



Petition received by AMS
on 3/1/2014

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August 6, 2013

Lisa M. Brines, Ph.D.
National List Manager
USDA/AMS/NOP
1400 Independence Ave. SW
Room 2648-So., Ag Stop 0268
Washington, DC 20250-0268

Dear Dr. Brines:

Please find enclosed with this cover letter a petition to add aluminum sulfate commonly referred to as alum to the National List at section **205.603** (synthetic substances allowed for use in organic livestock production) based on it's use as a poultry, turkey and livestock bedding (litter) amendment. Litter treated with aluminum sulfate is also used as a natural land applied fertilizer. Alum treated litter is approved by EPA/NRCS as part of their Environmental Quality Incentive Program (EQUIP), where NRCS pays an incentive in an attempt to encourage farmers to use alum based litter amendments. The purpose of the EQUIP program is to use aluminum sulfate to bind soluble phosphorus in litter preventing runoff of soluble phosphorus into ground water and waterways, which in turn prevents algae blooms, reducing the threat of algae related mycotoxin exposure to livestock and humans. With this in mind, it is also our wish to petition the NOP Board to add aluminum sulfate to the National List section **205.601** (synthetic substances allowed for use in organic crop production).

If you require additional information or clarification, please do not hesitate to call or email me.

Sincerely,

Pat Welch, Ph.D.

Aluminum Sulfate as a Poultry Litter Amendment for Ammonia Control and Improved Nutrient Content of Poultry Litter

Item A – Petition for inclusion of aluminum sulfate, commonly referred to as alum, at sections 205.601 (Synthetic substances allowed for use in organic crop production) and 205.603 (Synthetic substances allowed for use in organic livestock production).

At the present time there are no aluminum sulfate litter amendments approved for organic use in poultry, turkey and livestock bedding. Justification for permitting the use of aluminum sulfate is that it effectively reduces ammonia in poultry and livestock dwellings. It is well established that exposure of poultry and livestock to volatilized ammonia has a significant detrimental effects on animal health and well-being, livability and live performance. Volatilized ammonia exposure is also a health risk to caretakers. Aluminum sulfate has been shown to be a safe and effective economical way to control ammonia in poultry and livestock dwellings.

Item B – Information Regarding Aluminum Sulfate

1. The chemical name of the substance being petitioned is aluminum sulfate commonly referred to as alum.

Aluminum sulfate is marketed as a dry granule, a liquid and an acidified liquid:

- **Al⁺Clear[®] Poultry Grade Alum** ... (dry alum)
- **Al⁺Clear[®] Liquid Alum**
- **Al⁺Clear[®] A7** ... (acidified liquid alum)

2. This petition is being filed on behalf of Chemtrade Logistics US, LLC; 90 East Halsey Road, Parsippany, NJ 07054 ... Phone: (601) 319-5944. Email: pwelch@chemtradelogistics.com, pwelch5944@comcast.net.

3. Intended or current uses of aluminum sulfate:

- a. **Ammonia Control:** The intended and current use of aluminum sulfate is to be used as a poultry and livestock bedding amendment. Aluminum sulfate has been in poultry, turkeys and livestock for decades to safely and effectively protect animals and caretakers from volatilized ammonia that is generated from poultry and livestock manure, which accumulates in poultry and livestock bedding. For the sake of clarification the term litter will be used synonymously with bedding and mixtures of used bedding and manure. Volatilized ammonia that occurs from the natural decomposition process in litter is the result of bacterial enzyme hydrolysis of uric acid to urea which is further hydrolyzed to ammonia (NH₃). Ammonia has been shown to be detrimental to animal health, livability, well-being and overall live performance. Aluminum sulfate reacts with ammonia by donating acid ions, converting ammonia (NH₃) to ammonium (NH₄⁺), a highly reactive ion that bonds with nitrates, phosphates and sulfates forming

36 stabile non-volatile ammonium salts that are retained in the litter, which improve the
37 litter's nutrient value as a natural fertilizer.

- 38 b. **Aid to the Environment:** Alum also has the unique ability to bind soluble phosphorus
39 which is the basis for its use in the EPA/NRCS Environmental Quality Incentive
40 Program. NRCS pays poultry farmers a cost-share incentive to use aluminum sulfate
41 containing products (acidified liquid aluminum sulfate and dry liquid aluminum sulfate).
42 When phosphorus is bound by aluminum sulfate, soluble phosphorus no longer is an
43 environmental threat to ground water, lakes, streams and waterways, preventing
44 phosphorus related eutrophication that leads to algae bloom.
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46 Some algae species are toxigenic and this is the reason EPA provides incentives and
47 financial compensation for use of aluminum sulfate as a litter amendment. It should also
48 be noted that most of the water in the United States is treated with aluminum sulfate, as
49 a clarifying step in the reuse and water purification process.

- 50 c. **As a Natural Fertilizer:** By retaining nitrogen in the litter through the conversion of NH_3
51 to NH_4^+ , and by binding soluble phosphorus, the fertilizer nutrient value of alum treated
52 litter is improved. When land applied, litter that has been treated with alum contains
53 bound soluble phosphorus that is utilized by plants on an as need basis. Plants have
54 the ability to secrete acid from their roots to break the aluminum phosphate bonds re-
55 solubilize phosphorus, making the essential nutrient available to plants. Aluminum
56 sulfate in water treatment is classified as a flocculent and its function is to precipitate
57 silica, minerals and organic material out of suspension. It is incorporated as one of the
58 initial steps in municipal water purification. Aluminum sulfate based products have also
59 been used for decades in municipal water treatment and lake restorations in the US and
60 Canada. Over 50% of the municipal water in the US is treated with Chemtrade
61 aluminum sulfate, the sponsor for this petition and aluminum sulfate is the most widely
62 used water clarification chemical in the world.

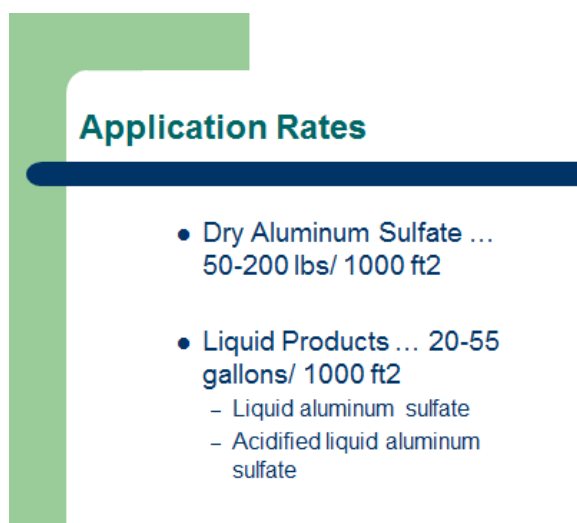
63 **d. Other Uses and Facts Regarding Aluminum Sulfate**

- 64 i. **Food Additives:** Alum (aluminum sulfate) is an acid salt and is used to adjust
65 acidity of foods. It is used in pickling, leavening agent in baked goods, and in
66 cheese processing.
67 ii. **Personal Care Products:** Used in styptic pencils, treatment of cold sores, and
68 some veterinary treatment procedures as an acidifying astringent and desiccant.
69 iii. **Soil Amendment:** Aluminum sulfate is used as a direct source of acidity in the
70 remediation of alkaline soils and to tie up phosphorus and improve water holding
71 capacity of the soil.

- 72 iv. Aluminum is the third most common element in the earth's crust and the most
73 abundant metal.
74 v. Soils are from 1-15% aluminum, with the US average approximately 7%.
75 vi. Solid dry alum (aluminum sulfate) is 9.2% aluminum, liquid alum is 4.2%
76 aluminum and liquid 7% acid alum is 3.25% aluminum.

