

Material Safety Data Sheet

Aqua Ammonia

1. Product and company identification

Product name	: Aqua Ammonia
Material uses	: Fertilizer; extracting metals from their ores; manufacturing of plastics, fibres, resins, explosives, detergents, pesticides, pharmaceuticals, ammonium compounds, and other chemicals.
Headquarters	: Marsulex Inc. 111 Gordon Baker Road Suite 300 North York, ON M2H 3R1 (416) 496-9655 www.marsulex.com
MSDS authored by	: KMK Regulatory Services inc.
In case of emergency	: Canada: CANUTEC +1-613-996-6666 US: CHEMTREC +1-800-424-9300
Product type	: Liquid.

2. Hazards identification

Emergency overview

Color	: Colorless.
Physical state	: Liquid. [Clear.]
Odor	: Ammonia
Signal word	: DANGER!
Hazard statements	: CAUSES RESPIRATORY TRACT, EYE AND SKIN BURNS. HARMFUL IF SWALLOWED. CONTAINS MATERIAL THAT MAY CAUSE TARGET ORGAN DAMAGE, BASED ON ANIMAL DATA.
Precautions	: Do not breathe vapor or mist. Do not ingest. Do not get in eyes or on skin or clothing. Use only with adequate ventilation. Keep container tightly closed and sealed until ready for use. Wash thoroughly after handling.
OSHA/HCS status	: This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).
Routes of entry	: Dermal contact. Eye contact. Inhalation. Ingestion.

Potential acute health effects

Inhalation	: Very hazardous by the following route of exposure: of inhalation (lung irritant). Inhalation of the spray or mist may produce severe irritation of respiratory tract, characterized by coughing, choking or shortness of breath. Over-exposure by inhalation may cause respiratory irritation.
Ingestion	: May be fatal if swallowed. May cause burns to mouth, throat and stomach.
Skin	: Corrosive to the skin. Causes burns.
Eyes	: Corrosive to eyes. Causes burns.

Potential chronic health effects

Chronic effects	: Contains material that may cause target organ damage, based on animal data.
Carcinogenicity	: No known significant effects or critical hazards.
Mutagenicity	: No known significant effects or critical hazards.
Teratogenicity	: No known significant effects or critical hazards.
Developmental effects	: No known significant effects or critical hazards.
Fertility effects	: No known significant effects or critical hazards.
Target organs	: Contains material which may cause damage to the following organs: lungs, upper respiratory tract, eye, lens or cornea.

2. Hazards identification

Over-exposure signs/symptoms

- Inhalation** : Adverse symptoms may include the following:
respiratory tract irritation
coughing
- Ingestion** : Adverse symptoms may include the following:
stomach pains
- Skin** : Adverse symptoms may include the following:
pain or irritation
redness
blistering may occur
People repeatedly exposed to ammonia may develop a tolerance (or acclimatization) to the irritating effects after a few weeks. Tolerance means that higher levels of exposure are required to produce effects earlier seen at lower concentrations. Owing to its corrosive nature, repeated or prolonged skin contact would be expected to cause drying, cracking, and inflammation of the skin (dermatitis).
- Eyes** : Adverse symptoms may include the following:
pain
watering
redness
- Medical conditions aggravated by over-exposure** : Repeated or prolonged contact with spray or mist may produce chronic eye irritation and severe skin irritation. Repeated or prolonged exposure to spray or mist may produce respiratory tract irritation leading to frequent attacks of bronchial infection.

