1.1 Product identifiers

Product name: Ammonia
Product Number: 294993
Brand: Aldrich
Index-No.: 007-001-00-5
REACH No.: 01-211948876-14-XXXX
CAS-No.: 7664-41-7

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

Gases under pressure (Liquefied gas), H280
Acute toxicity, Inhalation (Category 3), H331
Skin corrosion (Sub-category 1B), H314
Serious eye damage (Category 1), H318
Short-term (acute) aquatic hazard (Category 1), H400
Long-term (chronic) aquatic hazard (Category 2), H411

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

Labelling according Regulation (EC) No 1272/2008

Signal word: Danger

Hazard statement(s)
- H280: Contains gas under pressure; may explode if heated.
- H314: Causes severe skin burns and eye damage.
- H331: Toxic if inhaled.
- H410: Very toxic to aquatic life with long lasting effects.

Precautionary statement(s)
- P260: Do not breathe gas.
- P273: Avoid release to the environment.
- P280: Wear protective gloves/ protective clothing/ eye protection/ face protection.
- P303 + P361 + P353: IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water.
- P304 + P340 + P311: IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER/ doctor.
- 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.

Supplemental Hazard information (EU)
- EUH071: Corrosive to the respiratory tract.

Reduced Labeling (<= 125 ml)

Signal word: Danger

Hazard statement(s)
- H314: Causes severe skin burns and eye damage.
- H331: Toxic if inhaled.

Precautionary statement(s)
- P260: Do not breathe gas.
- P280: Wear protective gloves/ protective clothing/ eye protection/ face protection.
- P303 + P361 + P353: IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water.
- P304 + P340 + P311: IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER/ doctor.
- 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.

Supplemental Hazard information (EU)
- EUH071: Corrosive to the respiratory tract.

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>ammonia anhydrous</td>
<td>Flam. Gas 2; Press. Gas Liquefied gas; Acute Tox. 3; Skin Corr. 1B; Eye Dam. 1; Aquatic Acute 1; Aquatic Chronic 2; H221, H280, H331, H314, H318, H400, H411 M-Factor - Aquatic Acute: 10</td>
<td>&lt;= 100 %</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**
Consult a physician. Show this material 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.

**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
SECTION 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

Nitrogen oxides (NOx)
Not combustible.

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.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Wear respiratory protection. Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe 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

Clean up promptly by sweeping or vacuum.

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
Avoid contact with skin and eyes. Avoid inhalation of vapor or mist.

Hygiene measures
Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product.
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. Store in cool place.
Contents under pressure.

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**
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.

The selected protective gloves have to satisfy the specifications of Regulation (EU) 2016/425 and the standard EN 374 derived from it.

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: butyl-rubber
Minimum layer thickness: 0,3 mm
Break through time: 480 min
Material tested:Butoject® (KCL 897 / Aldrich Z677647, 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 EC 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, 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 AXBEK (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.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a) Appearance  Form: Liquefied gas
Color: colorless

b) Odor  stinging, Do not attempt to smell the product as it is hazardous.

c) Odor Threshold  No data available

d) pH  ca.10 - 12 at 50 g/l at 20 °C

e) Melting point/freezing point  Melting point/range: -78 °C - lit.

f) Initial boiling point and boiling range  -33 °C - lit.

g) Flash point  Not applicable

h) Evaporation rate  Not applicable

i) Flammability (solid, gas)  The product is not flammable.

j) Upper/lower flammability or explosive limits
   Upper explosion limit: 25 %(V)
   Lower explosion limit: 16 %(V)

k) Vapor pressure  8.600 hPa at 20 °C

l) Vapor density  0,6 - (Air = 1.0)

m) Relative density  No data available

n) Water solubility  531 g/l at 20 °C - OECD Test Guideline 105

o) Partition coefficient: n-octanol/water  Not applicable for inorganic substances

p) Autoignition temperature  651 °C

q) Decomposition temperature  > 450 °C -

r) Viscosity  Viscosity, kinematic: No data available
Viscosity, dynamic: No data available

s) Explosive properties  No data available

t) Oxidizing properties  No data available

9.2 Other safety information

Dissociation constant  9,25 at 25 °C

Relative vapor density  0,6 - (Air = 1.0)
SECTION 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
No data available

