



SAFETY DATA SHEET

Creation Date 24-Aug-1997

Revision Date 27-Mar-2015

Revision Number 12

SECTION 1: IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

1.1. Product identification

Product Description: Vanadium(V) oxide
Cat No. : 450160000; 450160010; 450160250; 450162500
Synonyms Vanadium pentoxide
CAS-No 1314-62-1
EC-No. 215-239-8
Molecular Formula O5 V2
Reach Registration Number 01-2119531331-54

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

Recommended Use Laboratory chemicals.
Uses advised against No Information available

1.3. Details of the supplier of the safety data sheet

Company Acros Organics BVBA
Janssen Pharmaceuticaaan 3a
2440 Geel, Belgium
E-mail address begel.sdsdesk@thermofisher.com

1.4. Emergency telephone number

For information **US** call: 001-800-ACROS-01 / **Europe** call: +32 14 57 52 11
Emergency Number **US**:001-201-796-7100 / **Europe**: +32 14 57 52 99
CHEMTREC Tel. No.**US**:001-800-424-9300 / **Europe**:001-703-527-3887

SECTION 2: HAZARDS IDENTIFICATION

2.1. Classification of the substance or mixture

CLP Classification - Regulation (EC) No 1272/2008

Physical hazards

Based on available data, the classification criteria are not met

Health hazards

Acute oral toxicity	Category 4
Acute Inhalation Toxicity - Dusts and Mists	Category 4
Serious Eye Damage/Eye Irritation	Category 1
Germ Cell Mutagenicity	Category 2
Reproductive Toxicity	Category 2
Specific target organ toxicity - (single exposure)	Category 3
Specific target organ toxicity - (repeated exposure)	Category 1

Environmental hazards

Chronic aquatic toxicity	Category 2
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Classification according to EU Directives 67/548/EEC or 1999/45/EC

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Symbol(s)	T - Toxic N - Dangerous for the environment
R-phrase(s)	R37 - Irritating to respiratory system R41 - Risk of serious damage to eyes R68 - Possible risk of irreversible effects R63 - Possible risk of harm to the unborn child R20/22 - Harmful by inhalation and if swallowed R48/23 - Toxic: danger of serious damage to health by prolonged exposure through inhalation R51/53 - Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment

For the full text of the R-phrases and H-Statements mentioned in this Section, see Section 16.

2.2. Label elements



Signal Word

Danger

Hazard Statements

- H302 - Harmful if swallowed
- H332 - Harmful if inhaled
- H318 - Causes serious eye damage
- H335 - May cause respiratory irritation
- H341 - Suspected of causing genetic defects
- H361d - Suspected of damaging the unborn child
- H372 - Causes damage to organs through prolonged or repeated exposure
- H411 - Toxic to aquatic life with long lasting effects

Precautionary Statements

- P280 - Wear protective gloves/ protective clothing/ eye protection/ face protection
- 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
- P260 - Do not breathe dust/fume/gas/mist/vapors/spray
- P273 - Avoid release to the environment

2.3. Other hazards

No information available

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

3.1. Substances

Component	CAS-No	EC-No.	Weight %	CLP Classification - Regulation (EC) No 1272/2008	DSD Classification - 67/548/EEC
Vanadium pentoxide	1314-62-1	EEC No. 215-239-8	>95	Acute Tox. 4 (H302) Acute Tox. 4 (H332) Eye Dam. 1 (H318) STOT SE 3 (H335) Muta. 2 (H341) Repr. 2 (H361d) STOT RE 1 (H372)	Xn; R20/22 Xi; R37-41 T; R48/23 N; R51-53 Repr.Cat.3; R63 Muta.Cat.3; R68

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				Aquatic Chronic 2 (H411)	
Reach Registration Number				01-2119531331-54	

For the full text of the R-phrases and H-Statements mentioned in this Section, see Section 16.

SECTION 4: FIRST AID MEASURES

4.1. Description of first aid measures

Eye Contact	Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Obtain medical attention.
Skin Contact	Wash off immediately with soap and plenty of water while removing all contaminated clothes and shoes. Obtain medical attention.
Ingestion	Call a physician immediately. Clean mouth with water.
Inhalation	Remove from exposure, lie down. Move to fresh air. If breathing is difficult, give oxygen. If not breathing, give artificial respiration. Immediate medical attention is required.
Protection of First-aiders	Ensure that medical personnel are aware of the material(s) involved, take precautions to protect themselves and prevent spread of contamination.

