Material Safety Data Sheet
Ammonium molybdate tetrahydrate,

Section 1 - Chemical Product and Company Identification

**MSDS Name:** Ammonium molybdate tetrahydrate, certified ACS, crystalline

**Synonyms:** Ammonium heptamolybdate ((NH4)6Mo7O24) tetrahydrate; Ammonium paramolybdate tetrahydrate; Moybdic acid (H6Mo7O24), hexaammonium salt, tetrahydrate.

Section 2 - Composition, Information on Ingredients

<table>
<thead>
<tr>
<th>CAS#</th>
<th>Chemical Name</th>
<th>Percent</th>
<th>EINECS/ELINCS</th>
</tr>
</thead>
<tbody>
<tr>
<td>12054-85-2</td>
<td>Ammonium molybdate(VI) tetrahydrate</td>
<td>99</td>
<td>unlisted</td>
</tr>
</tbody>
</table>

Section 3 - Hazards Identification

**EMERGENCY OVERVIEW**

Appearance: white or yellow powder.

**Warning!** Causes eye, skin, and respiratory tract irritation. May be harmful if inhaled. May be harmful if swallowed.

**Target Organs:** Blood, lungs.

**Potential Health Effects**

**Eye:** Causes eye irritation.

**Skin:** Causes skin irritation.

**Ingestion:** Harmful if swallowed. May cause gastrointestinal irritation with nausea, vomiting and diarrhea. Molybdenum toxicity in ruminants is characterized by symptoms of copper deficiency.

**Inhalation:** Causes upper respiratory tract irritation. Causes irritation of the mucous membrane. In an inhalation study, rats were administered 60 ug ammonium molybdate/ m3, 24 hours a day for 17 weeks. Changes in erythrocyte and leukocyte cell counts were observed.

**Chronic:** Not available. Rats were fed 25 or 50 ppm of ammonium molybdate in their food for 100 days, at which time they were killed and examined. Ammonium molybdate at 25 ppm had no effect on growth; at 50 ppm a slight decrease in the growth rate was observed. No deaths or significant effects on hemoglobin levels were observed at 25 or 50 ppm.

Section 4 - First Aid Measures

**Eyes:** Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid.

**Skin:** Immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Get medical aid if irritation develops or persists. Wash clothing before reuse.
**Ingestion:** Do not induce vomiting. If victim is conscious and alert, give 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious person. Get medical aid.

**Inhalation:** Remove from exposure and move to fresh air immediately. If breathing is difficult, give oxygen. Get medical aid if cough or other symptoms appear. Do NOT use mouth-to-mouth resuscitation. If breathing has ceased apply artificial respiration using oxygen and a suitable mechanical device such as a bag and a mask.

**Notes to Physician:** Treat symptomatically and supportively.

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**Section 5 - Fire Fighting Measures**

**General Information:** As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion. Substance is noncombustible.

**Extinguishing Media:** Substance is noncombustible; use agent most appropriate to extinguish surrounding fire.

**Flash Point:** Not applicable.

**Autoignition Temperature:** Not available.

**Explosion Limits, Lower:** Not available.

**Upper:** Not available.

**NFPA Rating:** (estimated) Health: 2; Flammability: 0; Instability: 0

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**Section 6 - Accidental Release Measures**

**General Information:** Use proper personal protective equipment as indicated in Section 8.

**Spills/Leaks:** Vacuum or sweep up material and place into a suitable disposal container. Clean up spills immediately, observing precautions in the Protective Equipment section. Avoid generating dusty conditions. Provide ventilation.

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**Section 7 - Handling and Storage**

**Handling:** Wash thoroughly after handling. Wash hands before eating. Minimize dust generation and accumulation. Avoid contact with eyes, skin, and clothing. Use only with adequate ventilation. Avoid breathing dust.

**Storage:** Keep container closed when not in use. Store in a cool, dry, well-ventilated area away from incompatible substances.

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**Section 8 - Exposure Controls, Personal Protection**

**Engineering Controls:** Use process enclosure, local exhaust ventilation, or other engineering controls to control airborne levels below recommended exposure limits. Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower.

