



Be Right™

SAFETY DATA SHEET

Issue Date 15-Feb-2021

Revision Date 08-Feb-2023

Version 7.8

Page 1 / 18

1. IDENTIFICATION

Product identifier

Product Name Molybdovanadate Reagent

Other means of identification

Product Code(s) 2076049

Safety data sheet number M00297

UN/ID no UN3264

Recommended use of the chemical and restrictions on use

Recommended Use Indicator for phosphate.

Uses advised against Consumer use.

Restrictions on use For Laboratory Use Only.

Details of the supplier of the safety data sheet

Manufacturer Address

Hach Company, P.O.Box 389, Loveland, CO 80539, USA, +1(970) 669-3050

Emergency telephone number

+1(303) 623-5716 - 24 Hour Service

2. HAZARDS IDENTIFICATION

Classification

Regulatory Status

This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

| | |
|---|------------|
| Corrosive to metals | Category 1 |
| Acute toxicity - Inhalation (Dusts/Mists) | Category 4 |
| Skin corrosion/irritation | Category 1 |
| Serious eye damage/eye irritation | Category 1 |

Hazards not otherwise classified (HNOC)

Data insufficient for GHS classification but significant enough for mention suggests:

CANCER HAZARD. STRONG INORGANIC ACID MISTS CONTAINING SULFURIC ACID CAN CAUSE CANCER.

Inhalation of low concentrations of sulfuric acid may result in airway irritation such as cough and shortness of breath; high concentrations may result in acute effects such as cough.

Label elements

Signal word

Danger



Hazard statements

H290 - May be corrosive to metals
H314 - Causes severe skin burns and eye damage
H332 - Harmful if inhaled

Precautionary statements

P271 - Use only outdoors or in a well-ventilated area
P304 + P340 - IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
P260 - Do not breathe dust/fume/gas/mist/vapors/spray
P280 - Wear protective gloves, protective clothing, eye protection, and face protection
P301 + P330 + P331 - IF SWALLOWED: rinse mouth. Do NOT induce vomiting
P303 + P361 + P353 - IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower
P305 + P351 + P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
P310 - Immediately call a POISON CENTER or doctor/physician
P363 - Wash contaminated clothing before reuse
P405 - Store locked up
P501 - Dispose of contents/ container to an approved waste disposal plant
P234 - Keep only in original container
P390 - Absorb spillage to prevent material damage

Other Hazards Known

Harmful to aquatic life

3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance

Not applicable

Mixture

Chemical Family
Chemical nature

Mixture.
Aqueous solution of inorganic acids and salts.

Percent ranges are used where confidential product information is applicable.

| Chemical name | CAS No | Percent Range | HMRIC # |
|------------------------------------|------------|---------------|---------|
| Sulfuric acid | 7664-93-9 | 40 - 50% | - |
| Molybdate (Mo7O246-), hexaammonium | 12027-67-7 | 1 - 5% | - |
| Diammonium sulfate | 7783-20-2 | 1 - 5% | - |
| Ammonium vanadate | 7803-55-6 | <1% | - |
| Dipotassium peroxodisulphate | 7727-21-1 | <0.1% | - |

4. FIRST AID MEASURES

Description of first aid measures

| | |
|---|--|
| General advice | Show this safety data sheet to the doctor in attendance. Immediate medical attention is required. |
| Inhalation | Remove to fresh air. If breathing has stopped, give artificial respiration. Get medical attention immediately. Do not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. If breathing is difficult, (trained personnel should) give oxygen. Delayed pulmonary edema may occur. Get immediate medical advice/attention. |
| Eye contact | Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Keep eye wide open while rinsing. Do not rub affected area. Get immediate medical advice/attention. |
| Skin contact | Wash off immediately with soap and plenty of water while removing all contaminated clothes and shoes. Get immediate medical advice/attention. |
| Ingestion | Clean mouth with water and drink afterwards plenty of water. Never give anything by mouth to an unconscious person. Do NOT induce vomiting. Get immediate medical advice/attention. |
| Self-protection of the first aider | Avoid contact with skin, eyes or clothing. Ensure that medical personnel are aware of the material(s) involved, take precautions to protect themselves and prevent spread of contamination. Avoid direct contact with skin. Use barrier to give mouth-to-mouth resuscitation. Avoid breathing vapors or mists. |

Most important symptoms and effects, both acute and delayed

Symptoms Burning sensation. Coughing and/ or wheezing. Difficulty in breathing.

Indication of any immediate medical attention and special treatment needed

Note to physicians Product is a corrosive material. Use of gastric lavage or emesis is contraindicated. Possible perforation of stomach or esophagus should be investigated. Do not give chemical antidotes. Asphyxia from glottal edema may occur. Marked decrease in blood pressure may occur with moist rales, frothy sputum, and high pulse pressure.

