



Right to Know Hazardous Substance Fact Sheet

Common Name: **ALUMINUM CHLORIDE**

Synonyms: Aluminum Trichloride; Anhydrous Aluminum Chloride

Chemical Name: Aluminum Chloride

Date: January 1999 Revision: June 2008

CAS Number: 7446-70-0

RTK Substance Number: 0057

DOT Number: UN 1726

Description and Use

Aluminum Chloride is a yellowish or grayish-white, crystalline powder with a sharp odor. It is used as a chemical intermediate for *Aluminum compounds*, as a catalyst for cracking petroleum, in preserving wood, and in medications, disinfectants, cosmetics, photography and textiles.

Reasons for Citation

- ▶ **Aluminum Chloride** is on the Right to Know Hazardous Substance List because it is cited by ACGIH, DOT, NIOSH and NFPA.
- ▶ This chemical is on the Special Health Hazard Substance List.

SEE GLOSSARY ON PAGE 5.

FIRST AID

Eye Contact

- ▶ Quickly brush off excess chemical from the face. Immediately flush with large amounts of water for at least 30 minutes, lifting upper and lower lids. Remove contact lenses, if worn, while flushing. Seek medical attention immediately.

Skin Contact

- ▶ Quickly remove contaminated clothing. Immediately blot or brush off excess chemical and wash gently with large amounts of water for at least 30 minutes. Seek medical attention immediately.

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.
- ▶ Medical observation is recommended for 24 to 48 hours after overexposure, as pulmonary edema may be delayed.

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 PAGE 6

Hazard Summary

Hazard Rating	NJDHSS	NFPA
HEALTH	-	3
FLAMMABILITY	-	0
REACTIVITY	-	2-W
CORROSIVE AND REACTIVE POISONOUS GASES ARE PRODUCED IN FIRE DO NOT USE WATER DOES NOT BURN		

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

- ▶ **Aluminum Chloride** can affect you when inhaled.
- ▶ **Aluminum Chloride** is CORROSIVE and contact can severely irritate and burn the skin and eyes with possible eye damage.
- ▶ Inhaling **Aluminum Chloride** can irritate the nose and throat.
- ▶ Inhaling **Aluminum Chloride** can irritate the lungs. Higher exposures may cause a build-up of fluid in the lungs (pulmonary edema), a medical emergency.
- ▶ Repeated exposure to **Aluminum Chloride** may cause scarring of the lungs (fibrosis).
- ▶ **Aluminum Chloride** is REACTIVE and a DANGEROUS EXPLOSION HAZARD.

Workplace Exposure Limits

The following exposure limits are for *Aluminum-soluble salts* (measured as *Aluminum*):

NIOSH: The recommended airborne exposure limit (REL) is **2 mg/m³** averaged over a 10-hour workshift.

ACGIH: Recommended withdrawing the adopted *Documentation* and *TLV* in their *2007 Notice of Intended Changes*.

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 (www.nj.gov/health/eoh/rtkweb) 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) and the PEOSH Hazard Communication Standard (N.J.A.C. 12:100-7) require 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 **Aluminum Chloride**:

- ▶ Contact can severely irritate and burn the skin and eyes with possible eye damage.
- ▶ Inhaling **Aluminum Chloride** can irritate the nose and throat causing coughing and wheezing.
- ▶ Inhaling **Aluminum Chloride** can irritate the lungs causing coughing and/or shortness of breath. Higher exposures may cause a build-up of fluid in the lungs (pulmonary edema), a medical emergency, with severe shortness of breath.

Chronic Health Effects

The following chronic (long-term) health effects can occur at some time after exposure to **Aluminum 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, **Aluminum Chloride** has not been tested for its ability to cause cancer in animals.

Reproductive Hazard

- ▶ There is limited evidence that **Aluminum Chloride** may damage the developing fetus and affect male fertility in animals.

Other Effects

- ▶ Repeated exposure to **Aluminum Chloride** may cause scarring of the lungs (fibrosis) and reduce lung function with symptoms of coughing and shortness of breath.

Medical

Medical Testing

Before beginning employment and at regular times thereafter, (at least annually), the following are recommended:

- ▶ Lung function tests

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

- ▶ Consider chest x-ray after acute overexposure

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

- ▶ Smoking can cause heart disease, 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 hazard information and training.
- ▶ 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.
- ▶ Get special training 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.

In addition, the following may be useful or required:

- ▶ Use a vacuum to reduce dust during clean-up.

