

SAFETY DATA SHEET

According to JIS Z 7253:2019
Revision date 27-Feb-2024
 Revision Number 3.05

Section 1: PRODUCT AND COMPANY IDENTIFICATION

| | |
|---------------------|---------------------|
| Product Name | Vanadium(V) Oxide |
| Product Code | 222-00122,226-00125 |

Supplier FUJIFILM Wako Pure Chemical Corporation
 1-2 Doshomachi 3-Chome, Chuo-ku, Osaka 540-8605, Japan
 Phone: +81-6-6203-3741
 Fax: +81-6-6203-2029

Emergency telephone number +81-6-6203-3741 / +81-3-3270-8571

Recommended uses For research use only

Restrictions on use Seek expert judgment when using for purposes other than those recommended.

Section 2: HAZARDS IDENTIFICATION

GHS classification

Classification of the substance or mixture

| | |
|---|-------------|
| Acute toxicity - Oral | Category 3 |
| Acute toxicity - Inhalation (Dusts/Mists) | Category 2 |
| Serious eye damage/eye irritation | Category 1 |
| Germ cell mutagenicity | Category 2 |
| Carcinogenicity | Category 1B |
| Reproductive Toxicity | Category 2 |
| Specific target organ toxicity (single exposure) | Category 1 |
| Category 1 respiratory system, liver, kidneys | |
| Specific target organ toxicity (repeated exposure) | Category 1 |
| Category 1 respiratory system | |
| Acute aquatic toxicity | Category 2 |
| Chronic aquatic toxicity | Category 1 |

Pictograms



Signal word

Danger

Hazard statements

- H318 - Causes serious eye damage
- H301 - Toxic if swallowed
- H330 - Fatal if inhaled
- H341 - Suspected of causing genetic defects
- H350 - May cause cancer
- H361 - Suspected of damaging fertility or the unborn child
- H410 - Very toxic to aquatic life with long lasting effects
- H401 - Toxic to aquatic life
- H370 - Causes damage to the following organs: respiratory system, liver, kidneys
- H372 - Causes damage to the following organs through prolonged or repeated exposure: respiratory system

Precautionary statements-(Prevention)

- Obtain special instructions before use
- Do not handle until all safety precautions have been read and understood
- Use personal protective equipment as required
- Do not breathe dust/fume/gas/mist/vapors/spray
- Wash face, hands and any exposed skin thoroughly after handling
- Do not eat, drink or smoke when using this product
- Avoid release to the environment

Precautionary statements-(Response)

- IF exposed: Call a POISON CENTER or doctor/physician
- IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
- Immediately call a POISON CENTER or doctor/physician
- IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician
- Rinse mouth
- Collect spillage

Precautionary statements-(Storage)

- Store locked up

Precautionary statements-(Disposal)

- Dispose of contents/container to an approved waste disposal plant

Others

Other hazards Not available

Section 3: COMPOSITION/INFORMATION ON INGREDIENTS

Single Substance or Mixture Substance

Formula V2O5

| Chemical Name | Weight-% | Molecular weight | ENCS | ISHL No. | CAS RN |
|-------------------|----------|------------------|---------|----------|-----------|
| Vanadium(V) Oxide | 99.0 | 181.88 | (1)-559 | * | 1314-62-1 |

Note on ISHL No.: * in the table means announced chemical substances.

Section 4: FIRST AID MEASURES

Inhalation

Remove to fresh air. If symptoms persist, call a physician.

Skin contact

Wash off immediately with soap and plenty of water. If symptoms persist, call a physician.

Eye contact

IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediate medical attention is required.

Ingestion

Rinse mouth. Never give anything by mouth to an unconscious person. Call a physician or poison control center immediately. Do not induce vomiting without medical advice.

Protection of first-aiders

Use personal protective equipment as required.

Section 5: FIRE FIGHTING MEASURES

Suitable extinguishing media

Use extinguishing measures that are appropriate to local circumstances and the surrounding environment

Unsuitable extinguishing media

No information available

Specific hazards arising from the chemical product

Thermal decomposition can lead to release of irritating and toxic gases and vapors.

