1. PRODUCT AND COMPANY IDENTIFICATION

Product Name: Ammonium hydroxide
Synonyms: Ammonia solution; Ammonia water; Ammonium hydrate
Recommended Use: Laboratory chemicals

2. HAZARDS IDENTIFICATION

DANGER!

Emergency Overview
Causes burns by all exposure routes. Very toxic to aquatic organisms.

Appearance: Colorless
Physical State: Liquid
Odor: Ammonia-like

Target Organs: Skin, Respiratory system, Eyes, Gastrointestinal tract (GI)

Potential Health Effects

Acute Effects

Principle Routes of Exposure

- Eyes: Causes burns.
- Skin: Causes burns. May be harmful in contact with skin.
- Inhalation: Causes burns. May be harmful if inhaled.
- Ingestion: Causes burns. May be harmful if swallowed.

Chronic Effects: None known.

See Section 11 for additional Toxicological information.

Aggravated Medical Conditions: No information available.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Haz/Non-haz
4. FIRST AID MEASURES

Eye Contact
Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Immediate medical attention is required.

Skin Contact
Wash off immediately with plenty of water for at least 15 minutes. Immediate medical attention is required.

Inhalation
Move to fresh air. If breathing is difficult, give oxygen. Do not use mouth-to-mouth resuscitation if victim ingested or inhaled the substance; induce artificial respiration with a respiratory medical device. Immediate medical attention is required.

Ingestion
Do not induce vomiting. Call a physician or Poison Control Center immediately.

Notes to Physician
Treat symptomatically.

5. FIRE-FIGHTING MEASURES

Flash Point
No information available.

Method -
No information available.

Autoignition Temperature
651°C / 1203.8°F

Explosion Limits
Upper
No data available

Lower
No data available

Suitable Extinguishing Media
CO₂, dry chemical, dry sand, alcohol-resistant foam. Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Unsuitable Extinguishing Media
No information available.

Hazardous Combustion Products
No information available.

Sensitivity to mechanical impact
No information available.

Sensitivity to static discharge
No information available.

Specific Hazards Arising from the Chemical
Keep product and empty container away from heat and sources of ignition

Protective Equipment and Precautions for Firefighters
As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear. Thermal decomposition can lead to release of irritating gases and vapors.

NFPA
Health 3 Flammability 1 Instability 0 Physical hazards N/A

6. ACCIDENTAL RELEASE MEASURES

Personal Precautions
Ensure adequate ventilation. Use personal protective equipment. Keep people away from and upwind of spill/leak. Evacuate personnel to safe areas. Avoid contact with skin, eyes and inhalation of vapors.

Environmental Precautions
Should not be released into the environment. Keep out of waterways.
Soak up with inert absorbent material. Keep in suitable, closed containers for disposal.

7. HANDLING AND STORAGE

Handling
Use only under a chemical fume hood. Wear personal protective equipment. Do not get in eyes, on skin, or on clothing. Do not breathe vapors/dust. Do not ingest.

Storage
Keep containers tightly closed in a dry, cool and well-ventilated place. Corrosives area.

8. EXPOSURE CONTROLS/PERSOAL PROTECTION

Engineering Measures
Use only under a chemical fume hood. Ensure that eyewash stations and safety showers are close to the workstation location.

Exposure Guidelines
This product does not contain any hazardous materials with occupational exposure limits established by the region specific regulatory bodies.

Personal Protective Equipment

Eye/face Protection
Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA’s eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin and body protection
Wear appropriate protective gloves and clothing to prevent skin exposure.

Respiratory Protection
Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State
Liquid

Appearance
Colorless

Odor
Ammonia-like

Odor Threshold
No information available.

pH
12

Vapor Pressure
500 hPa @ 20 °C

Vapor Density
0.59 (Air = 1.0)

Viscosity
No information available.

Boiling Point/Range
38°C / 100.4°F

Melting Point/Range
-57°C / -70.6°F

Decomposition temperature
No information available.

Flash Point
No information available.

Evaporation Rate
No information available.