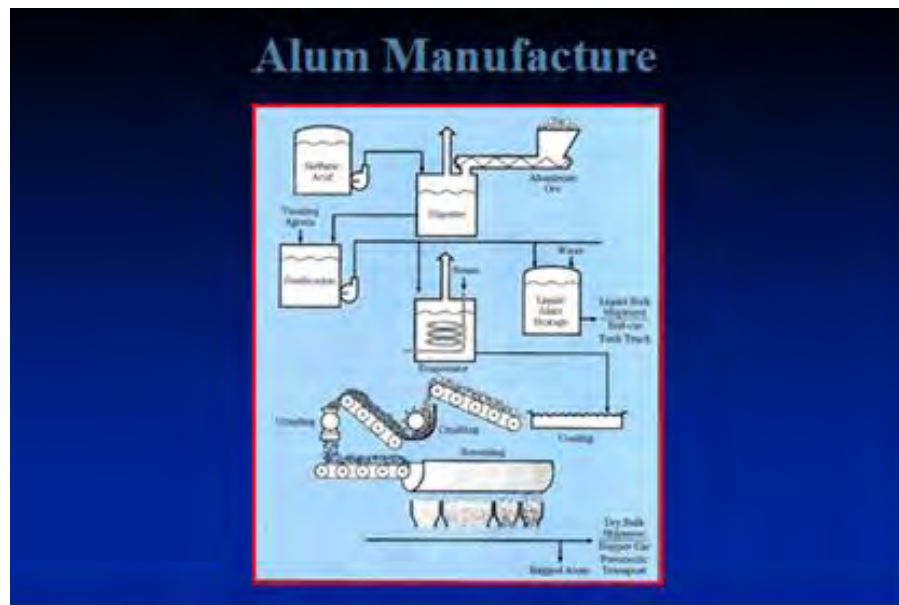
77 **4. List of crops, livestock and handling activities for which substance will be used:**

- 78 a. Aluminum sulfate treated litter is used as a land applied natural fertilizer in all areas of
79 plant agriculture, e.g., forages, row crops, and forest management.
80 b. Poultry and turkeys are the primary production animal class where aluminum sulfate is
81 used to control ammonia and to sanitize bedding, but it has been used to control
82 ammonia in bedding used with virtually all confined animal species.
83 c. The rate is dictated by litter conditions, weather, type of housing, ventilation equipment
84 and general husbandry expertise. Under less desirable conditions application rates
85 increase. Likewise under desirable conditions application rates can be reduced to lower
86 levels.



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- 88 d. **Application Techniques:** Dry aluminum sulfate is applied using drop spreaders, and
89 centrifugal (slinger) spreaders, varying in size and complexity depending on application
90 demand. Liquid aluminum sulfate is applied using a vehicle designed with a storage
91 tanks, a pump and a PVC spray wand equipped with stainless steel nozzles. Typical
92 dry product application rates range from 50 to 200 lbs. /1000 ft². Typical liquid product
93 application rates range from 20 to 55 gal/ 1000 ft². Dry aluminum sulfate is either
94 applied by the poultry farmer or by custom applicators. Liquid aluminum sulfate and
95 acidified aluminum sulfate products are applied by custom applicators.

- 96 **5. Source and Manufacturing:** Aluminum sulfate is manufactured by reacting bauxite ore or
97 hydrated aluminum $\text{Al}(\text{OH})_3$ or $\text{Al}_2\text{O}_3 \cdot 3\text{H}_2\text{O}$ with sulfuric acid and water. Water is added to dry
98 aluminum sulfate to produce liquid alum and acidified liquid alum is fortified with 7% sulfuric
99 acid.



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6. **Availability of Previous Reviews:** No previous reviews by any State have been conducted; however, USDS-ARS has conducted considerable research on aluminum sulfate and has numerous publications which are listed in the reference list in this petition, where they looked at a variety of parameters including reducing volatilized ammonia, the effects of alum treated litter on forage yields and reducing ammonia emissions from broiler houses. David Carter with Crystal Springs Consulting, a private consultant, was hired to do a thorough review of aluminum sulfate products and programs to determine the feasibility of acceptability of aluminum sulfate products as a an approved synthetic compound for organic use. His conclusion was that based on the chemistry of aluminum sulfate there should be no reasonable objection in its use as a litter amendment to control ammonia and as a natural fertilizer when treated litter is land applied.

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7. **Information regarding EPA, FDA and State regulatory authority registration numbers.**

- a. **California Proposition 65** – This product does not contain any Proposition 65 chemicals.
- b. **FDA Regulation** – Aluminum sulfate IFN 8-20-861, Reg. 582.1125. Limitations or restrictions (none). GRAS (generally regarded as safe). AAFCO manual.


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8. **CAS Number:** 10043-013

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9. **Physical properties, chemical mode of action, interaction with other substances, toxicity and environmental persistence:**

a. Physical Properties

 Proven Products and Innovative Application Expertise			
TYPICAL PROPERTIES	APPROXIMATE VALUES		
	Liquid Al+Clear [®] LIQUID ALUM	Dry Al+Clear [®] GROUND DRY ALUM	Al+Clear [®] Liquid A7 7% ACID LIQUID ALUM
Aluminum Metal (Al), %	4.20	9.10	3.25
Aluminum as Aluminum Oxide (Al ₂ O ₃), %	8.0-8.3	17.0-17.1	6.1-6.3
Aluminum Sulfate (Al ₂ (SO ₄) ₃ •(14)H ₂ O), %	48.5	99.0	35-37
Density, lb/ft ³ , lb/gal	11.1	41 (powder) - 63-71 (granular)	10.6-10.8
Alum, lb/gal	5.4	N/A	3.9
Specific Gravity	1.33 - 1.34	N/A	1.27 - 1.29
pH (neat = as delivered)	2.4	3.5 in 1% solution	<2.0
Freezing Point, degrees C/F	-15C/5F	N/A	7F
	PHOSPHORUS REMOVAL APPLICATION RATES, lb or gal/Kft ²		
	9.26	50	12.8
	13.89	75	19.2
	18.52	100	25.6
	27.78	150	38.5
	37.04	200	51.3

IMPORTANT: THESE APPLICATION RATE CONVERSIONS ARE INTENDED FOR CROSS-REFERENCING PHOSPHORUS REMOVAL EFFICIENCIES. DETERMINE LITTER CONDITIONS AND GROWER REQUIREMENTS PRIOR TO CHOOSING BEST PRODUCT AND RATE TO APPLY.

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b. As aluminum sulfate is hydrolyzed by moisture in the litter, aluminum sulfate produces acid ions (H⁺) which react with ammonia (NH₃) for form ammonium (NH₄⁺) an ion that readily bonds with soluble phosphorus. This is the basis for EPA/NRCS' Environmental Quality Improvement Program where NRCS pays poultry farmers to use alum based litter amendments because of the ability of aluminum sulfate to bind soluble phosphorus preventing runoff of soluble phosphorus into groundwater, streams and lakes which can result in algae blooms. Certain species of algae produce toxins that are toxic to animals and humans.

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c. Possibility of hazardous reactions as applied will not occur. RE: MSDS.

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d. Acute toxicity for mice is 6.21 grams/kg; rats 1.92 grams/kg. Long term studies conducted by USDA have shown no adverse effects to the environment when alum treated litter was land applied, and plant yields from tall fescue test plots were equal to or greater than test plots treated with non-alum treated litter or ammonium nitrate fertilizer. References...

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10. MSDS are available (below) but a substance report from the National Institute of Environmental Health Studies has not been conducted. Also included is an assessment conducted by Dave Carter with Crystal Springs Consulting, Westminster, CO; an independent consultant retained by General Chemical Corporation to evaluate the feasibility of acquiring organic certification.



Material Safety Data Sheet

NFPA	HMIS	PPE	Symbol(s) Regulated

Preparation Date August 22, 2008

Revision Date

Revision Number: 0

Product Name: Al+Clear Poultry Grade Alum

1. PRODUCT AND COMPANY IDENTIFICATION

Product Name: Al+Clear Poultry Grade Alum

Other/Generic Names: Aluminum Sulfate

Recommended Use: Agricultural

Manufacturer: General Chemical, LLC
90 East Halsey Road
Parsippany, NJ 07054

Further information: FOR MORE INFORMATION CALL:
Customer Service US ONLY: 800-631-8050
(Monday-Friday, 9:00am - 4:30pm)

Customer Service CANADA ONLY: 866-543-3896
(Monday-Friday, 9:00am - 4:30pm)

Emergency Telephone Number: IN CASE OF EMERGENCY CALL CHEMTREC: 800-424-9300 US ONLY
24 Hours/Day, 7 Days/Week) CANADA ONLY CALL CANUTEC: 613-996-6666
(24 Hours/Day, 7 Days/Week)

2. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW: White or creamy white granules or powder with no odor. Can irritate the skin and eyes. Not flammable, but may release toxic vapors if decomposed in a fire.

