

Safety Data Sheet

1. Identification

1.1. Product identifier

Product Identity	Vanadium Pentoxide (V ₂ O ₅)
Alternate Names	Vanadium Pentoxide

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

Intended use	See Technical Data Sheet.
Application Method	See Technical Data Sheet.

1.3. Details of the supplier of the safety data sheet

Company Name:	U.S. Vanadium, LLC 4285 Malvern Road Hot Springs, Arkansas 71901; U.S.A (Company Identification)
Telephone:	+1-501-262-1270
Fax:	+1-501-262-2793
Website:	

Emergency

24 hour Emergency Telephone No.	NATIONAL RESPONSE CENTER: +1-800-424-8802 CHEMTREC U.S. and CANADA: +1-800-424-9300 CHEMTREC International: +1-202-483-7616 (Collect)
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2. Hazard(s) identification

2.1. Classification of the substance or mixture

Acute Tox. 4; H302	Harmful if swallowed.
Acute Tox. 4; H332	Harmful if inhaled.
Skin. 3; H316	Causes mild skin irritation
Eye. 2B; H320	Causes Eye Irritation
Muta. 2; H341	Suspected of causing genetic defects.
Repr. 2; H361D	Suspected of damaging the unborn child.
STOT SE 3; H335	May cause respiratory irritation.
STOT RE 1; H372	Causes damage to organs through prolonged or repeated exposure. Specific Target Organs: (Not Available)
Aquatic Chronic 2; H411	Toxic to aquatic life with long lasting effects.

2.2. Label elements

Using the Toxicity Data listed in section 11 and 12 the product is labeled as follows.



Signal Word: Danger

Hazard Statements:

- H302 Harmful if swallowed.
- H316 Causes mild skin irritation.
- H320 Causes eye irritation.
- 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.

Precautionary Statements:

Safety Data Sheet

[Prevention]:

- P201 Obtain special instructions before use.
- P202 Do not handle until all safety precautions have been read and understood.
- P261 Avoid breathing dust / fume / gas / mist / vapors / spray.
- P264 Wash thoroughly after handling.
- 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.
- P281 Use personal protective equipment as required.

[Response]:

- P301+312 IF SWALLOWED: Call a POISON CENTER or doctor / physician if you feel unwell.
- P304+312 IF INHALED: Call a POISON CENTER or doctor / physician if you feel unwell.
- P308+313 IF exposed or concerned: Get medical advice / attention.
- P314 Get Medical advice / attention if you feel unwell.
- P330 Rinse mouth.
- P340 Remove victim to fresh air and keep at rest in a position comfortable for breathing.
- P391 Collect spillage.

[Storage]:

- P403+233 Store in a well ventilated place. Keep container tightly closed.
- P405 Store locked up.

[Disposal]:

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

3. Composition/information on ingredients

This product contains the following substances that present a hazard within the meaning of the relevant State and Federal Hazardous Substances regulations.

Ingredient/Chemical Designations	Weight %	GHS Classification	Notes
Vanadium pentoxide CAS Number: 0001314-62-1	>99%	Muta. 2; H341 Repr. 2; H361d STOT RE 1; H372 Acute Tox. 4; H332 Acute Tox. 4; H302 Skin. 3; H316 Eye 2B; H320 STOT SE 3; H335 Aquatic Chronic 2; H411	[1][2]

In accordance with paragraph (i) of §1910.1200, the specific chemical identity and/or exact percentage (concentration) of composition has been withheld as a trade secret.

[1] Substance classified with a health or environmental hazard.

[2] Substance with a workplace exposure limit.

*The full texts of the phrases are shown in Section 16.

4. First aid measures

4.1. Description of first aid measures

- General** In all cases of doubt, or when symptoms persist, seek medical attention.
Never give anything by mouth to an unconscious person.
- Inhalation** Remove to fresh air, keep patient warm and at rest. If breathing is irregular or stopped, give artificial respiration. If unconscious place in the recovery position and obtain immediate medical attention. Give nothing by mouth.
- Eyes** Flush with water 15 minutes to remove particles. See an ophthalmologist.
- Skin** Remove contaminated clothing. Wash skin thoroughly with soap and water or use a recognized skin cleanser.
- Ingestion** Give two glasses of water. Induce vomiting if conscious. Call a physician.

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

- Overview** **Eye Contact:** Causes eye irritation
Skin Contact: Cause mild skin irritation. Irritation with reddening and itching.

Safety Data Sheet

Inhalation: Irritation of the respiratory tract, chest tightness, wheezing, bloody nose, and coughing.
Ingestion: Abdominal discomfort, nausea, vomiting, cramping. Harmless green tongue discoloration.
EXTREME or repeated overexposure may cause chronic bronchitis, allergic skin reaction, or asthmatic reaction with possible lung injury in susceptible individuals. When exposure ceases, effects are usually reversible. See section 2 for further details.

