



Infosafe No™	1CHKF	Issue Date : November 2016	RE-ISSUED by CHEMSUPP
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Product Name : **VANADIUM PENTOXIDE**

Classified as hazardous

1. Identification

GHS Product Identifier	VANADIUM PENTOXIDE	
Company Name	CHEM-SUPPLY PTY LTD (ABN 19 008 264 211)	
Address	38 - 50 Bedford Street GILLMAN SA 5013 Australia	
Telephone/Fax Number	Tel: (08) 8440-2000 Fax: (08) 8440-2001	
Recommended use of the chemical and restrictions on use	Catalyst for many organic reactions, catalyst for oxidation of sulfur dioxide in sulfuric acid manufacture (contact process), phthalic anhydride from naphthalene or o-xylene, maleic anhydride from benzene or n-butane/butene, adipic acid from cyclohexanol/cyclohexanone, and acrylic acid from propane; ferrovandium; chemical intermediate for vanadium alloys and compounds; colouring agent for ceramics and textiles, inhibiting UV transmission in glass, depolarizer, photographic developer, oxidation catalyst in automobile catalytic converters; used in the production of oxalic acid from cellulose and of anthraquinone from anthracene; used to lower the melting point of enamel frits for the coating of aluminium substrates; corrosion inhibitor in the CO2 scrubbing solutions of the Benfield and related processes for the production of hydrogen from hydrocarbons; as cathode in primary and secondary (rechargeable) lithium batteries, in YVO4.	
Other Names	Name	Product Code
	VANADIUM PENTOXIDE LR Vanadic acid anhydride	VL002
Other Information	EMERGENCY CONTACT NUMBER: +61 08 8440 2000 Business hours: 8:30am to 5:00pm, Monday to Friday.	

Chem-Supply Pty Ltd does not warrant that this product is suitable for any use or purpose. The user must ascertain the suitability of the product before use or application intended purpose. Preliminary testing of the product before use or application is recommended. Any reliance or purported reliance upon Chem-Supply Pty Ltd with respect to any skill or judgement or advice in relation to the suitability of this product of any purpose is disclaimed. Except to the extent prohibited at law, any condition implied by any statute as to the merchantable quality of this product or fitness for any purpose is hereby excluded. This product is not sold by description. Where the provisions of Part V, Division 2 of the Trade Practices Act apply, the liability of Chem-Supply Pty Ltd is limited to the replacement of supply of equivalent goods or payment of the cost of replacing the goods or acquiring equivalent goods.

2. Hazard Identification

GHS classification of the substance/mixture	Eye Damage/Irritation: Category 1 Germ Cell Mutagenicity: Category 2 Acute Toxicity - Inhalation: Category 4 Acute Toxicity - Oral: Category 4 Soecific target organ toxicity - Repeated Exposure Category 1 Specific target organ toxicity - Single Exposure Category 3 (respiratory tract irritation) Toxic to Reproduction: Category 2
Signal Word (s)	DANGER
Hazard Statement (s)	H302 Harmful if swallowed. H318 Causes serious eye damage. 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.
Pictogram (s)	Health hazard, Corrosion, Exclamation mark, Environment





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Precautionary statement – Prevention	<p>P201 Obtain special instructions before use.</p> <p>P202 Do not handle until all safety precautions have been read and understood.</p> <p>P260 Do not breathe dust/fume/gas/mist/vapours/spray.</p> <p>P262 Do not get in eyes, on skin, or on clothing.</p> <p>P264 Wash thoroughly after handling.</p> <p>P270 Do not eat, drink or smoke when using this product.</p> <p>P271 Use only outdoors or in a well-ventilated area.</p> <p>P280 Wear protective gloves/protective clothing/eye protection/face protection.</p> <p>P281 Use personal protective equipment as required.</p> <p>P273 Avoid release to the environment.</p>
Precautionary statement – Response	<p>P302+P350 IF ON SKIN: Gently wash with plenty of soap and water.</p> <p>P310 Immediately call a POISON CENTER or doctor/physician.</p> <p>P361 Remove/Take off immediately all contaminated clothing.</p> <p>P363 Wash contaminated clothing before reuse.</p> <p>P304+P340 IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.</p> <p>P311 Call a POISON CENTER or doctor/physician.</p> <p>P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.</p> <p>P310 Immediately call a POISON CENTER or doctor/physician.</p> <p>P308+P313 IF exposed or concerned: Get medical advice/attention.</p>
Precautionary statement – Storage	<p>P403+P233 Store in a well-ventilated place. Keep container tightly closed.</p>
Precautionary statement – Disposal	<p>P405 Store locked up.</p> <p>P501 Dispose of contents/container to an approved waste disposal plant.</p>

