

Ammonium phosphomolybdate hydrate

sc-239240

Material Safety Data Sheet



The Power to Question

Hazard Alert Code Key: **EXTREME** **HIGH** **MODERATE** **LOW**

Section 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME

Ammonium phosphomolybdate hydrate

STATEMENT OF HAZARDOUS NATURE

CONSIDERED A HAZARDOUS SUBSTANCE ACCORDING TO OSHA 29 CFR 1910.1200.

NFPA



SUPPLIER

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EMERGENCY:

ChemWatch

Within the US & Canada: 877-715-9305

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SYNONYMS

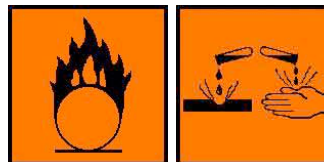
(NH₄)₃PMo₁₂O₄₀·xH₂O, (NH₄)₃PMo₁₂O₄₀.aq, "ammonium 12-molybdophosphate", "ammonium phosphomolybdate", "molybdophosphoric acid ammonium salt"

Section 2 - HAZARDS IDENTIFICATION

CHEMWATCH HAZARD RATINGS

	Min	Max
Flammability:	0	Blue bar
Toxicity:	2	Blue to yellow bar
Body Contact:	3	Blue to yellow bar
Reactivity:	2	Blue to yellow bar
Chronic:	2	Blue to yellow bar

Min/Nil=0
Low=1
Moderate=2
High=3
Extreme=4



CANADIAN WHMIS SYMBOLS



EMERGENCY OVERVIEW

RISK

Contact with combustible material may cause fire.
 Danger of cumulative effects.
 Causes burns.
 Risk of serious damage to eyes.

POTENTIAL HEALTH EFFECTS

ACUTE HEALTH EFFECTS

SWALLOWED

- The material can produce chemical burns within the oral cavity and gastrointestinal tract following ingestion.
- Accidental ingestion of the material may be damaging to the health of the individual.
- Molybdenum, an essential trace element, can in large doses hamper growth and cause loss of appetite, listlessness and diarrhea. Anemia also occurs, and other symptoms include graying of hair, shrinking of the testicles, reduced fertility and milk production, shortness of breath, incoordination and irritation of the mucous membranes.

EYE

- The material can produce chemical burns to the eye following direct contact. Vapors or mists may be extremely irritating.
- If applied to the eyes, this material causes severe eye damage.

SKIN

- The material can produce chemical burns following direct contact with the skin.
- Skin contact is not thought to have harmful health effects, however the material may still produce health damage following entry through wounds, lesions or abrasions.
- Open cuts, abraded or irritated skin should not be exposed to this material.
- Entry into the blood-stream, through, for example, cuts, abrasions or lesions, may produce systemic injury with harmful effects. Examine the skin prior to the use of the material and ensure that any external damage is suitably protected.

INHALED

- If inhaled, this material can irritate the throat and lungs of some persons.
- The material is not thought to produce adverse health effects following inhalation (as classified using animal models). Nevertheless, adverse effects have been produced following exposure of animals by at least one other route and good hygiene practice requires that exposure be kept to a minimum and that suitable control measures be used in an occupational setting.
- Persons with impaired respiratory function, airway diseases and conditions such as emphysema or chronic bronchitis, may incur further disability if excessive concentrations of particulate are inhaled.
- Bronchial and alveolar exudate are apparent in animals exposed to molybdenum by inhalation. Molybdenum fume may produce bronchial irritation and moderate fatty changes in liver and kidney.

CHRONIC HEALTH EFFECTS

- Repeated or prolonged exposure to corrosives may result in the erosion of teeth, inflammatory and ulcerative changes in the mouth and necrosis (rarely) of the jaw. Bronchial irritation, with cough, and frequent attacks of bronchial pneumonia may ensue. Repeated or long-term occupational exposure is likely to produce cumulative health effects involving organs or biochemical systems. Long term exposure to high dust concentrations may cause changes in lung function i.e. pneumoconiosis; caused by particles less than 0.5 micron penetrating and remaining in the lung. High levels of molybdenum can cause joint problems in the hands and feet with pain and lameness. Molybdenum compounds can also cause liver changes with elevated levels of enzymes and cause over-activity of the thyroid gland.

Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

NAME	CAS RN	%
phosphomolybdic acid, ammonium salt hydrate	54723-94-3	>98

Section 4 - FIRST AID MEASURES

SWALLOWED

· For advice, contact a Poisons Information Center or a doctor at once. · Urgent hospital treatment is likely to be needed.

EYE

- If this product comes in contact with the eyes: · Immediately hold eyelids apart and flush the eye continuously with running water. ·

Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids.

SKIN

- If skin or hair contact occurs: · Immediately flush body and clothes with large amounts of water, using safety shower if available. · Quickly remove all contaminated clothing, including footwear.

INHALED

- If fumes or combustion products are inhaled remove from contaminated area. · Lay patient down. Keep warm and rested. Inhalation of vapors or aerosols (mists, fumes) may cause lung edema. Corrosive substances may cause lung damage (e.g.

NOTES TO PHYSICIAN

- Treat symptomatically.

Depending on the degree of exposure, periodic medical examination is indicated. The symptoms of lung edema often do not manifest until a few hours have passed and they are aggravated by physical effort.

Section 5 - FIRE FIGHTING MEASURES

Vapour Pressure (mmHG):	Not applicable
Upper Explosive Limit (%):	Not applicable
Specific Gravity (water=1):	Not available
Lower Explosive Limit (%):	Not applicable

EXTINGUISHING MEDIA

- FOR SMALL FIRE:

- USE FLOODING QUANTITIES OF WATER.
- DO NOT use dry chemicals, CO2 or foam.

FIRE FIGHTING

- Alert Emergency Responders and tell them location and nature of hazard.
- May be violently or explosive reactive.

When any large container (including road and rail tankers) is involved in a fire, consider evacuation by 500 metres in all directions.

GENERAL FIRE HAZARDS/HAZARDOUS COMBUSTIBLE PRODUCTS

- Will not burn but increases intensity of fire.
 - Heating may cause expansion or decomposition leading to violent rupture of containers.
- Decomposition may produce toxic fumes of: nitrogen oxides (NOx), phosphorus oxides (POx), metal oxides.

FIRE INCOMPATIBILITY

- Avoid storage with reducing agents.
- Avoid any contamination of this material as it is very reactive and any contamination is potentially hazardous.

PERSONAL PROTECTION

Glasses:

Full face- shield.

Gloves:

Respirator:

Section 6 - ACCIDENTAL RELEASE MEASURES

MINOR SPILLS

- Drains for storage or use areas should have retention basins for pH adjustments and dilution of spills before discharge or disposal of material.
- Check regularly for spills and leaks.
- Clean up all spills immediately.
- No smoking, naked lights, ignition sources.

MAJOR SPILLS

- Clear area of personnel and move upwind.
- Alert Emergency Responders and tell them location and nature of hazard.

Section 7 - HANDLING AND STORAGE

PROCEDURE FOR HANDLING

- Avoid personal contact and inhalation of dust, mist or vapors.
- Provide adequate ventilation.

RECOMMENDED STORAGE METHODS

- Glass container.

- DO NOT repack. Use containers supplied by manufacturer only.
- For low viscosity materials
- Drums and jerricans must be of the non-removable head type.
- Where a can is to be used as an inner package, the can must have a screwed enclosure.

STORAGE REQUIREMENTS

■ In addition, Goods of Class 5.1, packing group II should be:

- stored in piles so that
- the height of the pile does not exceed 1 metre
- the maximum quantity in a pile or building does not exceed 1000 tonnes unless the area is provided with automatic fire extinguishers
- the maximum height of a pile does not exceed 3 metres where the room is provided with automatic fire extinguishers or 2 meters if not.
- the minimum distance between piles is not less than 2 metres where the room is provided with automatic fire extinguishers or 3 meters if not.
- the minimum distance to walls is not less than 1 metre.

Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE CONTROLS

Source	Material	TWA ppm	TWA mg/m ³	STEL ppm	STEL mg/m ³	Peak ppm	Peak mg/m ³	TWA F/CC	Notes
Canada - Yukon Permissible Concentrations for Airborne Contaminant Substances	phosphomolybdic acid, ammonium salt hydrate (Molybdenum (as Mo) - Soluble compounds)	-	5	-	10				
US - Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants	phosphomolybdic acid, ammonium salt hydrate (Molybdenum (as Mo) - Total dust)		15						
US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants	phosphomolybdic acid, ammonium salt hydrate (Molybdenum (as Mo) - Total dust)		10						
US - Idaho - Limits for Air Contaminants	phosphomolybdic acid, ammonium salt hydrate (Molybdenum (as Mo) Insoluble compounds)		5						
US - Minnesota Permissible Exposure Limits (PELs)	phosphomolybdic acid, ammonium salt hydrate (Molybdenum (as Mo) - Soluble compounds)		5						
US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants	phosphomolybdic acid, ammonium salt hydrate (Molybdenum (as Mo) Soluble compounds)		5						
US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants	phosphomolybdic acid, ammonium salt hydrate (Molybdenum (as Mo) - Soluble compounds)		5						

US - Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants	phosphomolybdic acid, ammonium salt hydrate (Molybdenum (as Mo) - Soluble compounds)	5		
US - Hawaii Air Contaminant Limits	phosphomolybdic acid, ammonium salt hydrate (Molybdenum (as Mo) Soluble compounds)	5	10	
US - Alaska Limits for Air Contaminants	phosphomolybdic acid, ammonium salt hydrate (Molybdenum (as Mo) Soluble compounds)	5		
US - Washington Permissible exposure limits of air contaminants	phosphomolybdic acid, ammonium salt hydrate (Molybdenum (as Mo) - Soluble compounds)	5	10	
Canada - Saskatchewan Occupational Health and Safety Regulations - Contamination Limits	phosphomolybdic acid, ammonium salt hydrate (Molybdenum, (as Mo): Soluble compounds, (respirable fraction++))	0.5	1.5	
Canada - Nova Scotia Occupational Exposure Limits	phosphomolybdic acid, ammonium salt hydrate (Molybdenum - Soluble compounds (as Mo))	0.5		TLV Basis: lower respiratory tract irritation
US OSHA Permissible Exposure Levels (PELs) - Table Z1	phosphomolybdic acid, ammonium salt hydrate (Molybdenum (as Mo) - Soluble compounds)	5		
US - Michigan Exposure Limits for Air Contaminants	phosphomolybdic acid, ammonium salt hydrate (Molybdenum, (as Mo) Soluble compounds)	5		
Canada - Northwest Territories Occupational Exposure Limits (English)	phosphomolybdic acid, ammonium salt hydrate (Molybdenum (as Mo) Soluble compounds)	5	10	
Canada - Alberta Occupational Exposure Limits	phosphomolybdic acid, ammonium salt hydrate (Molybdenum, as Mo - Soluble compounds, respirable)	0.5		

