

MATERIAL SAFETY DATA SHEET

ALUMINUM SULPHATE, SOLUTION, 30 - 60 %

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Brenntag Canada Inc.
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WHMIS#: 00061160
Index: HCl0002/14B
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Website: <http://www.brenntag.ca>

EMERGENCY TELEPHONE NUMBER (For Emergencies Involving Chemical Spills or Releases)

1 855 273 6824

PRODUCT IDENTIFICATION

Product Name: Aluminum Sulphate, Solution, 30 - 60 %.

Chemical Name: Aluminum Sulphate Hydrate.

Synonyms: Liquid Alum; Alum; Aluminum Sulphate Tetradecahydrate; Papermaker's Alum; Dialuminum Trisulphate; Aluminum Sulphate Liquid; Aluminum Sulphate, Aqueous Solution.

Chemical Family: Aqueous mixture of Metallic Sulphates.

Molecular Formula: Not available.

Product Use: Pulp and paper industry. Water treatment. Paper sizing. Foaming Agent. Fire extinguishing agent. Mordant in dyeing. Chemical intermediate.

WHMIS Classification / Symbol:

E: Corrosive



READ THE ENTIRE MSDS FOR THE COMPLETE HAZARD EVALUATION OF THIS PRODUCT.

2. COMPOSITION, INFORMATION ON INGREDIENTS (Not Intended As Specifications)

<i>Ingredient</i>	<i>CAS#</i>	<i>ACGIH TLV (TWA)</i>	<i>% Concentration</i>
Aluminum Sulphate	10043-01-3	---	30 - 60
or			
Aluminum Sulphate Hydrate	16828-12-9	---	30 - 60

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW: Corrosive! Toxic effects are principally related to its corrosive properties. Harmful if inhaled or swallowed. Mists or sprays are extremely irritating to eyes and respiratory tract. Causes severe skin and eye burns. May cause delayed lung injury. Prolonged or repeated exposure may cause discoloration and erosion of teeth. See "Other Health Effects" Section. Can decompose at high temperatures forming toxic gases. Contents may develop pressure on prolonged exposure to heat.

POTENTIAL HEALTH EFFECTS

Inhalation:	Corrosive! Caution should be taken to prevent aerosolization or misting of this product. Product may cause severe irritation of the nose, throat and respiratory tract. Repeated and/or prolonged exposures may cause productive cough, running nose, bronchopneumonia, pulmonary edema (fluid build-up in lungs), and reduction of pulmonary function. Airborne concentration of dust, mist or spray may cause damage to the lung tissue which could produce chemical pneumonia. Severe exposure may cause lung damage. Can cause injury to entire respiratory tract. See "Other Health Effects" Section.
Skin Contact:	Corrosive! Concentrated solutions may cause pain and deep and severe burns to the skin. Prolonged and repeated exposure to dilute solutions often causes irritation, redness, pain and drying and cracking of the skin. Prolonged and repeated contact may lead to dermatitis.
Skin Absorption:	Skin absorption is a secondary concern to the continual destruction of tissue while the product is in contact with the skin.
Eye Contact:	Corrosive! This product causes immediate pain, severe burns and permanent corneal damage which may result in blindness. May cause corneal damage and conjunctivitis.
Ingestion:	Corrosive! Swallowing this material causes severe burns to the mouth, throat and stomach, death may result. Severe scarring of the throat may occur.
Other Health Effects:	Corrosive effects on the skin and eyes may be delayed, and damage may occur without the sensation or onset of pain. Strict adherence to first aid measures following any exposure is essential. May cause incoordination, muscle spasms, chemical pneumonitis, pulmonary edema, central nervous system (CNS) depression, liver damage and kidney damage. Pulmonary edema is the build-up of fluid in the lungs that might be fatal. Symptoms of pulmonary edema, such as shortness of breath, may not appear until several hours after exposure and are aggravated by physical exertion. (4) CNS depression is characterized by headache, dizziness, drowsiness, nausea, vomiting and incoordination. Severe overexposures may lead to coma and possible death due to respiratory failure. Liver damage is characterized by the loss of appetite, jaundice (yellowish skin colour), and occasional pain in the upper left-hand side of the abdomen. Signs and symptoms of kidney damage generally progress from oliguria, to blood in the urine, to total renal failure. Application of a compound containing 96.7 % atomized Aluminum caused irritation to the eyes, but no corneal opacity and cleared up within seven days. Slight inflammation and small lens opacity have been observed following implantation of Aluminum particles into the eye. No irritation was observed after application of a compound containing 96.7 % atomized Aluminum to intact or abraded skin. (4) Introduction of aluminum compounds directly into the bloodstream may contribute to the development of neurological effects resembling senility, but such effects are unlikely through ingestion or inhalation. (4) There may be a relationship between aluminum exposure and a brain disease which causes early senility (Alzheimer's Disease), but at present this is unproven and controversial. Asthma-like symptoms have been reported in association with refining aluminum materials and fumes from aluminum soldering. (4) Ingestion of large amounts of Aluminum salts over a prolonged period of time may lead to phosphate deficiency, based on animal and human information. Prolonged ingestion of very large amounts (several grams/day) may result in osteomalacia (softening and bending of the bones). (4)