5. FIRE-FIGHTING MEASURES

| | |
|---|--|
| Suitable Extinguishing Media | Use extinguishing measures that are appropriate to local circumstances and the surrounding environment. |
| Unsuitable Extinguishing Media | Caution: Use of water spray when fighting fire may be inefficient. |
| Specific hazards arising from the chemical | The product causes burns of eyes, skin and mucous membranes. Thermal decomposition can lead to release of irritating gases and vapors. |
| Hazardous combustion products | Ammonia. Nitrogen oxides. Sulfur oxides. |
| Special protective equipment for fire-fighters | Firefighters should wear self-contained breathing apparatus and full firefighting turnout gear. Use personal protection equipment. |

6. ACCIDENTAL RELEASE MEASURES

U.S. Notice Only persons properly qualified to respond to an emergency involving hazardous

substances may respond to a spill according to federal regulations (OSHA 29 CFR 1910.120(a)(v)) and per your company's emergency response plan and guidelines/procedures. See Section 13, Special Instructions for disposal assistance. Outside of the US, only persons properly qualified according to state or local regulations should respond to a spill involving chemicals.

Personal precautions, protective equipment and emergency procedures

Personal precautions Avoid contact with skin, eyes or clothing. Ensure adequate ventilation. Use personal protective equipment as required. Attention! Corrosive material. Evacuate personnel to safe areas. Keep people away from and upwind of spill/leak. Avoid breathing vapors or mists.

Other Information Refer to protective measures listed in Sections 7 and 8.

Environmental precautions

Environmental precautions Prevent further leakage or spillage if safe to do so. Should not be released into the environment. Do not allow to enter into soil/subsoil. Prevent product from entering drains.

Methods and material for containment and cleaning up

Methods for containment Prevent further leakage or spillage if safe to do so.

Methods for cleaning up Pick up and transfer to properly labeled containers.

Prevention of secondary hazards Clean contaminated objects and areas thoroughly observing environmental regulations.

Reference to other sections See section 8 for more information. See section 13 for more information.

7. HANDLING AND STORAGE

Precautions for safe handling

Advice on safe handling Handle in accordance with good industrial hygiene and safety practice. Avoid contact with skin, eyes or clothing. In case of insufficient ventilation, wear suitable respiratory equipment. Handle product only in closed system or provide appropriate exhaust ventilation. Do not eat, drink or smoke when using this product. Take off contaminated clothing and wash before reuse. Avoid breathing vapors or mists.

Conditions for safe storage, including any incompatibilities

Storage Conditions Keep containers tightly closed in a dry, cool and well-ventilated place. Protect from moisture. Store locked up. Keep out of the reach of children. Store away from other materials.

Flammability class Not applicable

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters

Exposure Guidelines

| Chemical name | ACGIH TLV | OSHA PEL | NIOSH |
|----------------------------------|---|--|--|
| Sulfuric acid CAS#: 7664-93-9 | TWA: 0.2 mg/m ³ thoracic particulate matter | TWA: 1 mg/m ³ (vacated) TWA: 1 mg/m ³ | IDLH: 15 mg/m ³ TWA: 1 mg/m ³ |
| Molybdate (Mo7O246-), | TWA: 0.5 mg/m ³ Mo | TWA: 5 mg/m ³ | IDLH: 1000 mg/m ³ Mo |

| | | | |
|---|---------------------------------------|------------------------------------|---|
| hexaammonium CAS#: 12027-67-7 | respirable particulate matter | (vacated) TWA: 5 mg/m ³ | |
| Ammonium vanadate CAS#: 7803-55-6 | - | NDF | Ceiling: 0.05 mg/m ³ V dust and fume 15 min |
| Dipotassium peroxodisulphate CAS#: 7727-21-1 | TWA: 0.1 mg/m ³ persulfate | NDF | NDF |

Appropriate engineering controls

Engineering Controls

Showers
 Eyewash stations
 Ventilation systems.

Individual protection measures, such as personal protective equipment

Respiratory protection

No protective equipment is needed under normal use conditions. If exposure limits are exceeded or irritation is experienced, ventilation and evacuation may be required.

Hand Protection

Wear suitable gloves. Impervious gloves. Gloves must be inspected prior to use. The selected protective gloves have to satisfy the specifications of EU Directive 2016/425 and the standard EN 374 derived from it. Chemical resistant gloves made of butyl rubber or nitrile rubber category III according to EN 374-1:2016.

Eye/face protection

Face protection shield.

Skin and body protection

Wear suitable protective clothing. Long sleeved clothing. Chemical resistant apron.

General Hygiene Considerations

Wear suitable gloves and eye/face protection. Do not eat, drink or smoke when using this product. Regular cleaning of equipment, work area and clothing is recommended. Avoid contact with skin, eyes or clothing. Remove and wash contaminated clothing and gloves, including the inside, before re-use. Contaminated work clothing should not be allowed out of the workplace. Wash hands before breaks and immediately after handling the product.

Environmental exposure controls

Local authorities should be advised if significant spillages cannot be contained. Do not allow into any sewer, on the ground or into any body of water.

Thermal hazards

None under normal processing.

9. PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

| | | | | |
|-----------------------|----------|--------|-----------------------|----------------|
| Physical state | clear | Liquid | Color | light yellow |
| Appearance | Odorless | | Odor threshold | Not applicable |

| <u>Property</u> | <u>Values</u> | <u>Remarks • Method</u> |
|---|--|-------------------------|
| Molecular weight | Not applicable | |
| pH | < 0.5 | @ 20 °C |
| Melting point / freezing point | ~ -33 °C / -27.4 °F | |
| Initial boiling point and boiling range | ~ 109 °C / 228.2 °F | |
| Evaporation rate | 0.06 (water = 1) | |
| Vapor pressure | 21.827 mm Hg / 2.91 kPa at 25 °C / 77 °F | |
| Relative vapor density | 0.62 | |
| Specific Gravity | 1.375 | |

Product Code(s) 2076049
Issue Date 15-Feb-2021
Version 7.8

Product Name Molybdovanadate Reagent
Revision Date 08-Feb-2023
Page 6 / 18

Partition coefficient No data available
Soil Organic Carbon-Water Partition Coefficient No data available
Autoignition temperature No data available
Decomposition temperature No data available
Dynamic viscosity No data available
Kinematic viscosity No data available

Solubility(ies)

Water solubility

| Water solubility classification | Water solubility | Water Solubility Temperature |
|---------------------------------|------------------|------------------------------|
| Soluble | > 1000 mg/L | 25 °C / 77 °F |

Solubility in other solvents

| Chemical Name | Solubility classification | Solubility | Solubility Temperature |
|---------------|---------------------------|-------------|------------------------|
| Acid | Soluble | > 1000 mg/L | 25 °C / 77 °F |

Other information

Metal Corrosivity

Classified as corrosive to metal according to GHS criteria

Steel Corrosion Rate

286.33 mm/yr / 11.27 in/yr

Aluminum Corrosion Rate

No data available

Volatile Organic Compounds (VOC) Content

| Chemical name | CAS No | Volatile organic compounds (VOC) content | CAA (Clean Air Act) |
|------------------------------------|------------|--|---------------------|
| Sulfuric acid | 7664-93-9 | No data available | - |
| Molybdate (Mo7O246-), hexaammonium | 12027-67-7 | No data available | - |
| Diammonium sulfate | 7783-20-2 | No data available | - |
| Ammonium vanadate | 7803-55-6 | Not applicable | - |
| Dipotassium peroxodisulphate | 7727-21-1 | Not applicable | - |

Explosive properties

Upper explosion limit

No data available

Lower explosion limit

No data available

Flammable properties

Flash point

No data available

Flammability Limit in Air

Upper flammability limit:

No data available

Lower flammability limit:

No data available

Oxidizing properties

No data available.

Bulk density

Not applicable

10. STABILITY AND REACTIVITY

Reactivity

Corrosive on contact with water. Corrosive to metal.

Chemical stability

Stable under normal conditions.

Explosion data

Sensitivity to Mechanical Impact None.

Sensitivity to Static Discharge None.

Possibility of hazardous reactions

None under normal processing.

Hazardous polymerization

Hazardous polymerization does not occur.

Conditions to avoid

Exposure to air or moisture over prolonged periods. Excessive heat.

Incompatible materials

Oxidizing agent. Acids. Bases.

Hazardous decomposition products

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

11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure

Product Information

Inhalation

Corrosive by inhalation. Inhalation of corrosive fumes/gases may cause coughing, choking, headache, dizziness, and weakness for several hours. Pulmonary edema may occur with tightness in the chest, shortness of breath, bluish skin, decreased blood pressure, and increased heart rate. Inhaled corrosive substances can lead to a toxic edema of the lungs. Pulmonary edema can be fatal. Harmful by inhalation.

Eye contact

Causes burns. Corrosive to the eyes and may cause severe damage including blindness. Causes serious eye damage. May cause irreversible damage to eyes.

Skin contact

Corrosive. Causes severe burns. Avoid contact with skin and clothing.

Ingestion

Causes burns. Ingestion causes burns of the upper digestive and respiratory tracts. May cause severe burning pain in the mouth and stomach with vomiting and diarrhea of dark blood. Blood pressure may decrease. Brownish or yellowish stains may be seen around the mouth. Swelling of the throat may cause shortness of breath and choking. May cause lung damage if swallowed. May be fatal if swallowed and enters airways.

Symptoms

Redness. Burning. May cause blindness. Coughing and/ or wheezing.

Acute toxicity

Harmful if inhaled

Mixture

No data available.

Ingredient Acute Toxicity Data

Test data reported below.

Oral Exposure Route

| Chemical name | Endpoint type | Reported dose | Exposure time | Toxicological effects | Key literature references and sources for data |
|---|---------------|---------------|---------------|---|--|
| Molybdate (Mo7O246-), hexaammonium (1 - 5%) CAS#: 12027-67-7 | Rat LD50 | 333 mg/kg | None reported | None reported | Vendor SDS |
| Diammonium sulfate (1 - 5%) CAS#: 7783-20-2 | Rat LD50 | 2840 mg/kg | None reported | None reported | GESTIS |
| Ammonium vanadate (<1%) CAS#: 7803-55-6 | Rat LD50 | 58.1 mg/kg | None reported | Behavioral Somnolence (general depressed activity) Gastrointestinal Hypermotility Diarrhea Nutritional and Gross Metabolic Body temperature decrease | ChemADVISOR |
| Dipotassium peroxodisulphate (<0.1%) CAS#: 7727-21-1 | Rat LD50 | 802 mg/kg | None reported | None reported | IUCLID |

