



**MATERIAL SAFETY DATA SHEET**  
COMPLIES WITH 29 CFR 1910.1200.  
OSHA HAZARD COMMUNICATION RULE

**DATE OF LAST REVISION: 05-22-96**

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## CHEMICAL IDENTITY

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LABEL IDENTITY	<b>MOLYBDENUM METAL</b>
CALCULATED MOLECULAR WEIGHT	<b>95.94</b>
FORMULA	<b>Mo</b>
CHEMICAL FAMILY	<b>METAL</b>
CAS REGISTRY NUMBER	<b>7439-98-7, LISTED IN THE TSCA INVENTORY</b>
HAZARDOUS INGREDIENTS	<b>MOLYBDENUM METAL</b>
%: <b>99.9</b>	TLV: <b>10mg/m3</b> OSHA/PEL: <b>15mg/m3</b>

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## PHYSICAL AND CHEMICAL PROPERTIES

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COLOR, FORM	<b>Gray crystalline powder, pieces or pressed</b>
ODOR	<b>Odorless</b>
BOILING POINT	<b>4825</b>
DENSITY (gm/cc)	<b>10.2</b>
VAPOR PRESSURE @ 20°	<b>1mm Hg at 3102°C</b>
% VOLATILE BY VOLUME (%)	<b>NA</b>
REACTION WITH WATER	<b>None</b>
EVAPORATION RATE (H2O=1)	<b>NA</b>
SOLUBILITY IN WATER	<b>Insoluble</b>
MELTING POINT	<b>2622</b>

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## FIRE AND EXPLOSION HAZARD DATA

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FLASH POINT	<b>NA</b>
AUTOIGNITION TEMPERATURE (°C)	<b>NA</b>
FLAMMABILITY	<b>Slightly flammable</b>
EXTINGUISHING MEDIA	<b>Use agents for metal fires (such as: MET-L-X, TEC, or G-1 powder). Class D extinguisher</b>
SPECIAL FIRE FIGHTING PROCEDURES	<b>For a fire confined to a small area, use a respirator approved for toxic dusts and</b>
<b>fumes.</b>	<b>For a large fire involving this material, fire-fighters should use self-contained breathing apparatus.</b>
UNUSUAL FIRE & EXPLOSION HAZARDS	<b>Under abnormal conditions, molybdenum powder or dust may present a fire hazard depending upon particle size, dispersion and exposure to an ignition source(s). Mo wrought metals does not readily burn. When Mo is heated in air above 650, MoO3 sublimes.</b>



## MOLYBDENUM METAL MATERIAL SAFETY DATA SHEET

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### HEALTH HAZARD INFORMATION

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TOXICITY DATA      orl-rat TDLo: **6050ug/kg (35W pre)**      orl-mus TDLo: **448mg/kg (MGN)**  
                              ipr-rat LDLo: **114mg/kg**                                itr-rbt LDLo: **70mg/kg**

HMIS RATING:

HEALTH: **0**    FLAMMABILITY: **0**    REACTIVITY: **0**    PERSONAL PROTECTION: **B**

ROUTES OF ENTRY

INHALATION:      **Yes**  
SKIN:                **Yes**  
INGESTION:        **Yes**

MEDICAL CONDITIONS AGGRAVATED BY OVEREXPOSURE: **Chronic Respiratory Disease**

EFFECTS OF OVEREXPOSURE (acute and chronic):

INHALATION: **a respiratory irritant, no chronic affects known**

DERMAL/EYE: **may produce irritation to the eyes and mucous membranes of the noes and throat.**

OTHER: **no reports of toxic effects of Mo in the industrial setting are known. Animal studies indicate that insoluble Mo compounds are of a low order of toxicity. Freshly generated Molybdenum Oxide fumes can be more toxic (according to certain animal tests). Inhalation of high concentrates (by animals) of Molybdenum Trioxide has caused weight loss, diarrhea, loss of muscular coordination, and a high mortality rate.**

