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

1.1 Product identifier

Trade name/designation	Dinitrogen tetraoxide
Art-Nr(n).	4000, 70400
Substance name	dinitrogen tetraoxide
INDEX No.	007-002-00-0
EC No.	234-126-4
REACH No.	01-2119957842-27
CAS No.	10544-72-6

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

Process categories [PROC]
PROC1 Use in closed process, no likelihood of exposure
PROC2 Use in closed, continuous process with occasional controlled exposure
PROC3 Use in closed batch process (synthesis or formulation)
PROC8a Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities
PROC8b Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities
PROC9 Transfer of substance or preparation into small containers (dedicated filling line, including weighing)
PROC15 Use as laboratory reagent
PROC16 Use of fuels

Environmental release categories [ERC]
ERC1 Manufacture of substances
ERC2 Formulation into mixture
ERC4 Industrial use of processing aids in processes and products, not becoming part of articles
ERC6a Industrial use resulting in manufacture of another substance (use of intermediates)
ERC6b Industrial use of reactive processing aids
ERC8a Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor)
ERC8d Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor)

1.3 Details of the supplier of the safety data sheet

Supplier
GHC Gerling, Holz & Co. Handels GmbH
Ruhrstraße 113
D-22761 Hamburg
Telephone +49 40 853 123 0
E-mail hamburg@ghc.de
Website www.ghc.com

Department responsible for information:
GHC Gerling, Holz & Co. Handels GmbH
Telephone +49 40 853 123 0

E-mail (competent person):
msds@ghc.de

1.4 Emergency telephone number

EN: Poison Information Center Mainz +49 6131 19240

* SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008 [CLP]	Classification procedure
Ox. Gas 1, H270	
Press. Gas (Liq.), H280	
Acute Tox. 1, H330	
Skin Corr. 1B, H314	

Classification according to Regulation (EC) No 1272/2008 [CLP]	Classification procedure
Muta. 1B, H340	

Hazard statements for physical hazards
H270 May cause or intensify fire; oxidiser.
H280 Contains gas under pressure; may explode if heated.

Hazard statements for health hazards
H314 Causes severe skin burns and eye damage.
H330 Fatal if inhaled.
H340 May cause genetic defects if inhaled.

2.2 Label elements

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

Hazard pictograms


GHS03


GHS05


GHS06


GHS08

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.
H330 Fatal if inhaled.
H340 May cause genetic defects if inhaled.

Precautionary statements
P260 Do not breathe gas/vapours.
P280 Wear protective gloves/protective clothing and eye/face protection.
P303 + P361 + P353 IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water or shower.
P304 + P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P308 + P313 IF exposed or concerned: Get medical advice/attention.
P403 Store in a well-ventilated place.
P405 Store locked up.

Supplemental hazard information
EUH071 Corrosive to the respiratory tract.
EIGA0803 Restricted to professional users.
Please return container with residual pressure.

* 2.3 Other hazards

* **Adverse human health effects and symptoms**
Dangerous substances are released in case of decomposition.
Gas/vapour heavier than air. May accumulate in confined spaces, particularly at or below ground level.

Other adverse effects
The substance/mixture does not contain components considered to have endocrine disrupting properties according to REACH Article 57(f) or Commission Delegated regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at levels of 0.1% or higher.

Results of PBT and vPvB assessment
The substance/mixture does not contain components meeting the PBT/vPvB criteria of the Reach Regulation, Annex XIII, at levels of 0.1% or higher.

SECTION 3: Composition / information on ingredients

3.1 Substances

Substance name	dinitrogen tetraoxide
INDEX No.	007-002-00-0
EC No.	234-126-4
REACH No.	01-2119957842-27
CAS No.	10544-72-6
Specific concentration limit (SCL)	STOT SE 3;H335: C>=0.5% *

Additional information
Content: >= 98,5 %

3.2 Mixtures

not applicable

* SECTION 4: First aid measures

* 4.1 Description of first aid measures

General information
Remove contaminated, saturated clothing immediately.
First aider: Pay attention to self-protection!
Call a physician immediately.
Symptoms may develop several hours following exposure; medical observation therefore necessary for at least 48 hours.

