

Praxair Material Safety Data Sheet

1. Chemical Product and Company Identification

Product Name: Ammonia solutions (MSDS No. P-6293)	Trade Name: Aqueous Ammonia
Chemical Name: Solution of Ammonium Hydroxide and Water	Synonyms: Ammonium hydroxide, ammonium hydrate, aqua ammonia, ammonia water, ammonia monohydrate
Formula: Solution of NH ₄ OH and H ₂ O	Chemical Family: Amine
Telephone:	Company Name: Praxair, Inc. 39 Old Ridgebury Road Danbury, CT 06810-5113
Emergencies: 1-800-645-4633* CHEMTREC: 1-800-424-9300* Routine: 1-800-PRAXAIR	

* Call emergency numbers 24 hours a day only for spills, leaks, fire, exposure, or accidents involving this product. For routine information, contact your supplier, Praxair sales representative, or call 1-800-PRAXAIR (1-800-772-9247).

2. Composition/Information on Ingredients

See section 16 for important information about mixtures.

INGREDIENT	CAS NUMBER	CONCENTRATION	OSHA PEL	ACGIH TLV-TWA (2002)
Ammonium hydroxide	1336-21-6	12-16%	50 ppm*	25 ppm (35 ppm, 15 min, TLV STEL)*
Water	7732-18-5	84-88%	None currently established	None currently established

* Values are for ammonia vapor.

3. Hazards Identification

EMERGENCY OVERVIEW

DANGER! Toxic, corrosive liquid and vapor.

Harmful or fatal if inhaled or swallowed.

Causes eye, skin, and respiratory tract burns.

May cause kidney and respiratory system damage.

Vapor can catch fire.

Self-contained breathing apparatus and protective clothing must be worn by rescue workers.

Odor: Pungent, irritating

THRESHOLD LIMIT VALUE: TLV-TWA, AMMONIA, 25 ppm; 35 ppm, 15 min STEL (ACGIH, 2002). TLV-TWAs should be used as a guide in the control of health hazards and not as fine lines between safe and dangerous concentrations.

EFFECTS OF A SINGLE (ACUTE) OVEREXPOSURE:

INHALATION—Exposure to vapor concentrations moderately above the TLV may irritate the eyes, nose, and throat. Higher concentrations may cause breathing difficulty; chest pain; bronchospasm; pink, frothy sputum. Death may occur from pulmonary edema (fluid on the lungs). A brief exposure of as little as 5000 ppm may be fatal.

SKIN CONTACT—Liquid may cause moderate-to-severe redness, swelling, and ulceration of the skin, depending on the degree and duration of contact. At high concentrations, vapor may cause chemical burns. Prolonged or widespread skin contact may result in the absorption of potentially harmful amounts of material.

SWALLOWING—Toxic. May cause chemical burns of the mouth, throat, esophagus, and stomach. May be fatal in doses as small as 3-4 ml.

EYE CONTACT—Vapor may cause pain and excessive tearing with acute corneal injury at high concentrations. Liquid may cause pain, severe redness, and swelling of the conjunctiva, damage to the iris, glaucoma, and cataracts. Corneal opacification may result in blindness.

EFFECTS OF REPEATED (CHRONIC) OVEREXPOSURE: Chronic exposure may cause chemical pneumonitis and kidney damage.

OTHER EFFECTS OF OVEREXPOSURE: None known.

MEDICAL CONDITIONS AGGRAVATED BY OVEREXPOSURE: Inhalation may aggravate asthma and inflammatory or fibrotic pulmonary disease. Skin irritation may aggravate an existing dermatitis.

SIGNIFICANT LABORATORY DATA WITH POSSIBLE RELEVANCE TO HUMAN HEALTH HAZARD EVALUATION: None known.

CARCINOGENICITY: Ammonia is not listed by NTP, OSHA, or IARC.

4. First Aid Measures

INHALATION: Remove to fresh air. If not breathing, give artificial respiration. **WARNING: Rescuer may receive chemical burns from giving mouth-to-mouth resuscitation.** If breathing is difficult, qualified personnel may give oxygen. Keep victim warm. Call a physician.

