MATERIAL SAFETY DATA SHEET
OSHA HAZARD COMMUNICATION RULE

DATE OF LAST REVISION: 05-22-96

CHEMICAL IDENTITY

LABEL IDENTITY
CALCULATED MOLECULAR WEIGHT
FORMULA
CHEMICAL FAMILY
CAS REGISTRY NUMBER
HAZARDOUS INGREDIENTS

MOLYBDENUM METAL
95.94
Mo
METAL
7439-98-7, LISTED IN THE TSCA INVENTORY
MOLYBDENUM METAL
99.9
10mg/m³
15mg/m³

PHYSICAL AND CHEMICAL PROPERTIES

COLOR, FORM
ODOR
BOILING POINT
DENSITY (gm/cc)
VAPOUR PRESSURE @ 20°
% VOLATILE BY VOLUME (%)
REACTION WITH WATER
EVAPORATION RATE (H2O=1)
SOLUBILITY IN WATER
MELTING POINT

Gray crystalline powder, pieces or pressed
Odorless
4825
10.2
1mm Hg at 3102°C
None
Insoluble
2622

FIRE AND EXPLOSION HAZARD DATA

FLASH POINT
AUTOIGNITION TEMPERATURE (°C)
FLAMMABILITY
EXTINGUISHING MEDIA
SPECIAL FIRE FIGHTING PROCEDURES
fumes.

NA
NA
Slightly flammable
Use agents for metal fires (such as: MET-L-X, TEC, or G-1 powder). Class D extinguisher
For a fire confined to a small area, use a respirator approved for toxic dusts and

fumes.

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.
MOLYBDENUM METAL
MATERIAL SAFETY DATA SHEET

HEALTH HAZARD INFORMATION

TOXICITY DATA
- orl-rat TDLo: 6050ug/kg (35W pre)
- ipr-rat LDLo: 114mg/kg
- orl-mus TDLo: 448mg/kg (MGN)
- 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 nose 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.

Carcinogenicity: none
NTP: no
IARC Monographs: no
OSHA Regulate: no

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

REACTIVITY DATA

STABILITY
- Stable

CONDITIONS CONTRIBUTING TO UNSTABILITY
- None

INCOMPATIBILITY (MATERIALS TO AVOID)
- Strong oxidizers; BrF3, CIF3, F2, PbO2

HAZARDOUS DECOMPOSITION PRODUCTS
- Mo has none

HAZARDOUS POLYMERIZATION
- Will Not Occur

CONDITIONS TO AVOID
- None
SAFE HANDLING AND USE

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.

SPECIAL PROTECTIVE INFORMATION

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

SPECIAL PRECAUTIONS

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:                | Not Classified |
| UN NUMBER:               | Not Classified |
| IMCO CLASS:              | Not Classified |
| OTHER:                   | ND            |

PRECAUTIONARY LABELING

NONE

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