



Be Right™

# SAFETY DATA SHEET

Issue Date 02-Jun-2016

Revision Date 02-Feb-2017

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## 1. IDENTIFICATION

### Product identifier

**Product Name** Molybdate Reagent

### Other means of identification

**Product Code(s)** 223632

**Safety data sheet number** M00439

**UN/ID no** UN3264

### Synonyms

### Recommended use of the chemical and restrictions on use

**Recommended Use** Laboratory reagent. Phosphate determination.

**Uses advised against** None.

**Restrictions on use** None.

### Details of the supplier of the safety data sheet

#### Manufacturer Address

Hach Company  
P.O.Box 389 Loveland, CO 80539 USA  
(970) 669-3050

#### Emergency telephone number

(303) 623-5716 - 24 Hour Service (515)232-2533 - 8am - 4pm CST

## 2. HAZARDS IDENTIFICATION

### Classification

#### Regulatory Status

This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Corrosive to metals	Category 1
Skin corrosion/irritation	Category 1
Serious eye damage/eye irritation	Category 1
Aquatic Acute Toxicity	Category 3

#### Hazards not otherwise classified (HNOC)

Data insufficient for GHS classification but significant enough for mention suggests:

CANCER HAZARD. STRONG INORGANIC ACID MISTS CONTAINING SULFURIC ACID CAN CAUSE CANCER.

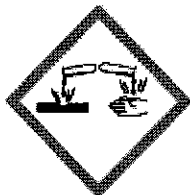
Inhalation of low concentrations of sulfuric acid may result in airway irritation such as cough and shortness of breath; high concentrations may result in acute effects such as cough.

#### Label elements

**Signal word - Danger**

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**Hazard statements**

H290 - May be corrosive to metals  
H314 - Causes severe skin burns and eye damage  
H402 - Harmful to aquatic life

**Precautionary statements**

P260 - Do not breathe dust/fume/gas/mist/vapors/spray  
P264 - Wash face, hands and any exposed skin thoroughly after handling  
P280 - Wear protective gloves/protective clothing/eye protection/face protection  
P273 - Avoid release to the environment  
P234 - Keep only in original container  
P304 + P340 - IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing  
P305 + P351 + P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing  
P303 + P361 + P353 - IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower  
P363 - Wash contaminated clothing before reuse  
P301 + P330 + P331 - IF SWALLOWED: rinse mouth. Do NOT induce vomiting  
P310 - Immediately call a POISON CENTER or doctor/physician  
P390 - Absorb spillage to prevent material damage  
P405 - Store locked up  
P406 - Store in corrosive resistant stainless steel container with a resistant inliner  
P501 - Dispose of contents/ container to an approved waste disposal plant

**Other Information**

Not applicable

**3. COMPOSITION/INFORMATION ON INGREDIENTS**

**Substance**

Not applicable

**Mixture**

**Synonyms**

Percent ranges are used where confidential product information is applicable.

Chemical Name	CAS No	Percent Range	HMRIC #
Sulfuric acid	7664-93-9	30 - 40%	-
Molybdate, hexaammonium, tetrahydrate	12054-85-2	1 - 5%	-
Molybdate (MoO42-), dihydrogen, (T-4)-	7782-91-4	0.1 - 1%	-
Nitric acid	7697-37-2	0.1 - 1%	-

#### 4. FIRST AID MEASURES

##### Description of first aid measures

<b>General advice</b>	See section 8 for PPE that may be required during handling. Do not breathe dust/fume/gas/mist/vapors/spray. Do not get in eyes, on skin, or on clothing. In case of accident or unwellness, seek medical advice immediately (show directions for use or safety data sheet if possible). If no local exhaust use approved fume hood and/or respirator. If experiencing respiratory symptoms: Call a POISON CENTER or doctor/physician. Remove from exposure, lie down. Immediate medical attention is required. IF IN EYES: Flush eyes for at least 15 minutes. IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.
<b>Eye contact</b>	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Call a physician immediately.
<b>Skin contact</b>	IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower. Call a physician immediately.
<b>Inhalation</b>	IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a physician immediately.
<b>Ingestion</b>	IF SWALLOWED: Rinse Mouth. Do NOT induce vomiting. Call a physician immediately.
<b>Self-protection of the first aider</b>	First aider: Pay attention to self-protection. Use personal protective equipment as required. Avoid contact with skin, eyes or clothing. Ensure that medical personnel are aware of the material(s) involved, take precautions to protect themselves and prevent spread of contamination. Do not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device.

##### Most important symptoms and effects, both acute and delayed

**Symptoms** See Section 11: TOXICOLOGICAL INFORMATION.

##### Indication of any immediate medical attention and special treatment needed

**Note to physicians** Treat symptomatically.

#### 5. FIRE-FIGHTING MEASURES

##### Suitable Extinguishing Media

Dry chemical. Do NOT use water.

**Unsuitable extinguishing media** Do NOT use water.

##### Flammable properties

Substance does not burn.

##### Specific hazards arising from the chemical

The product causes burns of eyes, skin and mucous membranes. Thermal decomposition can lead to release of irritating and toxic gases and vapors. In the event of fire and/or explosion do not breathe fumes.

**Hazardous combustion products**

This material will not burn.

##### Protective equipment and precautions for firefighters

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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**U.S. Notice** Only persons properly qualified to respond to an emergency involving hazardous substances may respond to a spill according to federal regulations (OSHA 29 CFR 1910.120(a)(v)) and per your company's emergency response plan and guidelines/procedures. See Section 13, Special Instructions for disposal assistance. Outside of the US, only persons properly qualified according to state or local regulations should respond to a spill involving chemicals.

**EC Notice** Only persons properly qualified to respond to an emergency involving hazardous substances should respond to a spill involving chemicals. See Section 13, Special Instructions for disposal assistance.

