



NITRIC OXIDE (15N, 98%+)

Safety Data Sheet

according to Regulation (EC) No. 1907/2006 (REACH) with its amendment Regulation (EU) 2015/830 and according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

Date of issue: 17/12/2010

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NLM-823

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1. Product identifier

Product form	: Substance
Substance name	: NITRIC OXIDE (15N, 98%+)
EC-No.	: 233-271-0 (Unlabeled)
CAS-No.	: 15917-77-8
Product code	: NLM-823
Formula	: *NO
Synonyms	: Nitrogen monoxide
Other means of identification	: Also applicable to: NLM-823-1-LB

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

1.2.1. Relevant identified uses

Main use category	: Professional use
Industrial/Professional use spec	: For professional use only

1.2.2. Uses advised against

No additional information available

1.3. Details of the supplier of the safety data sheet

Cambridge Isotope Laboratories, Inc.
50 Frontage Road
Andover, MA 01810
USA

USA: 1-800-322-1174 Int: 1-978-749-8000
cilsales@isotope.com www.isotope.com

Emergency telephone number

Emergency numbers:

Chemtrec: 1-800-424-9300 (24 hours)
International: 1-703-741-5970 (24 hours)

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

Classification according to Regulation (EC) No. 1272/2008 [CLP]

Ox. Gas 1	H270
Press. Gas (Comp.)	H280
Acute Tox. 2 (Inhalation:gas)	H330
Skin Corr. 1A	H314
Eye Dam. 1	H318

Full text of hazard classes and H-statements : see section 16

Classification according to Directive 67/548/EEC [DSD] or 1999/45/EC [DPD]

R5
C; R35
Xi; R41
Xi; R39
T+; R26
O; R8

Full text of R-phrases: see section 16

GHS-US classification

Ox. Gas 1	H270
Press. Gas (Comp.)	H280
Acute Tox. 1 (Inhalation:gas)	H330
Skin Corr. 1A	H314
Eye Dam. 1	H318
Carc. 1B	H350

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Full text of H statements : see section 16

Adverse physicochemical, human health and environmental effects

Blood.

2.2. Label elements

Labeling according to Regulation (EC) No. 1272/2008 [CLP]

Hazard pictograms (CLP) :



GHS04

GHS03

GHS06

GHS05

Signal word (CLP) :

Danger

Hazard statements (CLP) :

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

Precautionary statements (CLP) :

P220 - Keep/Store away from clothing, combustible materials, combustibles
P244 - Keep valves and fittings free from oil and grease.
P260 - Do not breathe dust, fume, gas, mist, spray, vapors.
P264 - Wash hands, forearms and face thoroughly after handling.
P271 - Use only outdoors or in a well-ventilated area.
P280 - Wear protective clothing, protective gloves.
P284 - [In case of inadequate ventilation] wear respiratory protection.
P301+P330+P331 - IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.

GHS-US labeling

Hazard pictograms (GHS-US) :



GHS04

GHS03

GHS06

GHS05

Signal word (GHS-US) :

Danger

Hazard statements (GHS-US) :

H270 - May cause or intensify fire; oxidizer
H280 - Contains gas under pressure; may explode if heated
H314 - Causes severe skin burns and eye damage
H318 - Causes serious eye damage
H330 - Fatal if inhaled

Precautionary statements (GHS-US) :

P201 - Obtain special instructions before use.
P202 - Do not handle until all safety precautions have been read and understood.
P220 - Keep/Store away from clothing, combustible materials, combustibles
P244 - Keep reduction valves/valves and fittings free from oil and grease
P260 - Do not breathe dust, fume, gas, mist, spray, vapors.
P264 - Wash hands, forearms and face thoroughly after handling.
P271 - Use only outdoors or in a well-ventilated area.
P280 - Wear protective clothing, protective gloves.
P284 - [In case of inadequate ventilation] wear respiratory protection.
P301+P330+P331 - If swallowed: rinse mouth. Do NOT induce vomiting
P303+P361+P353 - If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower
P304+P340 - If inhaled: Remove person to fresh air and keep comfortable for breathing
P305+P351+P338 - If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
P308+P313 - If exposed or concerned: Get medical advice/attention.
P310 - Immediately call a poison center or doctor
P320 - Specific treatment is urgent (see Hazard pictograms (CLP) on this label)
P321 - Specific treatment (see Hazard pictograms (CLP) on this label)
P363 - Wash contaminated clothing before reuse.
P370+P376 - In case of fire: Stop leak if safe to do so
P403 - Store in a well-ventilated place.
P403+P233 - Store in a well-ventilated place. Keep container tightly closed.
P405 - Store locked up.
P410+P403 - Protect from sunlight. Store in a well-ventilated place.
P501 - Dispose of contents/container to Comply with applicable regulations

