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ISO 9001: 2015

MATERIAL SAFETY DATA SHEET

Section 1 - Chemical Product and Company Identification

Vanadium(V) oxide, 99.99% (metals basis)

CodeV 5340

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
1314-62-1	Vanadium pentoxide	100.0	215-239-8

Hazard Symbols: T N

Risk Phrases: 20/22 37 48/23

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Appearance: yellow to brown solid. May cause eye and skin irritation. **Danger!** Causes respiratory tract irritation. Possible risk of harm to the unborn child. May be fatal if inhaled, absorbed through the skin or swallowed.

Target Organs: Central nervous system, lungs, eyes, reproductive system, skin.

Potential Health Effects

Eye: Causes eye irritation. Causes redness and pain.

Skin: May cause skin irritation. May cause skin sensitization, an allergic reaction, which becomes evident upon re-exposure to this material.

Ingestion: May be fatal if swallowed. May cause central nervous system effects. Symptoms include excess salivation, vomiting and diarrhea. High concentrations may cause drowsiness, convulsions, unconsciousness and central nervous system damage.

Inhalation: May cause respiratory tract irritation. May cause effects similar to those described for ingestion. May cause lung damage. May cause asthma and shortness of breath.

Chronic: Chronic inhalation and ingestion may cause effects similar to those of acute inhalation and ingestion.

Section 4 - First Aid Measures

Eyes: Flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid.

Skin: Get medical aid. Flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes.

Ingestion: If victim is conscious and alert, give 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious

person. Get medical aid immediately. Wash mouth out with water.
Inhalation: Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.
Notes to Physician: Treat symptomatically and supportively.

Section 5 - Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Substance is noncombustible.
Extinguishing Media: Use extinguishing media most appropriate for the surrounding fire.
Flash Point: Not applicable.
Autoignition Temperature: Not available.
Explosion Limits, Lower: Not available.
Upper: Not available.
NFPA Rating: (estimated) Health: 3; Flammability: ; Instability:

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.
Spills/Leaks: Vacuum or sweep up material and place into a suitable disposal container. Avoid generating dusty conditions. Provide ventilation.

Section 7 - Handling and Storage

Handling: Wash thoroughly after handling. Wash hands before eating. Remove contaminated clothing and wash before reuse. Do not get in eyes, on skin, or on clothing. Do not ingest or inhale. Do not breathe dust or fumes. Use only with adequate ventilation.
Storage: Store in a tightly closed container. Store in a cool, dry, well-ventilated area away from incompatible substances. Poison room locked.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls: Ventilation is normally required when handling or using this product to keep exposure to airborne contaminants below the exposure limit. Use adequate general or local exhaust ventilation to keep airborne concentrations below the permissible exposure limits. Use only under a chemical fume hood.
Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Vanadium pentoxide	0.05 mg/m ³ TWA (dust or fume, respirable fraction, as V ₂ O ₅)	35 mg/m ³ IDLH (dust and fume, as V)	0.5 mg/m ³ Ceiling (respirable dust, as V ₂ O ₅); 0.1 mg/m ³ Ceiling (fume, as V ₂ O ₅)

OSHA Vacated PELs: Vanadium pentoxide: 0.05 mg/m³ TWA (respirable dust, as V₂O₅); 0.05 mg/m³ TWA (fume, as V₂O₅)

Personal Protective Equipment

Eyes: Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin: Wear appropriate protective gloves to prevent skin exposure.

Clothing: Wear appropriate protective clothing to prevent skin exposure.

Respirators: Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Always use a NIOSH or European Standard EN 149 approved respirator when necessary.

Section 9 - Physical and Chemical Properties

Physical State: Solid
Appearance: yellow to brown
Odor: None reported.
pH: Not available.
Vapor Pressure: Not available.
Vapor Density: Not available.
Evaporation Rate: Not available.
Viscosity: Not available.
Boiling Point: 1750 deg C @ 760 mm Hg
Freezing/Melting Point: 690 deg C
Decomposition Temperature: 1750 deg C
Solubility: 1g/125ml
Specific Gravity/Density: 3.35 g/cm³
Molecular Formula: O₅V₂
Molecular Weight: 181.88

Section 10 - Stability and Reactivity

Chemical Stability: Stable under normal temperatures and pressures.
Conditions to Avoid: Exposure to air.
Incompatibilities with Other Materials: Strong acids.
Hazardous Decomposition Products: Irritating and toxic fumes and gases, vanadium oxide (VO_x) gases.
Hazardous Polymerization: Has not been reported.

