

## MATERIAL SAFETY DATA SHEET

### **Aluminum Chloride – Anhydrous**

Date Prepared 05/05/1997  
MSDS No.: SE-3101-00 REV: A

Latest Review: 2/01/2011

#### **Section 1. Chemical Product and Company Information**

Product Name .....Aluminum Chloride – Anhydrous  
Product Use .....Specialty & Commodity Chemicals  
Chemical Name Aluminum Chloride – Anhydrous  
Formula .....A1C1<sub>3</sub>  
CAS Registry Number...7446-70-0  
HMIS Hazard Rating .....Health: 3 Flammability: 0 Reactivity: 2  
NFPA Hazard Rating.....Health: 3 Flammability: 0 Reactivity: 2 W

Manufacturer .....**Vanchlor Co., Inc.**  
**45 Main Street**  
**Lockport NY USA 14094**  
**Phone: 716-434-2624 Fax: 716-438-9258**

24 Hour Emergency Response Phone Number: 716-434-2200  
Chemtrec 24 Hour Emergency Phone Number: 800-424-9300

Date MSDS Prepared ...May 1997  
MSDS Prepared By.....Matthew Barmasse – Safety/Environmental Manager

#### **Section 2. Hazards Identification**

##### 2.1 Hazard Overview

Physical State – Crystalline solid or powder.  
Color – Gray yellow and white particles.  
Odor – Sharp, pungent, and acidic  
Signal Word – DANGER!  
Hazard Statements - CAUSES RESPIRATORY TRACT, EYE AND SKIN BURNS, CAN CAUSE TARGET ORGAN DAMAGE.  
Precautionary Measures – Do not breathe dust. Use only with adequate ventilation. Do not get in eyes. Do not get on skin. Do not eat, drink, or smoke when using this product. Keep container tightly closed. Wash thoroughly after handling.  
OSHA/HCS Status – This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910, 1200).

2.2 Acute effects:

Routes of Entry: Skin contact, eye contact, inhalation, or ingestion.

Eye effects: Material is irritating and corrosive to eyes.

Skin effects: The material is irritating and corrosive to skin; may cause pain and second degree burns after a few minutes of contact if the skin is wet or damp.

Oral effects: Moderately toxic by ingestion and causes severe burns of the mouth.

Inhalation effects: Material is a severe respiratory irritant when inhaled.

2.3 Chronic effects: Can cause target organ damage.

2.4 OSHA Hazard Information:

OSHA Health Hazard Classification:

2.3.1 Carcinogen.

NTP ..... No  
 IARC..... No  
 OSHA ..... No

2.3.2 Target Organ Effects. (Chronic effects)

Hepatotoxin ..... No  
 Nephrotoxin..... No  
 Lungs ..... Yes  
 Reproductive ..... No  
 Cutaneous ..... Yes  
 Eye ..... No  
 Blood / Hematopoietic Systems ..... No

2.3.3 Other Hazards.

Corrosive ..... Yes  
 Highly Toxic..... No  
 Irritant ..... Yes  
 Sensitizer ..... No  
 Toxic..... Yes

**Section 3. Composition, Information on Ingredients**

<u>Chemical Name</u>	<u>Percentage</u>	<u>CAS Number</u>
Aluminum Chloride	>99%	7446-70-0

OSHA HAZARDOUS COMPONENTS (29 CFR 1910.1200)

<u>Chemical Name</u>	<u>OSHA PEL</u>	<u>AGGIH TLV</u>
Aluminum Chloride	OSHA PEL 1989 (United States, 3/1989). TWA: 2 mg/m <sup>3</sup> , (as Al) 8 hour(s).	None

**Section 4. First Aid Measures**

4.1 First Aid Measures

**First Aid for Eyes:** Flush eyes thoroughly with large quantities of water for at least 15 minutes. Seek medical attention immediately.

**First Aid for Skin:** Brush off any solid aluminum chloride before washing with soap and water or thermal burns will result from the reaction with water. When flushing with water, use large amounts of water. If irritation or burns develop seek immediate medical attention.

**First Aid for Inhalation:** Remove victim to fresh air. If breathing is difficult, administer oxygen. If not breathing, perform rescue breathing. Seek immediate medical attention. Aluminum chloride reacts with water to form hydrochloric acid which can be corrosive to the throat and lungs. Treatment should be as appropriate for chemical or thermal burns to the lungs.

**First Aid for Ingestion:** Seek immediate medical attention. Treatment should be as appropriate for acids. Aluminum chloride reacts with water in the system to form hydrochloric acid. Chemical and thermal burns to the mouth, throat and stomach may occur. Treat as appropriate for acid burns or thermal burns.

**Protection of First-Aiders:** If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Wash contaminated clothing thoroughly with water before removing it, or wear gloves.

