.2 ppm
Nunavut	OEL STEL [ppm]	5 ppm
Nunavut	OEL TWA [ppm]	3 ppm
Northwest Territories	OEL STEL [ppm]	5 ppm
Northwest Territories	OEL TWA [ppm]	3 ppm
Ontario	OEL STEL [ppm]	5 ppm
Ontario	OEL TWA [ppm]	3 ppm
Prince Edward Island	OEL TWA [ppm]	0.2 ppm
Québec	VEMP (OEL TWA)	5.6 mg/m <sup>3</sup>
Québec	VEMP (OEL TWA) [ppm]	3 ppm
Saskatchewan	OEL STEL [ppm]	5 ppm

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### Nitrogen dioxide (10102-44-0)

Saskatchewan	OEL TWA [ppm]	3 ppm
Yukon	OEL C	9 mg/m <sup>3</sup>
Yukon	OEL C [ppm]	5 ppm

#### 8.2. Appropriate engineering controls

Appropriate engineering controls : Use only in a closed system. A corrosion-resistant, forced-draft fume hood is preferred. LOCAL EXHAUST: A corrosion-resistant system is acceptable. Provide adequate general and local exhaust ventilation. Ensure exposure is below occupational exposure limits (where available).

#### 8.3. Individual protection measures/Personal protective equipment

Personal protective equipment : Safety glasses. Face shield. Gloves.



Hand protection : Wear work gloves when handling containers. Wear heavy rubber gloves where contact with product may occur.

Eye protection : Provide readily accessible eye wash stations and safety showers. Wear goggles and a face shield when transfilling or breaking transfer connections. Select in accordance with the current CSA standard Z94.3, "Industrial Eye and Face Protection", and any provincial regulations, local bylaws or guidelines.

Skin and body protection : Wear suitable protective clothing.

Respiratory protection : **Respiratory protection:** Use air supplied respirator when working in confined space or where local exhaust or ventilation does not keep exposure below OEL (if applicable). Select in accordance with provincial regulations, local bylaws or guidelines. Respirators should also be approved by NIOSH and MSHA. For emergencies or instances with unknown exposure levels, use a self-contained breathing apparatus (SCBA).

Thermal hazard protection : Wear cold insulating gloves when transfilling or breaking transfer connections.

Other information : **Other protection :** Safety shoes for general handling at customer sites. Metatarsal shoes and cuffless trousers for cylinder handling at packaging and filling plants. Select in accordance with the current CSA standard Z195, "Protective Foot Wear", and any provincial regulations, local bylaws or guidelines. For working with flammable and oxidizing materials, consider the use of flame resistant anti-static safety clothing.

## SECTION 9: Physical and chemical properties

### 9.1. Information on basic physical and chemical properties

(a) Physical state	: Gas
(b) Colour	: Brownish gas.
(c) Odour	: Poor warning properties at low concentrations. Pungent.
Odour threshold	: No data available
(d) Melting point	: -11.2 °C
Freezing point	: No data available
(e) Boiling point	: 21.2 °C
(f) Flammability	: Non flammable
(g) Flammability (solid, gas)	:
(h) Flash point	: Not applicable.
(i) Auto-ignition temperature	: Not applicable.
(j) Decomposition temperature	: No data available
(k) pH	: Not applicable.
(l) Viscosity, kinematic	: Not applicable.
(m) Solubility	: Water: No data available
(n) Partition coefficient – n-octanol/water [log Pow/log Kow]	: Not applicable.
(o) Vapour pressure	: 100 kPa
(p) Density	:

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Relative gas density	: 2.8
(r) Particle characteristics	: No data available
(s) Molecular mass	: 46 g/mol
(t) Critical temperature	: 158.2 °C
(u) Critical pressure	: 10100 kPa
(v) Oxidizing properties	: Oxidizer.
(w) Relative evaporation rate (butylacetate=1)	: No data available
Relative evaporation rate (ether=1)	: Not applicable.