**WHMIS Notice** Only persons properly qualified to respond to an emergency involving hazardous substances should respond to a spill involving chemicals. See Section 13, Special Instructions for disposal assistance.

**Personal precautions, protective equipment and emergency procedures**

**Personal precautions** Evacuate personnel to safe areas. Do not touch or walk through spilled material. Ventilate affected area. Use personal protective equipment as required.

**For emergency responders** Use personal protection recommended in Section 8.

**Environmental precautions**

**Environmental precautions** Do not allow into any sewer, on the ground or into any body of water. Should not be released into the environment. Prevent further leakage or spillage if safe to do so. Prevent product from entering drains. See Section 12 for additional ecological information.

**Methods and material for containment and cleaning up**

**Methods for containment** Prevent further leakage or spillage if safe to do so. Dike far ahead of liquid spill for later disposal.

**Methods for cleaning up** Take necessary precautions in observance of pertinent physical hazards. Neutralize spill if necessary. Soak up with inert absorbent material. Take up mechanically, placing in appropriate containers for disposal. Clean contaminated surface thoroughly. Dispose of in accordance with local, state and federal regulations or laws.

**Emergency Response Guide Number** 154

**7. HANDLING AND STORAGE**

**Precautions for safe handling**

**Advice on safe handling** Absorb spillage to prevent material damage.

**Conditions for safe storage, including any incompatibilities**

**Storage Conditions** Keep out of the reach of children. Keep containers tightly closed in a dry, cool and well-ventilated place. Keep in properly labeled containers. Keep/store only in original container.

**Flammability class** Not applicable

**8. EXPOSURE CONTROLS/PERSONAL PROTECTION**

**Control parameters**

**Exposure Guidelines**

Chemical Name	ACGIH TLV	OSHA PEL	NIOSH IDLH
Sulfuric acid 30 - 40%	TWA: 0.2 mg/m <sup>3</sup>	TWA: 1 mg/m <sup>3</sup> (vacated) TWA: 1 mg/m <sup>3</sup>	IDLH: 15 mg/m <sup>3</sup> TWA: 1 mg/m <sup>3</sup>
Molybdate, hexaammonium, tetrahydrate 1 - 5%	TWA: 0.5 mg/m <sup>3</sup>	TWA: 5 mg/m <sup>3</sup> (vacated) TWA: 5 mg/m <sup>3</sup>	IDLH: 1000 mg/m <sup>3</sup> Mo
Molybdate (MoO4 <sup>2-</sup> ), dihydrogen, (T-4)- 0.1 - 1%	TWA: 0.5 mg/m <sup>3</sup>	TWA: 5 mg/m <sup>3</sup> (vacated) TWA: 5 mg/m <sup>3</sup>	IDLH: 1000 mg/m <sup>3</sup> Mo
Nitric acid 0.1 - 1%	STEL: 4 ppm TWA: 2 ppm	TWA: 2 ppm TWA: 5 mg/m <sup>3</sup> (vacated) TWA: 2 ppm (vacated) TWA: 5 mg/m <sup>3</sup> (vacated) STEL: 4 ppm (vacated) STEL: 10 mg/m <sup>3</sup>	IDLH: 25 ppm TWA: 2 ppm TWA: 5 mg/m <sup>3</sup> STEL: 4 ppm STEL: 10 mg/m <sup>3</sup>

Chemical Name	Alberta OEL	British Columbia OEL	Manitoba OEL	New Brunswick OEL	New Foundland & Labrador OEL
Sulfuric acid 30 - 40%	TWA: 1 mg/m <sup>3</sup> STEL: 3 mg/m <sup>3</sup>	TWA: 0.2 mg/m <sup>3</sup>	TWA: 0.2 mg/m <sup>3</sup>	TWA: 1 mg/m <sup>3</sup> STEL: 3 mg/m <sup>3</sup>	TWA: 0.2 mg/m <sup>3</sup>
Molybdate, hexaammonium, tetrahydrate 1 - 5%	TWA: 0.5 mg/m <sup>3</sup>	TWA: 0.5 mg/m <sup>3</sup>	TWA: 0.5 mg/m <sup>3</sup>	TWA: 5 mg/m <sup>3</sup>	TWA: 0.5 mg/m <sup>3</sup>
Molybdate (MoO4 <sup>2-</sup> ), dihydrogen, (T-4)- 0.1 - 1%	TWA: 0.5 mg/m <sup>3</sup>	TWA: 0.5 mg/m <sup>3</sup>	TWA: 0.5 mg/m <sup>3</sup>	TWA: 5 mg/m <sup>3</sup>	TWA: 0.5 mg/m <sup>3</sup>
Nitric acid 0.1 - 1%	TWA: 2 ppm TWA: 5.2 mg/m <sup>3</sup> STEL: 4 ppm STEL: 10 mg/m <sup>3</sup>	TWA: 2 ppm STEL: 4 ppm	TWA: 2 ppm STEL: 4 ppm	TWA: 2 ppm TWA: 5.2 mg/m <sup>3</sup> STEL: 4 ppm STEL: 10 mg/m <sup>3</sup>	TWA: 2 ppm STEL: 4 ppm

