MATERIAL SAFETY DATA SHEET

Aluminum Chloride - Anhydrous

Date Prepared: 5/5/97
MSDS No.:SE-3101-00 REV:A
Latest Review: 9/1/06

SECTION 1. CHEMICAL PRODUCT AND COMPANY INFORMATION

Product Name…….:	Aluminum Chloride – Anhydrous		
Product Use……:	Specialty & Commodity Chemicals		
Chemical Name……..:	Aluminum Chloride – Anhydrous		
Chemical Family……:	Metal Chloride		
Formula……..:	$A1C1_3$		
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. COMPOSTION, INFORMATION ON INGREDIENTS

Chemical Name	Percentage	CAS Number	PIN #
Aluminum Chloride	>99%	7446-70-0	

OSHA HAZARDOUS COMPONENTS (29CFR 1910.1200)

Chemical Name	OSHA PEL	AGGIH TLV
Aluminum Chloride	None	None

SECTION 3. HAZARDS IDENTIFICATION

3.1 Acute effects:

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.

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

Acute inhalation effects: Material is a severe respiratory irritant when inhaled.

3.2 Chronic effects: Chronic health effects from expected possible exposure routes are not reported or expected.

3.2 OSHA Hazard Information:

OSHA Health Hazard Classification:

3.3.1 Carcinogen.

NTP…….: No
IARC……...: No
OSHA……..: No

3.3.2 Target Organ Effects. (Chronic effects)

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

3.3.3 Other Hazards.

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

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.
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 medical attention.
First Aid for Inhalation: Remove victim to fresh air. If breathing is difficult, administer oxygen. If not breathing, perform rescue breathing. Seek 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: See 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.

SECTION 5. FIRE FIGHTING MEASURES

5.1 Flammable properties.

Flash point……: None
UEL……...: None
LEL……...: None
Autoignition Temperature……: None

5.2 Explosion hazards.

Shock Sensitive……..:	No
Explosive Dust……...:	No
Other……...:	No

5.3 Extinguishing media — Not applicable

5.4 Hazardous combustion products — Hydrogen Chloride, aluminum oxide.

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.

See section 16 for the North American Emergency Response Guide #137

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.)

SECTION 7. HANDLING AND STORAGE

7.1 Storage conditions.

Storage Temperature……:	Ambient
Shelf Life……..:	1 Year (if stored properly)
Recommended Use……...:	90 Days
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.

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

8.1 Eye protection requirements: Where exposure to fumes or particulate may occur Safety glasses with monogoggles 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 facepiece respirator or safety glasses with faceshield).

8.2 Skin protection requirements: To prevent skin contact with aluminum chloride utilize poly coated tyvek coveralls. 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.
Color……:	Yellow to gray
Odor…….:	Sharp irritating
pH……..:	Not applicable
Boiling Point…….:	Not applicable
Vapor Pressure…….:	1 mm @ 100 degrees C
Evaporation Rate……..:	Not available
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/Water)…...:	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 LD_{50} in rabbits is >2 g/kg.
Acute Oral Effects……..:	The oral LD_{50} 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.
Subchronic 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……..: D003 – 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

MATERIAL SAFETY DATA SHEET

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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 8/ CORROSIVE
14.3 IATA Regulations	Packaging – 814 & 814Y
14.4 Transport Canada TDG Regulations PIN #1726	See section 14.1
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 (D003)
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

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

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Date Prepared: 5/5/97
MSDS No.:SE-3101-00 REV:A
Latest Review: 9/1/06

2000 North American Emergency Response Guide
(*Text of the 2000 ERG)*
ORANGE PAG 238 & 239
SUBSTANCES – WATER-REACTIVE – CORROSIVE

POTENTIAL HAZARDS
HEALTH

TOXIC:

- Inhalation, ingestion or contact (skin, eyes) with vapors, dusts or substance may cause severe injury, burns or death.
- Fire will produce irritating, corrosive and/or toxic gases.
- Reaction with water may generate much heat, which will increase the concentration of fumes in the air.
- Contact with molten substance may cause severe burns to skin and eyes.
- Runoff from fire control or dilution may cause pollution.