* **Following inhalation**
Remove casualty to fresh air and keep warm and at rest.
In case of breathing difficulties give oxygen.
In the event of pulmonary irritation treat initially with corticoid spray, e.g. Ventolair- or Pulmicort- metered-dose aerosol (Ventolair and Pulmicort are registrated trademarks).
In case of respiratory standstill give artificial respiration by respiratory bag (Ambu bag) or respirator. Obtain medical assistance.

* **Following skin contact**
After contact with skin, wash immediately with plenty of water and soap.
In case of frostbite, wash with plenty of water; do not remove clothing.
In case of frostbite rinse with lukewarm (not hot) water for at least 15 minutes. Do not remove clothing frozen to the skin.
Thaw with lukewarm water. Apply a sterile dressing. Obtain medical assistance.

After eye contact
Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Obtain medical assistance.

* **Following ingestion**
Do NOT induce vomiting.
Rinse mouth immediately and drink plenty of water.

4.2 Most important symptoms and effects, both acute and delayed

Symptoms
Dyspnoea
Dizziness
Corrosion
Strong eye irritation.

Effects
Methaemoglobin formation
Pulmonary oedema

4.3 Indication of any immediate medical attention and special treatment needed

Notes for the doctor
Treat symptomatically.
Where appropriate artificial ventilation.
Pulmonary oedema prophylaxis.
Against methaemoglobinaemia Toluidine blue solution intravenously or methylene blue intravenously

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
The product itself does not burn. The product itself does not burn. Match extinguishing measures to surrounding fire.
Extinguishing powder
Foam
Water spray jet
Carbon dioxide (CO_2)

Unsuitable extinguishing media
Full water jet

5.2 Special hazards arising from the substance or mixture

Hazardous combustion products
The substance / product enhances the combustion.
In case of fire formation of dangerous gases possible.
Nitrogen oxides (NO_x)

5.3 Advice for firefighters

Special protective equipment for firefighters
Wear a self-contained breathing apparatus and chemical protective clothing.

Additional information
If possible, shut off gas valves and move containers to a safe location.
Use water spray jet to protect personnel and to cool endangered containers.
Exposure to fire may cause rupture / explosion of the containers.
Dispose of fire residues and contaminated extinguishing water in accordance with local, official regulations.

* SECTION 6: Accidental release measures

* 6.1 Personal precautions, protective equipment and emergency procedures

For non-emergency personnel
Use personal protection equipment.
Leave the danger area.
Keep people away and stay on the upwind side.

* **For emergency responders**
Personal protection by wearing close-fitting protective clothing and breathing apparatus.
Pay attention to extension of gas especially at ground (heavier than air) and in direction of the wind.
Remove persons to safety.
Eliminate all sources of ignition until all spilled liquid has evaporated (floor is free of frost).

6.2 Environmental precautions

If possible, stop flow of product.
Do not allow to enter into soil/subsoil.
Do not allow to enter into surface water or drains.

6.3 Methods and material for containment and cleaning up

For containment
If necessary, secure leaky pressure receptacles using a salvage container.
Prevent the liquid from spreading over a wide area (set up barriers, cover sewage systems).
Limit expansion of the gas (water spray jet).

For cleaning up
Leave to vapourize.
Provide adequate ventilation.

6.4 Reference to other sections

Disposal: see section 13
Personal protection equipment: see section 8

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Protective measures
Use only in well-ventilated areas.
Transfer and handle product only in closed systems.
Usual measures for fire prevention.
Containers' temperature should not be increased above 50 °C.
The working pressure in the receptacle must not exceed the saturation vapour pressure of the pure product resulting at a temperature of 50 °C.
Prevent cylinders from falling over.
Ensure valve protection device is correctly fitted.
Ensure valve outlet cap nut or plug (where provided) is correctly fitted.
Open valve slowly to avoid pressure shock.
Do not allow backflow into the container.
Entering of water into the container must be prevented.
Keep valves and fittings free from oil and grease.
No water to valves, flanges and other fittings.
Purging of pipes and valves with inert gases - to avoid: water, solvents.