4. FIRST AID MEASURES

FIRST AID PROCEDURES

General Guidelines:	Prompt removal of the material and obtaining medical attention are essential for all contact. Remove all contaminated clothing and immediately wash the exposed areas with copious amounts of water. Continue the flushing during transportation to the emergency department. Corrosive effects may be delayed (up to 72 hours), and damage may occur without the sensation or onset of pain. Contact local poison control centre for further guidance.
Inhalation:	Move victim to fresh air. Give artificial respiration ONLY if breathing has stopped. Give cardiopulmonary resuscitation (CPR) if there is no breathing AND no pulse. Oxygen administration may be beneficial in this situation but should only be administered by personnel trained in its use. Obtain medical attention IMMEDIATELY.
Skin Contact:	Prompt removal of the material from the skin is essential. Remove all contaminated clothing and immediately wash the exposed areas with copious amounts of soap and water for a minimum of 30 minutes or up to 60 minutes for critical body areas. Immerse the exposed part immediately in ice water to relieve pain and to prevent swelling and blistering. Place cold packs, ice or wet cloths on the burned area if immersion is not possible. Cover the exposed part with a clean, preferably sterile, lint-free dressing. Obtain medical attention IMMEDIATELY and monitor breathing and treat for shock for severe exposure. See "Note to Physicians" below.