OSHA Regulatory Status: This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

Potential Health Effects

Skin:	May cause skin irritation, especially under repeated or prolonged contact, or when moisture is present.
Eyes:	May irritate or burn eyes. Similarly for the aqueous solution.
Inhalation:	Dust or mist inhalation at levels above the TLV may cause irritation to the respiratory tract.
Ingestion:	May irritate the gastrointestinal tract.
Delayed Effects:	None known.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Component	CAS-No	Weight %
aluminum sulfate	10043-01-3	100

4. FIRST AID MEASURES

Eye Contact	Immediately flush eyes with water for at least 15 minutes. Get medical attention if irritation persists.
Skin Contact:	Wash off immediately with soap and plenty of water removing all contaminated clothes and shoes. If irritation develops, get medical attention.
Inhalation:	Remove victim immediately to fresh air.
Ingestion:	If conscious, immediately give large quantity of water or milk. If not already vomiting, induce vomiting by touching finger to back of throat. Get medical attention.
Notes to Physician	Treat symptomatically.

5. FIRE-FIGHTING MEASURES

Flammable Properties

Flash Point:	Not flammable
FLASH POINT METHOD:	Not applicable.
Autoignition Temperature	Not applicable
UPPER FLAME LIMIT (volume % in air):	Not applicable
LOWER FLAME LIMIT (volume % in air):	Not applicable
FLAME PROPAGATION RATE (solids):	Not applicable
OSHA FLAMMABILITY CLASS:	Not applicable

Suitable Extinguishing Media Product is not flammable. Use any extinguishing agent suitable for surrounding fire.

Unsuitable Extinguishing Media No information available.

Explosion Limits

Hazardous Combustion Products No information available

Impact sensitivity No information available
Sensitivity to static discharge No information available

Specific Hazards Arising from the Chemical

Keep product and empty container away from heat and sources of ignition.

Protective Equipment and Precautions for Firefighters

Use self-contained breathing apparatus.

NFPA

Health 2

Flammability 0

Instability 1

6. ACCIDENTAL RELEASE MEASURES**IN CASE OF SPILL OR OTHER RELEASE:**

Shovel up dry chemical and place in empty container and cover. Spray residue with plenty of water. Neutralize residue with alkali such as soda ash, lime or limestone. Adequate ventilation is required for soda ash or limestone due to release of CO₂ gas. Collect liquid and/or residue and dispose of in accordance with applicable regulations.

7. HANDLING AND STORAGE**Handling**

Avoid contact with skin, eyes and clothing. Do not breathe product mists.

Storage

Store in a cool, dry place.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Component	ACGIH TLV	OSHA PEL	Ontario TWA EV	Mexico OEL (TWA)	NIOSH IDLH
aluminum sulfate 10043-01-3				TWA: 2 mg/m ³	

Engineering Measures

Use local exhaust if dusty or misty conditions prevail.

Personal Protective Equipment**Eye/face Protection**

Wear chemical safety goggles. Do not wear contact lenses.

Skin Protection

Wear gloves and appropriate industrial work clothing including long sleeved shirts and trousers for routine product handling. If prolonged or repeated contact is anticipated, all clothing should be impervious to liquid.

Respiratory Protection

A NIOSH approved dust or mist respirator should be worn in areas where product dusts or mists are present.

General Hygiene Considerations

Eyewash and safety showers are recommended.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	No information available
Color	White or creamy white
Chemical Formula	Al ₂ (SO ₄) ₃ •14H ₂ O
Odor	Odorless
Odor Threshold	No information available
Physical State	Granules or powder
pH	~3.5 (1% solution)
Flash Point:	Not flammable
Autoignition Temperature	Not applicable
Boiling Point/Range	Not applicable
Melting Point/Range	Not applicable
Flammability Limits in Air	No information available
Explosive Properties	No information available
Oxidizing Properties	No information available

Evaporation Rate	Not applicable
Vapour Pressure	Negligible
Vapour Density	Not applicable
Specific Gravity	1.61
Solubility	No information available
Partition Coefficient (n-octanol/water)	No information available
Viscosity	No information available
Molecular Weight	~594 for Al ₂ (SO ₄) ₃ * 14H ₂ O
Water Solubility	50% at 0°C

10. STABILITY AND REACTIVITY

Chemical Stability	Normally stable.
Conditions to Avoid	Avoid temperatures above 760°C, as this will yield toxic and corrosive gases.
Incompatible Products	Alkalis and water reactive materials such as oleum: causes exothermic reactions.
Hazardous Decomposition Products	At elevated temperatures, sulfur oxides may be formed. These are toxic and corrosive and are oxidizers. Sulfur trioxide is also a fire hazard. The loss of these gases leaves a caustic residue.
Possibility of Hazardous Reactions	Will not occur.

11. TOXICOLOGICAL INFORMATION

Acute Toxicity

LD50 Oral:	aluminum sulfate component: (oral-mouse): 6207 mg/kg (oral-rat): 1930 mg/kg
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Component Information

Irritation	No information available
Corrosivity	No information available.
Sensitization	No information available.

Chronic Toxicity

Carcinogenicity	There are no known carcinogenic chemicals in this product.
Mutagenic Effects	No information available.
Reproductive Effects	No information available.
Developmental Effects	No information available.
Teratogenicity	No information available.

Target Organ Effects No information available

Endocrine Disruptor Information

12. ECOLOGICAL INFORMATION

Ecotoxicity

Contains no substances known to be hazardous to the environment or not degradable in waste water treatment plants.

Component	Freshwater Algae	Freshwater Fish	Microtox	Water Flea
aluminum sulfate		LC50= 100 mg/L goldfish 96 h		

Persistence and Degradability No information available.

Bioaccumulation No information available.

Mobility in Environmental Media No information available

Other adverse effects aluminum sulfate component:
 14 ppm/36 hr./fundulus/fatal/fresh water;
 240 ppm/48 hr./mosquito fish/TLm/water type not specified;
 TLm Mosquito fish, 235 ppm, 96 hours;
 LC50 Largemouth bass, 250 ppm, 96 hours

13. DISPOSAL CONSIDERATIONS

Waste Disposal Methods If permitted by regulations, material may be dissolved in water and neutralized with alkali. Neutralized waste may have to be disposed of by an approved contractor.

Contaminated Packaging Empty containers should be taken for local recycling, recovery or waste disposal.

US EPA Waste Number No information available

Component	RCRA	RCRA - Basis for Listing	RCRA - D Series Wastes	RCRA - U Series Wastes
aluminum sulfate - 10043-01-3				

14. TRANSPORT INFORMATION

DOT
Proper Shipping Name Regulated
 Environmentally hazardous substances, solid, n.o.s. (contains aluminum sulfate) (only if greater than 8700 lbs. in one package)
Hazard Class 9
UN-No UN3077

TDG
Hazard Class Regulated
 9
UN-No UN3077

15. REGULATORY INFORMATION

International Inventories

TSCA Complies

DSL	Complies
NDSL	Complies
EINECS/ELINCS	Does not Comply
ENCS	Complies
CHINA	Complies
KECL	Does not Comply
PICCS	Complies
AICS	Complies

U.S. Federal Regulations

SARA 313

Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product does not contain any chemicals which are subject to the reporting requirements of the Act and Title 40n of the Code of Federal Regulations, Part 372.

SARA 311/312 Hazardous Categorization

Chronic Health Hazard	No
Acute Health Hazard	Yes
Fire Hazard	No
Sudden Release of Pressure Hazard	No
Reactive Hazard	No

Clean Water Act

CERCLA

U.S. State Regulations

Callifornia Proposition 65

This product does not contain any Proposition 65 chemicals.

State Right-to-Know

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
aluminum sulfate	X	X	X		

Other International Regulations

Mexico - Grade No information available

Canada

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR.

WHMIS Hazard Class

D2B Toxic materials

**16. OTHER INFORMATION**

Prepared By Kaci Rosano, Product Safety Supervisor

Preparation Date August 22, 2008

Revision Date

Revision Summary Transfer to new Werco format

Disclaimer

All information, statements, data, advice and/or recommendations, including, without limitation, those relating to storage, loading/unloading, piping and transportation (collectively referred to herein as "information") are believed to be accurate and reliable. However, no representation or warranty, express or implied, is made as to its completeness, accuracy, fitness or a particular purpose or any other matter, including, without limitation, that the practice or application of any such information is free of patent infringement or other intellectual property misappropriation. General Chemical, LLC, is not engaged in the business of providing technical, operational, engineering or safety information for a fee, and therefore, any such information provided herein has been furnished as an accommodation and without charge. All information provided herein is intended for use by persons having requisite knowledge, skill and experience in the chemical industry. General Chemical, LLC, shall not be responsible or liable for the use, application or implementation of the information, provided herein, and all such information is to be used at the risk, and in the sole judgement and discretion, of such persons, their employees, advisors and agents.