10.5 Incompatible materials
No data available

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
No data available

LC50 Inhalation - Rat - male - 4 h - 4,93 mg/l
Remarks: (ECHA)

Skin corrosion/irritation
Skin - Rabbit
Result: Corrosive - 4 h
(OECD Test Guideline 404)

Serious eye damage/eye irritation
Causes serious eye damage.

Respiratory or skin sensitization
No data available

Germ cell mutagenicity

Test Type: Ames test
Test system: Escherichia coli/Salmonella typhimurium
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 471
Result: negative

Test Type: Micronucleus test
Species: Mouse
Cell type: Bone marrow
Application Route: Intraperitoneal
Method: OECD Test Guideline 474
The life science business of Merck operates as MilliporeSigma in the US and Canada

Result: negative
Remarks: (in analogy to similar products)
The value is given in analogy to the following substances: ammonium chloride

**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**
Repeated dose toxicity - Rat - male and female - Oral - 35 Days - NOAEL (No observed adverse effect level) - 250 mg/kg - LOAEL (Lowest observed adverse effect level) - 750 mg/kg
Remarks:
(in analogy to similar products)
The value is given in analogy to the following substances: diammonium hydrogenphosphate

RTECS: BO0875000

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**
flow-through test LC50 - Pimephales promelas (fathead minnow) - 0,068 mg/l - 96 h
Remarks: (in analogy to similar products)
(ECHA)
The value is given in analogy to the following substances: ammonium sulphate

**Toxicity to daphnia and other aquatic invertebrates**
static test LC50 - Daphnia magna (Water flea) - 101 mg/l - 48 h
Remarks: (ECHA)
EC50 - Daphnia pulicaria - 1,16 mg/l - 48 h
Remarks: (Lit.)

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**  
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**  
Very toxic to aquatic life.  
No data available

### SECTION 13: Disposal considerations

13.1 **Waste treatment methods**

**Product**  
Offer surplus and non-recyclable solutions to a licensed disposal company. Waste material must be disposed of in accordance with the Directive on waste 2008/98/EC as well as other national and local regulations. Leave chemicals in original containers. No mixing with other waste. Handle uncleaned containers like the product itself.

**Contaminated packaging**  
Dispose of as unused product.

### SECTION 14: Transport information

14.1 **UN number**  
| ADR/RID: 1005 | IMDG: 1005 | IATA: 1005 |

14.2 **UN proper shipping name**  
ADR/RID: AMMONIA, ANHYDROUS  
IMDG: AMMONIA, ANHYDROUS  
IATA: Ammonia, anhydrous  
Passenger Aircraft: Not permitted for transport  
Cargo Aircraft: Not permitted for transport

14.3 **Transport hazard class(es)**  
ADR/RID: 2.3 (8)  
IMDG: 2.3 (8)  
IATA: 2.3 (8)

14.4 **Packaging group**  
ADR/RID: -  
IMDG: -  
IATA: -

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.

National legislation


: ACUTE TOXIC

: ENVIRONMENTAL HAZARDS

: Anhydrous Ammonia

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.

- EUH071 Corrosive to the respiratory tract.
- H221 Flammable gas.
- H280 Contains gas under pressure; may explode if heated.
- H314 Causes severe skin burns and eye damage.
- H318 Causes serious eye damage.
- H331 Toxic if inhaled.
- H400 Very toxic to aquatic life.
- H410 Very toxic to aquatic life with long lasting effects.
- H411 Toxic to aquatic life with long lasting effects.

Further information

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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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