Advices on general occupational hygiene
When using do not eat, drink, smoke, sniff.
Wash hands before breaks and after work.
Remove contaminated clothing and protective equipment before entering eating areas.

7.2 Conditions for safe storage, including any incompatibilities

Requirements for storage rooms and vessels
All regulations and local requirements for the storage of containers have to be respected.
Keep container tightly closed and in a well-ventilated place.
Containers' temperature should not be increased above 50 °C.
Prevent cylinders from falling over.
Only use containers specifically approved for the substance/product.
Information on suitable materials for receptacles and valves see ISO 11114.

Storage class
2A Gases (except aerosol dispensers and lighters)

Materials to avoid
Do not store together with explosives.
Do not store together with flammable liquids.
Do not store together with flammable solids.
Do not store together with pyrophoric and self-heating substances.
Do not store together with oxidizing liquids or oxidizing solids.
Do not store together with toxic liquids or toxic solids.
Do not store together with infectious substances.
Do not store together with radioactive material.
Do not store together with food or feed.

7.3 Specific end use(s)

Recommendation
Exposure scenarios (ES) see annex to this safety data sheet.

* SECTION 8: Exposure controls/personal protection

* 8.1 Control parameters

*** Occupational exposure limit values**

CAS No.	EC No.	Substance name	occupational exposure limit value
10102-44-0	233-272-6	Nitrogen dioxide	0,5 [ml/m³(ppm)] 0,96 [mg/m³] Short-term(ml/m³) 1 Short-term(mg/m³) 1,91 (IE)

DNEL worker

CAS No.	Substance name	DNEL value	DNEL type	Remark
10544-72-6	dinitrogen tetraoxide	0.95 mg/m³	long-term inhalative (local)	, repeated dose toxicity.
10544-72-6	dinitrogen tetraoxide	0.955 mg/m³	long-term inhalative (systemic)	, repeated dose toxicity.
10544-72-6	dinitrogen tetraoxide	1.91 mg/m³	acute inhalative (systemic)	
10544-72-6	dinitrogen tetraoxide	1.91 mg/m³	acute inhalative (local)	

*** 8.2 Exposure controls**

Appropriate engineering controls

Technical measures to prevent exposure
Transfer and handle only in enclosed systems.

*** Personal protection equipment**

Eye/face protection
Protective goggles according to EN 166, in case of increased risk add protective face shield.

Hand protection
Safety gloves according to EN 374:
Glove material specification [make/type, thickness, permeation time/life]: CR; 0,35 mm; >= 480 min

Body protection:
Safety shoes with steel toecap.
Body covering work clothing or chemical resistant suit at increased risk.

*** Respiratory protection**
Keep self contained breathing apparatus readily available for emergency use.
Respiratory protection necessary at:
high concentrations
Suitable respiratory protection apparatus:
Respiratory protection complying with EN 136.
Short term: filter apparatus, special gas filter, NO-P3
In case of rescue and maintenance activities in storage containers use environment-independent breathing apparatus because of risk of suffocation due to displacement of oxygen.

Environmental exposure controls

Remark
Prevent release to the environment.

* SECTION 9: Physical and chemical properties

*** 9.1 Information on basic physical and chemical properties**

Physical state
Gaseous / liquefied under pressure.

Colour
colourless

Odour
stinging

Safety relevant basis data

	Value	Method	Source, Remark
Odour threshold:			not determined
Melting point/freezing point	Melting point -11.2 °C		
Boiling point or initial boiling point and boiling range	21.2 °C pressure 1013 hPa		
flammability			none
Lower and upper explosion limit			not determined

	Value	Method	Source, Remark
Flash point			not applicable
Auto-ignition temperature			not determined
Decomposition temperature			not determined
pH			not applicable
Viscosity			not applicable
Solubility(ies)	Water solubility		not applicable hydrolysed (half-life < 12 hours)
Partition coefficient n-octanol/water (log value)			not determined
Vapour pressure	1000 hPa (20°C)		
Density and/or relative density			not applicable
Relative vapour density	4.1 (20°C)		Air = 1.
particle characteristics			not applicable

9.2 Other information

Other information
Vapours are heavier than air.

