

## Chemical Safety Data Sheet MSDS / SDS

**Ammonium hydroxide**

Revision Date:2024-12-21 Revision Number:1

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

Product name : Ammonium hydroxide  
CBnumber : CB1853050  
CAS : 1336-21-6  
EINECS Number : 215-647-6  
Synonyms : ammonium hydroxide,Ammonia solution

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

Relevant identified uses : For R&D use only. Not for medicinal, household or other use.  
Uses advised against : none

**Company Identification**

Company : Chemicalbook  
Address : Building 1, Huihuang International, Shangdi 10th Street, Haidian District, Beijing  
Telephone : 400-158-6606

**SECTION 2: Hazards identification****Classification of the substance or mixture**

Skin corrosion, Sub-category 1B  
Hazardous to the aquatic environment, short-term (Acute) - Category Acute 1

**Label elements****Pictogram(s)**

☐☐

Signal word : Danger

**Hazard statement(s)**

H302 Harmful if swallowed  
H303 May be harmful if swallowed  
H314 Causes severe skin burns and eye damage  
H315 Causes skin irritation  
H318 Causes serious eye damage  
H335 May cause respiratory irritation  
H400 Very toxic to aquatic life

H401 Toxic to aquatic life

H402 Harmful to aquatic life

H410 Very toxic to aquatic life with long lasting effects

H412 Harmful to aquatic life with long lasting effects

#### **Precautionary statement(s)**

P260 Do not breathe dust/fume/gas/mist/vapours/spray.

P264 Wash hands thoroughly after handling.

P264 Wash skin thoroughly after handling.

P273 Avoid release to the environment.

P280 Wear protective gloves/protective clothing/eye protection/face protection.

P309 IF exposed or if you feel unwell:

P310 Immediately call a POISON CENTER or doctor/physician.

P321 Specific treatment (see ... on this label).

P391 Collect spillage. Hazardous to the aquatic environment

P301+P330+P331 IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.

P303+P361+P353 IF ON SKIN (or hair): Remove/Take off Immediately all contaminated clothing. Rinse SKIN with water/shower.

P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do.

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P332+P313 IF SKIN irritation occurs: Get medical advice/attention.

P405 Store locked up.

#### **Prevention**

P260 Do not breathe dust/fume/gas/mist/vapours/spray.

P264 Wash ... thoroughly after handling.

P280 Wear protective gloves/protective clothing/eye protection/face protection/hearing protection/...

P273 Avoid release to the environment.

#### **Response**

P301+P330+P331 IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.

P363 Wash contaminated clothing before reuse.

P304+P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing.

P316 Get emergency medical help immediately.

P321 Specific treatment (see ... on this label).

P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

P391 Collect spillage.

#### **Storage**

P405 Store locked up.

#### **Disposal**

P501 Dispose of contents/container to an appropriate treatment and disposal facility in accordance with applicable laws and regulations, and product characteristics at time of disposal.

#### **Other hazards**

no data available

## SECTION 3: Composition/information on ingredients

### Substance

Product name	: Ammonium hydroxide
Synonyms	: ammonium hydroxide, Ammonia solution
CAS	: 1336-21-6
EC number	: 215-647-6
MF	: H5NO
MW	: 35.05

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## SECTION 4: First aid measures

### Description of first aid measures

#### If inhaled

Fresh air, rest. Artificial respiration may be needed. Refer for medical attention.

#### Following skin contact

Remove contaminated clothes. Rinse skin with plenty of water or shower. Refer for medical attention .

#### Following eye contact

First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then refer for medical attention.

#### Following ingestion

Rinse mouth. Do NOT induce vomiting. Give one or two glasses of water to drink. Refer for medical attention .

### Most important symptoms and effects, both acute and delayed

Excerpt from ERG Guide 154 [Substances - Toxic and/or Corrosive (Non-Combustible)]: TOXIC; inhalation, ingestion or skin contact with material may cause severe injury or death. Contact with molten substance may cause severe burns to skin and eyes. Avoid any skin contact. Effects of contact or inhalation may be delayed. Fire may produce irritating, corrosive and/or toxic gases. Runoff from fire control or dilution water may be corrosive and/or toxic and cause pollution. (ERG, 2016)

### Indication of any immediate medical attention and special treatment needed

Agents causing ocular burns, steps in treatment, and special problems are described. Injuries are caused by neutral organic, acid, and alkali compounds. Contact time and pH are the most important variables in any chemical burn. The corneal epithelium and endothelium provide a barrier to water soluble substances while the stroma is a barrier to lipid soluble substances. Alkali compounds cause most severe injuries depending on the hydroxyl ion concentration and the cation. Calcium hydroxide, sodium hydroxide, and ammonium hydroxide are most often responsible for alkali burns. Ammonium hydroxide penetrates most rapidly of all alkali compounds.

