Material Safety Data Sheet

### Section 1. Chemical Product and Company Identification

<table>
<thead>
<tr>
<th>Common Name/Trade Name</th>
<th>Ammonium Chloride-Ammonium Hydroxide TS</th>
</tr>
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<tbody>
<tr>
<td>Manufacturer</td>
<td>SPECTRUM LABORATORY PRODUCTS INC. 14422 S. SAN PEDRO STREET GARDENA, CA 90248</td>
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<tr>
<td>Commercial Name(s)</td>
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<tr>
<td>Synonym</td>
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<tr>
<td>Chemical Name</td>
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<tr>
<td>Chemical Family</td>
<td>(Alkali,)</td>
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<tr>
<td>Chemical Formula</td>
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<tr>
<td>Supplier</td>
<td>SPECTRUM LABORATORY PRODUCTS INC. 14422 S. SAN PEDRO STREET GARDENA, CA 90248</td>
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<tr>
<td>Catalog Number(s)</td>
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<tr>
<td>CAS#</td>
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<tr>
<td>RTECS</td>
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<td>TSCA</td>
<td>TSCA 8(b) inventory: Ammonium hydroxide; Ammonium chloride; Water</td>
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<td>CI#</td>
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**NFPA**

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<tr>
<th>Health Hazard</th>
<th>Fire Hazard</th>
<th>Reactivity</th>
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<tbody>
<tr>
<td>2</td>
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<td>0</td>
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**HMIS**

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**Personal Protective Equipment**

See Section 15.

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**Section 2. Composition and Information on Ingredients**

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<tr>
<th>Name</th>
<th>CAS #</th>
<th>TWA (mg/m³)</th>
<th>STEL (mg/m³)</th>
<th>CEIL (mg/m³)</th>
<th>% by Weight</th>
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<tr>
<td>1) Ammonia, anhydrous</td>
<td>7664-41-7</td>
<td>50</td>
<td>35</td>
<td></td>
<td>13.5-15.5</td>
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<tr>
<td>2) Water</td>
<td>7732-18-5</td>
<td>10</td>
<td>20</td>
<td></td>
<td>54.5-56.5</td>
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<tr>
<td>3) Ammonium chloride</td>
<td>12125-02-9</td>
<td>50</td>
<td>35</td>
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</table>

**Toxicological Data on Ingredients**

- **Ammonia, anhydrous:**
  - GAS (LC50): Acute: 2000 ppm 4 hours [Rat]. 4230 ppm 1 hours [Mouse].
- **Ammonium chloride:**
  - ORAL (LD50): Acute: 1650 mg/kg [Rat]. 1300 mg/kg [Mouse].

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**Section 3. Hazards Identification**

**Potential Acute Health Effects**

Very hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion. Hazardous in case of skin contact (corrosive), of eye contact (corrosive). 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.

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Continued on Next Page
Ammonium Chloride-Ammonium Hydroxide TS

Potential Chronic Health Effects
Slightly hazardous in case of skin contact (sensitizer).

CARCINOGENIC EFFECTS: Not available.
MUTAGENIC EFFECTS: Mutagenic for bacteria and/or yeast. [Ammonia, anhydrous].
TERATOGENIC EFFECTS: Not available.
DEVELOPMENTAL TOXICITY: Not available.
The substance may be toxic to lungs, mucous membranes, 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 to a highly toxic material may produce general deterioration of health by an accumulation in one or many human organs.

Section 4. 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.

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 immediate medical attention.

Ingestion
Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If large quantities of this material are swallowed, call a physician immediately. Loosen tight clothing such as a collar, tie, belt or waistband.

Serious Ingestion
Not available.

Section 5. Fire and Explosion Data

Flammability of the Product
Non-flammable.

Auto-Ignition Temperature
Not applicable.

Flash Points
Not applicable.

Flammable Limits
Not applicable.

Products of Combustion
Not available.

Fire Hazards in Presence of Various Substances
Not applicable.

Explosion Hazards in Presence of Various Substances
Non-explosive in presence of open flames and sparks, of shocks.

Fire Fighting Media and Instructions
Not applicable.

Special Remarks on Fire Hazards
Not available.