Dermal Exposure Route

| Chemical name | Endpoint type | Reported dose | Exposure time | Toxicological effects | Key literature references and sources for data |
|--|---------------|---------------|---------------|---|--|
| Ammonium vanadate (<1%) CAS#: 7803-55-6 | Rat LD50 | 2102 mg/kg | None reported | Behavioral Somnolence (general depressed activity) Gastrointestinal Hypermotility Diarrhea Nutritional and Gross Metabolic Body temperature decrease | HSDB |

Inhalation (Dust/Mist) Exposure Route

| Chemical name | Endpoint type | Reported dose | Exposure time | Toxicological effects | Key literature references and sources for data |
|--|---------------|---------------|---------------|-----------------------|--|
| Ammonium vanadate (<1%) CAS#: 7803-55-6 | Rat LC50 | 0.0078 mg/L | 4 hours | None reported | LOLI |

Unknown Acute Toxicity

0% of the mixture consists of ingredient(s) of unknown toxicity.

Acute Toxicity Estimations (ATE)

The following values are calculated based on chapter 3.1 of the GHS document

| | |
|---------------|----------------|
| ATEmix (oral) | 6,873.20 mg/kg |
|---------------|----------------|

| | |
|--------------------------------------|--------------------------|
| ATEmix (dermal) | No information available |
| ATEmix (inhalation-dust/mist) | 3.57 mg/l |
| ATEmix (inhalation-vapor) | No information available |
| ATEmix (inhalation-gas) | No information available |

Skin corrosion/irritation

Causes severe burns.

Mixture

No data available.

Ingredient Skin Corrosion/Irritation Data

Test data reported below.

| Chemical name | Test method | Species | Reported dose | Exposure time | Results | Key literature references and sources for data |
|--|---------------------------|---------|---------------|---------------|-------------------------------------|--|
| Sulfuric acid (40 - 50%) CAS#: 7664-93-9 | Existing human experience | Human | None reported | None reported | Corrosive to skin | HSDB |
| Diammonium sulfate (1 - 5%) CAS#: 7783-20-2 | Standard Draize Test | Rabbit | 800 mg | 20 hours | Not corrosive or irritating to skin | ECHA |

Serious eye damage/irritation

Classification based on data available for ingredients. Causes burns. Risk of serious damage to eyes.

Mixture

No data available.

Ingredient Eye Damage/Eye Irritation Data

Test data reported below.

| Chemical name | Test method | Species | Reported dose | Exposure time | Results | Key literature references and sources for data |
|--|---------------------------|---------|---------------|---------------|-------------------------------------|--|
| Sulfuric acid (40 - 50%) CAS#: 7664-93-9 | Existing human experience | Human | None reported | None reported | Corrosive to eyes | HSDB |
| Diammonium sulfate (1 - 5%) CAS#: 7783-20-2 | Standard Draize Test | Rabbit | 0.050 mL | None reported | Not corrosive or irritating to eyes | ECHA |

Respiratory or skin sensitization

Based on available data, the classification criteria are not met.

Mixture

No data available.

Ingredient Sensitization Data

No data available.

| Chemical name | Test method | Species | Results | Key literature references and sources for data |
|---|------------------------|---------|-----------------------------------|--|
| Dipotassium peroxodisulphate (<0.1%) CAS#: 7727-21-1 | Local Lymph Node Assay | Mouse | Confirmed to be a skin sensitizer | ECHA |

STOT - single exposure

Based on available data, the classification criteria are not met.

Mixture

No data available.

Ingredient Specific Target Organ Toxicity Single Exposure Data

Test data reported below.

Oral Exposure Route

| Chemical name | Endpoint type | Reported dose | Exposure time | Toxicological effects | Key literature references and sources for data |
|---|-------------------------|---------------|---------------|-------------------------|--|
| Diammonium sulfate (1 - 5%) CAS#: 7783-20-2 | Man TD _{Lo} | 1500 mg/kg | None reported | Gastrointestinal Gas | RTECS |

Inhalation (Vapor) Exposure Route

| Chemical name | Endpoint type | Reported dose | Exposure time | Toxicological effects | Key literature references and sources for data |
|--|---------------------------|---------------|---------------|---|--|
| Sulfuric acid (40 - 50%) CAS#: 7664-93-9 | Human TD _{Lo} | 0.144 mg/L | 5 minutes | Lungs, Thorax, or Respiration Dyspnea | RTECS |

STOT - repeated exposure

Based on available data, the classification criteria are not met.

Mixture

No data available.

Ingredient Specific Target Organ Toxicity Repeat Exposure Data

Test data reported below.