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CARCINOGENICITY: **none**    NTP: **no**    IARC MONOGRAPHS: **no**    OSHA REGULATE: **no**

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EMERGENCY FIRST AID PROCEDURES:

INGESTION: **Administer large quantities of water and induce vomiting**

INHALATION: **Remove to fresh air, treat symptomatically**

SKIN CONTACT: **Wash with soap and water, seek medical attention if irritation persists**

EYE CONTACT: **Flush eyes for at least 15 minutes with lukewarm water, seek medical attention if irritation persists**

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### REACTIVITY DATA

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STABILITY

**Stable**

CONDITIONS CONTRIBUTING TO UNSTABILITY

**None**

INCOMPATIBILITY (MATERIALS TO AVOID)

**Strong oxidizers; BrF3, ClF3, F2, PbO2**

HAZARDOUS DECOMPOSITION PRODUCTS

**Mo has none**

HAZARDOUD POLYMERZATION

**Will Not Occur**

CONDITIONS TO AVOID

**None**



## MOLYBDENUM METAL MATERIAL SAFETY DATA SHEET

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### SAFE HANDLING AND USE

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STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED: **When powders are spilled, avoid causing the material to be airborne. Supply adequate ventilation. If TLV is exceeded, clean-up personnel need NIOSH approved dust respirators. Vacuum (with appropriate filter to prevent airborne dust levels which exceed the TLV) or wet clean-up methods are recommended to prevent dust generation.**

WASTE DISPOSAL METHOD: **Dispose in an approved hazardous waste landfill.**

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### SPECIAL PROTECTIVE INFORMATION

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RESPIRATORY PROTECTION	<b>NIOSH approved dust respirator is required if TLV is exceeded</b>
LOCAL EXHAUST	<b>Recommended</b>
MECHANICAL (general)	<b>Recommended</b>
SPECIAL	<b>NA</b>
OTHER	<b>NA</b>
PROTECTIVE GLOVES	<b>Neoprene or rubber recommended</b>
EYE PROTECTION	<b>Safety glasses are required</b>
OTHER PROTECTIVE EQUIPMENT	<b>Normal laboratory wear</b>

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### SPECIAL PRECAUTIONS

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PRECAUTIONS TO BE TAKEN IN HANDLING/STORAGE: **Wash thoroughly after handling and before eating or smoking and at the end of the work shift. Do not shake clothing or other items to remove dust; use a vacuum. Avoid dust inhalation and direct skin contact; do not ingest. Maintain good housekeeping procedures to prevent accumulation of dust.**

TRANSPORTATION REQUIREMENTS	DOT CLASS:	<b>Not Classified</b>
	UN NUMBER:	<b>Not Classified</b>
	IMCO CLASS:	<b>Not Classified</b>
	OTHER:	<b>ND</b>

PRECAUTIONARY LABELING **NONE**

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THE ABOVE INFORMATION IS ACCURATE TO THE BEST OF OUR KNOWLEDGE. HOWEVER, SINCE DATA, SAFETY STANDARDS AND GOVERNMENT REGULATIONS ARE SUBJECT TO CHANGE THE CONDITIONS OF HANDLING AND USE, OR MISUSE ARE BEYOND OUR CONTROL, **ANGSTROM SCIENCES** MAKE NO WARRANTY, EITHER EXPRESSED OR IMPLIED, WITH RESPECT TO THE COMPLETENESS OR CONTINUING ACCURACY OF THE INFORMATION CONTAINED HEREIN AND DISCLAIMS ALL LIABILITY FOR THE RELIANCE THEREON. USER SHOULD SATISFY HIMSELF THAT HE HAS ALL CURRENT DATA RELEVANT TO HIS PARTICULAR USE.

**NA= NOT APPLICABLE**

**ND= NO DATA FOUND**

**NR=NOT RECORDED**