Inhalation Harmful if inhaled. May cause respiratory irritation.

Ingestion Harmful if swallowed.

5. Fire-fighting measures

5.1. Extinguishing media

Not flammable. Use media suitable for surrounding fire.

5.2. Special hazards arising from the substance or mixture

Hazardous decomposition: No hazardous decomposition data available.

Avoid breathing dust / fume / gas / mist / vapors / spray.

5.3. Advice for fire-fighters

Full protective equipment including positive pressure-breathing apparatus. (See DOT Guide 151.)

Avoid creating dust.

ERG Guide No. 151

6. Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

Put on appropriate personal protective equipment (see section 8).

6.2. Environmental precautions

Do not allow spills to enter drains or waterways.

Use good personal hygiene practices. Wash hands before eating, drinking, smoking or using toilet. Promptly remove soiled clothing and wash thoroughly before reuse.

6.3. Methods and material for containment and cleaning up

Prevent entering sewage systems or surface water.

Vacuum preferred (or sweeping). Addition of sand or sweeping compound is advisable.

Avoid decontamination procedures which create airborne dusting. Use ventilation if necessary to control dusting.

7. Handling and storage

7.1. Precautions for safe handling

Avoid areas where dust is present.

7.2. Conditions for safe storage, including any incompatibilities

Keep dry and in closed containers.

Incompatible materials: Incompatible with aluminum powder.

See section 2 for further details. - [Storage]:

7.3. Specific end use(s)

No data available.

8. Exposure controls and personal protection

8.1. Control parameters

Exposure

CAS No.	Ingredient	Source	Value
0001314-62-1	Vanadium pentoxide	OSHA	C 0.5 mg V2O5/m3 (resp)
		ACGIH	TWA: 0.2 mg/m3 (Total Dust) 2BRespirable dust and fume Ceiling: 0.05 mg/m3 2B
		NIOSH	C 0.05 mg V/m3 [15-minute]
		Supplier	No Established Limit

Safety Data Sheet

Carcinogen Data

CAS No.	Ingredient	Source	Value
0001314-62-1	Vanadium pentoxide	OSHA	Select Carcinogen: No
		NTP	Known: No; Suspected: No
		IARC	Group 1: No; Group 2a: No; Group 2b: Yes; Group 3: No; Group 4: No;

8.2. Exposure controls

Respiratory	Use respirators approved by NIOSH/MSHA in dusty areas.
Eyes	Use goggles or safety glasses with side shields.
Skin	Use protective gloves and barrier creams.
Engineering Controls	Proper dust collection. Minimize dust during dumping operations.
Other Work Practices	Use good personal hygiene practices. Wash hands before eating, drinking, smoking or using toilet. Promptly remove soiled clothing and wash thoroughly before reuse.

See section 2 for further details. - [Prevention]:

9. Physical and chemical properties

Appearance	Yellow-Orange Solid Granules
Odor	No smell
Odor threshold	Not determined
pH	Not Measured
Melting point / freezing point	690°C (1274°F)
Initial boiling point and boiling range	Not Measured
Flash Point	Not Measured
Evaporation rate (Ether = 1)	Not Measured
Flammability (solid, gas)	Not Applicable
Upper/lower flammability or explosive limits	Lower Explosive Limit: Not Measured Upper Explosive Limit: Not Measured
Vapor pressure (Pa)	Essentially Zero
Vapor Density	Not Measured
Specific Gravity	Not Measured
Solubility in Water	0.8g per 100cc (at 20C)
Partition coefficient n-octanol/water (Log Kow)	Not Measured
Auto-ignition temperature	Not Measured
Decomposition temperature	1750°C (3182°F)
Viscosity (cSt)	Not Measured
Oxidizing Properties	May act as a catalyst in certain chemical environments.
Bulk Density	1.2 to 1.3 g/cm ³ (75 to 80 lb/ft ³)

9.2. Other information

No other relevant information.

10. Stability and reactivity

10.1. Reactivity

Hazardous Polymerization will not occur.

10.2. Chemical stability

Stable under normal circumstances.

10.3. Possibility of hazardous reactions

No data available.

10.4. Conditions to avoid

Avoid any situations which cause dusting.

10.5. Incompatible materials

Incompatible with aluminum powder.

10.6. Hazardous decomposition products

Safety Data Sheet

No hazardous decomposition data available.

11. Toxicological information

Acute toxicity

Ingredient	Oral LD50, mg/kg	Skin LD50, mg/kg	Inhalation Vapor LC50, mg/L/4hr	Inhalation Dust/Mist LC50, mg/L/4hr	Inhalation Gas LC50, ppm
Vanadium pentoxide - (1314-62-1)	10 mg/kg oral-rat	No data available	No data available	No data available	No data available

Note: When no route specific LD50 data is available for an acute toxin, the converted acute toxicity point estimate was used in the calculation of the product's ATE (Acute Toxicity Estimate).