Specific Gravity
0.88-0.91

Solubility
Soluble in water

log Pow
No data available

Molecular Weight
35.05

Molecular Formula
H5 N O

10. STABILITY AND REACTIVITY

Stability
Stable under normal conditions.

Conditions to Avoid
Incompatible products. Excess heat.

Incompatible Materials
Strong oxidizing agents, Metals, Acids, Fluorine, Halogens

Hazardous Decomposition Products
Nitrogen oxides (NOx)
Hazardous Polymerization
Hazardous polymerization does not occur.

Hazardous Reactions
None under normal processing.

**11. TOXICOLOGICAL INFORMATION**

**Acute Toxicity**

Product Information
See actual entry in RTECS for complete information.

<table>
<thead>
<tr>
<th>Component Information</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Component</th>
<th>LD50 Oral</th>
<th>LD50 Dermal</th>
<th>LC50 Inhalation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ammonium hydroxide</td>
<td>350 mg/kg (Rat)</td>
<td>Not listed</td>
<td>Not listed</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Irritation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Causes burns by all exposure routes</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Toxicologically Synergistic Products</th>
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</thead>
<tbody>
<tr>
<td>No information available.</td>
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</tbody>
</table>

**Chronic Toxicity**

<table>
<thead>
<tr>
<th>Carcinogenicity</th>
</tr>
</thead>
<tbody>
<tr>
<td>There are no known carcinogenic chemicals in this product</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sensitization</th>
</tr>
</thead>
<tbody>
<tr>
<td>No information available.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Mutagenic Effects</th>
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<tbody>
<tr>
<td>No information available.</td>
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<table>
<thead>
<tr>
<th>Reproductive Effects</th>
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<tr>
<th>Developmental Effects</th>
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</thead>
<tbody>
<tr>
<td>No information available.</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Teratogenicity</th>
</tr>
</thead>
<tbody>
<tr>
<td>No information available.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Other Adverse Effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>See actual entry in RTECS for complete information.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Endocrine Disruptor Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>No information available.</td>
</tr>
</tbody>
</table>

**12. ECOLOGICAL INFORMATION**

**Ecotoxicity**
Do not empty into drains.

<table>
<thead>
<tr>
<th>Component</th>
<th>Freshwater Algae</th>
<th>Freshwater Fish</th>
<th>Microtox</th>
<th>Water Flea</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ammonium hydroxide</td>
<td>Not listed</td>
<td>0.53 mg/l LC50 96 h 0.75 - 3.4 mg/l LC50 96 h 8.2 mg/L LC50 96 h</td>
<td>Not listed</td>
<td>0.66 mg/L EC50 = 48 h</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Persistence and Degradability</th>
</tr>
</thead>
<tbody>
<tr>
<td>No information available</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Bioaccumulation/ Accumulation</th>
</tr>
</thead>
<tbody>
<tr>
<td>No information available</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Mobility</th>
</tr>
</thead>
<tbody>
<tr>
<td>No information available</td>
</tr>
</tbody>
</table>
13. DISPOSAL CONSIDERATIONS

Waste Disposal Methods
Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

14. TRANSPORT INFORMATION

DOT

UN-No: UN2672  
Proper Shipping Name: AMMONIA SOLUTIONS  
Hazard Class: 8  
Packing Group: III

TDG

UN-No: UN2672  
Proper Shipping Name: AMMONIA SOLUTIONS  
Hazard Class: 8  
Packing Group: III

IATA

UN-No: 2672  
Proper Shipping Name: AMMONIA SOLUTION  
Hazard Class: 8  
Packing Group: III

IMDG/IMO

UN-No: 2672  
Proper Shipping Name: AMMONIA SOLUTION  
Hazard Class: 8  
Packing Group: III