Section 11 - Toxicological Information

RTECS#:

CAS# 1314-62-1: YW2125000; YW2450000; YW2460000

LD50/LC50:

CAS# 1314-62-1:

Draize test, rabbit, eye: 20 mg/24H Moderate;

Inhalation, rat: LC50 = 126 mg/m³/6H;

Oral, mouse: LD50 = 23.4 mg/kg;

Oral, mouse: LD50 = 5 mg/kg;

Oral, rat: LD50 = 10 mg/kg;

Skin, rabbit: LD50 = 50 mg/kg;<br.

Carcinogenicity:

CAS# 1314-62-1: Not listed by ACGIH, IARC, NIOSH, NTP, or OSHA.

Epidemiology: In a study of 55 boilermakers exposed to vanadium pentoxide fume at > 0.05 mg/m³, the most frequent clinical presentation was secondary bronchitis.

Teratogenicity: No data available.

Reproductive Effects: See actual entry in RTECS for complete information.

Neurotoxicity: No data available.

Mutagenicity: Laboratory experiments have shown mutagenic effects.

Other Studies: No data available.

Section 12 - Ecological Information

No information available.

Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.

RCRA P-Series: CAS# 1314-62-1: waste number P120.

RCRA U-Series: None listed.

Section 14 - Transport Information

	US DOT	IATA	RID/ADR	IMO	Canada TDG
Shipping Name:	No information available.				No information available.
Hazard Class:					
UN Number:					
Packing Group:					

Section 15 - Regulatory Information

US FEDERAL

TSCA

CAS# 1314-62-1 is listed on the TSCA inventory.

Health & Safety Reporting List

None of the chemicals are on the Health & Safety Reporting List.

Chemical Test Rules

None of the chemicals in this product are under a Chemical Test Rule.

Section 12b

None of the chemicals are listed under TSCA Section 12b.

TSCA Significant New Use Rule

None of the chemicals in this material have a SNUR under TSCA.

SARA

CERCLA Hazardous Substances and corresponding RQs

CAS# 1314-62-1: 1000 lb final RQ; 454 kg final RQ

SARA Section 302 Extremely Hazardous Substances

CAS# 1314-62-1: 100 lb TPQ (lower threshold); 10000 lb TPQ (upper threshold)

SARA Codes

CAS # 1314-62-1: acute, chronic, flammable.

Section 313

This material contains Vanadium pentoxide (listed as Vanadium compounds), 100 0%, (CAS# 1314-62-1) which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 373.

Clean Air Act:

This material does not contain any hazardous air pollutants. This material does not contain any Class 1 Ozone depleters. This

material does not contain any Class 2 Ozone depletors.

Clean Water Act:

CAS# 1314-62-1 is listed as a Hazardous Substance under the CWA. None of the chemicals in this product are listed as Priority Pollutants under the CWA. None of the chemicals in this product are listed as Toxic Pollutants under the CWA.

OSHA:

None of the chemicals in this product are considered highly hazardous by OSHA.

STATE

CAS# 1314-62-1 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, Massachusetts.

California No Significant Risk Level: None of the chemicals in this product are listed.

European/International Regulations

European Labeling in Accordance with EC Directives

Hazard Symbols:

T N

Risk Phrases:

R 20/22 Harmful by inhalation and if swallowed.

R 37 Irritating to respiratory system.

R 48/23 Toxic : danger of serious damage to health by prolonged exposure through inhalation.

R 63 Possible risk of harm to the unborn child.

R 51/53 Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

R 68 Possible risk of irreversible effects.

Safety Phrases:

S 36/37 Wear suitable protective clothing and gloves.

S 38 In case of insufficient ventilation, wear suitable respiratory equipment.

S 45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

S 61 Avoid release to the environment. Refer to special instructions/safety data sheets.

WGK (Water Danger/Protection)

CAS# 1314-62-1: 2

Canada - DSL/NDL

CAS# 1314-62-1 is listed on Canada's DSL List.

Canada - WHMIS

This product does not have a WHMIS classification.

Canadian Ingredient Disclosure List

CAS# 1314-62-1 is listed on the Canadian Ingredient Disclosure List.

Exposure Limits

Section 16: Other Information

This safety data sheet should be used in conjunction with technical sheets. It does not replace them. The information given is based on our knowledge of this product, at the time of publication. It is given in good faith. The attention of the user is drawn to the possible risks incurred by using the product for any other purpose other than that for which it was intended. This does not in any way excuse the user from knowing and applying all the regulations governing his activity. It is the sole responsibility of the user to take all precautions required in handling the product. The aim of the mandatory regulations mentioned is to help the user to fulfill his obligations regarding the use of hazardous products.