

1. PRODUCT AND COMPANY IDENTIFICATION

Trade Name: Vanadium Dioxide

Chemical Formula: VO₂

Manufacturer Item Number: VA-5640

Manufacturer: Lorad Chemical Corporation
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2. HAZARD IDENTIFICATION

Signal Word: Warning

Pictograms:



Hazard Statements: H302+332 Harmful if swallowed or inhaled.
H315 Causes skin irritation.
H319 Causes serious eye irritation.
H335 May cause respiratory irritation.

Precautionary Statements: P261 Avoid breath dust / fumes / gas / mist / vapors / spray.
P264 Wash skin thoroughly after handling.
P280 Wear protective gloves / protective clothing / eye protection / face protection.
P302+352 IF ON SKIN: Wash with plenty of soap and water.
P305+351+338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses if present and easy to do. Continue rinsing.
P304+340 IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
P332+313: If skin irritation occurs: Get medical advice / attention.
P337+313 If eye irritation occurs: Get medical advice / attention.
P362 Take off contaminated clothing and wash before reuse.
P405 Store locked up.
P501 Dispose of contents / container in accordance with local / regional / national / international regulations.

HMIS Health Ratings (0-4)

- Health: 2
- Flammability: 0
- Physical: 1

3. COMPOSITION

Additional Names: Vanadium Oxide; Vanadium(IV) Oxide

Percentage: 100 wt%

CAS #: 12036-21-4

EC #: 234-841-1

4. FIRST AID PROCEDURES

General Treatment Consult a physician. Show this SDS to the doctor in attendance. Move out of dangerous area.

Special Treatment: No Data Available.

Important Symptoms: Direct contact with eyes may cause temporary irritation.

Inhalation: If breathing, move person into fresh air. If not breathing, give artificial respiration. Consult a physician if symptoms develop or persist.

Ingestion: Seek medical attention.

Skin: For skin contact, flush with large amounts of soap and water while removing contaminated clothing. Launder contaminated clothing before reuse. Get medical attention if irritation develops and persists.

Eyes: Immediately flush eyes with fresh water for at least 15 minutes while holding the eyelids open. Remove contact lenses if worn. Consult a physician.

5. FIREFIGHTING MEASURES

Flammability: Non-Flammable.

Special Hazards from Substance: During fire, gases hazardous to health may be formed.

Extinguishing Media: Use suitable extinguishing agent for surrounding material and type of fire. Do not use water for metal fires—use carbon dioxide, sand, or extinguishing powder.

Special Fire Fighting Procedures: Wear self-contained breathing apparatus for firefighting if necessary.

6. ACCIDENTAL RELEASE MEASURES

If Material is Released / Spilled: Wear appropriate respiratory and protective equipment specified in Section 8. Avoid dust formation. Avoid breathing vapors, mist, or gas. Isolate spill area and ensure adequate ventilation. Evacuate personnel to safe areas. Vacuum up spill using a high efficiency particulate absolute (HEPA) air filter and place in a closed container for disposal. Dispose of waste in accordance with applicable federal, state, local, and provincial environmental regulations.

Environmental Precautions: Prevent further leakage or spills if safe to do so. Do not allow to enter drains, sewers, or watercourses. Discharge into the environment must be avoided.

7. HANDLING AND STORAGE

Handling Conditions: Avoid prolonged exposure. Wash thoroughly after handling.

Storage Conditions: Store locked up. Keep container tightly sealed in a cool dry place. Store apart from materials and conditions listed in Section 10.

Work / Hygienic Maintenance: Do not eat, drink, or smoke when working with this product. Wear protective gloves, protective mask, protective eyewear, and protective clothing and wash skin thoroughly with soap after handling. Keep formation of airborne dusts to a minimum. Guard against dust accumulation. In case of insufficient ventilation, wear suitable respiratory equipment. For additional precautions, see Section 2.

Ventilation: Provide sufficient ventilation to maintain concentration at or below threshold limit.

8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

Permissible Exposure Limits:	Authority	Basis	Limit	Remarks
	-	-	-	No Data Available.
Threshold Limit Value:	Authority	Basis	Limit	Remarks
	NIOSH	ST	0.05 mg/m ³	As vanadium dust. 15-minute time-weighted average exposure. (airborne exposure limit)
Special Equipment:	Good general ventilation should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineered controls to maintain airborne levels below recommended exposure limits.			
Respiratory Protection:	Where risk assessment shows air-purifying respirators are appropriate use a particle respirator with type P100 (US) or type P3 (EN 143) respirator cartridges as a backup to other environmental 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).			
Protective Gloves:	Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.			
Eye Protection:	Safety glasses with side-shields (or goggles). Use equipment for eye protection tested and approved under government standards such as NIOSH (US) or EN 166 (EU).			
Body Protection:	Wear appropriate protective clothing.			