15. REGULATORY INFORMATION

International Inventories

<table>
<thead>
<tr>
<th>Component</th>
<th>TSCA</th>
<th>DSL</th>
<th>NDSL</th>
<th>EINECS</th>
<th>ELINCS</th>
<th>NLP</th>
<th>PICCS</th>
<th>ENCS</th>
<th>AICS</th>
<th>CHINA</th>
<th>KECL</th>
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</thead>
<tbody>
<tr>
<td>Water</td>
<td>X</td>
<td>X</td>
<td>-</td>
<td>231-791-2</td>
<td>-</td>
<td>X</td>
<td>-</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Ammonium hydroxide</td>
<td>X</td>
<td>X</td>
<td>-</td>
<td>215-647-6</td>
<td>-</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
</tbody>
</table>

Legend:

X - Listed
E - Indicates a substance that is the subject of a Section 5(e) Consent order under TSCA.
F - Indicates a substance that is the subject of a Section 5(f) Rule under TSCA.
N - Indicates a polymeric substance containing no free-radical initiator in its inventory name but is considered to cover the designated polymer made with any free-radical initiator regardless of the amount used.
P - Indicates a commenced PMN substance
R - Indicates a substance that is the subject of a Section 6 risk management rule under TSCA.
S - Indicates a substance that is identified in a proposed or final Significant New Use Rule
T - Indicates a substance that is the subject of a Section 4 test rule under TSCA.
XU - Indicates a substance exempt from reporting under the Inventory Update Rule, i.e. Partial Updating of the TSCA Inventory Data Base Production and Site Reports (40 CFR 710(B).
Y1 - Indicates an exempt polymer that has a number-average molecular weight of 1,000 or greater.
Y2 - Indicates an exempt polymer that is a polyester and is made only from reactants included in a specified list of low concern reactants that comprises one of the eligibility criteria for the exemption rule.

U.S. Federal Regulations

TSCA 12(b) Not applicable

SARA 313

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS-No</th>
<th>Weight %</th>
<th>SARA 313 - Threshold Values %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ammonium hydroxide</td>
<td>1336-21-6</td>
<td>25-30</td>
<td>1.0</td>
</tr>
</tbody>
</table>

SARA 311/312 Hazardous Categorization

- Acute Health Hazard: Yes
- Chronic Health Hazard: No
- Fire Hazard: No
- Sudden Release of Pressure Hazard: No
- Reactive Hazard: No

Clean Water Act

<table>
<thead>
<tr>
<th>Component</th>
<th>CWA - Hazardous Substances</th>
<th>CWA - Reportable Quantities</th>
<th>CWA - Toxic Pollutants</th>
<th>CWA - Priority Pollutants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water</td>
<td></td>
<td>1 LB</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Ammonium hydroxide</td>
<td>X</td>
<td>1000 lb</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Clean Air Act

Not applicable

OSHA Occupational Safety and Health Administration

Not applicable

CERCLA

This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302)

<table>
<thead>
<tr>
<th>Component</th>
<th>Hazardous Substances RQs</th>
<th>CERCLA EHS RQs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ammonium hydroxide</td>
<td>1000 lb</td>
<td>-</td>
</tr>
</tbody>
</table>

California Proposition 65

This product does not contain any Proposition 65 chemicals.

State Right-to-Know

<table>
<thead>
<tr>
<th>Component</th>
<th>Massachusetts</th>
<th>New Jersey</th>
<th>Pennsylvania</th>
<th>Illinois</th>
<th>Rhode Island</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ammonium hydroxide</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

U.S. Department of Transportation

Reportable Quantity (RQ): Y
DOT Marine Pollutant: N
DOT Severe Marine Pollutant: N
U.S. Department of Homeland Security
This product does not contain any DHS chemicals.

Other International Regulations

Mexico - Grade
No information available

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

WHMIS Hazard Class
E  Corrosive material

16. OTHER INFORMATION

Prepared By
Regulatory Affairs
Thermo Fisher Scientific
Email: EMSDS.RA@thermofisher.com

Creation Date
23-Nov-2009

Print Date
06-Aug-2013

Revision Summary
(M)SDS sections updated, 3.

Disclaimer
The information provided on 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 guide for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered as 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 material or in any process, unless specified in the text.

End of MSDS