

SAFETY DATA SHEET

Version 6.11
Revision Date 09/06/2024
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SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

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

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

Identified uses : Laboratory chemicals, Synthesis of substances
Uses advised against : The product is being supplied under the TSCA R&D Exemption (40 CFR Section 720.36). It is the recipient's responsibility to comply with the requirements of the R&D exemption. The product may not be used for a non-exempt commercial purpose under TSCA unless appropriate consent is granted in writing by MilliporeSigma.

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)

Flammable gases (Category 2), H221
Gases under pressure (Liquefied gas), H280
Acute toxicity, Inhalation (Category 3), H331

Skin corrosion (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 GHS Label elements, including precautionary statements

Pictogram



Signal Word

Danger

Hazard Statements

H221 Flammable gas.
H280 Contains gas under pressure; may explode if heated.
H314 Causes severe skin burns and eye damage.
H331 Toxic if inhaled.
H400 Very toxic to aquatic life.
H411 Toxic to aquatic life with long lasting effects.

Precautionary Statements

P210 Keep away from heat/ sparks/ open flames/ hot surfaces. No smoking.
P260 Do not breathe gas.
P264 Wash skin thoroughly after handling.
P271 Use only outdoors or in a well-ventilated area.
P273 Avoid release to the environment.
P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.
P301 + P330 + P331 IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
P303 + P361 + P353 IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/ shower.
P304 + P340 + P310 IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately 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.
P363 Wash contaminated clothing before reuse.
P377 Leaking gas fire: Do not extinguish, unless leak can be stopped safely.
P381 Eliminate all ignition sources if safe to do so.
P391 Collect spillage.
P403 + P233 Store in a well-ventilated place. Keep container tightly closed.
P405 Store locked up.
P410 + P403 Protect from sunlight. Store in a well-ventilated place.
P501 Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS

Corrosive to the respiratory tract.

SECTION 3: Composition/information on ingredients

3.1 Substances

Formula	: H ₃ N
Molecular weight	: 17.03 g/mol
CAS-No.	: 7664-41-7
EC-No.	: 231-635-3
Index-No.	: 007-001-00-5

Component	Classification	Concentration
ammonia anhydrous	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	<= 100 %

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

After swallowing: make victim drink water (two glasses at most), avoid vomiting (risk of perforation). Call a physician immediately. 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

Aldrich - 294993

Page 3 of 14

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media

Carbon dioxide (CO₂) Foam Dry powder

Unsuitable extinguishing media

Water

5.2 Special hazards arising from the substance or mixture

Nitrogen oxides (NO_x)

Not combustible.

Pay attention to flashback.

Ambient fire may liberate hazardous vapours.

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 gas. 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). Stop flow of gas, move leaking cylinder to open air if without risk.

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.

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**

Tightly closed. Keep locked up or in an area accessible only to qualified or authorized persons. Keep away from combustible materials and sources of ignition.

Contents under pressure.

Storage class

Storage class (TRGS 510): 2A: Gases

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**

Component	CAS-No.	Value	Control parameters	Basis
ammonia anhydrous	7664-41-7	TWA	50 ppm 35 mg/m ³	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		PEL	25 ppm 18 mg/m ³	California permissible exposure limits for chemical contaminants (Title 8, Article 107)
		STEL	35 ppm 27 mg/m ³	California permissible exposure limits for chemical contaminants (Title 8, Article 107)
		TWA	25 ppm	USA. ACGIH Threshold Limit Values (TLV)
		STEL	35 ppm	USA. ACGIH Threshold Limit Values (TLV)
		TWA	25 ppm 18 mg/m ³	USA. NIOSH Recommended Exposure Limits
		ST	35 ppm 27 mg/m ³	USA. NIOSH Recommended Exposure Limits

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 EN 16523-1 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 EN 16523-1 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).

Splash contact

Material: butyl-rubber

Minimum layer thickness: 0.7 mm
Break through time: 480 min
Material tested: Butoject® (KCL 898)

Body Protection

Flame retardant antistatic protective clothing.

Respiratory protection

Recommended Filter type: Filter type K

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.

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: Liquefied gas
Color: colorless |
| b) Odor | stinging, Do not attempt to smell the product as it is hazardous. |
| c) Odor Threshold | 0.02 ppm |
| d) pH | ca.10 - 12 at 50 g/l at 20 °C (68 °F) |
| e) Melting point/freezing point | Melting point/ range: -78 °C (-108 °F) - lit. |
| f) Initial boiling point and boiling range | -33 °C -27 °F - 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 (68 °F) |
| l) Vapor density | 0.6 - (Air = 1.0) |
| m) Density | 0.7 g/cm ³ at -33 °C (-27 °F) - liquid |
| Relative density | No data available |
| n) Water solubility | 531 g/l at 20 °C (68 °F) - OECD Test Guideline 105 |
| o) Partition coefficient: | Not applicable for inorganic substances |

Aldrich - 294993

Page 7 of 14

	n-octanol/water	
p)	Autoignition temperature	651 °C (1204 °F)
q)	Decomposition temperature	> 450 °C (> 842 °F) -
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	none

9.2 Other safety information

Dissociation constant	9.25 at 25 °C (77 °F)
Relative vapor density	0.6 - (Air = 1.0)
Oxidation-reduction Potential	-3,090 mV

SECTION 10: Stability and reactivity

10.1 Reactivity

No data available

10.2 Chemical stability

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

10.3 Possibility of hazardous reactions

Exothermic reaction with:

