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

1.1 Product identifiers

Product name: Hydroxylamine (50% solution in water) for synthesis
Product Number: 8.14441
Catalogue No.: 814441
Brand: Millipore

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

Identified uses: Chemical for synthesis

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

**GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)**

- Corrosive to Metals (Category 1), H290
- Acute toxicity, Oral (Category 4), H302
- Skin irritation (Category 2), H315
- Serious eye damage (Category 1), H318
- Skin sensitization (Category 1), H317
- Carcinogenicity (Category 2), H351
- Specific target organ toxicity - single exposure (Category 3), Respiratory system, H335
- Specific target organ toxicity - repeated exposure (Category 2), Blood, H373
- Short-term (acute) aquatic hazard (Category 1), H400

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

2.2 GHS Label elements, including precautionary statements

Millipore - 8.14441
Pictogram

Signal Word  Danger

Hazard statement(s)
H290  May be corrosive to metals.
H302  Harmful if swallowed.
H315  Causes skin irritation.
H317  May cause an allergic skin reaction.
H318  Causes serious eye damage.
H335  May cause respiratory irritation.
H351  Suspected of causing cancer.
H373  May cause damage to organs (Blood) through prolonged or repeated exposure.
H400  Very toxic to aquatic life.

Precautionary statement(s)
P201  Obtain special instructions before use.
P202  Do not handle until all safety precautions have been read and understood.
P234  Keep only in original container.
P260  Do not breathe mist or vapors.
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 must not be allowed out of the workplace.
P273  Avoid release to the environment.
P280  Wear protective gloves/ protective clothing/ eye protection/ face protection.
P301 + P312 + P330  IF SWALLOWED: Call a POISON CENTER/ doctor if you feel unwell. Rinse mouth.
P302 + P352  IF ON SKIN: Wash with plenty of soap and water.
P304 + P340 + P312  IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER/ doctor if you feel unwell.
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.
P362  Take off contaminated clothing and wash before reuse.
P390  Absorb spillage to prevent material damage.
P391  Collect spillage.
P403 + P233  Store in a well-ventilated place. Keep container tightly closed.
P405  Store locked up.
P406  Store in corrosive resistant container with a resistant inner liner.
P501  Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none
### SECTION 3: Composition/information on ingredients

#### 3.2 Mixtures

<table>
<thead>
<tr>
<th>Component</th>
<th>Classification</th>
<th>Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>hydroxylamine</td>
<td>Unst. Expl. ; Met. Corr. 1; Acute Tox. 4; Skin Irrit. 2; Eye Dam. 1; Skin Sens. 1; Carc. 2; STOT SE 3; STOT RE 2; Aquatic Acute 1; H200, H290, H302, H312, H315, H318, H317, H351, H335, H373, H400</td>
<td>&gt;= 50 - &lt; 70%</td>
</tr>
<tr>
<td>CAS-No.</td>
<td>7803-49-8</td>
<td></td>
</tr>
<tr>
<td>EC-No.</td>
<td>232-259-2</td>
<td></td>
</tr>
<tr>
<td>Index-No.</td>
<td>612-122-01-4</td>
<td></td>
</tr>
</tbody>
</table>

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**  
Show this material safety data sheet to the doctor in attendance.

**If inhaled**  
After inhalation: fresh air. Call in physician.

**In case of skin contact**  
In case of skin contact: Take off immediately all contaminated clothing. Rinse skin with water/shower. Consult a physician.

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

**If swallowed**  
After swallowing: immediately make victim drink water (two glasses at most). 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

### 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.
Fire may cause evolution of:
Ammonia, nitrogen oxides
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**

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. 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.

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
Risk of bursting. 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.

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
No metal containers.
Protected from light. Keep container tightly closed in a dry and well-ventilated place. Keep away from heat and sources of ignition.
Recommended storage temperature see product label.

**Storage class**
Storage class (TRGS 510): 3: Flammable liquids

**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**
Contains no substances with occupational exposure limit values.

**8.2 Exposure controls**

**Appropriate engineering controls**
Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance.

**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: Nitrile rubber
- Minimum layer thickness: 0.40 mm
- Break through time: > 480 min
- Material tested: Camatril® (KCL 730 / Aldrich Z677442, Size M)

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: 0.11 mm
- Break through time: > 30 min
- Material tested: KCL 741 Dermatril® L

**Body Protection**
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.
Control of environmental exposure
Do not let product enter drains.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a) Appearance
   Form: liquid
   Color: colorless

b) Odor
   odorless

c) Odor Threshold
   Not applicable

d) pH
   10.6 at 20 °C (68 °F)

e) Melting point/freezing point
   Solidification point: 8 °C (46 °F)

f) Initial boiling point and boiling range
   No data available

g) Flash point
   No data available

h) Evaporation rate
   No data available

i) Flammability (solid, gas)
   No data available

j) Upper/lower flammability or explosive limits
   No data available

k) Vapor pressure
   14 hPa at 20 °C (68 °F)

l) Vapor density
   No data available

m) Density
   1.12 g/cm3 at 20 °C (68 °F)
   Relative density
   No data available

n) Water solubility
   soluble

o) Partition coefficient: n-octanol/water
   No data available

p) Autoignition temperature
   No data available

q) Decomposition temperature
   > 50 °C (> 122 °F) -

r) Viscosity
   1.435 mm2/s at 25 °C (77 °F) -

s) Explosive properties
   No data available

t) Oxidizing properties
   none

9.2 Other safety information
   No data available
**SECTION 10: Stability and reactivity**

**10.1 Reactivity**
Vapor/air-mixtures are explosive at intense warming.

**10.2 Chemical stability**
In case of decomposition in closed containers and tubes risk of bursting due to buildup of overpressure.
Sensitive to air.
The product is chemically stable under standard ambient conditions (room temperature).