4.2. Most important symptoms and effects, both acute and delayed

Causes eye burns.

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

Notes to Physician Treat symptomatically.

SECTION 5: FIREFIGHTING MEASURES

5.1. Extinguishing media

Suitable Extinguishing Media

Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Extinguishing media which must not be used for safety reasons

No information available.

5.2. Special hazards arising from the substance or mixture

Non-combustible.

Hazardous Combustion Products

Thermal decomposition can lead to release of irritating gases and vapors.

5.3. Advice for firefighters

As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

SECTION 6: ACCIDENTAL RELEASE MEASURES

6.1. Personal precautions, protective equipment and emergency procedures

Avoid contact with skin, eyes and clothing. Use personal protective equipment. Avoid dust formation. Ensure adequate ventilation.

6.2. Environmental precautions

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Do not flush into surface water or sanitary sewer system.

6.3. Methods and material for containment and cleaning up

Sweep up or vacuum up spillage and collect in suitable container for disposal.

6.4. Reference to other sections

Refer to protective measures listed in Sections 8 and 13.

SECTION 7: HANDLING AND STORAGE

7.1. Precautions for safe handling

Do not breathe dust. Do not get in eyes, on skin, or on clothing. Use only in area provided with appropriate exhaust ventilation.

7.2. Conditions for safe storage, including any incompatibilities

Keep in a dry, cool and well-ventilated place. Keep container tightly closed. Keep locked-up.

7.3. Specific end use(s)

Use in laboratories

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1. Control parameters

Exposure limits

List source(s): **UK** - EH40/2005 Containing the workplace exposure limits (WELs) for use with the Control of Substances Hazardous to Health Regulations (COSHH) 2002 (as amended). Updated by September 2006 official press release and October 2007 Supplement. **IRE** - 2010 Code of Practice for the Safety, Health and Welfare at Work (Chemical Agents) Regulations 2001. Published by the Health and Safety Authority.

Component	European Union	The United Kingdom	France	Belgium	Spain
Vanadium pentoxide		STEL: 0.15 mg/m ³ 15 min TWA: 0.05 mg/m ³ 8 hr	TWA / VME: 0.05 mg/m ³ (8 heures).	TWA: 0.05 mg/m ³ 8 uren	TWA / VLA-ED: 0.05 mg/m ³ (8 horas)
Component	Italy	Germany	Portugal	The Netherlands	Finland
Vanadium pentoxide		TWA: 0.05 mg/m ³ (8 Stunden). AGW - exposure factor 1	TWA: 0.05 mg/m ³ 8 horas	STEL: 0.03 mg/m ³ 15 minuten TWA: 0.01 mg/m ³ 8 uren	TWA: 0.02 mg/m ³ 8 tunteina
Component	Austria	Denmark	Switzerland	Poland	Norway
Vanadium pentoxide	MAK-KZW: 0.25 mg/m ³ 15 Minuten MAK-TMW: 0.05 mg/m ³ 8 Stunden	TWA: 0.03 mg/m ³ 8 timer	STEL: 0.05 mg/m ³ 15 Minuten TWA: 0.05 mg/m ³ 8 Stunden	STEL: 0.1 mg/m ³ 15 minutach STEL: 0.5 mg/m ³ 15 minutach TWA: 0.05 mg/m ³ 8 godzinach	
Component	Bulgaria	Croatia	Ireland	Cyprus	Czech Republic
Vanadium pentoxide		TWA-GVI: 0.05 mg/m ³ 8 satima.	TWA: 0.05 mg/m ³ 8 hr. V total inhalable fraction STEL: 0.15 mg/m ³ 15 min		TWA: 0.05 mg/m ³ 8 hodinách. dust and fume Ceiling: 0.1 mg/m ³ dust and fume
Component	Estonia	Gibraltar	Greece	Hungary	Iceland
Vanadium pentoxide	TWA: 0.2 mg/m ³ 8 tundides. total dust V		TWA: 0.5 mg/m ³ TWA: 0.05 mg/m ³	STEL: 0.2 mg/m ³ 15 percekben. CK V	TWA: 0.2 mg/m ³ 8 klukkustundum. V dust,

