SAFETY DATA SHEET

1. Identification

Product Name  Hydrazine sulfate
Cat No. : AC423770000; AC423770050; AC423770500; AC423771000; AC423775000
Synonyms  Hydrazinium Sulfate; Hydrazine dihydrogen sulfate salt; Hydrazine hydrogen sulfate; Hydrazine monosulfate
Recommended Use  Laboratory chemicals.
Uses advised against  Not for food, drug, pesticide or biocidal product use

Company
Fisher Scientific  Acros Organics
One Reagent Lane  One Reagent Lane
Fair Lawn, NJ 07410  Fair Lawn, NJ 07410
Tel: (201) 796-7100

Emergency Telephone Number
For information US call: 001-800-ACROS-01 / Europe call: +32 14 57 52 11
Emergency Number US:001-201-796-7100 / Europe: +32 14 57 52 99
CHEMTREC Tel. No.US:001-800-424-9300 / Europe:001-703-527-3887

2. Hazard(s) identification

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

<table>
<thead>
<tr>
<th>Hazard Category</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute oral toxicity</td>
<td>Category 3</td>
</tr>
<tr>
<td>Acute dermal toxicity</td>
<td>Category 3</td>
</tr>
<tr>
<td>Acute Inhalation Toxicity - Dusts and Mists</td>
<td>Category 3</td>
</tr>
<tr>
<td>Skin Sensitization</td>
<td>Category 1</td>
</tr>
<tr>
<td>Carcinogenicity</td>
<td>Category 1B</td>
</tr>
</tbody>
</table>

Signal Word
Danger

Hazard Statements
Toxic if swallowed
Toxic in contact with skin
May cause an allergic skin reaction
Toxic if inhaled
May cause cancer
Precautionary Statements

Prevention
Obtain special instructions before use
Do not handle until all safety precautions have been read and understood
Use personal protective equipment as required
Wash face, hands and any exposed skin thoroughly after handling
Do not eat, drink or smoke when using this product
Avoid breathing dust/fume/gas/mist/vapors/spray
Use only outdoors or in a well-ventilated area
Contaminated work clothing should not be allowed out of the workplace
Wear protective gloves

Response
IF exposed or concerned: Get medical attention/advice

Inhalation
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
Call a POISON CENTER or doctor/physician

Skin
IF ON SKIN: Wash with plenty of soap and water
Call a POISON CENTER or doctor/physician if you feel unwell
Remove/Take off immediately all contaminated clothing
Wash contaminated clothing before reuse
If skin irritation or rash occurs: Get medical advice/attention

Ingestion
IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician
Rinse mouth

Storage
Store locked up
Store in a well-ventilated place. Keep container tightly closed

Disposal
Dispose of contents/container to an approved waste disposal plant

Hazards not otherwise classified (HNOC)
Very toxic to aquatic life with long lasting effects
WARNING! This product contains a chemical known in the State of California to cause cancer.

3. Composition / information on ingredients

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS-No</th>
<th>Weight %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydrazine sulfate</td>
<td>10034-93-2</td>
<td>&gt;95</td>
</tr>
</tbody>
</table>

4. First-aid measures

General Advice
Immediate medical attention is required. Show this safety data sheet to the doctor in attendance.

Eye Contact
Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Immediate medical attention is required.

Skin Contact
Wash off immediately with plenty of water for at least 15 minutes. Immediate medical attention is required.
Inhalation  Move to fresh air. 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. Immediate medical attention is required. If not breathing, give artificial respiration.

Ingestion  Do not induce vomiting. Call a physician or Poison Control Center immediately.

Most important symptoms/effects  May cause allergic skin reaction. Symptoms of allergic reaction may include rash, itching, swelling, trouble breathing, tingling of the hands and feet, dizziness, lightheadedness, chest pain, muscle pain or flushing.

Notes to Physician  Treat symptomatically

5. Fire-fighting measures

Unsuitable Extinguishing Media  No information available

Flash Point  No information available

Method -  No information available

Autoignition Temperature  No information available

Explosion Limits  Upper - No data available  Lower - No data available

Sensitivity to Mechanical Impact  No information available

Sensitivity to Static Discharge  No information available

Specific Hazards Arising from the Chemical  Thermal decomposition can lead to release of irritating gases and vapors. In the event of fire and/or explosion do not breathe fumes. Do not allow run-off from fire fighting to enter drains or water courses.

Hazardous Combustion Products  Nitrogen oxides (NOx)  Sulfur oxides  Thermal decomposition can lead to release of irritating gases and vapors.

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

6. Accidental release measures

Personal Precautions  Ensure adequate ventilation. Use personal protective equipment. Keep people away from and upwind of spill/leak. Evacuate personnel to safe areas. Avoid dust formation.

Environmental Precautions  Do not flush into surface water or sanitary sewer system. Do not allow material to contaminate ground water system. Prevent product from entering drains. Local authorities should be advised if significant spillages cannot be contained.

