1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name: Hydrazine
Product Number: 215155
Brand: Sigma-Aldrich
Index-No.: 007-008-00-3

CAS-No.: 302-01-2

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses: Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company: Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO  63103
USA

Telephone: +1 800-325-5832
Fax: +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone #: +1-703-527-3887 (CHEMTREC)

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Flammable liquids (Category 3), H226
Acute toxicity, Oral (Category 3), H301
Acute toxicity, Inhalation (Category 2), H330
Acute toxicity, Dermal (Category 3), H311
Skin corrosion (Category 1B), H314
Serious eye damage (Category 1), H318
Skin sensitisation (Category 1), H317
Carcinogenicity (Category 1B), H350
Acute aquatic toxicity (Category 1), H400
Chronic aquatic toxicity (Category 1), H410

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram

Signal word: Danger

Hazard statement(s)
H226: Flammable liquid and vapour.
H301 + H311: Toxic if swallowed or in contact with skin
H314: Causes severe skin burns and eye damage.
H317: May cause an allergic skin reaction.
H318  Causes serious eye damage.
H330  Fatal if inhaled.
H350  May cause cancer.
H410  Very toxic to aquatic life with long lasting effects.

Precautionary statement(s)
P201  Obtain special instructions before use.
P202  Do not handle until all safety precautions have been read and understood.
P210  Keep away from heat/sparks/open flames/hot surfaces. No smoking.
P233  Keep container tightly closed.
P240  Ground/bond container and receiving equipment.
P241  Use explosion-proof electrical/ ventilating/ lighting/ equipment.
P242  Use only non-sparking tools.
P243  Take precautionary measures against static discharge.
P260  Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.
P264  Wash skin thoroughly after handling.
P270  Do not eat, drink or smoke when using this product.
P271  Use only outdoors or in a well-ventilated area.
P272  Contaminated work clothing should not be allowed out of the workplace.
P273  Avoid release to the environment.
P280  Wear protective gloves/ protective clothing/ eye protection/ face protection.
P281  Use personal protective equipment as required.
P284  Wear respiratory protection.
P301 + P310 + P330  IF SWALLOWED: Immediately call a POISON CENTER/doctor. Rinse mouth.
P301 + P330 + P331  IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
P303 + P361 + P353  IF ON SKIN (or hair): Remove/ Take off immediately all contaminated clothing. Rinse skin with water/ shower.
P304 + P340 + P310  IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Immediately call a POISON CENTER or doctor/ physician.
P305 + P351 + P338 + P310  IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER/doctor.
P308 + P313  IF exposed or concerned: Get medical advice/ attention.
P333 + P313  If skin irritation or rash occurs: Get medical advice/ attention.
P363  Wash contaminated clothing before reuse.
P370 + P378  In case of fire: Use dry sand, dry chemical or alcohol-resistant foam for extinction.
P391  Collect spillage.
P403 + P233  Store in a well-ventilated place. Keep container tightly closed.
P403 + P235  Store in a well-ventilated place. Keep cool.
P405  Store locked up.
P501  Dispose of contents/ container to an approved waste disposal plant.

2.3  Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1  Substances

<table>
<thead>
<tr>
<th>Formula</th>
<th>H4N2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Molecular weight</td>
<td>32.05 g/mol</td>
</tr>
<tr>
<td>CAS-No.</td>
<td>302-01-2</td>
</tr>
<tr>
<td>EC-No.</td>
<td>206-114-9</td>
</tr>
<tr>
<td>Index-No.</td>
<td>007-008-00-3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Component</th>
<th>Classification</th>
<th>Concentration</th>
</tr>
</thead>
</table>

Sigma-Aldrich - 215155
**4. FIRST AID MEASURES**

4.1 **Description of first aid measures**

**General advice**
Move out of dangerous area. Consult a physician. Show this safety data sheet to the doctor in attendance.

**If inhaled**
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

**In case of skin contact**
Take off contaminated clothing and shoes immediately. Wash off with soap and plenty of water. Take victim immediately to hospital. Consult a physician.

**In case of eye contact**
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician. Continue rinsing eyes during transport to hospital.

**If swallowed**
Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 **Most important symptoms and effects, both acute and delayed**
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 **Indication of any immediate medical attention and special treatment needed**
No data available

**5. FIREFIGHTING MEASURES**

5.1 **Extinguishing media**

**Suitable extinguishing media**
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 **Special hazards arising from the substance or mixture**
No data available

5.3 **Advice for firefighters**
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 **Further information**
Use water spray to cool unopened containers.

**6. ACCIDENTAL RELEASE MEASURES**

6.1 **Personal precautions, protective equipment and emergency procedures**
Wear respiratory protection. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas. For personal protection see section 8.
6.2 **Environmental precautions**  
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 **Methods and materials for containment and cleaning up**  
Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13).

6.4 **Reference to other sections**  
For disposal see section 13.

---

### 7. Handling and Storage

#### 7.1 Precautions for safe handling  
Avoid contact with skin and eyes. Avoid inhalation of vapour or mist. Keep away from sources of ignition - No smoking. Take measures to prevent the build up of electrostatic charge. For precautions see section 2.2.

