

Section 1. Product and Company Identification

Product Name 3 & 4 Valent Vanadium Electrolyte

Parchem - fine & specialty chemicals

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EMERGENCY RESPONSE NUMBER
CHEMTEL

Toll Free US & Canada: 1 (800) 255-3924

All other Origins: 1 (813) 248-0585

Collect Calls Accepted

Section 2. Hazards Identification

Classification of the substance or mixture

Met. Corr. 1; H290 May be corrosive to metals.

Acute Tox. 4; H302 Harmful if swallowed.

Skin Irrit. 2; H315 Causes skin irritation.

Eye Dam. 1; H318 Causes serious eye damage.

Repr. 2; H361 Suspected of damaging fertility or the unborn child.

GHS Label Elements

Pictograms:



Signal word: DANGER

Hazard and precautionary statements

Hazard Statements

H290 May be corrosive to metals.

H302 Harmful if swallowed.

H315 Causes skin irritation.

H318 Causes serious eye damage.

H361 Suspected of damaging fertility or the unborn child.

Precautionary Statements

Prevention

P201 Obtain special instructions before use.

P202 Do not handle until all safety precautions have been read and understood.

P234 Keep only in original container.

P264 Wash thoroughly after handling.

P270 Do not eat, drink, or smoke when using this product.



P280 Wear protective gloves/eye protection/face protection.

Response

P301+312 IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell.

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.

P308+313 IF exposed or concerned: Get medical advice/attention.

P310 Immediately call a POISON CENTER or doctor/physician.

P321 Specific treatment (see information on this label).

P330 Rinse mouth.

P332+313 If skin irritation occurs: Get medical advice/attention.

P362 Take off contaminated clothing and wash before reuse.

Storage

P405 Store locked up.

P406 Store in a corrosive resistant/container with a resistant inner liner.

Disposal

P501 Dispose of contents/container in accordance with local/national regulations.

Section 3. Composition / Information on Ingredients

Common Name 3 & 4 Valent Vanadium Electrolyte

COMPONENT	CAS NUMBER	CONCENTRATION
Vanadyl Sulfate	27774-13-6	10 – 25%
Sulfuric Acid	7664-93-9	15 – 40%

Section 4. First Aid Measures

Description of first-aid measures

General: In all cases of doubt, or when symptoms persist, seek medical attention.

Never give anything by mouth to an unconscious person.

Inhalation: Remove to fresh air, keep patient warm and at rest. If breathing is irregular or stopped, give artificial respiration. If unconscious place in the recovery position and obtain immediate medical attention. Give nothing by mouth.

Eyes: Causes serious eye damage. Irrigate copiously with clean water for at least 15 minutes, holding the eyelids apart. Remove contact lenses, if present and easy to do. Continue rinsing. Seek medical attention.

Skin: Remove contaminated clothing. Wash skin thoroughly with soap and water or use a recognized skin cleanser.

Ingestion: Do NOT induce vomiting. Rinse mouth and slowly drink several glasses of water. Call a physician. Do NOT give anything by mouth to an unconscious or convulsing person.



Most important symptoms and effects, both acute and delayed

Overview

Eye Contact: Redness, swelling, pain, and flood of tears. Possible chemical burns and corneal damage. Causes serious eye damage.

Skin Contact: Irritation with burning, reddening, and itching. Dermatitis. Causes skin irritation.

Inhalation: Breathing difficulty, irritation of mucous membranes, coughing, acute reaction to vanadium salts and sulfuric-acid mists.

Ingestion: Chemical and irritation of the intestinal tract. Abdominal discomfort, vomiting, diarrhea, and spasms. Harmful if swallowed.

See section 2 for further details.

Section 5. Firefighting Measures

Extinguishing media: Use media suitable to the surrounding fire, such as water fog, dry chemical, foam, and carbon dioxide.