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## SECTION 5: Firefighting measures

### Extinguishing media

Excerpt from ERG Guide 154 [Substances - Toxic and/or Corrosive (Non-Combustible)]: SMALL FIRE: Dry chemical, CO<sub>2</sub> or water spray. LARGE FIRE: Dry chemical, CO<sub>2</sub>, alcohol-resistant foam or water spray. Move containers from fire area if you can do it without risk. Dike fire-control water for later disposal; do not scatter the material. FIRE INVOLVING TANKS OR CAR/TRAILER LOADS: Fight fire from maximum distance or use unmanned hose holders or monitor nozzles. Do not get water inside containers. Cool containers with flooding quantities of

water until well after fire is out. Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank. ALWAYS stay away from tanks engulfed in fire. (ERG, 2016)

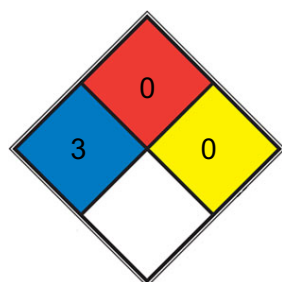
### Specific Hazards Arising from the Chemical

Excerpt from ERG Guide 154 [Substances - Toxic and/or Corrosive (Non-Combustible)]: Non-combustible, substance itself does not burn but may decompose upon heating to produce corrosive and/or toxic fumes. Some are oxidizers and may ignite combustibles (wood, paper, oil, clothing, etc.). Contact with metals may evolve flammable hydrogen gas. Containers may explode when heated. For electric vehicles or equipment, ERG Guide 147 (lithium ion batteries) or ERG Guide 138 (sodium batteries) should also be consulted. (ERG, 2016)

### Advice for firefighters

In case of fire in the surroundings, use appropriate extinguishing media. In case of fire: keep drums, etc., cool by spraying with water.

### NFPA 704



**HEALTH 3** Short exposure could cause serious temporary or moderate residual injury (e.g. [liquid hydrogen](#), [sulfuric acid](#), [calcium hypochlorite](#), hexafluorosilicic acid)

**FIRE 0** Materials that will not burn under typical fire conditions, including intrinsically noncombustible materials such as concrete, stone, and sand. Materials that will not burn in air when exposed to a temperature of 820 °C (1,500 °F) for a period of 5 minutes.(e.g. Carbon tetrachloride)

**REACT 0** Normally stable, even under fire exposure conditions, and is not reactive with water (e.g. helium,[N2](#))

**SPEC.**  
**HAZ.**

## SECTION 6: Accidental release measures

### Personal precautions, protective equipment and emergency procedures

Evacuate danger area! Consult an expert! Personal protection: complete protective clothing including self-contained breathing apparatus. Ventilation. Do NOT let this chemical enter the environment. Cautiously neutralize spilled liquid with dilute acid such as dilute sulfuric acid. Wash away remainder with plenty of water.

### Environmental precautions

Evacuate danger area! Consult an expert! Personal protection: complete protective clothing including self-contained breathing apparatus. Ventilation. Do NOT let this chemical enter the environment. Cautiously neutralize spilled liquid with dilute acid such as dilute sulfuric acid. Wash away remainder with plenty of water.

### Methods and materials for containment and cleaning up

Collect and arrange disposal. Keep the chemical in suitable and closed containers for disposal. Remove all sources of ignition. Use spark-proof tools and explosion-proof equipment. Adhered or collected material should be promptly disposed of, in accordance with appropriate laws and regulations.

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## SECTION 7: Handling and storage

### Precautions for safe handling

Handling in a well ventilated place. Wear suitable protective clothing. Avoid contact with skin and eyes. Avoid formation of dust and aerosols. Use non-sparking tools. Prevent fire caused by electrostatic discharge steam.

### Conditions for safe storage, including any incompatibilities

Separated from food and feedstuffs. See Chemical Dangers. Cool. Well closed. Keep in a well-ventilated room. See Notes. Keep cool in strong glass, plastic, or rubber stoppered bottles not completely filled. Ammonia water: 28-29%

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## SECTION 8: Exposure controls/personal protection

### Control parameters

#### Occupational Exposure limit values

TLV: 18 mg/m<sup>3</sup>, 25 ppm, as TWA; 27 mg/m<sup>3</sup> as STEL. MAK: 14 mg/m<sup>3</sup>, 20 ppm; peak limitation category: I(2); pregnancy risk group: C

#### Biological limit values

no data available

### Exposure controls

Ensure adequate ventilation. Handle in accordance with good industrial hygiene and safety practice. Set up emergency exits and the risk-elimination area.