Oral Exposure Route

| Chemical name | Endpoint type | Reported dose | Exposure time | Toxicological effects | Key literature references and sources for data |
|---|-------------------------|---------------|---------------|--|--|
| Ammonium vanadate (<1%) CAS#: 7803-55-6 | Rat TD _{Lo} | 4630 mg/kg | 90 days | Behavioral Food intake Blood Pigmented or nucleated red blood cells Changes in erythrocyte (RBC) count | RTECS |
| Dipotassium peroxodisulphate (<0.1%) CAS#: 7727-21-1 | Rat NOAEL | 131.5 mg/kg | 28 days | No toxicological effects observed | ECHA |

| Chemical name | Endpoint type | Reported dose | Exposure time | Toxicological effects | Key literature references and sources for data |
|---|---------------|---------------|---------------|--------------------------------------|--|
| Dipotassium peroxodisulphate (<0.1%) CAS#: 7727-21-1 | Rat NOAEL | 91 mg/kg | 90 days | No toxicological effects observed | ECHA |

Inhalation (Dust/Mist) Exposure Route

| Chemical name | Endpoint type | Reported dose | Exposure time | Toxicological effects | Key literature references and sources for data |
|---|-------------------------|------------------------|---------------|--|--|
| Ammonium vanadate (<1%) CAS#: 7803-55-6 | Rat TC _{Lo} | 4.59 mg/m ³ | 4 days | Lungs, Thorax, or Respiration Other changes Immunological Including | RTECS |

| | | | | | |
|---|--------------|------------------------|---------|---|------|
| | | | | Allergic Decrease in cellular immune response | |
| Dipotassium peroxodisulphate (<0.1%) CAS#: 7727-21-1 | Rat NOAEC | 10.3 mg/m ³ | 90 days | No toxicological effects observed | ECHA |

Inhalation (Vapor) Exposure Route

| Chemical name | Endpoint type | Reported dose | Exposure time | Toxicological effects | Key literature references and sources for data |
|---|---------------------------|---------------|---------------|--|--|
| Sulfuric acid (40 - 50%) CAS#: 7664-93-9 | Human TC _{Lo} | 0.003 mg/L | 168 days | Musculoskeletal Changes in teeth and supporting structures | RTECS |

Carcinogenicity

Based on available data, the classification criteria are not met.

Mixture

No data available.

Ingredient Carcinogenicity Data

No data available.

| Chemical name | CAS No | ACGIH | IARC | NTP | OSHA |
|------------------------------------|------------|-------|---------|-------|------|
| Sulfuric acid | 7664-93-9 | A2 | Group 1 | Known | X |
| Molybdate (Mo7O246-), hexaammonium | 12027-67-7 | A3 | - | - | - |
| Diammonium sulfate | 7783-20-2 | - | - | - | - |
| Ammonium vanadate | 7803-55-6 | - | - | - | - |
| Dipotassium peroxodisulphate | 7727-21-1 | - | - | - | - |

Legend

| | |
|--|---|
| ACGIH (American Conference of Governmental Industrial Hygienists) | A2 - Suspected Human Carcinogen A3 - Animal Carcinogen |
| IARC (International Agency for Research on Cancer) | Group 1 - Carcinogenic to Humans |
| NTP (National Toxicology Program) | Known - Known Carcinogen |
| OSHA | X - Present |

Germ cell mutagenicity

Based on available data, the classification criteria are not met.

Mixture invitro Data

No data available.

Substance invitro Data

Test data reported below.

| Chemical name | Test | Cell Strain | Reported dose | Exposure time | Results | Key literature references and sources for data |
|---|----------------------|------------------|---------------|---------------|---------------------------------------|--|
| Sulfuric acid (40 - 50%) CAS#: 7664-93-9 | Cytogenetic analysis | Hamster ovary | 4 mmol/L | None reported | Positive test result for mutagenicity | No information available |
| Ammonium vanadate (<1%) CAS#: 7803-55-6 | DNA damage | Human lymphocyte | 0.2 mmol/L | None reported | Positive test result for mutagenicity | RTECS |

Product Code(s) 2076049
Issue Date 15-Feb-2021
Version 7.8

Product Name Molybdovanadate Reagent
Revision Date 08-Feb-2023
Page 12 / 18

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|---|----------------------------|-------------------------------|-------------|---------------|----------|------|
| Dipotassium peroxodisulphate (<0.1%) CAS#: 7727-21-1 | Mutation in microorganisms | <i>Salmonella typhimurium</i> | 10 mg/plate | None reported | Negative | ECHA |
|---|----------------------------|-------------------------------|-------------|---------------|----------|------|

Mixture in vivo Data

No data available.

Substance in vivo Data

Test data reported below.

Oral Exposure Route

| Chemical name | Test | Species | Reported dose | Exposure time | Results | Key literature references and sources for data |
|--|-------------------|---------|---------------|---------------|---------------------------------------|--|
| Ammonium vanadate (<1%) CAS#: 7803-55-6 | Micronucleus test | Mouse | 50 mg/kg | None reported | Positive test result for mutagenicity | RTECS |

Reproductive toxicity

Based on available data, the classification criteria are not met.

Mixture

No data available.

Ingredient Reproductive Toxicity Data

Test data reported below.

| Chemical name | Endpoint type | Reported dose | Exposure time | Toxicological effects | Key literature references and sources for data |
|---|---------------|---------------|-------------------|--|--|
| Ammonium vanadate (<1%) CAS#: 7803-55-6 | Rat | 20 mg/kg | 70 days | Death Post-implantation mortality (e.g. dead and/or resorbed implants per total number of implants) Female fertility index (e.g. # females pregnant per # sperm positive females; # females pregnant per # females mated) Male fertility index (e.g. # males impregnating females per # males exposed to fertile nonpregnant females) | No information available |
| Dipotassium peroxodisulphate (<0.1%) CAS#: 7727-21-1 | Rat NOAEL | >= 250 mg/kg | Single generation | No reproductive or developmental toxic effects observed | ECHA |

Inhalation (Vapor) Exposure Route

| Chemical name | Endpoint type | Reported dose | Exposure time | Toxicological effects | Key literature references and sources for data |
|---|-------------------------|---------------|---------------|---|--|
| Sulfuric acid (40 - 50%) CAS#: 7664-93-9 | Rabbit TC _{Lo} | 0.02 mg/L | 7 hours | Specific Developmental Abnormalities Musculoskeletal system | No information available |

Aspiration hazard

Based on available data, the classification criteria are not met.