End of MSDS



MATERIAL SAFETY DATA SHEET

Liquid Al+Clear[®]

4. FIRST AID MEASURES

SKIN: Flush with plenty of water, removing contaminated clothing. If irritation develops, get medical attention.

EYES: Immediately flush with water, continuing for at least 15 minutes. If irritation persists, get medical attention.

INHALATION: Promptly remove to fresh air.

INGESTION: If conscious, immediately give large quantity of water or milk. If not already vomiting, induce vomiting by touching finger to back of throat. Get immediate medical assistance.

ADVICE TO PHYSICIAN: Treat symptomatically.

5. FIRE FIGHTING MEASURES

FLAMMABLE PROPERTIES

FLASH POINT:	Not flammable
FLASH POINT METHOD:	Not applicable
AUTOIGNITION TEMPERATURE:	Not applicable
UPPER FLAME LIMIT (volume % in air):	Not applicable
LOWER FLAME LIMIT (volume % in air):	Not applicable
FLAME PROPAGATION RATE (solids):	Not applicable
OSHA FLAMMABILITY CLASS:	Not applicable

EXTINGUISHING MEDIA:

Product is not flammable. Use any extinguishing agent suitable for surrounding fire.

UNUSUAL FIRE AND EXPLOSION HAZARDS:

None.

SPECIAL FIRE FIGHTING PRECAUTIONS/INSTRUCTIONS:

Use self-contained breathing apparatus. Use water spray to keep containers cool.

6. ACCIDENTAL RELEASE MEASURES

IN CASE OF SPILL OR OTHER RELEASE: (See section 8 for recommended personal protective equipment.)

Dilute small spills or leaks cautiously with plenty of water. Neutralize any further residue with alkali such as soda ash, lime or limestone. Adequate ventilation is required if soda ash or limestone is used, because of the consequent release of carbon dioxide gas. Large spills: dike up with soda ash and neutralize as above. Collect liquid and/or residue and dispose of in accordance with applicable regulations.

Spills and releases may have to be reported to Federal and/or local authorities. See Section 15 regarding reporting requirements.

7. HANDLING AND STORAGE

NORMAL HANDLING: (See section 8 for recommended personal protective equipment.)

Avoid contact with skin, eyes and clothing. Do not breathe product mists.

Material Safety Data Sheet



Liquid Al+Clear[®]

1. PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: Liquid Al+Clear[®]

OTHER/GENERIC NAMES: Mixture of Aluminum Sulfate in water.

PRODUCT USE: Agricultural.

MANUFACTURER: General Chemical Corporation
90 East Halsey Road
Parsippany, NJ 07054

FOR MORE INFORMATION CALL: 973-515-1840
(Monday-Friday, 9:00am-4:30pm)

IN CASE OF EMERGENCY CALL: 800-631-8050
(24 Hours/Day, 7 Days/Week)

2. COMPOSITION/INFORMATION ON INGREDIENTS

<u>INGREDIENT NAME</u>	<u>CAS NUMBER</u>	<u>WEIGHT %</u>
Aluminum sulfate	10043-01-3	<50
Water	7732-18-5	Balance

Trace impurities and additional material names not listed above may also appear in Section 15 towards the end of the MSDS. These materials may be listed for local "Right-To-Know" compliance and for other reasons.

OSHA Hazard Communication Standard: *This product is considered hazardous under the OSHA Hazard Communication Standard.*

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW: A clear, odorless light green or amber liquid. Can irritate the skin and eyes. Not flammable, but may release toxic vapors if decomposed in a fire.

POTENTIAL HEALTH HAZARDS

SKIN: May cause skin irritation.

EYES: May strongly irritate or burn the eyes.

INHALATION: Product mists may cause irritation to the respiratory tract.

INGESTION: May irritate the gastrointestinal tract. Concentrated solutions may cause burns to the digestive tract.

DELAYED EFFECTS: None known.

Ingredients found on one of the three OSHA designated carcinogen lists are listed below.

<u>INGREDIENT NAME</u>	<u>NTP STATUS</u>	<u>IARC STATUS</u>	<u>OSHA LIST</u>
No ingredients listed in this section.			



MATERIAL SAFETY DATA SHEET
Liquid Al+Clear®

STORAGE RECOMMENDATIONS:

Store in a cool area.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

ENGINEERING CONTROLS:

Use local exhaust if misting is anticipated.

PERSONAL PROTECTIVE EQUIPMENT

SKIN PROTECTION: Wear impervious (e.g. rubber) gloves and apron and full work clothing including long sleeved shirts, trousers and boots. Full impervious clothing is recommended if prolonged product contact is anticipated.

EYE PROTECTION: Wear chemical safety goggles. Do not wear contact lenses.

RESPIRATORY PROTECTION: A NIOSH approved mist respirator should be worn in areas where product mists are present.

ADDITIONAL RECOMMENDATIONS: The presence of an eyewash and safety shower is recommended.

EXPOSURE GUIDELINES

<u>INGREDIENT NAME</u>	<u>ACGIH TLV</u>	<u>OSHA PEL</u>	<u>OTHER LIMIT</u>
Aluminum sulfate (as Aluminum)	2 mg/m ³	2 mg/m ³	None

¹ = Limit established by General Chemical Corporation.

² = Workplace Environmental Exposure Level (AIHA).

³ = Biological Exposure Index (ACGIH).

OTHER EXPOSURE LIMITS FOR POTENTIAL DECOMPOSITION PRODUCTS:

None

9. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE:	Clear, light green or amber liquid.
PHYSICAL STATE:	Liquid
MOLECULAR WEIGHT:	Mixture
CHEMICAL FORMULA:	Mixture
ODOR:	Odorless
SPECIFIC GRAVITY (water = 1.0):	1.335
SOLUBILITY IN WATER (weight %):	100
pH:	~3.5 (1% solution)
BOILING POINT:	101°C
MELTING POINT:	-16°C
VAPOR PRESSURE:	Not applicable
VAPOR DENSITY (air = 1.0):	Not applicable



MATERIAL SAFETY DATA SHEET

Liquid Al+Clear[®]

EVAPORATION RATE: Not determined **COMPARED TO:** Not applicable.
% VOLATILES: ~50
FLASH POINT: Not flammable
(Flash point method and additional flammability data are found in Section 5.)

10. STABILITY AND REACTIVITY

NORMALLY STABLE? (CONDITIONS TO AVOID):

Normally stable. If evaporated to dryness, residue should not be exposed to elevated temperatures (above 760°C), as this will yield toxic and corrosive gases.

INCOMPATIBILITIES:

Alkalis and water reactive materials such as oleum: causes exothermic reactions.

HAZARDOUS DECOMPOSITION PRODUCTS:

At elevated temperatures, sulfur oxides may be formed. These are toxic and corrosive and are oxidizers. Sulfur trioxide is also a fire hazard. The loss of these gases leaves a caustic residue.

HAZARDOUS POLYMERIZATION:

Will not occur

11. TOXICOLOGICAL INFORMATION

IMMEDIATE (ACUTE) EFFECTS:

Aluminum sulfate:
LD₅₀ (oral, mouse): 6207 mg/kg
LD₅₀ (oral, rat): 1930 mg/kg

DELAYED (SUBCHRONIC AND CHRONIC) EFFECTS:

Data not available

OTHER DATA:

None

12. ECOLOGICAL INFORMATION

Aluminum sulfate:
14 ppm/36 hr/ fundulus/fatal/fresh water.
240 ppm/48 hr/mosquito fish/TL_m/water type not specified.
TL_m Mosquito fish, 235 ppm, 96 hours
LC₅₀ Largemouth bass, 250 ppm, 96 hours



MATERIAL SAFETY DATA SHEET
Liquid Al+Clear®

13. DISPOSAL CONSIDERATIONS

RCRA

Is the unused product a RCRA hazardous waste if discarded? Yes

If yes, the RCRA ID number is: D002 (corrosive)

OTHER DISPOSAL CONSIDERATIONS:

If permitted by regulations, material may be neutralized with alkali.

The information offered in section 13 is for the product as shipped. Use and/or alterations to the product such as mixing with other materials may significantly change the characteristics of the material and alter the RCRA classification and the proper disposal method.

14. TRANSPORT INFORMATION

US DOT HAZARD CLASS: 8

US DOT ID NUMBER: UN3264

PROPER SHIPPING NAME: Corrosive liquid, acidic, inorganic, N.O.S. (contains aluminum sulfate)

For additional information on shipping regulations affecting this material, contact the information number found in Section 1.