### Individual protection measures

#### Eye/face protection

Wear face shield or eye protection in combination with breathing protection.

#### Skin protection

Protective gloves. Protective clothing.

#### Respiratory protection

Use ventilation, local exhaust or breathing protection.

#### Thermal hazards

no data available

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## SECTION 9: Physical and chemical properties

### Information on basic physicochemical properties

Physical state	Liquid, Single Sub-Boiling Quartz Distillation
Colour	Colorless

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Odour	Intense, pungent, suffocating odor
Melting point/freezing point	-69°C(lit.)
Boiling point or initial boiling point and boiling range	145°C(lit.)
Flammability	Not combustible.
Lower and upper explosion limit/flammability limit	27%
Flash point	37°C(lit.)
Auto-ignition temperature	1204°F
Decomposition temperature	no data available
pH	10.09(1 mM solution);10.61(10 mM solution);11.12(100 mM solution);
Kinematic viscosity	no data available
Solubility	Exists only in solution
Partition coefficient n-octanol/water	no data available
Vapour pressure	115 mmHg at 20 °C for 29% solution
Density and/or relative density	approximate 0.96 (10%, 15°C)
Relative vapour density	approximate 0.96 (10%, 15°C)
Particle characteristics	no data available

## SECTION 10: Stability and reactivity

### Reactivity

Reacts with many heavy metals and heavy metal salts. This produces explosive compounds. Attacks many metals. This produces flammable/explosive gas (hydrogen - see ICSC 0001). The solution in water is a strong base. It reacts violently with acids.

### Chemical stability

no data available

### Possibility of hazardous reactions

AMMONIUM HYDROXIDE reacts exothermically with acids. Evolves toxic gaseous ammonia with strong bases. Reacts extremely violently with dimethyl sulfate [NFPA 491M 1991]. Reacts with aqueous silver nitrate sodium hydroxide to give a black precipitate of silver nitride. Such a precipitate can explode on stirring [MCA Case History 1554 1968]. Aqueous ammonia and Hg react to form an explosive solid, likely a fulminate. (Thodos, G. Amer. Inst. Chem. Engrs. J., 1964, 10, 274.).

### Conditions to avoid

no data available

### Incompatible materials

Caustic liq forms explosive compd with many heavy metals such as silver, lead, zinc, & their salts, especially halide salts.

### Hazardous decomposition products

When heated to decomposition it emits ammonia and nitroxides.

## SECTION 11: Toxicological information

### Acute toxicity

- Oral: LD50 Rat oral 350 mg/kg
- Inhalation: no data available
- Dermal: no data available

### Skin corrosion/irritation

no data available

### Serious eye damage/irritation

no data available

### Respiratory or skin sensitization

no data available

### Germ cell mutagenicity

no data available

### Carcinogenicity

no data available

### Reproductive toxicity

no data available

### STOT-single exposure

The substance is corrosive to the eyes, skin and respiratory tract. Corrosive on ingestion. Inhalation of high concentrations of the vapour may cause laryngeal oedema, inflammation of the respiratory tract and pneumonia. Exposure could cause asphyxiation due to swelling in the throat. The effects may be delayed.

### STOT-repeated exposure

Repeated or prolonged inhalation may cause effects on the lungs.

### Aspiration hazard

A harmful contamination of the air can be reached very quickly on evaporation of this substance at 20°C.

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## SECTION 12: Ecological information

### Toxicity

Toxicity to fish: LC50 *Lepomis macrochirus* (bluegill) 0.024-0.093 mg/l/48 hr. /Conditions of bioassay not specified

Toxicity to daphnia and other aquatic invertebrates: LC50 *Daphnia magna* 0.66 mg/l/48 hr 22 deg C /Conditions of bioassay not specified

Toxicity to algae: no data available

Toxicity to microorganisms: no data available

### **Persistence and degradability**

no data available

### **Bioaccumulative potential**

no data available

### **Mobility in soil**

no data available

### **Other adverse effects**

no data available

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## SECTION 13: Disposal considerations

### **Disposal methods**

#### **Product**

The material can be disposed of by removal to a licensed chemical destruction plant or by controlled incineration with flue gas scrubbing. Do not contaminate water, foodstuffs, feed or seed by storage or disposal. Do not discharge to sewer systems.

#### **Contaminated packaging**

Containers can be triply rinsed (or equivalent) and offered for recycling or reconditioning. Alternatively, the packaging can be punctured to make it unusable for other purposes and then be disposed of in a sanitary landfill. Controlled incineration with flue gas scrubbing is possible for combustible packaging materials.

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## SECTION 14: Transport information

### **UN Number**

ADR/RID: UN2672 (For reference only, please check.)

IMDG: UN2672 (For reference only, please check.)

IATA: UN2672 (For reference only, please check.)

### **UN Proper Shipping Name**

ADR/RID: AMMONIA SOLUTION, relative density between 0.880 and 0.957 at 15 °C in water, with more than 10% but not more than 35% ammonia (For reference only, please check.)

IMDG: AMMONIA SOLUTION, relative density between 0.880 and 0.957 at 15 °C in water, with more than 10% but not more than 35% ammonia (For reference only, please check.)

IATA: AMMONIA SOLUTION, relative density between 0.880 and 0.957 at 15 °C in water, with more than 10% but not more than 35% ammonia (For reference only, please check.)

### **Transport hazard class(es)**

ADR/RID: 8 (For reference only, please check.)

IMDG: 8 (For reference only, please check.)

IATA: 8 (For reference only, please check.)



### **Packing group, if applicable**

ADR/RID: III (For reference only, please check.)

IMDG: III (For reference only, please check.)

IATA: III (For reference only, please check.)

### **Environmental hazards**

ADR/RID: Yes

IMDG: Yes

IATA: Yes

### **Special precautions for user**

no data available

### **Transport in bulk according to IMO instruments**

no data available

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## SECTION 15: Regulatory information

### **Safety, health and environmental regulations specific for the product in question**

#### **European Inventory of Existing Commercial Chemical Substances (EINECS)**

Listed.

#### **EC Inventory**

Listed.

#### **United States Toxic Substances Control Act (TSCA) Inventory**

Listed.

#### **China Catalog of Hazardous chemicals 2015**

Listed.

#### **New Zealand Inventory of Chemicals (NZIoC)**

Listed.

#### **PICCS**

Listed.

#### **Vietnam National Chemical Inventory**

Listed.

#### **IECSC**

Listed.

#### **Korea Existing Chemicals List (KECL)**

Listed.

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## SECTION 16: Other information

### **Abbreviations and acronyms**

CAS: Chemical Abstracts Service

ADR: European Agreement concerning the International Carriage of Dangerous Goods by Road

RID: Regulation concerning the International Carriage of Dangerous Goods by Rail

IMDG: International Maritime Dangerous Goods

IATA: International Air Transportation Association

TWA: Time Weighted Average

STEL: Short term exposure limit

LC50: Lethal Concentration 50%

LD50: Lethal Dose 50%

EC50: Effective Concentration 50%

## References

IPCS - The International Chemical Safety Cards (ICSC), website: <http://www.ilo.org/dyn/icsc/showcard.home>

HSDB - Hazardous Substances Data Bank, website: <https://toxnet.nlm.nih.gov/newtoxnet/hsdb.htm>

IARC - International Agency for Research on Cancer, website: <http://www.iarc.fr/>

eChemPortal - The Global Portal to Information on Chemical Substances by OECD, website: [http://www.echemportal.org/echemportal/index?pageID=0&request\\_locale=en](http://www.echemportal.org/echemportal/index?pageID=0&request_locale=en)

CAMEO Chemicals, website: <http://cameochemicals.noaa.gov/search/simple>

ChemIDplus, website: <http://chem.sis.nlm.nih.gov/chemidplus/chemidlite.jsp>

ERG - Emergency Response Guidebook by U.S. Department of Transportation, website: <http://www.phmsa.dot.gov/hazmat/library/erg>

Germany GESTIS-database on hazard substance, website: <http://www.dguv.de/ifa/gestis/gestis-stoffdatenbank/index-2.jsp>

ECHA - European Chemicals Agency, website: <https://echa.europa.eu/>

## Other Information

Be aware that ammonia gas can evolve from ammonia solution. Ammonia vapour is flammable and explosive under certain conditions. See ICSC 0414. Do NOT completely fill bottles with the substance; strong solutions may develop pressure. Release caps with care. Melting points range from -3°C (4%) to -69°C (28%). Another boiling point is 25°C (32%). Other UN numbers are: UN 2073 Ammonia solution, relative density of less than 0.880 at 15°C in water, with more than 35% but no more than 50% ammonia; UN 3318 Ammonia solution, relative density of less than 0.880 at 15°C in water, with more than 50% ammonia. Depending on the degree of exposure, periodic medical examination is suggested.

### Disclaimer:

The information in this MSDS is only applicable to the specified product, unless otherwise specified, it is not applicable to the mixture of this product and other substances. This MSDS only provides information on the safety of the product for those who have received the appropriate professional training for the user of the product. Users of this MSDS must make independent judgments on the applicability of this SDS. The authors of this MSDS will not be held responsible for any harm caused by the use of this MSDS.