Special hazards arising from the substance or mixture: Wear appropriate chemically-protective equipment, such as gloves, a face shield, goggles, and suitable body protection (see Section 8). Level B gear recommended for large releases. Hazardous decomposition: If heated or involved in a fire, toxic and irritating fumes of sulfur oxides and vanadium oxides may be formed. Prevent spilled product from entering drains, sewers, waterways, and soil. Keep only in original container.

Advice for firefighters: Wear proper chemically resistant protective equipment and self-contained breathing apparatus (SCBA) operated in positive-pressure mode. This product may release flammable hydrogen gas on contact with many common metals, which may significantly contribute to the risk of fire and explosion. Fire may result in toxic and irritating fumes. Move container from fire area if it can be done without risk. Use water spray to keep fire exposed containers cool. Keep run-off water out of sewers and water sources.

Section 6. Accidental Release Measures

Personal precautions, protective equipment, and emergency procedures: Put on appropriate personal protective equipment (see section 8). Wear appropriate chemically-protective equipment, such as gloves, a face shield, goggles, and suitable body protection (see Section 8). Level B gear recommended for large releases.

Environmental precautions: Prevent spilled product from entering drains, sewers, waterways, and soil. Do not allow spills to enter drains or waterways. Use good personal hygiene practices. Wash hands before eating, drinking, smoking or using toilet. Promptly remove soiled clothing and wash thoroughly before reuse.

Methods and material for containment and cleaning up: Wear appropriate chemically-protective equipment, such as gloves, a face shield, goggles, and suitable body protection (see Section 8). Level B gear recommended for large releases. Ventilate area of release. Stop leak if possible without risk. Do not touch spilled material. Dike far ahead of spill with inert diking materials. For small spills, neutralize with soda ash, absorb spill with inert, non-combustible material such as



clay then place in suitable containers. For large spills, contain spill with inert, noncombustible absorbent material such as clay or earth. Remove spilled liquid with pumps into suitable containers, or absorb with dry clay and shovel into polyethylene or plastic containers. Steel or aluminum containers may react with the product and dissolve. Wash thoroughly after dealing with spillage.

Section 7. Handling and Storage

Precautions for safe handling

Always wear chemically-protective equipment during handling. Use in a well-ventilated area. Do not inhale vapors or mists. Do not allow contact with eyes, skin and clothing. Process and handling equipment must be resistant to dilute acidic solutions. Keep away from metals, bases and other incompatible materials. Wash thoroughly after handling material.

Conditions for safe storage, including any incompatibilities

Handle containers carefully to prevent damage and spillage. Store in closed, suitable containers located in a cool, dry, well-ventilated area. Store away from incompatibles.

Incompatible materials: Acids react with most metals to release hydrogen gas which can form explosive mixtures in air. Water, alkaline solutions, metals, metal powder, carbides, chlorates, fuminates, nitrates, picrates, strong oxidizers, reducers, or combustible organics. Hazardous gases may evolve on contact with chemicals such as cyanides, sulfides, and carbides.

Section 8. Exposure Controls / Personal Protection

Control Parameters

Exposure

Sulfuric Acid (CAS# 7664-93-9)

OSHA: TWA 1 mg/m³

ACGIH: TWA: 0.2 mg/m³ A1, 1, Revised 2004,

NIOSH: TWA 1 mg/m³

Supplier: No Established Limit

Vanadyl Sulfate (CAS# 27774-13-6)

OSHA: No Established Limit

ACGIH: No Established Limit

NIOSH: 0.05 mg/m³ 15-min ceiling for vanadium compounds

NIOSH: 0.05 mg/m³ for V₂O₅ TLV TWA

Supplier: No Established Limit

Carcinogen Data

Sulfuric Acid (CAS# 7664-93-9)

OSHA: Select Carcinogen: No

NTP: Known: Yes; Suspected: No

IARC: Group 1: Yes; Group 2a: No; Group 2b: No; Group 3: No; Group 4: No;



Vanadyl sulfate (CAS# 27774-13-6)

OSHA: Select Carcinogen: No

NTP: Known: No; Suspected: No

IARC: Group 1: No; Group 2a: No; Group 2b: No; Group 3: No; Group 4: No;

Exposure controls

Respiratory: Use respirators approved by NIOSH/MSHA; use SAR for oxygen-deficient atmosphere.