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2.3. Other hazards

No additional information available

SECTION 3: Composition/Information on ingredients

3.1. Substances

Name	Product identifier	%	Classification according to Directive 67/548/EEC
NITRIC OXIDE (15N, 98%+)	(CAS-No.) 15917-77-8 (EC-No.) 233-271-0 (Unlabeled)	100	R5 C; R35 Xi; R41 Xi; R39 T+; R26 O; R8

Name	Product identifier	%	Classification according to Regulation (EC) No. 1272/2008 [CLP]
NITRIC OXIDE (15N, 98%+)	(CAS-No.) 15917-77-8 (EC-No.) 233-271-0 (Unlabeled)	100	Ox. Gas 1, H270 Press. Gas (Comp.), H280 Acute Tox. 2 (Inhalation:gas), H330 Skin Corr. 1A, H314 Eye Dam. 1, H318

Full text of R- and H- phrases: see section 16

Name	Product identifier	%	GHS-US classification
NITRIC OXIDE (15N, 98%+) (Main constituent)	(CAS-No.) 15917-77-8	100	Ox. Gas 1, H270 Press. Gas (Comp.), H280 Acute Tox. 1 (Inhalation:gas), H330 Skin Corr. 1A, H314 Eye Dam. 1, H318 Carc. 1B, H350

Full text of H-phrases: see section 16

3.2. Mixtures

Not applicable

SECTION 4: First aid measures

4.1. Description of first aid measures

First-aid measures general	: Move out of dangerous area. Consult a physician and show this safety data sheet.
First-aid measures after inhalation	: If breathed in, move person to fresh air. If not breathing, give artificial respiration. Consult a physician.
First-aid measures after skin contact	: Take off contaminated clothing and shoes immediately. Wash off with soap and plenty of water. Take victim immediately to hospital. Consult a physician.
First-aid measures after eye contact	: Continue rinsing eyes during transport to hospital. Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.
First-aid measures after ingestion	: Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2. Most important symptoms and effects, both acute and delayed

Symptoms/effects after inhalation	: Fatal if inhaled.
Symptoms/effects after skin contact	: Causes severe skin burns.
Symptoms/effects after eye contact	: Causes serious eye damage.
Symptoms/effects after ingestion	: May be harmful if swallowed. Causes burns.

4.3. Indication of any immediate medical attention and special treatment needed

No additional information available

SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media : Use water spray, alcohol-resistant foam, dry chemical, or carbon dioxide.

5.2. Special hazards arising from the substance or mixture

No additional information available

5.3. Advice for firefighters

Firefighting instructions : Wear self contained breathing apparatus for fire fighting if necessary.

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Protection during firefighting : Do not enter fire area without proper protective equipment, including respiratory protection.
Other information : Use water spray to cool unopened containers.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

6.1.1. For non-emergency personnel

Emergency procedures : Wear respiratory protection. Avoid dust formation. Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.

6.1.2. For emergency responders

No additional information available

6.2. Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

6.3. Methods and material for containment and cleaning up

For containment : Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations. Do not flush with water. Keep in suitable, closed containers for disposal.

6.4. Reference to other sections

No additional information available

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Precautions for safe handling : Avoid contact with skin and eyes. Avoid inhalation of vapour or mist. Normal measures for preventive fire protection. Keep away from sources of ignition - No smoking.

Hygiene measures : Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

7.2. Conditions for safe storage, including any incompatibilities

Technical measures : Keep container tightly closed in a dry and well-ventilated place.

