AMMONIUM HYDROXIDE (<28% AQUEOUS AMMONIA)

AMH

CAUTIONARY RESPONSE INFORMATION

Common Synonyms
Ammonia solution
Ammonia water
Aqua ammonia
Aqueous ammonia
Household ammonia

Watery liquid Colorless Ammonia odor

Floats and mixes with water. Irritating vapor is produced.

Avoid contact with liquid and vapor. Keep people away.
Wear goggles, self-contained breathing apparatus, and rubber overclothing (including gloves).
Stop discharge if possible. Evacuate.
Stay upwind and use water spray to ``knock down'' vapor.
Isolate and remove discharged material.
Notify local health and pollution control agencies.
Protect water intakes.

Fire

Not flammable.

Exposure

CALL FOR MEDICAL AID.

VAPOR
Irritating to skin, eyes, nose and throat.
If inhaled, will cause nausea, vomiting, difficult breathing, or loss of consciousness.
Move to fresh air.
IF IN EYES, hold eyelids open and flush with plenty of water.
If breathing has stopped, give artificial respiration.
If breathing is difficult, give oxygen.

LIQUID
Will burn skin and eyes.
Harmful is swallowed.
Remove contaminated clothing and shoes.
Flush affected areas with plenty of water.
IF IN EYES, hold eyelids open and flush with plenty of water.
IF SWALLOWED and victim is CONSCIOUS, have victim drink water or milk.

Water Pollution

HARMFUL TO AQUATIC LIFE IN VERY LOW CONCENTRATIONS.
May be dangerous if it enters water intakes.
Notify local health and wildlife officials.
Notify operators of nearby water intakes.

1. CORRECTIVE RESPONSE ACTIONS

Dilute and disperse
Stop discharge

2. CHEMICAL DESIGNATIONS

2.1 CG Compatibility Group: 6; Ammonia
2.2 Formula: NH_4OH-H_2O
2.3 IMO/UN Designation: 2672
2.4 DOT ID No.: 2672 (10-35%)
2.5 CAS Registry No.: 1336-21-6
2.6 NAERG Guide No.: 154
2.7 Standard Industrial Trade Classification: 51481

3. HEALTH HAZARDS

3.1 Personal Protective Equipment: Rubber boots, gloves, apron, and coat; broad-brimmed rubber or felt hat; safety goggles. Use of protective oil will reduce skin irritation from ammonia.
3.2 Symptoms Following Exposure: Contact of liquid or vapor with skin, mucous membranes, lungs, or gastroenteric tract causes marked local irritation. Ingestion causes burning pain in mouth, throat, stomach, and thorax, constriction of throat, and coughing. This is soon followed by vomiting of blood or by passage of loose stools containing blood. Breathing difficulty, convulsions, and shock may result. Brief exposure to 5000 ppm or ingestion of 3-4 ml may be fatal.
3.3 Treatment of Exposure: INHALATION: give artificial respiration and oxygen if needed; enforce rest. INGESTION: do NOT induce vomiting; lavage stomach with water or lemon juice, milk, or demulcents; delay may cause perforation of esophagus or stomach; swelling of glottis may necessitate tracheostomy. EYES OR SKIN: wash with plenty of water.
3.4 TLV-TWA: 25 ppm as ammonia.
3.5 TLV-STEL: Not listed.
3.6 TLV-Ceiling: 35 ppm as ammonia.
3.7 Toxicity by Ingestion: Grade 3; oral rat, LD_{50} = 350 mg/kg
3.8 Toxicity by Inhalation: Currently not available.
3.9 Chronic Toxicity: Currently not available
3.10 Vapor (Gas) Irritant Characteristics: Vapors cause moderate irritation such that personnel will find high concentrations intolerable. The effect is temporary.
3.11 Liquid or Solid Characteristics: Causes smarting of the skin and first-degree burns on short exposure; may cause second-degree burns on long exposure.
3.12 Odor Threshold: 50 ppm
3.13 IDLH Value: 300 ppm as ammonia.
3.14 OSHA PEL-TWA: 50 ppm as ammonia.
3.15 OSHA PEL-STEL: Not listed.
3.16 OSHA PEL-Ceiling: Not listed.
3.17 EPA AEGL: Not listed

4. FIRE HAZARDS

4.1 Flash Point: Not flammable
4.2 Flammable Limits in Air: Not flammable
4.3 Fire Extinguishing Agents: Not pertinent
4.4 Fire Extinguishing Agents Not to Be Used: Not pertinent
4.5 Special Hazards of Combustion Products: Not pertinent
4.6 Behavior in Fire: Not pertinent
4.7 Auto Ignition Temperature: Not flammable
4.8 Electrical Hazards: Currently not available
4.9 Burning Rate: Not flammable
4.10 Adiabatic Flame Temperature: Not pertinent
4.11 Stoichometric Air to Fuel Ratio: Not pertinent
4.12 Flame Temperature: Not pertinent
4.13 Combustion Molar Ratio (Reactant to Product): Currently not available
4.14 Minimum Oxygen Concentration for Combustion (MOCC): Not listed

