

MATERIAL SAFETY DATA SHEET



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AMMONIUM HYDROXIDE

MSDS No. M0011

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Name: Ammonium Hydroxide

Product Catalog Number(s): AE4016, AE4017, AR0147

Synonyms:

Chemical Formula: NH₄OH

Molecular Weight: 38.04

Recommended Use: This product is recommended for laboratory and manufacturing use only. It is not recommended for drug, food or household use.

2. COMPOSITION AND INFORMATION ON INGREDIENTS

| <u>Ingredient</u> | <u>CAS No</u> | <u>Percent</u> | <u>Hazardous</u> |
|--------------------|---------------|----------------|------------------|
| Ammonium Hydroxide | 1336-21-6 | 21-72% | Yes |
| Water | 7732-18-5 | 28-79% | No |

3. HAZARDS IDENTIFICATION

DANGER! CORROSIVE. CAUSES BURNS BY ALL EXPOSURE ROUTES. TOXIC IF INHALED. HARMFUL IF SWALLOWED. MAY CAUSE PULMONARY EDEMA. VERY TOXIC TO AQUATIC ORGANISMS.



Acute Exposure Hazards:

Inhalation Hazard: Causes chemical burns to the respiratory tract. Toxic if inhaled. May produce cardiac failure and pulmonary edema. May cause central nervous system effects.

Ingestion Hazard: Harmful if swallowed. Causes gastrointestinal tract burns. Causes throat constriction, vomiting, convulsions, and shock.

Skin Contact Hazard: Causes skin burns. Harmful if absorbed through the skin.

Eye Contact Hazard: Causes eye burns. Increases the flow of tears.

Chronic Exposure Hazards: May cause liver and kidney damage. Laboratory experiments have resulted in mutagenic effects. Chronic exposure may cause blood effects. Animal studies have reported the development of tumors.

HMIS Rating:

Health – 3 Flammability – 0 Physical Hazard – 1 PPE – User supplied

NOTE: HMIS ratings use a numbering scale that ranges from 0 - 4 to indicate the degree of hazard. A value of zero means the chemical presents no hazard while a value of four indicates a high hazard. These ratings are based on the inherent properties of this chemical under expected conditions of normal use and are not intended to be used in emergency situations. PPE is determined by the user based on their needs and conditions.

4. FIRST-AID MEASURES

Inhalation: Remove from exposure and move to fresh air immediately. If breathing is difficult, give oxygen. SPEED IS ESSENTIAL, OBTAIN MEDICAL AID IMMEDIATELY. Do not use mouth-to-mouth resuscitation if victim ingested or 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.

Ingestion: Do not induce vomiting. If vomiting occurs naturally, have person lean forward. Get medical aid immediately. Call poison control center.

Skin Contact: Immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention immediately.

Eye Contact: Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

Notes to Physician: Treat symptomatically and supportively.

5. FIRE FIGHTING MEASURES

Flammability: Not expected to be a fire hazard

Auto-ignition Temperature: Not available.

Flash Point: Not available.

Flammable Limits: Not available.

Products of Combustion: Will decompose into toxic and irritating gases (nitrogen oxides – NO_x and ammonia – NH₃) under fire conditions.

Specific Fire Hazards: As in any fire, always wear self-contained breathing apparatus in pressure-demand (MSA/NIOSH approved or equivalent), and full protective gear. Approach fire from upwind to avoid hazardous vapors and toxic decomposition products. Use water spray to keep fire-exposed containers cool. Contact with metals may evolve flammable hydrogen gas. Containers may explode when heated.

Specific Explosion Hazards: Ammonium hydroxide itself is non-combustible. However concentrated ammonia solutions may give off ammonia vapors. Ammonia gas is generally not considered a serious fire or explosion hazard because ammonia/air mixtures are difficult to ignite. A relatively high concentration of ammonia gas must be present in order for ignition to occur. However, a large and intense energy source may cause ignition and/or explosion in a confined space.

Fire Fighting Media: Use water, dry chemical, chemical foam, or alcohol resistant foam.

National Fire Protective Association: Health - 3, Flammability - 0, Reactivity - 0

NOTE: NFPA ratings use a numbering scale that ranges from 0 - 4 to indicate the degree of hazard. A value of zero means the chemical presents no hazard while a value of four indicates a high hazard. They are for use by emergency personnel to address the hazards that are presented by short term, acute exposure to this product under fire, spill, or similar emergencies. Ratings involve data and interpretations that may vary from company to company.