Storage conditions : Store at room temperature away from light and moisture.

7.3. Specific end use(s)

No additional information available

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

NITRIC OXIDE (15N, 98%+) (15917-77-8)		
Italy - Portugal - USA ACGIH	ACGIH TWA (ppm)	25.00000000 ppm Remarks: Upper Respiratory Tract irritation. Hypoxia/cyanosis. Nitrosyl-hemoglobin formation. Substances for which there is a Biological Exposure Index or Indices (see BEI section), see BEI for Methemoglobin Inducers. USA. ACGIH Threshold Limit Values (TLV)
USA NIOSH	NIOSH REL (TWA) (mg/m ³)	30 mg/m ³ USA. NIOSH Recommended Exposure Limits
USA NIOSH	NIOSH REL (TWA) (ppm)	25 ppm USA. NIOSH Recommended Exposure Limits
USA OSHA	OSHA PEL (TWA) (mg/m ³)	30 mg/m ³ Remarks: The value in mg/m ³ is approximate. USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants.
USA OSHA	OSHA PEL (TWA) (ppm)	25 ppm USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants.
USA OSHA	OSHA PEL (Ceiling) (mg/m ³)	30 mg/m ³ California permissible exposure limits for chemical contaminants (Title 8, Article 107)
USA OSHA	OSHA PEL (Ceiling) (ppm)	25 ppm California permissible exposure limits for chemical contaminants (Title 8, Article 107)

8.2. Exposure controls

Appropriate engineering controls : Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product. Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

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Personal protective equipment : Gloves. Protective clothing. Protective goggles. Self-contained breathing apparatus.



Materials for protective clothing : Wear suitable protective clothing and gloves.
Hand protection : Wear suitable protective clothing and gloves.
Eye protection : Tightly fitting safety goggles. Faceshield (8-inch minimum).
Skin and body protection : Choose body protection according to the amount and concentration of the dangerous substance at the work place. Handle with gloves.
Respiratory protection : When appropriate, use NIOSH/CEN approved respirator.
Environmental exposure controls : Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state : Gas
Appearance : Compressed Gas
Molecular mass : 31 g/mol (Labeled)
Color : Colorless
Odor : No data available
Odor threshold : No data available
pH : No data available
Relative evaporation rate (butyl acetate=1) : No data available
Melting point : -163.6 °C (-262.5 °F) - lit.
Freezing point : No data available
Boiling point : -151.7 °C (-241.1 °F) - lit.
Flash point : No data available
Auto-ignition temperature : No data available
Decomposition temperature : No data available
Flammability (solid, gas) : No data available
Vapor pressure : No data available
Relative vapor density at 20 °C : 1.04 - (Air = 1.0)
Relative density : No data available
Solubility : Water: 0.067 g/l
Log Pow : No data available
Log Kow : No data available
Viscosity, kinematic : No data available
Viscosity, dynamic : No data available
Explosive properties : No data available
Oxidizing properties : The substance or mixture is classified as oxidizing with the Category 1.
Explosion limits : No data available

9.2. Other information

No additional information available

SECTION 10: Stability and reactivity

10.1. Reactivity

No additional information available

10.2. Chemical stability

Stable if stored under recommended conditions.

10.3. Possibility of hazardous reactions

No additional information available

10.4. Conditions to avoid

No additional information available

10.5. Incompatible materials

Strong oxidizing agents, Oxygen, Halides, Organic materials, reducing agents. Also avoid: Alcohols.

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10.6. Hazardous decomposition products

Nitrogen oxides.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity : Inhalation:gas: Fatal if inhaled.

