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

1.1. Product identifier

Trade name	Nitric oxide
Chemical description	Nitric oxide or nitrogen monoxide
CAS N°	10102-43-9
CE N°	233-271-0
Index N°	--
Registration n°	01-2120766630-54
Chemical formula	NO

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

Relevant identified uses	Industrial and professional Test gas/Calibration gas Chemical reaction / Synthesis Use for manufacture of electronic/photovoltaic components Laboratory use Contact supplier for more information on uses
Uses advised against	Consumer use not recommended

1.3. Details of the supplier of the safety data sheet

Company identification	MULTIGAS Route de l'Industrie 102 CH-1564 Domdidier
Phone number	+41 (0) 26 676 94 94
E-mail address	info@multigas.ch

1.4. Emergency telephone numbers


145 (Toxicology Centre Zurich) or +41 (0) 44 251 51 51
 +41 (0) 26 676 94 94 (Multigas)

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

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

Physical hazards	Oxidising Gases, Category 1	H270
	Gases under pressure : Compressed gas	H280





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Skin corrosion/irritation, Category 1B	H314
Serious eye damage/eye irritation, Category 1	H318
Acute toxicity (inhalation: gas) Category 1	H330

For the complete H-sentences texts mentioned in that chapter, refer to Section 16

2.2. Label elements

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

Hazard pictograms	   																				
	GHS03 GHS04 GHS05 GHS06																				
Signal word	Danger																				
Hazard statements	<table> <tr> <td>H270</td> <td>May cause or intensify fire; oxidiser</td> </tr> <tr> <td>H280</td> <td>Contains gas under pressure; may explode if heated</td> </tr> <tr> <td>H314</td> <td>Causes severe skin burns and eye damage</td> </tr> <tr> <td>H318</td> <td>Causes serious eye damage</td> </tr> <tr> <td>H330</td> <td>Fatal if inhaled</td> </tr> <tr> <td>EUH071</td> <td>Corrosive to the respiratory tract</td> </tr> </table>	H270	May cause or intensify fire; oxidiser	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	EUH071	Corrosive to the respiratory tract								
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2.3. Other hazards

None

SECTION 3: Composition/information on ingredients

3.1. Substances

Name	Product identifier	Concentration	Classification
Nitric oxide	(CAS-No.) 10102-43-9 (EC-No.) 233-271-0 (EC Index-No.) --- (Registration-No.) 01-2120766630-54	<= 100%	Ox. Gas 1, H270 Press. Gas (Comp.), H280 Skin Corr. 1B, H314 Eye Dam. 1, H318 Acute Tox. 1 (Inhalation: gas), H330

For the complete H-sentences texts mentioned in that chapter, refer to Section 16

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

3.2. Mixtures

Not established

SECTION 4: First aid measures

4.1. Description of first aid measures

General advice	See a doctor. Show this safety data sheet to the attending physician
In case of inhalation	In case of inhalation, remove the person from the contaminated area. In case of respiratory arrest, give artificial respiration. See a doctor
In case of skin contact	Remove contaminated clothing and shoes immediately. Wash with soap and plenty of water. Take victim immediately to hospital. See a doctor
In case of eyes contact	Rinse thoroughly with plenty of water for at least 15 minutes and consult a doctor
In case of ingestion	Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. See a doctor

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


The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

May cause severe chemical burns to skin and cornea Provide immediately available first-aid treatment

Prolonged exposure to low concentrations may cause pulmonary oedema

Potential adverse delayed effects

Destructive material of mucosal tissues and trachea. Cough, shortness of breath, headache, nausea

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

No data available

SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media Water spray or water mist. Dry powder. Carbon dioxide. Foam

Unsuitable extinguishing media Do not use water jet to extinguish

5.2. Special hazards arising from the substance or mixture

Specific hazards Supports combustion
Exposure to fire may cause containers to rupture/explode

Hazardous combustion products In case of fire or excessive heat, hazardous combustion products may be produced such as : nitric oxide, nitrogen dioxide

5.3. Additional information

Cool endangered receptacles with water spray jet from a protected position

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

Avoid breathing vapours, spray mists or gases
Provide adequate ventilation
Evacuate personnel to a safe place
Personal protective equipment, see section 8

