



# MATERIAL SAFETY DATA SHEET

## 1. Product and Company Identification

|                          |                                                                                                                     |
|--------------------------|---------------------------------------------------------------------------------------------------------------------|
| <b>Material name</b>     | <b>AMMONIUM MOLYBDATE TETRAHYDRATE</b>                                                                              |
| <b>Version #</b>         | 01                                                                                                                  |
| <b>Revision date</b>     | 09-01-2011                                                                                                          |
| <b>CAS #</b>             | 12054-85-2                                                                                                          |
| <b>Product Codes</b>     | <b>J.T.Baker: 0716</b><br><b>Macron: 3420</b>                                                                       |
| <b>Synonym(s)</b>        | Molybdic acid hexammonium salt tetrahydrate; ammonium molybdate tetrahydrate; ammonium heptamolybdate, tetrahydrate |
| <b>Manufacturer</b>      | Avantor Performance Materials, Inc.                                                                                 |
| <b>Address</b>           | 3477 Corporate Parkway<br>Suite #200<br>Center Valley, PA 18034<br>US                                               |
| <b>Customer Service</b>  | 855-282-6867                                                                                                        |
| <b>24 Hour Emergency</b> | 908-859-2151                                                                                                        |
| <b>Chemtec</b>           | 800-424-9300                                                                                                        |

## 2. Hazards Identification

|                                        |                                                                                                                                                                                                                                                                                                                            |
|----------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Emergency overview</b>              | WARNING<br><br>Harmful if swallowed. Dust may irritate the eyes and the respiratory system. Prolonged exposure may cause chronic effects.                                                                                                                                                                                  |
| <b>OSHA regulatory status</b>          | This product is considered hazardous under 29 CFR 1910.1200 (Hazard Communication).                                                                                                                                                                                                                                        |
| <b>Potential health effects</b>        |                                                                                                                                                                                                                                                                                                                            |
| <b>Routes of exposure</b>              | Inhalation. Ingestion. Skin contact. Eye contact.                                                                                                                                                                                                                                                                          |
| <b>Eyes</b>                            | Dust or powder may irritate eye tissue. If irritation should occur, it is expected to be transient.                                                                                                                                                                                                                        |
| <b>Skin</b>                            | Health injuries are not known or expected under normal use.                                                                                                                                                                                                                                                                |
| <b>Inhalation</b>                      | Dust may irritate respiratory system.                                                                                                                                                                                                                                                                                      |
| <b>Ingestion</b>                       | Harmful if swallowed. May cause stomach distress, nausea or vomiting.                                                                                                                                                                                                                                                      |
| <b>Target organs</b>                   | Reproductive organs. Blood. Liver. Kidney. Bone.                                                                                                                                                                                                                                                                           |
| <b>Chronic effects</b>                 | Possible cancer hazard - may cause cancer based on animal data. May cause adverse reproductive effects - such as birth defects, miscarriages, or infertility based on animal data. Suspected of causing genetic defects. Risk of damage to blood system. May cause damage to the liver and kidneys. Can cause bone damage. |
| <b>Potential environmental effects</b> | The product components are not classified as environmentally hazardous. However, this does not exclude the possibility that large or frequent spills can have a harmful or damaging effect on the environment.                                                                                                             |

## 3. Composition / Information on Ingredients

| <b>Components</b>               | <b>CAS #</b> | <b>Percent</b> |
|---------------------------------|--------------|----------------|
| AMMONIUM MOLYBDATE TETRAHYDRATE | 12054-85-2   | 90 - 100       |

**Composition comments** CAS # 12054-85-2 can be described by the CAS # 12027-67-7.

## 4. First Aid Measures

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### First aid procedures

|                     |                                                                                                                                                                                                                                                                   |
|---------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Eye contact</b>  | Any material that contacts the eye should be washed out immediately with water. If easy to do, remove contact lenses. Get medical attention if irritation develops or persists.                                                                                   |
| <b>Skin contact</b> | Wash skin with soap and water. Get medical attention if irritation develops or persists.                                                                                                                                                                          |
| <b>Inhalation</b>   | Move to fresh air. Treat symptomatically. Get medical attention if symptoms persist.                                                                                                                                                                              |
| <b>Ingestion</b>    | Call a physician or poison control center immediately. Only induce vomiting at the instruction of medical personnel. Never give anything by mouth to an unconscious person. If vomiting occurs, keep head low so that stomach content doesn't get into the lungs. |

### Notes to physician

Treat symptomatically. Symptoms may be delayed.