3. Composition/information on ingredients

Chemical Characterization Ingredients	Name	CAS	Proportion	Hazard Symbol	Risk Phrase
	Vanadium pentoxide	1314-62-1	100 %		

4. First-aid measures

Inhalation	If inhaled, remove from contaminated area to fresh air immediately, avoid becoming a casualty. Make patient comfortable, keep warm and at rest until fully recovered. If breathing is difficult (or develops a bluish skin discoloration), supply oxygen by a qualified person. Apply artificial respiration with a respiratory medical device if not breathing. Do not use mouth to mouth resuscitation. Immediately medical attention is required.
Ingestion	Rinse mouth thoroughly with water immediately, repeat until all traces of product have been removed. DO NOT INDUCE VOMITING. Seek immediate medical advice.
Skin	Wash affected area thoroughly with soap and water. Remove contaminated clothing and wash before reuse or discard. Seek immediate medical attention.
Eye contact	Immediately irrigate with copious quantity of water for at least 15 minutes. Eyelids to be held open. Seek medical attention.
First Aid Facilities	Maintain eyewash fountain and safety shower in work area.
Advice to Doctor	Treat symptomatically based on judgement of doctor and individual reactions of the patient.
Other Information	For advice, contact a Poisons Information Centre (Phone eg Australia 13 1126; New Zealand 0800 764 766) or a doctor.

5. Fire-fighting measures

Hazards from Combustion Products	Oxygen, irritating and toxic fumes and gases, vanadium oxide (VOx) gases.
Specific Methods	<p>No limitations to the type of extinguishing media.</p> <p>Small fire: Use dry chemical, CO2 or water spray.</p> <p>If safe to do so, move undamaged containers from fire area.</p> <p>Large fire: Use water spray, fog or foam - Do not use water jets.</p> <p>Cool containers with flooding quantities of water until well after fire is out. Avoid getting water inside containers.</p>



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Specific hazards arising from the chemical	Material does not burn. Fire or heat will produce irritating, poisonous and/or corrosive gases. Runoff may pollute waterways.
Hazchem Code	2X
Decomposition Temp.	1750 °C
Precautions in connection with Fire	Wear SCBA and chemical splash suit. Fully-encapsulating, gas-tight suits should be worn for maximum protection. Structural firefighter's uniform is NOT effective for these materials.

6. Accidental release measures

Personal Precautions	Evacuate the area of all non-essential personnel. Avoid substance contact. Avoid generation of dusts: do not inhale dusts. Ensure supply of fresh air in enclosed rooms.
Personal Protection	Wear protective clothing specified for normal operations (see Section 8)
Clean-up Methods - Small Spillages	Sweep up (avoid generating dust) and using clean non-sparking tools transfer to a clean, suitable, clearly labelled container for disposal in accordance with local regulations.

7. Handling and storage

Precautions for Safe Handling	Avoid contact with skin, eyes and clothing. Avoid ingestion or inhalation of dust or fumes. Avoid prolonged or repeated exposure. Keep container closed. Minimise dust accumulation and generation. Operations should be carried out in an efficient fume hood or equivalent system. Use only with adequate ventilation. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Chemicals should be used only by those trained in handling potentially hazardous materials. Wear suitable protective clothing. Rubber gloves, eye protection and protective clothing should be worn. Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. STRICT HYGIENE! Do not eat, drink, or smoke during work. Under no circumstances eat, drink or smoke while handling this material. Wash hands before eating. Isolate from food and feedstuffs. Isolate from incompatible substances. Protect against physical damage. Containers of this material may be hazardous when empty since they retain product residues (dust, solids); observe all warnings and precautions listed for the product.
Conditions for safe storage, including any incompatibilities	Store in tightly closed containers, in a cool, dry, well-ventilated area away from incompatible substances. Keep well closed and protected from direct sunlight and moisture. Protect against physical damage. Separated from food and feedstuffs. Keep containers closed when not in use - check regularly for spills. Store in a safe manner to minimize accidental breakage, spillage, or contact with moisture. Containers of this material may be hazardous when empty since they retain product residues (dust, solids); observe all warnings and precautions listed for the product.
Storage Regulations	Refer Australian Standard AS/NZS 4452:1997 'The storage and handling of toxic substances'.
Storage Temperatures	Store at room temperature (15 to 25 °C recommended).