SKIN CONTACT: Immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Discard clothing and shoes. Call a physician.

SWALLOWING: Give at least two glasses of water or milk at once. Do not induce vomiting. Call a physician.

EYE CONTACT: Immediately flush eyes thoroughly with water for at least 15 minutes. Hold the eyelids open and away from the eyeballs to ensure that all surfaces are flushed thoroughly. See a physician, preferably an ophthalmologist, immediately.

NOTES TO PHYSICIAN: *Victims of overexposure should be observed for at least 72 hours for delayed edema. The hazards of this material are mainly due to its severe irritant and corrosive properties on the skin and mucosal surfaces. There is no specific antidote. Treatment of overexposure should be directed at the control of symptoms and the clinical condition of the patient.*

5. Fire Fighting Measures

FLASH POINT (test method):	Not applicable	
AUTOIGNITION TEMPERATURE:	1202°F (650°C)*	
FLAMMABLE LIMITS IN AIR, % by volume:	LOWER: 16%*	UPPER: 25%*

* Based on ammonia.

EXTINGUISHING MEDIA: CO₂, dry chemical, water spray, or fog.

SPECIAL FIRE FIGHTING PROCEDURES: DANGER! Toxic, corrosive liquid and vapor. Vapor can catch fire. Evacuate all personnel from danger area. Do not approach area without self-contained breathing apparatus and protective clothing. Immediately spray containers with water from maximum distance until cool, taking care not to extinguish flames. Remove sources of ignition if without risk. Remove all containers from fire area if without risk; continue cooling water spray while moving containers. Stop flow of gas if without risk, or allow flames to burn out. On-site fire brigades must comply with OSHA 29 CFR 1910.156.

UNUSUAL FIRE AND EXPLOSION HAZARDS: Ammonia vapors in the 16-25% range can form explosive mixtures with air and oxidizing agents. No part of a container (e.g., a drum) should be subjected to a temperature higher than 77°F (25°C). If leaking or spilled product catches fire, do not extinguish flames. Flammable and toxic vapors may spread from leak and could explode if reignited. Vapors can be ignited by pilot lights, other flames, smoking, sparks, heaters, electrical equipment, static discharge, or other ignition sources at locations distant from product handling point. Explosive atmospheres may linger. Before entering area, especially confined areas, check atmosphere with an appropriate device.

HAZARDOUS COMBUSTION PRODUCTS: Nitrogen oxides

6. Accidental Release Measures

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED: DANGER! Toxic, corrosive liquid and vapor. Vapor can catch fire. Vapors in the 16-25% range can form explosive mixtures with air and oxidizing agents. (See section 5.) Evacuate all personnel from danger area. Use self-contained breathing apparatus where needed. Remove all sources of ignition if without risk. Reduce vapors with fog or fine water spray. Shut off flow if without risk. Ventilate area or move container to a well-ventilated area. Flammable vapors may spread from leak. Before entering area, especially confined areas, check atmosphere with an appropriate device.

WASTE DISPOSAL METHOD: Prevent waste from contaminating the surrounding environment. Keep personnel away. Discard any product, residue, disposable container, or liner in an environmentally acceptable manner, in full compliance with federal, state, and local regulations. If necessary, call your local supplier for assistance.

7. Handling and Storage

PRECAUTIONS TO BE TAKEN IN STORAGE: Store and use with adequate ventilation, preferably in a covered area outside. Do not store with oxygen or other oxidizers. Keep away from heat, sparks, and open flame. Storage in drums or similar containers should be only where temperature will not exceed 77°F (25°C). Keep containers tightly closed at all times when not in use.

PRECAUTIONS TO BE TAKEN IN HANDLING: Protect containers from damage. For other precautions in using this product, see section 16.

8. Exposure Controls/Personal Protection

VENTILATION/ENGINEERING CONTROLS:

LOCAL EXHAUST—Use a corrosion resistant local exhaust system, if necessary, to prevent oxygen deficiency and to keep hazardous fumes and gases below applicable TLVs in the worker's breathing zone.