6.2. Environmental precautions

All littering must be avoided in the environment

6.3. Methods and material for containment and cleaning up

Provide effective ventilation
Keep the area clear of all sources of ignition until all spilled liquid has evaporated (frost-free soil)

6.4. Reference to other sections

See also sections 8 and 13

Nitric oxide

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SECTION 7: Handling and storage

7.1. Precautions for safe handling

Avoid contact with skin and eyes
 Avoid breathing vapour or mist
 Keep away from sources of ignition - No smoking
 Take measures to prevent the accumulation of electrostatic charges
 For precautions, see section 2.2

7.2. Conditions for safe storage, including any incompatibilities

Store in a cool place. Keep container tightly closed in a dry and well-ventilated place
 Content under pressure

7.3. Specific end use(s)

None

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Components with occupational exposure limits

Component	CAS N°	Exposure value type	Control parameter	Source
Nitric oxide	10102-43-9	TWA	5 ppm	SUVA: Limit values of exposure to workstations (2021)
			6 mg/m ³	
		OEL		

8.2. Exposure controls

8.2.1. Appropriate engineering controls

Provide adequate general and local exhaust ventilation
 Gas detectors should be used when toxic gases may be released


8.2.2. Individual protection measures, e.g. personal protective equipment

Eye/face protection

Wear goggles and a face shield when transfilling or breaking transfer connections. Standard EN 166

Skin / hand protection

Wear protective gloves when handling gas cylinders. Standard EN 388- Protective gloves against mechanical hazards
 Wear cold insulating gloves

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when transferring or disconnecting transfer lines Standard EN 511 - Insulating gloves against cold

The selected protective gloves have to satisfy the specifications of EU Directive 89/686 / EEC and the standard EN 374 derived from it

For short-term use

Material: Chloroprene rubber

Penetration time:> 30 min

Glove thickness: 0.6 mm

For long-term use

Material: Butylelastomer

Penetration time:> 480 min

Glove thickness: 0.3 mm

Have appropriate, chemical-resistant protective clothing ready for use in emergencies. Norm EN943-1

Respiratory protection

Self-contained breathing apparatus (SCBA) or positive pressure air mask must be used in oxygenated atmospheres. Standard EN 137 - Self-contained compressed air device with a full face mask

8.2.3. Environmental exposure controls

Avoid any spill or leak if it can be done safely

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Appearance

- **Physical state at 20°C / 101.3kPa** Gas
- **Colour** Colourless

Odour No data available

Odour threshold No data available

pH No data available

Melting point / Freezing point -163.6°C

Boiling point -151.7°C

Flash point No data available

Evaporation rate No data available

Flammability (solid, gas) No data available

Explosive limits No data available

Vapour pressure [20°C] No data available

Vapour pressure [50°C] No data available

Vapour density 1.04

Relative density, liquid (water=1) No data available

Relative density, gas (air=1) 1.27 (-150.2°C)

Nitric oxide

Water solubility	50 g/l
Partition coefficient n-octanol/water (Log Kow)	No data available
Auto-ignition temperature	No data available
Decomposition temperature	No data available
Viscosity	No data available
Explosive properties	No data available
Oxidising properties	No data available

9.2. Other information

Molar mass	30.1 g/mole
Critical temperature [°C]	-93°C
Relative density, gas	1.27
	Gas or vapour heavier than air. May accumulate in confined areas, especially in low points and basements

SECTION 10: Stability and reactivity

10.1. Reactivity

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

10.2. Chemical stability

Stable under recommended storage conditions
 Decomposes at room temperature to other nitrogen oxides and nitrogen.
 Oxidises in air to form nitrogen dioxide which is extremely reactive

10.3. Possibility of hazardous reactions


Violently oxidises organic material

10.4. Conditions to avoid

Avoid moisture in installation systems

10.5. Incompatible materials

Fluorine, combustible materials, ozone, ammonia, chlorinated hydrocarbons, carbon disulphide, metals
 Reacts with water to form nitric acid. Quickly converted into air into nitrogen dioxide
 For additional information on compatibility refer to ISO 11114

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10.6. Hazardous decomposition products

