

## Section 1: Identification of the Substance/Mixture and of the Company/Undertaking

### Product Identifier:

**Identification as on the label/Trade name:** Vanadium(V) oxide, Enriched Vanadium.

**Molecular weight:** 181.88

**Chemical formula:** V<sub>2</sub>O<sub>5</sub>

**Synonyms:** Divanadium pentoxide.

### Details of the supplier of the Safety Data Sheet:

Neonest AB  
Storgatan 70C, Solna  
SE-17152  
Sweden

### Contact details:

+46-76-219-9731

### 24-hour Emergency Contact:

Swedish Poisons Centre  
Phone: 112 - Ask for Poisons Information, 112 – begär Giftinformation.

### Other International Contacts:

CHEMTREC 24-hour: +1-703-741-5500 (US + Worldwide)  
NHS: 111 (UK)  
Charite: +49 30 450 531 000 (Netherlands)  
INTCF: +34 917689800 (Spain)  
CapTv: +33 1 40 05 48 48 (France)

## Section 2: Hazards Identification

### Classification of the substances or mixture:

**The mixture is classified according to:** Regulation EC 1272/2008 [EU-GHS/CLP]

#### **Hazard classes/Hazard categories:**

Acute Toxicity, Oral (Category 4)  
Acute Toxicity, Inhalation (Category 4)  
STOT SE (Category 3)  
Mutagenicity (Category 2)  
Reproductive Toxicity (Category 2)  
STOT RE (Category 1)  
Aquatic Chronic (Category 2)

#### **Hazard statement:**

H302  
H332  
H335  
H341  
H361  
H372  
H411

### Label elements:

**Hazard pictograms:**



**Signal Words:** Danger.

**Hazard Statements:**

H302 Harmful if swallowed.

H332 Harmful if inhaled.

H335 May cause respiratory irritation.

H341 Suspected of causing genetic defects.

H361 Suspected of damaging fertility or the unborn child.

H372 Causes damage to organs through prolonged or repeated exposure.

H411 Toxic to aquatic life with long lasting effects.

**Precautionary Statements:**

P201 Obtain special instructions before use.

P202 Do not handle until all safety precautions have been read and understood.

P260 Do not breathe dust.

P270 Do not eat, drink or smoke when using this product.

P271 Use only outdoors or in a well-ventilated area.

P273 Avoid release to the environment.

P280 Wear protective gloves/protective clothing.

P301 + P312 IF SWALLOWED: Call a POISON CENTER/doctor if you feel unwell.

P304 + P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing.

P308 + P313 IF exposed or concerned: Get medical advice/attention.

P391 Collect spillage.

P403 + P233 Store in a well-ventilated place. Keep container tightly closed.

P405 Store locked up.

P501 Dispose of contents/container in accordance with local and national regulations.

**Other hazards:** None known.

### Section 3: Composition/Information on Ingredients

**Substance/Mixture:** Substance.

**Ingredients:**

Substance name (IUPAC/EC)	CAS-No.	Molecular weight	Concentration % by weight	Classification EC1272/2008	
	EC-No.				
Divanadium pentoxide	1314-62-1	181.88	>99%	Acute Tox. 4	H302
				Acute Tox. 4	H332
				STOT SE 3	H335
				Muta. 2 H341	H341
				Repr. 2 H361	H361
				STOT RE 1	H372
				Aquatic Chronic 2H411	
	215-239-8				

For explanation of abbreviations see Section 16.

## Section 4: First-Aid Measures

### Description of first aid measures:

**In case of inhalation:** If breathed in, move person into fresh air. If not breathing give artificial respiration Consult a physician.

**In case of skin contact:** Wash off with soap and plenty of water. Consult a physician.

**In case of eye contact:** Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

**In case of ingestion:** Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

### Most important symptoms and effects, both acute and delayed:

**Inhalation:** Harmful if inhaled; causes respiratory tract irritation.

**Eyes:** Causes eye irritation.

**Skin contact:** Causes skin irritation; may be fatal if absorbed through skin.

**Ingestion:** Harmful if swallowed.

**Indication of any immediate medical attention and special treatment needed:** Treat symptomatically. Show this safety data sheet to a physician or emergency room.

