SECTION 1: IDENTIFICATION

Product Identifier
Product Form: Mixture
Product Name: Liquid Alum

Intended Use of the Product
Alum is used as a coagulating agent in municipal and industrial water and wastewater treatment and as an additive in papermaking.

Name, Address, and Telephone of the Responsible Party
Manufacturer
CHEMTRADE LOGISTICS INC.
155 Gordon Baker Road
Suite 300
Toronto, Ontario M2H 3N5
For SDS Info: (416) 496-5856
www.chemtradelogistics.com

Emergency Telephone Number
Emergency Number :
Canada / US: CHEMTREC +1-800-424-9300
INTERNATIONAL: +1-703-741-5970
Chemtrade Emergency Contact: (866) 416-4404
For Chemical Emergency, Spill, Leak, Fire, Exposure, or Accident, call CHEMTREC – Day or Night

SECTION 2: HAZARDS IDENTIFICATION

Classification of the Substance or Mixture
GHS Classification
Met. Corr. 1 H290
Eye Dam. 1 H318
Aquatic Acute 3 H402

Full text of hazard classes and H-statements : see section 16

Label Elements
GHS Labeling
Hazard Pictograms :

Signal Word : Danger
Hazard Statements :
H290 - May be corrosive to metals.
H318 - Causes serious eye damage.
H402 - Harmful to aquatic life.

Precautionary Statements :
P234 - Keep only in original container.
P260 - Do not breathe vapors, mist, or spray.
P264 - Wash hands, forearms, and other exposed areas thoroughly after handling.
P273 - Avoid release to the environment.
P280 - Wear protective gloves, protective clothing, and eye protection.
P301+P330+P331 - IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
P303+P361+P353 - IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water.
P304+P340 - IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P305+P351+P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P310 - Immediately call a POISON CENTER or doctor.
P321 - Specific treatment (see section 4 on this SDS).
P363 - Wash contaminated clothing before reuse.
P390 - Absorb spillage to prevent material damage.
P405 - Store locked up.
P406 - Store in corrosive resistant container with a resistant inner liner.
P501 - Dispose of contents/container in accordance with local, regional, national, provincial, territorial and international regulations.

Other Hazards
Exposure may aggravate pre-existing eye, skin, or respiratory conditions.

Unknown acute toxicity
No data available

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

<table>
<thead>
<tr>
<th>Mixture</th>
<th>Product Identifier</th>
<th>%*</th>
<th>GHS Ingredient Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water</td>
<td>(CAS No) 7732-18-5</td>
<td>30 - 55</td>
<td>Not classified</td>
</tr>
<tr>
<td>Sulfuric acid, aluminum salt (3:2)**</td>
<td>(CAS No) 10043-01-3</td>
<td>45 - 70’</td>
<td>Met. Corr. 1, H290 Eye Dam. 1, H318 Aquatic Acute 3, H402</td>
</tr>
</tbody>
</table>

Full text of H-phrases: see section 16
**As Al₂(SO₄)₃·14H₂O (Dry Aluminum Sulfate).
*Percentages are listed in weight by weight percentage (w/w%) for liquid and solid ingredients. Gas ingredients are listed in volume by volume percentage (v/v%).
†The actual concentration of the ingredient(s) is withheld as a trade secret in accordance with the Hazardous Products Regulations (HPR) SOR/2015-17 and 29 CFR 1910.1200.

SECTION 4: FIRST AID MEASURES

Description of First-aid Measures
General: Never give anything by mouth to an unconscious person. If you feel unwell, seek medical advice (show the label where possible).
Inhalation: Remove to fresh air and keep at rest in a position comfortable for breathing. Immediately call a POISON CENTER or doctor/physician.
Skin Contact: Remove contaminated clothing. Immediately flush skin with plenty of water for at least 30 minutes. Wash contaminated clothing before reuse. Immediately call a POISON CENTER or doctor.
Eye Contact: Rinse cautiously with water for at least 30 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get immediate medical advice/attention.
Ingestion: Rinse mouth. Do NOT induce vomiting. Obtain emergency medical attention.

Most Important Symptoms and Effects Both Acute and Delayed
General: May cause skin irritation and eye damage.
Inhalation: May be corrosive to the respiratory tract.
Skin Contact: May cause irritation.
Eye Contact: Causes permanent damage to the cornea, iris, or conjunctiva.
Ingestion: May cause burns or irritation of the linings of the mouth, throat, and gastrointestinal tract.
Chronic Symptoms: None expected under normal conditions of use.