Chemical Name	Northwest Territories OEL	Nova Scotia OEL	Nunavut OEL	Ontario TWA	Prince Edward Island OEL
Sulfuric acid 30 - 40%	TWA: 0.2 mg/m <sup>3</sup> STEL: 0.6 mg/m <sup>3</sup>	TWA: 0.2 mg/m <sup>3</sup>	TWA: 0.2 mg/m <sup>3</sup> STEL: 0.6 mg/m <sup>3</sup>	TWA: 0.2 mg/m <sup>3</sup>	TWA: 0.2 mg/m <sup>3</sup>
Molybdate, hexaammonium, tetrahydrate 1 - 5%	TWA: 0.5 mg/m <sup>3</sup> STEL: 1.5 mg/m <sup>3</sup>	TWA: 0.5 mg/m <sup>3</sup>	TWA: 0.5 mg/m <sup>3</sup> STEL: 1.5 mg/m <sup>3</sup>	TWA: 0.5 mg/m <sup>3</sup>	TWA: 0.5 mg/m <sup>3</sup>
Molybdate (MoO4 <sup>2-</sup> ), dihydrogen, (T-4)- 0.1 - 1%	TWA: 0.5 mg/m <sup>3</sup> STEL: 1.5 mg/m <sup>3</sup>	TWA: 0.5 mg/m <sup>3</sup>	TWA: 0.5 mg/m <sup>3</sup> STEL: 1.5 mg/m <sup>3</sup>	TWA: 0.5 mg/m <sup>3</sup>	TWA: 0.5 mg/m <sup>3</sup>
Nitric acid 0.1 - 1%	TWA: 2 ppm STEL: 4 ppm	STEL: 4 ppm TWA: 2 ppm	TWA: 2 ppm STEL: 4 ppm	TWA: 2 ppm STEL: 4 ppm	STEL: 4 ppm TWA: 2 ppm

Chemical Name	Quebec OEL	Saskatchewan OEL	Yukon OEL
Sulfuric acid 30 - 40%	TWA: 1 mg/m <sup>3</sup> STEL: 3 mg/m <sup>3</sup>	TWA: 0.2 mg/m <sup>3</sup> STEL: 0.6 mg/m <sup>3</sup>	STEL: 1 mg/m <sup>3</sup> TWA: 1 mg/m <sup>3</sup>
Molybdate, hexaammonium, tetrahydrate 1 - 5%	TWA: 5 mg/m <sup>3</sup>	TWA: 0.5 mg/m <sup>3</sup> STEL: 1.5 mg/m <sup>3</sup>	STEL: 10 mg/m <sup>3</sup> TWA: 5 mg/m <sup>3</sup>
Molybdate (MoO4 <sup>2-</sup> ), dihydrogen, (T-4)- 0.1 - 1%	TWA: 5 mg/m <sup>3</sup>	TWA: 0.5 mg/m <sup>3</sup> STEL: 1.5 mg/m <sup>3</sup>	STEL: 10 mg/m <sup>3</sup> TWA: 5 mg/m <sup>3</sup>
Nitric acid 0.1 - 1%	TWA: 2 ppm TWA: 5.2 mg/m <sup>3</sup> STEL: 4 ppm STEL: 10 mg/m <sup>3</sup>	TWA: 2 ppm STEL: 4 ppm	STEL: 4 ppm STEL: 10 mg/m <sup>3</sup> TWA: 2 ppm TWA: 5 mg/m <sup>3</sup>

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**Other Information** Vacated limits revoked by the Court of Appeals decision in AFL-CIO v. OSHA, 965 F.2d 962 (11th Cir., 1992).

**Legend** See section 16 for terms and abbreviations

**Appropriate engineering controls**

**Engineering Controls** If no local exhaust use approved fume hood or self-contained breathing apparatus  
If no local exhaust use approved fume hood and/or respirator  
Showers  
Eyewash stations

**Individual protection measures, such as personal protective equipment**

**Eye/face protection** Wear tight sealing safety goggles and/or face protection shield. Avoid contact with eyes.

**Skin and body protection** Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact.

**Respiratory protection** Do not breathe gas/fumes/vapor/spray. If no local exhaust use approved fume hood and/or respirator. In case of inadequate ventilation wear respiratory protection.

**General Hygiene Considerations** Avoid breathing (dust, vapor, mist, gas). Avoid contact with skin, eyes or clothing. Use personal protective equipment as required. Wear suitable gloves and eye/face protection. Wash face, hands and any exposed skin thoroughly after handling. Do not eat, drink or smoke when using this product. Keep away from food, drink and animal feeding stuffs. Regular cleaning of equipment, work area and clothing is recommended. Handle in accordance with good industrial hygiene and safety practice. Avoid prolonged or repeated contact with skin. Take off all contaminated clothing and wash it before reuse.

**Environmental exposure controls**

Do not allow into any sewer, on the ground or into any body of water. Local authorities should be advised if significant spillages cannot be contained.

**9. PHYSICAL AND CHEMICAL PROPERTIES**

**Information on basic physical and chemical properties**

<b>Physical state</b>	Liquid		
<b>Gas Under Pressure</b>	Not classified according to GHS criteria		
<b>Appearance</b>	aqueous solution	<b>Color</b>	clear colorless
<b>Odor</b>	Odorless	<b>Odor threshold</b>	No data available

<b><u>Property</u></b>	<b><u>Values</u></b>	<b><u>Remarks • Method</u></b>
<b>Molecular weight</b>	No data available	
<b>pH</b>	< 0.5	
<b>Melting point/freezing point</b>	~ -43 °C / -45 °F	Estimation based on theoretical calculation
<b>Boiling point / boiling range</b>	~ 112 °C / 234 °F	Estimation based on theoretical calculation
<b>Evaporation rate</b>	0.12 (water = 1)	

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**Vapor pressure** 21.377 mm Hg / 2.85 kPa at 25 °C / 77 °F Estimation based on theoretical calculation

**Vapor density (air = 1)** No data available

**Specific gravity (water = 1 / air = 1)** 1.30

**Partition Coefficient (n-octanol/water)** Not applicable

**Soil Organic Carbon-Water Partition Coefficient** Not applicable

**Autoignition temperature** No data available

**Decomposition temperature** No data available

**Dynamic viscosity** No data available

**Kinematic viscosity** No data available

**Solubility(ies)**

**Water solubility**

<u>Water solubility classification</u>	<u>Water solubility</u>	<u>Water Solubility Temperature</u>
Soluble	> 1000 mg/L	25 °C / 77 °F

**Solubility in other solvents**

<u>Chemical Name</u>	<u>Solubility classification</u>	<u>Solubility</u>	<u>Solubility Temperature</u>
None reported	No information available	No data available	No information available

**Other Information**

**Metal Corrosivity** Classified as corrosive to metal according to GHS criteria

**GHS Metal Corrosivity Classification** Category 1, H290

**Steel Corrosion Rate** 107.4 mm/yr / 4.23 in/yr

**Aluminum Corrosion Rate**

**Bulk density** Not applicable

**Explosive properties** Not classified according to GHS criteria.

**Explosion data** Not Flammable, but reacts with most metals to form flammable hydrogen gas. During a fire, corrosive and toxic gases may be generated by thermal decomposition.