12. ECOLOGICAL INFORMATION

Ecotoxicity

Based on available data, the classification criteria are not met.

Unknown aquatic toxicity

0% of the mixture consists of component(s) of unknown hazards to the aquatic environment.

Mixture

Aquatic Acute Toxicity

No data available.

Aquatic Chronic Toxicity

No data available.

Substance

Aquatic Acute Toxicity

Test data reported below.

Fish

| Chemical name | Exposure time | Species | Endpoint type | Reported dose | Key literature references and sources for data |
|---|---------------|----------------------------|------------------|---------------|--|
| Molybdate (Mo7O246-), hexaammonium (1 - 5%) CAS#: 12027-67-7 | 96 hours | <i>Oncorhynchus mykiss</i> | LC ₅₀ | 320 mg/L | Vendor SDS |
| Diammonium sulfate (1 - 5%) CAS#: 7783-20-2 | 96 hours | <i>Oncorhynchus mykiss</i> | LC ₅₀ | 36.7 mg/L | GESTIS |
| Ammonium vanadate (<1%) CAS#: 7803-55-6 | 96 hours | None reported | LC ₅₀ | 2.6 mg/L | EPA |
| Dipotassium peroxodisulphate (<0.1%) CAS#: 7727-21-1 | 96 hours | None reported | LC ₅₀ | >= 76.3 mg/L | FIFRA |

Crustacea

| Chemical name | Exposure time | Species | Endpoint type | Reported dose | Key literature references and sources for data |
|---|---------------|----------------------|------------------|---------------|--|
| Molybdate (Mo7O246-), hexaammonium (1 - 5%) CAS#: 12027-67-7 | 48 Hours | <i>Daphnia magna</i> | EC ₅₀ | 140 mg/L | Vendor SDS |
| Diammonium sulfate (1 - 5%) CAS#: 7783-20-2 | 48 Hours | None reported | LC ₅₀ | 14 mg/L | GESTIS |
| Dipotassium peroxodisulphate (<0.1%) CAS#: 7727-21-1 | 48 Hours | <i>Daphnia magna</i> | EC ₅₀ | 92 mg/L | EPA |

Algae

| Chemical name | Exposure time | Species | Endpoint type | Reported dose | Key literature references and sources for data |
|------------------------------------|---------------|--------------------------------|------------------|---------------|--|
| Molybdate (Mo7O246-), hexaammonium | 72 Hours | <i>Desmodesmus subspicatus</i> | EC ₅₀ | 41 mg/L | Vendor SDS |

Product Code(s) 2076049
Issue Date 15-Feb-2021
Version 7.8

Product Name Molybdovanadate Reagent
Revision Date 08-Feb-2023
Page 14 / 18

| | | | | | |
|------------------------------|--|--|--|--|--|
| (1 - 5%) CAS#: 12027-67-7 | | | | | |
|------------------------------|--|--|--|--|--|

Aquatic Chronic Toxicity
No data available.

Persistence and degradability

Mixture
No data available.

Mixture
No data available.

Partition coefficient No data available

Mobility

Soil Organic Carbon-Water Partition Coefficient No data available

Other adverse effects
No information available

13. DISPOSAL CONSIDERATIONS

Waste treatment methods

Waste from residues/unused products Dispose of in accordance with local regulations. Dispose of waste in accordance with environmental legislation.

Contaminated packaging Do not reuse empty containers.

US EPA Waste Number P119 D002

| Chemical name | RCRA | RCRA - Basis for Listing | RCRA - D Series Wastes | RCRA - U Series Wastes |
|--------------------------------|------|--------------------------|------------------------|------------------------|
| Ammonium vanadate 7803-55-6 | P119 | - | - | - |

| Chemical name | RCRA - Halogenated Organic Compounds | RCRA - P Series Wastes | RCRA - F Series Wastes | RCRA - K Series Wastes |
|--------------------------------|--------------------------------------|------------------------|------------------------|------------------------|
| Ammonium vanadate 7803-55-6 | - | P119 | - | - |

Special instructions for disposal Dispose of in accordance with federal, state and local regulations.