* SECTION 10: Stability and reactivity

10.1 Reactivity

See section "Possibility of hazardous reactions".

10.2 Chemical stability

The substance is chemically stable under recommended conditions of storage, use and temperature.

* 10.3 Possibility of hazardous reactions

Reactions with numerous chemical compounds.
Risk of explosion in contact with ammonia.
May react violently with combustible materials.
May react violently with reducing agents.
Violently oxidises organic material.
Reactions with water.

10.4 Conditions to avoid

Heat sources / heat - risk of bursting.
Ignition sources, open flames, glowing metal surfaces, etc.
Humidity.

10.5 Incompatible materials

Alcohols
Oxygen
Aluminium / Aluminium alloys.
Copper, brass and other copper alloys

* 10.6 Hazardous decomposition products

Nitrogen oxides (NOx)

SECTION 11: Toxicological information

11.1 Information on hazard classes as defined in Regulation (EC) No 1272/2008

Acute toxicity

Animal data

	Effective dose	Method,Evaluation	Source, Remark
Acute oral toxicity			Study scientifically not necessary.
Acute dermal toxicity			Study scientifically not necessary.
Acute inhalation toxicity	Acute inhalation toxicity (gas) LC50: 115 ppm Species Rat Exposure time 60 min		Information concerns nitrogen dioxide.

Assessment/classification
Fatal if inhaled.

Skin corrosion/irritation

Assessment/classification
Causes severe burns.

Serious eye damage/irritation

Assessment/classification
Causes serious eye damage.

Sensitisation to the respiratory tract

Other information
No data available

Skin sensitisation

Other information
Study scientifically not necessary.

Germ cell mutagenicity

	Value	Method	Result / Evaluation	Remark
In vitro mutagenicity/genotoxicity			positive	Information concerns nitrogen dioxide.
In vivo mutagenicity/genotoxicity	Inhalation	OECD 489	positive	Information concerns nitrogen dioxide.

Assessment/classification
May cause genetic defects if inhaled.

Carcinogenicity

Assessment/classification
No data available

Reproductive toxicity

Assessment/classification
Study scientifically not necessary.

STOT-single exposure

STOT SE 1 and 2

Assessment/classification
Based on available data, the classification criteria are not met.

STOT-repeated exposure

Animal data

	Effective dose	Method	Specific effects:	Organs affected:	Source, Remark
Inhalative specific target organ toxicity (repeated exposure)	NOAEL(C): 2.15 ppm Species Rat Exposure duration 90 d	OECD 413			Information concerns nitrogen dioxide.

Assessment/classification
Based on available data, the classification criteria are not met.

Aspiration hazard

Assessment/classification
Study technically not feasible.

11.2 Information on other hazards

Other information

May be absorbed through the skin.
Formation of methaemoglobin

* SECTION 12: Ecological information

12.1 Toxicity

Aquatic toxicity

	Effective dose	Method,Evaluation	Source, Remark
Acute (short-term) fish toxicity	LC50: > 100 mg/L Species Oncorhynchus mykiss (Rainbow trout) Test duration 96 h	OECD 203	Analogous to a similar product.
Chronic (long-term) fish toxicity	not determined		
Acute (short-term) toxicity to crustacea	EC50 3581 mg/L Species Daphnia magna (Big water flea) Test duration 48 h		Analogous to a similar product.
Chronic (long-term) toxicity to aquatic invertebrate	not determined		
Acute (short-term) toxicity to algae and cyanobacteria	NOEC 6.75 mmol/l Test duration 10 d		Analogous to a similar product.
Chronic (long-term) toxicity to aquatic algae and cyanobacteria	not determined		
Toxicity to other aquatic plants/organisms	not determined		
Toxicity to microorganisms	not determined		

12.2 Persistence and degradability

Assessment/classification
Study scientifically not necessary.

