1 Identification of substance

· Trade name: Molybdate 3 Reagent Solution
· Product use: Reagent for water analysis
· Catalogue number: L531730
· Manufacturer/Supplier:
  Orbeco-Hellige, Inc.
  6456 Parkland Drive
  Sarasota, FL 34243
  USA
  phone: (941) 756-6410
  fax: (941) 727-9654
  www.orbeco.com
  Made in Germany
· Emergency information: Chemtrec: 800-424-9300

2 Hazards identification

· Hazard description:
  C Corrosive
· Canadian Hazard Symbols:
  [Chemical symbol]
· WHMIS classification:
  D1A
  Very toxic material causing immediate and serious toxic effects
  E
  Corrosive material
· Information pertaining to particular dangers for man and environment:
  The product has to be labelled due to the calculation procedure of the "General Classification guideline for preparations of the EU" in the latest valid version.
  R 35 Causes severe burns.
· Classification system:
  The classification was made according to the latest editions of international substances lists, and expanded upon from company and literature data.
· NFPA ratings (scale 0 - 4)
  Health = 3
  Fire = 0
  Reactivity = 1
3 Composition / Data on components

- Composition and Information on Ingredients:
  - CAS: 7664-93-9
    - EINECS: 231-639-5
    - Index number: 016-020-00-8
    - RTECS: WS5600000
    - sulphuric acid
    - C; R 35
    - 10-20%
  - CAS: 7732-18-5
    - EINECS: 231-791-2
    - RTECS: ZC 0110000
    - water, distilled, conductivity or of similar purity
    - 60-70%
  - CAS: 9999-99-9
    - Nonhazardous components
    - Any ingredient(s) of this product listed as "Nonhazardous component(s)" is not considered a health hazard according to OSHA definition.
    - 10-20%

- REACH - pre-registered substances
  All components are REACH pre-registered.

- Additional information:
  For the wording of the listed risk phrases refer to section 16.

4 First aid measures

- **General information:** Immediately remove any clothing soiled by the product.
  - **After inhalation:**
    - Supply fresh air or oxygen; call for doctor.
    - In case of unconsciousness remove to fresh air, apply artificial respiration, and consult a physician.
  - **After skin contact:**
    - Immediately wash with polyethylene glycol 400.
    - Immediately rinse with plenty of water.
    - Immediate medical treatment necessary. Failure to treat burns can prevent wounds from healing.
  - **After eye contact:**
    - Rinse opened eye for several minutes (15 min) under running water.
    - Call a doctor immediately.
  - **After swallowing:**
    - Rinse out mouth and then drink 1-2 glasses of water.
    - Do not induce vomiting; immediately call for medical help.
  - **The following symptoms may occur:**
    - after inhalation:
      - damage to the affected mucous membranes
      - breathing difficulty
    - after swallowing:
      - sickness
      - vomiting
      - diarrhoea
      - pain
  - **Danger:** Danger of gastric perforation.
  - **Treatment** Later observation for pneumonia and pulmonary edema.

5 Fire fighting measures

- **Suitable extinguishing agents:** Use fire fighting measures that suit the environment.
- **Special hazards caused by the material, its products of combustion or resulting gases:**
  - Formation of toxic gases is possible during heating or in case of fire.
    - nitrogen oxides
    - Sulfur oxides (SOx)
- **Protective equipment:**
  - Wear self-contained respiratory protective device.
  - Wear fully protective suit.
6 Accidental release measures

- **Person-related safety precautions:**
  Wear protective equipment. Keep unprotected persons away.
  Ensure adequate ventilation

- **Measures for environmental protection:** Do not allow product to reach sewage system or any water course.

- **Measures for cleaning/collection:**
  Dispose contaminated material as waste according to item 13.
  Ensure adequate ventilation.
  Neutralize with diluted sodium hydroxide solution.
  Absorb with liquid-binding material (sand, diatomite, universal binders).