See toxicological information (section 11)

3. Composition/information on ingredients

United States

Name	CAS number	%
Ammonium hydroxide	1336-21-6	10 - 35

Canada

Name	CAS number	%
Ammonium hydroxide	1336-21-6	10 - 35

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

4. First aid measures

- Eye contact** : Immediately flush the contaminated eye(s) with lukewarm, gently flowing water for at least 60 minutes, while holding the eyelid(s) open. Neutral saline solution may be used as soon as it is available. DO NOT INTERRUPT FLUSHING. If necessary, keep emergency vehicle waiting. Take care not to rinse the contaminated water into the unaffected eye or onto the face. Quickly transport the victim to an emergency care facility.
- Skin contact** : As quickly as possible, remove contaminated clothing, shoes, leather goods (e.g. watchbands, belts). Flush contaminated area with lukewarm, gently flowing water for at least 60 minutes. DO NOT INTERRUPT FLUSHING. If necessary, keep the emergency vehicle waiting. Transport victim to an emergency care facility immediately. Discard contaminated clothing, shoes and leather goods.
- Inhalation** : Move victim to fresh air. If breathing is difficult, oxygen may be beneficial if administered by trained personnel, preferably on a doctor's advice. DO NOT allow victim to move about unnecessarily. Symptoms of pulmonary edema can be delayed up to 48 hours after exposure. Give artificial respiration ONLY if breathing has stopped. Give Cardiopulmonary Resuscitation (CPR) if there is no breathing AND no pulse. Obtain medical attention IMMEDIATELY.

4. First aid measures

- Ingestion** : NEVER give anything by mouth if victim is rapidly losing consciousness, is unconscious or convulsing. Have victim rinse mouth thoroughly with water. DO NOT INDUCE VOMITING. Have victim drink 240-300 mL (8 to 10 oz.) of water to dilute material in the stomach. If milk is available, it may be administered AFTER the water has been given. If vomiting occurs naturally, repeat administration of water. Obtain medical attention IMMEDIATELY.
- Protection of first-aiders** : No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Wash contaminated clothing thoroughly with water before removing it, or wear gloves.
- Notes to physician** : In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.

5. Fire-fighting measures

- Flammability of the product** : Non-flammable.
- Extinguishing media**
- Suitable** : If ammonia vapors or gas is burning, use dry chemical powder or carbon dioxide for small fires and water spray, fog or foam for large fires. Otherwise, use extinguishing media appropriate to the surrounding fire conditions.
- Not suitable** : None known.
- Hazardous thermal decomposition products** : Decomposition products may include the following materials:
nitrogen oxides
- Special protective equipment for fire-fighters** : Do not enter without wearing specialized protective equipment suitable for the situation. Firefighter's normal protective clothing (Bunker Gear) will not provide adequate protection. A full-body encapsulating chemical resistant suit with positive pressure self-contained breathing apparatus (MSHA/NIOSH) approved or equivalent) may be necessary.
- Special remarks on fire hazards** : Non-flammable in the presence of the following materials or conditions: open flames, sparks and static discharge and heat.
- Special remarks on explosion hazards** : Concentrated solutions of ammonia give flammable vapors when the solution is between certain temperatures. Above 49°C (120°F), no flammable vapors are produced by ammonia solutions of any concentration. Ammonia gas is generally not considered a serious fire or explosion hazard because ammonia-air mixtures are difficult to ignite and a relatively high concentration of the gas is required. However, a large and intense energy source may cause ignition and/or an explosion, particularly in a confined space. Containers may rupture violently due to overpressurization if exposed to fire or excessive heat for a sufficient period of time. This rupture may release flammable and toxic gases.

6. Accidental release measures

- Personal precautions** : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Do not touch or walk through spilled material. Do not breathe vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment (see section 8).
- Environmental precautions** : Hazardous to aquatic environment. May cause long-term adverse effects in the aquatic environment. Prevent leaking substances from running into the aquatic environment or the sewage system. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).
- Small spill** : Cover with dry earth, sand or other non-combustible material. Use clean tools to collect material and place it into covered plastic containers for later disposal. Flush area with water.
- Large spill** : Prevent liquid from entering sewers or waterways. Dike with inert material (sand, earth, etc.). Stop or reduce leak if safe to do so. Consider in situ neutralization and disposal. Comply with Federal, Provincial/State and local regulations on reporting releases.