US ACGIH Threshold Limit Values (TLV)	phosphomolybdic acid, ammonium salt hydrate (Molybdenum - Soluble compounds (as Mo))	0.5	TLV Basis: lower respiratory tract irritation
US - California Permissible Exposure Limits for Chemical Contaminants	phosphomolybdic acid, ammonium salt hydrate (Molybdenum, soluble compounds, as Mo)	0.5	(n)
Canada - British Columbia Occupational Exposure Limits	phosphomolybdic acid, ammonium salt hydrate (Molybdenum - Soluble compounds, as Mo, Respirable)	0.5	
Canada - Prince Edward Island Occupational Exposure Limits	phosphomolybdic acid, ammonium salt hydrate (Molybdenum - Soluble compounds (as Mo))	0.5	TLV Basis: lower respiratory tract irritation
US - Oregon Permissible Exposure Limits (Z-1)	phosphomolybdic acid, ammonium salt hydrate (Molybdenum (soluble compounds))	- 5	Bold print identifies substances for which the Oregon Permissible Exposure Limits (PELs) are different than the federal Limits.
Canada - Quebec Permissible Exposure Values for Airborne Contaminants (English)	phosphomolybdic acid, ammonium salt hydrate (Molybdenum (as Mo): Soluble compounds)	5	
US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants	phosphomolybdic acid, ammonium salt hydrate (Molybdenum (as Mo)- Soluble compounds)	5	

ENDOELTABLE

PERSONAL PROTECTION



EYE

- Chemical goggles.
- Full face shield.

HANDS/FEET

- Wear chemical protective gloves, eg. PVC.

Suitability and durability of glove type is dependent on usage. Important factors in the selection of gloves include: such as:

- frequency and duration of contact,
- chemical resistance of glove material,
- glove thickness and
- dexterity

Select gloves tested to a relevant standard (e.g. Europe EN 374, US F739, AS/NZS 2161.1 or national equivalent).

· When prolonged or frequently repeated contact may occur, a glove with a protection class of 5 or higher (breakthrough time greater than 240 minutes according to EN 374, AS/NZS 2161.10.1 or national equivalent) is recommended.

· When only brief contact is expected, a glove with a protection class of 3 or higher (breakthrough time greater than 60 minutes according to EN 374, AS/NZS 2161.10.1 or national equivalent) is recommended.

· Contaminated gloves should be replaced.

Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly. Application of a non-perfumed moisturiser is recommended.

· DO NOT wear cotton or cotton-backed gloves.

· DO NOT wear leather gloves.

· Promptly hose all spills off leather shoes or boots or ensure that such footwear is protected with PVC over-shoes.

OTHER

· Overalls.

· PVC Apron.

· Some plastic personal protective equipment (PPE) (e.g. gloves, aprons, overshoes) are not recommended as they may produce static electricity.

· For large scale or continuous use wear tight-weave non-static clothing (no metallic fasteners, cuffs or pockets), non sparking safety footwear.

ENGINEERING CONTROLS

· Local exhaust ventilation is required where solids are handled as powders or crystals; even when particulates are relatively large, a certain proportion will be powdered by mutual friction.

· If in spite of local exhaust an adverse concentration of the substance in air could occur, respiratory protection should be considered.

Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL PROPERTIES

Mixes with water.

Corrosive.

State	DIVIDED SOLID	Molecular Weight	1876.35 (+aq)
Melting Range (°F)	Not available	Viscosity	Not Applicable
Boiling Range (°F)	Not applicable.	Solubility in water (g/L)	Miscible
Flash Point (°F)	Not applicable	pH (1% solution)	Not available
Decomposition Temp (°F)	Not Available	pH (as supplied)	Not applicable
Autoignition Temp (°F)	Not available.	Vapour Pressure (mmHG)	Not applicable
Upper Explosive Limit (%)	Not applicable	Specific Gravity (water=1)	Not available
Lower Explosive Limit (%)	Not applicable	Relative Vapor Density (air=1)	Not applicable
Volatile Component (%vol)	Not applicable	Evaporation Rate	Not applicable

APPEARANCE

Yellow powder; mixes with water.

Section 10 - CHEMICAL STABILITY

CONDITIONS CONTRIBUTING TO INSTABILITY

- Presence of incompatible materials.
- Product is considered stable under normal handling conditions.

STORAGE INCOMPATIBILITY

· Inorganic oxidising agents can react with reducing agents to generate heat and products that may be gaseous (causing pressurization of closed containers). The products may themselves be capable of further reactions (such as combustion in the air).

· Organic compounds in general have some reducing power and can in principle react with compounds in this class. Actual reactivity varies greatly with the identity of the organic compound.