**Upper explosion limit** No data available

**Lower explosion limit** No data available

**Flammable properties** Not classified as flammable according to GHS criteria.

**Flammability Limit in Air**

**Upper flammability limit:** No data available

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<b>Lower flammability limit:</b>	No data available
<b>Flash point</b>	No data available
<b>Method</b>	No information available
<b>Oxidizing properties</b>	Not classified according to GHS criteria.
<b>Reactivity properties</b>	Not classified as self-reactive, pyrophoric, self-heating or emitting flammable gases in contact with water according to GHS criteria.

## 10. STABILITY AND REACTIVITY

### Reactivity properties

Not classified as self-reactive, pyrophoric, self-heating or emitting flammable gases in contact with water according to GHS criteria

### Chemical stability

Stable under recommended storage conditions.

### Special dangers of the product

None reported

### Possibility of Hazardous Reactions

None under normal processing.

**Hazardous polymerization**      Hazardous polymerization does not occur.

### Conditions to avoid

Extremes of temperature and direct sunlight. Incompatible materials.

### Incompatible materials

Strong oxidizing agents. Strong acids. Strong bases.

### Hazardous Decomposition Products

Thermal decomposition can lead to release of irritating and toxic gases and vapors.

### Explosive properties

Not classified according to GHS criteria. Not Flammable, but reacts with most metals to form flammable hydrogen gas. During a fire, corrosive and toxic gases may be generated by thermal decomposition.

**Upper explosion limit**      No data available

**Lower explosion limit**      No data available

### Autoignition temperature

No data available

### Sensitivity to Static Discharge

None reported

### Sensitivity to Mechanical Impact

None reported

## 11. TOXICOLOGICAL INFORMATION



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NIOSH (RTECS) Number None reported

**Information on Likely Routes of Exposure**

<b>Product Information</b>	Corrosive to skin. Corrosive to eyes.
<b>Inhalation</b>	Causes burns. Corrosive by inhalation.
<b>Eye contact</b>	Corrosive to the eyes and may cause severe damage including blindness. Causes burns.
<b>Skin contact</b>	Cause severe skin burns and eye damage.
<b>Ingestion</b>	Ingestion causes burns of the upper digestive and respiratory tracts.
<b>Aggravated Medical Conditions</b>	Eye disorders. Skin disorders. Respiratory disorders.
<b>Toxicologically synergistic products</b>	None known.
<b>Toxicokinetics, metabolism and distribution</b>	See ingredients information below.

Chemical Name	Toxicokinetics, metabolism and distribution
Sulfuric acid (30 - 40%) CAS#: 7664-93-9	The corrosivity of sulfuric acid makes it difficult to assess its effects on metabolism. Its corrosivity is also the main contributor to acute deaths, therefore it is not classified for acute toxicity.
Nitric acid (0.1 - 1%) CAS#: 7697-37-2	Acute mortality can be attributed to the nitric acids corrosive effects.

**Product Acute Toxicity Data**

Oral Exposure Route No data available  
 Dermal Exposure Route No data available  
 Inhalation (Dust/Mist) Exposure Route No data available  
 Inhalation (Vapor) Exposure Route No data available  
 Inhalation (Gas) Exposure Route No data available

The following values are calculated based on chapter 3.1 of the GHS document

ATEmix (oral)	8,233.00 mg/kg
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**Ingredient Acute Toxicity Data**

**Oral Exposure Route**

If available, see data below

Chemical Name	Endpoint type	Reported dose	Exposure time	Toxicological effects	Key literature references and sources for data
Molybdate, hexaammonium, tetrahydrate (1 - 5%) CAS#: 12054-85-2	Rat LD <sub>50</sub>	354 mg/kg	None reported	None reported	No information available
Molybdate (MoO42-), dihydrogen, (T-4)- (0.1 - 1%) CAS#: 7782-91-4	Rat LD <sub>50</sub>	2689 mg/kg	None reported	None reported	Vendor SDS
Chemical Name	Endpoint type	Reported dose	Exposure time	Toxicological effects	Key literature references and sources for data
Sulfuric acid (30 - 40%) CAS#: 7664-93-9	Rat LD <sub>50</sub>	2140 mg/kg	None reported	None reported	IUCLID (The International Uniform Chemical Information Database)

**Dermal Exposure Route**

If available, see data below

Chemical Name	Endpoint type	Reported dose	Exposure time	Toxicological effects	Key literature references and sources for data
Molybdate (MoO4 <sup>2-</sup> ), dihydrogen, (T-4)- (0.1 - 1%) CAS#: 7782-91-4	Rat LD <sub>50</sub>	> 2000 mg/kg	None reported	None reported	IUCLID (The International Uniform Chemical Information Database)
Chemical Name	Endpoint type	Reported dose	Exposure time	Toxicological effects	Key literature references and sources for data
Nitric acid (0.1 - 1%) CAS#: 7697-37-2	Rat TD <sub>Lo</sub>	226500 mg/kg	None reported	Blood Methemoglobinemia-Carboxyhemoglobin	RTECS (Registry of Toxic Effects of Chemical Substances)

