Safety Data Sheet AMMONIUM METAVANADATE

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SECTION 1: Identification

GHS Product identifier

Product name	AMMONIUM METAVANADATE
Product number	AL072

Recommended use of the chemical and restrictions on use
In dyeing and printing on woolens; staining wood black; manufacturing vanadium black and <qt>indelible ink<qt>; producing vanadium luster on pottery; as photographic developer; in haematoxylin staining in microscopy; as a reagent in analytical chemistry; used as a substitute catalyst (because readily converted to vanadium pentoxide at elevated temperatures) in the production of, e.g., DENOX catalysts and zirconium vanadium oxide yellow ceramic colourants; and laboratory reagent.

Supplier's details

Name	ChemSupply Australia Pty Ltd
Address	38-50 Bedford Street 5013 Gillman South Australia Australia
Telephone	08 8440 2000
email	www.chemsupply.com.au

Emergency phone number

CHEMCALL 1800 127 406 (Australia) / +64-4-917-9888 (International)

SECTION 2: Hazard identification

General hazard statement
Classified as dangerous goods according to the Australian Dangerous Goods Code (ADG).

Classified as Hazardous according to the Globally Harmonised System of classification and labelling of Chemicals (GHS) including Work, Health and Safety regulations, Australia.

Classification of the substance or mixture

GHS classification in accordance with: UN GHS revision 7

- Acute toxicity, oral, Cat. 3
- Acute toxicity, inhalation, Cat. 4
- Hazardous to the aquatic environment, long-term (chronic), Cat. 2
- Serious eye damage/eye irritation, Cat. 2A
- Toxic to reproduction, Cat. 2
- Specific target organ toxicity following repeated exposure, Cat. 1

GHS label elements, including precautionary statements

Pictograms

Signal word	**Danger**

Hazard statement(s)

H301	Toxic if swallowed
H319	Causes serious eye irritation
H332	Harmful if inhaled
H361	Suspected of damaging fertility or the unborn child
H372	Causes damage to organs through prolonged or repeated exposure
H411	Toxic to aquatic life with long lasting effects

Precautionary statement(s)

P202	Do not handle until all safety precautions have been read and understood.
P260	Do not breathe dust/fume/gas/mist/vapors/spray.
P271	Use only outdoors or in a well-ventilated area.
P273	Avoid release to the environment.
P280	Wear protective gloves/protective clothing/eye protection/face protection.
P301+P310	IF SWALLOWED: Immediately call a POISON CENTER/doctor/physcian
P304+P340	IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P305+P351+P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P312	Call a POISON CENTER/doctor/physcian if you feel unwell.
P337+P313	If eye irritation persists: Get medical advice/attention.
P391	Collect spillage.
P405	Store locked up.
P501	Dispose of contents/container to an approved waste disposal facility

SECTION 3: Composition/information on ingredients

Mixtures

Molecular weight	116.98

Component	Identification	Weight %
Ammonium vanadate	CAS no.: 7803-55-6 EC no.: 232-261-3	<= 100 %

SECTION 4: First-aid measures

Description of necessary first-aid measures

General advice	First Aid Facilities: Maintain eyewash fountain in work area.
If inhaled	If inhaled, remove from contaminated area to fresh air immediately. Apply artificial respiration if not breathing. If breathing is difficult, give oxygen. Get medical aid if cough or other symptoms appear.
In case of skin contact	Rinse with plenty of water. Get medical attention if irritation develops and persists.

In case of eye contact	Immediately irrigate with copious quantity of water for at least 15 minutes. Eyelids to be held open. In all cases of eye contamination it is a sensible precaution to seek medical advice.
If swallowed	Rinse mouth thoroughly with water immediately, repeat until all traces of product have been removed. DO NOT INDUCE VOMITING. Seek medical advice if effects persist.

Most important symptoms/effects, acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

Indication of immediate medical attention and special treatment needed, if necessary
For advice, contact the National Poisons Information Centre (Phone Australia 13 11 26; New Zealand 0800 764 766) or a doctor.

SECTION 5: Fire-fighting measures

Suitable extinguishing media
Small fire: Use dry chemical, CO2 or water spray. If safe to do so, move undamaged containers from fire area.
Large fire: Use dry chemical, CO2, foam or water spray - Do not use water jets.
Cool containers with flooding quantities of water until well after fire is out. Avoid getting water inside containers.