14. TRANSPORT INFORMATION

DOT

UN/ID no UN3264
Proper shipping name Corrosive Liquid, Acidic, Inorganic, N.O.S.
DOT Technical Name Sulfuric acid
Transport hazard class(es) 8
Packing Group II
Reportable Quantity (RQ) Sulfuric acid: RQ kg= 1134.99
Description UN3264, Corrosive liquid, acidic, inorganic, n.o.s. (Sulfuric acid), 8, II, RQ
Emergency Response Guide Number 154

TDG

UN/ID no UN3264

Product Code(s) 2076049
Issue Date 15-Feb-2021
Version 7.8

Product Name Molybdovanadate Reagent
Revision Date 08-Feb-2023
Page 15 / 18

Proper shipping name Corrosive Liquid, Acidic, Inorganic, N.O.S.
TDG Technical Name Sulfuric acid
Transport hazard class(es) 8
Packing Group II
Description UN3264, Corrosive liquid, acidic, inorganic, n.o.s. (Sulfuric acid), 8, II

IATA

UN number or ID number UN3264
Proper shipping name Corrosive Liquid, Acidic, Inorganic, N.O.S.
IATA Technical Name Sulfuric acid
Transport hazard class(es) 8
Packing group II
ERG Code 8P
Special precautions for user A3, A803
Description UN3264, Corrosive liquid, acidic, inorganic, n.o.s. (Sulfuric acid), 8, II

IMDG

UN number or ID number UN3264
Proper shipping name Corrosive Liquid, Acidic, Inorganic, N.O.S.
IMDG Technical Name Sulfuric acid
Transport hazard class(es) 8
Packing Group II
EmS-No F-A, S-B
Special precautions for user 274
Description UN3264, CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S. (Sulfuric acid), 8, II

Note: No special precautions necessary.

Additional information

There is a possibility that this product could be contained in a reagent set or kit composed of various compatible dangerous goods. If the item is not in a reagent set or kit, the classification given above applies. If the item is part of a reagent set or kit the classification would change to the following: UN3316 Chemical Kit, Hazard Class 9, Packing Group II or III. If the item is not regulated, the Chemical Kit classification does not apply.

15. REGULATORY INFORMATION

National Inventories

TSCA Complies
DSL/NDSL Complies

TSCA - United States Toxic Substances Control Act Section 8(b) Inventory
DSL/NDSL - Canadian Domestic Substances List/Non-Domestic Substances List

International Inventories

EINECS/ELINCS Complies
ENCS Complies
IECSC Complies
KECL - Existing substances Complies
PICCS Complies
TCSI Complies
AICS Complies
NZIoC Complies

EINECS/ELINCS - European Inventory of Existing Chemical Substances/European List of Notified Chemical Substances
ENCS - Japan Existing and New Chemical Substances
IECSC - China Inventory of Existing Chemical Substances
KECL - Korean Existing and Evaluated Chemical Substances
PICCS - Philippines Inventory of Chemicals and Chemical Substances
TCSI - Taiwan Chemical Substances Inventory
AICS - Australian Inventory of Chemical Substances

Product Code(s) 2076049
Issue Date 15-Feb-2021
Version 7.8

Product Name Molybdovanadate Reagent
Revision Date 08-Feb-2023
Page 16 / 18

NZIoC - New Zealand Inventory of Chemicals

US Federal Regulations

SARA 313

Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product contains a chemical or chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372

| Chemical name | SARA 313 - Threshold Values % |
|---------------------------------------|-------------------------------|
| Sulfuric acid (CAS #: 7664-93-9) | 1.0 |
| Diammonium sulfate (CAS #: 7783-20-2) | 1.0 |
| Ammonium vanadate (CAS #: 7803-55-6) | 1.0 |

SARA 311/312 Hazard Categories

| | |
|--|-----|
| Acute health hazard | Yes |
| Chronic Health Hazard | Yes |
| Fire hazard | No |
| Sudden release of pressure hazard | No |
| Reactive Hazard | No |

CWA (Clean Water Act)

This product does not contain any substances regulated as pollutants pursuant to the Clean Water Act (40 CFR 122.21 and 40 CFR 122.42)

| Chemical name | CWA - Reportable Quantities | CWA - Toxic Pollutants | CWA - Priority Pollutants | CWA - Hazardous Substances |
|----------------------------|-----------------------------|------------------------|---------------------------|----------------------------|
| Sulfuric acid 7664-93-9 | 1000 lb | - | - | X |

CERCLA

This material, as supplied, does not contain any substances regulated as hazardous substances under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302) or the Superfund Amendments and Reauthorization Act (SARA) (40 CFR 355). There may be specific reporting requirements at the local, regional, or state level pertaining to releases of this material

| Chemical name | Hazardous Substances RQs | CERCLA/SARA RQ | Reportable Quantity (RQ) |
|--------------------------------|--------------------------|----------------|---|
| Sulfuric acid 7664-93-9 | 1000 lb | 1000 lb | RQ 1000 lb final RQ RQ 454 kg final RQ |
| Ammonium vanadate 7803-55-6 | 1000 lb | - | RQ 1000 lb final RQ RQ 454 kg final RQ |

U.S. - DEA (Drug Enforcement Administration) List I & List II

| Chemical name | U.S. - DEA (Drug Enforcement Administration) - List I or Precursor Chemicals | U.S. - DEA (Drug Enforcement Administration) - List II or Essential Chemicals |
|--|--|--|
| Sulfuric acid (40 - 50%) CAS#: 7664-93-9 | Not Listed | 50 gallon Export Volume (exports, transshipments and international transactions to designated countries given in 1310.08(b)) |

US State Regulations

California Proposition 65

This product contains the following Proposition 65 chemicals

| Chemical name | California Proposition 65 |
|----------------------------------|---------------------------|
| Sulfuric acid (CAS #: 7664-93-9) | Carcinogen |



WARNING: This product can expose you to chemicals including Sulfuric acid, which is known to the State of California to cause cancer.