Methods for Containment and Clean Up  Sweep up or vacuum up spillage and collect in suitable container for disposal. Avoid dust formation. Use spark-proof tools and explosion-proof equipment.

7. Handling and storage

Handling  Wear personal protective equipment. Ensure adequate ventilation. Use only under a chemical fume hood. Do not get in eyes, on skin, or on clothing. Avoid dust formation. Do not breathe vapors/dust. Do not ingest.

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

8. Exposure controls / personal protection

Exposure Guidelines  This product does not contain any hazardous materials with occupational exposure.
Hydrazine sulfate

Revision Date 27-Jun-2017

limits established by the region specific regulatory bodies.

Engineering Measures

Use only under a chemical fume hood. Ensure that eyewash stations and safety showers are close to the workstation location.

Personal Protective Equipment

Eye/face Protection

Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA’s eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166. Tightly fitting safety goggles. Face-shield.

Skin and body protection

Long sleeved clothing.

Respiratory Protection

Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Hygiene Measures

Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

<table>
<thead>
<tr>
<th>Physical State</th>
<th>Solid</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance</td>
<td>White</td>
</tr>
<tr>
<td>Odor</td>
<td>Odorless</td>
</tr>
<tr>
<td>Odor Threshold</td>
<td>No information available</td>
</tr>
<tr>
<td>pH</td>
<td>1.5 5% aq.sol</td>
</tr>
<tr>
<td>Melting Point/Range</td>
<td>254 °C / 489.2 °F</td>
</tr>
<tr>
<td>Boiling Point/Range</td>
<td>No information available</td>
</tr>
<tr>
<td>Flash Point</td>
<td>No information available</td>
</tr>
<tr>
<td>Evaporation Rate</td>
<td>No information available</td>
</tr>
<tr>
<td>Flammability (solid,gas)</td>
<td>No information available</td>
</tr>
<tr>
<td>Flammability or explosive limits</td>
<td>No data available</td>
</tr>
</tbody>
</table>

10. Stability and reactivity

Reactive Hazard

None known, based on information available

Stability

Stable under normal conditions.

Conditions to Avoid

Incompatible products. Excess heat.

Incompatible Materials

Bases, Oxidizing agents, Reducing agents

Hazardous Decomposition Products

Nitrogen oxides (NOx), Sulfur oxides, Thermal decomposition can lead to release of irritating gases and vapors
Hydrazine sulfate

11. Toxicological information

Acute Toxicity

Product Information

Component Information

<table>
<thead>
<tr>
<th>Component</th>
<th>LD50 Oral</th>
<th>LD50 Dermal</th>
<th>LC50 Inhalation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydrazine sulfate</td>
<td>LD50 = 601 mg/kg (Rat)</td>
<td>Not listed</td>
<td>Not listed</td>
</tr>
</tbody>
</table>

Toxicologically Synergistic Products

No information available

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Irritation

Severe eye irritant Irritating to skin

Sensitization

No information available

Carcinogenicity

The European Union classifies this product as a carcinogen.

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS-No</th>
<th>IARC</th>
<th>NTP</th>
<th>ACGIH</th>
<th>OSHA</th>
<th>Mexico</th>
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<tbody>
<tr>
<td>Hydrazine sulfate</td>
<td>10034-93-2</td>
<td>Not listed</td>
<td>Reasonably Anticipated</td>
<td>Not listed</td>
<td>X</td>
<td>Not listed</td>
</tr>
</tbody>
</table>

NTP: (National Toxicity Program)

Mutagenic Effects

Mutagenic effects have occurred in experimental animals.

Reproductive Effects

No information available.

Developmental Effects

No information available.

Teratogenicity

No information available.

STOT - single exposure

None known

STOT - repeated exposure

None known

Aspiration hazard

No information available

Symptoms / effects, both acute and delayed

Symptoms of allergic reaction may include rash, itching, swelling, trouble breathing, tingling of the hands and feet, dizziness, lightheadedness, chest pain, muscle pain or flushing

Endocrine Disruptor Information

No information available

Other Adverse Effects

The toxicological properties have not been fully investigated.

12. Ecological information

Ecotoxicity

Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment. The product contains following substances which are hazardous for the environment.

Persistence and Degradability

Soluble in water Persistence is unlikely based on information available.

Bioaccumulation / Accumulation

No information available.