12.3 Bioaccumulative potential

Assessment/classification
Study scientifically not necessary.

*** 12.4 Mobility in soil**

*** Assessment/classification**
Study scientifically not necessary.

12.5 Results of PBT and vPvB assessment

The substance/mixture does not contain components meeting the PBT/vPvB criteria of the Reach Regulation, Annex XIII, at levels of 0.1% or higher.

12.6 Endocrine disrupting properties

	Effective dose	Method,Evaluation	Source, Remark
Endocrine disrupting properties			See section 2.3

12.7 Other adverse effects

No data available

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Waste codes/waste designations according to EWC/AVV

Waste code product	Waste name
160504 *	gases in pressure containers (including halons) containing hazardous substances

Appropriate disposal / Product
Waste disposal according to directive 2008/98/EC, covering waste and dangerous waste.
Prevent release to the environment. No disposal via the sewage.

Appropriate disposal / Package
Transportable pressure equipment (empty, residual pressure): Return to supplier / manufacturer.

SECTION 14: Transport information

	Land transport (ADR/RID)	Sea transport (IMDG)	Air transport (ICAO-TI / IATA-DGR)
14.1 UN number or ID number	UN 1067	UN 1067	UN 1067
14.2 UN proper shipping name	DINITROGEN TETROXIDE	DINITROGEN TETROXIDE	Dinitrogen tetroxide
14.3 Transport hazard class(es)	2.3 (5.1, 8)	2.3 (5.1, 8)	2.3 (5.1, 8)
14.4 Packing group	-	-	-
14.5 Environmental hazards	No	No	No

14.6 Special precautions for user

The protective measures listed in Sections 6, 7 and 8 of the Safety Data Sheet have to be considered.

14.7 Maritime transport in bulk according to IMO instruments

No carriage in bulk.

Land transport (ADR/RID)

UN number or ID number	UN 1067
UN proper shipping name	DINITROGEN TETROXIDE
Transport hazard class(es)	2.3 (5.1, 8)
Hazard label(s)	2.3+5.1+8
Classification code	2TOC
Packing group	-
Environmental hazards	No
Limited quantity (LQ)	0
Special provisions	-
Tunnel restriction code	C/D

Sea transport (IMDG)

UN number or ID number	UN 1067
UN proper shipping name	DINITROGEN TETROXIDE
Transport hazard class(es)	2.3 (5.1, 8)
Packing group	-
Environmental hazards	No
Limited quantity (LQ)	0
Marine pollutant	No
EmS	F-C, S-W

Air transport (ICAO-TI / IATA-DGR)

UN number or ID number	UN 1067
UN proper shipping name	Dinitrogen tetroxide
Transport hazard class(es)	2.3 (5.1, 8)
Packing group	-
Environmental hazards	No

* SECTION 15: Regulatory information

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

* **EU legislation**

Restrictions of occupation
Observe employment restrictions under the Maternity Protection Directive (92/85/EEC) for expectant or nursing mothers.
Observe restrictions to employment for juvenils according to the 'juvenile work protection guideline' (94/33/EC).

* **Other regulations (EU)**

* **To follow:**
Regulation (EC) No 1907/2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH), Annex XVII No 28 - 30.
REGULATION (EU) 2021/821 setting up a Union regime for the control of exports, brokering, technical assistance, transit and transfer of dual-use items.
Directive 2012/18/EU on the control of major-accident hazards involving dangerous substances.
National and local regulations concerning chemicals shall be observed.

15.2 Chemical Safety Assessment

* **National regulations**

For this substance a chemical safety assessment has been carried out.

SECTION 16: Other information

Key literature references and sources for data
Information from our suppliers and data from the "GESTIS Substances Database" and the "Registered Substances" database of the European Chemicals Agency (ECHA) were used to create this safety data sheet.

Additional information
The information contained herein is based on the state of our knowledge. It characterizes the product with regard to the appropriate safety precautions. It does not represent a guarantee of the properties of the product.

