SECTION 1: IDENTIFICATION

Product Identifier
Product Form: Mixture
Product Name: Aluminum Sulfate – 48%
Formula: Al₂(SO₄)₃•14 H₂O (Dry Equivalent)

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.

Supplier Details
Northstar Chemical Inc.
14200 SW Tualatin Sherwood Road
Sherwood, OR 97140
For SDS Info: (503) 625-3770
www.northstarchemical.com

Emergency Number: US: CHEMTREC +1-800-424-9300

SECTION 2: HAZARDS IDENTIFICATION

Classification of the Substance or Mixture
Classification (GHS-US)
Met. Corr. 1  H290
Skin Corr. 1A  H314
Eye Dam. 1  H318
Aquatic Acute 3 H402
Full text of H-phrases: see section 16

Label Elements
GHS-US Labeling
Hazard Pictograms (GHS-US)

Signal Word (GHS-US): Danger
Hazard Statements (GHS-US): H290 - May be corrosive to metals
H314 - Causes severe skin burns and eye damage
H318 - Causes serious eye damage
H402 - Harmful to aquatic life

Precautionary Statements (GHS-US): 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 eye protection, protective clothing, protective gloves.
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/shower.
P304+P340 - IF INHALED: Remove person to fresh air and keep at rest in a position 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.
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P310 - Immediately call a 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, and international regulations.

Other Hazards
Other Hazards Not Contributing to the Classification: Exposure may aggravate those with pre-existing eye, skin, or respiratory conditions.

Unknown Acute Toxicity (GHS-US) Not available

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

<table>
<thead>
<tr>
<th>Name</th>
<th>Product identifier</th>
<th>% (w/w)</th>
<th>Classification (GHS-US)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water</td>
<td>(CAS No) 7732-18-5</td>
<td>balance</td>
<td>Not classified</td>
</tr>
<tr>
<td>Aluminum Sulfate</td>
<td>(CAS No) 10043-01-3</td>
<td>~48.5</td>
<td>Met. Corr. 1, H290</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(dry basis)</td>
<td>Eye Dam. 1, H318</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Aquatic Acute 3, H402</td>
</tr>
</tbody>
</table>

*As Al₂(SO₄)₃●14 H₂O (Dry Aluminum Sulfate).
The specific chemical identity and/or exact percentage of composition have been withheld as a trade secret [29 CFR 1910.1200]. A range of concentration as prescribed by the Controlled Products Regulations has been used where necessary, due to varying composition.

Full text of H-phrases: see section 16

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 if possible). Inhalation: Remove to fresh air and keep at rest in a position comfortable for breathing. Obtain medical attention if breathing difficulty persists.

Skin Contact: Rinse immediately with plenty of water. Obtain medical attention if irritation develops or persists.

Eye Contact: Rinse cautiously with water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Obtain medical attention.

Ingestion: Do NOT induce vomiting. Rinse mouth. Immediately call a POISON CENTER or doctor/physician.

Most Important Symptoms and Effects Both Acute and Delayed
General: Causes severe skin burns and eye damage.

Inhalation: May cause respiratory irritation.

Skin Contact: Redness. Pain. Serious skin burns. Blisters.

Eye Contact: Redness. Pain. Blurred vision. Severe burns. Causes permanent damage to the cornea, iris, or conjunctiva.

Ingestion: Ingestion is likely to be harmful or have adverse effects.

Chronic Symptoms: None expected under normal conditions of use.

Indication of Any Immediate Medical Attention and Special Treatment Needed
If you feel unwell, seek medical advice (show the label where possible).

SECTION 5: FIRE-FIGHTING MEASURES

Extinguishing Media
Suitable Extinguishing Media: Use extinguishing media appropriate for surrounding fire.

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: Product is not explosive.

Reactivity: Hazardous reactions will not occur under normal conditions. Aluminum Sulfate may react with some metals, to give flammable, potentially explosive hydrogen gas. Hydrogen gas can accumulate to explosive concentrations inside confined spaces.
Advice for Firefighters
Precautionary Measures Fire: Not available
Firefighting Instructions: Use water spray or fog for cooling exposed containers. In case of major fire and large quantities: Evacuate area. Fight fire remotely due to the risk of explosion.
Protection During Firefighting: Do not enter fire area without proper protective equipment, including respiratory protection. Hazardous Combustion Products: Forms aluminum oxide, sulfur dioxide and/or sulfur trioxide at temperatures above 760°C (1400°F) or when dry alum is encompassed in a fire involving other burning materials.
Other Information: Refer to Section 9 for flammability properties.
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: Avoid all contact with skin, eyes, or clothing. Avoid breathing (dust, vapor, mist, gas).
For Non-Emergency Personnel
Protective Equipment: Use appropriate personal protection equipment (PPE).
For Emergency Personnel
Protective Equipment: Equip cleanup crew with proper protection.