### General advice

Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves. Show this safety data sheet to the doctor in attendance.

## 5. Fire Fighting Measures

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### Flammable properties

This product is not flammable.

### Extinguishing media

|                                       |                                                                                                         |
|---------------------------------------|---------------------------------------------------------------------------------------------------------|
| <b>Suitable extinguishing media</b>   | Use extinguishing measures that are appropriate to local circumstances and the surrounding environment. |
| <b>Unsuitable extinguishing media</b> | None known.                                                                                             |

### Protection of firefighters

|                                                              |                                                                                                                                                                                                             |
|--------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Protective equipment and precautions for firefighters</b> | Firefighters should wear full protective gear. Wear full protective clothing, including helmet, self-contained positive pressure or pressure demand breathing apparatus, protective clothing and face mask. |
|--------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

### Special protective equipment for fire-fighters

As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

## 6. Accidental Release Measures

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### Personal precautions

Keep unnecessary personnel away. Keep upwind. Ventilate the area. Avoid inhalation of dust from the spilled material. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing.

### Environmental precautions

Prevent further leakage or spillage if safe to do so.

### Methods for containment

If sweeping of a contaminated area is necessary use a dust suppressant agent which does not react with the product. Prevent entry into waterways, sewer, basements or confined areas.

### Methods for cleaning up

Avoid dust formation.

Small Spills: Sweep up or vacuum up spillage and collect in suitable container for disposal.

Large Spills: Collect dust or particulates using a vacuum cleaner with a HEPA filter. Reduce airborne dust and prevent scattering by moistening with water.

Never return spills in original containers for re-use. Clean contaminated surface thoroughly. Clean up in accordance with all applicable regulations.

## 7. Handling and Storage

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### Handling

Wear appropriate personal protective equipment. Avoid breathing dust. Avoid contact with eyes. Do not taste or swallow. Use only with adequate ventilation. Wash thoroughly after handling. See Section 8 of the MSDS for Personal Protective Equipment.

### Storage

Keep containers tightly closed in a dry, cool and well-ventilated place.

## 8. Exposure Controls / Personal Protection

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|                                       |                                                                                                                                                                                                                                                                                                                                                                                               |
|---------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Engineering controls</b>           | Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level. |
| <b>Personal protective equipment</b>  |                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Eye / face protection</b>          | Use tight fitting goggles if dust is generated.                                                                                                                                                                                                                                                                                                                                               |
| <b>Skin protection</b>                | Wear appropriate clothing to prevent repeated or prolonged skin contact.                                                                                                                                                                                                                                                                                                                      |
| <b>Respiratory protection</b>         | If engineering controls do not maintain airborne concentrations below recommended exposure limits (where applicable) or to an acceptable level (in countries where exposure limits have not been established), an approved respirator must be worn. Respirator type: High-efficiency particulate respirator with full facepiece.                                                              |
| <b>General hygiene considerations</b> | Provide eyewash station and safety shower. Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants.                                                                                                                              |
| <b>General</b>                        | Wear chemical protective equipment that is specifically recommended by the manufacturer. Launder contaminated clothing before reuse.                                                                                                                                                                                                                                                          |

## 9. Physical & Chemical Properties

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|                                                       |                                                                                    |
|-------------------------------------------------------|------------------------------------------------------------------------------------|
| <b>Appearance</b>                                     | Crystalline.                                                                       |
| <b>Color</b>                                          | Yellow green to white.                                                             |
| <b>Odor</b>                                           | Odorless.                                                                          |
| <b>Odor threshold</b>                                 | Not available.                                                                     |
| <b>Physical state</b>                                 | Solid.                                                                             |
| <b>Form</b>                                           | Crystals.                                                                          |
| <b>pH</b>                                             | 5 - 5.5                                                                            |
| <b>Melting point</b>                                  | 194 °F (90 °C)                                                                     |
| <b>Freezing point</b>                                 | Not available.                                                                     |
| <b>Boiling point</b>                                  | 374 °F (190 °C) Decomposes.                                                        |
| <b>Flash point</b>                                    | Not available.                                                                     |
| <b>Evaporation rate</b>                               | Not available.                                                                     |
| <b>Flammability limits in air, upper, % by volume</b> | Not available.                                                                     |
| <b>Flammability limits in air, lower, % by volume</b> | Not available.                                                                     |
| <b>Vapor pressure</b>                                 | Not available.                                                                     |
| <b>Vapor density</b>                                  | Not available.                                                                     |
| <b>Specific gravity</b>                               | Not available.                                                                     |
| <b>Relative density</b>                               | Not available.                                                                     |
| <b>Solubility (water)</b>                             | Soluble.                                                                           |
| <b>Partition coefficient (n-octanol/water)</b>        | Not available                                                                      |
| <b>Auto-ignition temperature</b>                      | Not available.                                                                     |
| <b>Decomposition temperature</b>                      | Not available.                                                                     |
| <b>Molecular weight</b>                               | 1235.86                                                                            |
| <b>Molecular formula</b>                              | (NH <sub>4</sub> ) <sub>6</sub> Mo <sub>7</sub> O <sub>24</sub> ·4H <sub>2</sub> O |