MECHANICAL (general)—Not recommended as a primary ventilation system to control worker's exposure.

SPECIAL—None

OTHER—None

RESPIRATORY PROTECTION: Use air-supplied respirators for concentrations up to 10 times the applicable permissible exposure limit. For higher concentrations, a full-face, self-contained breathing apparatus operated in the pressure-demand mode is required. Respiratory protection must conform to OSHA rules as specified in 29 CFR 1910.134.

SKIN PROTECTION: Wear work gloves for container handling; neoprene wherever contact with product is possible.

EYE PROTECTION: Wear safety glasses when handling containers; vapor-proof goggles and a face shield wherever contact with product is possible. Select eye protection in accordance with OSHA 29 CFR 1910.133.

OTHER PROTECTIVE EQUIPMENT: Metatarsal shoes for container handling. Protective clothing where needed. Select equipment in accordance with OSHA 29 CFR 1910.132 and 1910.133. Regardless of protective equipment, never touch live electrical parts.

9. Physical and Chemical Properties

MOLECULAR WEIGHT (NH₄OH):	35.06
SPECIFIC GRAVITY (H₂O = 1):	0.897 (approximate)
SPECIFIC GRAVITY (Air = 1) at 32°F (0°C) and 1 atm:	0.597
SOLUBILITY IN WATER:	100%
PERCENT VOLATILES BY VOLUME:	12-16%
pH:	13+
BOILING POINT at 1 atm:	Circa 97°F (36°C) depending on concentration
MELTING POINT at 1 atm:	Circa -98°F (-72°C) depending on concentration
APPEARANCE, ODOR, AND STATE: Colorless liquid; pungent, irritating odor.	

10. Stability and Reactivity

STABILITY: Unstable Stable

INCOMPATIBILITY (materials to avoid): Acids, gold, silver, mercury, oxidizing agents, halogens, halogenated compounds, acids, copper, copper-zinc alloys (brass), chlorates, zinc

HAZARDOUS DECOMPOSITION PRODUCTS: The normal products of combustion are nitrogen and water. Hydrogen may be formed at temperatures above 1544°F (840°C).

HAZARDOUS POLYMERIZATION: May Occur Will Not Occur

CONDITIONS TO AVOID: None known.

11. Toxicological Information

LD₅₀ = 350 mg/kg, rat; LC₅₀ = 7338 ppm, 1 hr, rat (ammonia).

12. Ecological Information

Toxic to aquatic life. LC₅₀ < 1 mg/L, 96-hours, fish. Ammonium hydroxide does not contain any Class I or Class II ozone-depleting chemicals. Ammonium hydroxide is not listed as a marine pollutant by DOT.

13. Disposal Considerations

WASTE DISPOSAL METHOD: See section 6.

14. Transport Information

DOT/IMO SHIPPING NAME: Ammonia solutions

HAZARD CLASS:	PACKING GROUP:	IDENTIFICATION NUMBER:	PRODUCT RQ:
8	III	UN 2672	1000 lb (454 kg), ammonium hydroxide

SHIPPING LABEL(s): CORROSIVE

PLACARD (when required): CORROSIVE

15. Regulatory Information

The following selected regulatory requirements may apply to this product. Not all such requirements are identified. Users of this product are solely responsible for compliance with all applicable federal, state, and local regulations.

U.S. FEDERAL REGULATIONS:

EPA (ENVIRONMENTAL PROTECTION AGENCY)

CERCLA: COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION, AND LIABILITY ACT OF 1980 (40 CFR Parts 117 and 302):

Reportable Quantity (RQ): 1000 lb (454 kg)

SARA: SUPERFUND AMENDMENT AND REAUTHORIZATION ACT:

SECTIONS 302/304: Require emergency planning based on Threshold Planning Quantity (TPQ) and release reporting based on Reportable Quantities (RQ) of Extremely Hazardous Substances (EHS) (40 CFR Part 355):

Threshold Planning Quantity (TPQ): None

EHS RQ (40 CFR 355): None

SECTIONS 311/312: Require submission of MSDSs and reporting of chemical inventories with identification of EPA hazard categories. The hazard categories for this product are as follows:

IMMEDIATE: Yes

DELAYED: Yes

PRESSURE: No

REACTIVITY: No

FIRE: Yes

SECTION 313: Requires submission of annual reports of release of toxic chemicals that appear in 40 CFR Part 372.