**Inhalation (Dust/Mist) Exposure Route**

If available, see data below

Chemical Name	Endpoint type	Reported dose	Exposure time	Toxicological effects	Key literature references and sources for data
Nitric acid (0.1 - 1%) CAS#: 7697-37-2	Rat LC <sub>50</sub>	0.13 mg/L	4 hours	None reported	RTECS (Registry of Toxic Effects of Chemical Substances)

**Inhalation (Vapor) Exposure Route**

If available, see data below

Chemical Name	Endpoint type	Reported dose	Exposure time	Toxicological effects	Key literature references and sources for data
Nitric acid (0.1 - 1%) CAS#: 7697-37-2	Rat LC <sub>50</sub>	67 mg/L	4 hours	None reported	Vendor SDS
Chemical Name	Endpoint type	Reported dose	Exposure time	Toxicological effects	Key literature references and sources for data
Sulfuric acid (30 - 40%) CAS#: 7664-93-9	Rat LC <sub>50</sub>	0.510 mg/L	None reported	None reported	LOLI
Chemical Name	Endpoint type	Reported dose	Exposure time	Toxicological effects	Key literature references and sources for data
Sulfuric acid (30 - 40%) CAS#: 7664-93-9	Human TD <sub>Lo</sub>	0.144 mg/L	5 minutes	Lungs, Thorax, or Respiration Dyspnea	RTECS (Registry of Toxic Effects of Chemical Substances)
Nitric acid (0.1 - 1%) CAS#: 7697-37-2	Rat TC <sub>Lo</sub>	460 mg/L	1 hours	Nutritional and Gross Metabolic Weight loss or decreased weight gain	RTECS (Registry of Toxic Effects of Chemical Substances)

**Inhalation (Gas) Exposure Route**

No data available

**Product Skin Corrosion/Irritation Data**

No data available.

**Ingredient Skin Corrosion/Irritation Data**

If available, see data below

Chemical Name	Test method	Species	Reported dose	Exposure time	Results	Key literature references and sources for data
Sulfuric acid (30 - 40%) CAS#: 7664-93-9	Existing human experience	Human	None reported	None reported	Corrosive to skin	HSDB (Hazardous Substances Data Bank)
Nitric acid (0.1 - 1%) CAS#: 7697-37-2	Existing human experience	Human	None reported	None reported	Corrosive to skin	ERMA (New Zealand's Environmental Risk Management Authority)

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**Product Serious Eye Damage/Eye Irritation Data**

No data available.

**Ingredient Eye Damage/Eye Irritation Data**

If available, see data below

Chemical Name	Test method	Species	Reported dose	Exposure time	Results	Key literature references and sources for data
Sulfuric acid (30 - 40%) CAS#: 7664-93-9	Existing human experience	Human	None reported	None reported	Corrosive to eyes	HSDB (Hazardous Substances Data Bank)
Nitric acid (0.1 - 1%) CAS#: 7697-37-2	Existing human experience	Human	None reported	None reported	Corrosive to eyes	ERMA (New Zealand's Environmental Risk Management Authority)

**Sensitization Information**

**Product Sensitization Data**

Skin Sensitization Exposure Route No data available.

Respiratory Sensitization Exposure Route No data available.

**Ingredient Sensitization Data**

Skin Sensitization Exposure Route No data available.

Respiratory Sensitization Exposure Route No data available.

**Chronic Toxicity Information**

**Product Repeat Dose Toxicity Data**

Oral Exposure Route No data available.

Dermal Exposure Route No data available.

Inhalation (Dust/Mist) Exposure Route No data available.

Inhalation (Vapor) Exposure Route No data available.

Inhalation (Gas) Exposure Route No data available.

**Ingredient Repeat Dose Toxicity Data**

Oral Exposure Route No data available

Dermal Exposure Route No data available

Inhalation (Dust/Mist) Exposure Route If available, see data below

Chemical Name	Endpoint type	Reported dose	Exposure time	Toxicological effects	Key literature references and sources for data
Molybdate, hexaammonium, tetrahydrate (1 - 5%) CAS#: 12054-85-2	Rat TC <sub>Lo</sub>	0.060 mg/L	119 days	<b>Blood</b> Changes in erythrocyte (RBC) count <b>Biochemical</b> Enzyme inhibition, induction, or change in blood or tissue levels (dehydrogenases)	Vendor SDS
Chemical Name	Endpoint	Reported	Exposure	Toxicological effects	Key literature references and

	type	dose	time		sources for data
Nitric acid (0.1 - 1%) CAS#: 7697-37-2	Rat TC <sub>Lo</sub>	0.000050 mg/L	3 days	Lungs, Thorax, or Respiration Respiratory depression	RTECS (Registry of Toxic Effects of Chemical Substances)

**Inhalation (Vapor) Exposure Route**

If available, see data below

Chemical Name	Endpoint type	Reported dose	Exposure time	Toxicological effects	Key literature references and sources for data
Sulfuric acid (30 - 40%) CAS#: 7664-93-9	Human TC <sub>Lo</sub>	.003 mg/L	168 days	<b>Musculoskeletal</b> Changes in teeth and supporting structures	RTECS (Registry of Toxic Effects of Chemical Substances)
Nitric acid (0.1 - 1%) CAS#: 7697-37-2	Rat TC <sub>Lo</sub>	0.001071 mg/L	84 days	<b>Behavioral</b> Muscle contraction or spasticity <b>Biochemical</b> Enzyme inhibition, induction, or change in blood or tissue levels (true cholinesterase) <b>Kidney, Ureter, or Bladder</b> Other changes in urine composition	RTECS (Registry of Toxic Effects of Chemical Substances)