7. Handling and storage

- Handling** : Avoid contact with eyes, skin and clothing. Do not ingest. Use only with adequate ventilation. Use only with adequate ventilation. Wash thoroughly after handling. Avoid contact of spilled material and runoff with soil and surface waterways.
- Storage** : Store in a cool, dry, well-ventilated area, out of direct sunlight. Do not store below ground level or in confined spaces. Storage area should be clearly identified, clear of obstruction and accessible only to trained and authorized personnel. Keep storage area separate from work areas. Post warning signs. Inspect periodically for damage or leaks. Store away from incompatible materials such as chlorine or copper. Always store in original labeled container, or in the type of container recommended by the manufacturer/supplier. Protect the label and keep it visible. Keep containers tightly closed when not in use and when empty. Protect from damage. Store empty containers separately. Empty containers may contain hazardous residues.

8. Exposure controls/personal protection

United States

Ingredient	Exposure limits
Ammonium Hydroxide	ACGIH (United States). STEL: 35 ppm 8 hour(s). TWA: 25 ppm 8 hour(s).

Canada

Occupational exposure limits		TWA (8 hours)			STEL (15 mins)			Ceiling			
Ingredient	List name	ppm	mg/m ³	Other	ppm	mg/m ³	Other	ppm	mg/m ³	Other	Notations
No known value.											

Consult local authorities for acceptable exposure limits.

- Recommended monitoring procedures** : Due to the high potential hazard associated with ammonium hydroxide, stringent control measures such as enclosure or isolation may be necessary for large-scale handling operations. For large-scale handling operations, use non-sparking, corrosion-resistant ventilation systems, approved explosion-proof equipment and intrinsically safe electrical systems in areas of use. Supply sufficient replacement air to make up for air removed by exhaust systems. Use local exhaust ventilation at the site of chemical release.
- Engineering measures** : Use only with adequate ventilation. Use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits. The engineering controls also need to keep gas, vapor or dust concentrations below any lower explosive limits.
- Hygiene measures** : Ensure that eyewash stations and safety showers are close to the workstation location. Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing.

Personal protection

- Respiratory** : Up to 250 ppm: Chemical cartridge respirator with cartridge(s) to protect against ammonia; or Supplied-air respirator.
- Hands** : Use gloves appropriate for work or task being performed. Recommended: Butyl rubber gloves.
- Eyes** : Safety eyewear should be used when there is a likelihood of exposure. Recommended: Chemical splash goggles or face shield.
- Skin** : Full suit. Recommended (resistance to breakthrough longer than 8 hours): butyl rubber.
- Environmental exposure controls** : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

9. Physical and chemical properties

Physical state	: Liquid. [Clear.]
Color	: Colorless.
Odor	: Ammonia
Molecular weight	: 35.046
Molecular formula	: NH ₄ OH
pH	: 13 @ 10%/ 11.6 @ 1N.
Boiling/condensation point	: 27.2°C (81°F) @ 30% (w/w). 38°C (100°F) @ 10 - 35% (w/w).
Melting/freezing point	: -72.4°C (-98.3°F) @ 30% (w/w). -73°C (-100°F) @ 10 - 35% (w/w). -77°C (-107°F) @ 27 - 30% (w/w).
Specific gravity	: 0.895 g/cm ³
Relative density	: 0.895 (Water = 1) @ 30% (w/w). 1.9 @ 10 - 35% (w/w). 0.9 @ 27 - 30% (w/w). 0.898 @ 28% (w/w). 0.8974 @ 29.4% (w/w).
Vapor pressure	: 63.3 kPa (475 mm Hg) (at 20°C) @ 30% (w/w). 48 kPa (360 mm Hg) (at 20°C) @ 10 - 35% (w/w).
Vapor density	: 0.618 @ 15°C (59°F) (Air=1) @ 30% (w/w). 0.6 - 1,2 (Air = 1) @ 10 - 35% (w/w). 0.59 (Air = 1) @ 27 - 30% (w/w).
Odor threshold	: 0.043 to 5 ppm @ 30% (w/w).
Solubility	: Miscible in water.

