



Right to Know Hazardous Substance Fact Sheet

Common Name: **AMMONIUM CHLORIDE**

Synonym: Ammonium Muriate

Chemical Name: Ammonium Chloride

Date: June 2007

Revision: August 2016

CAS Number: 12125-02-9

RTK Substance Number: 0093

DOT Number: UN 3077

Description and Use

Ammonium Chloride is an odorless, white powder. *Solid Ammonium Chloride* is used to make dry batteries and *Ammonia compounds*, as a soldering flux, a pickling agent in *Zinc* coating and tinning, and a fertilizer. **Ammonium Chloride fume**, a finely divided particle dispersed in air, is produced in galvanizing operations.

Reason for Citation

- ▶ **Ammonium Chloride** is on the Right to Know Hazardous Substance List because it is cited by ACGIH, DOT, NIOSH, and EPA.

SEE GLOSSARY ON PAGE 5.

FIRST AID

Eye Contact

- ▶ Immediately flush with large amounts of cool water for at least 15 minutes, occasionally lifting upper and lower lids. Remove contact lenses, if worn, while rinsing. Medical attention is necessary.

Skin Contact

- ▶ Remove contaminated clothing. Wash contaminated skin with soap and water.

Inhalation

- ▶ Remove the person from exposure.
- ▶ Begin rescue breathing (using universal precautions) if breathing has stopped and CPR if heart action has stopped.
- ▶ Transfer promptly to a medical facility.

EMERGENCY NUMBERS

Poison Control: 1-800-222-1222

CHEMTREC: 1-800-424-9300

NJDEP Hotline: 1-877-927-6337

National Response Center: 1-800-424-8802

EMERGENCY RESPONDERS >>>> SEE BACK PAGE

Hazard Summary

Hazard Rating	NJDHSS	NFPA
HEALTH	2	-
FLAMMABILITY	0	-
REACTIVITY	0	-
DOES NOT BURN POISONOUS GASES ARE PRODUCED IN FIRE CONTAINERS MAY EXPLODE IN FIRE		

Hazard Rating Key: 0=minimal; 1=slight; 2=moderate; 3=serious; 4=severe

- ▶ **Ammonium Chloride** can affect you when inhaled.
- ▶ Contact can severely irritate the skin and eyes with possible eye damage.
- ▶ Inhaling **Ammonium Chloride** can irritate the nose, throat and lungs.
- ▶ **Ammonium Chloride** may cause an asthma-like allergy.
- ▶ Exposure may affect the kidneys.

Workplace Exposure Limits

NIOSH: The recommended airborne exposure limit (REL) is **10 mg/m³** (as fume) averaged over a 10-hour workshift and **20 mg/m³** (as fume) not to be exceeded during any 15-minute work period.

ACGIH: The threshold limit value (TLV) is **10 mg/m³** (as fume) averaged over an 8-hour workshift and **20 mg/m³** (as fume) as a STEL (short-term exposure limit).

Determining Your Exposure

- ▶ Read the product manufacturer's Material Safety Data Sheet (MSDS) and the label to determine product ingredients and important safety and health information about the product mixture.
- ▶ For each individual hazardous ingredient, read the New Jersey Department of Health and Senior Services Hazardous Substance Fact Sheet, available on the RTK Program website (<http://www.state.nj.us/health/workplacehealthandsafety/right-to-know/>) or in your facility's RTK Central File or Hazard Communication Standard file.
- ▶ You have a right to this information under the New Jersey Worker and Community Right to Know Act, the Public Employees Occupational Safety and Health (PEOSH) Act if you are a public worker in New Jersey, and under the federal Occupational Safety and Health Act (OSHA) if you are a private worker.
- ▶ The New Jersey Right to Know Act requires most employers to label chemicals in the workplace and requires public employers to provide their employees with information concerning chemical hazards and controls. The federal OSHA Hazard Communication Standard (29 CFR 1910.1200) requires private employers to provide similar information and training to their employees.

This Fact Sheet is a summary of available information regarding the health hazards that may result from exposure. Duration of exposure, concentration of the substance and other factors will affect your susceptibility to any of the potential effects described below.