15. REGULATORY INFORMATION

TOXIC SUBSTANCES CONTROL ACT (TSCA)

TSCA INVENTORY STATUS: All ingredients listed on the TSCA Inventory

OTHER TSCA ISSUES: None

SARA TITLE III/CERCLA

"Reportable Quantities" (RQs) and/or "Threshold Planning Quantities" (TPQs) exist for the following ingredients.

<u>INGREDIENT NAME</u>	<u>SARA/CERCLA RQ (lb)</u>	<u>SARA EHS TPQ (lb)</u>
Aluminum sulfate	5000	None

Spills or releases resulting in the loss of any ingredient at or above its RQ requires immediate notification to the National Response Center [(800) 424-8802] and to your Local Emergency Planning Committee.

SECTION 311 HAZARD CLASS: Immediate

SARA 313 TOXIC CHEMICALS:

The following ingredients are SARA 313 "Toxic Chemicals" and may be subject to annual reporting requirements. CAS numbers and weight percents are found in Section 2.

<u>INGREDIENT NAME</u>	<u>COMMENT</u>
No ingredients listed in this section.	



MATERIAL SAFETY DATA SHEET

Liquid AI+Clear®

STATE RIGHT-TO-KNOW

In addition to the ingredients found in Section 2, the following are listed for state right-to-know purposes.

<u>INGREDIENT NAME</u>	<u>WEIGHT %</u>	<u>COMMENT</u>
-------------------------------	------------------------	-----------------------

No ingredients listed in this section.

ADDITIONAL REGULATORY INFORMATION:

None listed

WHMIS CLASSIFICATION (CANADA):

E (corrosive based upon transportation classification) , D2B.
Classified in accordance with WHMIS Controlled Product regulations.

FOREIGN CHEMICAL CONTROL INVENTORY STATUS:

All ingredients listed on Canadian DSL.

16. OTHER INFORMATION

CURRENT ISSUE DATE: June, 2001
PREVIOUS ISSUE DATE: Not applicable

CHANGES TO MSDS FROM PREVIOUS ISSUE DATE ARE DUE TO THE FOLLOWING:

Not applicable - new product

OTHER INFORMATION: Not for Food or Drug Use.



Material Safety Data Sheet

NFPA	HMIS	PPE	Symbol(s)
			Regulated

Preparation Date August 22, 2008

Revision Date

Revision Number: 0

Product Name: AI+Clear® A7

1. PRODUCT AND COMPANY IDENTIFICATION

Product Name: AI+Clear® A7

Other/Generic Names: None.

Recommended Use: Agricultural

Manufacturer: General Chemical, LLC
90 East Halsey Road
Parsippany, NJ 07054

Further information: FOR MORE INFORMATION CALL:
Customer Service US ONLY: 800-631-8050
(Monday-Friday, 9:00am - 4:30pm)

Customer Service CANADA ONLY: 866-543-3896
(Monday-Friday, 9:00am - 4:30pm)

Emergency Telephone Number: IN CASE OF EMERGENCY CALL CHEMTREC: 800-424-9300 US ONLY
24 Hours/Day, 7 Days/Week) CANADA ONLY CALL CANUTEC: 613-996-6666
(24 Hours/Day, 7 Days/Week)

2. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW: A clear, light green or amber liquid with a negligible degree of odor. Can cause severe skin and eye irritation. Not flammable, but may release toxic vapors if decomposed in a fire.

OSHA Regulatory Status This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

Potential Health Effects

Skin: May cause severe skin irritation.

Eyes: May irritate or burn eyes.

Inhalation: Product mists may cause irritation to the respiratory tract.

Ingestion: May irritate or burn the gastrointestinal tract.

Delayed Effects: None known.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Component	CAS-No	Weight %
aluminum sulfate	10043-01-3	>45
Sulfuric acid	7664-93-9	<10
Water	7732-18-5	>45

4. FIRST AID MEASURES

Eye Contact Immediately flush eyes with water for at least 15 minutes. Get immediate medical assistance.

Skin Contact: Flush with plenty of water, removing contaminated clothing. If irritation develops, get medical attention.

Inhalation: Remove victim immediately to fresh air.

Ingestion: If conscious, immediately give large quantity of water or milk. Do not induce vomiting. Get medical attention immediately.

Notes to Physician Treat symptomatically.

5. FIRE-FIGHTING MEASURES

Flammable Properties

Flash Point:	Not flammable
FLASH POINT METHOD:	Not applicable.
Autoignition Temperature	Not applicable
UPPER FLAME LIMIT (volume % in air):	Not applicable
LOWER FLAME LIMIT (volume % in air):	Not applicable
FLAME PROPAGATION RATE (solids):	Not applicable
OSHA FLAMMABILITY CLASS:	Not applicable

Suitable Extinguishing Media

Product is not flammable. Use any extinguishing agent suitable for surrounding fire.

Unsuitable Extinguishing Media

No information available.

Explosion Limits

Hazardous Combustion Products

No information available

Impact sensitivity
Sensitivity to static discharge

No information available
No information available

Specific Hazards Arising from the Chemical

Keep product and empty container away from heat and sources of ignition.

Protective Equipment and Precautions for Firefighters

Use self-contained breathing apparatus. Use water spray to keep containers cool.

NFPA

Health 2

Flammability 0

Instability 1

6. ACCIDENTAL RELEASE MEASURES**IN CASE OF SPILL OR OTHER RELEASE:**

(See Section 8 for recommended personal protective equipment.) Dilute small spills or leaks cautiously with plenty of water. Neutralize any further residue with alkali such as soda ash, lime or limestone. Adequate ventilation is required if soda ash or limestone is used, because of the consequent release of carbon dioxide gas. Large spills: dike up with soda ash and neutralize as above. Collect liquid and/or residue and dispose of in accordance with applicable regulations.

7. HANDLING AND STORAGE**Handling**

Avoid contact with skin, eyes and clothing. Do not breathe product mists.

Storage

Store in a cool area.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Component	ACGIH TLV	OSHA PEL	Ontario TWAEV	Mexico OEL (TWA)	NIOSH IDLH
aluminum sulfate 10043-01-3				TWA: 2 mg/m ³	
Sulfuric acid 7664-93-9	TWA: 0.2 mg/m ³	TWA: 1 mg/m ³	TWA: 0.2 mg/m ³	TWA: 1 mg/m ³	15 mg/m ³
Water 7732-18-5					

Engineering Measures

Use local exhaust if misting is anticipated.

Personal Protective Equipment**Eye/face Protection**

Wear chemical safety goggles. Do not wear contact lenses.

Skin Protection

Wear impervious (e.g. rubber) gloves and apron and full work clothing including long sleeved shirts, trousers and boots. Full impervious clothing is recommended if prolonged product contact is anticipated.

Respiratory Protection

A NIOSH approved mist respirator should be worn in areas where product mists are present.

General Hygiene Considerations

Eyewash and safety showers are recommended.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	No information available
Color	Clear, light green or amber
Chemical Formula	Mixture
Odor	Negligible
Odor Threshold	No information available
Physical State	Liquid
pH	0.4 - 2.4
Flash Point:	Not flammable
Autoignition Temperature	Not applicable
Boiling Point/Range	~100 °C

Melting Point/Range	-18 °C
Flammability Limits in Air	No information available
Explosive Properties	No information available
Oxidizing Properties	No information available
Evaporation Rate	Not applicable
Vapour Pressure	Not applicable
Vapour Density	Not applicable
Specific Gravity	1.3 - 1.45
Solubility	No information available
Partition Coefficient (n-octanol/water)	No information available
Viscosity	No information available
Molecular Weight	Mixture
Water Solubility	100

10. STABILITY AND REACTIVITY

Chemical Stability	Normally stable. If evaporated to dryness, residue should not be exposed to elevated temperatures (above 760°C), as this will yield toxic and corrosive gases.
Incompatible Products	Alkalis and water reactive materials such as oleum: causes exothermic reactions.
Hazardous Decomposition Products	At elevated temperatures, sulfur oxides may be formed. These are toxic and corrosive and are oxidizers. Sulfur trioxide is also a fire hazard. The loss of these gases leaves a caustic residue.
Possibility of Hazardous Reactions	Will not occur.

11. TOXICOLOGICAL INFORMATION

Acute Toxicity

LD50 Oral:	aluminum sulfate component: (oral-mouse): 6207 mg/kg (oral-rat): 1930 mg/kg
LC50 Inhalation:	sulfuric acid component: (inhl-rat): 510 mg/m ³ /2 hr

Component Information

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
Sulfuric acid	2140 mg/kg (Rat)		
Water	90000 mL/kg (Rat)		

Irritation	No information available
Corrosivity	No information available.
Sensitization	No information available.