FIRE OR EXPLOSION:

- Some of these materials may burn, but none ignite readily.
- May ignite combustibles (wood, paper, oil, clothing, etc.)
- Substance will react with water (some violently), releasing corrosive and/or toxic gases.
- Flammable/toxic gases may accumulate in confined areas (basement, tanks, hopper/tank cars etc.)
- Contact with metals may evolve flammable hydrogen gas.
- Substance may be transported in a molten form.

PUBLIC SAFETY

- CALL Emergency Response Telephone Number on Shipping Paper first. If Shipping Paper not available or no answer, refer to appropriate telephone number listed on the inside back cover.
- Isolate spill or leak area immediately for at least 50 to 100 meters (160 to 330 feet) in all directions.
- Keep unauthorized personnel away.
- Stay upwind.
- Keep out of low areas.
- Ventilate enclosed areas.

PROTECTIVE CLOTHING

- Wear positive pressure self-contained breathing apparatus (SCBA).
- Wear chemical protective clothing, which is specifically recommended by the manufacturer.
- Structural firefighters' protective clothing is recommended for fire situations ONLY; it is not effective in spill situations.

EVACUATION

Spill: See the Table of Initial Isolation and Protective Action Distances for highlighted substances. For non –highlighted substances, increase, in the downwind direction, as necessary, the isolation distance shown under PUBLIC SAFETY.

Fire: If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (1/2 mile) in all directions; also, consider initial evacuation for 800 meters (1/2 mile) in all directions.

EMERGENCY RESPONSE

Fire

- When material is not involved in fire: do not use water on material itself.

Small Fires

- Dry chemical or CO2
- Move containers from fire area if you can do it without risk.

Large Fires

- Flood fire area with large quantities of water, while knocking down vapors with water fog. If insufficient water supply: knock down vapors only.

Fire involving Tanks or Car/Trailer Loads

- Cool containers with flooding quantities of water until well after fire is out.
- Do not get water inside containers.
- Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank.
- ALWAYS stay away from the ends of tanks.

SPILL OR LEAK

- Fully encapsulating, vapor protective clothing should be worn for spills and leaks and no fire.
- Do not touch damaged containers or spilled material unless wearing appropriate protective clothing.
- Stop leak if you can do it without risk.
- Use water spray to reduce vapors; do not put water directly on leak, spill area or inside container.
- Keep combustibles (wood, Paper, oil, etc.) away from spilled material.

Small Spills

- Cover with DRY earth, DRY sand, or other non-combustible material followed with plastic sheet to minimize spreading or contact with rain.
- Use clean non-sparking tools to collect material and place it into loosely covered plastic containers for later disposal.
- Prevent entry into waterways, sewers, basements or confined areas.

FIRST AID

- Move victim to fresh air.
- Call emergency medical care.
- Apply artificial respiration if victim is not breathing.
- Do not use mouth-to-mouth method 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.
- Administer oxygen if breathing is difficult.
- Remove and isolate contaminated clothing and shoes.
- In case of contact with substance, immediately flush skin or eyes with running water for at lease 20 minutes.
- For minor skin contact, avoid spreading material on unaffected skin.
- Removal of solidified molten material from skin requires medical assistance.
- Keep victim warm and quiet.
- Effects of exposure (inhalation, ingestion or skin contact) to substance may be delayed.
- Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves.

MATERIAL SAFETY DATA SHEET

Aluminum Chloride - Anhydrous

16.2 Disclaimer

This MSDS has been prepared in compliance with the ANSI standard ANSI Z400.1-1998. All information contained herein has been prepared by technically knowledgeable personnel and is correct to the best of our knowledge. This information is given without warranty or representation. We do not assume any legal responsibility for the source. It is the customer's responsibility to establish policies for the safe handling and use of this. Our technical staff will be happy to respond to any questions concerning this product or information contained herein.

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