Indication of Any Immediate Medical Attention and Special Treatment Needed
If exposed or concerned, get medical advice and attention. If medical advice is needed, have product container or label at hand.

SECTION 5: FIRE-FIGHTING MEASURES

Extinguishing Media
Suitable Extinguishing Media: Water spray, dry chemical, foam, carbon dioxide.
Unsuitable Extinguishing Media: Do not use a heavy water stream. Use of heavy stream of water may spread fire.

Special Hazards Arising From the Substance or Mixture
Fire Hazard: Not considered flammable but may burn at high temperatures.
Explosion Hazard: Contact with metallic substances may release flammable hydrogen gas.
Reactivity: May be corrosive to metals. Contact with metals may evolve flammable hydrogen gas. May react exothermically with water releasing heat. Adding an acid to a base or base to an acid may cause a violent reaction.

Advice for Firefighters
Precautionary Measures Fire: Exercise caution when fighting any chemical fire.
Firefighting Instructions: Use water spray or fog for cooling exposed containers.
Protection During Firefighting: Do not enter fire area without proper protective equipment, including respiratory protection.
Hazardous Combustion Products: Can liberate toxic and corrosive fumes of SO$_2$ and SO$_3$ under extreme conditions when boiled to dryness or heated above 600 °C (1112 °F).
Other Information: Do not allow run-off from fire fighting to enter drains or water courses.
Reference to Other Sections
Refer to Section 9 for flammability properties.

SECTION 6: ACCIDENTAL RELEASE MEASURES

Personal Precautions, Protective Equipment and Emergency Procedures
General Measures: Do not get in eyes, on skin, or on clothing. Do not breathe vapor, mist or spray.
For Non-Emergency Personnel
Protective Equipment: Use appropriate personal protective equipment (PPE).
For Emergency Personnel
Protective Equipment: Equip cleanup crew with proper protection.
Emergency Procedures: Upon arrival at the scene, a first responder is expected to recognize the presence of dangerous goods, protect oneself and the public, secure the area, and call for the assistance of trained personnel as soon as conditions permit. Ventilate area.

Environmental Precautions
Prevent entry to sewers and public waters. Avoid release to the environment.

Methods and Materials for Containment and Cleaning Up
For Containment: Contain any spills with dikes or absorbents to prevent migration and entry into sewers or streams. As an immediate precautionary measure, isolate spill or leak area in all directions.
Methods for Cleaning Up: Clean up spills immediately and dispose of waste safely. Transfer spilled material to a suitable container for disposal. Contact competent authorities after a spill. Absorb spillage to prevent material damage. Cautiously neutralize spilled liquid.
Reference to Other Sections
See Section 8 for exposure controls and personal protection and Section 13 for disposal considerations.

SECTION 7: HANDLING AND STORAGE

Precautions for Safe Handling
Additional Hazards When Processed: May be corrosive to metals. May release corrosive vapors.
Precautions for Safe Handling: Wash hands and other exposed areas with mild soap and water before eating, drinking or smoking and when leaving work. Handle empty containers with care because they may still present a hazard. Do not get in eyes, on skin, or on clothing. Do not breathe vapors, mist, and spray.
Hygiene Measures: Handle in accordance with good industrial hygiene and safety procedures.

Conditions for Safe Storage, Including Any Incompatibilities
Technical Measures: Comply with applicable regulations.
Storage Conditions: Keep container closed when not in use. Store in a dry, cool place. Keep/Store away from extremely high or low temperatures and incompatible materials. Store in corrosive resistant container with a resistant inner liner. Store in original container or corrosive resistant and/or lined container.
Incompatible Materials: Non acid-proof metals (such as aluminum, copper and iron), bases, unalloyed steel, galvanized surfaces.
Specific End Use(s)
Alum is used as a coagulating agent in municipal and industrial water and wastewater treatment and as an additive in papermaking.
SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

Control Parameters
For substances listed in section 3 that are not listed here, there are no established Exposure limits from the manufacturer, supplier, importer, or the appropriate advisory agency including: ACGIH (TLV), AIHA (WEEL), NIOSH (REL), OSHA (PEL), Canadian provincial governments, or the Mexican government.

Exposure Controls
Appropriate Engineering Controls: Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure. Ensure adequate ventilation, especially in confined areas. Ensure all national/local regulations are observed.


Materials for Protective Clothing: Chemical resistant materials and fabrics.