**Inhalation (Gas) Exposure Route**

No data available

Chemical Name	CAS No	ACGIH	IARC	NTP	OSHA
Sulfuric acid	7664-93-9	A2	Group 1	Known	X
Molybdate, hexaammonium, tetrahydrate	12054-85-2	A3	-	-	-
Molybdate (MoO42-), dihydrogen, (T-4)-	7782-91-4	A3	-	-	-
Nitric acid	7697-37-2	-	Group 2A Group 1	-	X

**Legend**

ACGIH (American Conference of Governmental Industrial Hygienists)	A2 - Suspected Human Carcinogen A3 - Animal Carcinogen
IARC (International Agency for Research on Cancer)	Group 1 - Carcinogenic to Humans Group 2A - Probably Carcinogenic to Humans
NTP (National Toxicology Program)	Known - Known Carcinogen
OSHA (Occupational Safety and Health Administration of the US Department of Labor)	X - Present

**Product Carcinogenicity Data**

No data available

**Oral Exposure Route**

No data available

**Dermal Exposure Route**

No data available

**Inhalation (Dust/Mist) Exposure Route**

No data available

**Inhalation (Vapor) Exposure Route**

No data available

**Inhalation (Gas) Exposure Route**

No data available

**Ingredient Carcinogenicity Data**

**Oral Exposure Route**

No data available

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Dermal Exposure Route No data available  
 Inhalation (Dust/Mist) Exposure Route No data available  
 Inhalation (Vapor) Exposure Route No data available  
 Inhalation (Gas) Exposure Route No data available

**Product Germ Cell Mutagenicity *invitro* Data**  
 No data available.

**Ingredient Germ Cell Mutagenicity *invitro* Data** If available, see data below

Chemical Name	Test	Cell Strain	Reported dose	Exposure time	Results	Key literature references and sources for data
Sulfuric acid (30 - 40%) CAS#: 7664-93-9	Cytogenetic analysis	Hamster ovary	4 mmol/L	None reported	Positive test result for mutagenicity	OECD (Organization for Economic Co-operation and Development)

Oral Exposure Route No data available  
 Dermal Exposure Route No data available  
 Inhalation (Dust/Mist) Exposure Route No data available  
 Inhalation (Vapor) Exposure Route No data available  
 Inhalation (Gas) Exposure Route No data available

**Ingredient Germ Cell Mutagenicity *invivo* Data**

Oral Exposure Route No data available  
 Dermal Exposure Route No data available  
 Inhalation (Dust/Mist) Exposure Route No data available  
 Inhalation (Vapor) Exposure Route No data available  
 Inhalation (Gas) Exposure Route No data available  
 Oral Exposure Route No data available  
 Dermal Exposure Route No data available  
 Inhalation (Dust/Mist) Exposure Route No data available  
 Inhalation (Vapor) Exposure Route No data available  
 Inhalation (Gas) Exposure Route No data available

**Ingredient Reproductive Toxicity Data**

Oral Exposure Route If available, see data below

Chemical Name	Endpoint type	Reported dose	Exposure time	Toxicological effects	Key literature references and sources for data
Nitric acid	Rat	21150 mg/kg	21 days	Effects on Embryo or Fetus	RTECS (Registry of Toxic

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(0.1 - 1%) CAS#: 7697-37-2	TD <sub>Lo</sub>			Fetotoxicity (except death e.g. stunted fetus)	Effects of Chemical Substances
<b>Chemical Name</b>	<b>Endpoint type</b>	<b>Reported dose</b>	<b>Exposure time</b>	<b>Toxicological effects</b>	<b>Key literature references and sources for data</b>
Nitric acid (0.1 - 1%) CAS#: 7697-37-2	Rat TD <sub>Lo</sub>	2345 mg/kg	18 days	Effects on Newborn	RTECS (Registry of Toxic Effects of Chemical Substances)

**Dermal Exposure Route** No data available

**Inhalation (Dust/Mist) Exposure Route** No data available

**Inhalation (Vapor) Exposure Route** If available, see data below

<b>Chemical Name</b>	<b>Endpoint type</b>	<b>Reported dose</b>	<b>Exposure time</b>	<b>Toxicological effects</b>	<b>Key literature references and sources for data</b>
Sulfuric acid (30 - 40%) CAS#: 7664-93-9	Rabbit TC <sub>Lo</sub>	.02 mg/L	7 hours	Specific Developmental Abnormalities Musculoskeletal system	OECD (Organization for Economic Co-operation and Development)

**Inhalation (Gas) Exposure Route** No data available

## 12. ECOLOGICAL INFORMATION

**Ecotoxicity** Harmful to aquatic life.

### Product Ecological Data

#### **Aquatic toxicity**

**Fish** No data available

**Crustacea** No data available

**Algae** No data available

#### **Terrestrial toxicity**

**Soil** No data available

**Vertebrates** No data available

**Invertebrates** No data available

### Ingredient Ecological Data

#### **Aquatic toxicity**

**Fish** If available, see ingredient data below

<b>Chemical Name</b>	<b>Exposure time</b>	<b>Species</b>	<b>Endpoint type</b>	<b>Reported dose</b>	<b>Key literature references and sources for data</b>
Molybdate, hexaammonium, tetrahydrate (1 - 5%) CAS#: 12054-85-2	96 hours	<i>Oncorhynchus mykiss</i>	LC <sub>50</sub>	320 mg/L	No information available
<b>Chemical Name</b>	<b>Exposure time</b>	<b>Species</b>	<b>Endpoint type</b>	<b>Reported dose</b>	<b>Key literature references and sources for data</b>
Sulfuric acid (30 - 40%) CAS#: 7664-93-9	96 hours	<i>Lepomis macrochirus</i>	LC <sub>50</sub>	> 16 mg/L	IUCLID (The International Uniform Chemical Information Database)
Molybdate,	48 hours	<i>Daphnia magna</i>	EC <sub>50</sub>	140 mg/L	No information available