6. ACCIDENTAL RELEASE MEASURES

Absorb spill with inert material (e.g. vermiculite, sand or earth), then place in suitable container. Wear a self contained breathing apparatus and appropriate personal protection as described in Section 8. Provide ventilation. Evacuate unnecessary personnel. Do not let this chemical enter the environment.

7. HANDLING AND STORAGE

Precautions: Always use proper personal protective equipment as described in section 8. Do not get in eyes, on skin, or on clothing. Do not ingest or inhale. Use only in a chemical fume hood.

Storage: Keep in a tightly closed container. Store in a cool, dry, well-ventilated area away from incompatible substances. Do not store in direct sunlight. Store in corrosives area.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls: Use adequate general or local exhaust ventilation to keep airborne concentrations below the permissible exposure limits. Use only under a chemical fume hood.

Personal Protection: Wear protective chemical goggles or appropriate eye protection. Use appropriate protective gloves and protective clothing to prevent skin exposure. A respiratory protection program that meets OSHA 29 CFR 1910.134 and ANSI Z88.2 requirements or European Standard EN 149 must be followed whenever possible. Always use a NIOSH or European Standard EN 149 approved respirator when necessary.

Exposure Limits (Ammonia):

ACGIH: 25 ppm TWA; 35 ppm STEL

NIOSH: 25 ppm TWA; 18 mg/m³ TWA 300 ppm IDLH

OSHA Final PEL: 50 ppm TWA; 35 mg/m³ TWA

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State and Appearance: Clear, colorless liquid.

Odor: Strong ammonia-like odor

Odor Threshold: 50 ppm.

Taste: Not available

Molecular Formula: NH₄OH

Molecular Weight: 38.04

pH: 13.6.

Boiling Point: 27° C.

Freezing/Melting Point: -69° C

Decomposition Temperature: Not available

Specific Gravity: 0.89

Vapor Density (Air=1): 0.59.

Vapor Pressure: 557 mm Hg @ 21 deg C.

Viscosity: Not available.

Solubility: Soluble

10. STABILITY AND REACTIVITY

Stability: Stable under normal temperatures and pressures.

Conditions to Avoid: Incompatible materials, excess heat, confined spaces.

Incompatibility With Various Substances: Strong oxidizing agents, acids, acrolein, halogens, mercury, hypochlorite, silver nitrate, acrylic acid, dimethyl sulfate, silver oxide.

Hazardous Decomposition Products: Nitrogen oxides (NO_x) and ammonia (NH₃).

Hazardous Polymerization: Will not occur.

11. TOXICOLOGICAL INFORMATION

Routes of Entry: Inhalation, ingestion, skin contact

Animal Toxicity (Ammonium Hydroxide):

Draize test, rabbit, eye: 250 ug Severe;

Draize test, rabbit, eye: 44 ug Severe;

Oral, rat: LD50 = 350 mg/kg;

Animal Toxicity (Ammonia - CAS# 7664-41-7):

Inhalation, mouse: LC50 = 4230 ppm/1H;

Inhalation, mouse: LC50 = 4600 mg/m³/2H;

Inhalation, rabbit: LC50 = 7 gm/m³/1H;

Inhalation, rat: LC50 = 2000 ppm/4H;

Inhalation, rat: LC50 = 18600 mg/m³/5M;

Inhalation, rat: LC50 = 7040 mg/m³/30M;

Skin, rat: LD50 = 112000 mg/m³/15M;

Skin, rat: LD50 = 71900 mg/m³/30M;

Skin, rat: LD50 = 4840 mg/m³/60M;

Carcinogenicity: Not listed as a carcinogen by ACGIH, IARC, NTP, or CA Prop 65

Epidemiology: Tumorigenic effects have been reported in experimental animals.

Teratogenicity: No information available.

Mutagenicity: Mutagenic effects have occurred in experimental animals.

Neurotoxicity: No information available.

12. ECOLOGICAL INFORMATION

Ecotoxicity:

Fish: Rainbow trout: LC50 = 0.008 mg/L; 24 Hr.; Unspecified

Fish: Fathead Minnow: LC50 = 8.2 mg/L; 96 Hr.; Unspecified

Fish: Bluegill/Sunfish: LC50 = 0.024-0.093 mg/L; 48 Hr.; Unspecified

Water flea Daphnia: EC50 = 0.66 mg/L; 48 Hr.; 22 degrees C No data available.