Specific hazards arising from the chemical
Hazards from Combustion Products: Irritating and toxic fumes and gases, vanadium oxide (VOx) gases, vanadium pentoxide, vanadium, ammonia, nitric acid, nitrogen oxides (NO, NO2 etc.).

Material does not burn. Fire or heat will produce irritating, poisonous and/or corrosive gases. Containers may explode when heated. Some may ignite combustibles (wood, paper, clothing, etc.) Contact with metals may evolve flammable hydrogen gas.

Special protective actions for fire-fighters
Wear SCBA and chemical splash suit. Fully-encapsulating, gas-tight suits should be worn for maximum protection. Structural firefighter's uniform is NOT effective for these materials.

SECTION 6: Accidental release measures

Personal precautions, protective equipment and emergency procedures
Avoid dust formation. Avoid breathing vapours, mist or gas. For personal protection see section 8.

Methods and materials for containment and cleaning up
Pick up and arrange disposal without creating dust. Sweep up and shovel. Do not flush with water. Keep in suitable, closed containers for disposal.

SECTION 7: Handling and storage

Precautions for safe handling
Avoid ingestion or inhalation of dust, vapour, mist, or gas. Avoid contact with eyes, skin and clothing. Avoid prolonged or repeated exposure. Minimize dust generation and accumulation. Keep container tightly closed when not in use. Use only in a chemical fume hood. Use only with adequate ventilation. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Wear suitable protective clothing. Keep away from incompatibles such as oxidizing agents, acids. Prevent contact with moisture. Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Under no circumstances eat, drink or smoke while handling this material. Chemicals should be used only by those trained in handling potentially hazardous materials.

Conditions for safe storage, including any incompatibilities
Stored in a separate locked safety storage cabinet or room. Store in tightly closed containers, in a cool, dry, well-ventilated area, away from incompatible materials. Protect against physical damage. Containers of vanadium shall be kept tightly closed at all times when not in use. Containers shall be stored in a safe manner to minimize accidental breakage, spillage, or contact with moisture. Store away from heat, sparks, flame and sources of ignition. Do not store near combustible materials. Product is hygroscopic. Take

precautions to avoid contact with atmospheric moisture. Store protected from moisture. Store away from foodstuffs. Keep protected from direct sunlight. Check regularly for leaks. Containers of this material may be hazardous when empty since they retain product residues (dust, solids); observe all warnings and precautions listed for the product.

SECTION 8: Exposure controls/personal protection

Appropriate engineering controls
Use ventilation adequate to keep exposures (airborne levels of dust, fume, vapor, gas, etc.) below recommended exposure limits.

Individual protection measures, such as personal protective equipment (PPE)

Eye/face protection
The use of a face shield, chemical goggles or safety glasses with side shield protection as appropriate. Must comply with Australian Standards AS 1337 and be selected and used in accordance with AS 1336.

Skin protection
Clean impervious clothing should be worn. Clothing for protection against
chemicals should comply with AS 3765 Clothing for Protection Against Hazardous
Chemicals.

Body protection
Footwear: Safety boots in industrial situations is advisory, foot protection should comply with AS 2210, Occupational protective footwear - Guide to selection, care and use.

Body Protection: Clean clothing or protective clothing should be worn, preferably with and apron. Clothing for protection against chemicals should comply with AS 3765 Clothing for Protection Against Hazardous Chemicals.

Respiratory protection
If engineering controls are not effective in controlling airborne exposure then an approved respirator with a replaceable vapor/ mist filter should be used. Refer to relevant regulations for further information concerning respiratory protective requirements. Reference should be made to Australian Standards AS/ NZS 1715, Selection, Use and Maintenance of Respiratory Protective Devices; and AS/ NZS 1716, Respiratory Protective Devices, in order to make any necessary changes for individual circumstances.

SECTION 9: Physical and chemical properties

Basic physical and chemical properties

Physical state	Solid
Appearance	White or slightly yellow crystals, powdered solid or crystalline powder.
Color	No data available.
Odor	Odourless.
Odor threshold	No data available.
Melting point/freezing point	200 °C (with decomposition)
Boiling point or initial boiling point and boiling range	No data available.
Flammability	No data available.
Lower and upper explosion limit/ flammability limit	No data available.
Flash point	No data available.

