

MATERIAL SAFETY DATA SHEET

SECTION 1 – PRODUCT IDENTIFICATION

Product Name: **Molybdenum Powder**
 Product Item: **106102**
 Product Code: **HA 6102**

 Supplier: **HAI Advanced Material Specialists, Inc.**
1688 Sierra Madre Circle
Placentia, CA 92870
(714)-414-0575

 Emergency Contact: (888) 255 3924 – Toll free
 Chemical Family: Metal
 Formula: Mo
 Molecular Weight: 95.94

SECTION 2 – HAZARDOUS INGREDIENTS

IMPORTANT! This section covers the material from which these products are manufactured. Dust and gases produced when spraying with normal use of these products are covered in Section 5.

Material or Component	CAS Number	Concentration	OSHA PEL	ACGIH TLV	Other Limits *
Molybdenum	7439-98-7	0 - 100%	No data	10 mg/m ³	5 bmg/m ³
Material or Component	RTECS #	OSHA STEL	OSHA CEIL	ACGIH STEL	ACGIH STEL
Molybdenum	QA4680000	No data	No data	No data	No data

US EPA SARA TITLE III

Material or Component	CAS Number	Sec. 302 (EHS)	Sec. 304 RQ	Sec. 313 (TRI)
Molybdenum	7439-98-7	No	No	No

SECTION 3 – PHYSICAL/CHEMICAL CHARACTERISTICS

Physical States: [] Gas [] Liquid [X] Solid
Melting Point: 2610 - 2626°C
Boiling Point: 4825 – 5560°C
Specific gravity (water=1): 10.2 g/cm³
Vapor pressure (mmHg): 1 mm at 3102°C
Vapor Density (Air=1): 6964
Evaporation rate (Butylacetate=1): N/A
Solubility in water: insoluble
Percent volatile (vol.): N/A
Corrosion Rate: No data
Appearance and odor: gray-black powder, odorless.
Other: None

SECTION 4 – FIRE AND EXPLOSION HAZARD DATA

<u>Flash point:</u>	N/A	Method Used: Unknown
<u>Auto ignition temp.:</u>	N/A	
<u>Flammable limits:</u>	N/A	
<u>Explosive Limits:</u>	LEL: N/A	UEL: N/A
<u>Extinguishing Media:</u>	N/A Use suitable extinguishing media for surrounding materials and type of fire.	
<u>Special fire fighting procedures:</u>	Firefighters must wear full face, self-contained breathing apparatus with full protective clothing to prevent contact with skin and eyes. Fumes from fire are hazardous. Isolate runoff to prevent environmental pollution.	
<u>Unusual fire and explosion hazards:</u>	Flammable in the form of dust or powder (below 9 microns), which may ignite during intensive mechanical treatment. When heated to decomposition, molybdenum metal may emit toxic fumes of molybdenum. May have a violent reaction with oxidizing agents. Molybdenum oxidizes rapidly above 1000F in air at sea level. Dust-air mixtures may be explosive. Combines with oxygen on heating to give MoO ₃ .	

SECTION 5 – REACTIVITY DATA

<u>Stability:</u>	Unstable []	Stable [X]
<u>Conditions to avoid - Instability:</u>	none	
<u>Incompatibility – Materials to avoid:</u>	Oxidizing agents, bromine trifluoride, chlorine trifluoride, fluorine, lead dioxide	
<u>Hazardous decomposition products:</u>	Molybdenum trioxide and other oxides of molybdenum.	
<u>Hazardous polymerization:</u>	Will occur []	Will not occur [X]
<u>Conditions to avoid – Hazardous polymerization:</u>	None	
<u>Product corrosive:</u>	Yes []	No [X]

SECTION 6 – HEALTH HAZARD DATA

Health Hazards (Acute and Chronic)

Molybdenum compounds are poison by subcutaneous and intraperitoneal routes. Molybdenum and its compounds are highly toxic based upon animal experiments. Symptoms of acute poisoning include severe gastrointestinal irritation with diarrhea, coma and deaths from heart failure. Experimental animals exposed to high levels accumulated Mo in the lungs spleen, and heart, and showed a decrease of DNA and RNA in the liver, kidneys and spleen. (Sax, Dangerous Properties of Industrial Materials, eighth edition)

<u>Inhalation:</u>	Acute: May cause irritation to the upper respiratory system. Chronic: May cause pneumoconiosis, anemia, hyperthyroidism, abnormal liver function test, increased susceptibility to gout.
<u>Ingestion:</u>	Acute: May cause acute molybdenum poisoning. Chronic: May cause chronic molybdenum poisoning.
<u>Skin:</u>	Acute: Prolonged or repeated contact may cause irritation. Chronic: No chronic health effects recorded.
<u>Eye:</u>	Acute: May cause irritation. Chronic: No chronic health effects recorded.
<u>Target Organs:</u>	Molybdenum may affect the lungs, bones, spleen, respiratory system, nervous system, liver, blood and heart.

