Material Safety Data Sheet
Hydrazine hydrate, 100% (Hydrazine, 64%)

MSDS# 11041

Section 1 - Chemical Product and Company Identification

MSDS Name: Hydrazine hydrate, 100% (Hydrazine, 64%)
Catalog Numbers: AC196710000, AC196710050, AC196711000, AC196715000, O3109-500
Synonyms: None.

Company Identification: Fisher Scientific
One Reagent Lane
Fair Lawn, NJ 07410

For information in the US, call: 201-796-7100
Emergency Number US: 201-796-7100
CHEMTREC Phone Number, US: 800-424-9300

Section 2 - Composition, Information on Ingredients

Risk Phrases:

<table>
<thead>
<tr>
<th>CAS#</th>
<th>Chemical Name</th>
<th>%</th>
<th>EINECS#</th>
</tr>
</thead>
<tbody>
<tr>
<td>302-01-2</td>
<td>Hydrazine</td>
<td>64</td>
<td>206-114-9</td>
</tr>
</tbody>
</table>

Hazard Symbols:

Risk Phrases:

<table>
<thead>
<tr>
<th>CAS#</th>
<th>Chemical Name</th>
<th>%</th>
<th>EINECS#</th>
</tr>
</thead>
<tbody>
<tr>
<td>7732-18-5</td>
<td>Water</td>
<td>36</td>
<td>231-791-2</td>
</tr>
</tbody>
</table>

Hazard Symbols:

Text for R-phrases: see Section 16

Section 3 - Hazards Identification

EMERGENCY OVERVIEW


Potential Health Effects

Eye: Causes eye burns. Effects may be delayed. May cause temporary blindness. May cause visual impairment.
Causes skin burns. May cause skin sensitization, an allergic reaction, which becomes evident upon re-exposure
Skin: to this material. Toxic in contact with skin. Substance is readily absorbed through the skin.

Ingestion: swelling of the throat, convulsions, and possible coma. Exposure may cause anemia and other blood abnormalities.

Inhalation: damage. Inhalation may be fatal as a result of spasms, inflammation, edema of the larynx and bronchi, chemical pneumonitis and pulmonary edema. Toxic if inhaled. Inhalation may produce burning sensation, coughing, wheezing, laryngitis, shortness of breath, headache, nausea, and vomiting. May cause respiratory sensitization. Possible cancer hazard based on tests with laboratory animals. Prolonged or repeated exposure may cause adverse reproductive effects. Repeated inhalation may cause chronic bronchitis. May cause fetal effects. Repeated exposure may cause sensitization dermatitis.

Chronic: Possible cancer hazard based on tests with laboratory animals. Prolonged or repeated exposure may cause adverse reproductive effects. Repeated inhalation may cause chronic bronchitis. May cause fetal effects. Repeated exposure may cause sensitization dermatitis.

Section 4 - First Aid Measures

Eyes: Get medical aid immediately. Do NOT allow victim to rub eyes or keep eyes closed. Extensive irrigation with water is required (at least 30 minutes).

Skin: Get medical aid immediately. Immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Discard contaminated clothing in a manner which limits further exposure.

Ingestion: Do not induce vomiting. If victim is conscious and alert, give 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious person. Get medical aid immediately.

Inhalation: Remove from exposure and move to fresh air immediately. If breathing is difficult, give oxygen. Get medical aid. Do NOT use mouth-to-mouth resuscitation. If breathing has ceased apply artificial respiration using oxygen and a suitable mechanical device such as a bag and a mask.

Notes to Physician:

Section 5 - Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Use water spray to keep fire-exposed containers cool. Combustible liquid. Containers may explode when heated. Powerful reducing agent.

Extinguishing Media: For small fires, use dry chemical, carbon dioxide, water spray or alcohol-resistant foam. For large fires, use water spray, fog, or alcohol-resistant foam. Use water spray to cool fire-exposed containers.

Autoignition Temperature: Not available.

Flash Point: 75 deg C (167.00 deg F)

Explosion Limits: 3.5%

Explosion Limits: Upper: 99.99%

NFPA Rating: health: 4; flammability: 2; instability: 3;

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.