## 10. Chemical Stability & Reactivity Information

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|---------------------------|---------------------------------------------|
| <b>Chemical stability</b> | Stable under normal temperature conditions. |
|---------------------------|---------------------------------------------|

|                                           |                                          |
|-------------------------------------------|------------------------------------------|
| <b>Conditions to avoid</b>                | Excessive heat.                          |
| <b>Incompatible materials</b>             | Strong oxidizing agents. Alkali metals.  |
| <b>Hazardous decomposition products</b>   | Ammonia. Nitrogen oxides (NOx).          |
| <b>Possibility of hazardous reactions</b> | Hazardous polymerization does not occur. |

## 11. Toxicological Information

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### Toxicological data

| Product                                          | Test Results                                                                                                                                                            |
|--------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| AMMONIUM MOLYBDATE TETRAHYDRATE (12054-85-2)     | Acute Oral LD50 Rat: 333 mg/kg                                                                                                                                          |
| <b>Sensitization</b>                             | Not a skin sensitizer.                                                                                                                                                  |
| <b>Acute effects</b>                             | Harmful if swallowed.                                                                                                                                                   |
| <b>Local effects</b>                             | Contact with eyes may cause irritation. Inhalation of dusts may cause respiratory irritation.                                                                           |
| <b>Chronic effects</b>                           | May cause reproductive effects. Suspected of causing genetic defects. Risk of damage to blood system. May cause damage to the liver and kidneys. Can cause bone damage. |
| <b>Carcinogenicity</b>                           | Possible cancer hazard - may cause cancer based on animal data. Not classifiable as to carcinogenicity to humans.                                                       |
| <b>ACGIH Carcinogens</b>                         |                                                                                                                                                                         |
| AMMONIUM MOLYBDATE TETRAHYDRATE (CAS 12054-85-2) | A3 Confirmed animal carcinogen with unknown relevance to humans.                                                                                                        |
| <b>Skin corrosion/irritation</b>                 | None known.                                                                                                                                                             |
| <b>Epidemiology</b>                              | No epidemiological data is available for this product.                                                                                                                  |
| <b>Mutagenicity</b>                              | Suspected of causing genetic defects.                                                                                                                                   |
| <b>Neurological effects</b>                      | None known.                                                                                                                                                             |
| <b>Reproductive effects</b>                      | Suspected of damaging fertility. Suspected of damaging the unborn child.                                                                                                |
| <b>Teratogenicity</b>                            | Components in this product have been shown to cause birth defects and reproductive disorders in laboratory animals.                                                     |
| <b>Symptoms and target organs</b>                | Irritant effects. Birth defects. Renal injury. Liver enlargement.                                                                                                       |

## 12. Ecological Information

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|------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Ecotoxicity</b>                             | The product components are not classified as environmentally hazardous. However, this does not exclude the possibility that large or frequent spills can have a harmful or damaging effect on the environment. |
| <b>Environmental effects</b>                   | An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.                                                                                                                |
| <b>Persistence and degradability</b>           | The product is not expected to be biodegradable.                                                                                                                                                               |
| <b>Partition coefficient (n-octanol/water)</b> | Not available                                                                                                                                                                                                  |

## 13. Disposal Considerations

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|-------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Disposal instructions</b>  | Dispose of this material and its container to hazardous or special waste collection point. Incinerate the material under controlled conditions in an approved incinerator. All wastes must be handled in accordance with local, state and federal regulations. |
| <b>Contaminated packaging</b> | Offer rinsed packaging material to local recycling facilities. Since emptied containers retain product residue, follow label warnings even after container is emptied.                                                                                         |

## 14. Transport Information

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### DOT

Not regulated as dangerous goods.

