

**1. PRODUCT AND COMPANY IDENTIFICATION**

Product Name	<b>Vanadium(V) oxide, Enriched Vanadium</b>
Chemical Formula	V <sub>2</sub> O <sub>5</sub>
Molecular Weight	181.88 g/mol
CAS No.	1314-62-1
EC SNo.	215-239-8
Supplier Address*	ISOFLEX USA PO Box 29475 San Francisco CA 94129 United States
Telephone	+1 415-440-4433
Fax	+1 415-563-4433
Emergency Phone Number (both supplier and manufacturer)	Infotrac/ +1 800-535-5053  *May include subsidiaries or affiliate companies/divisions
Email	<a href="mailto:iusa@isoflex.com">iusa@isoflex.com</a>
Website	<a href="http://www.isoflex.com">www.isoflex.com</a>
Preparation Information	ISOFLEX USA Product Safety +1 415-440-4433

**2. HAZARDS IDENTIFICATION**

**Emergency Overview:**

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

Target Organs: Lungs

Harmful. Flammable (USA) Highly Flammable (EU)

Limited evidence of a carcinogenic effect. May cause sensitization by skin contact.

Possible Carcinogen (US). Target organ(s): Lungs. Nose. Calif. Prop. 65 carcinogen.

**NFPA Ratings:** (0 = Minimal; 1 = Slight; 2 = Moderate; 3 = Serious; 4 = Severe)

**Health Hazard = 3    Flammability = 0    Reactivity = 0**



**HMIS Ratings:** (0 = Minimal; 1 = Slight; 2 = Moderate; 3 = Serious; 4 = Severe)

**Health Hazard = 3      Flammability = 0      Physical Hazard = 0**

<b>HEALTH HAZARD</b>	<b>3</b>
<b>FLAMMABILITY</b>	<b>0</b>
<b>PHYSICAL HAZARD</b>	<b>0</b>

### Potential Health Effects

<i>Inhalation</i>	May be fatal if inhaled; causes respiratory tract irritation
<i>Skin</i>	Causes skin irritation; may be fatal if absorbed through skin
<i>Eyes</i>	Causes eye irritation
<i>Ingestion</i>	May be fatal if swallowed

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### 3. COMPOSITION / INFORMATION ON INGREDIENTS

Chemical Name:	Vanadium(V) oxide
CAS No.:	1314-62-1
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### 4. FIRST AID MEASURES

<i>General Advice</i>	Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.
<i>Inhalation Exposure</i>	If breathed in, move person into fresh air. If not breathing give artificial respiration Consult a physician.
<i>Dermal Exposure</i>	Wash off with soap and plenty of water. Consult a physician.
<i>Eye Exposure</i>	Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.
<i>Oral Exposure</i>	Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

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### 5. FIREFIGHTING MEASURES

*Suitable Extinguishing Media*      Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

#### Firefighting

*Protective Equipment*      Wear self-contained breathing apparatus for firefighting if necessary.

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### 6. ACCIDENTAL RELEASE MEASURES

<i>Personal Precautions</i>	Use personal protective equipment. Avoid dust formation. Avoid breathing dust. Ensure adequate ventilation. Evacuate personnel to safe areas.
<i>Environmental Precautions</i>	Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.
<i>Methods for Cleaning Up</i>	Pick up and arrange disposal without creating dust. Keep in suitable, closed containers for disposal.

## 7. HANDLING AND STORAGE

### Handling

Avoid formation of dust and aerosols. Provide appropriate exhaust ventilation at places where dust is formed. Normal measures for preventive fire protection.

### Storage

Keep container tightly closed in a dry and well-ventilated place.

## 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

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® 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® 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.					

## Personal Protective Equipment

<i>Respiratory Protection</i>	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).
<i>Hand Protection</i>	Handle with gloves
<i>Eye Protection</i>	Face shield and safety glasses
<i>Skin and Body Protection</i>	Choose body protection according to the amount and concentration of the dangerous substance at the work place.
<i>Hygiene Measures</i>	Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product.

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## 9. PHYSICAL AND CHEMICAL PROPERTIES

### Appearance

Physical State	Solid
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### Safety Data

pH:	No data available	Density:	3.35 g/mL at 25 °C (77 °F)
Melting Point:	690 °C (1274 °F)	Boiling Point:	No data available
Flash Point:	Not applicable	Ignition Temperature:	No data available
Lower Explosion Limit:	No data available	Upper Explosion Limit:	No data available
Water Solubility:	No data available		

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## 10. STABILITY AND REACTIVITY

<i>Stability</i>	Stable under recommended storage conditions
<i>Conditions to Avoid</i>	No data available
<i>Materials to Avoid</i>	Strong acids
<i>Hazardous Decomposition Products</i>	Hazardous decomposition products formed under fire conditions; vanadium/vanadium oxides

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## 11. TOXICOLOGICAL INFORMATION

### Acute Toxicity

<i>LD50 Oral (Rat)</i>	10 mg/kg Remarks: Behavioral: Coma.
<i>LC50 Inhalation (Rat)</i>	6 h - 126 mg/m <sup>3</sup> Remarks: Sense Organs and Special Senses (Nose, Eye, Ear, and Taste): Eye: Other. Behavioral: Ataxia. Lungs, Thorax, or Respiration: Dyspnea.
<i>LD50 Dermal (Rabbit)</i>	50 mg/kg Remarks: Liver: Other changes. Kidney, Ureter, Bladder: Other changes.
<i>Skin Corrosion/Irritation</i>	Serious eye damage/eye irritation: Eyes - Rabbit - Moderate eye irritation - 24 h
<i>Respiratory or Skin Sensitization</i>	No data available
<i>Germ Cell Mutagenicity</i>	Laboratory experiments have shown mutagenic effects. In vitro tests showed mutagenic effects.