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A sudden increase in temperature and pressure preceded a violent explosion when heating 1-chloro-2,4-dinitrobenzene and ammonia in a direct fired autoclave. Reaction with liquid ammonia and chlorine azide gives an explosive yellow liquid. Liquid ammonia + 1.2 dichloroethane may explode. Passing ammonia gas over magnesium perchlorate dessicant causes intensive drying of ammonia gas which leads to an exotherm, followed by a violent explosion. Ammonia is capable of reacting with some heavy metal compounds (gold, silver, mercury) to produce materials, some of uncertain constitution, which may explode violently when dry. Action of ammonia or ammonium salts on gold (III) chloride, oxide or other salts under a variety of conditions gives explosive or "fulminating" gold. Halogens or interhalogens + ammonia either reacts violently or produces explosive products. Ammonia + nitrogen trichloride produces endothermic and explosive nitrogen trichloride. Reaction of ammonia + selenium difluoride dioxide is violent and many of the products and derivatives are both shock and heat sensitive explosives. These include ammonium, potassium silver and thallium salts of the "triselenimidate" ion. Violent explosions with ammonia + nitrogen oxide can occur in ammonia synthesis gas units. Liquid ammonia + solid dinitrogen tetraoxide reacts explosively. Oxygen + Platinium: oxidation of ammonia to nitric acid over platinium catalysts, substituion of oxygen for air causes fairly vigorous explosions. Thiocarbonyl azid thiocyanate reacts explosively with ammonia gas. Thiotrichiazyl chloride will rapidly absorb ammonia gas and then explode. Tetramethylammonium amide decomposes explosively at ambient temp. in presence of ammonia. Liquid ammonia + tellurium tetrachloride at -15 C forms tellurium nitride which explodes at 200 C. Ammonia + tellurium tetraboride gives a mixture of tritellurium tetramidride and tellurium bromide nitride, which explodes on heating. Liquid ammonia + ethylene oxide causes violent polymerization and a vapor cloud explosion. Ammonia + picric acid forms explosive salts. (Ammonia, anhydrous) Forms explosive compounds with many heavy metals such as silver, lead, zinc and their halide salts. It can form shock sensitive compounds with halogens, mercury oxide, and silver oxide. (Ammonium Hydroxide) Explosive reaction between bromine trifluoride and ammonium halides. (Ammonium Chloride)
**Section 9. Physical and Chemical Properties**

**Physical state and appearance**
- Liquid.

**Molecular Weight**
- Not applicable.

**pH (1% soln/water)**
- Basic.

**Boiling Point**
- The lowest known value is 100°C (212°F) (Water).

**Melting Point**
- Not available.

**Critical Temperature**
- Not available.

**Specific Gravity**
- Weighted average: 1.06 (Water = 1)

**Vapor Pressure**
- The highest known value is 2.3 kPa (@ 20°C) (Water).

**Vapor Density**
- The highest known value is 0.62 (Air = 1) (Water).

**Odor**
- Ammonia-like

**Taste**
- Acrid.

**Color**
- Colorless.

**Solubility**
- Easily soluble in cold water, hot water. Soluble in methanol, diethyl ether. Insoluble in acetone.

**Section 10. Stability and Reactivity Data**

**Stability**
- The product is stable.

**Instability Temperature**
- Not available.

**Conditions of Instability**
- Incompatible materials

**Incompatibility with various substances**
- Reactive with oxidizing agents, acids. Slightly reactive to reactive with metals, alkalis.

**Corrosivity**
- Not available

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Ammonium Chloride-Ammonium Hydroxide TS

Special Remarks on Reactivity

Halogens, salts of silver and zinc, air and hydrocarbons, calcium, 1-chloro-2,4-dinitrobenzene, chloroformamidinium nitrate, 2-chloronitrobenzene, chlorine azide, magnesium perchlorate, halogens or interhalogens, iodine, potassium, nitrogen trichloride, potassium chloride, nitryl chloride, chromium trioxide, trioxyn difluoride, selenium difluoride dioxide, nitric acid, hydrogen peroxide, nitrogen oxide, dinitrogen tetraoxide, oxygen, platinium, silver chloride, thiocarbonyl azide thiocyanate, sulfinyl chloride, thiotrithiazyl chloride, tetramethylammonium amide, tellurium tetrachloride, tellurium tetraesium, silver (I) oxide, dichlorine oxide, silver nitrate, ethylene oxide, acetaldehyde, acrolein, boron boron trioxide, bromine, bromine pentfluoride, fluorine, chloric acid, chlorine monoxide, chlorine trifluoride, chlorites, chlorosilane, chromic anhydride, ethylene dichloride, hydrogen bromide, hydrochloric acid, nitrogen peroxide, fluorine, some heavy metals (gold, silver, mercury), hexachloromelamine, hydrazine, alkal metals, nitrogen trifluoride, oxygen difluoride, phosphorus trichloride, potassium and arsenic, potassium and phosphine, potassium and sodium nitrite, selenium dioxide, tetramethylammonium amide, tellurium hydropentachloride, trichloromelamine, (Ammonia, anhydrous)

