

## Material Safety Data Sheet

# Vanadium(V) oxide

Report No.: VIH241107009-1  
Version: 2.1  
Preparation Date: 07/11/2024  
Revision Date: 07/11/2024

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

### 1.1 Product identifier

Product Name	Vanadium(V) oxide
Product No.	230801
Formula	V <sub>2</sub> O <sub>5</sub>
CAS No.	1314-62-1
Synonyms	Vanadium Pentoxide

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

Identified uses	Laboratory chemicals, Scientific research
Uses advised against	Consulting manufacturers

### 1.3 Details of the supplier of the safety data sheet

Company Name	VI HALBLEITERMATERIAL GmbH
Street	Bergener Straße 14.,
City	Hannover
State	Niedersachsen
Zip Code	30625
Country	Germany
Tel	0049 1626484175
Email	info@vimaterial.de
Website	<a href="https://vimaterial.de/">https://vimaterial.de/</a>

### 1.4 Emergency telephone number

Emergency Phone #	0049 1626484175
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## 2. Hazards Identification

### 2.1 Classification of the substance or mixture

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

## Physical hazards

Not Classified

## Health hazards

Acute toxicity, Oral	Category 3 (H301)
Acute toxicity, Inhalation	Category 4 (H332)
Serious eye damage	Category 1 (H318)
Germ cell mutagenicity	Category 2 (H341)
Carcinogenicity	Category 1B (H350)
Reproductive toxicity	Category 2 (H361fd)
STOT - single exposure	Category 3 (H335)
Effects on or via lactation	(H362)
STOT- repeated exposure	Category 1 (H372)

## Environmental hazards

Chronic aquatic toxicity	Category 2 (H411)
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Full text of Hazard Statements: see section 16

## 2.2 Label elements

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

Signal Word	Danger
Pictograms	

## Hazard Statements

H301	Toxic if swallowed
H318	Causes serious eye damage.
H330	Fatal if inhaled
H335	May cause respiratory irritation
H341	Suspected of causing genetic defects.
H350	May cause cancer
H361fd	Suspected of damaging fertility. Suspected of damaging the unborn child
H362	May cause harm to breast-fed children
H372	Causes damage to organs through prolonged or repeated exposure.
H411	Toxic to aquatic life with long lasting effects

## Precautionary Statements

<b>Prevention</b>	
P201	Obtain special instructions before use.
P260	Do not breathe dust/fume/gas/mist/vapors/spray
P264	Wash contaminated skin thoroughly after handling.
P280	Wear protective gloves/protective clothing.
<b>Response</b>	
P301 + P330 + P331	IF SWALLOWED: rinse mouth. Do NOT induce vomiting
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
P310	Immediately call a POISON CENTER or doctor/physician
<b>Storage</b>	
P403+P233	Store in a well-ventilated place. Keep container tightly closed
<b>Disposal</b>	
P501	Dispose of contents/container in accordance with local/regional/national/international regulations

### 2.3 Other hazards

This product does not contain any substances classified as PBT or vPvB

This product does not contain any known or suspected endocrine disruptors.

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## 3. Composition/information on ingredients

### 3.1 Substances

Chemical Family	Ceramic
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Component	CAS No.	EC No.	Concentration
Vanadium pentoxide (V <sub>2</sub> O <sub>5</sub> )	1314-62-1	215-239-8	<=100%

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## 4. First aid measures

### 4.1 Description of first aid measures

General Treatment	If symptoms persist, call a physician. Show this Safety Data Sheet to the medical personnel.
Inhalation	Remove victim to fresh air. If breathing is irregular or stopped, immediately seek medical assistance and start first aid actions.
Skin	Take off immediately all contaminated clothing. Rinse skin with

	water/ shower. Seek medical attention.
Eyes	Rinse with pure water for at least 15 minutes. Remove contact lenses, if present and easy to do. Seek medical attention.
Ingestion	Do NOT induce vomiting. Rinse mouth. Never give anything by mouth to an unconscious person. Seek medical attention.

