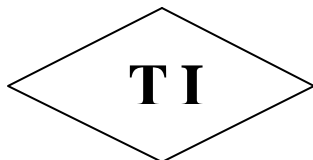


MATERIAL SAFETY DATA SHEET

AMMONIUM HYDROXIDE



DISTRIBUTORS:

TANNER INDUSTRIES, INC.

DIVISIONS:

NATIONAL AMMONIA	NORTHEASTERN AMMONIA
HAMLER INDUSTRIES	BOWER AMMONIA & CHEMICAL

735 Davisville Road, Third Floor, Southampton, PA 18966; 215-322-1238

CORPORATE EMERGENCY TELEPHONE NUMBER: 800-643-6226; CHEMTREC (CMA) 800-424-9300

DESCRIPTION

CHEMICAL NAME: Ammonium Hydroxide Solution (Baume 26°)

CAS REGISTRY NO: 1336-21-6

SYNONYMS: Aqua Ammonia

CHEMICAL FAMILY: Ammonia

FORMULA: NH₄OH + H₂O

MOL. WT: 35.05 (NH₄OH)

COMPOSITION: 29.4% Solution; 29.4% Ammonia, Anhydrous-CAS # 7664-41-7; 70.6% Water - CAS# 7732-18-5

STATEMENT OF HEALTH HAZARD

HAZARD DESCRIPTION:

Ammonia is an irritant and corrosive to the skin, eyes, respiratory tract and mucous membranes. May cause severe burns to the eyes, lungs and skin. Skin and respiratory related diseases could be aggravated by exposure.

Not recognized by OSHA as a carcinogen.

Not listed in the National Toxicology Program annual report.

Not listed as a carcinogen by the International Agency for Research on Cancer.

EXPOSURE LIMITS FOR AMMONIA: Vapor

OSHA	50 ppm,	35 mg/m ³ PEL	8 hour TWA
NIOSH	35 ppm,	27 mg/m ³ STEL	15 minutes
	25 ppm,	18 mg/m ³ PEL	10 hour TWA
ACGIH	300 ppm,	IDLH	
	25 ppm,	18 mg/m ³ TLV	8 hour TWA
	35 ppm,	27 mg/m ³ STEL	15 minutes

TOXICITY: LD 50 (Oral/Rat)

350 mg/kg

EMERGENCY TREATMENT

EFFECTS OF OVEREXPOSURE:

Eye: lacrimation, edema or blindness may occur.

Skin: irritation, corrosive burns, blister formation may result. Contact with liquid will freeze the tissue and produce a caustic burn.

Inhalation: acute exposure may result in severe irritation of the respiratory tract, bronchospasm, edema or respiratory arrest.

Ingestion: Symptoms similar to Inhalation. Lung irritation and pulmonary edema may occur.

Extreme exposure may result in death from spasm, inflammation or edema.

EMERGENCY AID:

Eye: flush with copious amounts of water for 15 minutes. Eyelids should be held apart and away from eyeball for thorough rinsing.

Skin: flush with copious amounts of water for 15 minutes while removing contaminated clothing and shoes. Exercise caution when removing contaminated clothing as it may be frozen to the skin. Do not rub or apply ointment on affected area.

Inhalation: remove to fresh air. Administer oxygen or artificial respiration if necessary.

Ingestion: if conscious, give large amounts of water to drink. May drink orange juice, citrus juice or diluted vinegar to counteract ammonia.

DO NOT INDUCE VOMITING! SEEK IMMEDIATE MEDICAL HELP FOR ALL EXPOSURES!

NOTE TO PHYSICIAN: Respiratory injury may appear as a delayed phenomenon. Pulmonary edema may follow chemical bronchitis. Supportive treatment with necessary ventilation actions, including oxygen, may warrant consideration.

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PHYSICAL DATA

BOILING PT: NH ₃ , vapors released upon warming	APPROXIMATE FREEZING PT: -108°F
VAPOR DENSITY (AIR=1): less than 1	VAPOR PRESSURE: 9.1 psia @ 60°F
SPECIFIC GRAVITY: 0.8974 AT 60°F	SOLUBILITY IN WATER: Complete
PERCENT VOLATILE: 100% AT 212°F	EVAPORATION RATE (Water=1): Similar
APPEARANCE AND ODOR: Colorless liquid and pungent odor	SURFACE TENSION: 62 Dynes/cm

FIRE AND EXPLOSION HAZARD DATA

FLASH POINT:	None
AUTOIGNITION TEMP:	Not applicable
FLAMMABLE LIMITS IN AIR:	for evolved ammonia: LEL 16% UEL 25%
EXTINGUISHING MEDIA:	Non-combustible

SPECIAL FIRE-FIGHTING PROCEDURES:

Must wear protective clothing and a positive pressure SCBA. Stop source if possible. Cool fire exposed containers with water spray. Stay upwind and use water spray to knock down vapor and dilute.

UNUSUAL FIRE AND EXPLOSION HAZARDS:

When heated, product will give off ammonia gas, which is a strong irritant to the eye, skin and respiratory tract.

Outdoors, ammonia is not generally a fire hazard.

Indoors, in confined areas, ammonia may be a fire hazard, especially if oil and other combustible materials are present.