Ammonium hydroxide is subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA) and 40CFR Part 372.

40 CFR 68: RISK MANAGEMENT PROGRAM FOR CHEMICAL ACCIDENTAL RELEASE PREVENTION: Requires development and implementation of risk management programs at facilities that manufacture, use, store, or otherwise handle regulated substances in quantities that exceed specified thresholds.

Ammonium hydroxide is not listed as a regulated substance.

TSCA: TOXIC SUBSTANCES CONTROL ACT: Ammonia is listed on the TSCA inventory.

OSHA: OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION:

29 CFR 1910.119: PROCESS SAFETY MANAGEMENT OF HIGHLY HAZARDOUS CHEMICALS: Requires facilities to develop a process safety management program based on Threshold Quantities (TQ) of highly hazardous chemicals.

Ammonium hydroxide is not listed in Appendix A as a highly hazardous chemical.

STATE REGULATIONS:

CALIFORNIA: Ammonium hydroxide is not listed by California under the SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT OF 1986 (Proposition 65).

PENNSYLVANIA: Ammonium hydroxide is subject to the PENNSYLVANIA WORKER AND COMMUNITY RIGHT-TO-KNOW ACT (35 P.S. Sections 7301-7320).

16. Other Information

Be sure to read and understand all labels and instructions supplied with all containers of this product.

OTHER HAZARDOUS CONDITIONS OF HANDLING, STORAGE, AND USE: *Corrosive liquid and vapor.* Harmful if inhaled. Do not breathe vapor. Do not get liquid or vapor in eyes, on skin, or on clothing. (See section 3.) Have safety showers and eyewash fountains immediately available. *Store and use with adequate ventilation at all times.* Use only with compatible materials and equipment. Keep away from oxidizing agents and other flammables. *May form explosive mixtures with air.* Keep away from heat, sparks, and open flame.

NOTE: *Prior to using any plastics, confirm their compatibility with ammonia.*

MIXTURES: When you mix two or more chemicals, you can create additional, unexpected hazards. Obtain and evaluate the safety information for each component before you produce the mixture. Consult an industrial hygienist or other trained person when you evaluate the end product. Remember, gases and liquids have properties that can cause serious injury or death.

HAZARD RATING SYSTEMS:

NFPA RATINGS:

HEALTH = 3
FLAMMABILITY = 1
INSTABILITY = 0
SPECIAL = None

HMIS RATINGS:

HEALTH = 2
FLAMMABILITY = 1
PHYSICAL HAZARD = 0

Praxair asks users of this product to study this MSDS and become aware of product hazards and safety information. To promote safe use of this product, a user should (1) notify employees, agents, and contractors of the information in this MSDS and of any other known product hazards and safety information, (2) furnish this information to each purchaser of the product, and (3) ask each purchaser to notify its employees and customers of the product hazards and safety information.

The opinions expressed herein are those of qualified experts within Praxair, Inc. We believe that the information contained herein is current as of the date of this Material Safety Data Sheet. Since the use of this information and the conditions of use of the product are not within the control of Praxair, Inc., it is the user's obligation to determine the conditions of safe use of the product.

Praxair MSDSs are furnished on sale or delivery by Praxair or the independent distributors and suppliers who package and sell our products. To obtain current Praxair MSDSs for these products, contact your Praxair sales representative or local distributor or supplier. If you have questions regarding Praxair MSDSs, would like the form number and date of the latest MSDS, or would like the names of the Praxair suppliers in your area, phone or write the Praxair Call Center (**Phone:** 1-800-PRAXAIR; **Address:** Praxair Call Center, Praxair, Inc., PO Box 44, Tonawanda, NY 14151-0044).

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