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

SECTION 11: Toxicological information

11.1. Chemical safety assessment

Acute toxicity	Fatal if inhaled Delayed fatal pulmonary oedema possible
Skin corrosion/irritation	Causes severe skin burns and eye damage
Serious eye damage/irritation	Causes serious eye damage
Respiratory or skin sensitisation	No data available
Germ cell mutagenicity	No data available
Carcinogenicity	No data available
Reproductive toxicity	No data available
STOT-single exposure – Target organ(s)	Severe corrosion to the respiratory tract at high concentrations
STOT-repeated exposure	Severe corrosion to the respiratory tract at high concentrations
Ingestion hazard	No data available

SECTION 12: Ecological information

12.1. Toxicity

Assessment	No data available
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12.2. Persistence and degradability

No data available

12.3. Bioaccumulative potential

No data available

12.4. Mobility in soil


No data available

12.5. Results of PBT and vPvB assessment

PBT / vPvB assessment is not available because the chemical safety assessment is not required / is not conducted

12.6. Other adverse effects

May cause pH changes in aqueous ecological systems

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SECTION 13: Disposal considerations

13.1. Waste treatment methods

Product	<p>Must not be discharged to atmosphere</p> <p>Gas may be scrubbed in alkaline solution under controlled conditions to avoid violent reaction</p> <p>Return unused product in original cylinder to supplier</p>
Contaminated container	<p>Eliminate as unused product</p> <p>Contact the supplier if instructions are needed</p>
OMoD Code	<p>16 05 04</p> <p>Gases in pressure containers containing dangerous substances (including halons)</p>

SECTION 14: Transport information


14.1. UN number

Transport par road/rail ADR / RID	Transport by sea IMDG	Transport by air IATA
1660	1660	1660

14.2. UN proper shipping name

Transport par road/rail ADR / RID	Transport by sea IMDG	Transport by air IATA
Nitric oxide compressed	Nitric oxide compressed	Nitric oxide compressed

14.3. Transport hazard class(es)


Labelling	
ADR/RID IMDG IATA	<p>2.3 : Toxic gases</p> <p>5.1 : Oxidizing substances</p> <p>8 : Corrosive substances</p>

14.4. Packing group

ADR/RID IMDG IATA	<p>Not established</p>
--	------------------------

14.5. Environmental hazards

ADR/RID	None
IMDG	None

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ICAO-TI / IATA-DGR

None

14.6. Special precautions for user

No data available

14.7. Transport in bulk according to Annex II of Marpol and the IBC Code

Not applicable

SECTION 15: Regulatory information

15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture

This safety data sheet complies with the requirements of Regulation (CE) No. 1907/2006

15.2. Chemical safety assessment

A 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 2015/830

Abbreviations and acronyms

ADR : European Agreement concerning the International Carriage of Dangerous Goods by Road

CAS : Chemical Abstract Service number (USA)

CLP : Classification Labelling Packaging Regulation; Regulation (EC) No 1272/2008

CSA : Chemical Safety Assessment

EIGA : European Industrial Gases Association

EINECS : European Inventory of Existing Commercial Chemical Substances

EN : European Standard

ATE : Acute Toxicity Estimate

IATA : International Air Transport Association

IMDG Code : International Maritime Dangerous Goods Code

LC50 : Lethal Concentration to 50 % of a test population

OMoD : Swiss Ordinance on the movement of waste

PBT : Persistent, Bioaccumulative and Toxic

PPE: Personal Protection Equipment


REACH : Registration, Evaluation, Authorisation and Restriction of Chemicals Regulation (EC) No 1907/2006

RID : Regulations concerning the international carriage of dangerous goods by rail

RMM : Risk Management Measures

STOT-SE : Specific Target Organ Toxicity - Single Exposure

UN : United Nations

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vPvB : Very Persistent and Very Bioaccumulative
WGK: Water Hazards Class

Full text of H, EUH and P statements used in sections 2 and 3

Hazard statements

H270 May cause or intensify fire; oxidiser
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
EUH071 Corrosive to the respiratory tract

Precautionary statements

P220 Keep away from combustible materials
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P260 Do not breathe gas, vapours
P280 Wear protective gloves, protective clothing, eye protection, face protection
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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
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P405 Store locked up

Disclaimer of liability

Details given in this document have been prepared based on the most available reliable documents and are believed to be correct at the time of going to press
They do not claim to be exhaustive and should be considered as a guide