#### 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.

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

1	Based on the symptoms that appear, provide targeted treatment.
2	Be aware that symptoms may be delayed.

## 5. Firefighting Measures

### 5.1 Extinguishing Media

Suitable extinguishing media	Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.
Unsuitable extinguishing media	N/A

### 5.2 Special hazards arising from the substance or mixture

1	Vanadium/vanadium oxides
2	Non-flammable.
3	Ambient fire may liberate hazardous vapours.

### 5.3 Advice for firefighters

1	As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.
2	Fight fire from a safe distance and with adequate protection. Do not allow firefighting water to enter drains or water courses.
3	Collect contaminated firefighting water separately.

## 6. Accidental Release Measures

### 6.1 Personal precautions, protective equipment and emergency procedures

For non-emergency personnel	Use personal protective equipment as required. Avoid dust formation. Ensure adequate ventilation. Keep people away from and upwind of spill/leak. Evacuate personnel to safe areas.
For emergency responders	Wear breathing apparatus if exposed to vapours/dust/spray/gases.

## 6.2 Environmental Precautions

1	Keep away from drains, surface and ground water. Retain contaminated washing water and dispose of it.
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## 6.3 Methods and material for containment and cleaning up

Advice on how to contain a spill	Covering of drains, Take up mechanically.
Advice on how to clean up a spill	Sweep up and shovel. Take care not to raise dust.
Other information relating to spills and releases	Place in appropriate containers for disposal. Ventilate affected area.

## 6.4 Reference to other sections

Refer to protective measures listed in Sections 8 and 13.

# 7. Handling and Storage

## 7.1 Precautions for safe handling

Recommendations	Do not get in eyes, on skin, or on clothing. Wear personal protective equipment/face protection. Avoid dust formation. Use only under a chemical fume hood. Do not breathe (dust, vapor, mist, gas). Do not ingest. If swallowed then seek immediate medical assistance
Hygiene Measures	Handle in accordance with good industrial hygiene and safety practice. Keep away from food, drink and animal feeding stuffs. Do not eat, drink or smoke when using this product. Remove and wash contaminated clothing and gloves, including the inside, before re-use. Wash hands before breaks and after work.

## 7.2 Conditions for safe storage, including any incompatibilities

Ventilation requirements	Keep in a dry, cool and well-ventilated place. Keep container tightly closed. Keep locked up.
Storage class	Class 6.1B
Incompatible materials	See section 10.5.

### 7.3 Specific end use(s)

Use in laboratories.

## 8. Exposure Controls/Personal Protection

### 8.1 Control parameters

#### Occupational exposure limit values (Workplace Exposure Limits)

Substance	CAS No.	Source	TWA (8 h)/ mg/m <sup>3</sup>	Remarks
Vanadium pentoxide (V <sub>2</sub> O <sub>5</sub> )	1314-62-1	TRGS 900 (DE)	0,02 (inhalable fraction, as V)	AGW; Carcinogenic (K2); respiratory sensitizer
Vanadium pentoxide (V <sub>2</sub> O <sub>5</sub> )	1314-62-1	EU SCOEL	0,05 (respirable fraction, as V)	Indicative OELV; STOT RE 2; Resp. Sens. 1
Vanadium pentoxide (V <sub>2</sub> O <sub>5</sub> )	1314-62-1	ACGIH TLV (USA)	0,05 (respirable fraction, as V <sub>2</sub> O <sub>5</sub> )	TLV-TWA; A3 carcinogen; upper respiratory tract irritant
Vanadium pentoxide (V <sub>2</sub> O <sub>5</sub> )	1314-62-1	NIOSH REL (USA)	0,05 (respirable dust, as V <sub>2</sub> O <sub>5</sub> )	Recommended exposure limit; potential occupational carcinogen
Vanadium pentoxide (V <sub>2</sub> O <sub>5</sub> )	1314-62-1	OSHA PEL (USA)	0,5 (ceiling, as V <sub>2</sub> O <sub>5</sub> fume or dust)	PEL-C; eye, skin, and respiratory tract irritation

