

Nitric oxide**ALSA088**

2.3 : Toxic gas.



5.1 : Oxidizing substances.



8 : Corrosive substance.

Danger**SECTION 1. Identification of the substance/mixture and of the company/undertaking****Product identifier**

Trade name : Nitric oxide
SDS Nr : ALSA088
Chemical description : Nitric oxide
CAS No :010102-43-9
EC No :233-271-0
Index No :---
Registration-No. : Registration deadline not expired.
Chemical formula : NO

Relevant identified uses of the substance or mixture and uses advised against

Relevant identified uses : Industrial and professional. Perform risk assessment prior to use.
Chemical reaction / Synthesis. Laboratory use
Contact supplier for more uses information

Details of the supplier of the safety data sheet

Company identification : AIR LIQUIDE (PTY) LTD
Crn Vereeniging Road & Andre Marais Street
Alrode, Alberton
Gauteng SOUTH AFRICA
Tel. : +27 87 288 1100
E-Mail address (competent person) : scr.sales@airliquide.com

Emergency telephone number

Emergency telephone number : +27 87 288 1100

SECTION 2. Hazards identification**Classification of the substance or mixture****Hazard Class and Category Code Regulation EC 1272/2008 (CLP)**

- Health hazards : Acute toxicity, Inhalation - Category 1 - Danger - (CLP : Acute Tox. 1) - H330
Skin corrosion - Category 1B - Danger - (CLP : Skin Corr. 1B) - H314
Corrosive to respiratory tract - (CLP : EUH071)
- Physical hazards : Oxidizing gases - Category 1 - Danger - (CLP : Ox. Gas 1) - H270
Gases under pressure - Compressed gas - Warning - (CLP : Press. Gas) - H280

Classification EC 67/548 or EC 1999/45

O; R8
T+; R26
C; R34

Not included in Annex VI.

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SECTION 2. Hazards identification (continued)

Label elements

Labelling Regulation EC 1272/2008 (CLP)

- Hazard pictograms



- Hazard pictograms code

: GHS06 - GHS03 - GHS05 - GHS04

- Signal word

: Danger

- Hazard statements

: H330 - Fatal if inhaled.
 H270 - May cause or intensify fire; oxidizer.
 H314 - Causes severe skin burns and eye damage.
 H280 - Contains gas under pressure; may explode if heated.

- Supplemental hazard information

: EUH071 - Corrosive to respiratory tract.

- Precautionary statements

- Prevention

: P260 - Do not breathe gas, vapours.
 P220 - Keep away from combustible materials.
 P280 - Wear protective gloves, protective clothing, eye protection, face protection.
 P244 - Keep valves and fittings free from oil and grease

- Response

: P304+P340+P315 - IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Get immediate medical advice / attention.
 P370+P376 - In case of fire : Stop leak if safe to do so.
 P303+P361+P353+P315 - IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower. Get immediate medical advice / attention.
 P305+P351+P338+P315 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get immediate medical advice / attention.

- Storage

: P405 - Store locked up.
 P403 - Store in a well-ventilated place.

Other hazards

: None.

SECTION 3. Composition/information on ingredients

Substance / 3.2. Mixture

Substance.

Substance name	Contents	CAS No	EC No	Index No	Registration no	Classification
Nitric oxide	: 100 %	10102-43-9	233-271-0	-----	* 2	O; R8 T+; R26 C; R34 ----- Acute Tox. 1 (H330) Ox. Gas 1 (H270) Skin Corr. 1B (H314) EUH071 Press. Gas (H280)

Contains no other components or impurities which will influence the classification of the product.

* 1: Listed in Annex IV / V REACH, exempted from registration.

* 2: Registration deadline not expired.

* 3: Registration not required: Substance manufactured or imported < 1t/y

Full text of R-phrases see chapter 16. Full text of H-statements see chapter 16

Nitric oxide**ALSA088****SECTION 4. First aid measures****Description of first aid measures**

- Inhalation : Remove victim to uncontaminated area wearing self contained breathing apparatus. Keep victim warm and rested. Call a doctor. Apply artificial respiration if breathing stopped.
- Skin contact : Remove contaminated clothing. Drench affected area with water for at least 15 minutes.
- Eye contact : Immediately flush eyes thoroughly with water for at least 15 minutes.
- Ingestion : Ingestion is not considered a potential route of exposure.