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	Ceiling: 0.05 mg/m ³ V respirable dust			TWA: 0.05 mg/m ³ 8 óraban. AK V	fume, and powder Ceiling: 0.4 mg/m ³ V dust, fume, and powder
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Component	Latvia	Lithuania	Luxembourg	Malta	Romania
Vanadium pentoxide	TWA: 0.1 mg/m ³	Ceiling: 0.05 mg/m ³ respirable fraction V TWA: 0.2 mg/m ³ inhalable fraction IPRD V			

Component	Russia	Slovak Republic	Slovenia	Sweden	Turkey
Vanadium pentoxide	MAC: 0.1 mg/m ³ MAC: 0.5 mg/m ³	TWA: 0.05 mg/m ³	TWA: 0.05 mg/m ³ 8 urah respirable fraction STEL: 0.2 mg/m ³ 15 minutah respirable fraction	LLV: 0.2 mg/m ³ 8 timmar. total dust CLV: 0.05 mg/m ³	

Biological limit values

List source(s):

Component	European Union	United Kingdom	France	Spain	Germany
Vanadium pentoxide			Vanadium: 0.05 mg/g creatinine urine end of shift at end of workweek	Vanadium: 50 µg/g Creatinine urine end of workweek	

Component	Gibraltar	Latvia	Slovak Republic	Luxembourg	Turkey
Vanadium pentoxide			Vanadium: 50 µg/g creatinine urine after all work shifts for long-term exposure Vanadium: 50 µg/g creatinine urine end of exposure or work shift		

Monitoring methods

BS EN 14042:2003 Title Identifier: Workplace atmospheres. Guide for the application and use of procedures for the assessment of exposure to chemical and biological agents.

MDHS14/3 General methods for sampling and gravimetric analysis of respirable and inhalable dust

Derived No Effect Level (DNEL) No information available

<u>Route of exposure</u>	Acute effects (local)	Acute effects (systemic)	Chronic effects (local)	Chronic effects (systemic)
Oral Dermal Inhalation				

Predicted No Effect Concentration (PNEC) No information available.

8.2. Exposure controls

Engineering Measures

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 Protection
Hand Protection

Goggles (European standard - EN 166)
Protective gloves

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Glove material	Breakthrough time	Glove thickness	EU standard	Glove comments
Natural rubber	See manufacturers recommendations	-	EN 374	(minimum requirement)
Nitrile rubber				
Neoprene				
PVC				

Skin and body protection Wear appropriate protective gloves and clothing to prevent skin exposure

Inspect gloves before use.

Please observe the instructions regarding permeability and breakthrough time which are provided by the supplier of the gloves. (Refer to manufacturer/supplier for information)

Ensure gloves are suitable for the task: Chemical compatibility, Dexterity, Operational conditions, User susceptibility, e.g. sensitisation effects, also take into consideration the specific local conditions under which the product is used, such as the danger of cuts, abrasion.

Remove gloves with care avoiding skin contamination.

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

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.

Recommended half mask:- Particle filtering: EN149:2001

When RPE is used a face piece Fit Test should be conducted

Hygiene Measures

Handle in accordance with good industrial hygiene and safety practice.

Environmental exposure controls

Prevent product from entering drains. Do not allow material to contaminate ground water system.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

9.1. Information on basic physical and chemical properties

Appearance	Amber	
Physical State	Powder Solid	
Odor	Odorless	
Odor Threshold	No data available	
pH	4	(5 %)
Melting Point/Range	690 °C / 1274 °F	
Softening Point	No data available	
Boiling Point/Range	1750 °C / 3182 °F	
Flash Point	No information available	Method - No information available
Evaporation Rate	Not applicable	Solid
Flammability (solid,gas)	No information available	
Explosion Limits	No data available	
Vapor Pressure	0.0443 hPa @ 700 °C	
Vapor Density	Not applicable	Solid
Specific Gravity / Density	3.350	
Bulk Density	No data available	
Water Solubility	8 g/L	
Solubility in other solvents	No information available	
Partition Coefficient (n-octanol/water)		
Autoignition Temperature	Not applicable	
Decomposition Temperature	1750 °C	
Viscosity	Not applicable	Solid
Explosive Properties	No information available	

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Oxidizing Properties No information available

9.2. Other information

Molecular Formula O5 V2
Molecular Weight 181.88

SECTION 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 Hazardous polymerization does not occur.
Hazardous Reactions No information available.