**10.3 Possibility of hazardous reactions**
Violent reactions possible with:
nitrites
nitrates
Strong oxidizing agents
strong alkalis
Metallic salts
metal alloys
Powdered metals
Caution! In contact with nitrites, nitrates, nitrous acid possible liberation of nitrosamines!

**10.4 Conditions to avoid**
Heating (explosive decomposition).
Keep away from direct sunlight.
no information available

**10.5 Incompatible materials**
Metals

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

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**SECTION 11: Toxicological information**

**11.1 Information on toxicological effects**

**Mixture**

**Acute toxicity**
Acute toxicity estimate Oral - 1,032 mg/kg
(Calculation method)
Symptoms: Irritations of mucous membranes in the mouth, pharynx, oesophagus and gastrointestinal tract.
Symptoms: Possible symptoms: mucosal irritations, Cough, Shortness of breath, Possible damages: damage of respiratory tract
Acute toxicity estimate Dermal - 2,200 mg/kg
(Calculation method)

**Skin corrosion/irritation**
Mixture causes skin irritation.

**Serious eye damage/eye irritation**
Mixture causes serious eye damage.

**Respiratory or skin sensitization**
Mixture may cause an allergic skin reaction.
**Germ cell mutagenicity**  
No data available

**Carcinogenicity**  
Evidence of a carcinogenic effect.

**IARC:** No ingredient of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

**NTP:** No ingredient of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

**OSHA:** No component of this product present at levels greater than or equal to 0.1% is on OSHA’s list of regulated carcinogens.

**Reproductive toxicity**  
No data available

**Specific target organ toxicity - single exposure**  
Mixture may cause respiratory irritation.

**Specific target organ toxicity - repeated exposure**  
Mixture may cause damage to organs through prolonged or repeated exposure.

**Aspiration hazard**  
No data available

11.2 Additional Information  
Other dangerous properties can not be excluded.

This substance should be handled with particular care.

Handle in accordance with good industrial hygiene and safety practice.

**Components**

**hydroxylamine**

**Acute toxicity**  
LD50 Oral - Rat - 516 mg/kg  
Inhalation: No data available  
LD50 Dermal - Rabbit - 1,500 - 2,000 mg/kg  
(OECD Test Guideline 402)

**Skin corrosion/irritation**  
Causes skin irritation. Classified according to Regulation (EU) 1272/2008, Annex VI (Table 3.1/3.2)

**Serious eye damage/eye irritation**  
Causes serious eye damage. Classified according to Regulation (EU) 1272/2008, Annex VI (Table 3.1/3.2)

**Respiratory or skin sensitization**  
May cause allergic skin reaction. Classified according to Regulation (EU) 1272/2008, Annex VI (Table 3.1/3.2)

**Germ cell mutagenicity**  
No data available

**Carcinogenicity**  
Suspected of causing cancer.
Reproductive toxicity
No data available

Specific target organ toxicity - single exposure
May cause respiratory irritation.
Remarks: Classified according to Regulation (EU) 1272/2008, Annex VI (Table 3.1/3.2)

Specific target organ toxicity - repeated exposure
May cause damage to organs through prolonged or repeated exposure. - Blood
Remarks: Classified according to Regulation (EU) 1272/2008, Annex VI (Table 3.1/3.2)

Aspiration hazard
No data available

SECTION 12: Ecological information

12.1 Toxicity

Mixture
No data available

12.2 Persistence and degradability

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 Endocrine disrupting properties
No data available

12.7 Other adverse effects
No data available

Components
hydroxylamine
No data available

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Waste material must be disposed of in accordance with the national and local regulations. Leave chemicals in original containers. No mixing with other waste. Handle uncleaned containers like the product itself. 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

DOT (US)
UN number: 2735   Class: 8   Packing group: III
Proper shipping name: Amines, liquid, corrosive, n.o.s. (hydroxylamine)
Reportable Quantity (RQ): Poison Inhalation Hazard: No

IMDG
UN number: 2735   Class: 8   Packing group: III
Proper shipping name: AMINES, LIQUID, CORROSIVE, N.O.S. (hydroxylamine)
EMS-No: F-A, S-B
Marine pollutant : yes

IATA
UN number: 2735   Class: 8   Packing group: III
Proper shipping name: Amines, liquid, corrosive, n.o.s. (hydroxylamine)

SECTION 15: Regulatory information

SARA 302 Components
This material does not contain any components with a section 302 EHS TPQ.

SARA 313 Components
This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

Massachusetts Right To Know Components
No components are subject to the Massachusetts Right to Know Act.

SECTION 16: Other information

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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