Special extinguishing method

No information available

Special protective actions for fire-fighters

Use personal protective equipment as required. Firefighters should wear self-contained breathing apparatus and full firefighting turnout gear.

Section 6: ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures

For indoor, provide adequate ventilation process until the end of working. Deny unnecessary entry other than the people involved by, for example, using a rope. While working, wear appropriate protective equipments to avoid adhering it on skin, or inhaling the gas. Work from windward, and retract the people downwind.

Environmental precautions

To be careful not discharged to the environment without being properly handled waste water contaminated.

Methods and materials for contaminant and methods and materials for cleaning up

Sweep up and gather scattered particles, and collect it in an empty airtight container.

Recovery, neutralization

No information available

Secondary disaster prevention measures

Clean contaminated objects and areas thoroughly observing environmental regulations.

Section 7: HANDLING AND STORAGE

Handling**Technical measures**

Avoid contact with reducing agents and combustible materials. Avoid contact with organic substance Use with local exhaust ventilation.

Precautions

Do not rough handling containers, such as upsetting, falling, giving a shock, and dragging. Prevent leakage, overflow, and scattering. Not to generate steam and dust in vain. Seal the container after use. After handling, wash hands and face, and then gargle. In places other than those specified, should not be smoking or eating and drinking. Should not be brought contaminated protective equipment and gloves to rest stops. Deny unnecessary entry of non-emergency personnel to the handling area.

Safety handling precautions

Avoid contact with skin, eyes or clothing. Use personal protective equipment as required.

Storage**Safe storage conditions****Storage conditions**

Store away from sunlight in well-ventilated place at room temperature (preferably cool).

Keep container tightly closed. Store locked up.

Safe packaging material

Glass

Incompatible substances

Organic substance, Combustible materials, Reducing agent

Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering controls

In case of indoor workplace, seal the source or use a local exhaust system. Provide the safety shower facility, and hand- and eye-wash facility. And display their position clearly.

Exposure limits

| Chemical Name | JSOH (Japan) | ISHL (Japan) | ACGIH |
|--------------------------------|---|----------------------------------|---|
| Vanadium(V) Oxide 1314-62-1 | TWA: 0.05 mg/m ³ OEL ISHL/ACL: 0.03 mg/m ³ | ISHL/ACL: 0.03 mg/m ³ | TWA: 0.05 mg/m ³ V inhalable particulate matter |

Personal protective equipment

| | |
|---------------------------------|---|
| Respiratory protection | Dust mask (JIS T 8151) |
| Hand protection | chemical protective gloves (JIS T 8116) |
| Eye protection | protective eyeglasses or chemical safety goggles (JIS T 8147) |
| Skin and body protection | Long-sleeved work clothes |

General hygiene considerations

Handle in accordance with good industrial hygiene and safety practice.

If this product is classified as "Chemical Substances Hazardous to Skin, etc.", use appropriate protective equipment to them.

Section 9: PHYSICAL AND CHEMICAL PROPERTIES

Form

| | |
|---|---|
| Color | reddish yellow- yellow-reddish brown |
| Appearance | powder |
| Odor | no data available |
| Melting point/freezing point | 690 °C |
| Boiling point, initial boiling point and boiling range | 1750 °C |
| Flammability | no data available |
| Evaporation rate: | no data available |
| Flammability (solid, gas): | no data available |
| Upper/lower flammability or explosive limits | |
| Upper: | no data available |
| Lower: | no data available |
| Flash point | no data available |
| Auto-ignition temperature: | no data available |
| Decomposition temperature: | no data available |
| pH | no data available |
| Viscosity (coefficient of viscosity) | no data available |
| Dynamic viscosity | no data available |
| Solubilities | dil. ammonia solution , water : slightly soluble . Ethanol : practically insoluble,or insoluble . |
| n-Octanol/water partition coefficient:(log Pow) | no data available |
| Vapour pressure | no data available |
| Specific Gravity / Relative density | 3.357 |
| Vapour density | no data available |
| Particle characteristics | no data available |