## Section 5: Fire-Fighting Measures

### Extinguisher media:

**Suitable extinguisher media:** Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

**Unsuitable extinguishing media:** None known.

**Special hazards arising from the mixture:** None known.

**Advice for fire-fighters:** Wear self-contained breathing apparatus and protective clothing for firefighting.

**Further information:** Standard procedure for chemical fires. Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

## Section 6: Accidental Release Measures

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

**Personal precautions:** Use personal protective equipment. Avoid dust formation. Avoid breathing dust. Ensure adequate ventilation. Evacuate personnel to safe areas.

**Environmental precautions:** Prevent product from entering drains. Prevent further leakage or spillage if safe to do so. Local authorities should be advised if significant spillages cannot be contained.

### Methods for containment and cleaning up:

**Methods for cleaning up:** Pick up and arrange disposal without creating dust. Keep in suitable, closed containers for disposal.

### Reference to other sections:

Treat recovered material as described in the section "Disposal considerations".

## Section 7: Handling and Storage

### Precautions for safe handling:

**Advice on safe handling:** Avoid formation of dust and aerosols. Provide appropriate exhaust ventilation at places where dust is formed. Normal measures for preventive fire protection.

**Hygiene measures:** Do not eat, drink or smoke when using this product.

### Conditions for safe storage, including incompatibilities:

**Requirements for storage areas and containers:** Keep container tightly closed in a dry and well-ventilated place.

## Section 8: Exposure Controls/Personal Protection

### Control parameters:

#### **Occupational exposure limits:**

Components	CAS-No.	Value	Control Parameters	Update	Basis
Vanadium pentoxide	1314-62-1	TWA	0.05 mg/m <sup>3</sup>	2007-01-01	USA - ACGIH Threshold Limit Values (TLV)
Remarks	Irritation Lung Adopted values or notations enclosed are those for which changes are proposed in the NIC See Notice of Intended Changes (NIC) Substances for which there is a Biological Exposure Index or Indices (see BEI <sup>®</sup> section) Not classifiable as a human carcinogen: Agents which cause concern that they could be carcinogenic for humans but which cannot be assessed conclusively because of a lack of data. In vitro or animal studies do not provide indications of carcinogenicity which are sufficient to classify the agent into one of the other categories.				
		TWA	0.05 mg/m <sup>3</sup>	1989-01-19	USA - OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000
		TWA	0.05 mg/m <sup>3</sup>	2008-01-01	USA - ACGIH Threshold Limit Values (TLV)
	Irritation Lung Adopted values or notations enclosed are those for which changes are proposed in the NIC See Notice of Intended Changes (NIC) Substances for which there is a Biological Exposure Index or Indices (see BEI <sup>®</sup> section) Not classifiable as a human carcinogen: Agents which cause concern that they could be carcinogenic for humans but which cannot be assessed conclusively because of a lack of data. In vitro or animal studies do not provide indications of carcinogenicity which are sufficient to classify the agent into one of the other categories.				
		C	0.1 mg/m <sup>3</sup>	2007-01-01	USA - Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
	Ceiling limit is to be determined from breathing-zone air samples.				

### Exposure controls:

**Appropriate engineering controls:** A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion into the general work area.

### Individual protection measures, such as personal protective equipment:

**Eye/face protection:** Face shield and safety glasses.

**Hand protection:** Use chemical resistant gloves. Examples of preferred glove barrier materials include: Butyl rubber, Neoprene, Nitrile/butadiene rubber, Polyethylene, Ethyl vinyl alcohol laminate, polyvinyl alcohol, Polyvinyl chloride.

**Body protection:** Choose body protection according to the amount and concentration of the dangerous substance at the work place.