Chronic Toxicity

Carcinogenicity There are no known carcinogenic chemicals in this product.

Component	ACGIH	IARC	NTP	OSHA	Mexico
Sulfuric acid	A2	Group 1	Known	X	A2

Mutagenic Effects	No information available.
Reproductive Effects	No information available.
Developmental Effects	No information available.
Teratogenicity	No information available.
Target Organ Effects	No information available
Other Adverse Effects	Delayed (Subchronic and chronic) effects.: Sulfuric acid component.: Chronic exposure can produce changes in pulmonary function and/or chronic bronchitis.

Endocrine Disruptor Information**12. ECOLOGICAL INFORMATION****Ecotoxicity**

Contains no substances known to be hazardous to the environment or not degradable in waste water treatment plants.

Component	Freshwater Algae	Freshwater Fish	Microtox	Water Flea
aluminum sulfate		LC50= 100 mg/L Carassius auratus 96 h LC50= 37 mg/L Gambusia affinis 96 h		EC50 = 136 mg/L 15 min
Sulfuric acid		LC50> 500 mg/L Brachydanio rerio 96 h		EC50 = 29 mg/L 24 h

Persistence and Degradability	No information available.
Bioaccumulation	No information available.
Mobility in Environmental Media	No information available
Other adverse effects	14 ppm/36 hr./fundulus/fatal/fresh water; 240 ppm/48 hr./mosquito fish/TLm/water type not specified; TLm Mosquito fish, 235 ppm, 96 hours; LC50 Largemouth bass, 250 ppm, 96 hours

13. DISPOSAL CONSIDERATIONS

Waste Disposal Methods	If permitted by regulations, material may be neutralized with alkali. The information offered in Section 13 is for the product as shipped. Use and/or alterations to the product such as mixing with other materials may significantly change the characteristics of the material and alter the RCRA classification and the proper disposal method.
Contaminated Packaging	Empty containers should be taken for local recycling, recovery or waste disposal.
US EPA Waste Number	No information available

Component	RCRA - Basis for Listing	RCRA - D Series Wastes	RCRA - U Series Wastes	RCRA - F Series Wastes	RCRA - P Series Wastes	RCRA - K Series Wastes
aluminum sulfate - 10043-01-3						
Sulfuric acid - 7664-93-9						

Water - 7732-18-5				
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14. TRANSPORT INFORMATION

DOT	Regulated
Proper Shipping Name	Corrosive liquid, acidic, inorganic, n.o.s. (contains aluminum sulfate and sulfuric acid)
Hazard Class	8
UN-No	UN3264
Packing Group	PGII
TDG	Regulated
Hazard Class	8
UN-No	UN3264
Packing Group	PGII

15. REGULATORY INFORMATION

International Inventories

TSCA	Complies
DSL	Complies
NDSL	Does not Comply
EINECS/ELINCS	Complies
ENCS	Complies
CHINA	Complies
KECL	Complies
PICCS	Complies
AICS	Complies

U.S. Federal Regulations

SARA 313

Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product contains a chemical or chemicals which are subject to the reporting requirements of the Act and and Title 40n of the Code of Federal Regulations, Part 372:

Component	CAS-No	Weight %	SARA 313 - Threshold Values
Sulfuric acid	7664-93-9	<10	1.0

SARA 311/312 Hazardous Categorization

Chronic Health Hazard	No
Acute Health Hazard	Yes
Fire Hazard	No
Sudden Release of Pressure Hazard	No
Reactive Hazard	No

Clean Water Act

Component	CWA - Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants	CWA - Hazardous Substances
Sulfuric acid 7664-93-9 (<10)	1000 lb			X

CERCLA

Component	Hazardous Substances RQs	CERCLA EHS RQs
Sulfuric acid	1000 lb	1000 lb

U.S. State Regulations**California Proposition 65**

This product does not contain any Proposition 65 chemicals.

Component	CAS-No	California Prop. 65
Sulfuric acid	7664-93-9	Carcinogen

State Right-to-Know

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
aluminum sulfate	X	X	X		
Sulfuric acid	X	X	X	X	X

Other International Regulations

Mexico - Grade No information available

Canada

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR.

WHMIS Hazard Class

E Corrosive material
D2B Toxic materials



16. OTHER INFORMATION

Prepared By Kaci Rosario, Product Safety Supervisor
Preparation Date August 22, 2008
Revision Date
Revision Summary Transfer to new Weracs format

Disclaimer

All information, statements, data, advice and/or recommendations, including, without limitation, those relating to storage, loading/unloading, piping and transportation (collectively referred to herein as "information") are believed to be accurate and reliable. However, no representation or warranty, express or implied, is made as to its completeness, accuracy, fitness or a particular purpose or any other matter, including, without limitation, that the practice or application of any such information is free of patent infringement or other intellectual property misappropriation. General Chemical, LLC, is not engaged in the business of providing technical, operational, engineering or safety information for a fee, and therefore, any such information provided herein has been furnished as an accommodation and without charge. All information provided herein is intended for use by persons having requisite knowledge, skill and experience in the chemical industry. General Chemical, LLC, shall not be responsible or liable for the use, application or implementation of the information, provided herein, and all such information is to be used at the risk, and in the sole judgement and discretion, of such persons, their employees, advisors and agents.

End of MSDS

Evaluation Criteria for Substances Added to the National List Questionnaire

EVALUATION CRITERIA FOR SUBSTANCES ADDED TO THE NATIONAL LIST

Category 1. Adverse impacts on humans or the environment? Substance: Aluminum Sulfate

Question	Yes	No	N/A ¹	Documentation (TAP; petition; regulatory agency; other)
1. Are there adverse effects on environment from manufacture, use, or disposal? [§205.600 b.2]		x		<p>Manufacture: Aluminum sulfate is produced from mixing aluminum ore (bauxite or hydrate) with sulfuric acid and water. When bauxite is used, the process generates a non-hazardous mud which can be recycled to make cement or disposed in a landfill. No other process wastes are generated.</p> <p>Use: Reports of dehydration have been noted when product was not applied according to instructions (left in piles on top of litter. When used according to manufacturer's instructions no adverse effects have been noted. In contrast improved bird health and well-being and better live performance have been documented when aluminum sulfate was used.</p> <p>Huff, W.E., P.A. Moore, J.M. Balog, G.R. Bayyari, and N.C. Rath. 1996. Poult. Sci. 75:1359-1364. American Feed Control Officials. 2012. Aluminum sulfate IFN 8-20-861 FDA Regulation: Reg. 5821125. Anti-gelling agent for molasses, dewater of beet pulp. Miles, D.M., S.L. Branton, and B.D. Lott. 2004. Atmospheric ammonia is detrimental to the performance of modern commercial broilers. Poult. Sci. 83:1650-1654.</p> <p>Disposal: None noted or reported.</p>
2. Is there environmental contamination during manufacture, use, misuse, or disposal? [§6518 m.3]		x		None noted. Refer to MSDS.
3. Is the substance harmful to the environment? [§6517c(1)(A)(i);6517(c)(2)(A)i]		x		<p>Aluminum sulfate actually is beneficial to the environment, in that it binds soluble phosphorus preventing phosphorus run-off into ground water, stock ponds streams, lakes and waterways. Its primary benefit to livestock, turkeys and poultry is to neutralize volatilized ammonia, improving air quality in animal rearing facilities. Volatile ammonia has been shown to be toxic to animals reared in confinement facilities, where ammonia levels were equal to or greater than 10 ppm.</p> <p>Miles, D.M., S.L. Branton, and B.D. Lott. 2004. Atmospheric ammonia is detrimental to the performance of modern commercial broilers. Poult. Sci. 83:1650-1654. Worley, J.W., M.L. Cabrera, and L.M. Risse. 2000. Reduced levels of alum to amend broiler litter. J. Am. Soc. of Agri. Engineers. Vol 16(4)441-444.</p>

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EVALUATION CRITERIA FOR SUBSTANCES ADDED TO THE NATIONAL LIST

Category 1. Adverse impacts on humans or the environment? Substance: Aluminum Sulfate