NITRIC OXIDE (15N, 98%+) (15917-77-8)	
LC50 inhalation rat (ppm)	57 ppm/4h
ATE CLP (gases)	100.000 ppmV/4h
ATE CLP (vapors)	1.068 mg/l/4h
ATE CLP (dust, mist)	1.068 mg/l/4h

Skin corrosion/irritation : Causes severe skin burns and eye damage.
No data available

Serious eye damage/irritation : Causes serious eye damage.
No data available

Respiratory or skin sensitization : Not available
No data available

Germ cell mutagenicity : Not classified

Carcinogenicity : Not classified

Reproductive toxicity : Not classified

Specific target organ toxicity – single exposure : Not classified

Specific target organ toxicity – repeated exposure : Not classified

Aspiration hazard : Not classified

Potential Adverse human health effects and symptoms : Material is extremely destructive to tissue of the mucous membranes and upper respiratory tract, eyes, and skin. Spasm, inflammation and edema of the larynx. Spasm, inflammation, and edema of the bronchi. Pneumonitis. Pulmonary edema. Nausea. Vomiting. Weakness. Dizziness. Vertigo. Headache. Sweating. Loss of appetite. To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Symptoms/effects after inhalation : Fatal if inhaled.

Symptoms/effects after skin contact : Causes severe skin burns.

Symptoms/effects after eye contact : Causes serious eye damage.

Symptoms/effects after ingestion : May be harmful if swallowed. Causes burns.

SECTION 12: Ecological information

12.1. Toxicity

No additional information available

12.2. Persistence and degradability

NITRIC OXIDE (15N, 98%+) (15917-77-8)	
Persistence and degradability	Not available.

12.3. Bioaccumulative potential

NITRIC OXIDE (15N, 98%+) (15917-77-8)	
Bioaccumulative potential	Not available.

12.4. Mobility in soil

NITRIC OXIDE (15N, 98%+) (15917-77-8)	
Ecology - soil	Not available.

12.5. Results of PBT and vPvB assessment

No additional information available

12.6. Other adverse effects

Other adverse effects : Not available.

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Regional legislation (waste) : Waste materials should be disposed of under conditions which meet Federal, State, and local environmental control regulations.

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- Product/Packaging disposal recommendations : Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material.
- Ecology - waste materials : Dispose of as unused product.

SECTION 14: Transport information

In accordance with ADR / RID / IMDG / IATA / ADN

14.1. UN number

- UN-No.(DOT) : 1660
DOT NA no. UN1660

14.2. UN proper shipping name

- Proper Shipping Name (DOT) : Nitric oxide, compressed
Class (DOT) : 2.3 - Class 2.3 - Poisonous gas 49 CFR 173.115
Hazard labels (DOT) : 2.3 - Poison gas
5.1 - Oxidizer
8 - Corrosive



- DOT Special Provisions (49 CFR 172.102) : 1 - This material is poisonous by inhalation (see 171.8 of this subchapter) in Hazard Zone A (see 173.116(a) or 173.133(a) of this subchapter), and must be described as an inhalation hazard under the provisions of this subchapter.
B37 - The amount of nitric oxide charged into any tank car tank may not exceed 1,379 kPa (200 psig) at 21 C (70 F).
B46 - The detachable protective housing for the loading and unloading valves of multi-unit tank car tanks must withstand tank test pressure and must be approved by the Associate Administrator.
B50 - Each valve outlet of a multi-unit tank car tank must be sealed by a threaded solid plug or a threaded cap with inert luting or gasket material. Valves must be of stainless steel and the caps, plugs, and valve seats must be of a material that will not deteriorate as a result of contact with the lading.
B60 - DOT Specification 106A500X multi-unit tank car tanks that are not equipped with a pressure relief device of any type are authorized. For the transportation of phosgene, the outage must be sufficient to prevent tanks from becoming liquid full at 55 C (130 F).
B77 - Other packaging are authorized when approved by the Associate Administrator.
- DOT Packaging Exceptions (49 CFR 173.xxx) : None
DOT Packaging Non Bulk (49 CFR 173.xxx) : 337
DOT Packaging Bulk (49 CFR 173.xxx) : None
DOT RQ : 10 lbs.
Marine pollutant : No.

14.3. Additional information

- Other information : No supplementary information available.