Health Hazard Information

Acute Health Effects

The following acute (short-term) health effects may occur immediately or shortly after exposure to **Ammonium Chloride**:

- ▶ Contact can severely irritate the skin and eyes with possible eye damage.
- ▶ Inhaling **Ammonium Chloride** can irritate the nose, throat and lungs.
- ▶ Exposure may cause headache, nausea, vomiting, drowsiness and confusion.

Chronic Health Effects

The following chronic (long-term) health effects can occur at some time after exposure to **Ammonium Chloride** and can last for months or years:

Cancer Hazard

- ▶ According to the information presently available to the New Jersey Department of Health and Senior Services, **Ammonium Chloride** has not been tested for its ability to cause cancer in animals.

Reproductive Hazard

- ▶ There is limited evidence that **Ammonium Chloride** may damage the developing fetus.

Other Effects

- ▶ **Ammonium Chloride** may cause an asthma-like allergy. Future exposure can cause asthma attacks with shortness of breath, wheezing, cough, and/or chest tightness.
- ▶ Exposure may affect the kidneys.

Medical

Medical Testing

If symptoms develop or overexposure is suspected, the following are recommended:

- ▶ Lung function tests. These may be normal if the person is not having an attack at the time of the test.
- ▶ Kidney function tests

Any evaluation should include a careful history of past and present symptoms with an exam. Medical tests that look for damage already done are not a substitute for controlling exposure.

Request copies of your medical testing. You have a legal right to this information under the OSHA Access to Employee Exposure and Medical Records Standard (29 CFR 1910.1020).

Mixed Exposures

- ▶ Because smoking can cause heart disease, as well as lung cancer, emphysema, and other respiratory problems, it may worsen respiratory conditions caused by chemical exposure. Even if you have smoked for a long time, stopping now will reduce your risk of developing health problems.

Workplace Controls and Practices

Very toxic chemicals, or those that are reproductive hazards or sensitizers, require **expert advice** on control measures if a less toxic chemical cannot be substituted. Control measures include: (1) enclosing chemical processes for severely irritating and corrosive chemicals, (2) using local exhaust ventilation for chemicals that may be harmful with a single exposure, and (3) using general ventilation to control exposures to skin and eye irritants. For further information on workplace controls, consult the NIOSH document on *Control Banding* at www.cdc.gov/niosh/topics/ctrlbanding/.

The following work practices are also recommended:

- ▶ Label process containers.
- ▶ Provide employees with information and training concerning their hazards.
- ▶ Monitor airborne chemical concentrations.
- ▶ Use engineering controls if concentrations exceed recommended exposure levels.
- ▶ Provide eye wash fountains and emergency showers.
- ▶ Wash or shower if skin comes in contact with a hazardous material.
- ▶ Always wash at the end of the workshift.
- ▶ Change into clean clothing if clothing becomes contaminated.
- ▶ Do not take contaminated clothing home.
- ▶ Special training is required to wash contaminated clothing.
- ▶ Do not eat, smoke, or drink in areas where chemicals are being handled, processed or stored.
- ▶ Wash hands carefully before eating, smoking, drinking, applying cosmetics or using the toilet.

Personal Protective Equipment

The OSHA Personal Protective Equipment Standard (29 CFR 1910.132) requires employers to determine the appropriate personal protective equipment for each hazard and to train employees on how and when to use protective equipment.

The following recommendations are only guidelines and may not apply to every situation.

Gloves and Clothing

- ▶ Avoid skin contact with **Ammonium Chloride**. Wear personal protective equipment made from material which can not be permeated and/or degraded by this substance. Safety equipment suppliers/manufacturers can provide recommendations on the most protective glove/clothing material for your operation.
- ▶ Safety equipment manufacturers recommend *Natural Rubber*, *Neoprene*, *Nitrile* or *4H®* as glove material for *Inorganic Salts*, and *DuPont Tychem® CPF3* as protective material for clothing.
- ▶ All protective clothing (suits, gloves, footwear, headgear) should be clean, available each day, and put on before work.