Acetaldehyde
 Acrolein
 boron triiodide
 boron trifluoride
 Bromine
 hydrogen bromide
 Hydrogen chloride gas
 chromyl chloride
 dimethylsulfate
 nitrogen oxides
 Hydrogen fluoride
 Carbon dioxide (CO₂)
 mercaptans
 chlorates
 nitryl compounds
 Phosgene
 Oxides of phosphorus
 Acids
 hydrogen sulphide
 sulphur dioxide
 chromium(VI) oxide

Aldrich - 294993

Page 8 of 14

metal catalysts
Barium
halogen-halogen compounds
halogen compounds
hypochlorous acid
phosphorus hydrogen
tetra methylammonium amide
propinyl chloride
Ethylene oxide
polymerization

A risk of explosion and/or of toxic gas formation exists with the following substances:

Ammonium salts
antimony hydride
Calcium
Chlorine
Chlorites
Fluorine
halogens
perchlorates
sodium hypochlorite
strong oxidising agents
Mercury
mercury compounds
sulfur
silver
silver salt
silver oxide
hydrogen peroxide
nitrogen trichloride
azides
halogen oxides
Nitro compounds
chlorinated solvents
Hydrocarbons
with
Air
Oxygen
with
Catalyst

Risk of ignition or formation of inflammable gases or vapours with:

Boron
Boranes
Nitric acid
silicon-hydrogen
Generates dangerous gases or fumes in contact with:
Carbon monoxide
with
heat
Possible formation of:
Hydrogen cyanide (hydrocyanic acid)

10.4 Conditions to avoid

no information available

10.5 Incompatible materials

various metals

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

Oral: No data available

LC50 Inhalation - Rat - male - 4 h - 4.93 mg/l - vapor

Remarks: (ECHA)

Dermal: No data available

Skin corrosion/irritation

Skin - Rabbit

Result: Corrosive - 4 h

(OECD Test Guideline 404)

Remarks: (Regulation (EC) No 1272/2008, Annex VI)

Serious eye damage/eye irritation

Remarks: 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

Result: negative

Remarks: (in analogy to similar products)

The value is given in analogy to the following substances: ammonium chloride

Carcinogenicity

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

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

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.)

Toxicity to fish(Chronic toxicity) flow-through test NOEC - Ictalurus punctatus - 0.048 mg/l - 31 d (OECD Test Guideline 215)

Toxicity to daphnia flow-through test LC50 - Daphnia magna (Water flea) - 4.07 mg/l -

Aldrich - 294993

Page 11 of 14

and other aquatic invertebrates(Chronic toxicity) 96 h (US-EPA)
Remarks: (in analogy to similar products)
The value is given in analogy to the following substances: ammonium chloride

flow-through test NOEC - Daphnia magna (Water flea) - 0.79 mg/l - 96 h (US-EPA)
Remarks: (in analogy to similar products)
The value is given in analogy to the following substances: ammonium chloride

12.2 Persistence and degradability

Biodegradability Result: - rapidly biodegradable
Remarks: 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 Endocrine disrupting properties

No data available

12.7 Other adverse effects

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. Pressurised gas bottle: dispose of only in empty condition!

SECTION 14: Transport information

DOT (US)

Aldrich - 294993

Page 12 of 14

UN number: 1005 Class: 2.3 (8)
 Proper shipping name: Ammonia, anhydrous
 Reportable Quantity (RQ): 100 lbs
 Marine pollutant: yes Poison Inhalation Hazard: Hazard Zone D

IMDG

UN number: 1005 Class: 2.3 (8) EMS-No: F-C, S-U
 Proper shipping name: AMMONIA, ANHYDROUS
 Marine pollutant : yes
 Marine pollutant : yes

IATA

UN number: 1005 Class: 2.3 (8)
 Proper shipping name: Ammonia, anhydrous
 IATA Passenger: Not permitted for transport
 IATA Cargo: Not permitted for transport

SECTION 15: Regulatory information

CERCLA Reportable Quantity

Components	CAS-No.	Component RQ (lbs)	Calculated product RQ (lbs)
ammonia anhydrous	7664-41-7	100	100

SARA 304 Extremely Hazardous Substances Reportable Quantity

Components	CAS-No.	Component RQ (lbs)	Calculated product RQ (lbs)
ammonia anhydrous	7664-41-7	100	100

SARA 302 Extremely Hazardous Substances Threshold Planning Quantity

Components	CAS-No.	Component TPQ (lbs)
ammonia anhydrous	7664-41-7	500

SARA 311/312 Hazards : Sudden Release of Pressure Hazard
 Acute Health Hazard
 Chronic Health Hazard

SARA 313 : The following components are subject to reporting levels established by SARA Title III, Section 313:
 ammonia 7664-41-7 >= 90 - <= 100 %
 anhydrous

US State Regulations

Massachusetts Right To Know

ammonia anhydrous 7664-41-7

Pennsylvania Right To Know

ammonia anhydrous 7664-41-7

Maine Chemicals of High Concern

Product does not contain any listed chemicals

Vermont Chemicals of High Concern

Product does not contain any listed chemicals

Washington Chemicals of High Concern

Product does not contain any listed chemicals

The ingredients of this product are reported in the following inventories:

TSCA : All substances listed as active on the TSCA inventory

TSCA list

No substances are subject to a Significant New Use Rule.

No substances are subject to TSCA 12(b) export notification requirements.

SECTION 16: Other information

Further information

The information is believed to be correct but is not exhaustive and will be used solely as a guideline, which is based on current knowledge of the chemical substance or mixture and is applicable to appropriate safety precautions for the product. 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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