MATERIAL SAFETY DATA SHEET

1. Product and Company Identification

Material name	**AMMONIUM HYDROXIDE, REAGENT (ACS)**
Catalog #	811
Version #	02
Revision date	12-Aug-2009
CAS #	Mixture
CAS #	1336-21-6
Synonym(s)	AMMONIA SOLUTION * AQUA AMMONIA
Manufacturer information	GFS Chemicals, Inc. P.O. Box 245 Powell, OH 43065 US www.gfschemicals.com Fax 740-881-5989 Phone 740-881-5501 Toll Free 800-858-9682 Emergency Assistance Chemtrec 800-424-8300

2. Hazards Identification

Emergency overview	DANGER Toxic if swallowed. Corrosive. Causes skin and eye burns. Prolonged exposure may cause chronic effects.
OSHA regulatory status	This product is considered hazardous under 29 CFR 1910.1200 (Hazard Communication).
Potential health effects	
Routes of exposure	Inhalation. Ingestion. Skin contact. Eye contact.
Eyes	Corrosive to the eyes and may cause severe damage including blindness. Causes chemical burns. Risk of serious damage to eyes. Do not get this material in contact with eyes.
Skin	Causes chemical burns. Do not get this material in contact with skin.
Inhalation	Toxic by inhalation. Causes burns. May cause irritation of respiratory tract. Do not breathe dust/fume/gas/mist/vapors/spray.
Ingestion	Toxic if swallowed. Harmful if swallowed. Components of the product may be absorbed into the body by ingestion. Ingestion may produce burns to the lips, oral cavity, upper airway, esophagus and possibly the digestive tract. Do not ingest.
Target organs	Eyes. Skin. Respiratory system.
Potential environmental effects	Components of this product are hazardous to aquatic life. May cause long-term adverse effects in the environment.

3. Composition / Information on Ingredients

Hazardous components	**CAS #**	**Percent**
AMMONIA	7664-41-7	20 - 40
Non-hazardous components	**CAS #**	**Percent**
WATER	7732-18-5	60 - 80

4. First Aid Measures

First aid procedures

Eye contact	Immediately flush eyes with plenty of water for at least 15 minutes. If a contact lens is present, DO NOT delay irrigation or attempt to remove the lens. Continue rinsing. Get medical attention immediately.
Skin contact	Remove and isolate contaminated clothing and shoes. Immediately flush skin with plenty of water. Get medical attention immediately. For minor skin contact, avoid spreading material on unaffected skin. Wash clothing separately before reuse.

Inhalation	Move to fresh air. Oxygen or artificial respiration if needed. Do not use mouth-to-mouth method if victim inhaled the substance. Induce artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. Get medical attention immediately.
Ingestion	If swallowed, rinse mouth with water (only if the person is conscious). Give water or milk to drink and ice to suck. Never give anything by mouth to a victim who is unconscious or is having convulsions. Do not induce vomiting without advice from poison control center. Do not use mouth-to-mouth method if victim ingested the substance. If vomiting occurs, keep head low so that stomach content doesn't get into the lungs. Get medical attention.
Notes to physician	In case of shortness of breath, give oxygen. Keep victim warm. Symptoms may be delayed.
General advice	Immediate medical attention is required. In case of shortness of breath, give oxygen. Keep victim warm. Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves.

5. Fire Fighting Measures

Flammable properties	Fumes are suffocating and corrosive. Not flammable by OSHA criteria. Not flammable by WHMIS criteria. Not combustible by OSHA criteria. Vapors may ignite.
Extinguishing media	
Suitable extinguishing media	Water.
Protection of firefighters	
Specific hazards arising from the chemical	Irritating, corrosive and/or toxic gases or fumes will be released during a fire.
Protective equipment and precautions for firefighters	Move containers from fire area if you can do so without risk. In the event of fire, cool tanks with water spray. Use water spray to cool unopened containers. Use water spray to reduce vapors. Cool containers exposed to flames with water until well after the fire is out.
Specific methods	In the event of fire, cool tanks with water spray. Use water spray to cool unopened containers.

6. Accidental Release Measures

Personal precautions	Keep unnecessary personnel away. Keep upwind. Keep out of low areas. Keep people away from and upwind of spill/leak. Fully encapsulating, vapor protective clothing should be worn for spills and leaks with no fire. Ventilate closed spaces before entering them. Ensure adequate ventilation. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing.
Environmental precautions	Prevent further leakage or spillage if safe to do so. Do not contaminate water.
Methods for containment	ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area). Stop the flow of material, if this is without risk. Dike the spilled material, where this is possible. Prevent entry into waterways, sewer, basements or confined areas.
Methods for cleaning up	Should not be released into the environment. Large Spills: Dike far ahead of spill for later disposal. Neutralize with acid. Use a non-combustible material like vermiculite, sand or earth to soak up the product and place into a container for later disposal. Small Spills: Wipe up with absorbent material (e.g. cloth, fleece). Clean surface thoroughly to remove residual contamination. Following product recovery, flush area with water. Never return spills in original containers for re-use.