**Notes to Physician:** Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.

**Section 5. Fire Fighting Measures**

5.1 Flammable properties.

Flash point..... None  
 UEL ..... None  
 LEL ..... None  
 Auto-ignition Temperature ..... None

5.2 Explosion hazards.

Shock Sensitive..... No  
 Explosive Dust ..... No  
 Other ..... No

5.3 Extinguishing media Use an extinguishing media other than water which is suitable for a surrounding fire. Do not use water to extinguish surrounding fire as a violent exothermic reaction producing corrosive hydrogen chloride gas can result.

5.4 Hazardous decomposition products: Hydrogen Chloride gas.

- 5.5 Fire fighting instructions. Do not put water on aluminum chloride spills! Water reacts violently and exothermically with aluminum chloride releasing toxic and corrosive hydrogen chloride gas. If water gets into closed containers or vessels the vessels could rupture do to over-pressurization. Flammable hydrogen gas can also be formed if water or moisture enters drums. Firefighters should do everything possible to keep water or moisture away from Aluminum Chloride. Utilize SCBA's and full turnout gear to respond. If vapors are in high concentrations (cause irritation to the skin), fully encapsulated Level A Suits are required.

## Section 6. Accidental Release Measures

- 6.1 **Spill or Leak Procedures:** Evacuate the area. Avoid contact with water or other incompatible materials (See Section 10). Wear PPE outlined in Section 8 and follow spill cleanup procedures outlined below.

**Personal Protective Equipment:** See Section 8.

**Environmental Precautions:** Spilled aluminum chloride will fume on moist days, releasing hydrogen chloride gas. Upon contact with water, large amounts of hydrogen chloride gas or acidic water will be generated.

**Procedure for Clean up of Spills.** Scoop up spilled materials and place into a full open head poly drum, or a full open head steel drum with a polypropylene liner. Lids with vent plugs are preferred to allow for easy venting of pressure. **(Note-** Do not mix speedy dry or other absorbent material with spilled aluminum chloride. The moisture in the speedy dry will react with the aluminum chloride. Do not close the drums tightly or they may build pressure. The spilled material will have absorbed some moisture and will need to vent until the reaction subsides before closing the drums tightly.) Sweep up as much of the spilled material as possible. Then wash the area down with large amounts of water and dispose of according to state and local regulations. **(Note -** The water will likely be acidic due to generation of hydrochloric acid from the reaction with aluminum chloride.) See Section 1 for emergency contact information and Section 13 for waste disposal.

## Section 7. Storage and Handling

- 7.1 Storage conditions.

Storage Temperature ..... Ambient  
 Shelf Life ..... 90 days (if stored properly)  
 Special Sensitivity ..... None (See section 7.2)

- 7.2 Storage & Handling Precautions.

**General** – store in a cool dry location with adequate ventilation and out of direct sunlight. Keep away from water and other incompatible materials. Keep containers tightly closed to prevent contamination with moisture, which will react with and degrade the product. Do not store in unlabeled containers.

**Handling** – Use appropriate personal protective equipment (see Section 8). Eating, drinking, and smoking should be prohibited in areas where this material is handled, stored, and processed. Do not breathe dust. Do not ingest. Use only with adequate ventilation. Wear appropriate respirator when ventilations is inadequate. Empty containers retain product residue and can be hazardous.

### Drums

- Do not stack drums. Stacking could damage the ring gasket resulting in a vapor release.
- Do not reuse drums. Empty drums must be properly cleaned and disposed of in accordance with all federal, state and local environmental regulations.
- Attempt to use entire contents of drums upon opening.
- Vent drums before opening.
- Store drums upright.
- Do not allow water to accumulate on the tops of drums.
- If holes develop in drum, repair leak immediately (2 part stick epoxy).

### Rigid Flow Bins

- Rigid flow bins are not pressure vessels, do not pressurize.
- Do not double stack.
- Use care not to puncture container.
- Venting is not required.
- Do not open fill caps.
- Report any malfunction of valve or excessive corrosion by tagging the valve assembly after use.
- Do not attempt to transfer product from bin to bin.

### Bulk Tank Trucks

- Do not open fill hatches.
- Do not pressurize over 25 psig or transfer hose maximum working pressure which ever is less.
- A constant supply of -80 degree F dew point nitrogen at 15-18 psig is required for unloading. Loss of flow could result in plugging of lines.
- Only use dry nitrogen or corrosion and product degradation will occur.
- Inspect hoses and connections prior to use.
- Always safety wire cam lock fittings before use.
- Note any malfunctions or visible residue on return bill of lading or the truck driver checklist.

## **Section 8. Exposure Controls, Personal Protection**

**Recommended Monitoring Procedures:** See Section 3 for NIOSH and OSHA exposure limits. Personal, workplace atmosphere or biological monitoring may be required to determine the effectiveness of the ventilation or other control measures and the necessity to use respiratory protective equipment.)