Explosive properties	This material in sufficient quantity and reduced particle size is capable of creating a dust explosion.
Auto-ignition temperature	No data available.
Decomposition temperature	200 °C.
Oxidizing properties	May act as an oxidizing agent.
pH	~ 6.5 @ 5g/L, H2O.
Kinematic viscosity	No data available.
Solubility	Solubility in Water: Slightly soluble (5.2 g/L @ 15 °C.) Solubility in Organic Solvents: Readily soluble in mono- and diethanolamine; soluble in dilute ammonia; insoluble in alcohol, ether and saturated ammonium chloride solution.
Partition coefficient n-octanol/ water (log value)	No data available.
Vapor pressure	Negligible.
Evaporation rate	Negligible.
Density and/or relative density	Specific Gravity: 2.326
Relative vapor density	No data available.
Particle characteristics	No data available.

Supplemental information regarding physical hazard classes
No data available.

Further safety characteristics (supplemental)
No data available.

SECTION 10: Stability and reactivity

Reactivity
Stable under normal conditions of storage and handling.

Chemical stability
Stable under ordinary conditions of use and storage, under normal temperatures and pressures. Hygroscopic. Loses water and ammonia on heating.

Possibility of hazardous reactions
Reactive with oxidizing agents, acids.
May react with alkalis.

Conditions to avoid
Strong heating, temperatures above 200°C, excessive dust generation, exposure to moist air or water/moisture, excess light and incompatible materials.

Incompatible materials
Strong acids, strong oxidizing agents, bases, lithium and chlorine trifluoride.

Hazardous decomposition products

Irritating and toxic fumes and gases, vanadium oxide (VOx) gases, vanadium pentoxide, vanadium, ammonia, nitric acid, nitrogen oxides (NO, NO2 etc.).

SECTION 11: Toxicological information

Information on toxicological effects

Acute toxicity
Acute Toxicity - Oral: LD50 Oral - Rat - 169 mg/kg (OECD Test Guideline 401)
Acute Toxicity - Inhalation: LC50 Inhalation - Rat - 4 h - 2.5 mg/l (OECD Test Guideline 403)

Ingestion: Toxic if swallowed. Causes gastrointestinal irritation with nausea, vomiting, abdominal cramping, hypermotility and diarrhoea. May also affect behaviour/central nervous system/nervous system (central nervous system depression, headache, tremors, tinnitus, somnolence, coma, convulsions), urinary system (kidneys -proteinuria, erythrocyturia, leukocyturia), blood (thrombocytopenia, anaemia, neutropenia, basophilic granulation of leukocytes). Vanadium compounds can cause polycythemia (an increase in the total red cell mass of the blood), followed by red blood cell destruction, anaemia, loss of appetite, pallor, emaciation and may affect the cardiovascular system (arythmias, bradycardia, vasospasm/vasoconstriction of the lungs, spleen, kidneys, and intestines. May also cause a greenish-black tongue discolouration due to deposition of vanadium salts.

Inhalation: Harmful if inhaled. Exposure can injure the lungs and bronchial airways. Symptoms include irritation and inflammation of the mucous membranes, nasal passages and pharnyx, rhinitis, epistaxis, pharyngitis, diffuse pulmonary fibrosis, bronchitis, tracheitis, a greenish-black discolouration of the tongue, metallic taste, dry mouth, sore throat, persistent cough, dyspnoea, bronchiolar constriction, tightness in the chest. An asthma-like condition may occur. May result in pulmonary oedema/pneumonia. May be fatal. Pulmonary oedema may be delayed up to 48 hours. May cause nervous system effects (headache, tremors, nervousness, psychiatric disturbances, vertigo or convulsions).

Skin corrosion/irritation
Acute Toxicity - Dermal: LD50 Dermal - Rat - > 2,500 mg/kg (OECD Test Guideline 402)

Symptoms include redness, itching, and pain. May develop skin rash or lesions with intense itching. May cause a greenish discolouration of the skin. May be absorbed by the skin.

Serious eye damage/irritation
Causes serious eye damage. Extensive evidence exists that vanadium dust (usually the pentoxide) is severely irritating to the mucous membranes of the eyes. Contact causes redness, stinging, blurring, tearing and burning pain. May cause conjunctivitis. Risk of serious damage to eyes. Possible risk of irreversible effects.