9. PHYSICAL AND CHEMICAL CHARACTERISTICS

Color:	Dark Blue / Black	Molecular Weight:	82.94 g/mol
Forms:	Powder	Density:	4.57 g/cm ³ (monoclinic) 4.65 g/cm ³ (tetragonal)
Odor:	Odorless	pH:	No Data Available.
Water Solubility:	Insoluble	Auto-ignition Temperature:	No Data Available.
Boiling Point:	No Data Available.	Evaporation Rate:	No Data Available.
Melting Point / Freezing Point:	>1,967°C (> 3,572°F)	Flammability or Explosive Limits:	No Data Available.
Vapor Pressure:	No Data Available.	Partition Coefficient: n-octanol/ water	No Data Available.
Vapor Density:	No Data Available.	Decomposition Temperature:	No Data Available.
Flash Point:	No Data Available.	Viscosity:	No Data Available.

10. REACTIVITY

Stability:	Stable under recommended storage conditions.
Reacts with:	Strong oxidizing agents, Halogens, Alkali Metals

Incompatible Conditions: No Data Available.

Hazardous Decomposition Products: Vanadium oxides, metal oxide fumes

11. TOXICOLOGICAL INFORMATION

Acute Toxicity	<p>Eyes: Direct contact with eyes may cause temporary irritation.</p> <p>Skin: No adverse effects due to skin contact are expected.</p> <p>Ingestion: Expected to a low ingestion hazard.</p> <p>Inhalation: Vanadium compounds can irritate the lungs.</p>
Chronic Toxicity	<p>Skin Corrosion / Irritation: No Data Available.</p> <p>Serious Eye Damage / Irritation: No Data Available.</p> <p>Respiratory / Skin Sensitization: Coughing, wheezing, and sore throat may persist for weeks following the termination of exposure. Prolonged inhalation may be harmful.</p> <p>Mutagenic Effects: No Data Available.</p> <p>Reproductive / Teratogenic Effects: No Data Available.</p> <p>Specific Target Organ Toxicity (single exposure): Weight loss has been reported as an effect of exposure to vanadium ore dust. Vanadium exposure may have neurobehavioral effects, such as reductions in visuospatial abilities and attention.</p> <p>Specific Target Organ Toxicity (repeated exposure): Repeated exposure to vanadium compounds may cause bronchitis to develop with cough, phlegm, and / or shortness of breath. Vanadium may damage the kidneys and repeated high exposure may cause anemia. Vanadium may cause an asthma-like allergy. Future exposure to asthma attacks with shortness of breath, wheezing, and chest tightness.</p> <p>Aspiration Hazard: No Data Available.</p> <p>Other Adverse Effects: To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.</p>
Carcinogenicity:	<p>IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable or confirmed human carcinogen by IARC.</p> <p>ACGIH: 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.</p> <p>NTP: 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.</p> <p>OSHA: 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.</p>

12. ECOLOGICAL INFORMATION

Aquatic Toxicity:	No Data Available.
Persistence and degradability:	No Data Available.
Bioaccumulative potential:	No Data Available.
Notes:	No Data Available.

13. DISPOSAL CONSIDERATIONS

Disposal: Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Empty containers should be taken to an appropriate waste handling site for recycling or disposal. Dispose of in accordance with local, state, or national regulations.

14. TRANSPORTATION DATA

Hazardous: **DoT:** Hazardous for Transportation
IMDG: Hazardous for Transportation
IATA: Hazardous for Transportation

Pictogram:



Hazard Class: 6.1 Toxic Substances.

Packing Group: III

UN Number: UN3285

US DoT **Proper Name:** Vanadium Compound, n.o.s. (Vanadium Dioxide)

Marine Pollutant: No

IMDG **Proper Name:** VANADIUM COMPOUND, N.O.S. (Vanadium Dioxide)

EMS-No: F-A,S-A

IATA **Proper Name:** VANADIUM COMPOUND, N.O.S. (Vanadium Dioxide)

15. REGULATORY INFORMATION

SARA 302 Components No chemical in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components The following components are subject to the reporting levels established by SARA Title III, Section 313:

Vanadium Compounds

SARA 311/312 Hazards Acute Health Hazard

Massachusetts Right to Know Components No components are subject to the Ma. Right to Know Act.

Pennsylvania Right to Know Components The fumes or dust from this product are known to the State of Pennsylvania to be an environmental hazard.

Vanadium Dioxide (CAS No. 12036-21-4)
Vanadium (Fume or Dust) (CAS No. 7440-62-2)

New Jersey Right to Know Components Vanadium Dioxide (CAS No. 12036-21-4)

California Prop. 65 Components This product does not contain any chemicals known to the State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

Copyright 2018 Lorad Chemical Corporation. The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document does not constitute a hazard assessment and should not be used in place of the user's own assessment of work place risks as required by other health and safety legislation. The information in this sheet does not represent a guarantee of the properties of the product. Lorad Chemical Corporation and its Affiliates make no warranty with respect to the accuracy of the information or the suitability of this product for any particular application, and shall not be held liable for any damage resulting from handling or from contact with the above product.

Revision Date: 04/05/2018