8. Exposure controls/personal protection

Occupational exposure limit values	Name	STEL		TWA		Footnote
		mg/m3	ppm	mg/m3	ppm	
	Vanadium pentoxide			0.05		Vanadium (as V2O5), (respirable dust & fume)
Other Exposure Information	A time weighted average (TWA) has been established for Vanadium (as V2O5), (respirable dust & fume) (Safe Work Australia) of 0.05 mg/m³. The exposure value at the TWA is the average airborne concentration of a particular substance when calculated over a normal 8 hour working day for a 5 day working week.					
Appropriate engineering controls	In industrial situations maintain the concentrations values below the TWA. This may be achieved by process modification, use of local exhaust ventilation, capturing substances at the source, or other methods.					
Respiratory Protection	Where ventilation is not adequate, respiratory protection may be required. Avoid breathing dust, vapours or mists. Respiratory protection should comply with AS 1716 - Respiratory Protective Devices and be					



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Eye Protection	selected in accordance with AS 1715 - Selection, Use and Maintenance of Respiratory Protective Devices. Filter capacity and respirator type depends on exposure levels. In event of emergency or planned entry into unknown concentrations a positive pressure, full-facepiece SCBA should be used. If respiratory protection is required, institute a complete respiratory protection program including selection, fit testing, training, maintenance and inspection.
Hand Protection	The use of a face shield, chemical goggles or safety glasses with side shield protection as appropriate. Must comply with Australian Standards AS 1337 and be selected and used in accordance with AS 1336. Hand protection should comply with AS 2161, Occupational protective gloves - Selection, use and maintenance.
Personal Protective Equipment	Final choice of personal protective equipment will depend on individual circumstances and/or according to risk assessments undertaken.
Footwear	Safety boots in industrial situations is advisory, foot protection should comply with AS 2210, Occupational protective footwear - Guide to selection, care and use.
Body Protection	Clean clothing or protective clothing should be worn, preferably with an apron. Clothing for protection against chemicals should comply with AS 3765 Clothing for Protection Against Hazardous Chemicals.
Hygiene Measures	Always wash hands before smoking, eating or using the toilet. Wash contaminated clothing and other protective equipment before storing or re-using.

9. Physical and chemical properties

Form	Solid
Appearance	Brownish powder.
Odour	Odourless.
Decomposition Temperature	1750 °C
Melting Point	690 °C
Boiling Point	1750 °C (decomposes)
Solubility in Water	Slightly soluble in water; 0.8 g/100 ml; 1 g/125 ml.
Solubility in Organic Solvents	Soluble in acetone. Insoluble in alcohol.
Specific Gravity	3.35 @ 25 °C
pH	4 (50 g/l slurry)
Vapour Pressure	0 mm Hg (20 °C); 0.0443 hPa (700 °C).
Vapour Density (Air=1)	6.3
Volatile Component	0 %vol @ 21 °C
Flammability	Non combustible material.
Explosion Properties	Dust/air mixture explosive.
Molecular Weight	181.88
Oxidising Properties	May act as an oxidizing agent. Decomposes at high temperatures releasing oxygen which may cause an existing fire to burn more vigorously.
Solubility in other solvents (kg/m3)	Soluble in concentrated acids, alkalis.

10. Stability and reactivity

Chemical Stability	Stable under ordinary conditions of use and storage.
Conditions to Avoid	Incompatible materials, dust generation, combustible substances, reducing agents.
Incompatible Materials	Acids, alkalis, alkali metals, alkaline earth metals/sulfur (in the presence of atmospheric oxygen and/or moisture), lithium + 400 °C, peroxyformic acid, chlorine trifluoride, calcium + sulfur/sodium + water, hydrochloric acid (formation of: chlorine), chlorine, chlorates, interhalogens, halogen-halogen compounds, performic acid, combustible substances, reducing agents.
Hazardous Decomposition Products	Irritating and toxic fumes and gases, vanadium oxide (VOx) gases, oxygen.



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Possibility of hazardous reactions The reaction of lithium and vanadium pentoxide occurs around 400 °C; the temperature then rises rapidly to 768 °C.
Mixtures with calcium, sodium, and water may ignite spontaneously.
Vanadium5+ is reduced to vanadium4+ by relatively mild reducing agents.
Reactive with acids, alkalis.
Reacts with combustible substances.
Will not occur.