**IATA**

Not regulated as dangerous goods.

**IMDG**

Not regulated as dangerous goods.

**15. Regulatory Information****US federal regulations**

This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

This product is not listed on the U.S. EPA TSCA Inventory. Under TSCA, hydrates are considered mixtures of their anhydrous salt and water. Accordingly, the anhydrous form is subject to TSCA reporting requirements.

**US EPCRA (SARA Title III) Section 313 - Toxic Chemical: De minimis concentration**

AMMONIUM MOLYBDATE TETRAHYDRATE (CAS 12054-85-2) 1.0 %

**US EPCRA (SARA Title III) Section 313 - Toxic Chemical: Listed substance**

AMMONIUM MOLYBDATE TETRAHYDRATE (CAS 12054-85-2) Listed.

**CERCLA (Superfund) reportable quantity**

None

**Superfund Amendments and Reauthorization Act of 1986 (SARA)**

**Hazard categories**  
 Immediate Hazard - Yes  
 Delayed Hazard - Yes  
 Fire Hazard - No  
 Pressure Hazard - No  
 Reactivity Hazard - No

**Section 311 hazardous chemical**  
 Yes

**Inventory status**

| Country(s) or region        | Inventory name                                                         | On inventory (yes/no)* |
|-----------------------------|------------------------------------------------------------------------|------------------------|
| Australia                   | Australian Inventory of Chemical Substances (AICS)                     | Yes                    |
| Canada                      | Domestic Substances List (DSL)                                         | No                     |
| Canada                      | Non-Domestic Substances List (NDSL)                                    | No                     |
| China                       | Inventory of Existing Chemical Substances in China (IECSC)             | Yes                    |
| Europe                      | European Inventory of Existing Commercial Chemical Substances (EINECS) | No                     |
| Europe                      | European List of Notified Chemical Substances (ELINCS)                 | No                     |
| Japan                       | Inventory of Existing and New Chemical Substances (ENCS)               | Yes                    |
| Korea                       | Existing Chemicals List (ECL)                                          | No                     |
| New Zealand                 | New Zealand Inventory                                                  | Yes                    |
| Philippines                 | Philippine Inventory of Chemicals and Chemical Substances (PICCS)      | Yes                    |
| United States & Puerto Rico | Toxic Substances Control Act (TSCA) Inventory                          | No                     |

\*A "Yes" indicates that all components of this product comply with the inventory requirements administered by the governing country(s)

**State regulations**

This product does not contain a chemical known to the State of California to cause cancer, birth defects or other reproductive harm.

**Saf-T-Data**

Health: 2 - Moderate (Life)  
 Flammability: 0 - None  
 Reactivity: 1 - Slight  
 Contact: 1 - Slight  
 Lab Protective Equip: B - GOGGLES; LAB COAT; VENT HOOD; PROPER GLOVES  
 Storage Color Code: G - Green (General Storage)

## 16. Labeling Info

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|                             |                                                                                                                                                                                                                                                                                                                                                                                                                       |
|-----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Label Hazard Warning</b> | WARNING<br><br>Harmful if swallowed. Dust may irritate the eyes and the respiratory system. Prolonged exposure may cause chronic effects.                                                                                                                                                                                                                                                                             |
| <b>Label Precautions</b>    | Avoid breathing dust/fume/gas/mist/vapors/spray. Avoid contact with eyes, skin, and clothing. Do not taste or swallow. Use only with adequate ventilation. Wash thoroughly after handling. Keep container closed.                                                                                                                                                                                                     |
| <b>Label First Aid</b>      | Immediately flush eyes with plenty of water for at least 15 minutes. Flush skin thoroughly with water. If gas/fume/vapor/dust/mist from the material is inhaled, remove the affected person immediately to fresh air. Get medical attention if irritation develops or persists. IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician. Do not induce vomiting without advice from poison control center. |

## 17. Other Information

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|---------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>NFPA ratings</b> | Health: 2<br>Flammability: 0<br>Instability: 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
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| <b>Issue date</b>   | 09-01-2011                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |