

MATERIAL SAFETY DATA SHEET

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Version 1.11

Section 1 - Product and Company Information

Product Name AMMONIUM HYDROXIDE, A.C.S. REAGENT
Product Number 221228
Brand SIAL

Company Sigma-Aldrich
Address 3050 Spruce Street
SAINT LOUIS MO 63103 US
Technical Phone: 800-325-5832
Fax: 800-325-5052
Emergency Phone: 314-776-6555

Section 2 - Composition/Information on Ingredient

Substance Name	CAS #		SARA 313
AMMONIA HYDROXIDE SOLUTION >= 25%	1336-21-6		No
Ingredient Name	CAS #	Percent	SARA 313
WATER	7732-18-5	>= 70	No
		<= 75	
AMMONIUM HYDROXIDE	1336-21-6	>= 25	No
		<= 30	

Formula NH4OH
Synonyms Ammonia aqueous * Ammonia water 29% * Aqua ammonia
RTECS Number: BQ9625000

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Corrosive. Dangerous for the environment.
Harmful if swallowed. Causes burns. Very toxic to aquatic organisms.
Lachrymator.

HMIS RATING

HEALTH: 3
FLAMMABILITY: 0
REACTIVITY: 0

NFPA RATING

HEALTH: 3
FLAMMABILITY: 0
REACTIVITY: 0

For additional information on toxicity, please refer to Section 11.

Section 4 - First Aid Measures

ORAL EXPOSURE

If swallowed, wash out mouth with water provided person is conscious. Call a physician. Do not induce vomiting.

INHALATION EXPOSURE

If inhaled, remove to fresh air. If not breathing give artificial respiration. If breathing is difficult, give oxygen.

DERMAL EXPOSURE

In case of skin contact, flush with copious amounts of water for at least 15 minutes. Remove contaminated clothing and shoes. Call a physician.

EYE EXPOSURE

In case of contact with eyes, flush with copious amounts of water for at least 15 minutes. Assure adequate flushing by separating the eyelids with fingers. Call a physician.

Section 5 - Fire Fighting Measures

EXPLOSION LIMITS

Lower: 16 % Upper: 27 %

AUTOIGNITION TEMP

651 °C

FLAMMABILITY

N/A

EXTINGUISHING MEDIA

Suitable: Carbon dioxide, dry chemical powder, or appropriate foam.

FIREFIGHTING

Protective Equipment: Wear self-contained breathing apparatus and protective clothing to prevent contact with skin and eyes. Specific Hazard(s): Emits toxic fumes under fire conditions.

Section 6 - Accidental Release Measures

PROCEDURE TO BE FOLLOWED IN CASE OF LEAK OR SPILL

Evacuate area.

PROCEDURE(S) OF PERSONAL PRECAUTION(S)

Wear self-contained breathing apparatus, rubber boots, and heavy rubber gloves.

METHODS FOR CLEANING UP

To adjust the pH, add a weak acid to the spilled material at a controlled rate to avoid excessive ammonia liberation. To collect spilled material, use an absorbent.

Section 7 - Handling and Storage

HANDLING

User Exposure: Do not breathe vapor. Do not get in eyes, on skin, on clothing. Avoid prolonged or repeated exposure.

STORAGE

Suitable: Keep tightly closed.

Section 8 - Exposure Controls / PPE

ENGINEERING CONTROLS

Safety shower and eye bath. Use only in a chemical fume hood.

PERSONAL PROTECTIVE EQUIPMENT

Respiratory: Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU). 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.

Hand: Compatible chemical-resistant gloves.

Eye: Chemical safety goggles.

Other: Faceshield (8-inch minimum).

GENERAL HYGIENE MEASURES

Wash contaminated clothing before reuse. Discard contaminated shoes. Wash thoroughly after handling.

Section 9 - Physical/Chemical Properties

Appearance	Physical State: Clear liquid Color: Colorless	
Property	Value	At Temperature or Pressure
Molecular Weight	35.05 AMU	
pH	11.7	20 °C
BP/BP Range	38.0 - 100.0 °C	760 mmHg
MP/MP Range	- 60.0 °C	
Freezing Point	N/A	
Vapor Pressure	115 mmHg	20 °C
Vapor Density	1.2 g/l	
Saturated Vapor Conc.	N/A	
SG/Density	0.99 g/cm3	
Bulk Density	N/A	
Odor Threshold	N/A	
Volatile%	N/A	
VOC Content	N/A	
Water Content	N/A	
Solvent Content	N/A	
Evaporation Rate	N/A	
Viscosity	N/A	
Surface Tension	N/A	
Partition Coefficient	N/A	
Decomposition Temp.	N/A	
Explosion Limits	Lower: 16 % Upper: 27 %	
Flammability	N/A	
Autoignition Temp	651 °C	
Refractive Index	N/A	
Optical Rotation	N/A	
Miscellaneous Data	N/A	
Solubility	N/A	

N/A = not available

Section 10 - Stability and Reactivity

STABILITY

Stable: Stable.

Materials to Avoid: Copper, Copper alloys, Galvanized iron, Zinc.

HAZARDOUS DECOMPOSITION PRODUCTS

Hazardous Decomposition Products: Nitrogen oxides, Ammonia.

HAZARDOUS POLYMERIZATION

Hazardous Polymerization: Will not occur

Section 11 - Toxicological Information

ROUTE OF EXPOSURE

Skin Contact: Causes burns.

Skin Absorption: May be harmful if absorbed through the skin.

Eye Contact: Causes burns. Lachrymator.

Inhalation: Material is extremely destructive to the tissue of the mucous membranes and upper respiratory tract. May be harmful if inhaled.

Ingestion: May be harmful if swallowed.

SIGNS AND SYMPTOMS OF EXPOSURE

Material is extremely destructive to tissue of the mucous membranes and upper respiratory tract, eyes, and skin.

Inhalation may result in spasm, inflammation and edema of the larynx and bronchi, chemical pneumonitis, and pulmonary edema.

Symptoms of exposure may include burning sensation, coughing, wheezing, laryngitis, shortness of breath, headache, nausea, and vomiting.

TOXICITY DATA

Oral
Human
43 mg/kg
LDLO

Inhalation
Human
5,000 ppm
LCLO

Oral
Rat
350 mg/kg
LD50

Remarks: Gastrointestinal: Other changes. Kidney, Ureter, Bladder: Other changes. Liver: Other changes.

Intravenous
Mouse
91 MG/KG
LD50

Remarks: Behavioral: Convulsions or effect on seizure threshold. Behavioral: Coma. Lungs, Thorax, or Respiration: Respiratory stimulation.

IRRITATION DATA

Eyes
Rabbit
0.25 mg
Remarks: Severe irritation effect

Eyes
Rabbit
0.044 mg

Remarks: Severe irritation effect

Eyes
Rabbit

1 mg

30S

Remarks: Rinsed

Section 12 - Ecological Information

ACUTE ECOTOXICITY TESTS

Test Type: LC50 Fish

Time: 96 h

Value: < 1 mg/l

ADDITIONAL RESULTS/DATA FROM RELEVANT SCIENTIFIC EXPERIMENTS

May be harmful to aquatic organisms due to the shift of the pH.

Section 13 - Disposal Considerations

APPROPRIATE METHOD OF DISPOSAL OF SUBSTANCE OR PREPARATION

Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber. Observe all federal, state, and local environmental regulations.

Section 14 - Transport Information

DOT

Proper Shipping Name: Ammonia solutions, [relative density between 0.880 and 0.957 at 15 degrees C in water, with more than 10 percent but not more than 35 percent ammonia]

UN#: 2672

Class: 8

Packing Group: Packing Group III

Hazard Label: Corrosive

PIH: Not PIH

IATA

Proper Shipping Name: Ammonia solution

IATA UN Number: 2672

Hazard Class: 8

Packing Group: III

Section 15 - Regulatory Information

EU DIRECTIVES CLASSIFICATION

Symbol of Danger: C-N

Indication of Danger: Corrosive. Dangerous for the environment.

R: 34-50

Risk Statements: Causes burns. Very toxic to aquatic organisms.

S: 26-36/37/39-45-61

Safety Statements: In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. Wear suitable protective clothing, gloves, and eye/face protection. In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible). Avoid release to the environment. Refer to special instructions/safety data

sheets.

US CLASSIFICATION AND LABEL TEXT

Indication of Danger: Corrosive. Dangerous for the environment.
Risk Statements: Harmful if swallowed. Causes burns. Very toxic to aquatic organisms.

Safety Statements: In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. Wear suitable protective clothing, gloves, and eye/face protection. In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible). Avoid release to the environment. Refer to special instructions/safety data sheets.

US Statements: Lachrymator.

UNITED STATES REGULATORY INFORMATION

SARA LISTED: No

TSCA INVENTORY ITEM: Yes

CANADA REGULATORY INFORMATION

WHMIS Classification: This product has been classified in accordance with the hazard criteria of the CPR, and the MSDS contains all the information required by the CPR.

DSL: Yes

NDSL: No

Section 16 - Other Information

DISCLAIMER

For R&D use only. Not for drug, household or other uses.

WARRANTY

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 Inc., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale. Copyright 2006 Sigma-Aldrich Co. License granted to make unlimited paper copies for internal use only.