**Respiratory protection:** Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

## Section 9: Physical and Chemical Properties

### Information on basic physical and chemical properties

**Appearance (form):** Solid.

**Colour:** No data available.

**Odour:** No data available.

**Odour threshold:** No data available.

**Molecular Weight:** 181.88

**pH (concentration):** No data available.

**Melting point/range (°C):** 690 °C

**Boiling point/range (°C):** No data available.

**Freezing point (°C):** No data available.

**Flash point (°C):** No data available.

**Evaporation rate:** No data available.

**Flammability (solid, gas):** No data available.

**Ignition temperature (°C):** No data available.

**Upper/lower flammability/explosive limits:** No data available.

**Vapour pressure (20 °C):** No data available.

**Vapour density:** No data available.

**Relative density (25 °C):** 3.35 g/mL at 25 °C

**Water solubility (g/L) at 20 °C:** No data available.

**n-Octanol/Water partition coefficient:** No data available.

**Auto-ignition temperature:** No data available.

**Decomposition temperature:** No data available.

**Viscosity, dynamic (mPa s):** No data available.

**Explosive properties:** The substance or mixture is not classified as explosive.

**Oxidising properties:** The substance or mixture is not classified as oxidizing.

## Section 10: Stability and Reactivity

**Reactivity:** No dangerous reaction known under conditions of normal use.

**Chemical stability:** Stable under normal conditions.

**Possibility of hazardous reactions:** No dangerous reaction known under conditions of normal use.

**Conditions to avoid:** None known.

**Incompatible materials:** Strong acids.

**Hazardous decomposition products:** Hazardous decomposition products formed under fire conditions: vanadium/vanadium oxides.

## Section 11: Toxicological Information

### Information on toxicological effects:

**Acute Toxicity:**

LD<sub>50</sub> Oral (rat) 10 mg/kg.

Remarks: Behavioural: Coma.

LC<sub>50</sub> Inhalation (rat) 6 h - 126 mg/m<sup>3</sup>

Remarks: Sense Organs and Special Senses (Nose, Eye, Ear, and Taste): Eye: Other. Behavioural: Ataxia. Lungs, Thorax, or Respiration: Dyspnoea.

LD<sub>50</sub> Dermal (rabbit) 50 mg/kg

Remarks: Liver: Other changes. Kidney, Ureter, Bladder: Other changes.

### Classification according to GHS (1272/2008/EG, CLP)

**Skin corrosion/irritation:**

Not classified based on available information.

**Serious eye damage/eye irritation:**

Not classified based on available information.

**Respiratory or skin sensitisation:**

May cause respiratory irritation.

**Germ cell mutagenicity:**

Laboratory experiments have shown mutagenic effects. In vitro tests showed mutagenic effects.

**Carcinogenicity:**

IARC: 2B - Group 2B: Possibly carcinogenic to humans (Vanadium pentoxide) ACGIH No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

**Reproductive toxicity:**

Possible risk of congenital malformation in the foetus. Suspected human reproductive toxicant.

**Specific target organ toxicity – single exposure (STOT):**

Not classified based on available information.

**Specific target organ toxicity (STOT) – repeated exposure:**

Causes damage to organs through prolonged or repeated exposure.

**Aspiration toxicity:**

Not classified based on available information.

## Section 12: Ecological Information

**Toxicity:** Toxic to aquatic life with long lasting effects.

Toxicity to fish: LC<sub>50</sub> - Oncorhynchus mykiss (rainbow trout) - 5.2 mg/l - 96.0 h

Toxicity to Daphnia and Other Aquatic Invertebrates: EC<sub>50</sub> - Daphnia magna (Water flea) - 0.94 mg/l - 48 h

**Persistence and degradability:** No data available.

**Bioaccumulative potential:** No data available.

**Mobility in soil:** No data available.

**Results of PBT& vPvB assessment:** Not relevant.

**Other adverse effects:** An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

### Section 13: Disposal Considerations

**Waste treatment methods:** Observe all local and national environmental regulations. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