Halogens, salts of silver and zinc, air and hydrocarbons, calcium, 1-chloro-2,4-dinitrobenzene, chloroformamidinium nitrate, 2-chloronitrobenzene, chlorine azide, magnesium perchlorate, halogens or interhalogens, iodine, potassium, nitrogen trichloride, potassium chloride, nitryl chloride, chromium trioxide, trioxyn difluoride, selenium difluoride dioxide, nitric acid, hydrogen peroxide, nitrogen oxide, dinitrogen tetraoxide, oxygen, platinium, silver chloride, thiocarbonyl azide thiocyanate, sulf nyl chloride, thiotrithiazyl chloride, tetramethylammonium amide, tellurium tetrachloride, tellurium tetraesium, silver (I) oxide, dichlorine oxide, silver nitrate, ethylene oxide, acetaldehyde, acrolein, boron boron trioxide, bromine, bromine pentfluoride, fluorine, chloric acid, chlorine monoxide, chlorine trifluoride, chlorites, chlorosilane, chromic anhydride, ethylene dichloride, hydrogen bromide, hydrochloric acid, nitrogen peroxide, fluorine, some heavy metals (gold, silver, mercury), hexachloromelamine, hydrazine, alkal metals, nitrogen trifluoride, oxygen difluoride, phosphorus trichloride, potassium and arsenic, potassium and phosphine, potassium and sodium nitrite, selenium dioxide, tetramethylammonium amide, tellurium hydropentachloride, trichloromelamine, (Ammonia, anhydrous)

 Organic acids, amides, organic anhydrides, isocyanates, vinyl acetate, epichlorhydrin, aldehydes, Acrylic acid, chlorosulfonic acid, dimethyl sulfate, fluorine, gold + aqua regia, hydrochloric acid, hydrofluoric acid, hydrogen peroxide, iodine, nitric acid, oleum, propiolactone, propylene oxide, silver nitrate, silver oxide + ethyl alcohol, nitromethane, silver permanganate, sulfuric acid, gold, mercury, and halide salts. Forms explosive compounds with many heavy metals (silver, lead, zinc) (Ammonium Hydroxide)

Incompatible with lead and silver salts. It can react violently with ammonium nitrate and potassium chlorate. Also incompatible with bromine trifluoride, ammonium halides, bromine pentfluoride, alkalies and their carbonates. At fire temperature, ammonium chloride may dissociate into ammonia and hydrogen chloride. (Ammonium Chloride)

Special Remarks on Corrosivity

Not available

Polymerization

Will not occur.

Section 11. Toxicological Information

Routes of Entry

Absorbed through skin. Eye contact. Inhalation. Ingestion.

Toxicity to Animals

Acute oral toxicity (LD50): 1300 mg/kg [Mouse]. (Ammonium chloride).

Acute oral toxicity (LD50): 350 mg/kg [Rat]. (Ammonium Hydroxide).

Chronic Effects on Humans

MUTAGENIC EFFECTS: Mutagenic for bacteria and/or yeast. [Ammonia, anhydrous].

Contains material which may cause damage to the following organs: lungs, mucous membranes, upper respiratory tract, skin, eyes.

Other Toxic Effects on Humans

Very hazardous in case of skin contact (irritant), of ingestion.

Hazardous in case of skin contact (corrosive), of eye contact (corrosive), of inhalation.

Special Remarks on Toxicity to Animals

Lowest Published Lethal Dose

LCL [Human] - Route: Inhalation; Dose: 5000 ppm/5M (Ammonia, anhydrous)

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)
### Acute Potential Health Effects:

**Skin:** Causes severe irritation. Causes skin burns. May cause deep, penetrating ulcers of the skin. Contact with skin may cause staining, inflammation, and thickening of the skin.

**Eye:** Contact with liquid or vapor causes severe burns and possible irreversible eye damage including corneal injury and cataracts.

**Inhalation:** Causes severe irritation of the upper respiratory tract with coughing, burns, breathing difficulty. May cause acute pulmonary edema, pneumoconiosis, fibrosis, and even coma. It is a respiratory stimulant when inhaled at lower concentrations. It may also affect behavior/central nervous system (convulsions, seizures, somnolence, confusion, drowsiness, tremor, ataxia, tremor), cardiovascular system (increase in blood pressure and pulse rate).