5. CHEMICAL REACTIVITY

5.1 Reactivity with Water: Mild liberation of heat
5.2 Reactivity with Common Materials: Corrosive to copper, copper alloys, aluminum alloys, galvanized surfaces
5.3 Stability During Transport: Stable
5.4 Neutralizing Agents for Acids and Caustics: Dilute with water
5.5 Polymerization: Not pertinent
5.6 Inhibitor of Polymerization: Not pertinent

6. WATER POLLUTION

6.1 Aquatic Toxicity:
6.25 ppm/24 hr/trout/lethal/fresh water
15 ppm/48 hr/sunfish/TL_m/Phila. tap water
6.2 Waterfowl Toxicity: Currently not available
6.3 Biological Oxygen Demand (BOD): Currently not available
6.4 Food Chain Concentration Potential: None
6.5 GESAMP Hazard Profile: Not listed

7. SHIPPING INFORMATION

7.1 Grades of Purity: Grade A: 29.4% NH_3; B: 25%; C: 15%. USP: 27 to 29%. CP: 28%
7.2 Storage Temperature: Ambient
7.3 Inert Atmosphere: No requirement
7.4 Venting: Pressure-vacuum
7.5 IMO Pollution Category: C
7.6 Ship Type: 3
7.7 Barge Hull Type: 3

8. HAZARD CLASSIFICATIONS

8.1 49 CFR Category: Corrosive material
8.2 49 CFR Class: 8
8.3 49 CFR Package Group: III
8.4 Marine Pollutant: No
8.5 NFPA Hazard Classification:

Category	Classification
Health Hazard (Blue).....	3
Flammability (Red).....	1
Instability (Yellow).....	0

8.6 EPA Reportable Quantity: 1000
8.7 EPA Pollution Category: C
8.8 RCRA Waste Number: Not listed
8.9 EPA FWPCA List: Yes

9. PHYSICAL & CHEMICAL PROPERTIES

9.1 Physical State at 15° C and 1 atm: Liquid
9.2 Molecular Weight: Not pertinent
9.3 Boiling Point at 1 atm: Not pertinent
9.4 Freezing Point: Not pertinent
9.5 Critical Temperature: Not pertinent
9.6 Critical Pressure: Not pertinent
9.7 Specific Gravity: 0.89 at 20°C (liquid)
9.8 Liquid Surface Tension: Not pertinent
9.9 Liquid Water Interfacial Tension: Not pertinent
9.10 Vapor (Gas) Specific Gravity: Not pertinent; 0.60
9.11 Ratio of Specific Heats of Vapor (Gas): Not pertinent
9.12 Latent Heat of Vaporization: Not pertinent
9.13 Heat of Combustion: Not pertinent
9.14 Heat of Decomposition: Not pertinent
9.15 Heat of Solution: Not pertinent
9.16 Heat of Polymerization: Not pertinent
9.17 Heat of Fusion: Currently not available
9.18 Limiting Value: Currently not available
9.19 Reid Vapor Pressure: Currently not available

NOTES

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9.20 SATURATED LIQUID DENSITY		9.21 LIQUID HEAT CAPACITY		9.22 LIQUID THERMAL CONDUCTIVITY		9.23 LIQUID VISCOSITY	
Temperature (degrees F)	Pounds per cubic foot	Temperature (degrees F)	British thermal unit per pound-F	Temperature (degrees F)	British thermal unit inch per hour-square foot-F	Temperature (degrees F)	Centipoise
10	56.640	34	1.000		NOT PERTINENT		NOT PERTINENT
15	56.530	36	1.000				
20	56.430	38	1.000				
25	56.330	40	1.000				
30	56.220	42	1.000				
35	56.120	44	1.000				
40	56.010	46	1.000				
45	55.910	48	1.000				
50	55.810	50	1.000				
55	55.700	52	1.000				
60	55.600	54	1.000				
65	55.490	56	1.000				
70	55.390	58	1.000				
75	55.290	60	1.000				
80	55.180	62	1.000				
85	55.080	64	1.000				
		66	1.000				
		68	1.000				
		70	1.000				
		72	1.000				
		74	1.000				
		76	1.000				

9.24 SOLUBILITY IN WATER		9.25 SATURATED VAPOR PRESSURE		9.26 SATURATED VAPOR DENSITY		9.27 IDEAL GAS HEAT CAPACITY	
Temperature (degrees F)	Pounds per 100 pounds of water	Temperature (degrees F)	Pounds per square inch	Temperature (degrees F)	Pounds per cubic foot	Temperature (degrees F)	British thermal unit per pound-F
	MISCIBLE		CURRENTLY NOT AVAILABLE		CURRENTLY NOT AVAILABLE		NOT PERTINENT