Section 10: STABILITY AND REACTIVITY

Stability

| | |
|---|--|
| Reactivity | no data available |
| Chemical stability | Stable under recommended storage conditions. |
| Hazardous reactions | None under normal processing |
| Conditions to avoid | Extremes of temperature and direct sunlight |
| Incompatible materials | Organic substance, Combustible materials, Reducing agent |
| Hazardous decomposition products | No information available |

Section 11: TOXICOLOGICAL INFORMATION

Acute toxicity

| Chemical Name | Oral LD50 | Dermal LD50 | Inhalation LC50 |
|-------------------|---------------------|-----------------------|-----------------------|
| Vanadium(V) Oxide | 466.9 mg/kg (Rat) | > 2,500 mg/kg (Rat) | 0.25 mg/L (Rat) 4 h |

| Chemical Name | Acute toxicity -oral- source information | Acute toxicity -dermal- source information | Acute toxicity -inhalation gas- source information |
|-------------------|---|---|--|
| Vanadium(V) Oxide | Based on the NITE GHS classification results. | Based on the NITE GHS classification results. | Based on the NITE GHS classification results. |

| Chemical Name | Acute toxicity -inhalation vapor- source information | Acute toxicity -inhalation dust- source information | Acute toxicity -inhalation mist- source information |
|-------------------|--|---|---|
| Vanadium(V) Oxide | Based on the NITE GHS classification results. | Based on the NITE GHS classification results. | Based on the NITE GHS classification results. |

Skin irritation/corrosion

| Chemical Name | Skin corrosion/irritation source information |
|-------------------|---|
| Vanadium(V) Oxide | Based on the NITE GHS classification results. |

Serious eye damage/ irritation

| Chemical Name | Serious eye damage/irritation source information |
|-------------------|--|
| Vanadium(V) Oxide | Based on the NITE GHS classification results. |

Respiratory or skin sensitization

| Chemical Name | Respiratory or Skin sensitization source information |
|-------------------|--|
| Vanadium(V) Oxide | Based on the NITE GHS classification results. |

Reproductive cell mutagenicity

| Chemical Name | germ cell mutagenicity source information |
|-------------------|---|
| Vanadium(V) Oxide | Based on the NITE GHS classification results. |

Carcinogenicity

| Chemical Name | Carcinogenicity source information |
|-------------------|---|
| Vanadium(V) Oxide | Based on the NITE GHS classification results. |

| Chemical Name | NTP | IARC | ACGIH | JSOH (Japan) |
|--------------------------------|-----|----------|-------|--------------|
| Vanadium(V) Oxide 1314-62-1 | - | Group 2B | A3 | Group 2B |

Reproductive toxicity

| Chemical Name | Reproductive toxicity source information |
|-------------------|---|
| Vanadium(V) Oxide | Based on the NITE GHS classification results. |

STOT-single exposure

| Chemical Name | STOT -single exposure- source information |
|-------------------|---|
| Vanadium(V) Oxide | Based on the NITE GHS classification results. |

STOT-repeated exposure

| Chemical Name | STOT -repeated exposure- source information |
|-------------------|---|
| Vanadium(V) Oxide | Based on the NITE GHS classification results. |

Aspiration hazard

| Chemical Name | Aspiration Hazard source information |
|-------------------|---|
| Vanadium(V) Oxide | Based on the NITE GHS classification results. |

Section 12: ECOLOGICAL INFORMATION

Ecotoxicity

| Chemical Name | Algae/aquatic plants | Fish | Crustacea |
|-------------------|----------------------|---|---|
| Vanadium(V) Oxide | N/A | LC50 : <i>Oryzias latipes</i> 4.46 mg/L 96 h | LC50 : <i>Daphnia magna</i> 1.45 mg/L 48 h |

Other data

| Chemical Name | Short-term (acute) hazardous to the aquatic environment source information | Long-term (chronic) hazardous to the aquatic environment source information |
|-------------------|--|---|
| Vanadium(V) Oxide | Based on the NITE GHS classification results. | Based on the NITE GHS classification results. |

Persistence and degradability No information available

| | |
|---------------------------|--------------------------|
| Bioaccumulative potential | No information available |
| Mobility in soil | No information available |
| Hazard to the ozone layer | No information available |

Section 13: DISPOSAL CONSIDERATIONS

Waste from residues

Disposal should be in accordance with applicable regional, national and local laws and regulations.

