

**MATERIAL SAFETY DATA SHEET**

( MSDS )

**AMMONIA SOLUTION**

CAS No.: CAS No.: 1336 - 21 - 6

IN CASE OF EMERGENCY, PLEASE CALL NEAREST FIRE / POLICE / AMBULANCE &amp;/OR DISTRICT AUTHORITIES

**FIRE - 101****POLICE -100****AMBULANCE - 102****1. Identification of the substance/mixture and of the company/undertaking****CHEMICAL NAME:** AMMONIUM HYDROXIDE**COMPOSITION:** 25% by weight of Ammonia gas in Water**CHEMICAL FAMILY:** Ammonia**FORMULA:** NH<sub>4</sub>OH or NH<sub>3</sub>(Aq)**MOLAR MASS:** 35.04 g/mol**SYNONYMS:** Aqua Ammonia, Aqueous Ammonia, Liquor Ammonia, Liquour Ammonia, Ammoniacal Liquor, Ammonia Water and Ammonia Solution**2. Hazards Identification****DESCRIPTION:** Is an irritant, and corrosive to skin, eye, respiratory tract and mucous membranes. May cause severe burns, eye and lung-injuries. Skin and respiratory related diseases 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: Vapor**

OSHA	Permissible Exposure Limit (PEL) 35 ppm (27 mg/m <sup>3</sup> )	as a 15-minute STEL
NIOSH	Recommended Exposure Level (REL) 25 ppm (17 mg/m <sup>3</sup> )	as 8-hour TWA (Time-Weighted Average)
NIOSH	Recommended Exposure Level (REL) 35 ppm	as a 15-minute STEL
ACGIH	Threshold Limit Value (TLV) 25 ppm (17 mg/m <sup>3</sup> )	as 8-hour TWA (Time-Weighted Average)
ACGIH	Short Term Exposure Limit (STEL) 35 ppm (24 mg/m <sup>3</sup> )	as a 15-minute STEL

**3. EMERGENCY TREATMENT****EFFECTS OF OVEREXPOSURE:** Eye & Skin: Overexposure can severely irritate and burn the skin or eye causing permanent damage. Inhalation: Severe irritation to nose, throat and lungs causing headaches, coughing, severe lung congestion, breathing difficulty, convulsion or shock.**EMERGENCY AID:** Skin: Flush with copious amounts of water while removing contaminated clothing and shoes. Wash clothing before re-use. Do not rub, or apply ointment on affected area. Ingestion: if conscious, give large

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amount of water to drink and follow with vinegar or fruit juice. Refer immediately to physician. Eye: flush with copious amount of water for 15 min. Eyelids should be held apart and away from eyeball for thorough rinsing. SPEED AND THOROUGHNESS IN RINSING THE EYE IS MOST IMPORTANT IN PREVENTING LATENT PERMANENT INJURIES. Inhalation: remove to fresh air. Administer oxygen or artificial respiration if necessary. SEEK IMMEDIATE MEDICAL HELP.

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

**4. PHYSICAL DATA**

BOILING POINT : 94°F (Approximately)

FREEZING POINT: (-99°F)

VAPOR PRESSURE @ 60°F : 6.4 psi

VAPOR DENSITY (Air=1): less than 1

SPECIFIC GRAVITY @ 60°F: 0.9089

SOLUBILITY IN WATER: Complete

PERCENT VOLATILE: 100% @ 212°F

EVAPORATION RATE (Water=1): Similar

APPEARANCE &amp; ODOUR: Colorless liquid and pungent odour

SURFACE TENSION: 63 dynes/cm

**5. FIRE AND EXPLOSION HAZARD DATA**

FLASH POINT

None

AUTO-IGNITION TEMPERATURE

Not applicable

FLAMMABLE LIMITS IN AIR

For evolved ammonia: LEL 16% UEL 25%

EXTINGUISHING MEDIA

Non-combustible

**6. FIRE-FIGHTING PROCEDURES**

**SPECIAL FIRE-FIGHTING PROCEDURES:** Must wear protective clothing & respiratory protection. See PROTECTIVE EQUIPMENT. Stop source if possible. Cool fire exposed containers with water spray. Stay upwind and use water spray to knock down vapor and dilute.

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**7. FIRE AND EXPLOSION HAZARDS**

**UNUSUAL FIRE AND EXPLOSION HAZARDS:** Not generally a fire hazard, if relief valves are inoperative, heat-exposed storage containers may become explosion hazards. Ammonia contact with chemicals such as mercury, chlorine, iodine, bromine, silver oxide, or hypochlorites can form explosive compounds. Special hazards with chlorine to form choramine gas, also a primary skin irritant and sensitizer. Combustion may form toxic nitrogen oxides.

**8. STABILITY & CHEMICAL REACTIVITY**

Stable at room temperature. Ammonia will react exothermically with Acids and Water.

**9. CONDITIONS TO AVOID**

Avoid mixing with sulfuric acid or other strong mineral acids. Avoid mixing with hypochlorites (chlorine bleach) or other halogens and sodium hydroxide. Avoid contact with galvanized surfaces, copper, brass, bronze, aluminium alloys, mercury, gold, silver, and strong oxidizers. Avoid heating.

**10. HAZARDOUS DECOMPOSITION PRODUCTS**

Ammonia decomposes to Hydrogen and Nitrogen gases above 450o C (842oF) in the presence of a catalyst.

**11. 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 which will absorb the evolved gas. Dilute with large amounts of water. Contain spill by diking.

**WASTE DISPOSAL:** Listed as hazardous substance under CWA (40 CFR 1164.40 cfe 117.3 Reportable Quantity Category C. 1000 lbs / 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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**12. RESPIRATORY PROTECTION**

MSHA/NIOSH approved respiratory protection with full face for gas and vapor contaminants effective for anhydrous ammonia and able to be used for entry and escape in emergencies. Refer to 29 CFR 1910.134 and ANSI: Z88.2 for requirement and selection.

**13. VENTILATION**

Local exhaust sufficient to keep ammonia gas below Permissible Exposure Limits. Refer to 29 CFR 1910.134 and ANSI: Z9.2 for requirement and selection.

**14. PROTECTIVE EQUIPMENT**

Splash-proof, chemical safety goggles, rubber gloves and boots to prevent contact. Respiratory protection. Cotton work clothes recommended. Refer to 29 CFR 1910.132 to 1910.136 for requirements.

**SPECIAL PRECAUTIONS**

**STORAGE AND HANDLING:** Store in cool, well-ventilated area with containers tightly closed.

OSHA 29 CFR 1910.111 prescribes handling and storage requirements for anhydrous ammonia as a hazardous material.

**WORK-PLACE PROTECTIVE EQUIPMENT:** Should be near, but outside of Ammonia area.

Eye-Wash and Safety-Shower should be in immediate vicinity. See 29 CFR 1910.141 for workplace requirements.

**DISPOSAL:** Aqua Ammonia is listed as a hazardous substance under FWPCA. See WASTE DISPOSAL.

Classified as RCRA Hazardous waste due to corrosivity with designation D002 if disposed off in original form.

**PERSONAL:** Avoid unnecessary exposure. Use protective equipment as needed. Do not wear contact lenses.

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