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 **Aluminum Chloride**. Wear personal protective equipment made from material which can not be permeated or degraded by this substance. Safety equipment suppliers and manufacturers can provide recommendations on the most protective glove and clothing material for your operation.
- ▶ Safety equipment manufacturers recommend Natural Rubber or Nitrile for **solid Aluminum Chloride** and Neoprene (if *Hydrogen Chloride gas* is present) for gloves and DuPont Tyvek® for **solid Aluminum Chloride** and Tychem® Responder (if *Hydrogen Chloride gas* is present), or the equivalent, as protective materials for clothing.
- ▶ All protective clothing (suits, gloves, footwear, headgear) should be clean, available each day, and put on before work.

Eye Protection

- ▶ For **solid Aluminum Chloride**, wear eye protection with side shields or goggles.
- ▶ Wear indirect-vent, impact and splash resistant goggles when working with liquids.
- ▶ Wear a face shield along with goggles when working with corrosive, highly irritating or toxic substances.

Respiratory Protection

Improper use of respirators is dangerous. Respirators should only be used if the employer has implemented 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).

- ▶ Where the potential exists for exposure over **2 mg/m³** (as *Aluminum*), use a NIOSH approved air-purifying, particulate filter respirator with an N95, R95 or P95 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.
- ▶ Leave the area immediately if (1) while wearing a filter or cartridge respirator you can smell, taste, or otherwise detect **Aluminum Chloride**, (2) while wearing particulate filters abnormal resistance to breathing is experienced, or (3) eye irritation occurs while wearing a full facepiece respirator. 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.
- ▶ Consider all potential sources of exposure 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 for high exposure exists, or when *Hydrogen Chloride gas* may be present, 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).

- ▶ **Aluminum Chloride** is nonflammable.
- ▶ Use dry chemical or CO₂ as extinguishing agents.
- ▶ **DO NOT USE WATER.**
- ▶ **POISONOUS GASES ARE PRODUCED IN FIRE**, including *Hydrogen Chloride*.
- ▶ Use water spray to keep fire-exposed containers cool. **DO NOT** get water inside containers.
- ▶ **Aluminum Chloride** may ignite combustibles (wood, paper and oil).

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 **Aluminum Chloride** is spilled, 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.
- ▶ **DO NOT USE WATER OR WET METHOD.**
- ▶ Ventilate area after clean-up is complete.
- ▶ Keep **Aluminum Chloride** out of confined spaces where water may be present (such as sewers), because of the possibility of an explosion.
- ▶ It may be necessary to contain and dispose of **Aluminum 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 **Aluminum Chloride** you should be trained on its proper handling and storage.

- ▶ **Aluminum Chloride** may react violently with WATER and MOIST AIR to form toxic *Hydrogen Chloride gas* and heat.
- ▶ **Aluminum Chloride** is not compatible with ALUMINUM OXIDE; CARBON OXIDE; PHENYL AZIDE; GLYCIDOL; NITROBENZENE; ALKENES; BENZOYL CHLORIDE; NAPHTHALENE; ETHYLENE OXIDE; OXYGEN DIFLUORIDE; NITROMETHANE; ANILINES; ETHYLENIMINE; OXIDIZING AGENTS (such as PERCHLORATES, PEROXIDES, PERMANGANATES, CHLORATES, NITRATES, CHLORINE, BROMINE and FLUORINE); STRONG BASES (such as SODIUM HYDROXIDE and POTASSIUM HYDROXIDE); EPICHLOROHYDRIN; HALOGENATED HYDROCARBONS; and ALCOHOL.
- ▶ Store in tightly closed containers in a cool, well-ventilated area away from METALS, COMBUSTIBLES and ORGANICS.
- ▶ Prolonged storage of *anhydrous Aluminum Chloride* in closed containers may result in spontaneous decomposition or explosion.

Occupational Health Information Resources

The New Jersey Department of Health and Senior Services, Occupational Health Service, offers multiple services in occupational health. These services include providing informational resources, educational materials, public presentations, and industrial hygiene and medical investigations and evaluations.

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.state.nj.us
 Web address: <http://www.nj.gov/health/eoh/rtkweb>

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.

Acute Exposure Guideline Levels (AEGs) are established by the EPA. They describe the risk to humans resulting from once-in-a-lifetime, or rare, exposure to airborne 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 unique, identifying number, assigned by the Chemical Abstracts Service, to 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.

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

Emergency Response Planning Guideline (ERPG) values are intended to provide estimates of concentration ranges where one reasonably might anticipate observing adverse effects.