Eye Contact:	Immediately flush eyes with running water for a minimum of 30 minutes, preferably up to 60 minutes. Hold eyelids open during flushing. If irritation persists, repeat flushing. Do not transport victim until the recommended flushing period is completed unless flushing can be continued during transport. Where possible, consult an ophthalmologist.
Ingestion:	Do not attempt to give anything by mouth to an unconscious person. IMMEDIATELY contact local Poison Control Centre. If victim is alert and not convulsing, rinse mouth out and give 1 to 2 glasses of milk. Water may be used if milk is not available but it is not as effective. If spontaneous vomiting occurs, have victim lean forward with head down to avoid breathing in of vomitus, rinse mouth and administer more milk or water. IMMEDIATELY transport victim to an emergency facility. Do not attempt to neutralize the acid with weak bases since the exothermic reaction may extend the corrosive injury. Do not use buffering agents (e.g., antacids) they produce significant exothermic reactions without significantly altering the pH. Since reexposure of the mucosa to acid is harmful, be careful to avoid further vomiting and limit fluid to one to two glasses for an adult. (3)
Note to Physicians:	This product contains materials that may cause severe pneumonitis if aspirated. If ingestion has occurred less than 2 hours earlier, carry out careful gastric lavage; use endotracheal cuff if available, to prevent aspiration. Observe patient for respiratory difficulty from aspiration pneumonitis. Give artificial resuscitation and appropriate chemotherapy if respiration is depressed. Due to the severely irritating or corrosive nature of the material, swallowing may lead to ulceration and inflammation of the upper alimentary tract with hemorrhage and fluid loss. Also, perforation of the esophagus or stomach may occur, leading to mediastinitis or peritonitis and the resultant complications. Mucosal injury following ingestion of this corrosive material may contraindicate the induction of vomiting in the treatment of possible intoxication. Similarly, if gastric lavage is performed, intubation should be done with great care. If oral burns are present or a corrosive ingestion is suspected by the patient's history, perform esophagoscopy as soon as possible. Scope should not be passed beyond the first burn because of the risk of perforation. Treatment for corrosive chemical contact with skin after initial flushing procedures: 1. Immerse the exposed part immediately in ice water to relieve pain and to prevent swelling and blistering. Place cold packs, ice or wet cloths on the burned area if immersion is not possible. 2. Remove anything that is constrictive, such as rings, bracelets or footwear, before swelling begins. 3. Cover the exposed part with a clean, preferably sterile, lint-free dressing. 4. For severe exposure, immediately seek medical attention and monitor breathing and treat for shock. Immediate consultation with the local Poison Control Centre should be initiated. Severe and sometimes delayed (up to 72 hours) local and systemic reactions can occur. Medical conditions that may be aggravated by exposure to this product include diseases of the skin, eyes or respiratory tract (asthma and bronchitis), neurological, cardiovascular and skin disorders, preexisting liver and kidney disorders.

5. FIRE-FIGHTING MEASURES

Flashpoint (°C)	Autolgnition Temperature (°C)	Flammability Limits in Air (%):	
		LEL	UEL
Not Flammable.	Not applicable.	Not applicable.	Not applicable.
Flammability Class (WHMIS):	Not regulated.		
Hazardous Combustion Products:	Thermal decomposition products are toxic and may include sulphuric acid, oxides of sulphur, aluminum and irritating gases.		
Unusual Fire or Explosion Hazards:	Reacts with most metals to form flammable and explosive hydrogen gas. Closed containers exposed to heat may burst.		
Sensitivity to Mechanical Impact:	Not expected to be sensitive to mechanical impact.		
Rate of Burning:	Not available.		
Explosive Power:	Not available.		
Sensitivity to Static Discharge:	Not expected to be sensitive to static discharge.		
EXTINGUISHING MEDIA			
Fire Extinguishing Media:	Use media appropriate for surrounding fire and/or materials. Aluminum Sulphate is used as an extinguishing agent.		

FIRE FIGHTING INSTRUCTIONS

Instructions to the Fire Fighters: Isolate materials that are not involved in the fire and protect personnel. Cool containers with flooding quantities of water until well after the fire is out. Spilled material may cause floors and contact surfaces to become slippery.

Fire Fighting Protective Equipment: Use self-contained breathing apparatus and protective clothing. Protective clothing for skin and eye protection should be worn to protect against corrosive materials.

6. ACCIDENTAL RELEASE MEASURES

Information in this section is for responding to spills, leaks or releases in order to prevent or minimize the adverse effects on persons, property and the environment. There may be specific reporting requirements associated with spills, leaks or releases, which change from region to region.

Containment and Clean-Up Procedures: See Section 13, "Deactivating Chemicals". In all cases of leak or spill contact vendor at Emergency Number shown on the front page of this MSDS.

Wear respirator, protective clothing and gloves. Spilled material may cause floors and contact surfaces to become slippery. Recover spilled material on non-combustible absorbents, such as sand or vermiculite, and place in covered containers for disposal. Collect product for recovery or disposal. For release to land, or storm water runoff, contain discharge by constructing dikes or applying inert absorbent; for release to water, utilize damming and/or water diversion to minimize the spread of contamination. Ventilate enclosed spaces. Notify applicable government authority if release is reportable or could adversely affect the environment. Replace damaged containers immediately to avoid loss of material and contamination of surrounding atmosphere.