Product Code(s) 2076049
Issue Date 15-Feb-2021
Version 7.8

Product Name Molybdovanadate Reagent
Revision Date 08-Feb-2023
Page 17 / 18

For more information, go to <http://www.P65Warnings.ca.gov>

IMERC: Not applicable

U.S. State Right-to-Know Regulations

This product may contain substances regulated by state right-to-know regulations.

| Chemical name | New Jersey | Massachusetts | Pennsylvania |
|---|------------|---------------|--------------|
| Sulfuric acid 7664-93-9 | X | X | X |
| Diammonium sulfate 7783-20-2 | - | X | X |
| Ammonium vanadate 7803-55-6 | X | X | X |
| Dipotassium peroxodisulphate 7727-21-1 | X | X | X |

U.S. EPA Label Information

| Chemical name | FIFRA | FDA |
|--------------------|----------|-----------------|
| Sulfuric acid | 180.0910 | 21 CFR 184.1095 |
| Diammonium sulfate | 180.0910 | 21 CFR 184.1143 |

16. OTHER INFORMATION, INCLUDING DATE OF PREPARATION OF THE LAST REVISION

Special Comments

None

Additional information

Global Automotive Declarable Substance List (GADSL)

Not applicable

NFPA and HMIS Classifications

| | | | | |
|-------------|---------------------------|-------------------------|-----------------------------|---|
| NFPA | Health hazards - 3 | Flammability - 0 | Instability - 0 | Physical and chemical properties - |
| HMIS | Health hazards - 3 | Flammability - 0 | Physical hazards - 0 | Personal protection - X - 1 |

Key or legend to abbreviations and acronyms used in the safety data sheet

| | |
|---------|---|
| ACGIH | ACGIH (American Conference of Governmental Industrial Hygienists) |
| ATSDR | ATSDR (Agency for Toxic Substances and Disease Registry) |
| CCRIS | CCRIS (Chemical Carcinogenesis Research Information System) |
| CDC | CDC (Center for Disease Control) |
| CEPA | CEPA (Canadian Environmental Protection Agency) |
| CICAD | CICAD (Concise International Chemical Assessment Documents) |
| ECHA | ECHA (The European Chemicals Agency) |
| EEA | EEA (European Environment Agency) |
| EPA | EPA (Environmental Protection Agency) |
| ERMA | ERMA (New Zealand's Environmental Risk Management Authority) |
| ECOSARS | Estimation through ECOSARS v1.11 part of the Estimation Programs Interface (EPI) Suite™ |
| FDA | FDA (Food & Drug Administration) |
| GESTIS | GESTIS (Information System on Hazardous Substances of the German Social Accident Insurance) |

Product Code(s) 2076049
Issue Date 15-Feb-2021
Version 7.8

Product Name Molybdovanadate Reagent
Revision Date 08-Feb-2023
Page 18 / 18

| | |
|-------------|---|
| HSDB | HSDB (Hazardous Substances Data Bank) |
| INERIS | INERIS (The National Industrial Environment and Risks Institute) |
| IPCS INCHEM | IPCS INCHEM (International Programme on Chemical Safety) |
| IUCLID | IUCLID (The International Uniform Chemical Information Database) |
| NITE | Japan National Institute of Technology and Evaluation (NITE) |
| NIH | NIH (National Institutes of Health) |
| NIOSH | NIOSH (National Institute for Occupational Safety and Health) |
| LOLI | LOLI (List of Lists - An International Chemical Regulatory Database) |
| NDF | no data |
| NICNAS | Australia National Industrial Chemicals Notification and Assessment Scheme (NICNAS) |
| NIOSH IDLH | Immediately Dangerous to Life or Health |
| OSHA | OSHA (Occupational Safety and Health Administration of the US Department of Labor) |
| PEEN | PEEN (Pan European Ecological Network) |
| RTECS | RTECS (Registry of Toxic Effects of Chemical Substances) |
| SIDS | SIDS (Screening Information Dataset) for High Volume Chemicals |
| SYKE | The Finnish Environment Institute (SYKE) |
| USDA | USDA (United States Department of Agriculture) |
| USDC | USDC (United States Department of Commerce) |
| WHO | WHO (World Health Organization) |

Legend - Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

| | | | |
|------|---------------------------------|---------|---|
| TWA | TWA (time-weighted average) | STEL | STEL (Short Term Exposure Limit) |
| MAC | Maximum Allowable Concentration | Ceiling | Ceiling Limit Value |
| X | Listed | Vacated | These values have no official status. The only binding levels of contaminants are those listed in the final OSHA PEL. These lists are for reference purposes only. Please note that some reference state regulations of these "liberated" exposure limits in their state regulations. |
| SKN* | Skin designation | SKN+ | Skin sensitization |
| RSP+ | Respiratory sensitization | ** | Hazard Designation |
| C | Carcinogen | R | Reproductive toxicant |
| M | mutagen | | |

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Revision Note None

Disclaimer

USER RESPONSIBILITY: Each user should read and understand this information and incorporate it in individual site safety programs in accordance with applicable hazard communication standards and regulations.

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End of Safety Data Sheet