### 9.2. Other information

Gas group	: Liquefied gas
Additional information	: Gas/vapour heavier than air. May accumulate in confined spaces, particularly at or below ground level.

## SECTION 10: Stability and reactivity

Reactivity	: Cylinders are <b>NOT</b> equipped with a pressure relief valve. MAY CAUSE OR INTENSIFY FIRE; OXIDIZER.
Chemical stability	: Stable under normal conditions.
Possibility of hazardous reactions	: <b>May explode on contact with:</b> Incompatible materials.
Conditions to avoid	: High temperature.
Incompatible materials	: Water. Reacts with water to form corrosive acids. Nitric acid. Nitric oxide. With water causes rapid corrosion of some metals. Bases. Aluminium. <b>May explode on contact with:</b> Ammonia. Boron trichloride. Carbon disulfide. Cyclohexane. Fluorine. Formaldehyde. Nitrobenzene. Toluene. Propylene. Alcohols. Ozone. incompletely halogenated hydrocarbons.
Hazardous decomposition products	: At high temperatures : Above 160°C (320°F). Nitric oxide. Oxygen.

## SECTION 11: Toxicological information

**11.1 Likely routes of exposure** : Inhalation

**11.2 Symptoms related to the physical, chemical, and toxicological characteristics** : No additional information available

### **11.3 Delayed and immediate effects and chronic effects**

Acute toxicity (oral)	: Not classified
Acute toxicity (dermal)	: Not classified
Acute toxicity (inhalation)	: FATAL IF INHALED.
Skin corrosion/irritation	: CAUSES SEVERE SKIN BURNS. pH: Not applicable.
Serious eye damage/irritation	: CAUSES SERIOUS EYE DAMAGE. pH: Not applicable.
Respiratory or skin sensitization	: Not classified
Germ cell mutagenicity	: Not classified
Carcinogenicity	: Not classified
Reproductive toxicity	: Not classified
Specific target organ toxicity (single exposure)	: Not classified

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Specific target organ toxicity (repeated exposure) : Not classified  
Aspiration hazard : Not classified

### 11.4 Toxicity

Nitrogen dioxide ( f )10102-44-0	
LC50 inhalation rat (ppm)	57.5 ppm/4h
ATE CA (Gases)	57.5 ppmv/4h

## SECTION 12: Ecological information

### 12.1. Toxicity

Ecology - general : No data available. No known ecological damage caused by this product.

### 12.2. Persistence and degradability

Nitrogen dioxide (10102-44-0)	
Persistence and degradability	Not applicable for inorganic gases.

### 12.3. Bioaccumulative potential

Nitrogen dioxide (10102-44-0)	
Log Pow	Not applicable.
Log Kow	Not applicable.
Bioaccumulative potential	No data available.

### 12.4. Mobility in soil

Nitrogen dioxide (10102-44-0)	
Mobility in soil	No data available.
Log Pow	Not applicable.
Log Kow	Not applicable.
Ecology - soil	Because of its high volatility, the product is unlikely to cause ground or water pollution.

### 12.5. Other adverse effects

Other adverse effects : May cause pH changes in aqueous ecological systems.  
Effect on the ozone layer : None.  
Effect on global warming : No known effects from this product.

## SECTION 13: Disposal considerations

Product/Packaging disposal recommendations : Do not attempt to dispose of residual or unused quantities. Return container to supplier.