7. Handling and Storage

Handling	DO NOT handle, store or open near an open flame, sources of heat or sources of ignition. Protect material from direct sunlight. Do not get this material in contact with eyes. Do not get this material in contact with skin. Do not get this material on clothing. Do not use in areas without adequate ventilation. Wear personal protective equipment. Avoid prolonged exposure. Wash thoroughly after handling. Avoid release to the environment.
Storage	Store locked up. Keep away from heat, sparks and open flame. Store in a well-ventilated place. Keep container tightly closed. Keep away from food, drink and animal feedingstuffs. Keep out of the reach of children.

8. Exposure Controls / Personal Protection

Occupational exposure limits

ACGIH

Components	CAS #	Type	Value	Form
AMMONIA	7664-41-7	STEL	35 ppm	
		TWA	25 ppm	

U.S. - OSHA

Components	CAS #	Type	Value	Form
AMMONIA	7664-41-7	PEL	35 mg/m3	
			50 ppm	
		STEL	27 mg/m3	
			35 ppm	

Engineering controls Ensure adequate ventilation, especially in confined areas.

Personal protective equipment

Respiratory protection In case of insufficient ventilation, wear suitable respiratory equipment. Do not breathe dust/fume/gas/mist/vapors/spray.

Hand protection Chemical resistant gloves.

Eye / face protection Wear chemical goggles. Do not get in eyes.

Skin protection Do not get this material in contact with skin. Do not get this material on clothing. Wear chemical protective equipment that is specifically recommended by the manufacturer. Wear appropriate chemical resistant clothing. Structural firefighters protective clothing provides limited protection in fire situations ONLY; it is not effective in spill situations. Use chemical splash goggles and face shield (ANSI Z87.1 or approved equivalent). Chemical resistant gloves.

General hygeine considerations Do not get in eyes. Do not get this material in contact with skin. Do not get this material on clothing. When using, do not eat, drink or smoke. Wash hands after handling and before eating. Keep away from food and drink. Handle in accordance with good industrial hygiene and safety practice.

General Structural firefighters protective clothing provides limited protection in fire situations ONLY; it is not effective in spill situations.

9. Physical & Chemical Properties

Appearance Clear.

Color Colorless.

Odor Ammoniacal.

Odor threshold Not available.

Physical state Liquid.

Form Liquid.

pH > 11 (1 N solution)

Melting point -97.6 °F (-72 °C)

Freezing point Not available.

Boiling point > 84.2 °F (> 29 °C) readily looses ammonia

Flash point Not available.

Evaporation rate Not available.

Flammability Not available.

Flammability limits in air, upper, % by volume 25 %

Flammability limits in air, lower, % by volume 16 %

Vapor pressure 719 torr (at 27 C)

Vapor density 0.6

Specific gravity	0.9
Relative density	0.9 g/cm3
Solubility (water)	completely miscible
Partition coefficient (n-octanol/water)	Not available.
Auto-ignition temperature	1203.8 °F (651 °C) (ammonia vapor)
Decomposition temperature	Not available.
Percent volatile	100 %
Molecular weight	35.0500 g/mol
Molecular formula	NH4OH

10. Chemical Stability & Reactivity Information

Chemical stability	Stable at ambient temperatures. Ammonia evaporates from opened containers.
Conditions to avoid	This product may react with oxidizing agents. Do not mix with other chemicals. Reacts violently with strong acids. Heat, flames and sparks.
Incompatible materials	Strong oxidizing agents. Acids. Halogens. Silver salts. Do not mix with other chemicals.
Hazardous decomposition products	Ammonia
Possibility of hazardous reactions	Hazardous polymerization does not occur.

11. Toxicological Information

Acute effects Causes burns.

Acute Inhalation: LC 50

AMMONIA	7664-41-7	Mouse 7.105 mg/l 10 min
AMMONIA	7664-41-7	Cat 0.746 mg/l 1 h
AMMONIA	7664-41-7	Cat 7.05 mg/l 1 h
AMMONIA	7664-41-7	Rabbit 7.05 mg/l 1 h
AMMONIA	7664-41-7	Mouse 3.31 mg/l 2 h
AMMONIA	7664-41-7	Rat 5.1 mg/l 1 h
AMMONIA	7664-41-7	Rat 7.6 mg/l 2 h
AMMONIA	7664-41-7	Mouse 3.36 mg/l 1 h

Acute Inhalation: LC L0

AMMONIA	7664-41-7	Rat 1.4 mg/l 1 h
AMMONIA	7664-41-7	Rabbit 4.9 mg/l 1 h
AMMONIA	7664-41-7	Cat 4.9 mg/l 1 h

Acute Oral: LD 50

AMMONIA	7664-41-7	Rat 350 mg/kg

Toxicology data for the preparation

Acute LCL0: 4.83 mg/l, Rat, Inhalation, estimated

Chronic effects	Hazardous by OSHA criteria. Prolonged exposure may cause chronic effects.
Carcinogenicity	This product is not considered to be a carcinogen by IARC, ACGIH, NTP, or OSHA.
Corrosivity	Hazardous by OSHA criteria.
Mutagenicity	Mutagenic effects have been investigated.