### Section 14: Transport Information

**DOT:**

**Proper Shipping Name:** VANADIUM PENTOXIDE.

**Hazard Class:** 6.1

**UN Number:** 2862

**Packing Group:** III

**Hazard Labels:**



**Reportable quantity:** 1000 lbs

**Marine Pollutant:** No

**IMDG:**

**Proper Shipping Name:** VANADIUM PENTOXIDE.

**Hazard Class:** 6.1

**UN Number:** 2862

**Packing Group:** III

**EMS No.:** F-A, S-A

**Marine Pollutant:** No

**IATA:**

**Proper Shipping Name:** VANADIUM PENTOXIDE.

**Hazard Class:** 6.1

**UN Number:** 2862

**Packing Group:** III

### Section 15: Regulatory Information

**EU regulations:**

**Regulation (EC) No. 1005/2009 on substances that deplete the ozone layer, Annex I and II, as amended**

Not listed.

**Regulation (EC) No. 850/2004 on persistent organic pollutants, Annex I**

Not listed.

**Regulation (EU) No. 649/2012 concerning the export and import of dangerous chemicals, Annex I, Part 1 as amended**

Not listed.

**Regulation (EU) No. 649/2012 concerning the export and import of dangerous chemicals, Annex I, Part 2 as amended**

Not listed.

**Regulation (EU) No. 649/2012 concerning the export and import of dangerous chemicals, Annex I, Part 3 as amended**

Not listed.

**Regulation (EU) No. 649/2012 concerning the export and import of dangerous chemicals, Annex V as amended**

Not listed.

**Regulation (EC) No. 166/2006 Annex II Pollutant Release and Transfer Registry**

Not listed.

**Regulation (EC) No. 1907/2006, REACH Article 59(10) Candidate List as currently published by ECHA**

Not listed.

**Authorisations:**

**Regulation (EC) No. 1907/2006, REACH Annex XIV Substances subject to authorization, as amended**

Not listed.

**Restrictions on use:**

**Regulation (EC) No. 1907/2006 Annex XVII Substances subject to restriction on marketing and use**

Not regulated.

**Regulation (EC) No. 1907/2006, REACH Annex XVII Substances subject to restriction on marketing and use as amended**

Not listed.

**Directive 2004/37/EC on the protection of workers from the risks related to exposure to carcinogens and mutagens at work**

Not regulated.

**Directive 92/85/EEC: on the safety and health of pregnant workers and workers who have recently given birth or are breastfeeding.**

Not regulated.

**Other EU regulations:**

**Directive 2012/18/EU on major accident hazards involving dangerous substances**

Not listed.

**Directive 98/24/EC on the protection of the health and safety of workers from the risks related to chemical agents at work.**

Always applicable.

**Directive 94/33/EC on the protection of young people at work**

Not listed.

**Other regulations:** The product is classified and labelled in accordance with EC directives or respective national laws. This Safety Data Sheet complies with the requirements of Regulation (EC) No 1907/2006, as amended.

**OSHA Hazards:** Target Organ Effect, Highly toxic by inhalation, Highly toxic by ingestion, Highly toxic by skin absorption, Irritant, Carcinogen, Teratogen.

**DSL Status:** All components of this product are on the Canadian DSL list.



**SARA 302 Components:** Vanadium pentoxide / CAS No. 1314-62-1 / Revision Date 2007-07-01

**SARA 313 Components:** Vanadium pentoxide / CAS No. 1314-62-1 / Revision Date 2007-07-01

**SARA 311/312 Hazards:** Acute Health Hazard, Chronic Health Hazard.

**Massachusetts Right To Know Components:** Vanadium pentoxide / CAS No. 1314-62-1 / Revision Date 2007-07-01

**Pennsylvania Right To Know Components:** Vanadium pentoxide / CAS No. 1314-62-1 / Revision Date 2007-07-01

**New Jersey Right To Know Components:** Vanadium pentoxide / CAS No. 1314-62-1 / Revision Date 2007-07-01

**California Prop. 65 Components:** This product does not contain any chemicals known to the State of California to cause cancer, birth defects, or any other reproductive harm.