Hand Protection: Wear protective gloves.

Eye Protection: Chemical safety goggles and face shield.

Skin and Body Protection: Wear suitable protective clothing.

Respiratory Protection: If exposure limits are exceeded or irritation is experienced, approved respiratory protection should be worn. In case of inadequate ventilation, oxygen deficient atmosphere, or where exposure levels are not known wear approved respiratory protection.

Other Information: When using, do not eat, drink or smoke.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

Information on Basic Physical and Chemical Properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical State</td>
<td>Liquid</td>
</tr>
<tr>
<td>Appearance</td>
<td>Clear</td>
</tr>
<tr>
<td>Odor</td>
<td>Odorless</td>
</tr>
<tr>
<td>Odor Threshold</td>
<td>Not available</td>
</tr>
<tr>
<td>pH</td>
<td>1.4 - 2.6</td>
</tr>
<tr>
<td>Evaporation Rate</td>
<td>Not available</td>
</tr>
<tr>
<td>Melting Point</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Freezing Point</td>
<td>-15.56 °C (3.99 °F)</td>
</tr>
<tr>
<td>Boiling Point</td>
<td>101 °C (213.8 °F)</td>
</tr>
<tr>
<td>Flash Point</td>
<td>Not flammable</td>
</tr>
<tr>
<td>Auto-ignition Temperature</td>
<td>Not available</td>
</tr>
<tr>
<td>Decomposition Temperature</td>
<td>Not available</td>
</tr>
<tr>
<td>Flammability (solid, gas)</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Lower Flammable Limit</td>
<td>Not available</td>
</tr>
<tr>
<td>Upper Flammable Limit</td>
<td>Not available</td>
</tr>
<tr>
<td>Vapor Pressure</td>
<td>Not available</td>
</tr>
<tr>
<td>Relative Vapor Density at 20°C</td>
<td>Not available</td>
</tr>
<tr>
<td>Relative Density</td>
<td>Not available</td>
</tr>
<tr>
<td>Specific Gravity</td>
<td>1.30 – 1.35</td>
</tr>
<tr>
<td>Solubility</td>
<td>Water: Completely miscible in water</td>
</tr>
<tr>
<td>Partition Coefficient: N-Octanol/Water</td>
<td>Not available</td>
</tr>
<tr>
<td>Viscosity</td>
<td>Not available</td>
</tr>
</tbody>
</table>

SECTION 10: STABILITY AND REACTIVITY

Reactivity: May be corrosive to metals. Contact with metals may evolve flammable hydrogen gas. May react exothermically with water releasing heat. Adding an acid to a base or base to an acid may cause a violent reaction.
**Chemical Stability**: Stable under recommended handling and storage conditions (see section 7).

**Possibility of Hazardous Reactions**: Hazardous polymerization will not occur.

**Conditions to Avoid**: Extremely high or low temperatures and incompatible materials.

**Incompatible Materials**: Non acid-proof metals (such as aluminum, copper and iron), bases, unalloyed steel, galvanized surfaces.

**Hazardous Decomposition Products**: None expected under normal conditions of use.

### SECTION 11: TOXICOLOGICAL INFORMATION

**Information on Toxicological Effects - Product**

- **Acute Toxicity (Oral)**: Not classified
- **Acute Toxicity (Dermal)**: Not classified
- **Acute Toxicity (Inhalation)**: Not classified

**LD50 and LC50 Data**: Not available

**Skin Corrosion/Irritation**: May causes skin irritation and eye damage.

**pH**: 1.4 - 2.6

**Eye Damage/Irritation**: Causes serious eye damage.

**pH**: 1.4 - 2.6

**Respiratory or Skin Sensitization**: Not classified

**Germ Cell Mutagenicity**: Not classified

**Carcinogenicity**: Not classified

**Specific Target Organ Toxicity (Repeated Exposure)**: Not classified

**Reproductive Toxicity**: Not classified

**Specific Target Organ Toxicity (Single Exposure)**: Not classified

**Aspiration Hazard**: Not classified

**Symptoms/Effects After Inhalation**: May be corrosive to the respiratory tract.

**Symptoms/Effects After Skin Contact**: Causes permanent damage to the cornea, iris, or conjunctiva.

**Symptoms/Effects After Ingestion**: May cause burns or irritation of the linings of the mouth, throat, and gastrointestinal tract.