**Engineering Measures:** Use only with adequate ventilation. Use process enclosures, local exhaust ventilation, or other engineering controls to keep worker exposure to airborne contaminant below any recommended or statutory limits.

8.1 Eye protection requirements: Where exposure to fumes or particulate may occur Safety glasses with mono-goggles or full face respiratory protection is recommended to prevent corrosive fumes or particles from entering the eyes. During unloading of pressurized bulk trailers full face protection is required (Full face-piece respirator or safety glasses with face-shield).

- 8.2 Skin protection requirements: To prevent skin contact with aluminum chloride, utilize poly-coated Tyvek coveralls, with rubber boots and gloves. Acidic hydrogen chloride gas generated during spills may require fully encapsulated suits (Level A) if skin irritation occurs.
- 8.3 Respiratory protection requirements: A NIOSH/MSHA approved respirator for acid gasses with a high efficiency dust filter. For emergency response to large spills SCBA's are recommended.
- 8.4 Engineering controls: Utilize mechanical ventilation to prevent buildup of aluminum chloride fumes or particulate in utilization areas. Eye wash and safety shower area required in utilization areas due to the corrosive nature of aluminum chloride.
- 8.5 PPE for emergency response: For small spills, Level C protection may be adequate (Full face filtering respirator, Tyvek coveralls, rubber boots & gloves). For large spills generating significant fumes Level A is recommended (SCBA, vapor tight suite with boots & gloves).

## Section 9. Physical and Chemical Properties

Physical Form .....	Hexagonal deliquescent crystals or powder.
Color .....	Yellow, White, to Gray
Odor .....	Sharp irritating
pH .....	Not applicable
Boiling Point.....	Not applicable
Vapor Pressure.....	1 mm @ 100 degrees C
Evaporation Rate.....	Not applicable
Vapor Density (Air = 1) .....	9.19g/l @ 200 degrees C
Sublimation Point.....	181 degrees C @ 1 atm.
Water Solubility.....	Reacts violently
Oil Solubility .....	Not available
Partition Coefficient (n-octanol/H <sub>2</sub> O) .....	Not available
Specific Gravity.....	Not available
Bulk Density.....	2.44 g/cc crystal (Ideal) 1.25 – 1.60 g/cc powder

## Section 10. Stability and Reactivity

- 10.1 Conditions under which the product is chemically unstable: Stable if kept dry and protected from atmospheric moisture. Stable at normal temperature and pressures but may decompose on prolonged storage creating a build-up of pressure. If contaminated with moisture, acid will be formed that may react with the steel drum resulting in formation of flammable hydrogen gas. Negligible fire hazard when exposed to heat or flame. Sublimation occurs at 181 degrees C.
- 10.2 Conditions of reactivity: Reacts violently with water with releasing toxic and corrosive hydrogen chloride with sufficient heat and pressure generated to rupture containers. (See incompatibilities in section 10.3)
- 10.3 Incompatibilities
  - Water
  - Alkali: may react explosively
  - Alkenes: violent, highly exothermic polymerization possible.
  - Allyl chloride: violent polymerization possible.
  - Ethylene oxide: violent polymerization possible.

Metals: may corrode in the presence of moisture.  
 Organic nitro compounds: vigorous reaction.  
 Oxygen difluoride: explodes.  
 Potassium: forms impact sensitive mixture.  
 Sodium: forms impact sensitive mixture.

10.4 Hazardous Decomposition Products. Hydrogen chloride, aluminum oxide, aluminum hydroxide.

10.5 Hazardous Polymerization Possible. See Section 10.3

## **Section 11. Toxicological Information**

Eye Effects.....	None available
Skin Effects.....	The dermal LD50 in rabbits is >2 g/kg.
Acute Oral Effects.....	The oral LD50 values are 3,450 mg/kg for Rats and 1,130 mg/kg for mice.
Acute Inhalation Effects.....	None reported. May cause decreased pulmonary function upon repeated exposure to significant levels of fumes.
Sub-chronic Effects .....	None reported.
Sensitization to product .....	None reported.
Chronic/Carcinogenicity.....	None reported.
Mutagenicity.....	None reported.
Teratogenicity .....	None reported.
Reproductive toxicity .....	Reproductive effects were observed in pregnant rats treated by gavage on gestation days 1 – 21 to 300 and 400 mg/kg/day had decreased weight gain and the pups born had increased mortality and delayed neuromotor maturation during the first week.