Classification	Category	Hazard Description
Acute toxicity (oral)	4	Harmful if swallowed.
Acute toxicity (dermal)	---	Not Applicable
Acute toxicity (inhalation)	4	Harmful if inhaled.
Skin corrosion/irritation	3	Causes mild skin irritation
Serious eye damage/irritation	2B	Causes eye irritation
Respiratory sensitization	---	Not Applicable
Skin sensitization	---	Not Applicable
Germ cell mutagenicity	2	Suspected of causing genetic defects.
Carcinogenicity	---	Not Applicable
Reproductive toxicity	2	Suspected of damaging the unborn child.
STOT-single exposure	3	May cause respiratory irritation.
STOT-repeated exposure	1	Causes damage to organs through prolonged or repeated exposure.
Aspiration hazard	---	Not Applicable

12. Ecological information

12.1. Toxicity

Toxic to aquatic life with long lasting effects.

No additional information provided for this product. See Section 3 for chemical specific data.

Aquatic Ecotoxicity

Ingredient	96 hr LC50 fish, mg/l	48 hr EC50 crustacea, mg/l	ErC50 algae, mg/l
Vanadium pentoxide - (1314-62-1)	Not Available	Not Available	Not Available

12.2. Persistence and degradability

Does not readily deteriorate in the environment.

12.3. Bioaccumulative potential

Not Measured

12.4. Mobility in soil

No data available.

12.5. Results of PBT and vPvB assessment

This product contains no PBT/vPvB chemicals.

12.6. Other adverse effects

No data available.

13. Disposal considerations

Safety Data Sheet

13.1. Waste treatment methods

Listed as an acutely hazardous waste when discarded.
U.S. EPA classifies discarded product, non-RCRA empty containers and liners, or spill residue as P119 waste.

14. Transport information

	DOT (Domestic Surface Transportation)	IMO / IMDG (Ocean Transportation)	ICAO/IATA
14.1. UN number	UN2862	UN2862	UN2862
14.2. UN proper shipping name	UN2862, Vanadium pentoxide, non-fused form, 6.1, III	Vanadium pentoxide, non-fused form	Vanadium pentoxide, non-fused form
14.3. Transport hazard class(es)	DOT Hazard Class: 6.1	IMDG: 6.1 Sub Class: Not Applicable	Air Class: 6.1
14.4. Packing group	III	III	III
14.5. Environmental hazards			
IMDG	Marine Pollutant: Yes (Vanadium oxide)		
14.6. Special precautions for user			
	No further information		

15. Regulatory information

Regulatory Overview The regulatory data in Section 15 is not intended to be all-inclusive, only selected regulations are represented.

Toxic Substance Control Act (TSCA) All components of this material are either listed or exempt from listing on the TSCA Inventory.

WHMIS Classification D2A

US EPA Tier II Hazards

Fire: No

Sudden Release of Pressure: No

Reactive: No

Immediate (Acute): Yes

Delayed (Chronic): Yes

EPCRA 311/312 Chemicals and RQs (lbs):

Vanadium pentoxide (1,000.00)

EPCRA 302 Extremely Hazardous:

Vanadium pentoxide

EPCRA 313 Toxic Chemicals:

Vanadium pentoxide

Proposition 65 - Carcinogens (>0.0%):

Vanadium pentoxide

Proposition 65 - Developmental Toxins (>0.0%):

To the best of our knowledge, there are no chemicals at levels which require reporting under this statute.

Proposition 65 - Female Repro Toxins (>0.0%):

To the best of our knowledge, there are no chemicals at levels which require reporting under this statute.

Proposition 65 - Male Repro Toxins (>0.0%):

To the best of our knowledge, there are no chemicals at levels which require reporting under this statute.

New Jersey RTK Substances (>1%):

Vanadium pentoxide

Pennsylvania RTK Substances (>1%):

Vanadium pentoxide

16. Other information

The information and recommendations contained herein are based upon data believed to be correct. However, no guarantee or warranty of any kind, expressed or implied, is made with respect to the information contained herein. We accept no responsibility and disclaim all liability for any harmful effects which may be caused by exposure to our products. Customers/users of this product must comply with all applicable health and safety laws, regulations, and orders.

Safety Data Sheet

The full text of the phrases appearing in section 3 is:

H302 Harmful if swallowed.

H316 Cause mild skin irritation.

H320 Causes eye irritation.

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.

Listings of changes from previous versions in other formats are not applicable.

U.S. Vanadium, LLC believes that the data on this sheet are correct as of the effective date and that the opinions given reflect those of qualified experts. Since U.S. Vanadium, LLC cannot control the product or its use, it is the user's responsibility to use the product safely. The data on this sheet apply only to products sold by corporate subsidiaries of U.S. Vanadium, LLC and may not apply to products sold by others.

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