#### 7.2 Conditions for safe storage, including any incompatibilities  
Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage. Storage class (TRGS 510): Flammable liquids

#### 7.3 Specific end use(s)  
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

---

### 8. Exposure Controls/Personal Protection

#### 8.1 Control parameters  
Components with workplace control parameters

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS-No.</th>
<th>Value</th>
<th>Control parameters</th>
<th>Basis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydrazine</td>
<td>302-01-2</td>
<td>TWA</td>
<td>0.010000 ppm</td>
<td>USA. ACGIH Threshold Limit Values (TLV)</td>
</tr>
</tbody>
</table>

Remarks: Upper Respiratory Tract cancer  
Confirmed animal carcinogen with unknown relevance to humans  
Danger of cutaneous absorption

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS-No.</th>
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<thead>
<tr>
<th>Component</th>
<th>CAS-No.</th>
<th>Value</th>
<th>Control parameters</th>
<th>Basis</th>
</tr>
</thead>
</table>
| Hydrazine | 302-01-2 | TWA | 1.000000 ppm  
1.300000 mg/m3 | USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants |

Skin designation:  
The value in mg/m3 is approximate.

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS-No.</th>
<th>Value</th>
<th>Control parameters</th>
<th>Basis</th>
</tr>
</thead>
</table>
| C | | 0.030000 ppm  
0.040000 mg/m3 | USA. NIOSH Recommended Exposure Limits |

Potential Occupational Carcinogen  
See Appendix A  
2 hour ceiling value

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS-No.</th>
<th>Value</th>
<th>Control parameters</th>
<th>Basis</th>
</tr>
</thead>
</table>
| PEL | | 0.01 ppm  
0.013 mg/m3 | California permissible exposure limits for chemical contaminants (Title 8, Article 107) |

#### 8.2 Exposure controls  
**Appropriate engineering controls**  
Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product.
**Personal protective equipment**

**Eye/face protection**
Tightly fitting safety goggles. Faceshield (8-inch minimum). Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

**Skin protection**
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

- **Full contact**
  - Material: butyl-rubber
  - Minimum layer thickness: 0.3 mm
  - Break through time: 480 min
  - Material tested: Butoject® (KCL 897 / Aldrich Z677647, Size M)

- **Splash contact**
  - Material: Nitrile rubber
  - Minimum layer thickness: 0.11 mm
  - Break through time: 30 min
  - Material tested: Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374

If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

**Body Protection**
Complete suit protecting against chemicals, Flame retardant antistatic protective clothing. The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

**Respiratory protection**
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

**Control of environmental exposure**
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

---

**9. PHYSICAL AND CHEMICAL PROPERTIES**

**9.1 Information on basic physical and chemical properties**

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) Appearance</td>
<td>Form: liquid, clear</td>
</tr>
<tr>
<td></td>
<td>Colour: colourless</td>
</tr>
<tr>
<td>b) Odour</td>
<td>Ammonia odor</td>
</tr>
<tr>
<td>c) Odour Threshold</td>
<td>No data available</td>
</tr>
<tr>
<td>d) pH</td>
<td>No data available</td>
</tr>
<tr>
<td>e) Melting point/freezing point</td>
<td>1.4 °C (34.5 °F)</td>
</tr>
<tr>
<td>f) Initial boiling point and boiling range</td>
<td>113.5 °C (236.3 °F) at 1,013 hPa (760 mmHg)</td>
</tr>
<tr>
<td>g) Flash point</td>
<td>52 °C (126 °F) - closed cup</td>
</tr>
<tr>
<td>h) Evaporation rate</td>
<td>No data available</td>
</tr>
<tr>
<td>i) Flammability (solid, gas)</td>
<td>No data available</td>
</tr>
</tbody>
</table>
j) Upper/lower flammability or explosive limits
   Upper explosion limit: 99.99 % (V)
   Lower explosion limit: 4.7 % (V)

k) Vapour pressure
   13 hPa (10 mmHg) at 30.70 °C (87.26 °F)

l) Vapour density
   1.11 - (Air = 1.0)

m) Relative density
   No data available

n) Water solubility
   completely miscible

o) Partition coefficient: n-octanol/water
   log Pow: -0.16

p) Auto-ignition temperature
   No data available

q) Decomposition temperature
   No data available

r) Viscosity
   No data available

s) Explosive properties
   No data available

t) Oxidizing properties
   No data available

9.2 Other safety information
   Dissociation constant 6.05
   Relative vapour density 1.11 - (Air = 1.0)

10. STABILITY AND REACTIVITY

10.1 Reactivity
   No data available

10.2 Chemical stability
   Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
   No data available

10.4 Conditions to avoid
   Heat, flames and sparks.

10.5 Incompatible materials
   Oxidizing agents, Oxygen, Copper, Zinc, Organic materials

10.6 Hazardous decomposition products
   Hazardous decomposition products formed under fire conditions. - Nitrogen oxides (NOx)
   Other decomposition products - No data available
   In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

   Acute toxicity
   LD50 Oral - Rat - female - 108 - 141 mg/kg
   (OECD Test Guideline 401)
   LC50 Inhalation - Rat - male - 4 h - 0.759 mg/l
   Dermal: No data available
   No data available