10.4. Conditions to avoid

Incompatible products. Combustible material.

10.5. Incompatible materials

Strong acids. Reducing agents.

10.6. Hazardous decomposition products

Thermal decomposition can lead to release of irritating gases and vapors.

SECTION 11: TOXICOLOGICAL INFORMATION

11.1. Information on toxicological effects

Product Information

(a) acute toxicity;

Oral Category 4
Dermal Based on available data, the classification criteria are not met
Inhalation Category 4

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
Vanadium pentoxide	474 mg/kg (Rat, male) 467 mg/kg (Rat, female) 314 mg/kg (Rat, male) 221 mg/kg (Rat, female)	50 mg/kg (Rabbit)	4.29 mg/L (Rat) 4 h

(b) skin corrosion/irritation; Based on available data, the classification criteria are not met

(c) serious eye damage/irritation; Category 1

(d) respiratory or skin sensitization;

Respiratory Based on available data, the classification criteria are not met
Skin Based on available data, the classification criteria are not met

(e) germ cell mutagenicity; Category 2

(f) carcinogenicity; Based on available data, the classification criteria are not met

The table below indicates whether each agency has listed any ingredient as a carcinogen

Component	EU	UK	Germany	IARC
Vanadium pentoxide				Group 2B

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(g) reproductive toxicity;	Category 2
(h) STOT-single exposure;	Category 3
(i) STOT-repeated exposure;	Category 1
Target Organs	No information available.
(j) aspiration hazard;	Not applicable Solid
Symptoms / effects,both acute and delayed	No information available

SECTION 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 Soluble in water, Persistence is unlikely, based on information available.
Degradability Not relevant for inorganic substances.
Degradation in sewage treatment plant Contains substances known to be hazardous to the environment or not degradable in waste water treatment plants.

12.3. Bioaccumulative potential Bioaccumulation is unlikely

12.4. Mobility in soil The product is water soluble, and may spread in water systems Will likely be mobile in the environment due to its water solubility. Highly mobile in soils

12.5. Results of PBT and vPvB assessment No data available for assessment.

12.6. Other adverse effects

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

SECTION 13: DISPOSAL CONSIDERATIONS

13.1. Waste treatment methods

Waste from Residues / Unused Products Waste is classified as hazardous. Dispose of in accordance with the European Directives on waste and hazardous waste. Dispose of in accordance with local regulations.

Contaminated Packaging Dispose of this container to hazardous or special waste collection point.

European Waste Catalogue (EWC) According to the European Waste Catalogue, Waste Codes are not product specific, but application specific.

Other Information Do not dispose of waste into sewer. Waste codes should be assigned by the user based on the application for which the product was used. Do not empty into drains. Do not let this chemical enter the environment.

SECTION 14: TRANSPORT INFORMATION

IMDG/IMO

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14.1. UN number	UN2862
14.2. UN proper shipping name	VANADIUM PENTOXIDE
14.3. Transport hazard class(es)	6.1
14.4. Packing group	III

ADR

14.1. UN number	UN2862
14.2. UN proper shipping name	VANADIUM PENTOXIDE
14.3. Transport hazard class(es)	6.1
14.4. Packing group	III

IATA

14.1. UN number	UN2862
14.2. UN proper shipping name	VANADIUM PENTOXIDE
14.3. Transport hazard class(es)	6.1
14.4. Packing group	III

14.5. Environmental hazards Dangerous for the environment
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. Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code Not applicable, packaged goods

SECTION 15: REGULATORY INFORMATION

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

International Inventories X = listed

Component	EINECS	ELINCS	NLP	TSCA	DSL	NDSL	PICCS	ENCS	IECSC	AICS	KECL
Vanadium pentoxide	215-239-8	-		X	X	-	X	X	X	X	X

National Regulations

Component	Germany - Water Classification (VwVwS)	Germany - TA-Luft Class
Vanadium pentoxide	WGK 3	

Component	France - INRS (Tables of occupational diseases)
Vanadium pentoxide	Tableaux des maladies professionnelles (TMP) - RG 66

Take note of Control of Substances Hazardous to Health Regulations (COSHH) 2002 and 2005 Amendment.