Most important symptoms and effects, both acute and delayed

- : Delayed adverse effects possible.
May cause severe chemical burns to skin and cornea. Suitable first-aid treatment should be immediately available. Seek medical advice before using product.
Prolonged exposure to small concentrations may result in pulmonary oedema.
Refer to section 11.

Indication of any immediate medical attention and special treatment needed

- : Treat with corticosteroid spray as soon as possible after inhalation
Obtain medical assistance.

SECTION 5. Fire-fighting measures**Extinguishing media****Extinguishing media**

- Suitable extinguishing media : All known extinguishants can be used.

Special hazards arising from the substance or mixture

- Specific hazards** : Supports combustion.
Exposure to fire may cause containers to rupture/explode.
- Hazardous combustion products** : None that are more toxic than the product itself.

Advice for fire-fighters

- Specific methods** : If possible, stop flow of product.
Coordinate fire measure to the surrounding fire. Cool endangered containers with water spray jet from a protected position. Do not empty contaminated fire water into drains.
- Special protective equipment for fire fighters** : Use self-contained breathing apparatus and chemically protective clothing.

SECTION 6. Accidental release measures**Personal precautions, protective equipment and emergency procedures**

- : Ensure adequate air ventilation.
Monitor concentration of released product.
Try to stop release.
Evacuate area.
Eliminate ignition sources.
Use self-contained breathing apparatus and chemically protective clothing.
Prevent from entering sewers, basements and workpits, or any place where its accumulation can be dangerous.

Environmental precautions

- : Try to stop release.
Monitor concentration of released product.
Reduce vapour with fog or fine water spray.

Methods and material for containment and cleaning up

- : Ventilate area.
Wash contaminated equipment or sites of leaks with copious quantities of water.
Hose down area with water.

Nitric oxide**ALSA088****SECTION 6. Accidental release measures (continued)****Reference to other sections**

: See also sections 8 and 13.

SECTION 7. Handling and storage**Precautions for safe handling****Safe use of the product**

: Only experienced and properly instructed persons should handle gases under pressure. The product must be handled in accordance with good industrial hygiene and safety procedures.
Use only properly specified equipment which is suitable for this product, its supply pressure and temperature. Contact your gas supplier if in doubt.
Avoid exposure, obtain special instructions before use.
Use no oil or grease.
Do not smoke while handling product.
Keep equipment free from oil and grease.
Ensure the complete gas system was (or is regularly) checked for leaks before use.
Installation of a cross purge assembly between the cylinder and the regulator is recommended.
Purge system with dry inert gas (e.g. helium or nitrogen) before gas is introduced and when system is placed out of service.
Avoid suck back of water, acid and alkalis.

Safe handling of the gas receptacle

: Do not allow backfeed into the container.
Open valve slowly to avoid pressure shock.
Refer to supplier's container handling instructions.
Protect cylinders from physical damage; do not drag, roll, slide or drop.
When moving cylinders, even for short distances, use a cart (trolley, hand truck, etc.) designed to transport cylinders.
Leave valve protection caps in place until the container has been secured against either a wall or bench or placed in a container stand and is ready for use.
If user experiences any difficulty operating cylinder valve discontinue use and contact supplier.
Never attempt to repair or modify container valves or safety relief devices.
Damaged valves should be reported immediately to the supplier.
Keep container valve outlets clean and free from contaminants particularly oil and water.
Replace valve outlet caps or plugs and container caps where supplied as soon as container is disconnected from equipment.
Close container valve after each use and when empty, even if still connected to equipment.
Never attempt to transfer gases from one cylinder/container to another.
Never use direct flame or electrical heating devices to raise the pressure of a container.
Do not remove or deface labels provided by the supplier for the identification of the cylinder contents.