Relevant H- and EUH-phrases (Number and full text)

H270	May cause or intensify fire; oxidiser.
H314	Causes severe skin burns and eye damage.
H330	Fatal if inhaled.

Indication of changes
* Data changed compared with the previous version

Annex: Exposure scenarios

Identification of the substance or mixture

Product definition : Mono-constituent substance

Product name : dinitrogen tetraoxide

Section 1 — Title

Short title of the exposure scenario : dinitrogen tetraoxide - Distribution, Formulation

Identified use name : Industrial distribution.
Industrial USE to formulate chemical product mixtures.

Substance supplied to that use in form of : As such, In a mixture

List of use descriptors

Process Category : PROC01, PROC03, PROC08b, PROC09, PROC15
Environmental Release Category : ERC02
Subsequent service life relevant for that use : No.

Section 2 — Exposure controls

Contributing exposure scenario controlling environmental exposure for: All
This product is not classified according to EU legislation., No exposure assessment presented for the environment.

Contributing exposure scenario controlling worker exposure for: All

Concentration of substance in mixture or article : <= 100 %
Physical state : Liquefied gas.

Technical conditions and measures at process level (source) to prevent release :
Process design : Use closed dosing, transfer, sampling and application systems, including connectors.

Ventilation control measures : Local exhaust ventilation should be provided.

Conditions and measures related to personal protection, hygiene and health evaluation

Advice on general occupational hygiene : Pay attention to good general hygiene and housekeeping., See Section 8 of the safety data sheet (general health and safety

		measures).
Personal protection	:	Causes severe skin burns and eye damage., Wear protective gloves/clothing and eye/face protection., See Section 8 of the safety data sheet (personal protective equipment).
Respiratory protection	:	In case of inadequate ventilation wear respiratory protection:, acid gas filter (Type E)

Section 3 — Exposure estimation and reference to its source

Exposure estimation and reference to its source - Workers:		
Exposure assessment (human):	:	Used CHESAR model. EASE v2.0
Exposure estimation	:	See Section 8 in SDS, DNEL. Estimated workplace exposures are not expected to exceed DNELs when the identified risk management measures are adopted.

Section 4 — Guidance to Downstream User to evaluate if he works inside the boundaries set by the ES

Environment	:	Not applicable.
Health	:	Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures., For scaling, see, EASE v2.0

Abbreviations and acronyms

Process Category	:	PROC01 - Use in closed process, no likelihood of exposure PROC03 - Use in closed batch process (synthesis or formulation) PROC08b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC09 - Transfer of substance or preparation into small containers (dedicated filling line, including weighing) PROC15 - Use a laboratory reagent
Environmental Release Category	:	ERC02 - Formulation of preparations

Section 1 — Title

Short title of the exposure scenario : dinitrogen tetraoxide - Industrial

Identified use name : Industrial USE as chemical intermediate.
Industrial USE for surface/article treatment.
Industrial USE as a laboratory/research chemical.
Industrial use of the substance as propellant.

Substance supplied to that use in form of : As such, In a mixture

List of use descriptors

Process Category : PROC01, PROC02, PROC03, PROC08b, PROC09, PROC15, PROC16
Environmental Release Category : ERC04, ERC06a, ERC06b
Market sector by type of chemical product : PC13, PC15, PC19, PC21
Sector of end use : SU09
Subsequent service life relevant for that use : No.

Section 2 — Exposure controls

Contributing exposure scenario controlling environmental exposure for: All
This product is not classified according to EU legislation., No exposure assessment presented for the environment.

Contributing exposure scenario controlling worker exposure for: All

Concentration of substance in mixture or article : <= 100 %
Physical state : Liquefied gas.

Technical conditions and measures at process level (source) to prevent release :
Process design : Use closed dosing, transfer, sampling and application systems, including connectors.