Serious eye damage/irritation: Serious eye damage/eye irritation Category 2A
H319 Causes serious eye irritation.

Respiratory or skin sensitization
Not classified based on available information.

Germ cell mutagenicity
Not classified based on available information.

Carcinogenicity
Not classified based on available information.

Reproductive toxicity
Suspected of damaging fertility or the unborn child

Specific target organ toxicity (STOT) - single exposure
Not classified based on available information.

Specific target organ toxicity (STOT) - repeated exposure
Specific target organ toxicity - repeated exposure, Inhalation Category 1, Respiratory Tract
H372 Causes damage to organs (Respiratory Tract) through prolonged or repeated exposure if inhaled.

Aspiration hazard
Not classified based on available information.

Additional information
Chronic Effects: Chronic exposure may cause a greenish tongue, metallic taste in the mouth, cough and chronic bronchitis (with or without emphysema). Repeated exposure of the eyes to a low level of dust can produce eye irritation. Prolonged or repeated exposure may cause sensitization dermatitis. May produce scattered allergy-like eczematous skin lesions symptomatic of vanadium toxicity. Material is a potent enzyme inhibitor. Effects may be delayed. Laboratory experiments have resulted in mutagenic effects.

SECTION 12: Ecological information

Toxicity
Ecotoxicity: Long-term (chronic) aquatic hazard Category 2)
H411 Toxic to aquatic life with long lasting effects.

SECTION 13: Disposal considerations

Disposal methods

Product disposal
Waste material must be disposed of in accordance with the national and local regulations. Leave chemicals in original containers.

Other disposal recommendations
Do not discharge this material into waterways, drains and sewers.

SECTION 14: Transport information

ADG (Road and Rail)
UN Number: 2859
Class: 6.1
Packing Group: II
Proper Shipping Name: AMMONIUM METAVANADATE

Hazchem emergency action code (EAC)
2Z

IMDG
UN Number: 2859
Class: 6.1
Packing Group: II
EMS Number:
Proper Shipping Name: AMMONIUM METAVANADATE

IATA
UN Number: 2859
Class: 6.1
Packing Group: II
Proper Shipping Name: AMMONIUM METAVANADATE

SECTION 15: Regulatory information

Safety, health and environmental regulations specific for the product in question

Australia SUSMP
Poison Schedule: NS

Massachusetts Right To Know Components

Chemical name: Ammonium vanadate
CAS number: 7803-55-6

New Jersey Right To Know Components
Common name: Ammonium metavanadate
CAS number: 7803-55-6

Pennsylvania Right To Know Components
Chemical name: Ammonium vanadate
CAS number: 7803-55-6

Canadian Domestic Substances List (DSL)
Chemical name: Vanadate ($vo3^{1}$-), ammonium
CAS: 7803-55-6

SECTION 16: Other information

Further information/disclaimer
ChemSupply Australia Pty Ltd does not warrant that this product is suitable for any use or purpose. The user must ascertain the suitability of the product before use or application intended purpose. Preliminary testing of the product before use or application is recommended. Any reliance or purported reliance upon ChemSupply Australia Pty Ltd with respect to any skill or judgement or advice in relation to the suitability of this product of any purpose is disclaimed. Except to the extent prohibited at law, any condition implied by any statute as to the merchantable quality of this product or fitness for any purpose is hereby excluded. This product is not sold by description. Where the provisions of Part V, Division 2 of the Trade Practices Act apply, the liability of ChemSupply Australia Pty Ltd is limited to the replacement of supply of equivalent goods or payment of the cost of replacing the goods or acquiring equivalent goods.

Preparation information
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Standard for the Uniform Scheduling of Medicines and Poisons, Commonwealth of Australia
National Road Transport Commission, 'Australian Code for the Transport of Dangerous Goods by Road and Rail 7th. Ed.'
Safe Work Australia, 'National Code of Practice fot the Preparation of Safety Data Sheets for Hazardous Chemicals', July 2020.
Safe Work Australia, 'National Guide for Classifying Hazardous Chemicals', July 2020.
Safe Work Australia, Workplace Exposure Standards for Airbourne Contaminants, December 2019
Safe Work Australia, Hazardous Chemical Information System (HCIS), hcis.safeworkaustralia.gov.au
IATA, Dangerous Goods Regulations (DGR)
IMO, International Maritime Dangerous Goods Code (IMDG)