**Exposure Limits**

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>ACGIH</th>
<th>NIOSH</th>
<th>OSHA - Final PELs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ammonium</td>
<td>0.5 mg/m3 TWA</td>
<td>1000 mg/m3 IDLH</td>
<td>5 mg/m3 TWA (as</td>
</tr>
</tbody>
</table>
molybdate(VI) tetrahydrate (respirable fraction, as Mo) (listed under Molybdenum soluble compounds). (as Mo) (listed under Molybdenum soluble compounds). Mo) (listed under Molybdenum soluble compounds).

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<table>
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<tbody>
<tr>
<td>Ammonium molybdate(VI) anhydrous</td>
<td>0.5 mg/m3 TWA (respirable fraction, as Mo) (listed under Molybdenum soluble compounds).</td>
<td>1000 mg/m3 IDLH (as Mo) (listed under Molybdenum soluble compounds).</td>
</tr>
</tbody>
</table>

**Personal Protective Equipment**

**Eyes:** Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

**Skin:** Wear appropriate protective gloves to prevent skin exposure.

**Clothing:** Wear appropriate protective clothing to prevent skin exposure.

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### Section 9 - Physical and Chemical Properties

**Physical State:** Powder  
**Appearance:** white or yellow  
**Odor:** none reported  
**pH:** Not available.  
**Vapor Pressure:** Not applicable.  
**Vapor Density:** Not available.  
**Evaporation Rate:** Not applicable.  
**Viscosity:** Not applicable.  
**Boiling Point:** decomposes  
**Freezing/Melting Point:** 190 deg C  
**Decomposition Temperature:** Not available.  
**Solubility:** Soluble.  
**Specific Gravity/Density:** 2.49  
**Molecular Formula:** (NH$_4$)$_6$Mo$_7$O$_{24}$.4H$_2$O  
**Molecular Weight:** 1235.86

### Section 10 - Stability and Reactivity

**Chemical Stability:** Stable under normal temperatures and pressures.  
**Conditions to Avoid:** Dust generation, excess heat.  
**Incompatibilities with Other Materials:** Strong acids.  
**Hazardous Decomposition Products:** Nitrogen oxides, ammonia and/or derivatives, oxides of molybdenum.  
**Hazardous Polymerization:** Has not been reported.

### Section 11 - Toxicological Information

**RTECS#:**  
**CAS# 12054-85-2 unlisted.**  
**CAS# 12027-67-7: QA5076000**  
**LD50/LC50:**
Oral median lethal dose for daily repeated doses was found to be 333 mg Mo/kg/day (up to 232 days) for ammonium molybdate. This is not an acute oral LD50 value, which is a dose administered once.

**Carcinogenicity:**

CAS# 12054-85-2:

- **ACGIH:** A3 - Confirmed animal carcinogen with unknown relevance to humans (listed as 'Molybdenum soluble compounds').
- **California:** Not listed.
- **NTP:** Not listed.
- **IARC:** Not listed.

CAS# 12027-67-7:

- **ACGIH:** A3 - Confirmed animal carcinogen with unknown relevance to humans (listed as 'Molybdenum soluble compounds').
- **California:** Not listed.
- **NTP:** Not listed.
- **IARC:** Not listed.

**Epidemiology:** No epidemiological studies or case reports investigating the association of exposure to ammonium molybdate and cancer risk in humans were identified in the available literature.

**Teratogenicity:** No information found

**Reproductive Effects:** No information found

**Mutagenicity:** Positive in micronucleus assay in human lymphocytes. Induced chromosome aberrations and sister-chromatid exchanges in human lymphocytes. Positive in E. coli strains WP2 and WP2uvra without activation. Positive in B. subtilis strains H17 and M45.

**Neurotoxicity:** No information found

**Other Studies:**

### Section 12 - Ecological Information

No information available.

### Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.

**RCRA P-Series:** None listed.

**RCRA U-Series:** None listed.

### Section 14 - Transport Information

<table>
<thead>
<tr>
<th>IATA</th>
<th>Shipping</th>
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<tr>
<td></td>
<td>Please contact for shipping</td>
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</tbody>
</table>
### Section 15 - Regulatory Information

**Hazard Symbols:**
- XN

**Risk Phrases:**
- R 22 Harmful if swallowed.

**Safety Phrases:**
- S 22 Do not breathe dust.
- S 24/25 Avoid contact with skin and eyes.

### Section 16 - Additional Information

**MSDS Creation Date:** 12/12/1997  
**Revision #8 Date:** 10/03/2005

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall INDO GULF GROUP be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if INDO GULF GROUP has been advised of the possibility of such damages.