Eyes: Use chemical-splash goggles and a full face shield or mask.

Skin: Wear chemically-protective clothing. Use chemically-protective gloves.

Engineering Controls: Provide adequate ventilation. Where reasonably practicable this should be achieved by the use of local exhaust ventilation and good general extraction. If these are not sufficient to maintain concentrations of particulates and any vapor below occupational exposure limits suitable respiratory protection must be worn.

Other Work Practices: Do not inhale vapors or mists. Do not allow contact with eyes, skin and clothing. Do not eat, drink, smoke or use cosmetics while working with this product. Thoroughly wash at the end of each work shift. Immediately remove any clothing that becomes contaminated and launder before re-use. Contaminated shoes should be destroyed. Use good personal hygiene practices. Wash hands before eating, drinking, smoking or using toilet. Promptly remove soiled clothing and wash thoroughly before reuse.

Section 9. Physical and Chemical Properties

Appearance: Dark Blue to Blue-Green Liquid

Odor: None

Odor threshold: Not determined

pH: Less than 2.

Melting point/freezing point: Not applicable.

Initial boiling point and boiling range: 120°C. (248°F).

Flash Point: None.

Evaporation rate (Ether = 1): Not applicable

Flammability (solid, gas): Not Applicable

Upper/lower flammability or explosive limits Lower Explosive Limit: Not applicable

Upper Explosive Limit: Not applicable

Vapor pressure (Pa): Not applicable

Vapor Density: Not applicable

Specific Gravity: Not applicable

Solubility in Water: Miscible with water at all concentrations.

Partition coefficient (n-Octanol/water): Log Kow: Not Measured

Auto-ignition temperature: Not applicable

Decomposition temperature: Not applicable

Viscosity (cSt): Not Measured

Oxidizing Properties: May act as a catalyst in certain chemical environments.

Other information: No other relevant information

Section 10. Stability and Reactivity

Reactivity: This product may release flammable hydrogen gas on contact with many common metals. Generates heat when mixed with alkali.

Chemical stability: Stable under normal circumstances.

Possibility of hazardous reactions: Reacts with some bases.

Conditions to avoid: Keep away from extreme heat and extreme cold.

Incompatible materials: Acids react with most metals to release hydrogen gas which can form explosive mixtures in air. Water, alkaline solutions, metals, metal powder, carbides, chlorates, fuminates, nitrates, picrates, strong oxidizers, reducers, or combustible organics. Hazardous gases may evolve on contact with chemicals such as cyanides, sulfides, and carbides.

Hazardous decomposition products: If heated or involved in a fire, toxic and irritating fumes of sulfur oxides and vanadium oxides may be formed.

Section 11. Toxicological Information

Acute Toxicity

Vanadyl Sulfate: No data available

Sulfuric Acid

Oral LD50 - Rat: 2140.00 mg/kg (Category 5)

Classification	Category	Hazard Description
Acute toxicity (oral)	4	Harmful if swallowed.
Acute toxicity (dermal)	—	Not Applicable
Acute toxicity (inhalation)	—	Not Applicable
Skin corrosion/irritation	2	Causes skin irritation.
Serious eye damage/irritation	1	Causes serious eye damage.
Respiratory sensitization	—	Not Applicable
Skin sensitization	—	Not Applicable
Germ cell mutagenicity	—	Not Applicable
Carcinogenicity	—	Not Applicable
Reproductive toxicity	2	Suspected of damaging fertility or the unborn child.
STOT-single exposure	—	Not Applicable
STOT-repeated exposure	—	Not Applicable
Aspiration hazard	—	Not Applicable



Section 12. Ecological Information

Toxicity: Components of this product can be harmful or fatal to aquatic organisms. The ecotoxic effects of the product itself have not been fully investigated. This material will lower the pH of any environment.