**National regulations:** Follow national regulation for work with chemical agents.

**Chemical safety assessment:** No Chemical Safety Assessment has been carried out.

## Section 16: Other Information

### List of abbreviations:

ACGIH American Conference of Governmental Industrial Hygienists  
ADR European Agreement Concerning the International Carriage of Dangerous Goods by Road  
ALARA As Low As Is Reasonably Achievable  
AMU Atomic Mass Unit  
ANSI American National Standards Institute  
BLS Basic Life Support  
CAM Continuous Air Monitor  
CAS Chemical Abstracts Service (division of the American Chemical Society)  
CEN European Committee for Standardization  
CERCLA Comprehensive Environmental Response Compensation and Liability Act  
CLP Classification, Labelling and Packaging (European Union)  
CPR Controlled Products Regulations (Canada)  
CWA Clean Water Act (USA)  
DAC Derived Air Concentration (USA)  
DOE United States Department of Energy (USA)  
DOT United States Department of Transportation (USA)  
DSL Domestic Substances List (Canada)  
EC50 Half Maximal Effective Concentration  
EINECS European Inventory of Existing Commercial Chemical Substances  
EHS Environmentally Hazardous Substance  
ELINCS European List of Notified Chemical Substances  
EMS Emergency Response Procedures for Ships Carrying Dangerous Goods  
EPA Environmental Protection Agency (USA)  
EPCRA Emergency Planning and Community Right-To-Know Act (EPCRA) of 1986  
GHS Globally Harmonized System  
HMIS Hazardous Materials Identification System (USA)  
IARC International Agency for Research on Cancer  
IATA International Air Transport Association  
IBC Intermediate Bulk Containers  
ICAO International Civil Aviation Organization  
IDLH Immediately Dangerous to Life or Health  
IMDG International Maritime Code for Dangerous Goods  
LC50 Lethal concentration, 50 percent

LD50 Lethal dose, 50 percent  
LDLO Lethal Dose Low  
LOEC Lowest-Observed-Effective Concentration  
MARPOL International Convention for the Prevention of Pollution from Ships  
MSHA Mine Safety and Health Administration (USA)  
NCRP National Council on Radiation Protection & Measurements (USA)  
NDSL Non-Domestic Substances List (Canada)  
NFPA National Fire Protection Association (USA)  
NIOSH National Institute for Occupational Safety and Health (USA)  
NOEC No Observed Effect Concentration  
N.O.S. Not Otherwise Specified  
NRC Nuclear Regulatory Commission (USA)  
NTP National Toxicology Program (USA)  
OSHA Occupational Safety and Health Administration (USA)  
PBT Persistent Bioaccumulative and Toxic Chemical  
PEL Permissible Exposure Limit  
PIH Poisonous by Inhalation Hazard  
RCRA Resource Conservation and Recovery Act (USA)  
RCT Radiation Control Technician  
REACH Registration, Evaluation, Authorisation and Restriction of Chemicals (Europe)  
RID Regulations Concerning the International Transport of Dangerous Goods by Rail  
RTECS Registry of Toxic Effects of Chemical Substances  
SARA Superfund Amendments and Reauthorization Act (USA)  
TDG Transportation of Dangerous Goods (Canada)  
TIH Toxic by Inhalation Hazard  
TLV Threshold Limit Value  
TPQ Threshold Planning Quantity  
TSCA Toxic Substances Control Act  
TWA Time Weighted Average  
UN United Nations (Number)  
VOC Volatile Organic Compound  
vPvB Very Persistent Very Bioaccumulative Chemical  
WGK Wassergefährdungsklassen (Germany: Water Hazard Classes)  
WHMIS Workplace Hazardous Materials Information System

**References:**

Not available.

**Full text of any H-statements not written out in full under Sections 2 to 15:**

H302 Harmful if swallowed.

H332 Harmful if inhaled.

H335 May cause respiratory irritation.

H341 Suspected of causing genetic defects.

H361 Suspected of damaging fertility or the unborn child.

H372 Causes damage to organs through prolonged or repeated exposure.

H411 Toxic to aquatic life with long lasting effects.

**Revision information:**

None.

**Training information:**

Follow training instructions when handling this material.

**Further Information:**

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

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