Conditions for safe storage, including any incompatibilities

: Keep container below 50°C in a well ventilated place.
Segregate from flammable gases and other flammable materials in store.
Observe all regulations and local requirements regarding storage of containers. Containers should be stored in the vertical position and properly secured to prevent toppling. Stored containers should be periodically checked for general condition and leakage. Container valve guards or caps should be in place. Store containers in location free from fire risk and away from sources of heat and ignition. Keep away from combustible materials.
Containers should not be stored in conditions likely to encourage corrosion.

Specific end use(s)

: None.

Nitric oxide**ALSA088****SECTION 8. Exposure controls/personal protection****Control parameters****Occupational Exposure Limits**

Nitric oxide	: TLV© -TWA [ppm] : 25
DNEL: Derived no effect level	: None available.
PNEC: Predicted no effect concentration	: None available.

Exposure controls

Appropriate engineering controls	: Product to be handled in a closed system and under strictly controlled conditions. Ensure exposure is below occupational exposure limits (where available). Consider work permit system e.g. for maintenance activities. Preferably use only permanent leak-tight installations (e.g. welded pipes). Systems under pressure should be regularly checked for leakages. Provide adequate general and local exhaust ventilation. Alarm detectors should be used when toxic gases may be released.
Individual protection measures, e.g. personal protective equipment	: A risk assessment should be conducted and documented in each work area to assess the risks related to the use of the product and to select the PPE that matches the relevant risk. The following recommendations should be considered. Keep suitable chemically resistant protective clothing readily available for emergency use. Keep self contained breathing apparatus readily available for emergency use. Wear leather safety gloves and safety shoes when handling cylinders. Wear safety glasses with side shields
Environmental exposure controls	: Refer to local regulations for restriction of emissions to the atmosphere. See section 13 for specific methods for waste gas treatment.

SECTION 9. Physical and chemical properties**Information on basic physical and chemical properties****Appearance**

- Physical state at 20°C / 101.3kPa	: Gas.
- Colour	: Brownish gas.
Odour	: Poor warning properties at low concentrations.
Odour threshold	: Odour threshold is subjective and inadequate to warn for overexposure.
Molar mass [g/mol]	: 30
Melting point [°C]	: -164
Boiling point [°C]	: -152
Critical temperature [°C]	: -93
Flash point [°C]	: Not applicable for gases and gas-mixtures.
Evaporation rate (ether=1)	: Not applicable for gases and gas-mixtures.
Flammability range [vol% in air]	: Non flammable.
Vapour pressure [20°C]	: Not applicable.
Relative density, gas (air=1)	: 1
Relative density, liquid (water=1)	: 1.3
Solubility in water [mg/l]	: 67
Partition coefficient n-octanol/water	: Not applicable for inorganic gases.
Auto-ignition temperature [°C]	: Not applicable.
Oxidising properties	: Oxidiser.

Other information

Other data	: Gas/vapour heavier than air. May accumulate in confined spaces, particularly at or below ground level.
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Nitric oxide**ALSA088****SECTION 10. Stability and reactivity****Reactivity**

: No reactivity hazard other than the effects described in sub-sections below.

Chemical stability: Stable under normal conditions.
Decomposes at room temperature to other nitrogen oxides and nitrogen. Oxidises in air to form nitrogen dioxide which is extremely reactive.**Possibility of hazardous reactions**

: Violently oxidises organic material.

Conditions to avoid

: Heat.

Incompatible materials: Air.
May react violently with reducing agents.
May react violently with combustible materials.
For additional information on compatibility refer to ISO 11114**Hazardous decomposition products**

: Under normal conditions of storage and use, hazardous decomposition products should not be produced.

SECTION 11. Toxicological information**Information on toxicological effects**

Acute toxicity	: Delayed fatal pulmonary oedema possible.
Rat inhalation LC50 [ppm/4h]	: 57.5
Skin corrosion/irritation	: Severe corrosion to skin at high concentrations.
Serious eye damage/irritation	: Severe corrosion to the eyes at high concentrations.
Respiratory or skin sensitisation	: No known effects from this product.
Carcinogenicity	: No known effects from this product.
Germ cell mutagenicity	: No known effects from this product.
Reproductive toxicity	: No known effects from this product.
STOT-single exposure	: Severe corrosion to the respiratory tract at high concentrations.
STOT-repeated exposure	: No known effects from this product.
Aspiration hazard	: Not applicable for gases and gas-mixtures.