Question	Yes	No	N/A ¹	Documentation (TAP; petition; regulatory agency; other)
1. Are there adverse effects on environment from manufacture, use, or disposal? [§205.600 b.2]		x		<p>Manufacture: Aluminum sulfate is produced from mixing aluminum ore (bauxite or hydrate) with sulfuric acid and water. When bauxite is used, the process generates a non-hazardous mud which can be recycled to make cement or disposed in a landfill. No other process wastes are generated.</p> <p>Use: Reports of dehydration have been noted when product was not applied according to instructions (left in piles on top of litter. When used according to manufacturer's instructions no adverse effects have been noted. In contrast improved bird health and well-being and better live performance have been documented when aluminum sulfate was used.</p> <p>Huff, W.E., P.A. Moore, J.M. Balog, G.R. Bayyari, and N.C. Rath. 1996. Poult. Sci. 75:1359-1364. American Feed Control Officials. 2012. Aluminum sulfate IFN 8-20-861 FDA Regulation: Reg. 5821125. Anti-gelling agent for molasses, dewater of beet pulp. Miles, D.M., S.L. Branton, and B.D. Lott. 2004. Atmospheric ammonia is detrimental to the performance of modern commercial broilers. Poult. Sci. 83:1650-1654.</p> <p>Disposal: None noted or reported.</p>
2. Is there environmental contamination during manufacture, use, misuse, or disposal? [§6518 m.3]		x		None noted. Refer to MSDS.
3. Is the substance harmful to the environment? [§6517c(1)(A)(i);6517(c)(2)(A)i]		x		<p>Aluminum sulfate actually is beneficial to the environment, in that it binds soluble phosphorus preventing phosphorus run-off into ground water, stock ponds streams, lakes and waterways. Its primary benefit to livestock, turkeys and poultry is to neutralize volatilized ammonia, improving air quality in animal rearing facilities. Volatile ammonia has been shown to be toxic to animals reared in confinement facilities, where ammonia levels were equal to or greater than 10 ppm.</p> <p>Miles, D.M., S.L. Branton, and B.D. Lott. 2004. Atmospheric ammonia is detrimental to the performance of modern commercial broilers. Poult. Sci. 83:1650-1654. Worley, J.W., M.L. Cabrera, and L.M. Risse. 2000. Reduced levels of alum to amend broiler litter. J. Am. Soc. of Agri. Engineers. Vol 16(4)441-444. Worley, J.W., M.L. Cabrera, and L.M. Risse. 2000. Reduced levels of alum to amend broiler litter. J. Am. Soc. of Agri. Engineers. Vol 16(4)441-444.</p>

				Nagaraja, K.V., D.A. Emry, K.A. Jordan, J.A. Newman, and B.S. Pomeroy. 1982. Am J Vet Res, Vol 44, No. 8.
4. Does the substance contain List 1, 2, or 3 inerts? [§6517 c (1) (B)(ii); 205.601(m)2]		x		Refer to MSDS ... Aluminum sulfate is not an inert compound.
5. Is there potential for detrimental chemical interaction with other materials used? [§6518 m.1]		x		Refer to MSDS ... none noted.
6. Are there adverse biological and chemical interactions in agro-ecosystem? [§6518 m.5]		x		Alum applied to animal bedding actually reduces the point source problems associated with soluble phosphorus runoff, when alum treated litter is land applied. No adverse biological or chemical interactions impacting agro-ecosystems have been noted or reported. Shreve, B.R., P.A. Moore, T.C. Daniel, D.R., and D.M. Miller. 1995. Reduction of phosphorus in runoff from field-applied poultry litter using chemical amendments. J. Environ. Qual. 24:106-111. P.A. Moore, Jr., T.C. Daniel, and D.R. Edwards. 1999. Reducing phosphorus runoff and improving poultry production with alum. Poult. Sci. 78:692-698. P.A. Moore, Jr., and D.R. Edwards. 2005. Long-term effects of poultry litter, alum-treated litter, and ammonium nitrate on aluminum availability in soils. J. Environ. Qual. 34:2104-2111.
7. Are there detrimental physiological effects on soil organisms, crops, or livestock? [§6518 m.5]		x		Actually soils that have received alum treated litter at a rate as high as 200 lbs. /Kft ² of litter improved plant yields when used as fertilizer. The phosphorus that is bound and unavailable in ground water is available on demand to plants as a result of the ability of plant root systems to secrete acid that releases phosphorus back into the soil. Shreve, B.R., P.A. Moore, T.C. Daniel, D.R., and D.M. Miller. 1995. Reduction of phosphorus in runoff from field-applied poultry litter using chemical amendments. J. Environ. Qual. 24:106-111. P.A. Moore, Jr., T.C. Daniel, and D.R. Edwards. 1999. Reducing phosphorus runoff and improving poultry production with alum. Poult. Sci. 78:692-698. P.A. Moore, Jr., and D.R. Edwards. 2005. Long-term effects of poultry litter, alum-treated litter, and ammonium nitrate on aluminum availability in soils. J. Environ. Qual. 34:2104-2111. Moore, P.A. and D.R. Edwards. 2007. Long-term effects of poultry litter, alum-treated litter, and ammonium nitrate on phosphorus availability in soils. J. Environ. Qual. 36:163-174. Warren, J.G., C.J. Penn, J.M. McGrath, and K. Sistani. 2008. Guo, M., and W.Song. 2009. Environmental, well-being

			<p>and behavior. Nutrient value of alum-treated poultry litter for land application. Poult. Sci. 88:1782-1792.</p> <p>DeLaune, P.B., P.A. Moore, Jr., and J.L. Lemunyon. 2006. Effect of chemical and microbial amendment on phosphorus runoff from composted poultry litter. J. Environ. Qual. 35:1201-1296.</p> <p>Sims, J.T., and N.J. Luka-McCafferty. 2002. On-farm evaluation of aluminum sulfate (alum) as a poultry litter amendment effects on litter properties. J. Environ. Qual. 31:2066-2073.</p> <p>Penn, C. and H. Zhang. 2008. Alum-treated poultry litter as a fertilizer source. Oklahoma Cooperative Extension Service PSS-2254.</p>
8. Is there a toxic or other adverse action of the material or its breakdown products? [§6518 m.2]		x	<p>Dosages in excess of amounts normally consumed as a result of litter eating have been shown to be safe. Alum is considered GRAS for use in feeds and ingredients as a flow agent by AAFCO.</p> <p>Huff, W.E., P.A. Moore, J.M. Balog, G.R. Bayyari, and N.C. Rath. 1996. Poult. Sci.75:1359-1364.</p> <p>American Feed Control Officials. 2012. Aluminum sulfate IFN 8-20-861 FDA Regulation: Reg. 5821125. Anti-gelling agent for molasses, dewater of beet pulp.</p>
9. Is there undesirable persistence or concentration of the material or breakdown products in environment?[§6518 m.2]		x	<p>USDA-ARS had conducted long term exposure studies showing insignificant impact on soil nutrient profiles.</p> <p>P.A. Moore, Jr., and D.R. Edwards. 2005. Long-term effects of poultry litter, alum-treated litter, and ammonium nitrate on aluminum availability in soils. J. Environ. Qual. 34:2104-2111.</p> <p>Sims, J.T., and N.J. Luka-McCafferty. 2002. On-farm evaluation of aluminum sulfate (alum) as a poultry litter amendment effects on litter properties. J. Environ. Qual. 31:2066-2073.</p> <p>Penn, C. and H. Zhang. 2008. Alum-treated poultry litter as a fertilizer source. Oklahoma Cooperative Extension Service PSS-2254.</p> <p>Warren, J.G., C.J. Penn, J.M. McGrath, and K. Sistani. 2008.</p> <p>Guo, M., and W.Song. 2009. Environmental, well-being and behavior. Nutrient value of alum-treated poultry litter for land application. Poult. Sci. 88:1782-1792.</p>
10. Is there any harmful effect on human health? [§6517 c (1)(A) (i) ; 6517 c(2)(A)l; §6518 m.4]		x	Minor effects ...Refer to MSDS
11. Is there an adverse effect on human health as defined by applicable Federal regulations? [205.600 b.3]		x	Aluminum sulfate is not listed as a known or suspected carcinogen, or any other type of adverse human health effect, in any Federal regulation.
12. Is the substance GRAS when used according to FDA's good manufacturing practices? [§205.600 b.5]	x		<p>American Feed Control Officials, 2012</p> <p>Aluminum sulfate IFN 8-20-861</p> <p>FDA Regulation: Reg. 5821125</p> <p>Anti-gelling agent for molasses, dewater of beet pulp.</p>

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13. Does the substance contain residues of heavy metals or other contaminants in excess of FDA tolerances? [§205.600 b.5]		x	Concentrations of heavy metals (As, Cd, Cr, Cu, Hg, Ni, and Pb) are below analytical detection limits. Detection limits range from 0.5 ppm for Hg to 2 ppm for As.
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¹If the substance under review is for crops or livestock production, all of the questions from 205.600 (b) are N/A—not applicable.