**Ingestion:** Harmful if swallowed. Affects the Gastrointestinal tract (burns, swelling of the lips, mouth, and larynx, throat constriction, nausea, vomiting, thirst, convulsions, shock, and may cause severe and permanent damage), liver, and urinary system (kidneys). May affect behavior (convulsions, seizures, somnolence, confusion, drowsiness, tremor, ataxia, excitement), eyes (Mydriasis), cardiovascular system (bradycardia), respiration (respiratory stimulation, apnea, hyperventilation, pulmonary edema). May cause serious metabolic acidosis with hypokalemia. Transient hyperglycemia and glycosuria may also occur.

### Chronic Potential Health Effects:

**Ingestion:** May cause effects similar to those of acute ingestion. It may also affect metabolism (anorexia, metabolic acidosis)

**Inhalation:** Repeated exposure to low concentrations may cause bronchitis or bronchospasm (asthma) with cough, phlegm, and/or shortness of breath. May also cause liver and kidney damage, and affect the brain, and blood.

**Eye:** May cause corneal damage and the development of cataracts and glaucoma.

**Skin:** Repeated skin contact to low concentrations may cause dryness, itching, and redness (dermatitis).

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### Section 12. Ecological Information

**Ecotoxicity**
Not available.

**BOD5 and COD**
Not available.

**Products of Biodegradation**
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

**Toxicity of the Products of Biodegradation**
The products of degradation are less toxic than the product itself.

**Special Remarks on the Products of Biodegradation**
Not available.

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### Section 13. Disposal Considerations

**Waste Disposal**
Waste must be disposed of in accordance with federal, state and local environmental control regulations.

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### Section 14. Transport Information

**DOT Classification**
Class 8: Corrosive material

**Identification**
: Ammonia Solution  UNNA: 2672  PG: III

**Special Provisions for Transport**
Not available.

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**DOT (Pictograms)**

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Section 15. Other Regulatory Information and Pictograms

Federal and State Regulations
- Connecticut hazardous material survey: Ammonium hydroxide
- Illinois toxic substances disclosure to employee act: Ammonium hydroxide; Ammonium chloride
- Illinois chemical safety act: Ammonium hydroxide; Ammonium chloride
- New York release reporting list: Ammonium hydroxide; Ammonium chloride
- Rhode Island RTK hazardous substances: Ammonium chloride
- Pennsylvania RTK: Ammonium hydroxide; Ammonium chloride
- Minnesota: Ammonium chloride
- Massachusetts RTK: Ammonium hydroxide; Ammonium chloride
- Massachusetts spill list: Ammonium hydroxide; Ammonium chloride
- New Jersey: Ammonium hydroxide; Ammonium chloride
- New Jersey spill list: Ammonium hydroxide; Ammonium chloride
- New Jersey toxic catastrophe prevention act: Ammonium hydroxide
- Louisiana spill reporting: Ammonium hydroxide; Ammonium chloride
- California Director's List of Hazardous Substances: Ammonium Hydroxide (Ammonia); Ammonium Chloride
- TSCA 8(b) inventory: Ammonium hydroxide; Ammonium chloride; Water
- CERCLA: Hazardous substances: Ammonium hydroxide: 1000 lbs. (453.6 kg); Ammonium chloride: 5000 lbs. (2268 kg);

California Proposition 65 Warnings
- California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer which would require a warning under the statute: No products were found.
- California prop. 65: This product contains the following ingredients for which the State of California has found to cause birth defects which would require a warning under the statute: No products were found.

Other Regulations

Other Classifications
- WHMIS (Canada) CLASS E: Corrosive liquid.
- Health Hazard 3
- Fire Hazard 0
- Reactivity 0
- Personal Protection
- National Fire Protection Association (U.S.A.)
- Health 2
- Flammability 0
- Reactivity 0
- Specific hazard

WHMIS (Canada) (Pictograms)

DSCL (EEC) (Pictograms)

TDG (Canada) (Pictograms)

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**Protective Equipment**

- Gloves.
- Full suit.
- Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate.
- Face shield.

**Section 16. Other Information**

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<th>MSDS Code</th>
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<tbody>
<tr>
<td>References</td>
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<tr>
<td>Other Special Considerations</td>
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Verified by Sonia Owen.  

CALL (310) 516-8000

**Notice to Reader**

All chemicals may pose unknown hazards and should be used with caution. This Material Safety Data Sheet (MSDS) applies only to the material as packaged. If this product is combined with other materials, deteriorates, or becomes contaminated, it may pose hazards not mentioned in this MSDS. It shall be the user's responsibility to develop proper methods of handling and personal protection based on the actual conditions of use. While this MSDS is based on technical data judged to be reliable, Spectrum Quality Products, Inc. assumes no responsibility for the completeness or accuracy of the information contained herein.