SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers
Product name : Hydrazine
Product Number : 215155
Brand : Sigma-Aldrich
Index-No. : 007-008-00-3
REACH No. : 01-2119492624-31-XXXX
CAS-No. : 302-01-2

1.2 Relevant identified uses of the substance or mixture and uses advised against
Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet
Company : Sigma-Aldrich Inc.
3050 SPRUCE ST
ST. LOUIS MO 63103
UNITED STATES

Telephone : +1 314 771-5765
Fax : +1 800 325-5052

1.4 Emergency telephone
Emergency Phone # : 800-424-9300 CHEMTREC (USA) +1-703-527-3887 CHEMTREC (International) 24 Hours/day; 7 Days/week

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture
Classification according to Regulation (EC) No 1272/2008
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 (Sub-category 1B), H314
Serious eye damage (Category 1), H318
Skin sensitization (Category 1), H317
Carcinogenicity (Category 1B), H350
Short-term (acute) aquatic hazard (Category 1), H400
Long-term (chronic) aquatic hazard (Category 1), H410
2.2 Label elements

**Labelling according Regulation (EC) No 1272/2008**

**Pictogram**

<table>
<thead>
<tr>
<th>Signal word</th>
<th>Danger</th>
</tr>
</thead>
</table>

**Hazard statement(s)**
- H226 Flammable liquid and vapor.
- 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.
- H330 Fatal if inhaled.
- H350 May cause cancer.
- H410 Very toxic to aquatic life with long lasting effects.

**Precautionary statement(s)**
- P210 Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
- P273 Avoid release to the environment.
- P280 Wear protective gloves/ protective clothing/ eye protection/ face protection/ hearing protection.
- P303 + P361 + P353 IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water.
- P304 + P340 + P310 IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER/ doctor.
- P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

**Supplemental Hazard Statements**
none

**Restricted to professional users.**

**Reduced Labeling (< 125 ml)**

**Pictogram**

<table>
<thead>
<tr>
<th>Signal word</th>
<th>Danger</th>
</tr>
</thead>
</table>

**Hazard statement(s)**
- H314 Causes severe skin burns and eye damage.
- H317 May cause an allergic skin reaction.
- H350 May cause cancer.
- H330 Fatal if inhaled.
- H301 + H311 Toxic if swallowed or in contact with skin.

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- P280 Wear protective gloves/ protective clothing/ eye protection/ face protection/ hearing protection.
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- P304 + P340 + P310 IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER/ doctor.
- P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes.
Supplemental Hazard Statements

2.3 **Other hazards**
This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

### SECTION 3: Composition/information on ingredients

#### 3.1 Substances

<table>
<thead>
<tr>
<th>Component</th>
<th>Classification</th>
<th>Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydrazine</td>
<td>Included in the Candidate List of Substances of Very High Concern (SVHC)</td>
<td>&lt;= 100 %</td>
</tr>
<tr>
<td>CAS-No.</td>
<td>302-01-2</td>
<td></td>
</tr>
<tr>
<td>EC-No.</td>
<td>206-114-9</td>
<td></td>
</tr>
<tr>
<td>Index-No.</td>
<td>007-008-00-3</td>
<td></td>
</tr>
</tbody>
</table>

Concentration limits:

- >= 10 %: Skin Corr. 1B, H314; 3 - < 10 %: Skin Irrit. 2, H315; 3 - < 10 %: Eye Irrit. 2, H319; M-Factor - Aquatic Acute: 1 - Aquatic Chronic: 1

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

### SECTION 4: First aid measures

#### 4.1 Description of first-aid measures

**General advice**
First aiders need to protect themselves. Show this material safety data sheet to the doctor in attendance.

**If inhaled**
After inhalation: fresh air. Immediately call in physician. If breathing stops: immediately apply artificial respiration, if necessary also oxygen.
**In case of skin contact**
In case of skin contact: Take off immediately all contaminated clothing. Rinse skin with water/shower. Call a physician immediately.

**In case of eye contact**
After eye contact: rinse out with plenty of water. Immediately call in ophthalmologist. Remove contact lenses.

**If swallowed**
If swallowed: give water to drink (two glasses at most). Seek medical advice immediately. In exceptional cases only, if medical care is not available within one hour, induce vomiting (only in persons who are wide awake and fully conscious), administer activated charcoal (20 - 40 g in a 10% slurry) and consult a doctor as quickly as possible. Do not attempt to neutralise.

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

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**SECTION 5: Firefighting measures**

5.1 **Extinguishing media**

**Suitable extinguishing media**
Water Foam Carbon dioxide (CO2) Dry powder

**Unsuitable extinguishing media**
For this substance/mixture no limitations of extinguishing agents are given.

5.2 **Special hazards arising from the substance or mixture**
Nitrogen oxides (NOx)
Combustible.
Vapors are heavier than air and may spread along floors.
Forms explosive mixtures with air at elevated temperatures.
Development of hazardous combustion gases or vapours possible in the event of fire.

