1 Identification of the substance/mixture and of the company/undertaking

Product identifier
- **Product name:** Molybdic Acid
- **Stock number:** A10537
- **CAS Number:** 7782-91-4
- **EINECS Number:** 231-970-5

Relevant identified uses of the substance or mixture and uses advised against.

- **Sector of Use:** SU24 Scientific research and development

Details of the supplier of the safety data sheet

- **Manufacturer/Supplier:**
  - Alfa Aesar, A Johnson Matthey Company
  - Johnson Matthey Catalog Company, Inc.
  - 30 Bond Street
  - Ward Hill, MA 01835-8099
  - Tel: 800-343-0660
  - Fax: 800-322-4757
  - Email: tech@alfa.com
  - www.alfa.com

Information Department: Health, Safety and Environmental Department

Emergency telephone number:
- During normal hours the Health, Safety and Environmental Department at (800) 343-0660. After normal hours call Carechem 24 at (866) 928-0789.

2 Hazards identification

Classification of the substance or mixture

- **GHS07**

  - H315 Causes skin irritation.
  - H319 Causes serious eye irritation.
  - H335 May cause respiratory irritation.

Classification according to Directive 67/548/EEC or Directive 1999/45/EC

- **Xi; Irritant**

R36/37/38: Irritating to eyes, respiratory system and skin.

Label elements

- **Code letter and hazard designation of product:** Xi Irritant
- **Risk phrases:** 36/37/38 Irritating to eyes, respiratory system and skin.
- **Safety phrases:**
  - 26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
  - 37 Wear suitable gloves.

Hazard description:

WHMIS classification

Classification system

- **HMIS ratings (scale 0-4)**
  - **HEALTH:** 1 Health (acute effects) = 1
  - **FIRE:** 0 Flammability = 0
  - **REACTIVITY:** 1 Reactivity = 1

Other hazards

Results of PBT and vPvB assessment

- **PBT:** Not applicable.
Material Safety Data Sheet
According to OSHA and ANSI

Printing date 06/01/2011
Reviewed on 11/27/2006

Product name: Molybdic acid

VPvB: Not applicable.

3 Composition/information on ingredients
Chemical characterization: Substances
(CAS#) Description:
Molybdic acid (CAS# 7782-91-4); 100%
Identification number(s):
EINECS Number: 231-970-5

4 First aid measures
Description of first aid measures
After inhalation
Supply fresh air. If required, provide artificial respiration. Keep patient warm.
Seek immediate medical advice.
After skin contact
Immediately wash with water and soap and rinse thoroughly.
Seek immediate medical advice.
After eye contact
Rinse opened eye for several minutes under running water. Then consult a doctor.
After swallowing Seek medical treatment.

5 Firefighting measures
Extinguishing media
Suitable extinguishing agents
Product is not flammable. Use fire fighting measures that suit the surrounding fire.
Special hazards arising from the substance or mixture
In case of fire, the following can be released:
Nitrogen oxides (NOx)
Advice for firefighters
Protective equipment:
Wear self-contained respirator.
Wear fully protective impervious suit.

6 Accidental release measures
Personal precautions, protective equipment and emergency procedures
Wear protective equipment. Keep unprotected persons away.
Ensure adequate ventilation
Environmental precautions:
Do not allow material to be released to the environment without proper governmental permits.
Methods and material for containment and cleaning up:
Pick up mechanically.
Reference to other sections
See Section 7 for information on safe handling
See Section 8 for information on personal protection equipment.
See Section 13 for disposal information.

7 Handling and storage
Handling
Precautions for safe handling
Keep container tightly sealed.
Store in cool, dry place in tightly closed containers.
No special precautions are necessary if used correctly.

Conditions for safe storage, including any incompatibilities
Storage
Requirements to be met by storerooms and receptacles: No special requirements.
Information about storage in one common storage facility: Not required.
Further information about storage conditions:
Keep container tightly sealed.
Store in cool, dry conditions in well sealed containers.
8 Exposure controls/personal protection

Additional information about design of technical systems:
Properly operating chemical fume hood designed for hazardous chemicals and having an average face velocity of at least 100 feet per minute.

Control parameters
Components with limit values that require monitoring at the workplace:

Molybdenum and compounds (as Mo)

<table>
<thead>
<tr>
<th>Country</th>
<th>Limit Value (mg/m³)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACGIH TLV</td>
<td>5</td>
</tr>
<tr>
<td>Austria MAK</td>
<td>15</td>
</tr>
<tr>
<td>Belgium TWA</td>
<td>5</td>
</tr>
<tr>
<td>Denmark TWA</td>
<td>5</td>
</tr>
<tr>
<td>Finland TWA</td>
<td>5</td>
</tr>
<tr>
<td>France VMR</td>
<td>5</td>
</tr>
<tr>
<td>Germany MAK</td>
<td>5</td>
</tr>
<tr>
<td>Netherlands MAC-TGG</td>
<td>5</td>
</tr>
<tr>
<td>Sweden NGV (total dust)</td>
<td>10</td>
</tr>
<tr>
<td>Switzerland TWA</td>
<td>5</td>
</tr>
<tr>
<td>United Kingdom TWA</td>
<td>10; 20-STEL</td>
</tr>
<tr>
<td>USA PEL</td>
<td>5</td>
</tr>
</tbody>
</table>

Additional information: No data

Exposure controls

Personal protective equipment

General protective and hygienic measures
The usual precautionary measures for handling chemicals should be followed.
Keep away from foodstuffs, beverages and feed.
Remove all soiled and contaminated clothing immediately.
Wash hands before breaks and at the end of work.

Breathing equipment: Use suitable respirator when high concentrations are present.