If relief valves are inoperative, heat exposed storage containers may become explosion hazards.

Combustion of released ammonia may form nitrogen oxides.

CHEMICAL REACTIVITY

STABILITY:

Stable at room temperature. Ammonium Hydroxide will react exothermically with acids. Ammonia vapors are released when heated.

CONDITIONS TO AVOID:

Avoid Ammonium Hydroxide contact with chemicals such as mercury, chlorine, iodine, bromine, silver oxide or hypochlorites; they can form explosive compounds.

Avoid Ammonium Hydroxide contact with chlorine, which forms a chloramine gas, that is a primary skin irritant and sensitizer.

Ammonium Hydroxide has a corrosive reaction with galvanized surfaces, copper, brass, bronze, aluminum alloys, mercury, gold and silver.

HAZARDOUS DECOMPOSITION PRODUCTS:

Ammonium Hydroxide decomposition to hydrogen and nitrogen gases above 450°C (842°F)

SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN:

Wear respiratory protection and protective clothing; see PROTECTIVE EQUIPMENT. Stop source if possible. Stay upwind and use water spray to absorb the evolved gas. Dilute with large amount of water. Contain spill from entering drains, sewers, water systems by utilizing methods, such as diking.

WASTE DISPOSAL:

Listed as hazardous substance under CWA (40 CFR 116.40 CFR 117.3 Reportable Quantity Category C. 1000#/454kg)

Comply with all regulations. Suitably diluted product may be disposed of on agricultural land as fertilizer. Keep spill from entering streams or lakes.

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SPECIAL PROTECTION AND PROCEDURES

RESPIRATORY PROTECTION:

MSHA/NIOSH approved respiratory protection that consists of a full face gas mask and canisters effective for ammonia that enable use for entry and escape in emergencies. Refer to 29 CFR 1910.134 and ANSI: Z88.2 for requirements and selection. A positive pressure SCBA is required for entry into ammonia atmospheres at or above 300 ppm.

VENTILATION:

Local exhaust sufficient to keep ammonia gas to 25ppm or less.

PROTECTIVE EQUIPMENT:

Splash-proof, chemical safety goggles, rubber gloves and boots should be worn to prevent contact. Face shield can be worn over the goggles as additional protection. Respiratory protection and cotton work clothes are recommended. Refer to 29 CFR 1910.132 to 1910.136 for requirements. A positive pressure SCBA is required for entry into ammonia atmospheres at or above 300 ppm.

SPECIAL PRECAUTIONS

STORAGE AND HANDLING:

Keep product in strong glass or plastic, tightly closed containers. Store in cool (26.7°C/80°F) and well-ventilated area.

WORK-PLACE PROTECTIVE EQUIPMENT:

Protective equipment should be stored near, but outside of ammonium hydroxide area. Water for first-aid, such as an eyewash station and safety shower, is to be kept available in the immediate vicinity. See 29 CFR 1910.141 for workplace requirements.

DISPOSAL:

Ammonium Hydroxide is listed as a hazardous substance under FWPCA. See WASTE DISPOSAL. Classified as RCRA Hazardous waste due to corrosivity with designation D002 if disposed of in original form.

LABELING AND SHIPPING

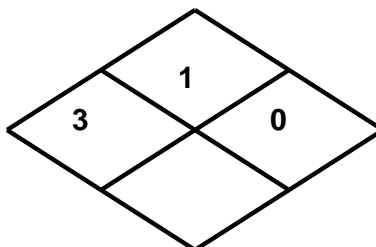
HAZARD CLASS: 8 [Corrosive Material]

PROPER SHIPPING DESCRIPTION: Ammonia Solutions, 8, UN2672, PG III, RQ

PLACARD: Corrosive

IDENTIFICATION NO: UN 2672

National Fire Protection Assoc. Hazardous Rating:



Hazardous Materials Identification System Labels:

AMMONIUM HYDROXIDE	
HEALTH	3
FLAMMABILITY	1
REACTIVITY	0
PERSONAL PROTECTION	H

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OTHER REGULATORY REQUIREMENTS

Under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), Section 103, any environmental release of this chemical equal to or over the reportable quantity of 1000 lbs. must be reported promptly to the National Response Center, Washington, D.C. (1-800-424-8802).

Any consumer product containing 5% or more ammonia requires a POISON label under FHSA (16 CFR 1500. 129(1)).

The material is subject to the reporting requirements of Section 313, Section 304 and Section 312, Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR 372. As of June 30, 1995, this material is reportable with the following qualifications: 10% of total aqueous ammonia is reportable as Ammonia (7664-41-4) under this listing.

EPA hazard Categories - Immediate: Yes; Delayed: No; Fire: No; Sudden Release: No; Reactive: No
Regulated Air Act – 40 CFR 112(r) at concentrations greater than 20% and amounts greater than 20,000 lbs.

The information, data, and recommendations in this material safety data sheet relate only to the specific material designated herein and do not relate to use in combination with any other material or in any process. The information, data, and recommendations set forth herein are believed by us to be accurate. We make no warranties, either expressed or implied, with respect thereto and assume no liability in connection with any use of such information, data, and recommendations.