

AMMONIA

HAZARD AND SAFETY MEASURES

Use of Ammonia

- Agricultural Applications
- Chemical Process Industries
- Pollution Control
- Refrigeration
- Water Treatment
- Metal Treatment

Physical and Chemical Properties

- Physical state and appearance: Colourless gas
- Odor: Pungent (Strong.)
- Taste: Acrid.
- Molecular Weight: 35.05
- Color: Colorless.
- pH (1% soln/water): 11.6 [Basic.] This is the actual pH in a 1(N)solution.
- Melting Point: -69.2°C (-92.6°F)
- Boiling Point – 33.34°C
- Solubility in water: 47% w/w (0°C), 31% w/w(25°C), 18% w/w(50°C)

Physical and Chemical Properties

Specific Gravity: 0.898 (Water = 1)

Vapor Pressure: 287.9 kPa (@ 20°C)

Vapor Density: 0.769 Kg/m³ (Air = 1.225 kg/m³)

Odor Threshold: 5 - 50 ppm as ammonia

LEL = 15 %

HEL = 28 %

Auto ignition Temperature = 651°C

Stability and Reactivity Data

Stability: The product is stable.

Corrosivity: Extremely corrosive in presence of zinc, copper. Corrosive in presence of aluminium.

- Non-corrosive in presence of glass, stainless steel(304),stainless steel(316).
- Forms explosive compounds with many heavy metals (silver, lead, zinc) and halide salts.

Special Remarks on Corrosivity: Dissolves copper and zinc. Corrosive to aluminium and its alloys.

Corrosive to galvanized surfaces.

Severe corrosive effect on brass and bronze

Polymerization: Will not occur.

Hazard Identification

- ❑ **Potential Acute Health Effects:** Very hazardous in case of skin contact (corrosive, irritant, permeator), of eye contact (irritant), of ingestion, .
- ❑ Liquid or spray mist may produce tissue damage particularly on mucous membranes of eyes, mouth and respiratory tract.
- ❑ Skin contact may produce burns.
- ❑ Inhalation of the spray mist may produce severe irritation of respiratory tract, characterized by coughing, choking, or shortness of breath.
- ❑ Severe over-exposure can result in death.
- ❑ Inflammation of the eye is characterized by redness, watering and itching.
- ❑ Skin inflammation is characterized by itching, scaling, reddening, or occasionally blistering.

Hazard Identification

Potential Chronic Health Effects

- ❑ CARCINOGENIC EFFECTS: Not available.

- ❑ MUTAGENIC EFFECTS: Mutagenic for bacteria and/or yeast. [Ammonia, anhydrous].
TERATOGENIC EFFECTS: Not available.

- ❑ DEVELOPMENTAL TOXICITY: Not available. The substance is toxic to upper respiratory tract, skin, eyes. Repeated or prolonged exposure to the substance can produce target organs damage. Repeated or prolonged contact with spray mist may produce chronic eye irritation and severe skin irritation. Repeated or prolonged exposure to spray mist may produce respiratory tract irritation leading to frequent attacks of bronchial infection. Repeated exposure may produce general deterioration of health by an accumulation in one or many human organs.

Ammonia Exposure

Exposure Level	Description
5 ppm	Odor Threshold (OSHA)
25 ppm	8 Hour Recommended Exposure Limit (REL) (NIOSH)
25 ppm	8 Hour Threshold Limit Value (TLV) (ACGIH)
35 ppm	15 Minute Short Term Exposure Limit (STEL) (NIOSH)
35 ppm	15 Minute Threshold Limit Value - Short Term Exposure Limit (TLV-STEL)(ACGIH)
50 ppm	8 Hour Permissible Exposure Limit (PEL) (OSHA)
300 ppm	Immediately Dangerous to Life or Health – (IDLH) (OSHA)
300 ppm	Immediately Dangerous to Life or Health – (IDLH) (NIOSH)
300 ppm	Immediately Dangerous to Life or Health – (IDLH) (ACGIH)

Toxicological Information

- **Routes of Entry:** Absorbed through skin. Dermal contact. Eye contact. Inhalation. Ingestion.
- **Toxicity to Animals: Oral toxicity (LD50):** 350 mg/kg [Rat].
- **Chronic Effects on Humans: MUTAGENIC EFFECTS:** Mutagenic for bacteria and/or yeast. [Ammonium hydroxide]. May cause damage to the following organs: mucous membranes, skin, eyes.
- **Other Toxic Effects on Humans:** Very hazardous in case of skin contact (corrosive, irritant, permeator), of ingestion, . Hazardous in case of eye contact (corrosive), of inhalation (lung corrosive).
- **Special Remarks on Toxicity to Animals:** Highly toxic to aquatic organisms
- **Special Remarks on Chronic Effects on Humans:** May affect genetic material based on tests with microorganisms and animals. May cause cancer (tumorigenic) based on animal data. No human data found at this time. (Ammonia, anhydrous)

First Aid Measures

- ❖ **Eye Contact:** Check for and remove any contact lenses. Immediately flush eyes with running water for at least 15 minutes, keeping eyelids open. Cold water may be used. Get medical attention immediately. Finish by rinsing thoroughly with running water to avoid a possible infection.
- ❖ **Skin Contact:** In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Cover the irritated skin with an emollient. Cold water may be used. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention immediately.
- ❖ **Serious Skin Contact:** Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek immediate medical attention.

First Aid Measure

- ❖ **Inhalation:** If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention immediately.
- ❖ **Serious Inhalation:** Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. **WARNING:** It may be hazardous to the person providing aid to give mouth-to-mouth resuscitation when the inhaled material is toxic, infectious or corrosive. Seek medical attention.
- ❖ **Ingestion:** If swallowed, do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention immediately

Handling and Storage

❑ **Precautions:** Keep locked up. Keep container dry. Do not ingest. Do not breathe gas/fumes/ vapor/spray. Never add water to this product.

In case of insufficient ventilation, wear suitable respiratory equipment.

If ingested, seek medical advice immediately and show the container or the label.

Avoid contact with skin and eyes. Keep away from incompatibles such as metals, acids.

❑ **Storage:** Keep container tightly closed. Keep container in a cool, well-ventilated area. Do not store above 25°C (77°F).

Exposure Control

- **Engineering Controls:** Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.
- **Personal Protection:** Face shield. Full suit. Vapour respirator. Be sure to use an approved/certified respirator or equivalent. Gloves. Boots.

Exposure Control

- **Personal Protection in Case of a Large Spill:** Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist before handling this product.



SCBA with Full Suit



Accidental Release measure

- **Small Spill:** Dilute with water and mop up, or absorb with an inert dry material and place in an appropriate waste disposal container. If necessary: Neutralize the residue with a dilute solution of acetic acid.
- **Large Spill:** Stop leak if without risk. Absorb with dry earth, sand or other non-combustible material. Do not get water inside container. Do not touch spilled material. Use water spray curtain to divert vapor drift. Use water spray to reduce vapors. Prevent entry into sewers, basements or confined areas; dike if needed. Call for assistance on disposal. Neutralize the residue with a dilute solution of acetic acid. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

SPRINKLER SYSTEM IN FIXED INSTALLATION

S
P
R
I
N
K
L
E
R
S



Water spray on leakage of Mobile storage



THANK YOU