Carcinogenicity: NTP? [No] ARC Monographs? [No] OSHA Regulated? [No]

Carcinogenicity / other Information:

Mutation data reported. An experimental teratogen. Experimental reproductive effects.

Molybdenum Other Toxicity Data

cyt-rat-ihl 19500 ug/m3 orl-mus TDLO: 448 mg/kg (multi):TER
ipr-rat LDLO: 114 mg/kg itr-rbt LDLO: 70 mg/kg
orl-rat TDLO: 6050 ug/kg (female 35W pre):REP

Recommended Exposure Limits See "Section II"

LD 50 / LC 50 See "Carcinogenicity / other Information"

Signs and Symptoms of Exposure

Inhalation: May cause a red, dry throat and coughing.

Ingestion: Acute molybdenum poisoning may cause severe gastrointestinal irritation, diarrhea, coma, and death from cardiac failure. Chronic molybdenum poisoning as seen in animals may cause: loss of weight, anorexia, anemia, deficient lactation, male sterility, osteoporosis and bone-joint abnormalities.

Skin: May cause redness, burning, and itching.

Eye: May cause redness, burning, itching and watering.

Medical Conditions Generally Aggravated by Exposure

Pre-existing lung disorders.

Emergency and First Aid Procedures

Inhalation: Remove victim to fresh air; keep warm and quiet; give oxygen if breathing is difficult and seek medical attention.

Ingestion: Give 1-2 glasses of milk or water and induce vomiting; seek medical attention. Never induce vomiting or give anything by mouth to an unconscious person.

Skin: Remove contaminated clothing; brush material off skin; wash affected area with mild soap and water; seek medical attention if symptoms persist.

Eye: Flush eyes with lukewarm water, lifting upper and lower eyelids, for at least 15 minutes. Seek medical attention if symptoms persist.

SECTION 7 - PRECAUTIONS FOR SAFE HANDLING AND USE/DISPOSAL

Steps to be Taken in Case Material is Released or Spilled

Wear appropriate respiratory and protective equipment specified in section VIII-control measures. Isolate spill area and provide ventilation. Vacuum up spill using a high efficiency particulate absolute (HEPA) air filter and place in a closed container for proper disposal. Take care not to raise dust.

Waste Disposal Method

Dispose of in accordance with local, state and federal regulations.

Hazard Label information

Store in cool, dry area Store in tightly sealed container Wash thoroughly after handling

Precautions to be Taken in Handling

None

Precautions to be Taken in Storing

None

Other Precautions

None recorded.

SECTION 8 - CONTROL MEASURES

Protective Equipment Summary - Hazard Label Information:

NIOSH approved respirator Impervious gloves Safety glasses Clothes to prevent skin contact

Respiratory Equipment (Specify Type)

NIOSH - approved dust, mist, fume cartridge respirator

Eye Protection

Safety glasses

Protective Gloves

Rubber gloves

Other Protective Clothing

Protective gear suitable to prevent contamination

Ventilation

Local Exhaust: minimum face velocity of 60 f.p.m, to maintain concentration at or below PEL, TLV
Special: Handle in a controlled, enclosed process
Mechanical (Gen): Not recommended
Other: None

Work/Hygienic/Maintenance Practices

Implement engineering and work practice controls to reduce and maintain concentration of exposure at low levels.
Use good housekeeping and sanitation practices.
Do not use tobacco or food in work area.
Wash thoroughly before eating and smoking.
Do not blow dust off clothing or skin with compressed air.

SECTION 9 – OTHER

Control of Substances Hazardous to Health Regulations
EH40 Occupational Exposure Limits

MOLYBDENUM INSOLUBLE COMPOUNDS

Maximum Exposure Limit: NE
Occupational Exposure Standard: 10 mg/m³. 20 mg/m³ Short-term Exposure Limit

HAI Advanced Material Specialists, Inc. request the users of this product to study this Material Safety Data Sheet (MSDS) and become aware of product hazards and safety information. To promote safe use of this product, a user should (1) notify its employees, agents, and contractors of the information on this MSDS and any product hazard and safety information, (2) furnish this same information to each of its customers for the product, and (3) request such customers to notify their employees and customers for the product of the product hazards and safety information.

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Abbreviations used: N/A=Not Applicable NE: Not Established