Eye Protection

- ▶ Wear non-vented, impact resistant goggles when working with fumes, gases, or vapors.
- ▶ Wear a face shield along with goggles when working with corrosive, highly irritating or toxic substances.

Respiratory Protection

Improper use of respirators is dangerous. Such equipment should only be used if the employer has a written program that takes into account workplace conditions, requirements for worker training, respirator fit testing, and medical exams as described in the OSHA Respiratory Protection Standard (29 CFR 1910.134).

- ▶ For field applications check with your supervisor and your safety equipment supplier regarding the appropriate respiratory equipment.
- ▶ Where the potential exists for exposure over **10 mg/m³**, use a NIOSH approved air-purifying, particulate filter respirator with an N95 filter. More protection is provided by a full facepiece respirator than by a half-mask respirator, and even greater protection is provided by a powered-air purifying respirator.
- ▶ Where the potential exists for exposure over **10 mg/m³** of **Ammonium Chloride** in liquid form, use a NIOSH approved full facepiece respirator with an acid gas cartridge which is specifically approved for *Ammonia*. Increased protection is obtained from full facepiece powered-air purifying respirators.
- ▶ If while wearing a filter or cartridge respirator you can smell, taste, or otherwise detect **Ammonium Chloride**, or if while wearing particulate filters abnormal resistance to breathing is experienced, or eye irritation occurs while wearing a full facepiece respirator, leave the area immediately. Check to make sure the respirator-to-face seal is still good. If it is, replace the filter or cartridge. If the seal is no longer good, you may need a new respirator.
- ▶ Be sure to consider all potential exposures in your workplace. You may need a combination of filters, prefilters or cartridges to protect against different forms of a chemical (such as vapor and mist) or against a mixture of chemicals.
- ▶ Where the potential exists for exposure over **100 mg/m³**, use a NIOSH approved supplied-air respirator with a full facepiece operated in a pressure-demand or other positive-pressure mode. For increased protection use in combination with an auxiliary self-contained breathing apparatus operated in a pressure-demand or other positive-pressure mode.

Fire Hazards

If employees are expected to fight fires, they must be trained and equipped as stated in the OSHA Fire Brigades Standard (29 CFR 1910.156).

- ▶ Extinguish fire using an agent suitable for type of surrounding fire. **Ammonium Chloride** itself does not burn.
- ▶ POISONOUS GASES ARE PRODUCED IN FIRE, including *Nitrogen Oxides*, *Hydrogen Chloride*, and *Ammonia*.
- ▶ CONTAINERS MAY EXPLODE IN FIRE.

Spills and Emergencies

If employees are required to clean-up spills, they must be properly trained and equipped. The OSHA Hazardous Waste Operations and Emergency Response Standard (29 CFR 1910.120) may apply.

If **Ammonium Chloride** is spilled or leaked, take the following steps:

- ▶ Evacuate personnel and secure and control entrance to the area.
- ▶ Eliminate all ignition sources.
- ▶ Collect powdered material in the most convenient and safe manner and deposit in sealed containers.
- ▶ Ventilate and wash area after clean-up is complete.
- ▶ It may be necessary to contain and dispose of **Ammonium Chloride** as a HAZARDOUS WASTE. Contact your state Department of Environmental Protection (DEP) or your regional office of the federal Environmental Protection Agency (EPA) for specific recommendations.

Handling and Storage

Prior to working with **Ammonium Chloride** you should be trained on its proper handling and storage.

- ▶ **Ammonium Chloride** reacts violently with AMMONIUM NITRATE; POTASSIUM CHLORATE; BROMINE TRIFLUORIDE; and BROMINE PENTAFLUORIDE causing fire and explosion.
- ▶ **Ammonium Chloride** is not compatible with ALKALIES and their CARBONATES; LEAD SALTS; SILVER SALTS; OXIDIZING AGENTS (such as PERCHLORATES, PEROXIDES, PERMANGANATES, CHLORATES, NITRATES, CHLORINE, BROMINE and FLUORINE); and STRONG ACIDS (such as HYDROCHLORIC, SULFURIC and NITRIC).
- ▶ **Ammonium Chloride** reacts with HYDROGEN CYANIDE to form explosive *Nitrogen Trichloride*.
- ▶ **Ammonium Chloride** attacks COPPER and COPPER COMPOUNDS.
- ▶ Store in tightly closed containers in a cool, well-ventilated area.