Spills/Leaks: Clean up spills immediately, observing precautions in the Protective Equipment section. Remove all sources of ignition. Absorb spill using an absorbent, non-combustible material such as earth, sand, or vermiculite. Do not use combustible materials such as sawdust. Use a spark-proof tool. Provide ventilation. Place under an inert atmosphere.

Section 7 - Handling and Storage

Handling: Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Do not get in eyes, on skin, or on clothing. Empty containers retain product residue, (liquid and/or vapor), and can be dangerous. Keep container tightly closed. Keep away from heat, sparks and flame. Do not ingest or inhale. Use only in a chemical fume hood. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose empty containers to heat, sparks or open flames.

Storage: Keep away from sources of ignition. Do not store in direct sunlight. Store in a tightly closed container. Corrosives
Section 8 - Exposure Controls, Personal Protection

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>ACGIH</th>
<th>NIOSH</th>
<th>OSHA - Final PELs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydrazine</td>
<td>0.01 ppm; Skin -</td>
<td>50 ppm IDLH</td>
<td>1 ppm TWA; 1.3 mg/m3 TWA</td>
</tr>
<tr>
<td></td>
<td>potential</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>significant</td>
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<tr>
<td></td>
<td>contribution to</td>
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</tr>
<tr>
<td></td>
<td>overall exposure</td>
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<td></td>
</tr>
<tr>
<td></td>
<td>by the cutaneous</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>route</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Water</td>
<td>none listed</td>
<td>none listed</td>
<td>none listed</td>
</tr>
<tr>
<td>Hydrazine monohydrate</td>
<td>none listed</td>
<td>none listed</td>
<td>none listed</td>
</tr>
<tr>
<td>Hydrazine hydrate</td>
<td>none listed</td>
<td>none listed</td>
<td>none listed</td>
</tr>
</tbody>
</table>

OSHA Vacated PELs: Hydrazine: 0.1 ppm TWA; 0.1 mg/m3 TWA Water: None listed Hydrazine monohydrate: None listed Hydrazine hydrate: None listed

Engineering Controls:

Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate ventilation to keep airborne concentrations low. Use only under a chemical fume hood.

Exposure Limits

Personal Protective Equipment

Eyes: Wear chemical splash goggles and face shield.

Skin: Wear appropriate protective gloves to prevent skin exposure.

Clothing: Wear appropriate protective clothing to prevent skin exposure.

Respirators: 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.

Section 9 - Physical and Chemical Properties

Physical State: Liquid

Color: colorless

Odor: strong odor - ammonia-like

pH: Strong Base

Vapor Pressure: Not available

Vapor Density: Not available

Evaporation Rate: Not available

Viscosity: Not available

Boiling Point: 118 deg C (244.40°F)

Freezing/Melting Point: -51.7 deg C (-61.06°F)

Decomposition Temperature: Not available

Solubility in water: Miscible in water.

Specific Gravity/Density: Not available.

Molecular Formula: H4N2.H2O

Molecular Weight: 50.06

Section 10 - Stability and Reactivity

Chemical Stability: Stable. However becomes unstable if dehydrated.

Conditions to Avoid: Incompatible materials, ignition sources, exposure to air, excess heat, temperatures above 100°C.

Oxidizing agents, acids, alkali metals, copper, glass, halogens, iron, nitric acid, nitrites, perchlorates, Incompatibilities with sodium hydroxide, zinc, potassium, hydrogen peroxide, sodium, lead, dinitrogen tetraoxide,
Other Materials: molybdenum(IV) oxide, mercuric oxide, organic matter, metal salts, stannous chloride, 2,4-dinitrochlorobenzene, thiocyanates, rust, metal oxides.

Hazardous Decomposition Products: Nitrogen oxides, ammonia and/or derivatives, hydrogen gas.

Hazardous Polymerization: Has not been reported.