Ventilation control measures	:	Local exhaust ventilation should be provided.
Conditions and measures related to personal protection, hygiene and health evaluation		
Advice on general occupational hygiene	:	Pay attention to good general hygiene and housekeeping., See Section 8 of the safety data sheet (general health and safety measures).
Personal protection	:	Causes severe skin burns and eye damage., Wear protective gloves/clothing and eye/face protection. See Section 8 of the safety data sheet (personal protective equipment).
Respiratory protection	:	In case of inadequate ventilation wear respiratory protection:, acid gas filter (Type E)

Section 3 — Exposure estimation and reference to its source

Exposure estimation and reference to its source - Workers:		
Exposure assessment (human):	:	Used CHESAR model. EASE v2.0
Exposure estimation	:	See Section 8 in SDS, DNEL. Estimated workplace exposures are not expected to exceed DNELs when the identified risk management measures are adopted.

Section 4 — Guidance to Downstream User to evaluate if he works inside the boundaries set by the ES

Environment	:	Not available.
Health	:	Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures., For scaling, see, EASE v2.0

Abbreviations and acronyms

Process Category	:	PROC01 - Use in closed process, no likelihood of exposure PROC02 - Use in closed, continuous process with occasional controlled exposure PROC03 - Use in closed batch process (synthesis or formulation) PROC08b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC09 - Transfer of substance or preparation into small containers (dedicated filling line, including weighing) PROC15 - Use a laboratory reagent

		PROC16 - Using material as fuel sources, limited exposure to unburned product to be expected
Environmental Release Category	:	ERC04 - Industrial use of processing aids in processes and products, not becoming part of articles ERC06a - Industrial use resulting in manufacture of another substance (use of intermediates) ERC06b - Industrial use of reactive processing aids
Market sector by type of chemical product	:	PC13 - Fuels PC15 - Non-metal surface treatment products PC19 - Intermediate PC21 - Laboratory chemicals
Sector of end use	:	SU09 - Manufacture of fine chemicals

Section 1 — Title

Short title of the exposure scenario : dinitrogen tetraoxide - Professional

Identified use name : Professional USE as a laboratory/research chemical.

Substance supplied to that use in form of : As such, In a mixture

List of use descriptors

Process Category : PROC03, PROC15
Environmental Release Category : ERC08a, ERC08d
Sector of end use : SU24, SU 0: Other: M74.9
Subsequent service life relevant for that use : No.

Section 2 — Exposure controls

Contributing exposure scenario controlling environmental exposure for: All
This product is not classified according to EU legislation., No exposure assessment presented for the environment.

Contributing exposure scenario controlling worker exposure for: All

Concentration of substance in mixture or article : <= 100 %
Physical state : Liquefied gas.

Technical conditions and measures at process level (source) to prevent release :
Process design : Use closed dosing, transfer, sampling and application systems, including connectors.

Ventilation control measures : Local exhaust ventilation should be provided.

Conditions and measures related to personal protection, hygiene and health evaluation

Advice on general occupational hygiene : Pay attention to good general hygiene and housekeeping., See Section 8 of the safety data sheet (general health and safety

		measures).
Personal protection	:	Causes severe skin burns and eye damage., Wear protective gloves/clothing and eye/face protection. See Section 8 of the safety data sheet (personal protective equipment).
Respiratory protection	:	In case of inadequate ventilation wear respiratory protection:, acid gas filter (Type E)

Section 3 — Exposure estimation and reference to its source

Exposure estimation and reference to its source - Workers:		
Exposure assessment (human):	:	Used CHESAR model. EASE v2.0
Exposure estimation	:	See Section 8 in SDS, DNEL. Estimated workplace exposures are not expected to exceed DNELs when the identified risk management measures are adopted.

Section 4 — Guidance to Downstream User to evaluate if he works inside the boundaries set by the ES

Environment	:	Not applicable.
Health	:	Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures., For scaling, see, EASE v2.0

Abbreviations and acronyms

Process Category	:	PROC03 - Use in closed batch process (synthesis or formulation) PROC15 - Use a laboratory reagent
Environmental Release Category	:	ERC08a - Wide dispersive indoor use of processing aids in open systems ERC08d - Wide dispersive outdoor use of processing aids in open systems
Sector of end use	:	SU24 - Scientific research and development SU 0: Other: M74.9 - Other professional, scientific and technical activities n.e.c.