Hazardous Polymerization**11. Toxicological Information****Acute Toxicity - Dermal** LD50 (rabbit): 50 mg/kg.**Ingestion** Toxic if swallowed. Symptoms may include excess salivation, nausea, headache, vomiting, diarrhoea and abdominal pain. Anaemia may occur. May cause central nervous system effects. High concentrations may cause drowsiness, convulsions, unconsciousness and central nervous system damage.**Inhalation** Irritating to mucous membranes of the respiratory tract (airways). May cause effects similar to those described for ingestion. Highly toxic fume, mist, dust. Exposure can injure the lungs and bronchial airways. Symptoms include irritation and inflammation of the mucous membranes, nasal passages and pharynx, a greenish-black discolouration of the tongue, persistent cough, shortness of breath, bronchiolar constriction, tightness in the chest. An asthma-like condition may occur. May result in pulmonary oedema/pneumonia. May be fatal.**Skin** Irritating to skin. Symptoms include redness, itching, and pain. May develop skin rash or lesions with intense itching. May cause skin sensitization, an allergic reaction, which becomes evident upon re-exposure to this material.**Eye** Causes severe eye irritation, with redness and pain. Vapour, mist and dust cause irritation with sensation of burning, redness, pain, and signs of conjunctivitis.**Carcinogenicity** Vanadium pentoxide [1314-62-1] is evaluated in the IARC Monographs (Vol. 86; in preparation) as Group 2B: Possibly carcinogenic to humans.**Reproductive Toxicity** H361 Suspected of damaging fertility or the unborn child.**Chronic Effects** Repeated or prolonged exposure may cause lung damage, respiratory tract sensitization or skin sensitization. Chronic inhalation and ingestion may cause effects similar to those of acute inhalation and ingestion.

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.

Serious eye damage/irritation Draize test, rabbit, eye: 20 mg/24 h Moderate.**Mutagenicity** R68(M3) Mutagen Category 3, Harmful - Possible risk of irreversible effects - Worksafe Aust. Listed as a mutagen, category 3 in List of Designated Hazardous Substances, - NOHSC. Substances that cause concern for man owing to possible mutagenic effects. There is evidence from appropriate mutagenicity studies, but this is insufficient to place the substance in Category 2.**12. Ecological information****Ecotoxicity** The following applies to vanadium compounds in general: toxic for aquatic organisms.**Environmental Protection** Do not allow to enter waters, waste water, or soil!**Acute Toxicity - Fish** LD50 (Oncorhynchus mykiss - rainbow trout): 5.2 mg/l/96.0h**Acute Toxicity - Daphnia** ED50 (Daphnia magna - Water flea): 0.94 mg/l/48h**13. Disposal considerations****Disposal Considerations** Whatever cannot be saved for recovery or recycling should be disposed of according to relevant local, state and federal government regulations.**14. Transport information****Transport Information** Dangerous Goods of Class 6 (Toxic and Infectious Substances) are incompatible in a placard load with any of the following: -Class 1, Class 3, if the Class 3 dangerous goods are nitromethane, Class 8, if the Class 6 dangerous goods are cyanides and the Class 8 dangerous goods are acids; and are



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U.N. Number	incompatible with food and food packaging in any quantity. 2862
UN proper shipping name	VANADIUM PENTOXIDE
Transport hazard class(es)	6.1
Hazchem Code	2X
Packaging Method	3.8.6.1
Packing Group	III
EPG Number	6A5
IERG Number	34

15. Regulatory information**Poisons Schedule** Not Scheduled**16. Other Information**

Literature References 'Standard for the Uniform Scheduling of Medicines and Poisons No. 6', Commonwealth of Australia, February 2015.
Lewis, Richard J. Sr. 'Hawley's Condensed Chemical Dictionary 13th. Ed.', Rev., John Wiley and Sons, Inc., NY, 1997.
National Road Transport Commission, 'Australian Code for the Transport of Dangerous Goods by Road and Rail 7th. Ed.', 2007.
Safe Work Australia, 'National Code of Practice for the Preparation of Safety Data Sheets for Hazardous Chemicals', 2011.
Standards Australia, 'SAA/SNZ HB 76:2010 Dangerous Goods - Initial Emergency Response Guide', Standards Australia/Standards New Zealand, 2010.
Safe Work Australia, 'Approved Criteria for Classifying Hazardous Substances [NOHSC:1008 (2004)]'.
Safe Work Australia, 'Hazardous Substances Information System, 2005'.
Safe Work Australia, 'National Code of Practice for the Labelling of Safe Work Hazardous Substances (2011)'.
Safe Work Australia, 'National Exposure Standards for Atmospheric Contaminants in the Occupational Environment [NOHSC:1003(1995) 3rd Edition]'.
Contact Person/Point Paul McCarthy Ph. (08) 8440 2000 **DISCLAIMER STATEMENT:**
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Empirical Formula & Structural Formula V2O5
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