· Inorganic oxidising agents can react violently with active metals, cyanides, esters, and thiocyanates.

· Inorganic reducing agents react with oxidizing agents to generate heat and products that may be flammable, combustible, or otherwise reactive. Their reactions with oxidizing agents may be violent.

· Incidents involving interaction of active oxidants and reducing agents, either by design or accident, are usually very energetic and

examples of so-called redox reactions.

- **WARNING:** Avoid or control reaction with peroxides. All transition metal peroxides should be considered as potentially explosive. For example transition metal complexes of alkyl hydroperoxides may decompose explosively.
 - The pi-complexes formed between chromium(0), vanadium(0) and other transition metals (haloarene-metal complexes) and mono-or poly-fluorobenzene show extreme sensitivity to heat and are explosive.
 - Avoid reaction with borohydrides or cyanoborohydrides.
 - Metals and their oxides or salts may react violently with chlorine trifluoride and bromine trifluoride.
 - These trifluorides are hypergolic oxidisers. They ignite on contact (without external source of heat or ignition) with recognised fuels - contact with these materials, following an ambient or slightly elevated temperature, is often violent and may produce ignition.
 - The state of subdivision may affect the results.
 - Reacts with metals producing flammable / explosive hydrogen gas.
 - Avoid any contamination of this material as it is very reactive and any contamination is potentially hazardous.
- Avoid storage with reducing agents.

For incompatible materials - refer to Section 7 - Handling and Storage.

Section 11 - TOXICOLOGICAL INFORMATION

phosphomolybdic acid, ammonium salt hydrate

TOXICITY AND IRRITATION

PHOSPHOMOLYBDIC ACID, AMMONIUM SALT HYDRATE:

- unless otherwise specified data extracted from RTECS - Register of Toxic Effects of Chemical Substances.
 - Asthma-like symptoms may continue for months or even years after exposure to the material ceases. This may be due to a non-allergenic condition known as reactive airways dysfunction syndrome (RADS) which can occur following exposure to high levels of highly irritating compound. Key criteria for the diagnosis of RADS include the absence of preceding respiratory disease, in a non-atopic individual, with abrupt onset of persistent asthma-like symptoms within minutes to hours of a documented exposure to the irritant. A reversible airflow pattern, on spirometry, with the presence of moderate to severe bronchial hyperreactivity on methacholine challenge testing and the lack of minimal lymphocytic inflammation, without eosinophilia, have also been included in the criteria for diagnosis of RADS. RADS (or asthma) following an irritating inhalation is an infrequent disorder with rates related to the concentration of and duration of exposure to the irritating substance. Industrial bronchitis, on the other hand, is a disorder that occurs as result of exposure due to high concentrations of irritating substance (often particulate in nature) and is completely reversible after exposure ceases. The disorder is characterised by dyspnea, cough and mucus production.
- No significant acute toxicological data identified in literature search.

CARCINOGEN

Molybdenum - Soluble compounds (as Mo)	US ACGIH Threshold Limit Values (TLV) - Carcinogens	Carcinogen Category	A3
TWAMG_M3~	US - Maine Chemicals of High Concern List	Carcinogen	A3

Section 12 - ECOLOGICAL INFORMATION

This material and its container must be disposed of as hazardous waste.

Ecotoxicity

Ingredient	Persistence: Water/Soil	Persistence: Air	Bioaccumulation	Mobility
phosphomolybdic acid, ammonium salt hydrate	No Data Available	No Data Available		

Section 13 - DISPOSAL CONSIDERATIONS

US EPA Waste Number & Descriptions

A. General Product Information

Ignitability characteristic: use EPA hazardous waste number D001 (waste code I)

Corrosivity characteristic: use EPA hazardous waste number D002 (waste code C)

Disposal Instructions

All waste must be handled in accordance with local, state and federal regulations.

† Legislation addressing waste disposal requirements may differ by country, state and/ or territory. Each user must refer to laws operating in their area. In some areas, certain wastes must be tracked.