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hexaammonium, tetrahydrate (1 - 5%) CAS#: 12054-85-2					
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**Crustacea**

If available, see ingredient data below

Chemical Name	Exposure time	Species	Endpoint type	Reported dose	Key literature references and sources for data
Nitric acid (0.1 - 1%) CAS#: 7697-37-2	48 Hours	<i>Carcinu maenas</i>	LC <sub>50</sub>	180 mg/L	GESTIS (Information System on Hazardous Substances of the German Social Accident Insurance)
Chemical Name	Exposure time	Species	Endpoint type	Reported dose	Key literature references and sources for data
Sulfuric acid (30 - 40%) CAS#: 7664-93-9	48 hours	<i>Crangon crangon</i>	EC <sub>50</sub>	> 70 mg/L	IUCLID (The International Uniform Chemical Information Database)

**Algae**

If available, see ingredient data below

Chemical Name	Exposure time	Species	Endpoint type	Reported dose	Key literature references and sources for data
Molybdate, hexaammonium, tetrahydrate (1 - 5%) CAS#: 12054-85-2	72 Hours	<i>Desmodesmus subspicatus</i>	EC <sub>50</sub>	41 mg/L	No information available

**Terrestrial toxicity**

**Soil** No data available  
**Vertebrates** No data available  
**Invertebrates** No data available

**Other Information**

Canadian Environmental Protection Act (CEPA) - Domestic Substances List (DSL):  
 Environmentally Hazardous Substances Categorizations

**Persistence and degradability**

None known.

**Product Biodegradability Data**

If available, see ingredient data below.

**Ingredient Biodegradability Data**

Test data reported below

Chemical Name	Test method	Biodegradation	Exposure time	Results
Molybdate, hexaammonium, tetrahydrate (1 - 5%) CAS#: 12054-85-2	None reported	None reported	None reported	Readily biodegradable

**Bioaccumulation**

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If available, see ingredient data below.

**Product Bioaccumulation Data** No data available.

**Ingredient Bioaccumulation Data** No data available

**Additional information**

**Product Information**

**Partition Coefficient (n-octanol/water)** Not applicable

**Ingredient Information**

Chemical Name	Partition Coefficient (n-octanol/water)	Method
Molybdate (MoO42-), dihydrogen, (T-4)- (0.1 - 1%) CAS#: 7782-91-4	log K <sub>ow</sub> = 1.93	Estimation through KOWWIN v1.68 part of the Estimation Programs Interface (EPI) Suite™

**Mobility**

Mobility in soil: High mobility. If available, see ingredient data below.

**Product Information**

**Soil Organic Carbon-Water Partition Coefficient** Not applicable

**Ingredient Information** No data available

**Additional information**

**Water solubility**

**Product Information**

<u>Water solubility classification</u>	<u>Water solubility</u>	<u>Water Solubility Temperature</u>
Soluble	> 1000 mg/L	25 °C / 77 °F

**Ingredient Information**

Chemical Name	Water solubility classification	Water solubility	Water solubility temperature °C	Water solubility temperature °F
Sulfuric acid CAS#: 7664-93-9	Soluble	> 1000 mg/L	25 °C	77 °F
Molybdate, hexaammonium, tetrahydrate CAS#: 12054-85-2	Soluble	> 1000 mg/L	25 °C	77 °F
Molybdate (MoO42-), dihydrogen, (T-4)- CAS#: 7782-91-4	Slightly soluble	> 0.1 mg/L	25 °C	77 °F
Nitric acid CAS#: 7697-37-2	Soluble	> 1000 mg/L	25 °C	77 °F

**Other adverse effects**

No information available.

**13. DISPOSAL CONSIDERATIONS**



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#### Waste treatment methods

**Disposal of wastes** Disposal should be in accordance with applicable regional, national, and local laws and regulations.

**Contaminated packaging** Do not reuse container.

**US EPA Waste Number** D002

**Special instructions for disposal** Work in an approved fume hood. Dilute material with excess water making a weaker than 5% solution. Adjust to a pH between 6 and 9 with an alkali, such as soda ash or sodium bicarbonate. Open cold water tap completely, slowly pour the material to the drain. Allow cold water to run for 5 minutes to completely flush the system.

### 14. TRANSPORT INFORMATION

#### DOT

UN/ID no UN3264  
Proper shipping name Corrosive Liquid, Acidic, Inorganic, N.O.S.  
DOT Technical Name (<45% Sulfuric Acid solution)  
Hazard Class 8  
Packing Group II  
Emergency Response Guide Number 154

#### TDG

UN/ID no UN3264  
Proper shipping name Corrosive Liquid, Acidic, Inorganic, N.O.S.  
TDG Technical Name (<45% Sulfuric Acid solution)  
Hazard Class 8  
Packing Group II

#### IATA

UN/ID no UN3264  
Proper shipping name Corrosive Liquid, Acidic, Inorganic, N.O.S.  
IATA Technical Name (<45% Sulfuric Acid solution)  
Hazard Class 8  
Packing Group II  
ERG Code 154

#### IMDG

UN/ID no UN3264  
IMDG Technical Name (<45% Sulfuric Acid solution)  
Hazard Class 8  
Packing Group II

**Note:** No special precautions necessary.

#### **Additional information**

There is a possibility that this product could be contained in a reagent set or kit composed of various compatible dangerous goods. If the item is not in a reagent set or kit, the classification given above applies. If the item is part of a reagent set or kit the classification would change to the following: UN3316 Chemical Kit, Hazard Class 9, Packing Group II or III. If the item is not regulated, the Chemical Kit classification does not apply.