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 maintained by federal EPA. The database contains information on human health effects that may result from exposure to various chemicals in the environment.

LEL or Lower Explosive Limit, is the lowest concentration of a combustible substance (gas or vapor) in the air capable of continuing 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.

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, which 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: **ALUMINUM CHLORIDE**

Synonyms: Aluminum Trichloride; Anhydrous Aluminum Chloride

CAS No: 7446-70-0

Molecular Formula: $AlCl_3$

RTK Substance No: 0057

Description: Yellowish or grayish-white crystalline solid or powder with a sharp odor that is water reactive

HAZARD DATA

Hazard Rating	Firefighting	Reactivity
<p>3 - Health 0 - Fire 2-W - Reactivity DOT#: UN 1726 ERG Guide #: 137 Hazard Class: 8 (Corrosive)</p>	<p>Non-flammable Use dry chemical or CO_2 as extinguishing agents. DO NOT USE WATER. Use water spray to keep fire-exposed containers cool. DO NOT get water inside tanks. POISONOUS GASES ARE PRODUCED IN FIRE, including <i>Hydrogen Chloride</i>. Aluminum Chloride may ignite combustibles (wood, paper and oil).</p>	<p>Aluminum Chloride may react violently with WATER and MOIST AIR to form toxic <i>Hydrogen Chloride</i> gas and heat. Aluminum Chloride is not compatible with ALUMINUM OXIDE; CARBON OXIDE; PHENYL AZIDE; GLYCIDOL; NITROBENZENE; ALKENES; BENZOYL CHLORIDE; NAPHTHALENE; ETHYLENE OXIDE; OXYGEN DIFLUORIDE; NITROMETHANE; ANILINES; ETHYLENIMINE; OXIDIZING AGENTS (such as PERCHLORATES, PEROXIDES, PERMANGANATES, CHLORATES, NITRATES, CHLORINE, BROMINE and FLUORINE); STRONG BASES (such as SODIUM HYDROXIDE and POTASSIUM HYDROXIDE); EPICHLOROHYDRIN; HALOGENATED HYDROCARBONS; and ALCOHOL.</p>

SPILL/LEAKS

Isolation Distance:
 Small Spills: 30 meters (100 feet) when spilled in water
 Large Spills: 120 meters (400 feet) when spilled in water
 Fire: 800 meters (1/2 mile)
 Collect powdered material in the most convenient and safe manner and deposit in sealed containers.
 Keep **Aluminum Chloride** out of confined spaces where water may be present (such as sewers), because of the possibility of an explosion.
 Harmful to aquatic life at low concentrations.

PHYSICAL PROPERTIES

Odor Threshold: Sharp
Flash Point: Nonflammable
Vapor Density: 2.5 (air = 1)
Vapor Pressure: 1 mm Hg at 212°F (100°C)
Specific Gravity: 2.7 (water = 1)
Water Solubility: Decomposes
Boiling Point: 360°F (182°C)
Melting Point: 374°F (190°C)
Molecular Weight: 133.34

EXPOSURE LIMITS

OSHA: None
NIOSH: 2 mg/m³, 10-hr TWA
ACGIH: Withdrawn
IDLH: None

PROTECTIVE EQUIPMENT

Gloves: Natural Rubber and Nitrile (for *solid*) and Neoprene (if *HCl* gas is present)
Coveralls: DuPont Tyvek® (for *solid*) and Tychem® Responder (if *Hydrogen Chloride* gas is present)
Respirator: >2 mg/m³ - Full facepiece APR with High efficiency filter
 If *Hydrogen Chloride* gas is present, use Supplied air

HEALTH EFFECTS

Eyes: Severe irritation and burns
Skin: Severe irritation and burns
Inhalation: Nose, throat and lung irritation with coughing, wheezing and severe shortness of breath (pulmonary edema)

FIRST AID AND DECONTAMINATION

Remove the person from exposure.
Quickly brush off excess chemical from the face. Immediately flush with large amounts of water for at least 30 minutes, lifting upper and lower lids. Remove contact lenses, if worn, while flushing. Seek medical attention immediately.
Quickly remove contaminated clothing. Immediately blot or brush off excess chemical and wash gently with large amounts of water for at least 30 minutes. Seek medical attention immediately.
Begin artificial respiration if breathing has stopped and CPR if necessary.
Transfer to a medical facility.
Medical observation is recommended as symptoms may be delayed.