Overland transport

- Class (ADR) : 2 - Gases
Classification code (ADR) : 1TOC
Hazard labels (ADR) : 2.3 - Toxic gases
5.1 - Oxidizing substances
8 - Corrosive substances



- Tunnel restriction code (ADR) : D
Limited quantities (ADR) : 0
EAC : 2PE
APP : B
Excepted quantities (ADR) : E0

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Transport by sea

DOT Vessel Stowage Location	: D - The material must be stowed "on deck only" on a cargo vessel and on a passenger vessel carrying a number of passengers limited to not more than the larger of 25 passengers or one passenger per each 3 m of overall vessel length, but the material is prohibited on passenger vessels in which the limiting number of passengers is exceeded.
DOT Vessel Stowage Other	: 40 - Stow "clear of living quarters", 89 - Segregation same as for oxidizers, 90 - Stow "separated from" radioactive materials
MFAG-No	: 124

Air transport

DOT Quantity Limitations Passenger aircraft/rail (49 CFR 173.27)	: Forbidden
DOT Quantity Limitations Cargo aircraft only (49 CFR 175.75)	: Forbidden
Civil Aeronautics Law	: Gases under pressure/Gases toxic under pressure

14.4. Environmental hazards

Other information : No supplementary information available.

14.5. Special precautions for user

14.6. Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

Not applicable

SECTION 15: Regulatory information

15.1. US Federal regulations

NITRIC OXIDE (15N, 98%+) (15917-77-8)	
Listed on the United States SARA Section 302	
SARA Section 311/312 Hazard Classes	Immediate (acute) health hazard Reactive hazard Sudden release of pressure hazard
SARA Section 313 - Emission Reporting	Not subject to reporting requirements of the United States SARA Section 313

15.2. International regulations

CANADA

NITRIC OXIDE (15N, 98%+) (15917-77-8)
Listed on the Canadian DSL (Domestic Substances List)

15.2.1. National regulations

No additional information available

15.3. US State regulations

NITRIC OXIDE (15N, 98%+)(15917-77-8)	
U.S. - California - Proposition 65 - Carcinogens List	No
U.S. - California - Proposition 65 - Developmental Toxicity	No
U.S. - California - Proposition 65 - Reproductive Toxicity - Female	No
U.S. - California - Proposition 65 - Reproductive Toxicity - Male	No
State or local regulations	U.S. - Massachusetts - Right To Know List U.S. - Pennsylvania - RTK (Right to Know) List U.S. - New Jersey - Right to Know Hazardous Substance List

SECTION 16: Other information

Other information : This product is not radioactive. The data given for this product are those of the corresponding unlabeled compound, unless specifically indicated otherwise. Health and safety data for labeled compounds are generally not available, but are assumed to be similar or identical to the corresponding unlabeled compound.

Full text of R-, H- and EUH-phrases:

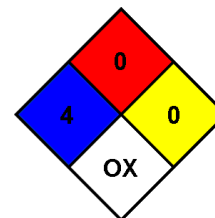
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Acute Tox. 2 (Inhalation:gas)	Acute toxicity (inhalation:gas) Category 2
Eye Dam. 1	Serious eye damage/eye irritation Category 1
Ox. Gas 1	Oxidizing gases Category 1
Press. Gas (Comp.)	Gases under pressure Compressed gas
Skin Corr. 1A	Skin corrosion/irritation Category 1A
H270	May cause or intensify fire; oxidizer
H280	Contains gas under pressure; may explode if heated
H314	Causes severe skin burns and eye damage
H318	Causes serious eye damage
H330	Fatal if inhaled
R26	Very toxic by inhalation
R35	Causes severe burns
R39	Danger of very serious irreversible effects
R41	Risk of serious damage to eyes
R5	Heating may cause an explosion
R8	Contact with combustible material may cause fire
C	Corrosive
O	Oxidizing
T+	Very toxic
Xi	Irritant

- NFPA health hazard : 4 - Materials that, under emergency conditions, can be lethal.
- NFPA fire hazard : 0 - Materials that will not burn under typical fire conditions, including intrinsically noncombustible materials such as concrete, stone, and sand.
- NFPA reactivity : 0 - Material that in themselves are normally stable, even under fire conditions.
- NFPA specific hazard : OX - Materials that posses oxidizing properties.



Hazard Rating

- Health : 4 Severe Hazard - Life-threatening, major or permanent damage may result from single or repeated overexposures
- Flammability : 1 Slight Hazard
- Physical : 3 Serious Hazard

CIL Substance SDS

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