## **Section 12. Ecological Information**

12.1 Ecotoxicity – Forms hydrochloric acid in water which is hazardous to all aquatic life. Fathead minnows, Pimephales promelas, (1 day, 12 day, and 4 week post-hatch) exposed to 50, 100, 200, and 400 ug/L aluminum (as aluminum chloride) in 96 hour flow through tests and resulted in 90-100% mortality at pH 4.5 and 5.5 in all life stages at the three highest concentrations. Exposures of up to 60 ug/L at pH levels as low as 5.2 to fathead minnows resulted in decreases in juvenile survival, spawning success, and larval survival. Rainbow trout exposed for up to an hour to 0.954 mg/L aluminum (as aluminum chloride) at pH 5.4 had significantly increased mucous and gill tissue aluminum content.

12.2 Environmental Fate – Hydrolyzes in water to form hydrochloric acid, aluminum oxychloride and aluminum hydroxide and therefore will not persist in water or moist soil. May be persistent in the ambient atmosphere; does not photolyze or react with the common reactive species such as hydroxyl radicals or ozone. It would be washed out of the atmosphere by rain. May be absorbed into atmospheric droplets of water and hydrolyze. However, this is generally a very slow process.

**Section 13. Disposal Considerations**

RCRA Hazard Class.....D002 – Reactive  
 Disposal Considerations.....Incinerate or neutralize with water or alkaline media and treat the acidic waste according to federal, state, and local regulations.

**Section 14. Transport Information**

14.1 DOT Shipping Requirements

Shipping Name ..... Aluminum Chloride  
 Technical Name ..... Aluminum Chloride  
 Hazard Class ..... 8  
 UN/NA Number ..... UN1726  
 Packing Group ..... II  
 Label(s) ..... Corrosive  
 Placard(s)..... Corrosive  
 Markings ..... None  
 Hazardous Substance ..... No  
 RQ..... None  
 Poison/Inhalation hazard ..... No  
 Marine Pollutant..... No  
 Packaging Requirements..... Non-bulk packaging: Subsection  
 173.212, Bulk packaging: Subsection  
 173.240, Quality Limitations:  
 Passenger aircraft or railcar: 15 kg  
 Cargo aircraft only: 50 kg  
 Exemption Number ..... None  
 Bill of Lading Description ..... Aluminum Chloride, anhydrous, 8,  
 UN1726, PG II, Emergency Response  
 Guide (2000) #137.  
 Other information ..... 2000 North American Emergency  
 Response Guide #137

14.2 IMO Regulations ..... Shipping Name/ IMO Number:  
 Aluminum Chloride, anhydrous/  
 UN1726 Hazard Class or Division

14.3 IATA Regulations..... Packaging – 814 & 814Y

14.4 Transport Canada TDG Regulations ..... See section 14.1  
 PIN #1726

14.5 ARD – European Agreement Carriage by Highway. Not available

14.6 RID – European Agreement Carriage by Rail. Not available

14.7 Transportation Emergency Response

In the event of an unusual delay, fire, accident, or release of this product during transportation, the transporter can refer to this MSDS or the current edition of the DOT Emergency Response Guide Book for emergency response information. In any of the above mentioned circumstances, the transporter shall immediately call the emergency phone numbers on page 1 of this MSDS for emergency response support.

## **Section 15. Regulatory Information**

- 15.1 U.S. Federal Regulations.  
 TSCA 8(b) Inventory Status: TSCA Listed.  
 TSCA 5(a)(2)SNUR: Not applicable  
 RCRA Waste: Yes – Reactive (D002)  
 40CFR Part 302 TPQ/RQ: No  
 40CFR Part 311/312 Hazard Classes: Acute (X) Chronic ( )  
 Reactive (X) Fire ( ) Sudden Release of Pressure ( )  
 40CFR Part 313 TRI Chemical: No  
 Section 112b Clean Air Act (Hazardous Air Pollutant) - No  
 40CFR Part 68.130 Table 1 (Regulated Substance) - No  
 SARA 302/304/311/312 extremely hazardous substances: No products found.  
 SARA 302/304 emergency planning and notification: No products found.  
 SARA 302/304/311/312 hazardous chemicals: Aluminum Chloride, anhydrous  
 SARA 311/312 MSDS distribution – chemical inventory – hazard identification:  
 Aluminum chloride, anhydrous: reactive, immediate (acute) health hazard, Delayed  
 (chronic) health hazard  
 Clean Water Act (CWA) 307: No products found.  
 Clean Water Act (CWA) 311: No products found.  
 Clean Air Act (CAA) 112 regulated flammable substances: No products found.  
 Clean Air Act (CAA) 112 regulated toxic substances: No products found.
- 15.2 International Regulations.  
 Canadian WHMIS: Corrosive  
 Canadian CEPA (DSL): Domestic Substance List - #6606  
 European EINECS: Listed (231-208-1)
- 15.3 State Regulations.  
New York State Chemical Bulk Storage: Not listed.

## **Section 16. Other Information**

**Note:** To the best of our knowledge, the information contained herein is accurate. However, neither the above-name supplier, nor any of its subsidiaries or related companies, assumes any liability whatsoever for the accuracy or completeness of the information contained herein. Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.