CHEMICAL IDENTITY

MOLYBDENUM OXIDE

CALCULATED MOLECULAR WEIGHT
143.94

FORMULA
MoO₃

CHEMICAL FAMILY
METAL OXIDE

CAS REGISTRY NUMBER
1313-27-5, LISTED IN THE TSCA INVENTORY

HAZARDOUS INGREDIENTS
MOLYBDENUM METAL

%: 0-100%

TLV: 10mg/m³

OSHA/PEL: 5mg/m³

PHYSICAL AND CHEMICAL PROPERTIES

COLOR, FORM
White to Off White Powder

ODOR
Odorless

BOILING POINT
1150°C

DENSITY (gm/cc)
NA

VAPOR PRESSURE @ 20°
NA

% VOLATILE BY VOLUME (%)
NA

EVAPORATION RATE (H₂O=1)
NA

SOLUBILITY IN WATER
0.107 G/100 G Water @ 18°C

MELTING POINT
795°C

FIRE AND EXPLOSION HAZARD DATA

FLASH POINT
NA

AUTOIGNITION TEMPERATURE (°C)
NA

FLAMMABILITY
NA

EXTINGUISHING MEDIA
Use that which is appropriate for the surrounding fire.

SPECIAL FIRE FIGHTING PROCEDURES
Wear appropriate protective equipment including respiratory protection as conditions warrant. Stop spill/release if it can be done without risk. Move undamaged containers from fire area if it can be done without risk. Water spray may be useful in minimizing or dispensing vapors and cooling equipment exposed to heat and flame.

UNUSUAL FIRE & EXPLOSION HAZARDS
No unusual fire or explosion hazards are expected.
MOLYBDENUM OXIDE
MATERIAL SAFETY DATA SHEET

HEALTH HAZARD INFORMATION

TOXICITY DATA

<table>
<thead>
<tr>
<th>Route</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>orl-rat TDLo</td>
<td>6050 ug/kg (35W pre)</td>
</tr>
<tr>
<td>ipr-rat LDLo</td>
<td>114 mg/kg</td>
</tr>
<tr>
<td>orl-mus TDLo</td>
<td>448 mg/kg (MGN)</td>
</tr>
<tr>
<td>itr-rbt LDLo</td>
<td>70 mg/kg</td>
</tr>
</tbody>
</table>

HMIS RATING:
- HEALTH: 2
- FLAMMABILITY: 0
- REACTIVITY: 0

PERSONAL PROTECTION: Wear fully protective impervious suit.

ROUTES OF ENTRY

<table>
<thead>
<tr>
<th>Route</th>
<th>Yes</th>
</tr>
</thead>
<tbody>
<tr>
<td>INHALATION:</td>
<td>Yes</td>
</tr>
<tr>
<td>SKIN:</td>
<td>Yes</td>
</tr>
<tr>
<td>INGESTION:</td>
<td>Yes</td>
</tr>
<tr>
<td>EYES:</td>
<td>Yes</td>
</tr>
</tbody>
</table>

MEDICAL CONDITIONS AGGRAVATED BY OVEREXPOSURE: Persons with pre-existing skin disorders or eye problems or impaired respiratory function may be more susceptible to the effects of the substance.

EFFECTS OF OVEREXPOSURE (acute and chronic): IRRITATION

INHALATION: This material is toxic by inhalation. Breathing dusts may be harmful. Effects of overexposure may include irritation of the nose and throat, diarrhea and Tremors. Respiratory symptoms associated with pre-existing lung disorders. (Eg. Asthma-like conditions). May be aggravated by exposure to this material.

DERMAL/EYE: Irritation, contact with dusts may cause stinging, tearing, redness, And swelling.

INGESTION: This material is toxic and may be harmful if swallowed. Effects of over exposure may include diarrhea, fatigue, loss of appetite and tremors.

SKIN: Contact with dusts may be abrasive and irritating to the skin and may cause redness and burning. There is insufficient information available on this material to predict the effects from skin absorption.

CARCINOGENICITY: NTP: no IARC MONOGRAPHS: no OSHA REGULATE: no

EMERGENCY FIRST AID PROCEDURES:

INGESTION: If victim is conscious and alert, vomiting should be induced for ingestion of more than one swallow (1-2 tablespoons for an adult), preferably with syrup of ipecac under direction from a physician or poison center. If syrup of ipecac is not available, vomiting can be induced by gently placing two fingers in the back of the throat. If possible, do not leave victim unattended.

