

Vanadium (V) Oxide (Vanadia) Powder (V2O5)

US Research Nanomaterials, Inc.

Material Safety Data Sheet

acc. to OSHA and ANSI

1 Chemical product and company identification

Trade name: Vanadium (V) Oxide (Vanadia, Vanadium Pentoxide) Powder (V2O5)

Stock #: US1128M

Manufacturer/Supplier:

US Research Nanomaterials, Inc.

3302 Twig Leaf Lane

Houston, Texas 77084, USA

www.us-nano.com

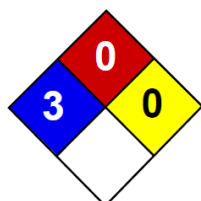
2 Composition/Information on ingredients

Cas#: 1314-62-1

Chemical characterization: Vanadium (V) Oxide Powder (V2O5), 99%.

3 Hazards identification

Hazard description



| | |
|---------------------|---|
| Health | 3 |
| Fire | 0 |
| Reactivity | 0 |
| Personal Protection | E |

Risk Phrases

20/22 37 48/23 51/53 63 68

Overview

Harmful by inhalation and if swallowed. Irritating to respiratory system. Toxic: danger of serious damage to health by prolonged exposure through inhalation. Possible risk of harm to the unborn child. Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment. Possible risk of irreversible effects.

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.

Inhalation: Causes respiratory tract irritation. May cause effects similar to those described for ingestion. May cause lung damage. May

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| <p>cause asthma and shortness of breath. Chronic: Chronic inhalation and ingestion may cause effects similar to those of acute inhalation and ingestion.</p> |
| <p>4 First aid measures</p> |
| <p>After inhalation Supply fresh air. If required, provide artificial respiration. Keep patient warm. Seek immediate medical advice.</p> <p>After skin contact Immediately wash with water and soap and rinse thoroughly. Seek immediate medical advice.</p> <p>After swallowing Seek immediate medical advice.</p> |
| <p>5 Fire fighting measures</p> |
| <p>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. Decomposes at high temperatures releasing oxygen which may cause an existing fire to burn more vigorously.</p> <p>Suitable extinguishing agents Use extinguishing media most appropriate for the surrounding fire.</p> |
| <p>6 Accidental release measures</p> |
| <p>Person-related safety precautions Wear protective equipment. Keep unprotected persons away. Ensure adequate ventilation.</p> <p>Measures for environmental protection Do not allow material to be released to the environment without proper governmental permits.</p> <p>Measures for cleaning/collecting Ensure adequate ventilation.</p> <p>Additional information See Section 7 for information on safe handling. See Section 8 for information on personal protection equipment. See Section 13 for disposal information.</p> |
| <p>7 Handling and storage</p> |
| <p>Handling Wash thoroughly after handling. Wash thoroughly after handling. 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.</p> <p>Storage Store in a tightly closed container. Store in a cool, dry, well-ventilated area away from incompatible substances.</p> |

Information about storage in one common storage facility

Store away from oxidizing agents.

Store away from halogens.

Store away from water/moisture.

Do not store together with acids.

Further information about storage conditions

Keep container tightly sealed.

Store in cool, dry conditions in well sealed containers.

8 Exposure controls and personal protection**Additional information about design of technical systems**

Properly operating chemical fume hood designed for hazardous chemicals and having an average face velocity of at least 100 feet per minute.

Components with limit values that require monitoring at the workplace

TWA: 0.05 (mg/m³) from ACGIH (TLV) [United States] Respirable.

TWA: 0.1 (mg/m³) from OSHA (PEL) [United States]

Respirable. CEIL: 0.05 (mg/m³) from NIOSH [United States] Respirable. United Kingdom, WEL - TWA: 0.05 mg/m³ TWA

United Kingdom, WEL - STEL: 0.15 mg/m³ STEL

Belgium - TWA: 0.05 mg/m³ VLE (fume, respirable fraction, as V2O5)

France - VME: 0.05 mg/m³ VME (dust and fume, as V2O5)

Germany: 0.05 mg/m³ TWA (respirable fraction, exposure factor 1)

Japan: 0.05 mg/m³ OEL

Malaysia: 0.05 mg/m³ TWA (respirable dust or fume)

Spain: 0.05 mg/m³ VLA-ED (respirable dust or fume, as V2O5)

Personal protective equipment**General protective and hygienic measures**

The usual precautionary measures for handling chemicals should be followed.

