HALBLEITER MATERIAL

*Material Safety Data Sheet*

# Vanadium Pentoxide Powder

Report No.: VIH241107007-1
Version: 2.1
Preparation Date: 11/07/2024
Revision Date: 11/07/2024

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

### 1.1 Product identifier

| | |
|---|---|
| Product Name | Vanadium Pentoxide |
| Product No. | 230801PD |
| Formula | $V_2O_5$ |
| CAS No. | 1314-62-1 |
| Synonyms | Vanadium(V) oxide |

### 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 | https://vimaterial.de/ |

### 1.4 Emergency telephone number

| | |
|---|---|
| Emergency Phone # | 0049 1626484175 |

## 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) |

*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**

| | |
|---|---|
| **Prevention** | |
| P260 | Do not breathe dust/fume/gas/mist/vapors/spray |
| P264 | Wash contaminated skin thoroughly after handling. |
| P280 | Wear protective gloves/protective clothing. |
| **Response** | |
| 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 |
| **Storage** | |
| P403+P233 | Store in a well-ventilated place. Keep container tightly closed |
| **Disposal** | |
| 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.

## 3. Composition/information on ingredients

### 3.1 Substances

| | |
|---|---|
| Chemical Family | Ceramic |

| Component | CAS No. | EC No. | Concentration |
|---|---|---|---|
| Vanadium pentoxide ($V_2O_5$) | 1314-62-1 | 215-239-8 | <=100% |

## 4. First aid measures

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### 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 | Never give anything by mouth to an unconscious person. Rinse mouth with water. 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 water spray, alcohol-resistant foam, dry chemical or carbon dioxide. |
| Unsuitable extinguishing media | N/A |

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

| | |
|---|---|
| 1 | Vanadium/vanadium oxides |
| 2 | Non-flammable. |
| 3 | Thermal decomposition can lead to release of irritating gases and vapors. |

### 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. |

### 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 | Take up mechanically. 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

| Substance | CAS No. | Source | TWA (8 h)/ mg/m³ | Remarks |
|---|---|---|---|---|
| Vanadium pentoxide ($V_2O_5$) | 1314-62-1 | TRGS 900 (DE) | 0.02 (inhalable fraction, as V) | AGW; Carcinogenic (K2); respiratory sensitizer |
| Vanadium pentoxide ($V_2O_5$) | 1314-62-1 | EU SCOEL | 0.05 (respirable fraction, as V) | Indicative OELV; STOT RE 2; Resp. Sens. 1 |
| Vanadium pentoxide ($V_2O_5$) | 1314-62-1 | ACGIH TLV (USA) | 0.05 (respirable fraction, as $V_2O_5$) | TLV-TWA; A3 carcinogen; upper respiratory tract irritant |
| Vanadium pentoxide ($V_2O_5$) | 1314-62-1 | NIOSH REL (USA) | 0.05 (respirable dust, as $V_2O_5$) | Recommended exposure limit; potential occupational carcinogen |
| Vanadium pentoxide ($V_2O_5$) | 1314-62-1 | OSHA PEL (USA) | 0.5 (ceiling, as $V_2O_5$ 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)

### 8.2 Exposure controls

**Appropriate engineering controls**

| | |
|---|---|
| 1 | Ensure that eyewash stations and safety showers are close to the workstation location. |
| 2 | Ensure adequate ventilation, especially in confined areas. |
| 3 | Use explosion-proof electrical/ventilating/lighting equipment. |
| 4 | 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.

| | |
|---|---|
| **Large scale/emergency use** | Use a NIOSH/MSHA or European Standard EN 136 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced<br>Recommended Filter type: Particulates filter conforming to EN 143 |
| **Small scale/Laboratory use** | 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.<br>Recommended half mask:- Particle filtering: EN149:2001<br>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.

## 9. Physical and Chemical Characteristics

### 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 | 1750 °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 | 1750 °C |
| pH | 4 |
| Viscosity | Not applicable |
| Water Solubility | 0.9 to 0.94 g/l |
| Solubility in other solvents | No data available |
| Partition Coefficient (n-octanol/water) | No data available |
| Vapor Pressure | No data available |
| Density / Specific Gravity | 3.65 g/cm$^3$ |
| Vapor Density | Not applicable |
| Particle characteristics | No data available |

### 9.2 Other information

| | |
|---|---|
| Molecular formula | $V_2O_5$ |
| Molecular weight | 181.88 g/mol |
| Evaporation Rate | Not applicable - Solid |

## 10. Stability and reactivity

### 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

## 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 ($V_2O_5$) | 474 mg/kg ( Rat, male )<br>467 mg/kg ( Rat, female )<br>314 mg/kg ( Rat, male )<br>221 mg/kg ( Rat, female ) | LD50 > 2500 mg/kg ( Rat ) | LC50 = 4.4 mg/L ( Rat ) 4 h<br>LC50 = 2.21 mg/L ( Rat ) 4 h |

| | | |
|---|---|---|
| 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.

## 12. Ecological Information

### 12.1 Toxicity

| | |
|---|---|
| Ecotoxicity effects | Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment. |

### 12.2 Persistence and degradability

| | |
|---|---|
| Persistence | No data available. |
| Degradability | No data available. |

### 12.3 Bioaccumulative potential

| | |
|---|---|
| Bioaccumulative potential | No data available. |

### 12.4 Mobility in soil

| | |
|---|---|
| Mobility in soil | No data available. |

### 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. |

### 12.6 Endocrine disrupting properties

| | |
|---|---|
| Endocrine Disruptor Information | This product does not contain any known or suspected endocrine disruptors. |

### 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 |

## 13. Disposal Considerations

### 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**

| | |
|---|---|
| **14.1. UN number** | UN2862 |
| **14.2. UN Proper shipping name** | VANADIUM PENTOXIDE |
| **14.3. Transport hazard class(es)** | 6.1 |
| **14.4. Packaging group** | III |

**ADR/RID/ADN**

| | |
|---|---|
| **14.1. UN number** | UN2862 |
| **14.2. UN Proper shipping name** | VANADIUM PENTOXIDE |
| **14.3. Transport hazard class(es)** | 6.1 |
| **14.4. Packaging group** | III |

**ICAO-IATA/DGR**

| | |
|---|---|
| **14.1. UN number** | UN2862 |
| **14.2. UN Proper shipping name** | VANADIUM PENTOXIDE |
| **14.3. Transport hazard class(es)** | 6.1 |
| **14.4. Packaging group** | III |

| | |
|---|---|
| **14.5. Environmental hazards** | Dangerous for the environment<br>Product is a marine pollutant according to the criteria set by IMDG/IMO |
| | |
| **14.6. Special precautions for user** | No special precautions required |
| | |
| **14.7. Maritime transport in bulk according to IMO instruments** | 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.

## 16. Other information

### Revision information

| | |
|---|---|
| Preparation date | 11/07/2024 |
| Revision date | 11/07/2024 |
| 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

[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.