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

1.1. Product identifier

Trade name	Nitrogen dioxide
Chemical description	Nitrogen dioxide, Dinitrogen tetroxide
CAS N°	10102-44-0
CE N°	233-272-6
Index N°	007-002-00-0
Registration n°	Registration deadline not expired
Chemical formula	NO ₂

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

Relevant identified uses	Industrial and professional Test gas/Calibration gas 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 : Liquefied gas	H280
	Skin corrosion/irritation, Category 1B	H314

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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	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 P244 Keep valves and fittings free from oil and grease P260 Do not breathe gas, vapours P280 Wear protective gloves, protective clothing, eye protection, face protection 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 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 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 P370+P376 In case of fire: stop leak if safe to do so P410+403 Protect from sunlight. Store in a well-ventilated place P405 Store locked up.

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2.3. Other hazards

None

SECTION 3: Composition/information on ingredients

3.1. Substances

Name	Product identifier	Concentration	Classification
Nitrogen dioxide	(CAS-No.) 10102-44-0 (EC-No.) 233-272-6 (EC Index-No.) 007-002-00-0 (Registration-No.) --	≤ 100%	Ox. Gas 1, H270 Press. Gas (Liq.), H280 Acute Tox. 1 (Inhalation: gas), H330 Skin Corr. 1B, H314 Eye Dam. 1, H318

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

May cause severe chemical burns to skin and cornea. Suitable first-aid treatment should be immediately available. Seek medical advice before using product

Material is destructive to tissue of the mucous membranes and upper respiratory tract. Cough, shortness of breath, headache, nausea

Refer to section 11

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

No data available

Nitrogen dioxide

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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 In case of fire or excessive heat, hazardous combustion products may be produced

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

Try to stop the leak

6.3. Methods and material for containment and cleaning up

Ventilate the area

Keep area evacuated and free from ignition sources until any spilled liquid has evaporated (ground free from frost)

6.4. Reference to other sections


See also sections 8 and 13

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

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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
Nitrogen dioxide	10102-44-0	TWA	3 ppm	SUVA: Limit values of exposure to workstations
			6 mg/m ³	
		OEL	3 ppm	SUVA: Limit values of exposure to workstations
			6 mg/m ³	

8.2. Exposure controls

8.2.1. Appropriate engineering controls

Provide adequate general and local exhaust ventilation

Gas detectors should be used when flammable / toxic gases / vapours are likely to 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 - Personal eye-protection - specifications

Provide readily accessible eye wash stations and safety showers

Skin / hand protection

Wearing chemical resistant gloves Standard EN 374

For short-term use

Material: Chloroprene rubber

Penetration time:> 30 min


Glove thickness: 0.6 mm

For long-term use

Material: Butyl rubber

Penetration time:> 480 min

Glove thickness: 0.3 mm

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Respiratory protection

Have appropriate, chemical-resistant protective clothing ready for use in emergencies

When the risk assessment shows that the use of respirable respirators is appropriate, use a full face mask with EN 14387 multipurpose cartridge. If the mask is the only means of protection, use a full face respirator. Use NIOSH (US) or CEN (EU) tested and approved equipment

8.2.3. Environmental exposure controls

-

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** Brownish gas

Odour Pungent

Odour threshold No data available

pH No data available

Melting point / Freezing point -11.2°C

Boiling point 21.1°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] 1 bar

Vapour pressure [50°C] 3.4 bar

Vapour density No data available

Relative density, liquid (water=1) 1.4

Relative density, gas (air=1) 2.8

Water solubility Reacts with water forming nitrous acid and nitric acid

Partition coefficient No data available

n-octanol/water (Log Kow)


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

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9.2. Other information

Molar mass	46 g/mol
Critical temperature [°C]	158°C
Relative vapour density	Gas/vapour heavier than air. May accumulate in confined spaces, particularly at or below ground level.

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

10.3. Possibility of hazardous reactions

Nitrogen dioxide is an oxidant and an oxidizer. In general, combustible materials and reducing materials can react strongly, often even explosively, with nitrogen dioxide

10.4. Conditions to avoid

Avoid moisture in installation systems

10.5. Incompatible materials

Attacks copper and its alloys. With water causes rapid corrosion of some metals

May react violently with combustible materials

May react violently with reducing agents

Keep equipment free from oil and grease

Reacts with water to form corrosive acids

May react violently with alkalis

For additional information on compatibility refer to ISO 11114


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
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	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	No data available
Ingestion hazard	No data available

SECTION 12: Ecological information

12.1. Toxicity

Assessment No data available

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

Harmful to aquatic organisms

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Product	Must not be released into the atmosphere Burn in a chemical incinerator equipped with an afterburner and scrubber Return to the supplier the product not consumed in its original container
Contaminated container	Eliminate as unused product

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Contact the supplier if instructions are needed

OMoD Code

16 05 04

Gases in pressure containers containing dangerous substances

SECTION 14: Transport information

14.1. UN number

Transport par road/rail ADR / RID	Transport by sea IMDG	Transport by air IATA
1067	1067	1067

14.2. UN proper shipping name

Transport par road/rail ADR / RID	Transport by sea IMDG	Transport by air IATA
Dinitrogen tetroxide (Nitrogen dioxide)	Dinitrogen tetroxide (Nitrogen dioxide)	Dinitrogen tetroxide (Nitrogen dioxide)

14.3. Transport hazard class(es)

Labelling



ADR/RID
IMDG
IATA

2.3 : Toxic gases
5.1 : Oxidizing substances
8 : Corrosive substances

14.4. Packing group

ADR/RID
IMDG
IATA

Not established

14.5. Environmental hazards

ADR/RID

None

IMDG

None

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

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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	<p>ADR : European Agreement concerning the International Carriage of Dangerous Goods by Road</p> <p>CAS : Chemical Abstract Service number (USA)</p> <p>CLP : Classification Labelling Packaging Regulation; Regulation (EC) No 1272/2008</p> <p>CSA : Chemical Safety Assessment</p> <p>EIGA : European Industrial Gases Association</p> <p>EINECS : European Inventory of Existing Commercial Chemical Substances</p> <p>EN : European Standard</p> <p>ATE : Acute Toxicity Estimate</p> <p>IATA : International Air Transport Association</p> <p>IMDG Code : International Maritime Dangerous Goods Code</p> <p>LC50 : Lethal Concentration to 50 % of a test population</p> <p>OMoD : Swiss Ordinance on the movement of waste</p> <p>PBT : Persistent, Bioaccumulative and Toxic</p> <p>PPE: Personal Protection Equipment</p> <p>REACH : Registration, Evaluation, Authorisation and Restriction of Chemicals Regulation (EC) No 1907/2006</p> <p>RID : Regulations concerning the international carriage of dangerous goods by rail</p> <p>RMM : Risk Management Measures</p> <p>STOT-SE : Specific Target Organ Toxicity - Single Exposure</p> <p>UN : United Nations</p> <p>vPvB : Very Persistent and Very Bioaccumulative</p> <p>WGK: Water Hazards Class</p>

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

Hazard statements

H270

May cause or intensify fire; oxidiser

Nitrogen dioxide

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- 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
- P244 Keep valves and fittings free from oil and grease
- P260 Do not breathe gas, vapours
- P280 Wear protective gloves, protective clothing, eye protection, face protection
- 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
- 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
- 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
- P370+P376 In case of fire: stop leak if safe to do so
- P410+403 Protect from sunlight. Store in a well-ventilated place
- 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