**Information on Toxicological Effects - Ingredient(s)**

**LD50 and LC50 Data**:

<table>
<thead>
<tr>
<th>Ingredient (CAS)</th>
<th>LD50 (oral rat) (mg/kg)</th>
<th>LC50 (fish) (mg/l)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water (7732-18-5)</td>
<td>&gt; 90000</td>
<td></td>
</tr>
</tbody>
</table>

### SECTION 12: ECOLOGICAL INFORMATION

**Toxicity**

**Ecology - General**: Harmful to aquatic life.

**Sulfuric acid, aluminum salt (3:2) (10043-01-3)**

- **LC50 Fish 1**: 100 mg/l (Exposure time: 96h – Species: Carassius auratus [static])
- **EC50 Daphnia 1**: 12800 ug/l (Exposure time: 48h – Species: Crangonyx pseudogracilis)
- **LD50 Fish 2**: 33.9 mg/l (Exposure time: 96h – Species: Pimephales promelas [flow-through])

**Persistence and Degradability**

**Liquid Alum**: Not established.

**Bioaccumulative Potential**

**Liquid Alum**: Not established.

**Mobility in Soil**

Not available

**Other Adverse Effects**

**Other Information**: Avoid release to the environment.
Liquid Alum
Safety Data Sheet


SECTION 13: DISPOSAL CONSIDERATIONS

Waste Disposal Recommendations: Dispose of waste material in accordance with all local, regional, national, provincial, territorial and international regulations.

Additional Information: Container may remain hazardous when empty. Continue to observe all precautions.

Ecology - Waste Materials: Avoid release to the environment. This material is hazardous to the aquatic environment. Keep out of sewers and waterways.

SECTION 14: TRANSPORT INFORMATION

The shipping description(s) stated herein were prepared in accordance with certain assumptions at the time the SDS was authored, and can vary based on a number of variables that may or may not have been known at the time the SDS was issued.

<table>
<thead>
<tr>
<th>TRANSPORTATION CLASSIFICATION</th>
<th>DOT</th>
<th>TDG</th>
<th>IMDG</th>
<th>IATA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identification Number</td>
<td>UN3264</td>
<td>UN3264</td>
<td>UN3264</td>
<td>UN3264</td>
</tr>
<tr>
<td>Proper Shipping Name</td>
<td>CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S., (CONTAINS ALUMINUM SULFATE)</td>
<td>CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S., (CONTAINS ALUMINUM SULFATE)</td>
<td>CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S., (CONTAINS ALUMINUM SULFATE)</td>
<td>CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S., (CONTAINS ALUMINUM SULFATE)</td>
</tr>
<tr>
<td>Transport Hazard Class(es)</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>Packing Group</td>
<td>III</td>
<td>III</td>
<td>III</td>
<td>III</td>
</tr>
<tr>
<td>Environmental Hazards</td>
<td>Marine Pollutant: No</td>
<td>Marine Pollutant: No</td>
<td>Marine Pollutant: No</td>
<td>Marine Pollutant: N/A</td>
</tr>
<tr>
<td>Emergency Response</td>
<td>ERG Number: 154</td>
<td>ERAP Index: Not applicable</td>
<td>EMS: F-A, S-B</td>
<td>ERG code (IATA): 8L</td>
</tr>
<tr>
<td>Additional Information</td>
<td>Not applicable</td>
<td>Not applicable</td>
<td>Not applicable</td>
<td>Not applicable</td>
</tr>
</tbody>
</table>

SECTION 15: REGULATORY INFORMATION

US Federal Regulations

<table>
<thead>
<tr>
<th>Chemical Name (CAS No.)</th>
<th>CERCLA RQ</th>
<th>EPCRA 304 RQ</th>
<th>SARA 302 TPQ</th>
<th>SARA 313</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sulfuric acid, aluminum salt (3:2) (10043-01-3)</td>
<td>5000 lb</td>
<td>Not present</td>
<td>Not present</td>
<td>No</td>
</tr>
</tbody>
</table>

SARA 311/312

Liquid Alum
Immediate (acute) health hazard

US TSCA Flags
Not present

US State Regulations

California Proposition 65

<table>
<thead>
<tr>
<th>Chemical Name (CAS No.)</th>
<th>Carcinogenicity</th>
<th>Developmental Toxicity</th>
<th>Female Reproductive Toxicity</th>
<th>Male Reproductive Toxicity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sulfuric acid, aluminum salt (3:2) (10043-01-3)</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
</tbody>
</table>

