

Dinitrogen tetroxide

N₂O₄

1. Identification of the substance/mixture and of the company/undertaking

Product identifier	
Name of product	Dinitrogen tetroxide
	Art-Nr.: 4000
Name of substance	dinitrogen tetroxide
Index No	007-002-00-0
EC No	234-126-4
CAS No	10544-72-6

Manufacturer / Distributor:

Ehsan International Gases

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**Recommended intended
purpose(s)** Basic substance.
Oxidising agent.

2. Hazards identification

Classification according to 67/548/EEC or 1999/45/EC

T+; R26

C; R34

R-phrases

26 Very toxic by inhalation.

34 Causes burns.

Hazard classes and Hazard categories	Hazard Statements	Classification procedure	Classification according to Regulation (EC) No 1272/2008 [CLP/GHS]
Ox. Gas 1	H270		Hazard statements for physical hazards H270 May cause or intensify fire; oxidiser. H280 Contains gas under pressure; may explode if heated.
Liquef. Gas	H280		
Acute Tox. 1	H330		
Skin Corr. 1B	H314		

Hazard statements for health hazards

H314 Causes severe skin burns and eye damage. H330

Fatal if inhaled.

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

Dinitrogen tetroxide

N₂O₄



GHS03



GHS04



GHS05



GHS06

Signal word

Danger

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.

Precautionary Statements

Prevention

P244 Keep reduction valves free from grease and oil.
P260 Do not breathe gas/vapours.
P280 Wear protective gloves/protective clothing/eye protection/face protection.

Response

P303 + P361 + P353 IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.
P304 + P340 IF INHALED: Remove to fresh air and keep at rest in a position 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.
P315 Get immediate medical advice/attention.

Storage

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

Supplemental Hazard information (EU)

Health properties

Corrosive to the respiratory tract.

Information pertaining to special dangers for human and environment

Dangerous substances are released in case of decomposition.
Gas/vapour heavier than air. May accumulate in confined spaces, particularly at or below ground level. Contact with liquid may cause cold burns/frostbite.

3. Composition/information on ingredients

CAS No 10544-72-6

dinitrogen tetroxide

EC No 234-126-4

Index No 007-002-00-0

4. First aid measures

General information

Remove contaminated soaked clothing immediately and dispose it safely.
Adhere to personal protective measures when giving first aid.
Seek medical advice immediately.

In case of inhalation

Remove the casualty into fresh air and keep him immobile.

Dinitrogen tetroxide

N₂O₄

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 registered trademarks).

In case of respiratory standstill give artificial respiration by respiratory bag (Ambu bag) or respirator. Send for a doctor.

In case of skin contact

In case of contact with skin wash off immediately with plenty of water.

In case of eye contact

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

In case of ingestion

Do not induce vomiting.

Refer to medical treatment.

Rinse out mouth and give plenty of water to drink.

Treatment (Advice to doctor)

Pulmonary oedema prophylaxis.

5. Firefighting measures

Suitable extinguishing media

Product does not burn, fire-extinguishing activities according to surrounding.

Extinguishing media which must not be used for safety reasons

Full water jet on the leakage.

Special hazards arising from the substance or mixture

In the event of fire the following can be released: Nitrogen oxides (NO_x)

Special protective equipment for fire-fighters

Use breathing apparatus with independent air supply (isolated). Wear full protective clothing.

Additional information

Cool endangered containers with water spray jet.

In case of fire: Stop leak if safe to do so.

Exposure to fire may cause containers to rupture / explode.

6. Accidental release measures

Personal precautions

See chapter 8.

Remove persons to safety.

Evacuate area.

Environmental precautions

If possible, stop flow of product.

Do not discharge into the drains/surface waters/groundwater.

Do not discharge into the subsoil/soil.

Methods for cleaning up

Ensure adequate air ventilation.

Additional Information

Informations for personal protective equipment see chapter 8.

Dinitrogen tetroxide

N₂O₄

7. Handling and storage

Advice on safe handling

- Use only in thoroughly ventilated areas.
- Transfer and handle only in enclosed systems.
- Prevent cylinders from falling over.
- Ensure valve outlet cap nut or plug is correctly fitted.
- Ensure valve protection device is correctly fitted.
- Open valve slowly to avoid pressure shock.
- Use only properly specified equipment which is suitable for this product, its supply pressure and temperature. Do not allow backfeed into the container.
- Suck back 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.

Advice on protection against fire and explosion

- The product is not combustible, but supports burning.
- Avoid effect of heat.

Requirements for storage rooms and vessels

- Ventilate store-rooms thoroughly.
- Use transportable pressure equipment.
- Suitable materials: Normalised steel and carbon steel, tempered steel, aluminium alloys, stainless steel.
- Valve: Suitable materials: Carbon steels, aluminium alloys, stainless steel. Unsuitable materials: Brass, copper alloys.