7 Handling and storage

- **Handling:**
  - **Information for safe handling:**
    Ensure good ventilation/exhaustion at the workplace.
    Open and handle receptacle with care.
    Prevent formation of aerosols.
    Use only in well ventilated areas.
  - **Information about protection against explosions and fires:** The product is not flammable.

- **Storage:**
  - **Requirements to be met by storerooms and receptacles:** Store in a cool location.
  - **Information about storage in one common storage facility:**
    store away from water
    store away from metals
  - **Further information about storage conditions:**
    Keep receptacle tightly sealed.
    Protect from heat and direct sunlight.
    Protect from humidity and water.
    Protect from exposure to the light.
  - **Recommended storage temperature:** 20°C ± 5°C (approx. 68°F)

8 Exposure controls and personal protection

- **Additional information about design of technical systems:** No further data; see item 7.

<table>
<thead>
<tr>
<th>Components with limit values that require monitoring at the workplace:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>7664-93-9 sulphuric acid (20-25%)</strong></td>
</tr>
<tr>
<td>PEL (USA) 1 mg/m³</td>
</tr>
<tr>
<td>REL (USA) 1 mg/m³</td>
</tr>
<tr>
<td>TLV (USA) 0.2* mg/m³</td>
</tr>
<tr>
<td>EL (Canada) 0.2 mg/m³</td>
</tr>
<tr>
<td>ACGIH A2; IARC 1</td>
</tr>
<tr>
<td>EV (Canada) 0.2 mg/m³</td>
</tr>
</tbody>
</table>

- **Additional information:** The lists that were valid during the creation were used as basis.
Trade name: Molybdate 3 Reagent Solution

- **Personal protective equipment:**
- **General protective and hygienic measures:**
  Keep away from foodstuffs, beverages and feed.
  Immediately remove all soiled and contaminated clothing.
  Wash hands before breaks and at the end of work.
  Do not inhale gases / fumes / aerosols.
  Avoid contact with the eyes and skin.
  Do not eat, drink, smoke or sniff while working.

- **Breathing equipment:** Use respiratory protective device against the effects of fumes/dust/aerosol.
- **Recommended filter device for short term use:** Filter B
- **Protection of hands:**
  Acid resistant gloves
  Preventive skin protection by use of skin-protecting agents is recommended.
  After use of gloves apply skin-cleaning agents and skin cosmetics.

- **Material of gloves**
  Nitrile rubber, NBR
  Recommended thickness of the material: ≥ 0.11 mm

- **Penetration time of glove material**
  Value for the permeation: Level ≥ 1 (10 min)
  The exact breakthrough time has to be found out by the manufacturer of the protective gloves and has to be observed.

- **Eye protection:** Tightly sealed goggles
- **Body protection:** Acid resistant protective clothing

### 9 Physical and chemical properties

- **Odor Threshold:** Not applicable.
- **Form:** Fluid
- **Color:** Colorless
- **Odor:** Odorless

- **Melting point/Melting range:** Undetermined.
- **Boiling point/Boiling range:** 100°C (212°F)
- **Freezing Point:** Not applicable.
- **Flash point:** Not applicable.

- **Flammability (solid, gaseous):**
  - Upper Flammable Limit: Not applicable.
  - Lower Flammable Limit: Not applicable.
  - Ignition temperature: Undetermined.
  - Sensitivity to Mechanical Impact: None
  - Sensitivity to Static Discharge: None

- **Auto igniting:** Product is not selfigniting.
- **Danger of explosion:** Product does not present an explosion hazard.
- **Vapor Density:** Not applicable.
- **Specific Gravity:** Not applicable.

- **Density at 20°C (68°F):** 1.23 g/cm³
- **Solubility in / Miscibility with Water:** Fully miscible.
- **Coefficient of Water / Oil Distribution:** Not applicable.