5.3 **Advice for firefighters**
Stay in danger area only with self-contained breathing apparatus. Prevent skin contact by keeping a safe distance or by wearing suitable protective clothing.

5.4 **Further information**
Remove container from danger zone and cool with water. Suppress (knock down) gases/vapors/mists with a water spray jet. Prevent fire extinguishing water from contaminating surface water or the ground water system.

---

**SECTION 6: Accidental release measures**

6.1 **Personal precautions, protective equipment and emergency procedures**
Advice for non-emergency personnel: Do not breathe vapors, aerosols. Avoid substance contact. Ensure adequate ventilation. Keep away from heat and sources of ignition. Evacuate the danger area, observe emergency procedures, consult an expert. For personal protection see section 8.
6.2 Environmental precautions
Do not let product enter drains. Risk of explosion.

6.3 Methods and materials for containment and cleaning up
Cover drains. Collect, bind, and pump off spills. Observe possible material restrictions (see sections 7 and 10). Take up carefully with liquid-absorbent material (e.g. Chemizorb®). Dispose of properly. Clean up affected area.

6.4 Reference to other sections
For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling
Advice on safe handling
Work under hood. Do not inhale substance/mixture. Avoid generation of vapours/aerosols.

Advice on protection against fire and explosion
Keep away from open flames, hot surfaces and sources of ignition. Take precautionary measures against static discharge.

Hygiene measures
Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance. For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Storage conditions
Keep container tightly closed in a dry and well-ventilated place. Keep away from heat and sources of ignition. Keep locked up or in an area accessible only to qualified or authorized persons.

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

SECTION 8: Exposure controls/personal protection

8.1 Control parameters
Ingredients with workplace control parameters

8.2 Exposure controls

Personal protective equipment

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

Skin protection
This recommendation applies only to the product stated in the safety data sheet, supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN374 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).
Full contact
Material: butyl-rubber
Minimum layer thickness: 0,7 mm
Break through time: 480 min
Material tested: Butoject® (KCL 898)

This recommendation applies only to the product stated in the safety data sheet, supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN374 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0,4 mm
Break through time: 240 min
Material tested: Camatril® (KCL 730 / Aldrich Z677442, Size M)

**Body Protection**
Flame retardant antistatic protective clothing.

**Respiratory protection**
required when vapours/aerosols are generated.
Our recommendations on filtering respiratory protection are based on the following standards: DIN EN 143, DIN 14387 and other accompanying standards relating to the used respiratory protection system.
Recommended Filter type: Filter type ABEK

The entrepreneur has to ensure that maintenance, cleaning and testing of respiratory protective devices are carried out according to the instructions of the producer. These measures have to be properly documented.

**Control of environmental exposure**
Do not let product enter drains. Risk of explosion.

---

**SECTION 9: Physical and chemical properties**

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

- **a)** Appearance
  - Form: oily
  - Color: colorless

- **b)** Odor
  - Ammonia odor

- **c)** Odor Threshold
  - No data available

- **d)** pH
  - No data available

- **e)** Melting point/freezing point
  - Melting point: 2 °C

- **f)** Initial boiling point and boiling range
  - 113,5 °C at 1.013 hPa

- **g)** Flash point
  - 38 °C - closed cup

- **h)** Evaporation rate
  - No data available

- **i)** Flammability (solid, gas)
  - No data available

- **j)** Upper/lower
  - Upper explosion limit: 99,99 % (V)
**flammasibility or explosive limits**

| Lower explosion limit: 4,7 % (V) |

**k) Vapor pressure**

| 19,2 hPa at 25 °C |

**l) Vapor density**

| 1,11 - (Air = 1.0) |

**m) Relative density**

| No data available |

**n) Water solubility**

| Completely miscible |

**o) Partition coefficient:**

| Log Pow: -0,16 at 25 °C - Bioaccumulation is not expected. |

**p) Autoignition temperature**

| 24 °C |

**q) Decomposition temperature**

| No data available |

**r) Viscosity**

| Viscosity, kinematic: No data available |

| Viscosity, dynamic: 0,91 mPa.s at 25 °C |

**s) Explosive properties**

| No data available |

**t) Oxidizing properties**

| No data available |

**9.2 Other safety information**

| Dissociation constant | 6,05 at 25 °C |

| Relative vapor density | 1,11 - (Air = 1.0) |

**SECTION 10: Stability and reactivity**

**10.1 Reactivity**

Vapor/air-mixtures are explosive at intense warming.

**10.2 Chemical stability**

The product is chemically stable under standard ambient conditions (room temperature).