7. HANDLING AND STORAGE

HANDLING

Handling Practices: Use normal "good" industrial hygiene and housekeeping practices. Vent container frequently, and more often in warm weather, to relieve pressure.

Ventilation Requirements: See Section 8, "Engineering Controls".

Other Precautions: Use only with adequate ventilation and avoid breathing aerosols (vapours or mists). Avoid contact with eyes, skin or clothing. Wash thoroughly with soap and water after handling. Wash contaminated clothing thoroughly before re-use.

Corrosive residue is most likely to be deposited at process vents or storage tanks, especially during filling operations. The use of compressed air to force corrosive materials from delivery trucks is of special concern. Scrubbing the exhaust of these vents is highly recommended. Jurisdictional regulations should be consulted to determine required practices.

STORAGE

Storage Temperature (°C): Do not freeze. Ideal storage temperature is 7 to 40 °C. (3)

Ventilation Requirements: Ventilation should be corrosion proof.

Storage Requirements: Store in a clean, cool well ventilated area, away from organic chemicals, strong bases, strong acids, metal powders, carbides, sulfides, and any readily oxidizable material. Protect from direct sunlight. Protect against physical damage. Storage tanks should be in a contained area to control any spills or leaks. Storage area should be equipped with corrosion-resistant floors, sumps and should have controlled drainage to a recovery tank.

Special Materials to be Used for Packaging or Containers: Materials of construction for storing the product include: stainless steel, plastics, fiberglass. (3) Equipment for storage, handling or transport should NOT be made from the following material, or, where applicable, its alloys: cast iron, steel, aluminum or iron. Solutions are corrosive to mild steel. Confirm suitability of any material before using.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Recommendations listed in this section indicate the type of equipment, which will provide protection against overexposure to this product. Conditions of use, adequacy of engineering or other control measures, and actual exposures will dictate the need for specific protective devices at your workplace.

ENGINEERING CONTROLS

Engineering Controls: Local exhaust ventilation required. Ventilation should be corrosion proof. Make up air should be supplied to balance air that is removed by local or general exhaust ventilation. Ventilate low lying areas such as sumps or pits where dense vapours may collect.

For personnel entry into confined spaces (i.e. bulk storage tanks) a proper procedure must be followed. It must include consideration of, among other things, ventilation, testing of tank atmosphere, provision and maintenance of SCBA, and emergency rescue. Use the "buddy" system. The second person should be in view and trained and equipped to execute a rescue. (6)

PERSONAL PROTECTIVE EQUIPMENT (PPE)

Eye Protection: Safety glasses with side shields are recommended to prevent eye contact. Use full face-shield and chemical safety goggles when there is potential for contact. Contact lenses should not be worn when working with this material.

Skin Protection: Gloves and protective clothing made from natural rubber, neoprene or PVC should be impervious under conditions of use. Prior to use, user should confirm impermeability. Discard contaminated gloves.

Respiratory Protection: No specific guidelines available. A NIOSH/MSHA-approved full facepiece air-purifying respirator equipped with acid gas, dust, mist, fume cartridges for concentrations up to 20 mg/m³ Aluminum Sulphate. An air-supplied respirator if concentrations are higher or unknown.

Other Personal Protective Equipment: Wear an impermeable apron and boots. Locate safety shower and eyewash station close to chemical handling area. Take all precautions to avoid personal contact.

EXPOSURE GUIDELINES

SUBSTANCE	ACGIH TLV (STEL)	OSHA PEL (TWA)	OSHA PEL (STEL)	NIOSH REL (TWA)	NIOSH REL (STEL)
Aluminum Sulphate Hydrate	---	---	---	2 mg/m ³ as Al soluble salts	---

9. PHYSICAL AND CHEMICAL PROPERTIES (Not intended as Specifications)

Physical State:	Liquid.
Appearance:	Clear, light green to amber coloured liquid.
Odour:	Odourless.
Odour Threshold (ppm):	Not applicable.
Boiling Range (°C):	101 - 115. (3)
Melting/Freezing Point (°C):	-16. (3)
Vapour Pressure (mm Hg at 20° C):	Not available.
Vapour Density (Air = 1.0):	Not available.
Relative Density (g/cc):	1.32 - 1.34. (3)
Bulk Density:	1 320 - 1 340 kg/m ³ .
Viscosity:	Not available.
Evaporation Rate (Butyl Acetate = 1.0):	Not available.
Solubility:	Soluble in water.
% Volatile by Volume:	30 - 60. (3)
pH:	1.9 - 2.3. (3)
Coefficient of Water/Oil Distribution:	Not available.
Volatile Organic Compounds (VOC):	Not applicable.
Flashpoint (°C):	Not Flammable.

10. STABILITY AND REACTIVITY

CHEMICAL STABILITY

Under Normal Conditions: Stable.

Under Fire Conditions: Not flammable.

Hazardous Polymerization: Will not occur.

Conditions to Avoid: High temperatures, sparks, open flames and all other sources of ignition. Decomposition will occur above 650 to 760 °C. (3) The residue is caustic. Secure containers at all times.

Materials to Avoid:	Strong oxidizing and reducing agents. Lewis or mineral acids. Strong bases. Sodium Hydroxide. Alkali metals and their hydroxides. Organic materials. Alkalies. Water reactive materials such as Sodium cause strong exothermic reaction with the hydrate. Aluminum Sulphate reacts with water to form sulphuric acid. Reacts with water to form sulphuric acid which will corrode most metals. Combustibles. Hydrogen gas may be produced on prolonged contact with metals such as aluminum, tin, lead and zinc. Metals. Steel. Cast Iron. Mild steel.
Decomposition or Combustion Products:	Thermal decomposition products are toxic and may include sulphuric acid, oxides of sulphur, aluminum and irritating gases.

11. TOXICOLOGICAL INFORMATION

TOXICOLOGICAL DATA:

SUBSTANCE	LD50 (Oral, Rat)	LD50 (Dermal, Rabbit)	LC50 (Inhalation, Rat, 4h)
Aluminum Sulphate Hydrate	9 000 mg/kg (3)	---	---
Carcinogenicity Data:	The ingredient(s) of this product is (are) not classed as carcinogenic by ACGIH, IARC, OSHA or NTP.		
Reproductive Data:	No adverse reproductive effects are anticipated.		
Mutagenicity Data:	Mutagenicity tests in animals have been negative or inconclusive. See "Other Studies Relevant to Material".		
Teratogenicity Data:	No adverse teratogenic effects are anticipated.		
Respiratory / Skin Sensitization Data:	None known.		
Synergistic Materials:	None known.		
Other Studies Relevant to Material:	Application of 10 mg of Aluminum Sulphate Hydrate produced severe eye irritation in rabbits. (4) No evidence of irritation was observed following application of a solution of 10 % Aluminum Sulphate in water (pH 3.0) to mice, rabbits and guinea pigs for 5 days. Aluminum Sulphate Hydrate was applied to the skin of rabbits for 4 hours. No irritation was observed (scored 0) at 4 hours, 24 hours and 48 hours. (4) Aluminum Sulphate has been shown to cause an increase in chromosomal breaks when tested in rat somatic cells in vivo and to induce sister chromatid exchanges, chromosomal aberrations and micronuclei in human leukocytes under in vitro conditions. (3)		

12. ECOLOGICAL INFORMATION

Ecotoxicity:	Harmful to aquatic life at low concentrations. Acidic soil conditions can develop with product present. Higher than normal toxic heavy metal concentrations can then occur in ground and surface waters. LC50, 96-hour (Fish) = 100 mg/L. (3)
Environmental Fate:	Not available. Can be dangerous if allowed to enter drinking water intakes. Do not contaminate domestic or irrigation water supplies, lakes, streams, ponds, or rivers.

