

SAFETY DATA SHEET

according to the OSHA
Hazard Communication Standard

Version 6.9
Revision Date 07/10/2026
Print Date 07/11/2026

SECTION 1. IDENTIFICATION

1.1 Product identifiers

Product name : Ammonia

Product Number : 09684
Brand : Sigma-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

Restrictions on use : Not Available

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 number

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

SECTION 2. HAZARDS IDENTIFICATION

GHS classification in accordance with the OSHA Hazard Communication Standard (29 CFR 1910.1200)

Hazards for the product as supplied

Flammable gases : Category 2

Gases under pressure : Liquefied gas

Acute toxicity (Inhalation)	: Category 3
Skin corrosion	: Category 1B
Serious eye damage	: Category 1
Short-term (acute) aquatic hazard	: Category 1
Long-term (chronic) aquatic hazard	: Category 2

Other hazards

Corrosive to the respiratory tract.

GHS label elements

Hazard pictograms :



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 :

Prevention:

- 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.

Response:

- 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.

Storage:

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.

Disposal:

P501 Dispose of contents/ container to an approved waste disposal plant.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance / Mixture : Substance

CAS-No. : 7664-41-7

Components

Chemical name	CAS No./Unique ID	Concentration (% w/w)	Trade secret
ammonia anhydrous	7664-41-7*	>= 90 - <= 100	-

* Indicates that the identifier is a CAS No.

Actual concentration is withheld as a trade secret

SECTION 4. FIRST AID MEASURES

General advice : First aiders need to protect themselves. Show this 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.
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
Protection of first-aiders	: For personal protection see section 8.
Notes to physician	: No data available

SECTION 5. FIREFIGHTING MEASURES

Suitable extinguishing media	: Carbon dioxide (CO ₂) Foam Dry powder
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Unsuitable extinguishing media	: Water
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Specific hazards during fire fighting	: Not combustible.
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Pay attention to flashback.

Ambient fire may liberate hazardous vapours.

Hazardous combustion products	: Nitrogen oxides (NO _x)
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Specific extinguishing methods	: No data available
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Further information	: Remove container from danger zone and cool with water. Suppress (knock down) gases/vapours/mists with a water spray jet.
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Prevent fire extinguishing water from contaminating surface water or the ground water system.

Special protective equipment for fire-fighters : Stay in danger area only with self-contained breathing apparatus. Prevent skin contact by keeping a safe distance or by wearing suitable protective clothing.

SECTION 6. ACCIDENTAL RELEASE MEASURES

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.
Advice for emergency responders:
For personal protection see section 8.

Environmental precautions : Do not let product enter drains.

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.

SECTION 7. HANDLING AND STORAGE

For precautions see section 2.2.

Advice on protection against fire and explosion : Keep away from open flames, hot surfaces and sources of ignition.

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

Further information on storage conditions : Tightly closed.
Keep locked up or in an area accessible only to qualified or authorised persons.
Keep away from combustible materials and sources of ignition.

Storage class : 2A, Gases

Recommended storage temperature : Recommended storage temperature see product label.

Further information on storage stability : Contents under pressure.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Ingredients with workplace control parameters

Components	CAS-No.	Value type (Form of exposure)	Control parameters / Permissible concentration	Basis
ammonia anhydrous	7664-41-7	TWA	50 ppm 35 mg/m ³	OSHA Z-1
		TWA	25 ppm (Ammonia)	ACGIH
		STEL	35 ppm (Ammonia)	ACGIH
		TWA	25 ppm 18 mg/m ³ (Ammonia)	NIOSH REL
		ST	35 ppm 27 mg/m ³ (Ammonia)	NIOSH REL

Engineering measures : No data available

Personal protective equipment

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 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.

