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Aluminum Sulfate STORAGE AND HANDLING

Shipment

Liquid Aluminum Sulfate is shipped in stainless steel, fiberglass or rubber lined tank trucks which conform to D.O.T. specifications as well as the laws of the states in which they operate. Liquid aluminum sulfate is also available in railcars.

The average bulk shipment is 4,200 gallons or approximately 47,000 pounds. The Liquid Aluminum Sulfate is unloaded through a 2 inch reinforced rubber hose using air pressure supplied by the truck's air compressor. The fittings are 2-inch cam & groove quick connect couplers.

The Liquid Aluminum Sulfate may be delivered at temperatures >113°F.

Storage and Handling

Tanks for receiving tank truck deliveries should be a minimum of 1.5 times the delivery amount or a minimum of 6,500-gallon capacity. An easy means of determining the level in the tanks should be available, such as a sight tube or dip stick, so that the tank will not be overfilled during delivery.

Storage tanks should be indoors or in an enclosed, heated area. Liquid Alum begins to crystallize near 30° F and freezes around 9° F. If outside storage is necessary, the storage tanks should be insulated and depending on the thru-put of material, may require a heat source to maintain the contents at around 50° F.

Storage tanks should be emptied and inspected annually.

Equipment and Piping

Storage Tanks: Tanks may be constructed of fiberglass/epoxy, rubber lined steel or Type 316 stainless steel.

Piping: Schedule 80 PVC is often used for operating temperatures not exceeding 120° F. At temperatures above 120° F, use schedule 80 CPVC or Type 316 stainless steel. Glass reinforced plastic or hard rubber are also suitable materials for piping. Due to the high co- efficiency of expansion for PVC and CPVC, piping made of these materials should not be anchored at both ends of a piping run and must be adequately supported when installed.

Gravity feed, when possible, is preferable to the use of pumps. Initial pump cost and maintenance are eliminated. When centrifugal pumps are used they should be sized for head and flow requirements. Wetted parts should be of Alloy 20 or Type 316 stainless steel. Packing may be of graphite or Teflon.

Gasket materials are Teflon, neoprene or rubber.

There are several types of valves suitable for handling Liquid Aluminum Sulfate. Their wetted parts should be of Alloy 20, Type 316 stainless steel, Teflon, PVC or Hastelloy C.
Feed rates and metering can be accomplished using rotameters, volumetric displacement pumps, weighing devices and mechanical feeders. The wetted parts of these devices should be of Alloy 20, Type 316 stainless steel, Teflon, PVC or Hastelloy C.

Maintenance of the equipment should follow general industry standards and manufacturers recommendations.

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Aluminum Sulfate STORAGE AND HANDLING

Aluminum Sulfate, Solution, 36° Baume

Formula $Al_2(SO_4)_3 \cdot 14\ H_2O$ in water solution

CAS # 10043-01-3

Specific Gravity	1.33 @ 60° F
Freezing Point*	9° F
Boiling Point	214° F
Al2O3	8.3%
pH	2.0 – 2.4
Density @ 60° F	11.11#/gal
Pounds of dry alum/gallon	5.43

* The freezing point of alum solutions can only be given as approximations because alum solutions tend to crystallize as well as freeze. A concentrated alum solution stored for a period of time at temperatures slightly above the freezing point will crystallize and give the appearance of freezing.

Safety

Liquid Aluminum Sulfate is an acid salt and should be handled with care. Employ precautions to prevent spraying or splashing, particularly if the material is hot. Avoid contact with the eyes, mucous membranes and skin.

OSHA 1910.132 requires employers to determine the appropriate personal equipment for each hazard and to train employees on how and when to use protective equipment. The following recommendations are guidelines and may not apply to every situation.

Clothing

- Avoid contact with Aluminum sulfate. If there is a potential for contact, wear protective gloves and clothing. Safety equipment suppliers/manufacturers can provide recommendations on the most protective glove/clothing material for your operation.
- All protective clothing (suits, gloves, footwear, headgear) should be clean, available each day, and put on before work.

Eye Protection

- Wear indirect-vent, impact and splash resistant goggles when working with liquids.
- A face shield along with goggles may be appropriate when working with corrosive, highly irritating or toxic substances.

Liquid Aluminum Sulfate when spilled on stairways, walkways and floors may become very slippery and pose a danger. Ferrous metals will deteriorate rapidly when exposed to Liquid Aluminum Sulfate.

Spill

Spills may be contained and collected into containers for later use or disposal. Because of its low pH, Liquid Aluminum Sulfate may be considered a hazardous waste under RCRA. The “Reportable Quantity” for Aluminum Sulfate is 5,000-pounds. Local and state regulations may require reporting of smaller quantities. Residues may be neutralized to a pH of 7 with soda ash*. Persons responding to a spill of Aluminum Sulfate should wear appropriate personal protective equipment to prevent contact with skin, eyes and clothing. In areas where an Aluminum Sulfate mist may be present, a NIOSH approved cartridge respirator should be worn. Disposal of any hazardous waste must comply with local, state and federal regulations.

* Be aware, neutralization with soda ash releases carbon dioxide gas. Make sure there is adequate ventilation.

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