A Hierarchy of Controls seems to be common - the user should investigate:

- Reduction

- Reuse
- Recycling
- Disposal (if all else fails)

This material may be recycled if unused, or if it has not been contaminated so as to make it unsuitable for its intended use. Shelf life considerations should also be applied in making decisions of this type. Note that properties of a material may change in use, and recycling or reuse may not always be appropriate.

DO NOT allow wash water from cleaning equipment to enter drains. Collect all wash water for treatment before disposal.

- Recycle wherever possible.
- Consult manufacturer for recycling options or consult Waste Management Authority for disposal if no suitable treatment or disposal facility can be identified.

For small quantities:

- Dissolve the material (in water or acid solution as appropriate) or convert it to a water soluble state with appropriate oxidizing agent.
- Precipitate as the sulfide, adjusting the pH to neutral to complete the precipitation.

Adjust pH to 7 and treat with sulfide to precipitate molybdenum.

Section 14 - TRANSPORTATION INFORMATION

DOT:

Symbols: None Hazard class or Division: 5.1

Identification Numbers: UN3085 PG: II

Label Codes: 5.1, 8 Special provisions: 62, IB6,

IP2, T3,

TP33

Packaging: Exceptions: None Packaging: Non- bulk: 212

Packaging: Exceptions: None Quantity limitations: 5 kg

Passenger aircraft/rail:

Quantity Limitations: Cargo 25 kg Vessel stowage: Location: B

aircraft only:

Vessel stowage: Other: 13, 34,

56, 58,

106, 138

Hazardous materials descriptions and proper shipping names:

Oxidizing solid, corrosive, n.o.s.

Air Transport IATA:

UN/ID Number: 3085 Packing Group: II

Special provisions: A3

Cargo Only

Packing Instructions: 562 Maximum Qty/Pack: 25 kg

Passenger and Cargo Passenger and Cargo

Packing Instructions: Y544 Maximum Qty/Pack: 5 kg

Passenger and Cargo Limited Quantity Passenger and Cargo Limited Quantity

Packing Instructions: 558 Maximum Qty/Pack: 2.5 kg

Shipping Name: OXIDIZING SOLID, CORROSIVE, N.O.S.

*(CONTAINS PHOSPHOMOLYBDIC ACID, AMMONIUM SALT HYDRATE)

Maritime Transport IMDG:

IMDG Class: 5.1 IMDG Subrisk: 8

UN Number: 3085 Packing Group: II

EMS Number: F-A,S-Q Special provisions: 274

Limited Quantities: 1 kg

Shipping Name: OXIDIZING SOLID, CORROSIVE, N.O.S.(contains phosphomolybdic acid, ammonium salt hydrate)

Section 15 - REGULATORY INFORMATION

phosphomolybdic acid, ammonium salt hydrate (CAS: 54723-94-3) is found on the following regulatory lists;

"Canada - Northwest Territories Occupational Exposure Limits (English)", "Canada - Nova Scotia Occupational Exposure Limits", "Canada - Saskatchewan Occupational Health and Safety Regulations - Contamination Limits", "US - Alaska Limits for Air Contaminants", "US - Connecticut Hazardous Air Pollutants", "US - Hawaii Air Contaminant Limits", "US - Idaho - Limits for Air Contaminants", "US - Michigan Exposure Limits for Air Contaminants", "US - Minnesota Permissible Exposure Limits (PELs)", "US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants", "US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants", "US - Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants", "US - Washington Permissible exposure limits of air contaminants", "US OSHA Permissible Exposure Levels (PELs) - Table Z1"

Section 16 - OTHER INFORMATION

LIMITED EVIDENCE

■ Ingestion may produce health damage*.

* (limited evidence).

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■ Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.

A list of reference resources used to assist the committee may be found at:

www.chemwatch.net/references.

■ The (M)SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios. Scale of use, frequency of use and current or available engineering controls must be considered.

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