SECTION 12. Ecological information**Toxicity**

: No data available.

Persistence - degradability

: No data available.

Bioaccumulative potential

: No data available.

Mobility in soil

: No data available.

Results of PBT and vPvB assessment

: No data available.

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SECTION 12. Ecological information (continued)

Other adverse effects

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

SECTION 13. Disposal considerations

Waste treatment methods

: Gas may be scrubbed in alkaline solution under controlled conditions to avoid violent reaction. Must not be discharged to atmosphere.
Refer to the code of practice of EIGA (Doc. 30/10 "Disposal of Gases, downloadable at <http://www.eiga.org>) for more guidance on suitable disposal methods

Additional information

: None.

SECTION 14. Transport information

UN number : 1660
Labelling ADR, IMDG, IATA



: 5.1 : Oxidizing substances.
2.3 : Toxic gas.
8 : Corrosive substance.

Land transport (ADR/RID)

H.I. nr : --
UN proper shipping name : NITRIC OXIDE, COMPRESSED
Transport hazard class(es) : 2
Classification code : 1 TOC
Packing Instruction(s) : P200
Environmental hazards : None.

Sea transport (IMDG)

Proper shipping name : NITRIC OXIDE, COMPRESSED
Class : 2.3
Packing group : P200
Emergency Schedule (EmS) - Fire : F-C
Emergency Schedule (EmS) - Spillage : S-W
Packing instruction : P200

Air transport (ICAO-TI / IATA-DGR)

Proper shipping name (IATA) : NITRIC OXIDE, COMPRESSED
Class : 2.3
Passenger and Cargo Aircraft : DO NOT LOAD IN PASSENGER AIRCRAFT.
Cargo Aircraft only : FORBIDDEN.

Special precautions for user

: Avoid transport on vehicles where the load space is not separated from the driver's compartment.
Ensure vehicle driver is aware of the potential hazards of the load and knows what to do in the event of an accident or an emergency.
Before transporting product containers :

Nitric oxide**ALSA088****SECTION 14. Transport information (continued)**

- Ensure that containers are firmly secured.
- Ensure cylinder valve is closed and not leaking.
- Ensure valve outlet cap nut or plug (where provided) is correctly fitted.
- Ensure valve protection device (where provided) is correctly fitted.
- Ensure there is adequate ventilation.

SECTION 15. Regulatory information**Safety, health and environmental regulations/legislation specific for the substance or mixture****EU legislation**

- Restrictions on use** : None.
Seveso directive 96/82/EC : Covered

National legislation

- : Ensure all national/local regulations are observed.

Chemical Safety Assessment

- : This product is either exempt from REACH, does not meet the minimum volume threshold for a CSR or the CSA has not yet been carried out.

SECTION 16. Other information

- Indication of changes** : Revised safety data sheet in accordance with commission regulation (EU) No 453/2010
- Training advice** : Ensure operators understand the toxicity hazard.
Users of breathing apparatus must be trained.
- List of full text of R-phrases in section 3.** : R8 : Contact with combustible material may cause fire.
R26 : Very toxic by inhalation.
R34 : Causes burns.
- List of full text of H-statements in section 3.** : EUH071 - Corrosive to respiratory tract.
H270 - May cause or intensify fire; oxidizer.
H280 - Contains gas under pressure; may explode if heated.
H314 - Causes severe skin burns and eye damage.
H330 - Fatal if inhaled.
- Note** : This Safety Data Sheet has been established in accordance with the applicable European Union legislation.
- DISCLAIMER OF LIABILITY** : Whilst proper care has been taken in the preparation of this document, no liability for injury or damage resulting from its use can be accepted.
Details given in this document are believed to be correct at the time of going to press. Before using this product in any new process or experiment, a thorough material compatibility and safety study should be carried out.

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