Notes:

TWA: Time-weighted average (long-term exposure limit): measured or calculated in relation to a reference period of 8 hours time-weighted average (unless otherwise specified)

#### Derived No Effect Level (DNEL) / Derived Minimum Effect Level (DMEL)

Exposure scenario	Route of exposure	Population	DNEL / DMEL value
chronic - systemic effects	human, inhalatory	worker (industry)	DNEL=0,5 mg/m <sup>3</sup>
chronic - local effects	human, inhalatory	worker (industry)	DNEL=0,14 mg/m <sup>3</sup>
acute - local effects	human, inhalatory	worker (industry)	DNEL=0,7 mg/m <sup>3</sup>

#### Predicted No-Effect Concentration (PNEC)

Exposure scenario	Organism	Environmental compartment	PNEC value
short-term (single instance)	aquatic organisms	freshwater	PNEC=17,1 µg/l
short-term (single instance)	aquatic organisms	marine water	PNEC=2,5 µg/l
short-term (single instance)	aquatic organisms	sewage treatment plant (STP)	PNEC=450 µg/l
short-term (single instance)	aquatic organisms	freshwater sediment	PNEC=538 mg/kg

short-term (single instance)	aquatic organisms	marine sediment	PNEC=79 mg/kg
short-term (single instance)	terrestrial organisms	soil	PNEC=7,2 mg/kg

## 8.2 Exposure controls

### Appropriate engineering controls

Ensure adequate ventilation, especially in confined areas. Ensure that eyewash stations and safety showers are close to the workstation location.

Wherever possible, engineering control measures such as the isolation or enclosure of the process, the introduction of process or equipment changes to minimise release or contact, and the use of properly designed ventilation systems, should be adopted to control hazardous materials at source.

### Personal protective equipment

#### Eye/face protection

Wear safety glasses with side shields (or goggles) (European standard - EN166) and face protection.

#### Skin protection

-Hand Protection

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

-Other protection measures

Wear appropriate protective gloves and clothing to prevent skin exposure. Wash hands thoroughly after handling.

#### Respiratory Protection

When workers are facing concentrations above the exposure limit they must use appropriate certified respirators.

To protect the wearer, respiratory protective equipment must be the correct fit and be used and maintained properly.

<b>Large scale/emergency use</b>	Use a NIOSH/MSHA or European Standard EN 136 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced Recommended Filter type: Particulates filter conforming to EN 143
<b>Small scale/Laboratory use</b>	Use a NIOSH/MSHA or European Standard EN 149:2001 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced. Recommended half mask:- Particle filtering: EN149:2001 When RPE is used a face piece Fit Test should be conducted

### Environmental exposure controls

Use appropriate container to avoid environmental contamination. Keep away from drains, surface and ground water.

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## 9. Physical and Chemical Characteristics

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### 9.1 Information on basic physical and chemical properties

Physical State	Solid. Powder
Colour	Orange-yellow
Odor	odourless
Melting Point/Range	690 °C
Boiling Point/Range	1.750 °C
Flammability (liquid)	Not applicable
Flammability (solid, gas)	No data available
Explosion limits	No data available
Flash Point	No data available
Autoignition Temperature	No data available
Decomposition Temperature	1.750 °C
pH	No data available
Viscosity	Not applicable
Water Solubility	Soluble
Solubility in other solvents	No data available
Partition Coefficient (n-octanol/water)	No data available
Vapor Pressure	No data available
Density / Specific Gravity	3,35 g/cm <sup>3</sup>
Vapor Density	Not applicable
Particle characteristics	No data available

### 9.2 Other information

Molecular formula	V <sub>2</sub> O <sub>5</sub>
Molecular weight	181,88 g/mol
Evaporation Rate	Not applicable - Solid

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## 10. Stability and reactivity

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### 10.1 Reactivity

None known, based on information available

### 10.2 Chemical stability

Stable under normal conditions

### 10.3 Possibility of hazardous reactions

**Hazardous Polymerization:** No information available

**Hazardous Reactions:** No information available

### 10.4 Conditions to avoid

No data available.