Category 2. Is the Substance Essential for Organic Production? Substance: Aluminum sulfate

Question	Yes	No	N/A ¹	Documentation (TAP; petition; regulatory agency; other)
1. Is there a natural source of the substance? [§205.600 b.1]		x		
2. Is there an organic substitute? [§205.600 b.1]		x		<p>Natural parasiticides may be considered an alternative to the use of synthetic products in organic production. Examples include garlic, wormwood, wild ginger, conifers, diatomaceous earth and charcoal, among others²⁵. Because these products do not go through the FDA's drug approval process, their safety and efficacy may be unknown. Av Singh reports that natural dewormers may be poisonous so it is crucial that recommended dosages be followed. Additionally, some research has indicated that while diatomaceous earth administered to sheep seemed to promote lower fecal egg counts, this claim was not supported by statistical analysis and there was no improvement in the performance of treated sheep²⁶. Nematode is parasiticide that is the product of a natural fermentation product. Studies have indicated that it is as effective as moxidectin in the treatment of <i>Haemonchus contortus</i> infections in sheep²⁷ and that it is effective against common gastrointestinal parasites of canines²⁸. However, no approved formulations of nemadectin are available for use in the United States.</p>
3. Is the substance essential for handling of organically produced agricultural products? [§205.600 b.6]	x			<p>Controlling ammonia in any confined animal rearing facility improves animal health and well-being which has a direct impact on farm profitability, by improving growth rates, feed conversion, livability, and reducing downgrades. The impact of exposure to ammonia not only affects the animals but it is also toxic to caretakers.</p> <p>Miles, D.M., S.L. Branton, and B.D. Lott. 2004. Atmospheric ammonia is detrimental to the performance of modern commercial broilers. <i>Poult. Sci.</i> 83:1650-1654.</p> <p>Worley, J.W., M.L. Cabrera, and L.M. Risse. 2000. Reduced levels of alum to amend broiler litter. <i>J. Am. Soc. of Agri. Engineers.</i> Vol 16(4)441-444.</p> <p>Nagaraja, K.V., D.A. Emry, K.A. Jordan, J.A. Newman, and B.S. Pomeroy. 1982. <i>Am J Vet Res</i>, Vol 44, No. 8.</p> <p>Worley, J.W., M.L. Cabrera, and L.M. Risse. 2000. Reduced levels of alum to amend broiler litter. <i>J. Am. Soc. of Agri. Engineers.</i> Vol 16(4)441-444.</p> <p>Nagaraja, K.V., D.A. Emry, K.A. Jordan, J.A. Newman, and B.S. Pomeroy. 1982. <i>Am J Vet Res</i>, Vol 44, No. 8.</p> <p>Al-Mashhadani, E.H., and M.M. Beck. 1985. Effect of atmospheric ammonia on the surface ultrastructure of the lung and trachea of broiler chicks. <i>Poult. Sci.</i> 64:2056-2061.</p>
4. Is there a wholly natural		x		

substitute product? [§6517 c (1)(A)(ii)]				
5. Is the substance used in handling, not synthetic, but not organically produced? [§6517 c (1)(B)(iii)]			x	
6. Is there any alternative substances? [§6518 m.6]		x		
7. Is there another practice that would make the substance unnecessary? [§6518 m.6]		x		In order to ventilate confined areas like brood chambers sufficient to eliminate exposure to volatilized ammonia above 20 ppm under conditions of high ammonia challenge would require ventilation duration and speed that would chill chicks. Baby chicks are unable to regulate their body temperature like older birds and must maintain body temperature (103-105 F) with supplemental heat the first week to 10 days post-hatch.

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¹If the substance under review is for crops or livestock production, all of the questions from 205.600 (b) are N/A—not applicable.

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Category 3. Is the substance compatible with organic production practices?

Substance: **Aluminum sulfate**

Question	Yes	No	N/A ¹	Documentation (TAP; petition; regulatory agency; other)
1. Is the substance compatible with organic handling? [§205.600 b.2]			x	
2. Is the substance consistent with organic farming and handling? [§6517 c (1)(A)(iii); 6517 c (2)(A)(ii)]	x			The use of alum treated litter is used by farming operations as fertilizer. USDA-ARS research has shown that alum treated litter when used as fertilizer produced greater plant yields than ammonium nitrate.
3. Is the substance compatible with a system of sustainable agriculture? [§6518 m.7]	x			A long-term study conducted by USDA-ARS has shown that there are not detrimental effects with long term use of alum as an amendment to poultry litter. P.A. Moore, Jr., and D.R. Edwards. 2005. Long-term effects of poultry litter, alum-treated litter, and ammonium nitrate on aluminum availability in soils. J. Environ. Qual. 34:2104-2111.
4. Is the nutritional quality of the food maintained with the substance? [§205.600 b.3]	x			No toxic residues have been reported from the use of aluminum sulfate in poultry and turkey litter and millions of birds have been raised on alum treated litter. Huff, W.E., P.A. Moore, J.M. Balog, G.R. Bayyari, and N.C. Rath. 1996. Poult. Sci.75:1359-1364. American Feed Control Officials. 2012. Aluminum sulfate IFN 8-20-861 FDA Regulation: Reg. 5821125. Anti-gelling agent for molasses, dewater of beet pulp.
5. Is the primary use as a preservative? [§205.600 b.4]		x		Although alum dries litter and has been shown to reduce Listeria and Darkling Beetles but it is primarily used to neutralize ammonia (NH ₃) and convert it to an ammonium ion (NH ₄ ⁺). NH ₄ ⁺ is not volatile remaining in the litter, increasing its fertilizer nutrient value. References:
6. Is the primary use to recreate or improve flavors, colors, textures, or nutritive values lost in processing (except when required by law, e.g., vitamin D in milk)? [205.600 b.4]		x		There is one publication that indicates that alum improves sellable processing yield. Miles, D.M., S.L. Branton, and B.D. Lott. 2004. Atmospheric ammonia is detrimental to the performance of modern commercial broilers. Poult. Sci. 83:1650-1654.
7. Is the substance used in production, and does it contain an active synthetic ingredient in the following categories: a. copper and sulfur compounds;	x			Aluminum sulfate is 48.49% sulfate or 16.2% sulfur.
b. toxins derived from bacteria;		x		
c. pheromones, soaps, horticultural oils, fish emulsions, treated seed, vitamins and minerals?	x			Aluminum sulfate contains the minerals: Aluminum and sulfur.
d. livestock parasiticides and medicines?	x			Elevated application rates of aluminum sulfate have been shown effective against Darkling Beetles a poultry house pest know to be a bio-accumulator of several poultry pathogens.

180 ¹If the substance under review is for crops or livestock production, all of the questions from 205.600 (b) are N/A—not
181 applicable.

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367 Lower and Longer Lasting pH Control

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370 **11. Petition justification:** At the present time no commercially available litter amendments are
371 approved for organic use in poultry, turkeys or livestock. Air quality and the effects of even low
372 levels of ammonia on bird physiology is significant, effecting bird health, well-being and live
373 performance. Ammonia also poses a health risk to caretakers. Chemtrade has had numerous
374 requests from poultry and turkey producers, and animal health distributors to obtain organic
375 certification for alum based litter amendments. Aside from ammonia control alum (aluminum
376 sulfate) containing litter amendments have the added environmental benefit of binding soluble
377 phosphorus preventing runoff of soluble phosphorus into streams, lakes, waterways and
378 groundwater. Because of aluminum sulfate's ability to bind soluble phosphorus, alum based
379 products are approved for use in EPA/NRCS EQUIP programs, where producers are paid an
380 incentive for using alum based litter amendments. From a natural fertilizer standpoint,
381 aluminum sulfate has been shown to increase plant yields of tall fescue research plots in a 20
382 year USDA study, achieving plant yields comparable to ammonium nitrate. Aluminum sulfate
383 treated bedding that is land applied has a characteristic slow release of essential plant
384 nutrients. Plants secrete acid from their roots that release aluminum sulfate bound minerals
385 (phosphorus and other minerals) on an as needed basis into the soil, making them available to
386 the plant. It is our belief that alum based litter amendments are the safest and the most

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effective litter amendments on the market. It is our hope that the NOP Board will give serious consideration to the approval of aluminum sulfate based litter amendments for use in organic poultry, turkey and livestock production.

End of Petition