Occupational Health Information Resources

The New Jersey Department of Health and Senior Services, Occupational Health Service, offers multiple services in occupational health. These include: Right to Know Information Resources, Public Presentations, General References, Industrial Hygiene Information, Surveys and Investigations, and Medical Evaluation.

For more information, please contact:

New Jersey Department of Health & Senior Services
 Right to Know Program
 PO Box 368
 Trenton, NJ 08625-0368
 Phone: 609-984-2202
 Fax: 609-984-7407
 E-mail: rtk@doh.nj.gov
 Web address:
<http://www.state.nj.us/health/workplacehealthandsafety/right-to-know/>

The Right to Know Hazardous Substance Fact Sheets are not intended to be copied and sold for commercial purposes.

GLOSSARY

ACGIH is the American Conference of Governmental Industrial Hygienists. They publish guidelines called Threshold Limit Values (TLVs) for exposure to workplace chemicals.

Boiling point is the temperature at which a substance can change its physical state from a liquid to a gas.

A **carcinogen** is a substance that causes cancer.

The **CAS number** is assigned by the Chemical Abstracts Service to identify a specific chemical.

CFR is the Code of Federal Regulations, which are the regulations of the United States government.

A **combustible** substance is a solid, liquid or gas that will burn.

A **corrosive** substance is a gas, liquid or solid that causes destruction of human skin or severe corrosion of containers.

DEP is the New Jersey Department of Environmental Protection.

DOT is the Department of Transportation, the federal agency that regulates the transportation of chemicals.

EPA is the Environmental Protection Agency, the federal agency responsible for regulating environmental hazards.

A **fetus** is an unborn human or animal.

A **flammable** substance is a solid, liquid, vapor or gas that will ignite easily and burn rapidly.

The **flash point** is the temperature at which a liquid or solid gives off vapor that can form a flammable mixture with air.

IARC is the International Agency for Research on Cancer, a scientific group.

Ionization Potential is the amount of energy needed to remove an electron from an atom or molecule. It is measured in electron volts.

IRIS is the Integrated Risk Information System database of the federal EPA that classifies chemicals according to their cancer-causing potential.

LEL or **Lower Explosive Limit** is the lowest concentration in air below which there is not enough fuel (gas or vapor) to continue an explosion.

mg/m³ means milligrams of a chemical in a cubic meter of air. It is a measure of concentration (weight/volume).

A **mutagen** is a substance that causes mutations. A **mutation** is a change in the genetic material in a body cell. Mutations can lead to birth defects, miscarriages, or cancer.

NAERG is the North American Emergency Response Guidebook. It is a guide for emergency responders for transportation emergencies involving hazardous substances.

NFPA is the National Fire Protection Association. It classifies substances according to their fire and explosion hazard.

NIOSH is the National Institute for Occupational Safety and Health. It tests equipment, evaluates and approves respirators, conducts studies of workplace hazards, and proposes standards to OSHA.

NTP is the National Toxicology Program which tests chemicals and reviews evidence for cancer.

OSHA is the federal Occupational Safety and Health Administration, which adopts and enforces health and safety standards.

PEOSHA is the New Jersey Public Employees Occupational Safety and Health Act. PEOSH adopts and enforces health and safety standards in public workplaces.

Permeated is the movement of chemicals through protective materials.

PIH is a DOT designation for chemicals which are Poison Inhalation Hazards.

ppm means parts of a substance per million parts of air. It is a measure of concentration by volume in air.

A **reactive** substance is a solid, liquid or gas that releases energy under certain conditions.

STEL is a Short Term Exposure Limit which is usually a 15-minute exposure that should not be exceeded at any time during a work day.

A **teratogen** is a substance that causes birth defects by damaging the fetus.

UEL or **Upper Explosive Limit** is the highest concentration in air above which there is too much fuel (gas or vapor) to begin a reaction or explosion.