Keep away from foodstuffs, beverages and feed.

Remove all soiled and contaminated clothing immediately.

Wash hands before breaks and at the end of work.

Avoid contact with the eyes and skin.

Breathing equipment

Use suitable respirator when high concentrations are present.

Protection of hands

Impervious gloves

Check protective gloves prior to each use for their proper condition.

Material of gloves

The selection of suitable gloves not only depends on the material, but also on quality.

Quality will vary from manufacturer to manufacturer.

Eye protection

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|---|--------------------------------|
| Safety glasses Body protection Protective work clothing. | |
| 9 Physical and chemical properties | |
| Form: Powder Color: Yellow Odor: Odorless | |
| | Value/Range Unit Method |
| Change in condition | |
| Melting point/Melting range: | 690°C |
| Boiling point/Boiling range: | 1750°C |
| Molecular Weight: | 181.9 g/mole |
| Flash point: | Not applicable |
| Flammability (solid, gaseous) | Not applicable |
| Ignition temperature: | Not determined |
| Decomposition temperature: | Not determined |
| Explosion limits: | |
| Lower: | Not determined |
| Upper: | Not determined |
| Vapor pressure: | Not determined |
| Density: | at 20°C 3.357g/cm ³ |
| Solubility in / Miscibility with Water: Partially soluble in cold water. Solubility in water: 1 g/125 ml. | |
| 10 Stability and reactivity | |
| Stability: The product is stable. Instability Temperature: Not available. Conditions of Instability: Incompatible materials, dust generation Incompatibility with various substances: Reactive with acids, alkalis. Corrosivity: Non-corrosive in presence of glass. Special Remarks on Reactivity: Incompatible with lithium, chlorine trifluoride, peroxyformic acid. Special Remarks on Corrosivity: Not available. Polymerization: Will not occur. | |
| 11 Toxicological information | |
| RTECS#: CAS# 1314-62-1: YW2125000 YW2450000 YW2460000 LD50/LC50: RTECS: CAS# 1314-62-1: Draize test, rabbit, eye: 20 mg/24H Moderate; Inhalation, rat: LC50 = 126 mg/m ³ /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;. | |
| Carcinogenicity: | |

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| <p>Vanadium pentoxide - California: carcinogen, initial date 2/11/05 IARC: Group 2B carcinogen</p> |
| <p>12 Ecological information</p> |
| <p>General notes Do not allow material to be released to the environment without proper governmental permits.</p> |
| <p>13 Disposal considerations</p> |
| <p>Product Recommendation Consult state, local or national regulations for proper disposal. Uncleaned packagings Recommendation Disposal must be made according to official regulations.</p> |
| <p>14 Transport information</p> |
| <p>IATA Shipping Name: VANADIUM PENTOXIDE Hazard Class: 6.1 UN Number: 2862 Packing Group: III IMO Shipping Name: VANADIUM PENTOXIDE Hazard Class: 6.1 UN Number: 2862 Packing Group: III RID/ADR Shipping Name: VANADIUM PENTOXIDE Hazard Class: 6.1 UN Number: 2862 Packing Group: II</p> |
| <p>15 Regulations</p> |
| <p>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 51/53 Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment. R 63 Possible risk of harm to the unborn child. R 68 Possible risk of irreversible effects. Safety Phrases:</p> |

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
CAS# 1314-62-1 is listed on Canada's DSL List
US Federal
TSCA
CAS# 1314-62-1 is listed on the TSCA Inventory.

16 Other information

Employers should use this information only as a supplement to other information gathered by them, and should make independent judgement of suitability of this information to ensure proper use and protect the health and safety of employees. This information is furnished without warranty, and any use of the product not in conformance with this Material Safety Data Sheet, or in combination with any other product or process, is the responsibility of the user.