10. Stability and reactivity

Chemical stability	: The product is stable.
Conditions to avoid	: High temperatures, open flames, electric sparks, welding.
Materials to avoid	: Reactive with oxidising agents.. Heavy metals and their salts (e.g. silver, gold, lead, mercury or zinc, especially halide salts) - may form shock-sensitive compounds that may explode when dry.
Hazardous decomposition products	: Ammonia and oxides of nitrogen.
Possibility of hazardous reactions	: Under normal conditions of storage and use, hazardous reactions will not occur.
Hazardous polymerization	: Under normal conditions of storage and use, hazardous polymerization will not occur.

11. Toxicological information

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
Ammonium hydroxide	LD50 Oral	Rat	350 mg/kg	-
Aqua Ammonia	LC50 Inhalation Vapor	Rat	3670 ppm	4 hours
	LD50 Oral	Rat	350 mg/kg	-

Chronic toxicity : No specific data.

12. Ecological information

Environmental effects : Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Aquatic ecotoxicity

Product/ingredient name	Result	Species	Exposure
Ammonium hydroxide	Acute EC50 0.66 mg/l Acute LC50 8.2 mg/l	Daphnia Fish	48 hours 96 hours

Toxicity of the products of biodegradation : The products of biodegradation are more toxic than the original product.

Products of degradation : Products of degradation: nitrogen oxides (NO, NO₂ etc.).






13. Disposal considerations

Waste disposal : The generation of waste should be avoided or minimized wherever possible. This material and its container must be disposed of in a safe way. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Empty containers or liners may retain some product residues. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of cultures and exposed materials by autoclaving at 121°C and 15 PPSI for 30 minutes.




Disposal should be in accordance with applicable regional, national and local laws and regulations.

Refer to Section 7: HANDLING AND STORAGE and Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION for additional handling information and protection of employees.

14. Transport information

Regulatory information	UN number	Proper shipping name	Classes	PG*	Label	Additional information
DOT Classification	UN2672	AMMONIA, SOLUTIONS	8 (6.1)	III		Quantity limitation 5L
TDG Classification	UN2672	AMMONIA, SOLUTIONS	8 (6.1)	III		Quantity limitation 5L
IMDG Class	UN2672	AMMONIA, SOLUTIONS. Marine pollutant (Ammonium hydroxide)	8 (6.1)	III	  	-

14 . Transport information

IATA-DGR Class	UN2672	AMMONIA, SOLUTIONS	8 (6.1)	III	  	-
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PG* : Packing group

Exemption to the above classification may apply.

AERG : 154

15 . Regulatory information

United States

HCS Classification

: Toxic material
Corrosive material
Target organ effects

U.S. Federal regulations

: **United States inventory (TSCA 8b)**: All components are listed or exempted.
SARA 302/304/311/312 extremely hazardous substances: No products were found.
SARA 302/304 emergency planning and notification: No products were found.
SARA 302/304/311/312 hazardous chemicals: Ammonium hydroxide
SARA 311/312 MSDS distribution - chemical inventory - hazard identification:
 Ammonium hydroxide: Immediate (acute) health hazard, Delayed (chronic) health hazard
Clean Water Act (CWA) 307: No products were found.
Clean Water Act (CWA) 311: Ammonium hydroxide
Clean Air Act (CAA) 112 accidental release prevention: No products were found.
Clean Air Act (CAA) 112 regulated flammable substances: No products were found.
Clean Air Act (CAA) 112 regulated toxic substances: No products were found.

Clean Air Act Section 112(b) Hazardous Air Pollutants (HAPs)

: Not listed

Clean Air Act Section 602 Class I Substances

: Not listed

Clean Air Act Section 602 Class II Substances

: Not listed

DEA List I Chemicals (Precursor Chemicals)

: Not listed

DEA List II Chemicals (Essential Chemicals)

: Not listed

SARA 313

	<u>Product name</u>	<u>CAS number</u>	<u>Concentration</u>
Form R - Reporting requirements	: Ammonia hydroxide	1336-21-6	10 - 35
Supplier notification	: Ammonia hydroxide	1336-21-6	10 - 35

SARA 313 notifications must not be detached from the MSDS and any copying and redistribution of the MSDS shall include copying and redistribution of the notice attached to copies of the MSDS subsequently redistributed.