- **pH-value at 20°C (68°F):** 1.2
- **Solvent content:**
  - Organic solvents: 0.0 %
10 Stability and reactivity

- **Thermal decomposition / conditions to be avoided:** To avoid thermal decomposition do not overheat.
- **Materials to be avoided:**
  - ammonia (NH₃)
  - alkalis
  - acids
  - metals
  - halogen compounds
  - combustible materials
  - organic solvents
  - nitriles
  - peroxides
  - oxidizing agents
- **Dangerous reactions**
  - Corrosive action on metals.
  - When diluting, always add acid to water, never vice versa.
  - Reacts with metals forming hydrogen (Danger of explosion!)
  - Reacts with organic substances.
  - Diluting or dissolving in water always causes rapid heating.
- **Dangerous products of decomposition:**
  - nitrogen oxides
  - Sulfur oxides (SOₓ)
  - see chapter 5

11 Toxicological information

- **Acute toxicity:** Quantitative data on the toxicity of the preparation are not available.
- **LD/LC₅₀ values that are relevant for classification:**

<table>
<thead>
<tr>
<th>7664-93-9 sulphuric acid</th>
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</thead>
<tbody>
<tr>
<td>Oral</td>
</tr>
<tr>
<td>Inhalative</td>
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<tr>
<td></td>
</tr>
</tbody>
</table>

- **Primary irritant effect:**
  - **on the skin:** Strong caustic effect on skin and mucous membranes.
  - **on the eye:** strong caustic effect
  - **Sensitization:** No sensitizing effects known.
- **Experience with humans:**
  - molybdenum(VI):
    - Can cause liver damage.
    - Can cause kidney damages.
- **Additional toxicological information:**
  - The product shows the following dangers according to internally approved calculation methods for preparations:
    - Corrosive
    - Swallowing will lead to a strong caustic effect on mouth and throat and to the danger of perforation of esophagus and stomach.
in case of an acute molybdenum(VI) intoxication: diarrhoea, anaemia, fatigue, loss of appetite

- Carcinogenicity: NTP? IARC Monographs? OSHA Regulated? see chapter 8 / 15
- Teratogenicity: Not found.
- Mutagenicity: Not found.
- Reproductive Toxicity: Not found.
- Synergistic Products: None

12 Ecological information

- Information about elimination (persistence and degradability):

  Other information:
  Quantitative data on the ecological effect of this preparation are not available. Methods for the determination of biodegradability are not applicable to inorganic substances. Does not cause biologicall oxygen deficit.

- Ecotoxical effects:

  - Aquatic toxicity:

    | 7664-93-9 sulphuric acid |
    |-------------------------|
    | Daphnia EC50 29 mg/l/24h (Daphnia magna) |
    | LC50 16-29 mg/l/96h (Lepomis macrochirus) |
    | MERCK |

  - Remark:
    Forms corrosive mixtures with water even if diluted.
    toxic for algae
    Toxic for fish:
    molybdenum compounds in general: > 25 mg/l
  - Algae toxicity: molybdenum compounds: Sc. quadricula toxic from 54 mg/l
  - Remark: neutralization possible

- General notes:
  Water hazard class 1 (Self-assessment): slightly hazardous for water
  Do not allow undiluted product or large quantities of it to reach ground water, water course or sewage system.
  Must not reach bodies of water or drainage ditch undiluted or unneutralized.
  Rinse off of bigger amounts into drains or the aquatic environment may lead to decreased pH-values. A low pH-value harms aquatic organisms. In the dilution of the use-level the pH-value is considerably increased, so that after the use of the product the aqueous waste, emptied into drains, is only low water-dangerous.

13 Disposal considerations

- Product:
  Recommendation:
  Hand over to hazardous waste disposers.
  Must not be disposed of together with household garbage. Do not allow product to reach sewage system.