Advice on storage compatibility

- Do not store with combustible materials.
- Do not store together with feedstuff.
- Do not store together with explosives.
- Do not store together with infectious substances.
- Do not store together with radioactive material.
- Do not store together with toxic liquids or toxic solids.
- Do not store together with food.
- Do not store together with oxidizing liquids or oxidizing solids.
- Do not store together with reducing agents.

Further information on storage conditions

- Ensure valve protection device is correctly fitted.
- Recommended storage temperature: =< 20 °C.
- Store only in closed original container at cool and aired place.
- Store away from combustible materials.
- Prevent cylinders from falling over.
- Protect from heat/overheating.

8. Exposure controls/personal protection

Ingredients with occupational exposure limits to be monitored

CAS No	Name	Code	[mg/m ³]	[ppm]	Remark
10102-44-0	nitrogen dioxide	8 hours		0,2	
10102-44-0	Nitrogen dioxide	8 hours Short-term	9	5	OSHA, USA

Respiratory protection

- Keep self contained breathing apparatus readily available for emergency use.

Dinitrogen tetroxide

N₂O₄

Short term: filter apparatus, special gas filter, NO-P3

Hand protection

Glove material specification [make/type, permeation time/life]: PVC, PTEE, >= 60 min

Eye protection safety goggles, in case of increased risk add protective face shield

Skin protection

Body covering work clothing, or chemical resistant suit at increased risk.

General protective measures

Do not inhale gases/vapours/aerosols.

Hygiene measures

At work do not eat, drink, smoke or take drugs. Wash hands before breaks and after work.

9. Physical and chemical properties

Form
liquid

Colour
yellow

Odour
irritant

Important health, safety and environmental information

	Value	Temperature	at	Method	Remark
pH value in delivery state	not applicable				
boiling point	21,2 °C		1013 hPa		
melting point	-11,2 °C				
Flash point	not applicable				
Vapour pressure	1000 hPa	20 °C			
Density	1,44 g/cm ³	21 °C	1013 hPa	liquid	
Rel. vapour density	1,59			air = 1	
Solubility in water	not applicable				hydrolyses
Partition coefficient (log p_{OW})	not applicable				
Viscosity dynamic	0,43 mPa*s	20 °C			

Oxidizing properties

Oxygen equivalency factor Ci = 1 (ISO 10156-2:2005)

Explosive properties

no

Dinitrogen tetroxide

N₂O₄

10. Stability and reactivity

Conditions to avoid

Heat sources / heat - risk of bursting.
Humidity.

Materials to avoid

Reactions with numerous chemical compounds.

Hazardous decomposition products

Nitrous oxides (NO_x)

11. Toxicological information

Acute toxicity/Irritability/Sensitization

	Value/Validation	Species	Method	Remark
LC50 acute inhalation	89 ppm (4 h)	rat		
Irritability skin	irritant			
Irritability eye	irritant			
Skin sensitization	not determined			

Subacute Toxicity - Carcinogenicity

	Value	Species	Method	Validation
Mutagenicity				Information on genotoxicity in vivo available.
Reproduction-Toxicity				Indications of toxic effects are available from reproduction studies in animals.
Carcinogenicity				Indications of possible carcinogenic effects in animal studies are available.

12. Ecological information

Data on elimination (persistence and degradability)

Elimination rate	Method of analysis	Method	Validation

Dinitrogen tetroxide

N₂O₄

Physico-chemical degradability not determined

Biological degradability

Biodegradable

At normal temperature very highly volatile or gaseous product that

can be released to atmosphere. Elimination test cannot be employed.

Ecotoxicological effects

Value	Species	Method	Validation
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Fish not determined

Daphnia not determined

Algae not determined

Additional ecological information

Value	Method	Remark
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COD not determined

BOD not determined

13. Disposal considerations

Waste code No.

16 05 04*

Name of waste

gases in pressure containers (including halons) containing dangerous substances

Wastes marked with an asterisk are considered to be hazardous waste pursuant to Directive 91/689/EEC on hazardous waste.

Recommendations for the product

Dispose of in accordance with the local official regulations.

Recommendations for packaging

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

14. Transport information

Land and inland navigation transport ADR/RID

UN 1067 DINITROGEN TETROXIDE, 2.3 (5.1+8), (C/D), Classification code: 2TOC

Marine transport IMDG

UN 1067 DINITROGEN TETROXIDE, 2.3 (5.1+8), Marine pollutant: no

EmS: F-C, S-W

Air transport ICAO/IATA-DGR

UN 1067 Dinitrogen tetroxide, 2.3 (5.1+8)

FORBIDDEN

15. Regulatory information

Chemical Safety Assessment

For this substance a chemical safety assessment has not been carried out.

Dinitrogen tetroxide

N₂O₄

16. Other information

Recommend uses and restrictions

National and local regulations concerning chemicals shall be observed.

Further information

All declarations of safety-data-sheet refer to pure substance.

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.

Wording of the R/H-phrases specified in chapter 3 (not the classification of the mixture!)

R 26 Very toxic by inhalation.

R 34 Causes burns.

R 8 Contact with combustible material may cause fire.

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.