## Carcinogenicity

<i>IARC</i>	2B - Group 2B: Possibly carcinogenic to humans (Vanadium pentoxide)
<i>ACGIH</i>	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.
<i>NTP</i>	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.
<i>OSHA</i>	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.
<i>Reproductive Toxicity</i>	Possible risk of congenital malformation in the fetus. Suspected human reproductive toxicant
<i>Specific Target Organ Toxicity / Single Exposure (Globally Harmonized System)</i>	May cause damage to organs; may cause respiratory irritation
<i>Specific Target Organ Toxicity / Repeated Exposure (Globally Harmonized System)</i>	No data available
<i>Aspiration Hazard</i>	No data available
<i>Signs and Symptoms of Exposure</i>	To the best of our knowledge, the chemical, physical and toxicological properties have not been thoroughly investigated.

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## 12. ECOLOGICAL INFORMATION

### Toxicity

<i>Toxicity to Fish</i>	LC50 - <i>Oncorhynchus mykiss</i> (rainbow trout) - 5.2 mg/l - 96.0 h
<i>Toxicity to Daphnia and Other Aquatic Invertebrates</i>	EC50 - <i>Daphnia magna</i> (Water flea) - 0.94 mg/l - 48 h
<i>Persistence and Degradability</i>	No data available
<i>Bioaccumulative Potential</i>	No data available
<i>Mobility in Soil</i>	No data available
<i>PBT and vPvB Assessment</i>	No data available
<i>Other Adverse Effects</i>	An environmental hazard cannot be excluded in the event of unprofessional handling or disposal. Toxic to aquatic organisms; may cause long-term adverse effects in the aquatic environment.

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## 13. DISPOSAL CONSIDERATIONS

<i>Product</i>	Observe all federal, state and local 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.
<i>Contaminated Packaging</i>	Dispose of as unused product.

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**14. TRANSPORT INFORMATION****DOT**

<i>Proper Shipping Name</i>	Vanadium pentoxide
<i>UN No.</i>	2862
<i>Class</i>	6.1
<i>Packing Group</i>	III
<i>Reportable Quantity (RQ)</i>	1000 lbs
<i>Marine Pollutant</i>	No
<i>Poison Inhalation Hazard</i>	No

**IMDG**

<i>Proper Shipping Name</i>	Vanadium pentoxide
<i>UN No.</i>	2862
<i>Class</i>	6.1
<i>Packing Group</i>	III
<i>EMS No.</i>	F-A, S-A
<i>Marine Pollutant</i>	No

**IATA**

<i>Proper Shipping Name</i>	Vanadium pentoxide
<i>UN No.</i>	2862
<i>Class</i>	6.1
<i>Packing Group</i>	III

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**15. REGULATORY INFORMATION**

<b>OSHA Hazards</b>	Target Organ Effect, Highly toxic by inhalation, Highly toxic by ingestion, Highly toxic by skin absorption, Irritant, Carcinogen, Teratogen
<b>DSL Status</b>	All components of this product are on the Canadian DSL list.
<b>SARA 302 Components</b>	Vanadium pentoxide / CAS No. 1314-62-1 / Revision Date 2007-07-01
<b>SARA 313 Components</b>	Vanadium pentoxide / CAS No. 1314-62-1 / Revision Date 2007-07-01
<b>SARA 311/312 Hazards</b>	Acute Health Hazard, Chronic Health Hazard
<b>Massachusetts Right to Know Components</b>	Vanadium pentoxide / CAS No. 1314-62-1 / Revision Date 2007-07-01
<b>Pennsylvania Right to Know Components</b>	Vanadium pentoxide / CAS No. 1314-62-1 / Revision Date 2007-07-01
<b>New Jersey Right to Know Components</b>	Vanadium pentoxide / CAS No. 1314-62-1 / Revision Date 2007-07-01
<b>California Prop. 65 Components</b>	This product does not contain any chemicals known to the State of California to cause cancer, birth defects, or any other reproductive harm.

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## 16. OTHER INFORMATION

<i>Prepared By</i>	ISOFLEX USA PO Box 29475 San Francisco CA 94129 United States
<i>Issuing Date</i>	January 12, 2014
<i>Revision Date</i>	July 29, 2021
<i>Revision Number</i>	2
<i>Revision Note</i>	Required review and update

### ISOFLEX USA's Commonly Used Abbreviations and Acronyms\*

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

\*One or more of the above-listed items may not appear in this document.

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