12. Ecological Information

Ecotoxicity Components of this product are hazardous to aquatic life. Contains a substance which causes risk of hazardous effects to the environment.

Fish Toxicity: EC 50

AMMONIA	7664-41-7	Killifish (Nothobranchius guentheri) 0.53 - 0.62 mg/l 24 h Static Mortality
AMMONIA	7664-41-7	Red Sea Bream (Pagrus major) 6.6 - 7 mg/l Not reported Mortality

Fish Toxicity: LD 50

AMMONIA	7664-41-7	Bleak (Alburnus alburnus) 29.6 mg/l 48 h Not reported Mortality
AMMONIA	7664-41-7	Rainbow trout,donaldson trout (Oncorhynchus mykiss) 22.2 mg/l 48 h Not reported Mortality
AMMONIA	7664-41-7	Goldfish (Carassius auratus) 69.4 mg/l 48 h Not reported Mortality

Invertebrate Toxicity: EC 50

AMMONIA	7664-41-7	Water flea (Simocephalus vetulus) 8.24 mg/l 24 h Renewal Intoxication
AMMONIA	7664-41-7	Water flea (Daphnia magna) 2.1 mg/l 24 h Renewal Intoxication

Environmental effects An environmental hazard cannot be excluded in the event of unprofessional handling or disposal. Harmful to aquatic organisms.

Persistence and degradability Not available.

13. Disposal Considerations

Waste codes D002: Waste Corrosive material [pH <=2 or =>12.5, or corrosive to steel]

Disposal instructions Dispose of this material and its container to hazardous or special waste collection point. Do not allow this material to drain into sewers/water supplies. Dilute with water, neutralize with HCl, discharge to sewer with lots of water. Dispose in accordance with all applicable regulations.

14. Transport Information

DOT

Basic shipping requirements:

Proper shipping name	Ammonia solutions, relative density between 0.880 and 0.957 at 15 degrees C in water, with more than 10 percent but not more than 35 percent ammonia
Hazard class	8
UN number	UN2672
Packing group	III
Additional information:	
Special provisions	IB3, IP8, T7, TP1
Packaging exceptions	154
Packaging non bulk	203
Packaging bulk	241
ERG number	154

15. Regulatory Information

US federal regulations This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.
All components are on the U.S. EPA TSCA Inventory List.

US EPCRA (SARA Title III) Section 302 - Extremely Hazardous Spill: Reportable quantity

AMMONIA	7664-41-7	100 LBS

US EPCRA (SARA Title III) Section 302 - Extremely Hazardous Substance: Threshold Planning Quantity

AMMONIA	7664-41-7	500 LBS

US EPCRA (SARA Title III) Section 313 - Toxic Chemical: De minimis concentration

AMMONIA	7664-41-7	1.0 %

CERCLA (Superfund) reportable quantity

AMMONIA, ANHYDROUS, BULK LIQUID FOR RIVER STREET: 100.0000

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Hazard categories	Immediate Hazard - Yes Delayed Hazard - Yes Fire Hazard - No Pressure Hazard - No Reactivity Hazard - No
Section 302 extremely hazardous substance	No
Section 311 hazardous chemical	Yes

Inventory status

Country(s) or region	Inventory name	On inventory (yes/no)*
Australia	Australian Inventory of Chemical Substances (AICS)	Yes
Canada	Domestic Substances List (DSL)	Yes
Canada	Non-Domestic Substances List (NDSL)	No
China	Inventory of Existing Chemical Substances in China (IECSC)	Yes
Europe	European Inventory of New and Existing Chemicals (EINECS)	Yes
Europe	European List of Notified Chemical Substances (ELINCS)	No
Japan	Inventory of Existing and New Chemical Substances (ENCS)	Yes
Korea	Existing Chemicals List (ECL)	Yes
New Zealand	New Zealand Inventory	No
Philippines	Philippine Inventory of Chemicals and Chemical Substances (PICCS)	Yes
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

A "Yes" indicates that all components of this product comply with the inventory requirements administered by the governing country(s)

State regulations This product does not contain a chemical known to the State of California to cause cancer, birth defects or other reproductive harm.

US - New Jersey Community RTK (EHS Survey): Reportable threshold

AMMONIA	7664-41-7	500 LBS

US - Pennsylvania RTK - Hazardous Substances: Listed substance

AMMONIA	7664-41-7	Listed.

16. Other Information

Further information	HMIS® is a registered trade and service mark of the NPCA.
HMIS® ratings	Health: 3* Flammability: 1 Physical hazard: 1
NFPA ratings	Health: 3 Flammability: 1 Instability: 1
Disclaimer	The information in the sheet was written based on the best knowledge and experience currently available. The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.
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This data sheet contains changes from the previous version in section(s):	This document has undergone significant changes and should be reviewed in its entirety.