### 10.5 Incompatible materials

Strong acids. Reducing Agent.

### 10.6 Hazardous decomposition products

Vanadium/vanadium oxides

In the event of fire: see section 5

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## 11. Toxicological information

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

Acute toxicity

Toxic if swallowed. Fatal if inhaled.

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
Vanadium pentoxide (V <sub>2</sub> O <sub>5</sub> )	474 mg/kg ( Rat, male )	LD50 > 2.500 mg/kg ( Rat )	LC50 = 4,4 mg/L ( Rat ) 4 h LC50 = 2,21 mg/L ( Rat ) 4 h
	467 mg/kg ( Rat, female )		
	314 mg/kg ( Rat, male )		
	221 mg/kg ( Rat, female )		

Skin corrosion/irritation	No data available.	
Serious eye damage/irritation	Causes serious eye damage.	
Respiratory or skin sensitization	Respiratory	No data available.
	Skin	No data available.
Germ cell mutagenicity	Suspected of causing genetic defects.	
Carcinogenicity	May cause cancer	
Reproductive toxicity	Suspected of damaging the unborn child. Suspected of damaging fertility. May cause harm to breastfed children.	
STOT - single exposure	May cause respiratory irritation.	
STOT - repeated exposure	Causes damage to organs (respiratory tract) through prolonged or repeated exposure (if inhaled)	
Aspiration hazard	Not applicable. Solid	

### 11.2 Information on other hazards

**Endocrine Disrupting Properties:** Assess endocrine disrupting properties for human health. This product does not contain any known or suspected endocrine disruptors.

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## 12. Ecological Information

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### 12.1 Toxicity

Ecotoxicity effects	Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
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### 12.2 Persistence and degradability

Persistence	No data available.
Degradability	No data available.

### 12.3 Bioaccumulative potential

Bioaccumulative potential	No data available.
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### 12.4 Mobility in soil

Mobility in soil	No data available.
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### 12.5 Results of PBT and vPvB assessment

Results of PBT and vPvB assessment	In accordance with Annex XIII of the REACH Regulation, inorganic substances do not require assessment.
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### 12.6 Endocrine disrupting properties

Endocrine Disruptor Information	This product does not contain any known or suspected endocrine disruptors.
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### 12.7 Other adverse effects

Persistent Organic Pollutant	This product does not contain any known or suspected substance
Ozone Depletion Potential	This product does not contain any known or suspected substance

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## 13. Disposal Considerations

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### 13.1 Waste treatment methods

Dispose of in accordance with all applicable local and national regulations. Use recovery/recycling where feasible, otherwise incineration is the recommended method of disposal. Empty

containers may contain hazardous residues. Do not cut, puncture or weld on or near to the container. Labels should not be removed from containers until they have been cleaned. Contaminated containers must not be treated as household waste. Containers should be cleaned by appropriate methods and then re-used or disposed of by landfill or incineration as appropriate. Do not incinerate closed containers.

## 14. Transport information

### IMDG

<b>14.1. UN number</b>	UN2862
<b>14.2. UN Proper shipping name</b>	VANADIUM PENTOXIDE
<b>14.3. Transport hazard class(es)</b>	6.1
<b>14.4. Packaging group</b>	III

### ADR/RID/ADN

<b>14.1. UN number</b>	UN2862
<b>14.2. UN Proper shipping name</b>	VANADIUM PENTOXIDE
<b>14.3. Transport hazard class(es)</b>	6.1
<b>14.4. Packaging group</b>	III

### ICAO-IATA/DGR

<b>14.1. UN number</b>	UN2862
<b>14.2. UN Proper shipping name</b>	VANADIUM PENTOXIDE
<b>14.3. Transport hazard class(es)</b>	6.1
<b>14.4. Packaging group</b>	III

<b>14.5. Environmental hazards</b>	Dangerous for the environment Product is a marine pollutant according to the criteria set by IMDG/IMO
<b>14.6. Special precautions for user</b>	No special precautions required
<b>14.7. Maritime transport in bulk according to IMO instruments</b>	Not applicable, packaged goods

## 15. Regulatory information

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

## mixture

This Safety Data Sheet is prepared in accordance with Commission Regulation (EC) 1907/2006, amended by Commission Regulation (EU) 2020/878.