- Uncleaned packagings:
  Recommendation: Disposal must be made according to official regulations.
  Recommended cleansing agent: Water, if necessary with cleansing agents.
14 Transport information

- **TDG / DOT regulations:**
  - Hazard class: 8
  - Identification number: UN2796
  - Packing group: II
  - Proper shipping name (technical name): SULPHURIC ACID, solution
  - Label: 8

- **Land transport ADR/RID (cross-border):**
  - ADR/RID class: 8 (C1) Corrosive substances
  - Danger code (Kemler): 80
  - UN-Number: 2796
  - Packaging group: II
  - Description of goods: 2796 SULPHURIC ACID, solution
  - Limited quantity (LQ): LQ22

- **Maritime transport IMDG:**
  - IMDG Class: 8
  - UN Number: 2796
  - Label: 8
  - Packaging group: II
  - EMS Number: F-A,S-B
  - Marine pollutant: No
  - Proper shipping name: SULPHURIC ACID, solution

- **Air transport ICAO-TI and IATA-DGR:**
  - ICAO/IATA Class: 8
  - UN/ID Number: 2796
  - Label: 8
  - Packaging group: II
  - Proper shipping name: SULPHURIC ACID, solution
  - Canadian TDG Class: 8

- **UN "Model Regulation":** UN2796; SULPHURIC ACID, solution; 8; II
**15 Regulations**

<table>
<thead>
<tr>
<th>Section 355 (Extremely hazardous substances):</th>
<th>7664-93-9 sulphuric acid</th>
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<tr>
<td>Section 313 (Specific toxic chemical listings):</td>
<td>7664-93-9 sulphuric acid</td>
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<tr>
<td>TSCA (Toxic Substances Control Act):</td>
<td>7732-18-5 water, distilled, conductivity or of similar purity</td>
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<td></td>
<td>7664-93-9 sulphuric acid</td>
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</tbody>
</table>

**Proposition 65**

- **Chemicals known to cause cancer:** None of the ingredients is listed.
- **Chemicals known to cause reproductive toxicity for females:** None of the ingredients is listed.
- **Chemicals known to cause reproductive toxicity for males:** None of the ingredients is listed.
- **Chemicals known to cause developmental toxicity:** None of the ingredients is listed.

**Canadian Ingredient Disclosure List**

- **Limit 0.1%** None of the ingredients is listed.
- **Limit 1%** 7664-93-9 sulphuric acid

**Canadian Domestic Substances List (DSL)**

- 7732-18-5 water, distilled, conductivity or of similar purity
- 7664-93-9 sulphuric acid

**EPA (Environmental Protection Agency)** None of the ingredients is listed.

**IARC (International Agency for Research on Cancer)**

- 7664-93-9 sulphuric acid 1

**NTP (National Toxicology Program)**

- 7664-93-9 sulphuric acid K

**NIOSH-Ca (National Institute for Occupational Safety and Health)** None of the ingredients is listed.

**OSHA-Ca (Occupational Safety & Health Administration)** None of the ingredients is listed.

**Australian Inventory of Chemical Substances** All ingredients are listed.

**ENCS List (MITI):**

- 7664-93-9 sulphuric acid 1-430

**Standard for the Uniform Scheduling of Drugs and Poisons** None of the ingredients is listed.

**Product related hazard informations:**
The product has been classified and marked in accordance with directives on hazardous materials.
Hazard symbols:
C Corrosive

Hazard-determining components of labelling:
sulphuric acid

Risk phrases:
35 Causes severe burns.

Safety phrases:
20 When using do not eat or drink.
23 Do not breathe fumes / aerosol
26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
36/37/39 Wear suitable protective clothing, gloves and eye/face protection.
45 In case of accident or if you feel unwell, seek medical advice immediately.
60 This material and its container must be disposed of as hazardous waste.

Information about limitation of use: Employment restrictions concerning young persons must be observed.

Water hazard class: Water hazard class 1 (Self-assessment): slightly hazardous for water.

CPR Classification:
Class D, Div. 1-A
Class E

This product has been classified in accordance with the hazard criteria of the CPR and the MSDS contains all of the information required by the CPR.

16 Other information
This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

Relevant R-phrases
35 Causes severe burns.

Recommended restriction of use: professional/industrial use only

Contact: Orbeco-Hellige, Inc., Quality Assurance Dept., Phone: 941-756-6410

Sources
International Chemical Safety Cards (ICSCs)
GESTIS-Stoffdatenbank
Data arise from manufacturers' data sheets, reference works and literature.

* Data compared to the previous version altered.