13. DISPOSAL CONSIDERATIONS

Deactivating Chemicals:	Neutralize with lime, soda ash or crushed limestone. Neutralization is expected to be exothermic. Effervescence may result. Confirm pH using pH paper.
Waste Disposal Methods:	This information applies to the material as manufactured. Reevaluation of the product may be required by the user at the time of disposal since the product uses, transformations, mixtures and processes may influence waste classification. Dispose of waste material at an approved (hazardous) waste treatment/disposal facility in accordance with applicable local, provincial and federal regulations. Do not dispose of waste with normal garbage, or to sewer systems.
Safe Handling of Residues:	See "Deactivating Chemicals". See "Waste Disposal Methods".
Disposal of Packaging:	Empty containers retain product residue (liquid and/or vapour) and can be dangerous. Empty drums should be completely drained, properly bunged and promptly returned to a drum reconditioner. Do not dispose of package until thoroughly washed out. Dispose of waste material at an approved (hazardous) waste treatment/disposal facility in accordance with applicable local, provincial and federal regulations.

14. TRANSPORTATION INFORMATION

CANADIAN TDG ACT SHIPPING DESCRIPTION:

CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S. (Aluminum Sulphate), Class 8, UN3264, PG III.

Label(s): Corrosives. Placard: Corrosives.

ERAP Index: -----, Exemptions: None known.

May also be shipped / labelled as : Corrosive Liquids, NOS (Aluminum Sulphate), Class 8, UN1760, PG III.

US DOT CLASSIFICATION (49CFR 172.101, 172.102):

CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S. (Aluminum Sulphate), Class 8, UN3264, PG III.

Label(s): Corrosive. Placard: Corrosive.

CERCLA-RQ: Aluminum Sulphate: 5 000
lbs / 2 270 kg. Exemptions: Not available.

May also be shipped / labelled as : Corrosive Liquids, NOS (Aluminum Sulphate), Class 8, UN1760, PG III..

15. REGULATORY INFORMATION

CANADA

CEPA - NSNR: All components of this product are included on the DSL.

CEPA - NPRI: Aluminum (and its salts).

Controlled Products Regulations Classification (WHMIS):

E: Corrosive

USA

Environmental Protection Act: All components of this product are included on the TSCA inventory.

OSHA HCS (29CFR 1910.1200): Corrosive.

NFPA: 3 Health, 0 Fire, 0 Reactivity (3)

HMIS: 3 Health, 0 Fire, 0 Reactivity (3)

INTERNATIONAL

Not available.

16. OTHER INFORMATION

REFERENCES

1. RTECS-Registry of Toxic Effects of Chemical Substances, Canadian Centre for Occupational Health and Safety RTECS database.
2. Clayton, G.D. and Clayton, F.E., Eds., Patty's Industrial Hygiene and Toxicology, 3rd ed., Vol. IIA,B,C, John Wiley and Sons, New York, 1981.
3. Supplier's Material Safety Data Sheet(s).
4. CHEMINFO chemical profile, Canadian Centre for Occupational Health and Safety, Hamilton, Ontario, Canada.
5. Guide to Occupational Exposure Values, 2011, American Conference of Governmental Industrial Hygienists, Cincinnati, 2011.
6. Regulatory Affairs Group, Brenntag Canada Inc.
7. The British Columbia Drug and Poison Information Centre, Poison Managements Manual, Canadian Pharmaceutical Association, Ottawa, 1981.
8. NFPA 325M Fire Hazard Properties of Flammable Liquids, Gases, and Volatile Solids, 1994 Edition, Quincy, MA, 1994.

The information contained herein is offered only as a guide to the handling of this specific material and has been prepared in good faith by technically knowledgeable personnel. It is not intended to be all-inclusive and the manner and conditions of use and handling may involve other and additional considerations. No warranty of any kind is given or implied and Brenntag Canada Inc. will not be liable for any damages, losses, injuries or consequential damages which may result from the use of or reliance on any information contained herein.

This Material Safety Data Sheet is valid for three years.

To obtain revised copies of this or other Material Safety Data Sheets, contact your nearest Brenntag Canada Regional office.

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