Vapor Density is the ratio of the weight of a given volume of one gas to the weight of another (usually *Hydrogen*), at the same temperature and pressure.

The **vapor pressure** is a measure of how readily a liquid or a solid mixes with air at its surface. A higher vapor pressure indicates a higher concentration of the substance in air and therefore increases the likelihood of breathing it in.

Common Name: **AMMONIUM CHLORIDE**

Synonym: Ammonium Muriate

CAS No: 12125-02-9

Molecular Formula: NH₄Cl

RTK Substance No: 0093

Description: White powder or finely divided airborne particle.

HAZARD DATA

Hazard Rating	Firefighting	Reactivity
<p>2 - Health</p> <p>0 - Fire</p> <p>0 - Reactivity</p> <p>DOT#: UN 3077</p> <p>ERG Guide #: 171</p> <p>Hazard Class: 9 (Environmentally Hazardous Substance)</p>	<ul style="list-style-type: none"> - Extinguish fire using an agent suitable for type of surrounding fire. Ammonium Chloride itself does not burn. - POISONOUS GASES ARE PRODUCED IN FIRE, including <i>Nitrogen Oxides, Hydrogen Chloride</i> and <i>Ammonia</i>. - CONTAINERS MAY EXPLODE IN FIRE. 	<ul style="list-style-type: none"> - Reacts violently with AMMONIUM NITRATE; POTASSIUM CHLORATE; BROMINE TRIFLUORIDE; and BROMINE PENTAFLUORIDE causing fire and explosion. - Incompatible with ALKALIES and their CARBONATES; LEAD SALTS; SILVER SALTS; OXIDIZING AGENTS (such as PERCHLORATES, PEROXIDES, PERMANGANATES, CHLORATES, NITRATES, CHLORINE, BROMINE and FLUORINE); and STRONG ACIDS (such as HYDROCHLORIC, SULFURIC and NITRIC). - Reacts with HYDROGEN CYANIDE to form explosive <i>Nitrogen Trichloride</i>.

SPILL/LEAKS

Isolation Distance: 10 to 25 meters (30 to 80 feet)

- Sweep spilled substance into containers.
- Keep out of waterways as this substance is toxic to aquatic organisms.

PHYSICAL PROPERTIES

Odor Threshold:	Odorless
Flash Point:	Noncombustible
LEL:	N/A
UEL:	N/A
Vapor Density:	1.9 (air = 1)
Vapor Pressure:	1 mm Hg at 321°F (161°C)
Water Solubility:	Soluble
Boiling Point:	968°F (520°C)
Melting Point:	640°F (338°C) (decomposes)

EXPOSURE LIMITS

ACGIH: 10 mg/m³ 8-hr TWA, 20 mg/m³ STEL

NIOSH: 10 mg/m³ 10-hr TWA, 20 mg/m³ STEL

IDLH LEVEL: No Information

(All the above are for *Ammonium Chloride fume*)

PAC: PAC-1 = 20 ppm; PAC-2 = 110 ppm;

PAC-3 = 330 ppm

PROTECTIVE EQUIPMENT

Gloves:	Natural Rubber, Neoprene, Nitrile, 4H® (for <i>Inorganic Salts</i>)
Coverall:	Dupont Tychem® CPF3
Boot:	Rubber or Neoprene
Respirator:	>10 mg/m ³ N95 or N95 plus Ammonia Cartridge if a liquid >100 mg/m ³ SA

HEALTH EFFECTS

Eyes:	Irritation and possible eye damage
Skin:	Irritation
Acute:	Nose, throat and lung irritation, headache, drowsiness and confusion
Chronic:	Cancer - Not tested. Asthma-like allergy. May affect the kidneys.

FIRST AID AND DECONTAMINATION

- Remove person from exposure.
- Flush eyes with large amounts of water for at least 15 minutes. Remove contact lenses if worn.
- Remove contaminated clothing and wash contaminated skin with soap and water.
- Begin artificial respiration if breathing has stopped and CPR if necessary.
- Transfer to a medical facility.