Take note of Dir 94/33/EC on the protection of young people at work

Take note of Dir 92/85/EC on the protection of pregnant and breastfeeding women at work

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

15.2. Chemical safety assessment

A Chemical Safety Assessment/Report (CSA/CSR) has not been conducted

SECTION 16: OTHER INFORMATION

Full text of R-phrases referred to under sections 2 and 3

R37 - Irritating to respiratory system

R41 - Risk of serious damage to eyes

R63 - Possible risk of harm to the unborn child

R68 - Possible risk of irreversible effects

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R20/22 - Harmful by inhalation and if swallowed
R48/23 - Toxic: danger of serious damage to health by prolonged exposure through inhalation
R51/53 - Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment

Full text of H-Statements referred to under sections 2 and 3

H302 - Harmful if swallowed
H318 - Causes serious eye damage
H332 - Harmful if inhaled
H335 - May cause respiratory irritation
H341 - Suspected of causing genetic defects
H361d - Suspected of damaging the unborn child
H372 - Causes damage to organs through prolonged or repeated exposure
H411 - Toxic to aquatic life with long lasting effects

Legend

CAS - Chemical Abstracts Service

EINECS/ELINCS - European Inventory of Existing Commercial Chemical Substances/EU List of Notified Chemical Substances

PICCS - Philippines Inventory of Chemicals and Chemical Substances

IECSC - Chinese Inventory of Existing Chemical Substances

KECL - Korean Existing and Evaluated Chemical Substances

WEL - Workplace Exposure Limit

ACGIH - American Conference of Governmental Industrial Hygienists

DNEL - Derived No Effect Level

RPE - Respiratory Protective Equipment

LC50 - Lethal Concentration 50%

NOEC - No Observed Effect Concentration

PBT - Persistent, Bioaccumulative, Toxic

TSCA - United States Toxic Substances Control Act Section 8(b) Inventory

DSL/NDL - Canadian Domestic Substances List/Non-Domestic Substances List

ENCS - Japanese Existing and New Chemical Substances

AICS - Australian Inventory of Chemical Substances

NZIoC - New Zealand Inventory of Chemicals

TWA - Time Weighted Average

IARC - International Agency for Research on Cancer

PNEC - Predicted No Effect Concentration

LD50 - Lethal Dose 50%

EC50 - Effective Concentration 50%

POW - Partition coefficient Octanol:Water

vPvB - very Persistent, very Bioaccumulative

ADR - European Agreement Concerning the International Carriage of Dangerous Goods by Road

IMO/MDG - International Maritime Organization/International Maritime Dangerous Goods Code

OECD - Organisation for Economic Co-operation and Development

BCF - Bioconcentration factor

Key literature references and sources for data

Suppliers safety data sheet, Chemadvisor - LOLI, Merck index, RTECS

ICAO/IATA - International Civil Aviation Organization/International Air Transport Association

MARPOL - International Convention for the Prevention of Pollution from Ships

ATE - Acute Toxicity Estimate

VOC - Volatile Organic Compounds

Training Advice

Chemical hazard awareness training, incorporating labelling, Safety Data Sheets (SDS), Personal Protective Equipment (PPE) and hygiene.

First aid for chemical exposure, including the use of eye wash and safety showers.

Use of personal protective equipment, covering appropriate selection, compatibility, breakthrough thresholds, care, maintenance, fit and standards.

Chemical incident response training.

Creation Date 24-Aug-1997

Revision Date 27-Mar-2015

Revision Summary Update to Format.

This safety data sheet complies with the requirements of Regulation (EC) No. 1907/2006

Disclaimer

The information provided on 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 guide for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered as 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 material or in any process, unless specified in the text.

End of Safety Data Sheet