Mobility

Will likely be mobile in the environment due to its water solubility.
13. Disposal considerations

| Waste Disposal Methods | Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification. |

14. Transport information

<table>
<thead>
<tr>
<th>DOT</th>
<th>UN-No</th>
<th>UN3288</th>
<th>Proper Shipping Name</th>
<th>TOXIC SOLID, INORGANIC, N.O.S.</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Proper technical name</td>
<td>Hydrazine sulfate</td>
<td>Hazard Class</td>
<td>6.1</td>
</tr>
<tr>
<td></td>
<td>Packing Group</td>
<td>III</td>
<td></td>
<td></td>
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<tr>
<td>TDG</td>
<td>UN-No</td>
<td>UN3288</td>
<td>Proper Shipping Name</td>
<td>TOXIC SOLID, INORGANIC, N.O.S.</td>
</tr>
<tr>
<td></td>
<td>Hazard Class</td>
<td>6.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Packing Group</td>
<td>III</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IATA</td>
<td>UN-No</td>
<td>UN3288</td>
<td>Proper Shipping Name</td>
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</tr>
<tr>
<td></td>
<td>Hazard Class</td>
<td>6.1</td>
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<td></td>
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<tr>
<td></td>
<td>Packing Group</td>
<td>III</td>
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</tr>
<tr>
<td>IMDG/IMO</td>
<td>UN-No</td>
<td>UN3288</td>
<td>Proper Shipping Name</td>
<td>TOXIC SOLID, INORGANIC, N.O.S.</td>
</tr>
<tr>
<td></td>
<td>Hazard Class</td>
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<td></td>
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<td>Packing Group</td>
<td>III</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

15. Regulatory information

All of the components in the product are on the following Inventory lists: X = listed

<table>
<thead>
<tr>
<th>Component</th>
<th>TSCA</th>
<th>DSL</th>
<th>NDSL</th>
<th>EINECS</th>
<th>ELINCS</th>
<th>NLP</th>
<th>PICCS</th>
<th>ENCS</th>
<th>AICS</th>
<th>IECSC</th>
<th>KECL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydrazine sulfate</td>
<td>X</td>
<td>X</td>
<td>-</td>
<td>233-110-4</td>
<td>-</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
</tbody>
</table>

Legend:
X - Listed
E - Indicates a substance that is the subject of a Section 5(e) Consent order under TSCA.
F - Indicates a substance that is the subject of a Section 5(f) Rule under TSCA.
N - Indicates a polymeric substance containing no free-radical initiator in its inventory name but is considered to cover the designated polymer made with any free-radical initiator regardless of the amount used.
P - Indicates a commenced PMN substance
R - Indicates a substance that is the subject of a Section 6 risk management rule under TSCA.
S - Indicates a substance that is identified in a proposed or final Significant New Use Rule
T - Indicates a substance that is the subject of a Section 4 test rule under TSCA.
XU - Indicates a substance exempt from reporting under the Inventory Update Rule, i.e. Partial Updating of the TSCA Inventory Data Base Production and Site Reports (40 CFR 710(B)).
Y1 - Indicates an exempt polymer that has a number-average molecular weight of 1,000 or greater.
Y2 - Indicates an exempt polymer that is a polyester and is made only from reactants included in a specified list of low concern reactants that comprises one of the eligibility criteria for the exemption rule.

U.S. Federal Regulations

TSCA 12(b) | Not applicable

SARA 313

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS-No</th>
<th>Weight %</th>
<th>SARA 313 - Threshold Values %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydrazine sulfate</td>
<td>10034-93-2</td>
<td>&gt;95</td>
<td>0.1</td>
</tr>
</tbody>
</table>
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)  Not applicable

Clean Air Act  Not applicable

OSHA  Occupational Safety and Health Administration
Not applicable

CERCLA  Not applicable

California Proposition 65
This product contains the following proposition 65 chemicals

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS-No</th>
<th>California Prop. 65</th>
<th>Prop 65 NSRL</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydrazine sulfate</td>
<td>10034-93-2</td>
<td>Carcinogen</td>
<td>0.2 µg/day</td>
<td>Carcinogen</td>
</tr>
</tbody>
</table>

U.S. State Right-to-Know Regulations

<table>
<thead>
<tr>
<th>Component</th>
<th>Massachusetts</th>
<th>New Jersey</th>
<th>Pennsylvania</th>
<th>Illinois</th>
<th>Rhode Island</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydrazine sulfate</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>-</td>
</tr>
</tbody>
</table>

U.S. Department of Transportation

Reportable Quantity (RQ):  N
DOT Marine Pollutant  N
DOT Severe Marine Pollutant  N

U.S. Department of Homeland Security
This product does not contain any DHS chemicals.

Other International Regulations

Mexico - Grade  No information available

16. Other information

Prepared By  Regulatory Affairs
Thermo Fisher Scientific
Email: EMSDS.RA@thermofisher.com

Creation Date  28-Oct-2009
Revision Date  27-Jun-2017
Print Date  27-Jun-2017
Revision Summary  This document has been updated to comply with the US OSHA HazCom 2012 Standard replacing the current legislation under 29 CFR 1910.1200 to align with the Globally Harmonized System of Classification and Labeling of Chemicals (GHS).

Disclaimer
The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

End of SDS