Hand protection

Material : butyl-rubber
Break through time : 480 min
Glove thickness : 0.7 mm
Protective index : Full contact

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Manufacturer	: Butoject® (KCL 898)
Material	: butyl-rubber
Break through time	: 480 min
Glove thickness	: 0.7 mm
Protective index	: Splash contact
Manufacturer	: Butoject® (KCL 898)
Remarks	: 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).
Eye 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 and body protection	: Flame retardant antistatic protective clothing.
Hygiene measures	: Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	: Liquefied gas
Colour	: colourless
Odour	: stinging, Do not attempt to smell the product as it is hazardous.
Odour Threshold	: 0.02 ppm
pH	: ca. 10 - 12 (68 °F / 20 °C) Concentration: 50 g/l
Melting point/ range	: -108 °F / -78 °C Method: lit.
Boiling point/boiling range	: -27 °F / -33 °C Method: lit.

Flash point	: Not applicable
Evaporation rate	: Not applicable
Flammability (solid, gas)	: The product is not flammable.
Flammability (liquids)	: No data available
Burning rate	: No data available
Self-ignition	: 1204 °F / 651 °C
Upper explosion limit / Upper flammability limit	: 25 %(V)
Lower explosion limit / Lower flammability limit	: 16 %(V)
Vapour pressure	: 8,600 hPa (68 °F / 20 °C)
Relative vapour density	: 0.6 (Air = 1.0)
Relative density	: No data available
Density	: 0.7 g/cm ³ (-27 °F / -33 °C) liquid
Solubility(ies)	
Water solubility	: 531 g/l (68 °F / 20 °C) Method: OECD Test Guideline 105
Partition coefficient: n- octanol/water	: Not applicable for inorganic substances
Autoignition temperature	: 1204 °F / 651 °C
Decomposition temperature	: > 842 °F / > 450 °C
Viscosity	
Viscosity, dynamic	: 0.254 mPa.s (-27 °F / -33 °C)
Viscosity, kinematic	: No data available
Flow time	: No data available
Explosive properties	: No data available
Oxidizing properties	: none
Oxidizing potential	: -3,090 mV

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Molecular weight : 17.03 g/mol

Particle characteristics
Particle size : No data available

SECTION 10. STABILITY AND REACTIVITY

Reactivity : No data available

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

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

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)

Conditions to avoid : no information available

Incompatible materials : various metals

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

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 - vapour

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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 component 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 component 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 - No observed adverse effect level - 250 mg/kg - Lowest observed adverse effect level - 750 mg/kg

Remarks: (in analogy to similar products)

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The value is given in analogy to the following substances: diammonium hydrogenphosphate

RTECS: B00875000

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

Ecotoxicity

Components:

ammonia anhydrous:

Toxicity to fish	: LC50 (Pimephales promelas (fathead minnow)): 0.068 mg/l End point: mortality Exposure time: 96 h Test Type: flow-through test Analytical monitoring: yes 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	: LC50 (Daphnia magna (Water flea)): 101 mg/l End point: mortality Exposure time: 48 h Test Type: static test Analytical monitoring: yes Remarks: (ECHA) EC50 (Daphnia pulicaria): 1.16 mg/l Exposure time: 48 h Remarks: (Lit.)
M-Factor (Acute aquatic toxicity)	: 10
Toxicity to fish (Chronic toxicity)	: NOEC (Ictalurus punctatus): 0.048 mg/l Exposure time: 31 d Test Type: flow-through test Method: OECD Test Guideline 215
Toxicity to daphnia and other aquatic invertebrates (Chronic)	: LC50 (Daphnia magna (Water flea)): 4.07 mg/l End point: mortality Exposure time: 96 h

toxicity)

Test Type: flow-through test
Method: US-EPA
Remarks: (in analogy to similar products)
The value is given in analogy to the following
substances: ammonium chloride

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

Persistence and degradability

Components:

ammonia anhydrous:

Biodegradability : Result: rapidly biodegradable
Remarks: Readily biodegradable.

Bioaccumulative potential

Components:

ammonia anhydrous:

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

Mobility in soil

No data available

Other adverse effects

No data available

Endocrine disrupting properties

No data available

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal methods

Waste from residues : 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

International Regulations

IATA-DGR

Not permitted for transport

IMDG-Code

UN number : UN 1005
Proper shipping name : AMMONIA, ANHYDROUS

Class : 2.3
Subsidiary risk : 8
Packing group : Not assigned by regulation
Labels : 2.3 (8)
EmS Code : F-C, S-U
Marine pollutant : yes

Transport in bulk according to IMO instruments

Not applicable for product as supplied.