State Right-To-Know Lists

<table>
<thead>
<tr>
<th>Chemical Name (CAS No.)</th>
<th>Carcinogenicity</th>
<th>Developmental Toxicity</th>
<th>Female Reproductive Toxicity</th>
<th>Male Reproductive Toxicity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sulfuric acid, aluminum salt (3:2) (10043-01-3)</td>
<td>U.S. - Massachusetts - Right To Know List - Yes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>U.S. - New Jersey - Right to Know Hazardous Substance List - Yes</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Liquid Alum
Safety Data Sheet


Canadian Regulations

Sulfuric acid, aluminum salt (3:2) (10043-01-3)
Listed on the Canadian DSL (Domestic Substances List)
Not listed on the Canadian NDSL (Non-Domestic Substances List)

International Inventories/Lists

<table>
<thead>
<tr>
<th>Chemical Name (CAS No.)</th>
<th>Australia AICS</th>
<th>Turkey CICR</th>
<th>Korea ECL</th>
<th>EU EINECS</th>
<th>EU ELINCS</th>
<th>EU SVHC</th>
<th>EU NLP</th>
<th>Mexico INSQ</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sulfuric acid, aluminium salt (3:2) (10043-01-3)</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Chemical Name (CAS No.)</th>
<th>China IECSC</th>
<th>Japan ENCS</th>
<th>Japan ISHL</th>
<th>Japan PDSCL</th>
<th>Japan PRTR</th>
<th>Philippines PICCS</th>
<th>New Zealand NZIOC</th>
<th>US TSCA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sulfuric acid, aluminium salt (3:2) (10043-01-3)</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

SECTION 16: OTHER INFORMATION, INCLUDING DATE OF PREPARATION OR LAST REVISION

Revision Date : 06/11/2019

Revision Summary

<table>
<thead>
<tr>
<th>Section</th>
<th>Change</th>
<th>Date Changed</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Text update</td>
<td>06/11/2019</td>
</tr>
<tr>
<td>12</td>
<td>Text update</td>
<td>06/11/2019</td>
</tr>
</tbody>
</table>

Other Information : This document has been prepared in accordance with the SDS requirements of the OSHA Hazard Communication Standard 29 CFR 1910.1200 and Canada’s Hazardous Products Regulations (HPR).

GHS Full Text Phrases:

- Aquatic Acute 3: Hazardous to the aquatic environment - Acute Hazard Category 3
- Eye Dam. 1: Serious eye damage/eye irritation Category 1
- Met. Corr. 1: Corrosive to metals Category 1
- Skin Corr. 1A: Skin corrosion/irritation Category 1A
- H290: May be corrosive to metals
- H318: Causes serious eye damage
- H402: Harmful to aquatic life

NFPA 704

- NFPA Health Hazard : 2
- NFPA Fire Hazard : 0
- NFPA Reactivity Hazard : 1

HMIS Rating

- Health : 2
- Flammability : 0
- Physical : 1

PPE : See Section 8

Abbreviations and Acronyms

AICS – Australian Inventory of Chemical Substances
ACGIH – American Conference of Governmental Industrial Hygienists
AIHA – American Industrial Hygiene Association
ATE - Acute Toxicity Estimate
BCF – Bioconcentration factor
BEI - Biological Exposure Indices (BEI)
CAS No - Chemical Abstracts Service number
CERCLA RQ - Comprehensive Environmental Response, Compensation, and
LC50 - Median Lethal Concentration
LD50 - Median Lethal Dose
LOAEL - Lowest Observed Adverse Effect Level
LOEC - Lowest-observed-effect Concentration
Log Pow - Octanol/water Partition Coefficient
NFPA 704 – National Fire Protection Association – Standard System for the
Identification of the Hazards of Materials for Emergency Response
NIOSH - National Institute for Occupational Safety and Health
Handle product with due care and avoid unnecessary contact. This information is supplied under U.S. OSHA’S “Right to Know” (29 CFR 1910.1200) and Canada’s WHMIS regulations. Although certain hazards are described herein, we cannot guarantee these are the only hazards that exist. The information contained herein is based on data available to us and is believed to be true and accurate but it is not offered as a product specification. No warranty, expressed or implied, regarding the accuracy of this data, the hazards connected with the use of the product, or the results to be obtained from the use thereof, is made and Chemtrade and its affiliates assume no responsibility. Chemtrade is a member of the CIAC (Chemistry Industry Association of Canada) and adheres to the codes and principles of Responsible Care™.