### 15. REGULATORY INFORMATION

#### National Inventories

TSCA Complies

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DSL/NDSL Complies

TSCA- United States Toxic Substances Control Act Section 8(b) Inventory  
 DSL/NDSL- Canadian Domestic Substances List/Non-Domestic Substances List

**International Inventories**

EINECS/ELINCS Complies  
 ENCS Does not comply  
 IECS Complies  
 KECL Complies  
 PICCS Complies  
 TCSI Complies  
 AICS Complies  
 NZIoC Complies

EINECS/ELINCS- European Inventory of Existing Chemical Substances/European List of Notified Chemical Substances  
 ENCS- Japan Existing and New Chemical Substances  
 IECS- China Inventory of Existing Chemical Substances  
 KECL- Korean Existing and Evaluated Chemical Substances  
 PICCS- Philippines Inventory of Chemicals and Chemical Substances  
 TCSI- Taiwan Chemical Substances Inventory  
 AICS- Australian Inventory of Chemical Substances  
 NZIoC- New Zealand Inventory of Chemicals

**US Federal Regulations**

**SARA 313**

Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product contains a chemical or chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372

Chemical Name	SARA 313 - Threshold Values %
Sulfuric acid (CAS #: 7664-93-9)	1.0
Molybdate, hexaammonium, tetrahydrate (CAS #: 12054-85-2)	1.0
Nitric acid (CAS #: 7697-37-2)	1.0

**SARA 311/312 Hazard Categories**

Acute health hazard Yes  
 Chronic Health Hazard Yes  
 Fire hazard No  
 Sudden release of pressure hazard No  
 Reactive Hazard No

**CWA (Clean Water Act)**

This product does not contain any substances regulated as pollutants pursuant to the Clean Water Act (40 CFR 122.21 and 40 CFR 122.42)

Chemical Name	CWA - Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants	CWA - Hazardous Substances
Sulfuric acid 7664-93-9	1000 lb	-	-	X
Nitric acid 7697-37-2	1000 lb	-	-	X

**CERCLA**

This material, as supplied, does not contain any substances regulated as hazardous substances under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302) or the Superfund Amendments and Reauthorization Act (SARA) (40 CFR 355). There may be specific reporting requirements at the local, regional, or state level pertaining to releases of this material

Chemical Name	Hazardous Substances RQs	CERCLA/SARA RQ	Reportable Quantity (RQ)
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Sulfuric acid 7664-93-9	1000 lb	1000 lb	RQ 1000 lb final RQ RQ 454 kg final RQ
Nitric acid 7697-37-2	1000 lb	1000 lb	RQ 1000 lb final RQ RQ 454 kg final RQ

**U.S. - Department of Homeland Security - Chemical Facility Anti-Terrorism Standards (CFATS) - Security Issues**

Chemical Name	U.S. - Department of Homeland Security - Chemical Facility Anti-Terrorism Standards (CFATS) - Security Issues
Nitric acid (0.1 - 1%) CAS#: 7697-37-2	Release - Toxic; Theft - Explosives/Improvised Explosive Device Precursors

**U.S. - DEA (Drug Enforcement Administration) List I & List II**

Chemical Name	U.S. - DEA (Drug Enforcement Administration) - List I or Precursor Chemicals	U.S. - DEA (Drug Enforcement Administration) - List II or Essential Chemicals
Sulfuric acid (30 - 40%) CAS#: 7664-93-9	Not Listed	50 gallon Export Volume (exports, transshipments and international transactions to designated countries)

**US State Regulations**

**California Proposition 65**

This product does not contain any Proposition 65 chemicals

**U.S. State Right-to-Know Regulations**

Chemical Name	New Jersey	Massachusetts	Pennsylvania
Sulfuric acid 7664-93-9	X	X	X
Nitric acid 7697-37-2	X	X	X

**U.S. EPA Label Information**

EPA Pesticide Registration Number Not applicable

**16. OTHER INFORMATION, INCLUDING DATE OF PREPARATION OF THE LAST REVISION**

**Additional information**

**Global Automotive Declarable Substance List (GADSL)**

Not applicable

**Special Comments**

None

**NFPA and HMIS Classifications**

NFPA	Health hazards - 3	Flammability - 0	Instability - 0	Physical and Chemical Properties -
HMIS	Health hazards - 3	Flammability - 0	Physical Hazards - 0	Personal protection - X - See section 8 for more information

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**Key or legend to abbreviations and acronyms used in the safety data sheet**

NIOSH IDLH *Immediately Dangerous to Life or Health*  
ACGIH ACGIH (American Conference of Governmental Industrial Hygienists)  
NDF *no data*

**Legend - Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION**

TWA	TWA (time-weighted average)	STEL	STEL (Short Term Exposure Limit)
MAC	Maximum Allowable Concentration	Ceiling	Ceiling Limit Value
X	Listed	Vacated	These values have no official status. The only binding levels of contaminants are those listed in the final OSHA PEL. These lists are for reference purposes only. Please note that some reference state regulations of these "liberated" exposure limits in their state regulations.
SKN*	Skin designation	SKN+	Skin sensitization
RSP+	Respiratory sensitization	**	Hazard Designation
C	Carcinogen	R	Reproductive toxicant
M	mutagen		

**Prepared By** Hach Product Compliance Department

**Issue Date** 02-Jun-2016

**Revision Date** 02-Feb-2017

**Revision Note** None

**Disclaimer**

**USER RESPONSIBILITY: Each user should read and understand this information and incorporate it in individual site safety programs in accordance with applicable hazard communication standards and regulations.**

**THE INFORMATION CONTAINED HEREIN IS BASED ON DATA CONSIDERED TO BE ACCURATE. HOWEVER, NO WARRANTY IS EXPRESSED OR IMPLIED REGARDING THE ACCURACY OF THESE DATA OR THE RESULTS TO BE OBTAINED FROM THE USE THEREOF.**

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**End of Safety Data Sheet**