Protection of hands: Impervious gloves

Eye protection: Safety glasses

Body protection: Protective work clothing.

9 Physical and chemical properties

Information on basic physical and chemical properties

General Information

Appearance:
Form: Powder
Color: Yellowish
Odor: Odorless
Odour threshold: Not determined.

pH-value: Not applicable.

Change in condition
Melting point/Melting range: Not determined
Boiling point/Boiling range: Not determined
Sublimation temperature / start: Not determined

Flash point: Not applicable

Flammability (solid, gaseous) Product is not flammable.

Ignition temperature: Not determined

Auto igniting: Not determined.

Danger of explosion: Product does not present an explosion hazard.

Explosion limits:
Lower: Not determined
Upper: Not determined

Vapor pressure: Not applicable.

Density: Not determined
Relative density: Not determined
Vapour density: Not applicable.
Evaporation rate: Not applicable.
Material Safety Data Sheet
According to OSHA and ANSI

Printing date 06/01/2011 Reviewed on 11/27/2006

Product name: Molybdic acid

Solubility in / Miscibility with
Water: Insoluble

Segregation coefficient (n-octanol/water): Not determined.

Viscosity:
  dynamic: Not applicable.
  kinematic: Not applicable.

Other information: No further relevant information available.

10 Stability and reactivity

Reactivity
Chemical stability
Thermal decomposition / conditions to be avoided:
Decomposition will not occur if used and stored according to specifications.

Possibility of hazardous reactions No dangerous reactions known

Incompatible materials: None known.

Hazardous decomposition products: Nitrogen oxides

11 Toxicological information

Information on toxicological effects
Acute toxicity:
Primary irritant effect:
on the skin: Irritant to skin and mucous membranes.
on the eye: Irritating effect.

Sensitization: No sensitizing effects known.

Subacute to chronic toxicity:
Acute molybdenum poisoning may cause severe gastrointestinal irritation, diarrhea, coma and
death from cardiac failure.
Chronic molybdenum poisoning in laboratory animals has caused loss of weight, anorexia,
anemia, deficient lactation, male sterility, osteoporosis and bone joint abnormalities.

Additional toxicological information:
To the best of our knowledge the acute and chronic toxicity of this substance is not fully
known.

No classification data on carcinogenic properties of this material is available from the EPA,
IARC, NTP, OSHA or ACGIH.

12 Ecological information

Toxicity
Acquatic toxicity: No further relevant information available.

Persistence and degradability: No further relevant information available.

Behavior in environmental systems:
Bioaccumulative potential: No further relevant information available.

Mobility in soil: No further relevant information available.

Additional ecological information:

General notes:
Do not allow material to be released to the environment without proper governmental permits.

Results of PBT and vPvB assessment
PBT: Not applicable.
vPvB: Not applicable.

Other adverse effects: No further relevant information available.

13 Disposal considerations

Waste treatment methods
Recommendation Consult state, local or national regulations to ensure proper disposal.

Uncleaned packagings:
Recommendation: Disposal must be made according to official regulations.

14 Transport information

Not a hazardous material for transportation.
Material Safety Data Sheet
According to OSHA and ANSI

Product name: Molybdic acid

<table>
<thead>
<tr>
<th>DOT regulations:</th>
<th>Hazard class: None</th>
</tr>
</thead>
<tbody>
<tr>
<td>Land transport ADR/RID (cross-border)</td>
<td>ADR/RID class: None</td>
</tr>
<tr>
<td>Maritime transport IMDG:</td>
<td>IMDG Class: None</td>
</tr>
<tr>
<td>Marine pollutant:</td>
<td>No</td>
</tr>
<tr>
<td>Air transport ICAO-TI and IATA-DGR:</td>
<td>ICAO/IATA Class: None</td>
</tr>
</tbody>
</table>

Special precautions for user: Not applicable.

Transport/Additional information: Not dangerous according to the above specifications.
Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code: Not applicable.

15 Regulatory information

Safety, health and environmental regulations/legislation specific for the substance or mixture

Product related hazard informations:
Observe the general safety regulations when handling chemicals

Risk phrases:
36/37/38 Irritating to eyes, respiratory system and skin.

Safety phrases:
26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
37 Wear suitable gloves.

National regulations
All components of this product are listed in the U.S. Environmental Protection Agency Toxic Substances Control Act Chemical substance Inventory.
All components of this product are listed on the Canadian Domestic Substances List (DSL).

Information about limitation of use: For use only by technically qualified individuals.
Chemical safety assessment: A Chemical Safety Assessment has not been carried out.

16 Other information

Employers should use this information only as a supplement to other information gathered by them, and should make independent judgement of suitability of this information to ensure proper use and protect the health and safety of employees. This information is furnished without warranty, and any use of the product not in conformance with this Material Safety Data Sheet, or in combination with any other product or process, is the responsibility of the user.

Department issuing MSDS: Health, Safety and Environmental Department.
Contact:
Zachariah C. Holt
Global EHS Manager

Abbreviations and acronyms:
- ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)
- RID: Règlement international concernant le transport des marchandises dangereuses par chemin de fer (Regulations Concerning the International Transport of Dangerous Goods by Rail)
- IMDG: International Maritime Code for Dangerous Goods
- IATA: International Air Transport Association
- IATA-DGR: Dangerous Goods Regulations by the "International Air Transport Association" (IATA)
- C.D.A.O: International Civil Aviation Organization
- ICAO-TI: Technical Instructions by the "International Civil Aviation Organization" (ICAO)
- EINECS: European Inventory of Existing Commercial Chemical Substances
- CAS: Chemical Abstracts Service (division of the American Chemical Society)
- HMIS: Hazardous Materials Identification System (USA)
- WHMIS: Workplace Hazardous Materials Information System (Canada)