### Authorisations/Restrictions

Regulation (EC) 1907/2006, REACH, Annex XIV list of substances subject to authorisation:	Not applicable
Regulation (EC) 1907/2006, REACH, Annex XVII restrictions on the manufacture, placing on the market and use of certain dangerous substances:	Use restricted. See item 75. (see link for restriction details)
Regulation (EC) 1005/2009 on substances that deplete the ozone layer:	Not applicable
Regulation (EC) 850/2004 on persistent organic pollutants, amended by (EU) No 2019/1021:	Not applicable

REACH links

<https://echa.europa.eu/substances-restricted-under-reach>

### 15.2 Chemical Safety Assessment

No Chemical Safety Assessment has been carried out for this substance.

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## 16. Other information

### Revision information

Preparation date	07/11/2024
Revision date	07/11/2024
Revision reason	Creation.

### Abbreviations and acronyms

CAS	Chemical Abstracts Service
ADR	European Agreement concerning the International Carriage of Dangerous Goods by Road
RID	Regulation concerning the International Carriage of Dangerous Goods by Rail
IATA	International Air Transportation Association
IMDG	International Maritime Dangerous Goods
LC50	Lethal Concentration 50%
LD50	Lethal Dose 50%
TWA	Time Weighted Average
STOT	Specific target organ toxicity
PBT	Persistent, Bioaccumulative, Toxic

vPvB	Very Persistent, very Bioaccumulative
WEL	Workplace exposure limit

## References

- [1] CAMEO Chemicals, website: <http://cameochemicals.noaa.gov/search/simple>
- [2] ECHA - European Chemicals Agency, website: <https://echa.europa.eu/>
- [3] eChemPortal - The Global Portal to Information on Chemical Substances by OECD, website: [http://www.echemportal.org/echemportal/index?pageID=0&request\\_locale=en](http://www.echemportal.org/echemportal/index?pageID=0&request_locale=en)
- [4] Germany GESTIS-database on hazard substance, website: <http://www.dguv.de/ifa/gestis/gestis-stoffdatenbank/index-2.jsp>
- [5] HSDB - Hazardous Substances Data Bank, website: <https://toxnet.nlm.nih.gov/newtoxnet/hsdb.htm>
- [6] IARC - International Agency for Research on Cancer, website: <http://www.iarc.fr/>
- [7] IPCS - The International Chemical Safety Cards (ICSC), website: <http://www.ilo.org/dyn/icsc/showcard.home>
- [8] ERG - Emergency Response Guidebook by U.S. Department of Transportation, website: <http://www.phmsa.dot.gov/hazmat/library/erg>

## List of relevant phrases (code and full text as stated in chapter 2 and 3)

H301	Toxic if swallowed
H318	Causes serious eye damage.
H330	Fatal if inhaled
H335	May cause respiratory irritation
H341	Suspected of causing genetic defects
H350	May cause cancer
H361fd	Suspected of damaging fertility. Suspected of damaging the unborn child
H362	May cause harm to breast-fed children
H372	Causes damage to organs through prolonged or repeated exposure
H411	Toxic to aquatic life with long lasting effects

## Disclaimer

The information of this safety data sheet is based on our knowledge of this product, at the time of publication. It is given in good faith. The attention of the user is drawn to the possible risks incurred by using the product for any other purpose other than that for which it was intended. This does not in any way excuse the user from knowing and applying all the regulations governing his activity. It is the sole responsibility of the user to take all precautions required in handling the product. The aim of the mandatory regulations mentioned is to help the user to fulfill his obligations regarding the use of hazardous products. For further information please contact [info@vimaterial.de](mailto:info@vimaterial.de).