Contaminated container and contaminated packaging

Disposal should be in accordance with applicable regional, national and local laws and regulations.

Section 14: TRANSPORT INFORMATION

ADR/RID

| | |
|-------------------------|--------------------|
| UN number | UN2862 |
| Proper shipping name: | Vanadium pentoxide |
| UN classification | 6.1 |
| Subsidiary hazard class | |
| Packing group | III |
| Marine pollutant | Yes |

IMDG

| | |
|--|--------------------------|
| UN number | UN2862 |
| Proper shipping name: | Vanadium pentoxide |
| UN classification | 6.1 |
| Subsidiary hazard class | |
| Packing group | III |
| Marine pollutant (Sea) | Yes |
| Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code | No information available |

IATA

| | |
|-------------------------------------|--------------------|
| UN number | UN2862 |
| Proper shipping name: | Vanadium pentoxide |
| UN classification | 6.1 |
| Subsidiary hazard class | |
| Packing group | III |
| Environmentally Hazardous Substance | Yes |

Section 15: REGULATORY INFORMATION

Japanese regulations

| | |
|--|--|
| Fire Service Act | Firefighting Inhibitor |
| Poisonous and Deleterious Substances Control Law | Deleterious Substances 3rd. Grade |
| Industrial Safety and Health Act | Harmful Substances Whose Names Are to be Indicated on the Label (Law Art.57) Notifiable Substances (Law Art.57-2) Group 2 Specified Chemical Substance Working Environment Evaluation Standards, Administrative Control Levels (Law Art.65-2, Para.1) |
| Industrial Safety and Health Act (2024-) | 【2024.4.1~】 Chemical Substances Hazardous to Skin, etc.(Regulations Article 594-2 Paragraph 1) |
| Regulations for the carriage and storage of dangerous goods in ship | Toxic Substances - Poison (Ordinance Art.3, Ministry of Transportation Ordinance Regarding Transport by Ship and Storage, Attached Table 1) |
| Civil Aeronautics Law | Toxic and Infectious Substances (Ordinance Art.194, MITL Notification for Air Transportation of Explosives etc., Attached Table 1) |
| Pollutant Release and Transfer | Class 1 |

**Register Law
(2023.4.1-)**

Class 1 - No. 321
Export Trade Control Order Not applicable
Air Pollution Control Law Hazardous Air Pollutants

| Chemical Name | Poisonous and Deleterious Substances Control Law | Industrial Safety and Health Act Substances (Law Art.57-2) | Pollutant Release and Transfer Register Law (2023.4.1-) |
|---|--|--|---|
| Vanadium(V) Oxide 1314-62-1 (99.0) | Applicable | Applicable | Applicable |

Section 16: OTHER INFORMATION

Key literature references and sources for data etc.

NITE: National Institute of Technology and Evaluation (JAPAN)
<http://www.safe.nite.go.jp/japan/db.html>
 IATA dangerous Goods Regulations
 RTECS:Registry of Toxic Effects of Chemical Substances
 Japan Industrial Safety and Health Association GHS Model SDS
 Dictionary of Synthetic Organic Chemistry , SSOCJ, Koudansha Scientific Co.Ltd.
 Chemical Dictionary, Kyouritsu Publishing Co., Ltd.
 etc

Record of SDS revisions

The following contents were revised. Regulatory information.

Disclaimer

This SDS is according to JIS Z 7253: 2019. The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

GHS Classification is according to JIS Z 7252:2019. *JIS: Japanese Industrial Standards

End of Safety Data Sheet