## SECTION 14: Transport information

### 14.1. Basic shipping description

In accordance with TDG

### TDG

UN-No. (TDG) : UN1067  
TDG Primary Hazard Classes : 2.3 - Class 2.3 - Toxic Gases  
TDG Subsidiary Classes : 5.1;8  
Proper shipping name : NITROGEN DIOXIDE  
ERAP Index : 25  
Explosive Limit and Limited Quantity Index : 0

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Passenger Carrying Ship Index : Forbidden  
Passenger Carrying Road Vehicle or Passenger Carrying Railway Vehicle Index : Forbidden

### 14.2. Air and sea transport

#### IMDG

UN-No. (IMDG) : 3157  
Proper Shipping Name (IMDG) : LIQUEFIED GAS, OXIDIZING, N.O.S.  
Class (IMDG) : 2.2 - Non-flammable, non-toxic gases  
MFAG-No : 124

#### IATA

UN-No. (IATA) : 3157  
Proper Shipping Name (IATA) : LIQUEFIED GAS, OXIDIZING, N.O.S.  
Class (IATA) : 2 - Gases

## SECTION 15: Regulatory information

### 15.1. National regulations

#### Nitrogen dioxide (10102-44-0)

Listed on the Canadian DSL (Domestic Substances List)

### 15.2. International regulations

#### Nitrogen dioxide (10102-44-0)

Listed on the AICS (Australian Inventory of Chemical Substances)  
Listed on IECSC (Inventory of Existing Chemical Substances Produced or Imported in China)  
Listed on the EEC inventory EINECS (European Inventory of Existing Commercial Chemical Substances)  
Listed on the Japanese ENCS (Existing & New Chemical Substances) inventory  
Listed on the Japanese ISHL (Industrial Safety and Health Law)  
Listed on the Korean ECL (Existing Chemicals List)  
Listed on NZIoC (New Zealand Inventory of Chemicals)  
Listed on PICCS (Philippines Inventory of Chemicals and Chemical Substances)  
Listed on the United States TSCA (Toxic Substances Control Act) inventory  
Listed on INSQ (Mexican National Inventory of Chemical Substances)

## SECTION 16: Other information

Date of issue : 15/10/1979  
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Supersedes : 01/01/2021

#### Indication of changes:

Training advice : Users of breathing apparatus must be trained.

Other information : When you mix two or more chemicals, you can create additional, unexpected hazards. Obtain and evaluate the safety information for each component before you produce the mixture. Consult an industrial hygienist or other trained person when you evaluate the end product. Before using any plastics, confirm their compatibility with this product.

Linde Canada asks users of this product to study this SDS and become aware of the product hazards and safety information. To promote safe use of this product, a user should (1) notify employees, agents, and contractors of the information in this SDS and of any other known product hazards and safety information, (2) furnish this information to each purchaser of the product, and (3) ask each purchaser to notify its employees and customers of the product hazards and safety information.

The opinions expressed herein are those of qualified experts within Linde Canada Inc. We believe that the information contained herein is current as of the date of this Safety Data Sheet. Since the use of this information and the conditions of use are not within the control of Linde Canada Inc, it is the user's obligation to determine the conditions of safe use of the product. Linde Canada Inc, SDSs are furnished on sale or delivery by Linde Canada Inc, or the independent distributors and suppliers who package and sell our products. To obtain current SDSs for these products, contact your Linde sales representative, local distributor, or supplier, or download from [www.lindecana.ca](http://www.lindecana.ca).

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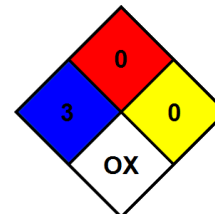
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- NFPA health hazard : 3 - Short exposure could cause serious temporary or residual injury even though prompt medical attention was given.
- NFPA fire hazard : 0 - Materials that will not burn.
- NFPA instability : 0 - Normally stable, even under fire exposure conditions, and are not reactive with water.
- NFPA specific hazard : OX - This denotes an oxidizer, a chemical which can greatly increase the rate of combustion/fire.



### HMIS III Rating

- Health : 3 Serious Hazard - Major injury likely unless prompt action is taken and medical treatment is given
- Flammability : 0 Minimal Hazard - Materials that will not burn
- Physical : 1 Slight Hazard - Materials that are normally stable but can become unstable (self-react) at high temperatures and pressures. Materials may react non-violently with water or undergo hazardous polymerization in the absence of inhibitors.

### SDS Canada (GHS) - Linde NEW

*This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product.*