MATERIAL SAFETY DATA SHEET
OSHA HAZARD COMMUNICATION RULE

DATE OF LAST REVISION: 05-13-96

### CHEMICAL IDENTITY

<table>
<thead>
<tr>
<th>LABEL IDENTITY</th>
<th>CHEMICAL NAME/SYNONYMS</th>
<th>FORMULA</th>
<th>CAS REGISTRY NUMBER</th>
<th>HAZARDOUS INGREDIENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>MOLYBDENUM SULFIDE</td>
<td>MOLYBDENUM DISULFIDE, III SULFIDE</td>
<td>MoS₂</td>
<td>1317-33-5, LISTED ON TSCA.</td>
<td>MOLYBDEMUM, 100%, (AS Mo)</td>
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<tr>
<td>(0.1-1% TUNGSTEN UNLESS SPECIFIED)</td>
<td>TLV: 5mg/m³, OSHA PEL: 5mg/m³</td>
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</tbody>
</table>

### PHYSICAL AND CHEMICAL PROPERTIES

| COLOR, FORM | BLACK LUSTROUS POWDER |
| ODOR | ROTTEN EGG LIKE ODOR |
| BOILING POINT | DECOMPOSES IN AIR (SUBLIMES @ 450) |
| DENSITY (gm/cc) | 4.80 AT 14° |
| VAPOR PRESSURE @ 20° | NA |
| % VOLATILE BY VOLUME (%) | NA |
| REACTION WITH WATER | MAY FORM H₂S |
| EVAPORATION RATE (H₂O=1) | NA |
| SOLUBILITY IN WATER | INSOLUBLE |
| MELTING POINT | 1185 (2375) |
| OTHER | SOLUBLE IN HOT WATER, AQUA REGIA, HNO₃, INSOLUBLE IN DILUTE ACID |

### FIRE AND EXPLOSION HAZARD DATA

| FLASH POINT | NA |
| AUTOIGNITION TEMPERATURE (°C) | NA |
| FLAMMABILITY | NON-FLAMMABLE |
| EXTINGUISHING MEDIA | USE DRY CHEMICAL, CO₂. DO NOT USE WATER. |

SPECIAL FIRE FIGHTING PROCEDURES: **Wear a self-contained breathing apparatus and full protective clothing to prevent contact with skin and eyes.**

UNUSUAL FIRE & EXPLOSION HAZARDS: **May emit toxic fumes of Sox & H₂S if involved in a fire or on contact with acids or acidic fumes. Sulfides are moderate fire hazards when exposed to flame or spontaneous chemical reaction. Ignites easily at room temperature. Upon contact with acids or moisture H₂S is evolved. Oxiders on contact with sulfides ignite vigorously.**
MOLYBDENUM SULFIDE
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HEALTH HAZARD INFORMATION

TOXICITY DATA
HMIS RATING:
  HEALTH: 3  FLAMMABILITY: 1  REACTIVITY: 2  PERSONAL PROTECTION: J

MoO₂ data: scu-mus  LD50: 318mg/kg

INHALATION: Yes
SKIN: Yes
INGESTION: Yes

MEDICAL CONDITIONS AGGRAVATED BY OVEREXPOSURE: Respiratory Disorders
EFFECTS OF OVEREXPOSURE (acute and chronic):
  INHALATION: Respiratory irritant. Coughing sneezing, difficulty breathing and pulmonary edema possible. May cause irritation of the mucous membranes of the nose and throat.
  DERMAL/EYE CONTACT: Irritation to the skin may cause redness, inflammation and dermatitis. Irritation to the eyes may cause inflammation, redness, watering and risk of serious injury.
  OTHER: Sulfides cause softening and irritation of the skin. Taken by mouth they are corrosive and irritating through the liberation of H₂S and free alkali.

CARCINOGENICITY: No  NTP: No  IARC MONOGRAPHS: No  OSHA REGULATE: No

EMERGENCY FIRST AID PROCEDURES:
  INGESTION: 1-2 cups of milk or water to induce vomiting, seek medical attn.
  INHALATION: Remove victim to fresh air, administer oxygen if breathing is difficult and seek medical attention immediately.
  SKIN CONTACT: Brush material off skin. Wash affected area with soap and water and seek medical attention immediately.
  EYE CONTACT: Flush eyes with water for 15 minutes. seek medical attention.

REACTIVITY DATA

STABILITY: Stable
CONDITIONS CONTRIBUTING TO INSTABILITY: Heat
INCOMPATIBILITY (MATERIALS TO AVOID): Potassium Nitrate, violent reaction with H₂O₂
HAZARDOUS DECOMPOSITION PRODUCTS: Mo, MoOx, SOx, S and H₂S
HAZARDOUS POLYMERIZATION: Will Not Occur
CONDITIONS TO AVOID: Heat, excessive moisture/water
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SAFE HANDLING AND USE

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED:
Wear self-contained breathing apparatus and full protective clothing. Isolate area, insure proper ventilation and water/moisture is kept out of area, vacuum spill (use high efficiency unit) and place in container for proper disposal.

WASTE DISPOSAL METHOD:
Consult federal, state and local regulations for proper disposal.

SPECIAL PROTECTIVE INFORMATION

RESPIRATORY PROTECTION
NIOSH/MSHA approved dust-mist-fume cartridge respirator

LOCAL EXHAUST
Maintain below TLV

MECHANICAL (general)
Recommended

SPECIAL
Handle in dry, controlled atmosphere

OTHER
NA

PROTECTIVE GLOVES
Neoprene

EYE PROTECTION
Safety glasses

OTHER PROTECTIVE EQUIPMENT
Wear protective clothing to prevent contamination of skin and clothes

SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING/STORAGE:
Store in tightly closed container, store in cool, dry place, wash hands and face thoroughly after handling and before meals.

TRANSPORTATION REQUIREMENTS
DOT CLASS: Not Classified
UN NUMBER: N. C.
IMCO CLASS: N. C.
OTHER: SPC, Corrosive

PRECAUTIONARY LABELING
NONE

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NA= NOT APPLICABLE  ND= NO DATA FOUND