Section 11 - Toxicological Information

CAS# 302-01-2: MU7175000
CAS# 7732-18-5: ZC0110000
CAS# 7803-57-8: MV8050000
CAS# 10217-52-4: MV4590000

RTECS:

CAS# 302-01-2: Dermal, guinea pig: LD50 = 190 mg/kg; Inhalation, mouse: LC50 = 252 ppm/4H; Inhalation, mouse: LC50 = 1000 mg/m3/2H; Inhalation, mouse: LC50 = 320 mg/m3/4H; Inhalation, rat: LC50 = 570 ppm/4H; Inhalation, rat: LC50 = 130 mg/m3/4H; Oral, mouse: LD50 = 59 mg/kg; Oral, mouse: LD50 = 59 mg/kg; Oral, rat: LD50 = 60 mg/kg; Oral, rat: LD50 = 60 mg/kg; Skin, rabbit: LD50 = 91 mg/kg;

LD50/LC50: RTECS:

CAS# 7732-18-5: Oral, rat: LD50 = >90 mL/kg;

RTECS:

CAS# 7803-57-8: Oral, mouse: LD50 = 83 mg/kg; Oral, rabbit: LD50 = 55 mg/kg; Oral, rat: LD50 = 129 mg/kg;

RTECS:

CAS# 10217-52-4: Inhalation, rat: LC50 = 80 mg/m3; Oral, mouse: LD50 = 83 mg/kg; Oral, rabbit: LD50 = 55 mg/kg; Oral, rat: LD50 = 129 mg/kg;

Hydrazine - ACGIH: A3 - Confirmed Animal Carcinogen with Unknown Relevance to Humans California: carcinogen, initial date 1/1/88 NTP: Suspect carcinogen IARC: Group 2B carcinogen

Carcinogenicity: Water - Not listed as a carcinogen by ACGIH, IARC, NTP, or CA Prop 65.

Hydrazine monohydrate - Not listed as a carcinogen by ACGIH, IARC, NTP, or CA Prop 65.

Hydrazine hydrate - Not listed as a carcinogen by ACGIH, IARC, NTP, or CA Prop 65.

Other: See actual entry in RTECS for complete information.

Section 12 - Ecological Information

Ecotoxicity: Not available

Section 13 - Disposal Considerations

Dispose of in a manner consistent with federal, state, and local regulations.

Section 14 - Transport Information

US DOT
Shipping Name: HYDRAZINE AQUEOUS SOLUTION
Hazard Class: 8
UN Number: UN2030
Packing Group: II
Canada TDG
Shipping Name: HYDRAZINE, AQUEOUS SOLUTION
Hazard Class: 8.61
UN Number: UN2030
Packing Group: II

USA RQ: CAS# 302-01-2: 1 lb final RQ; 0.454 kg final RQ

European/International Regulations

European Labeling in Accordance with EC Directives

Hazard Symbols: T C N

Risk Phrases:
R 45 May cause cancer.
R 23/24/25 Toxic by inhalation, in contact with skin and if swallowed.
R 34 Causes burns.
R 43 May cause sensitization by skin contact.
R 50/53 Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Safety Phrases:
S 53 Avoid exposure - obtain special instructions before use.
S 45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).
S 60 This material and its container must be disposed of as hazardous waste.
S 61 Avoid release to the environment. Refer to special instructions/safety data sheets.

WGK (Water Danger/Protection)

CAS# 302-01-2: 3
CAS# 7732-18-5: Not available
CAS# 7803-57-8: 3
CAS# 10217-52-4: Not available

Canada

CAS# 302-01-2 is listed on Canada's DSL List
CAS# 7732-18-5 is listed on Canada's DSL List
Canadian WHMIS Classifications: D1A, D2A, E, B3
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.
CAS# 302-01-2 is listed on Canada's Ingredient Disclosure List
CAS# 7732-18-5 is not listed on Canada's Ingredient Disclosure List.
CAS# 7803-57-8 is not listed on Canada's Ingredient Disclosure List.
CAS# 10217-52-4 is not listed on Canada's Ingredient Disclosure List.

US Federal

TSCA

CAS# 302-01-2 is listed on the TSCA Inventory.
CAS# 7732-18-5 is listed on the TSCA Inventory.
CAS# 7803-57-8 is not on the TSCA Inventory because it is a hydrate. It is considered to be listed if the CAS number for the anhydrous form is on the Inventory (40CFR720.3(u)(2)).
CAS# 10217-52-4 is not on the TSCA Inventory because it is a hydrate. It is considered to be listed if the CAS number for the anhydrous form is on the Inventory (40CFR720.3(u)(2)).
The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantibility or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall the company be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential, or exemplary damages howsoever arising, even if the company has been advised of the possibility of such damages.

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