   Skin corrosion/irritation
   Skin - Rabbit
   Result: Corrosive - 4 h
Serious eye damage/eye irritation
No data available

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
No data available

Carcinogenicity
This is or contains a component that has been reported to be carcinogenic based on its IARC, OSHA, ACGIH, NTP, or EPA classification.
Possible human carcinogen

IARC: 2B - Group 2B: Possibly carcinogenic to humans (Hydrazine)
NTP: Reasonably anticipated to be a human carcinogenThe reference note has been added by TD based on the background information of the NTP. (Hydrazine)
OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
No data available

No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
Repeated dose toxicity: Mouse - female - Inhalation - NOAEL: 6.65 mg/m3
RTECS: MU7175000

spasm, inflammation and edema of the larynx, spasm, inflammation and edema of the bronchi, pneumonitis, pulmonary edema, burning sensation, Cough, wheezing, laryngitis, Shortness of breath, Headache, Nausea, Vomiting

Liver - Irregularities - Based on Human Evidence
Liver - Irregularities - Based on Human Evidence

12. ECOLOGICAL INFORMATION

12.1 Toxicity
Toxicity to daphnia and other aquatic invertebrates
semi-static test EC50 - Daphnia pulex (Water flea) - 0.17 mg/l - 48 h

Toxicity to algae
static test EC50 - Desmodesmus subspicatus (Scenedesmus subspicatus) - 0.017 mg/l - 72 h

Toxicity to bacteria
Respiration inhibition EC50 - Sludge Treatment - 5.5 mg/l - 3 h
(OECD Test Guideline 209)

12.2 Persistence and degradability
Biodegradability
Biotic/Aerobic - Exposure time 20 d
Result: 28 % - Not readily biodegradable.
12.3 Bioaccumulative potential
   No data available

12.4 Mobility in soil
   No data available

12.5 Results of PBT and vPvB assessment
   PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
   An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
   Very toxic to aquatic life with long lasting effects.
   No data available

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods
   Product
   Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material.

   Contaminated packaging
   Dispose of as unused product.

14. TRANSPORT INFORMATION

   DOT (US)
   UN number: 2029 Class: 8 (3, 6.1) Packing group: I
   Proper shipping name: Hydrazine, anhydrous
   Reportable Quantity (RQ): 1 lbs
   Poison Inhalation Hazard: No

   IMDG
   UN number: 2029 Class: 8 (3, 6.1) Packing group: I
   Proper shipping name: HYDRAZINE, ANHYDROUS
   Marine pollutant: yes
   EMS-No: F-E, S-C

   IATA
   UN number: 2029 Class: 8 (3, 6.1) Packing group: I
   Proper shipping name: Hydrazine, anhydrous
   IATA Passenger: Not permitted for transport

15. REGULATORY INFORMATION

   SARA 302 Components
   The following components are subject to reporting levels established by SARA Title III, Section 302:
<table>
<thead>
<tr>
<th>CAS-No.</th>
<th>Revision Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydrazine</td>
<td>302-01-2</td>
</tr>
</tbody>
</table>

   SARA 313 Components
   The following components are subject to reporting levels established by SARA Title III, Section 313:
<table>
<thead>
<tr>
<th>CAS-No.</th>
<th>Revision Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydrazine</td>
<td>302-01-2</td>
</tr>
</tbody>
</table>

   SARA 311/312 Hazards
   Fire Hazard, Acute Health Hazard, Chronic Health Hazard

   Massachusetts Right To Know Components
<table>
<thead>
<tr>
<th>CAS-No.</th>
<th>Revision Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydrazine</td>
<td>302-01-2</td>
</tr>
</tbody>
</table>

   Pennsylvania Right To Know Components
<table>
<thead>
<tr>
<th>CAS-No.</th>
<th>Revision Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydrazine</td>
<td>302-01-2</td>
</tr>
</tbody>
</table>
New Jersey Right To Know Components

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS-No.</th>
<th>Revision Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydrazine</td>
<td>302-01-2</td>
<td>2007-07-01</td>
</tr>
</tbody>
</table>

California Prop. 65 Components

**WARNING!** This product contains a chemical known to the State of California to cause cancer.

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS-No.</th>
<th>Revision Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydrazine</td>
<td>302-01-2</td>
<td>2007-09-28</td>
</tr>
</tbody>
</table>

16. OTHER INFORMATION

**Full text of H-Statements referred to under sections 2 and 3.**

- Acute Tox.  
- Aquatic Acute  
- Aquatic Chronic  
- Carc.  
- Eye Dam.  
- Flam. Liq.  
- H226  
- H301  
- H301 + H311  
- H311  
- H314  
- H317  
- H330  
- H350  

**HMIS Rating**

- Health hazard: 4
- Chronic Health Hazard: *
- Flammability: 4
- Physical Hazard: 3

**NFPA Rating**

- Health hazard: 4
- Fire Hazard: 4
- Reactivity Hazard: 3

**Further information**

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**Preparation Information**

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 4.9
Revision Date: 05/24/2016
Print Date: 04/18/2017