National Regulations

49 CFR

UN/ID/NA number : UN 1005
Proper shipping name : Ammonia, anhydrous

Class : 2.2

Packing group : Not assigned by regulation
Labels : Division 2.2 - Non-flammable, non-toxic gases
ERG Code : 125
Marine pollutant : yes
Poison Inhalation Hazard : Hazard Zone D

Special precautions for user

The transport classification(s) provided herein are for informational purposes only, and solely based upon the properties of the unpackaged material as it is described within this Safety Data Sheet. Transportation classifications may vary by mode of transportation, package sizes, and variations in regional or country regulations.

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 components of this product are reported in the following inventories:

US 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

Full text of other abbreviations

ACGIH : USA. ACGIH Threshold Limit Values (TLV)
NIOSH REL : USA. NIOSH Recommended Exposure Limits
OSHA Z-1 : USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
ACGIH / TWA : 8-hour, time-weighted average
ACGIH / STEL : Short-term exposure limit
NIOSH REL / TWA : Time-weighted average concentration for up to a 10-hour workday during a 40-hour workweek

NIOSH REL / ST : STEL - 15-minute TWA exposure that should not be exceeded at any time during a workday
OSHA Z-1 / TWA : 8-hour time weighted average

AIIC - Australian Inventory of Industrial Chemicals; ASTM - American Society for the Testing of Materials; bw - Body weight; CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act; CMR - Carcinogen, Mutagen or Reproductive Toxicant; DIN - Standard of the German Institute for Standardisation; DOT - Department of Transportation; DSL - Domestic Substances List (Canada); ECx - Concentration associated with x% response; EHS - Extremely Hazardous Substance; ELx - Loading rate associated with x% response; EmS - Emergency Schedule; ENCS - Existing and New Chemical Substances (Japan); ErCx - Concentration associated with x% growth rate response; ERG - Emergency Response Guide; GHS - Globally Harmonised System; GLP - Good Laboratory Practice; HMIS - Hazardous Materials Identification System; IARC - International Agency for Research on Cancer; IATA - International Air Transport Association; IBC - International Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk; IC50 - Half maximal inhibitory concentration; ICAO - International Civil Aviation Organization; IECSC - Inventory of Existing Chemical Substances in China; IMDG - International Maritime Dangerous Goods; IMO - International Maritime Organisation; ISHL - Industrial Safety and Health Law (Japan); ISO - International Organisation for Standardisation; KECI - Korea Existing Chemicals Inventory; LC50 - Lethal Concentration to 50 % of a test population; LD50 - Lethal Dose to 50% of a test population (Median Lethal Dose); MARPOL - International Convention for the Prevention of Pollution from Ships; MSHA - Mine Safety and Health Administration; n.o.s. - Not Otherwise Specified; NFPA - National Fire Protection Association; NO(A)EC - No Observed (Adverse) Effect Concentration; NO(A)EL - No Observed (Adverse) Effect Level; NOELR - No Observable Effect Loading Rate; NTP - National Toxicology Program; NZIoC - New Zealand Inventory of Chemicals; OECD - Organisation for Economic Co-operation and Development; OPPTS - Office of Chemical Safety and Pollution Prevention; PBT - Persistent, Bioaccumulative and Toxic substance; PICCS - Philippines Inventory of Chemicals and Chemical Substances; (Q)SAR - (Quantitative) Structure Activity Relationship; RCRA - Resource Conservation and Recovery Act; REACH - Regulation (EC) No 1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals; RQ - Reportable Quantity; SADT - Self-Accelerating Decomposition Temperature; SARA - Superfund Amendments and Reauthorization Act; SDS - Safety Data Sheet; TCSI - Taiwan Chemical Substance Inventory; TECI - Thailand Existing Chemicals Inventory; TSCA - Toxic Substances Control Act (United States); UN - United Nations; UNRTDG - United Nations Recommendations on the Transport of Dangerous Goods; vPvB - Very Persistent and Very Bioaccumulative

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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