Environmental Fate: Do not empty into drains.

13. DISPOSAL CONSIDERATIONS

Material that cannot be saved for recovery or recycling should be managed in an appropriate and approved waste facility. Processing, use or contamination of this product may change the waste management options. Waste generators must decide if discarded material is a hazardous waste. State and local disposal regulations may differ from federal disposal definitions found in 40 CFR 261.3. Dispose of container and unused contents in accordance with federal, state and local requirements.

14. TRANSPORT INFORMATION

US DOT

Proper Shipping Name: Ammonia Solutions

Hazard Class: 8

UN Number: UN2672

Packing Group: III

Canada TDG

Proper Shipping Name: Ammonia Solutions

Hazard Class: 8

UN Number: UN2672

Packing Group: III

International (Water, I.M.O.)

Proper Shipping Name: Ammonia Solutions

Hazard Class: 8

UN Number: UN2672

Packing Group: III

International (Air, I.C.A.O.)

Proper Shipping Name: Ammonia Solutions

Hazard Class: 8

UN Number: UN2672

Packing Group: III

15. REGULATORY INFORMATION

US Federal Regulations:

TSCA: CAS# 7664-41-7 and CAS# 1336-21-6 are listed on the TSCA Inventory.

Health and Safety Reporting List: CAS# 7664-41-7 and CAS# 1336-21-6: Not listed.

Chemical Test Rules: CAS# 7664-41-7 and CAS# 1336-21-6 are not listed.

Section 12b: CAS# 7664-41-7 and CAS# 1336-21-6 are not listed.

TSCA Significant New Use Rule: CAS# 7664-41-7 and CAS# 1336-21-6 do not have an SNUR under TSCA.

CERCLA Hazardous Substances: CAS# 7664-41-7: 100 lb final RQ; 45.4 kg final RQ; CAS# 1336-21-6: 1000 lb final RQ; 454 kg final RQ.

SARA Section 302: CAS# 7664-41-7: 500 lb TPO

SARA Codes: CAS# 1336-21-6: immediate, delayed

Section 313: Ammonia (CAS# 7664-41-7) is subject to SARA Title III Section 313 and 40 CFR 373 reporting requirements.

Clean Air Act: CAS# 7664-41-7 and CAS# 1336-21-6 are not listed as a hazardous air pollutant (HAP). They are not a Class 1 Ozone Depleter. It is not a Class 2 Ozone Depleter.

Clean Water Act: CAS# 7664-41-7 and CAS# 1336-21-6 are listed as a Hazardous Substance. They are not a Priority Pollutant. It is not a Toxic Pollutant.

OSHA: CAS# 7664-41-7 is considered highly hazardous by OSHA.

US State Regulations:

CAS# 7664-41-7 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, and Massachusetts. CAS# 1336-21-6 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, and Massachusetts.

California Prop 65: California No Significant Risk Level: Not listed

Canada:

DSL/NDL: CAS# 7664-41-7 and CAS# 1336-21-6 are listed on Canada's DSL list.

WHMIS: This product has a WHMIS classification of D1B, E. This product has been classified in accordance with hazard criteria of the Controlled Products Regulations and this MSDS contains all the information required by those regulations.

Ingredient Disclosure List: CAS# 7664-41-7 and CAS# 1336-21-6 are listed on Canada's Ingredient Disclosure List.

DSCL (EEC):

Hazard Symbols: C, N

Risk Phrases: R34 – Cause burns; R50 – Very toxic to aquatic organisms.

Safety Phrases: S26 – In case of contact with eyes, wash with plenty of water and seek medical advice; S36/37/39 – Wear suitable gloves, protective clothing, and eye/face protection; S45 – In case of accident, or if you feel unwell, seek medical advice immediately, show the label where possible; S61 – Avoid release to the environment, see MSDS for special instructions.

WGK (Water Danger/protection): CAS# 1336-21-6: 2; CAS# 7664-41-7: 2

16. OTHER INFORMATION

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Last Revised: 5/18/2010

The information contained herein is based on current knowledge and experience; no responsibility is accepted that the information is sufficient or correct in all cases. Users should consider these data only as a supplement to other information gathered by them and must make independent determinations of suitability and completeness of information from all sources to assure proper use and disposal of these materials and the safety and health of employees and customers and the protection of the environment.

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