INHALATION: Immediately move victim away from exposure and into fresh air. If respiratory symptoms or other symptoms of exposure develop, seek immediate medical attention. If victim is not breathing immediately begin artificial respiration. If breathing difficulties develop, oxygen should be administered by qualified personnel. Seek immediate medical attention.
SKIN CONTACT: Remove contaminated shoes and clothing and flush affected area(s) with large amounts of water. If skin surface is damaged, apply a clean dressing, and seek medical attention. If skin surface is not damaged, cleanse the affected area(s) thoroughly by washing with mild soap and water. If irritation or redness develops, seek medical attention.

EYE CONTACT: Move victim away from exposure and into fresh air. If irritation or redness Develops, flush eyes with clean water and seek medical attention. For direct contact hold Eyelids apart and flush the affected eye(s) with clean water for at least 15 minutes. Seek medical attention.

### REACTIVITY DATA

<table>
<thead>
<tr>
<th>STABILITY</th>
<th>Stable under normal conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td>CONDITIONS CONTRIBUTING TO UNSTABILITY</td>
<td>None</td>
</tr>
<tr>
<td>INCOMPATIBILITY (MATERIALS TO AVOID)</td>
<td>Avoid contact with strong alkali metals or hot magnesium.</td>
</tr>
<tr>
<td>HAZARDOUS DECOMPOSITION PRODUCTS</td>
<td>None</td>
</tr>
<tr>
<td>HAZARDOUS POLYMERZATION</td>
<td>Will Not Occur</td>
</tr>
<tr>
<td>CONDITIONS TO AVOID</td>
<td>None</td>
</tr>
</tbody>
</table>

### SAFE HANDLING AND USE

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED: Stay upwind and away from spill/release. Isolate hazard area and limit entry to authorized personnel. Stop spill/release if it can be done without risk. Wear appropriate protective equipment. Including respiratory protection as conditions warrant. Prevent spilled material from entering sewers, storm drains, and other unauthorized treatment/drainage systems and natural waterways. Minimize dust generation sweep up and place appropriately for disposal. Notify appropriate federal, state and local agencies. Clean-up procedure should insure minimizing dust; vacuum dust rather than sweep, for example. Do not allow material to enter source of drinking water.

WASTE DISPOSAL METHOD: Dispose of in accordance with local, state and federal regulations. May be sold as scrap for reclaim or returned to the producer.

### SPECIAL PROTECTIVE INFORMATION

RESPIRATORY PROTECTION

If airborne concentrations exceed established Exposure limits, a exhaust system may be required.

LOCAL EXHAUST

If current ventilation practices are not adequate to maintain airborne concentrations below the established exposure limits, additional ventilation or exhaust systems may be required.
MOLYBDENUM OXIDE METAL
MATERIAL SAFETY DATA SHEET

PROTECTIVE GLOVES
The use of gloves impermeable to the specific materials handled is advised to prevent skin contact, possible irritation and absorption.

EYE PROTECTION
Approved eye protection to safeguard against Potential eye contact, irritation or injury is recommended.

OTHER:
It is suggested that a source of clean water be available in the work area for flushing eyes and skin. Impervious clothing should be worn as needed.

SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING/STORAGE: Avoid contact with strong alkali metals (particularly sodium) or hot magnesium. Use and store this material in cool, dry, well ventilated areas. Keep container(s) closed. Store only in approved containers. Keep away from any incompatible materials. Protect container(s) against physical damage. Do not enter confined spaces such as tanks or pits without following proper entry procedures such as ASTM-4276. The use of respiratory protection is advised when concentrations exceed any established exposure limits. Wash thoroughly after handling. Do not wear contaminated clothing or shoes. Use good personal hygiene practice.

STORAGE: Store in a cool, dry place.

OTHER PRECAUTIONS: Avoid contact with eyes, skin, cloth & prolong repeated exposure. Avoid inhalation.

TRANSPORTATION REQUIREMENTS

DOT CLASS: Not Classified
UN NUMBER: NA
IMCO CLASS: Not Classified
OTHER: ND

PRECAUTIONARY LABELING: NONE

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.

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