Aquatic Ecotoxicity

Ingredient	96hr LC50 fish	48hr EC50 crustacea	ErC50 algae
Vanadyl Sulfate (27774-13-6)	Not Available	Not Available	Not Available
Sulfuric acid (7664-93-9)	42.00, Gambusia affinis	42.50, Pandalus montagui	Not Available

Persistence and degradability: The components of this product will react with other substances or be degraded over time into other inorganic compounds.

Bioaccumulative potential: Not Measured

Mobility in soil: No data available.

Results of PBT and vPvB assessment: This product contains no PBT/vPvB chemicals.

Other adverse effects: No data available.

Section 13. Disposal Considerations

Waste Treatment Methods: Dispose of product and contaminated packaging in accordance with all local, state, and federal environmental control regulations.

Section 14. Transport Information

DOT (Domestic Surface Transportation)

UN Number: UN2922

UN Proper Shipping Name: Corrosive liquids, toxic, n.o.s. (Contains sulfuric acid, Vanadyl sulfate)

Transport Hazard Class: 8

Packing Group: II

IMO/IMDG (Ocean Transportation)

UN Number: UN2922

UN Proper Shipping Name: Corrosive liquids, toxic, n.o.s. (Contains sulfuric acid, Vanadyl sulfate)

Transport Hazard Class: 8

Packing Group: II

ICAO/IATA

UN Number: UN2922



UN Proper Shipping Name: Corrosive liquids, toxic, n.o.s. (Contains sulfuric acid, Vanadyl sulfate)

Transport Hazard Class: 8

Packing Group: II

Environmental Hazards

IMDG - Marine Pollutant: Yes

Special Precautions for User: No further information

Section 15. Regulatory Information

Regulatory Overview: The regulatory data in Section 15 is not intended to be all-inclusive, only selected regulations are represented.

Toxic Substance Control Act (TSCA): All components of this material are either listed or exempt from listing on the TSCA Inventory.

WHMIS Classification: D2A E

US EPA Tier II Hazards

Fire: No

Sudden Release of Pressure: No

Reactive: Yes

Immediate (Acute): Yes

Delayed (Chronic): No

Note: Strong inorganic acid mists containing sulfuric acid are listed on the California Proposition 65 Carcinogen List. [Sulfuric acid, in and of itself, is not listed under Proposition 65. However, if one has sulfuric acid, which through its intended use generates an acid mist that in turn contains sulfuric acid that would meet the listing. The term "strong" does not refer to the concentration of the acid, but rather the strength of the acid. The basis for the listing of strong inorganic acid mists containing sulfuric acid was the formal identification by the National Toxicology Program (NTP), in its Ninth Report on Carcinogens, that this chemical mixture is "known to be a human carcinogen." (Public notice available at http://www.oehha.ca.gov/prop65/CRNR_notices/admin_listing/intent_to_list/noil19b4.html.)

EPCRA 311/312 Chemicals and RQs

Sulfuric acid: 1,000.00 lbs.

Vanadyl Sulfate: 1,000.00 lbs.

EPCRA 302 Extremely Hazardous: Sulfuric acid

EPCRA 313 Toxic Chemicals: Sulfuric acid; Vanadyl sulfate.



Proposition 65 - Carcinogens (> 0.0%): To the best of our knowledge, there are no chemicals at levels which require reporting under this statute.

Proposition 65 - Developmental Toxins (> 0.0%): To the best of our knowledge, there are no chemicals at levels which require reporting under this statute.

Proposition 65 - Female Repro Toxins (> 0.0%): To the best of our knowledge, there are no chemicals at levels which require reporting under this statute.

Proposition 65 - Male Repro Toxins (> 0.0%): To the best of our knowledge, there are no chemicals at levels which require reporting under this statute.

New Jersey RTK Substances (> 1%): Sulfuric acid; Vanadyl sulfate.

Pennsylvania RTK Substances (> 1%): Sulfuric acid; Vanadyl sulfate.

Section 16. Other Information

Disclaimer: 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 is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product.

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