**10.3 Possibility of hazardous reactions**

Risk of explosion with:
- alkali compounds
- perchlorates
- barium oxide
- nitrites
- Calcium
- amides
- Calcium oxide
- chromates/perchromates
- chromium(VI) oxide
- Fluorine
- Salts of hydrazine
- azides
- Potassium
- potassium dichromate
- potassium permanganate
- copper compounds
- nitrates
Raney-nickel
metal catalysts
sodium
Organic Substances
mercury compounds
mercury(II) nitrate
mercury oxide
Nitric acid
Mild steel
nitrogen oxides
Tetryl (N-Methyl-N-2,4,6-tetranitroaniline)
hydrogen peroxide
zinc diethyl
tin (II) chloride
halogen oxides
Wood/Sawdust
metallic oxides
Steam
organic nitro compounds
metallic salts
Sulfides
phosphorus halides
silver compounds
Oxygen
liquid
silver
with
Catalyst
Nitromethane
with
Methanol
Ammonia
with
Alkali metals
Sodium hydroxide
with
Air
Methanol
with
Nitromethane
absorbents, filter materials, wiping cloths and protective clothing
with
Heavy metals
Risk of ignition or formation of inflammable gases or vapours with:
Chlorine
nitrogen dioxide
Rust
Air
Oxidizing agents
Exothermic reaction with:
chlorates
halogens
Acids
metals
metallic chlorides
Oxygen
Phosgene

10.4 Conditions to avoid
Heating.

10.5 Incompatible materials
Iron, Mild steel, Copper, Nickel, Lead, silver, metal alloys, glass, rubber

10.6 Hazardous decomposition products
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - male - 262 mg/kg
(OECD Test Guideline 401)

LC50 Inhalation - Rat - male - 4 h - 0.76 mg/l
Remarks: (ECHA)

Acute toxicity estimate Dermal - Not tested on animals - 300.1 mg/kg
Remarks: Expert judgment

Skin corrosion/irritation
Skin - Rabbit
Result: Corrosive - 4 h
(OECD Test Guideline 404)
Remarks: (55% solution)
(Regulation (EC) No 1272/2008, Annex VI)

Serious eye damage/eye irritation
Causes serious eye damage.

Respiratory or skin sensitization
(Regulation (EC) No 1272/2008, Annex VI)

Germ cell mutagenicity
No data available

Carcinogenicity
No data available

Reproductive toxicity
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

11.2 Additional Information
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
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.
Liver - Irregularities - Based on Human Evidence

SECTION 12: Ecological information

12.1 Toxicity
Toxicity to fish static test LC50 - Poecilia reticulata (guppy) - 0,61 mg/l - 96 h
Remarks: (ECHA)

Toxicity to daphnia and other aquatic invertebrates semi-static test EC50 - Daphnia pulex (Water flea) - 0,16 mg/l - 48 h
Remarks: (in analogy to similar products)
The value is given in analogy to the following substances: Hydrazine hydrate

Toxicity to algae static test ErC50 - Desmodesmus subspicatus (green algae) - 0,017 mg/l - 48 h

Toxicity to bacteria static test EC50 - activated sludge - 5,5 mg/l - 3 h
Remarks: (OECD Test Guideline 209)

12.2 Persistence and degradability
Biodegradability aerobic - Exposure time 24 h
Result: 99 % - Inherently biodegradable.
Remarks: (OECD Test Guideline 302B)

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

12.6 Other adverse effects
No data available
SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
See www.retrologistik.com for processes regarding the return of chemicals and containers, or contact us there if you have further questions.

SECTION 14: Transport information

14.1 UN number
ADR/RID: 2029    IMDG: 2029    IATA: 2029

14.2 UN proper shipping name
ADR/RID: HYDRAZINE, ANHYDROUS    IMDG: HYDRAZINE, ANHYDROUS    IATA: Hydrazine, anhydrous
Passenger Aircraft: Not permitted for transport

14.3 Transport hazard class(es)
ADR/RID: 8 (3, 6.1)    IMDG: 8 (3, 6.1)    IATA: 8 (3)(6.1)

14.4 Packaging group
ADR/RID: I    IMDG: I    IATA: I

14.5 Environmental hazards
ADR/RID: yes    IMDG Marine pollutant: yes    IATA: no

14.6 Special precautions for user
No data available

SECTION 15: Regulatory information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture
This material safety data sheet complies with the requirements of Regulation (EC) No. 1907/2006.

Authorisations and/or restrictions on use

REACH - Restrictions on the manufacture, placing on the market and use of certain dangerous substances, preparations and articles (Annex XVII)

National legislation

: ACUTE TOXIC

: ENVIRONMENTAL HAZARDS

: Carcinogenic substances
Other regulations
Observe work restrictions regarding maternity protection in accordance to Dir 92/85/EEC or stricter national regulations where applicable.

Take note of Dir 94/33/EC on the protection of young people at work.

15.2 Chemical Safety Assessment
For this product a chemical safety assessment was not carried out

SECTION 16: Other information

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

H226 Flammable liquid and vapor.
H301 Toxic if swallowed.
H301 + H311 Toxic if swallowed or in contact with skin.
H311 Toxic in contact with skin.
H314 Causes severe skin burns and eye damage.
H315 Causes skin irritation.
H317 May cause an allergic skin reaction.
H318 Causes serious eye damage.
H319 Causes serious eye irritation.
H330 Fatal if inhaled.
H350 May cause cancer.
H400 Very toxic to aquatic life.
H410 Very toxic to aquatic life with long lasting effects.

Further information
The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

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