15 . Regulatory information

- State regulations**
- Connecticut Carcinogen Reporting:** None of the components are listed.
 - Connecticut Hazardous Material Survey:** None of the components are listed.
 - Florida substances:** None of the components are listed.
 - Illinois Chemical Safety Act:** None of the components are listed.
 - Illinois Toxic Substances Disclosure to Employee Act:** None of the components are listed.
 - Louisiana Reporting:** None of the components are listed.
 - Louisiana Spill:** None of the components are listed.
 - Massachusetts Spill:** None of the components are listed.
 - Massachusetts Substances:** The following components are listed: Ammonium hydroxide
 - Michigan Critical Material:** None of the components are listed.
 - Minnesota Hazardous Substances:** None of the components are listed.
 - New Jersey Hazardous Substances:** The following components are listed: Ammonium hydroxide
 - New Jersey Spill:** None of the components are listed.
 - New Jersey Toxic Catastrophe Prevention Act:** None of the components are listed.
 - New York Acutely Hazardous Substances:** The following components are listed: Ammonium hydroxide
 - New York Toxic Chemical Release Reporting:** None of the components are listed.
 - Pennsylvania RTK Hazardous Substances:** The following components are listed: Ammonium hydroxide
 - Rhode Island Hazardous Substances:** None of the components are listed.

California Prop. 65

No products were found.

Canada

- WHMIS (Canada)**
- Class D-1B: Material causing immediate and serious toxic effects (Toxic).
 - Class E: Corrosive material
- Canadian lists**
- CEPA Toxic substances:** None of the components are listed.
 - Canadian ARET:** None of the components are listed.
 - Canadian NPRI:** The following components are listed: Ammonium hydroxide
 - Alberta Designated Substances:** None of the components are listed.
 - Ontario Designated Substances:** None of the components are listed.
 - Quebec Designated Substances:** None of the components are listed.

- Canada inventory** : All components are listed or exempted.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all the information required by the Controlled Products Regulations.

International regulations

- International lists**
- Australia inventory (AICS):** All components are listed or exempted.
 - China inventory (IECSC):** All components are listed or exempted.
 - Japan inventory:** All components are listed or exempted.
 - Korea inventory:** All components are listed or exempted.
 - New Zealand Inventory of Chemicals (NZIoC):** All components are listed or exempted.
 - Philippines inventory (PICCS):** All components are listed or exempted.

- Chemical Weapons Convention List Schedule I Chemicals** : Not listed

- Chemical Weapons Convention List Schedule II Chemicals** : Not listed

- Chemical Weapons Convention List Schedule III Chemicals** : Not listed

16 . Other information

United States

Label requirements : CAUSES RESPIRATORY TRACT, EYE AND SKIN BURNS. HARMFUL IF SWALLOWED. CONTAINS MATERIAL THAT MAY CAUSE TARGET ORGAN DAMAGE, BASED ON ANIMAL DATA.

Hazardous Material Information System (U.S.A.) :

Health	*	3
Flammability		0
Physical hazards		0

Caution: HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks. Although HMIS® ratings are not required on MSDSs under 29 CFR 1910.1200, the preparer may choose to provide them. HMIS® ratings are to be used with a fully implemented HMIS® program. HMIS® is a registered mark of the National Paint & Coatings Association (NPCA). HMIS® materials may be purchased exclusively from J. J. Keller (800) 327-6868.

The customer is responsible for determining the PPE code for this material.

National Fire Protection Association (U.S.A.) :



Canada

WHMIS (Canada) :



References

: - 29CFR Part1910.1200 OSHA MSDS Requirements. - 49CFR Table List of Hazardous Materials, UN#, Proper Shipping Names, PG. ANSI Z400.1, MSDS Standard, 2004. - Canada Gazette Part II, Vol. 122, No. 2. Registration SOR/88-64, 31 December 1987. Hazardous Products Act "Ingredient Disclosure List" - Canadian Transport of Dangerous Goods, Regulations and Schedules, Clear Language version 2005. - Manufacturer's Material Safety Data Sheet.

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Notice to reader

To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein.

Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.