Environmental Precautions
Prevent entry to sewers and public waters. Notify authorities if liquid enters sewers or public waters.

Methods and Material for Containment and Cleaning Up
For Containment: Contain any spills with dikes or absorbents to prevent migration and entry into sewers or streams.
Methods for Cleaning Up: Collect spillage. Dispose in a safe manner in accordance with local/national regulations.
Reference to Other Sections
See Heading 8. Exposure controls and personal protection.

SECTION 7: HANDLING AND STORAGE

Precautions for Safe Handling
Hygiene Measures: Handle in accordance with good industrial hygiene and safety procedures. Wash hands and other exposed areas with mild soap and water before eating, drinking or smoking and when leaving work. Use good housekeeping practices during storage, transfer, handling, to avoid excessive dust accumulation. Protect from moisture.

Conditions for Safe Storage, Including Any Incompatibilities
Technical Measures: Comply with applicable regulations.
Storage Conditions: Store in a dry, cool and well-ventilated place. Keep container closed when not in use. Keep/Store away from direct sunlight, extremely high or low temperatures and incompatible materials.
Incompatible Materials: Strong bases.
Special Rules on Packaging: Store in original container or corrosive resistant and/or lined container.
Specific End Use(s)
For professional use only.

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), NIOSH (REL), OSHA (PEL), Canadian provincial governments, or the Mexican government.

Exposure Controls
Appropriate Engineering Controls: Ensure adequate ventilation, especially in confined areas. Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure. Ensure all national/local regulations are observed.
Materials for Protective Clothing: Chemically resistant materials and fabrics.
Hand Protection: Wear chemically resistant protective gloves.
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Eye Protection: Chemical goggles or safety glasses.
Skin and Body Protection: Wear suitable protective clothing.
Respiratory Protection: Use NIOSH-approved dust mask if dust has the potential to become airborne.
Environmental Exposure Controls: Do not allow the product to be released into the environment.
Consumer Exposure Controls: Do not eat, drink or smoke during use

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>1.9 - 2.4</td>
</tr>
<tr>
<td>Melting Point</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Freezing Point</td>
<td>-15.56 °C (4°F)</td>
</tr>
<tr>
<td>Boiling Point</td>
<td>101 °C (213.80 °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>1.335</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>
<tr>
<td>Explosion Data – Sensitivity to Mechanical Impact</td>
<td>Not expected to present an explosion hazard due to mechanical impact.</td>
</tr>
<tr>
<td>Explosion Data – Sensitivity to Static Discharge</td>
<td>Not expected to present an explosion hazard due to static discharge.</td>
</tr>
</tbody>
</table>

SECTION 10: STABILITY AND REACTIVITY
Reactivity: Hazardous reactions will not occur under normal conditions. Aluminum Sulfate may react with some metals, to give flammable, potentially explosive hydrogen gas. Hydrogen gas can accumulate to explosive concentrations inside confined spaces. Chemical Stability: Stable under recommended handling and storage conditions (see section 7).

Possibility of Hazardous Reactions: Hazardous polymerization will not occur.


Hazardous Decomposition Products: Oxides of aluminum. The decomposition products are corrosive and hazardous to health.

SECTION 11: TOXICOLOGICAL INFORMATION
Information on Toxicological Effects - Product

Acute Toxicity: Not classified
LD50 and LC50 Data: Not available
Skin Corrosion/Irritation: Causes severe skin burns and eye damage. pH: 1.9 - 2.4
Serious Eye Damage/Irritation: Causes serious eye damage. pH: 1.9 - 2.4
Respiratory or Skin Sensitization: Not classified
Germ Cell Mutagenicity: Not classified
Teratogenicity: Not available
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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/Injuries After Inhalation: May cause respiratory irritation.
Symptoms/Injuries After Ingestion: Ingestion is likely to be harmful or have adverse effects. Chronic Symptoms: None expected under normal conditions of use.

Information on Toxicological Effects - Ingredient(s)
LD50 and LC50 Data:

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>LD50 Oral Rat</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water (7732-18-5)</td>
<td>&gt; 90000 mg/kg</td>
</tr>
</tbody>
</table>

SECTION 12: ECOLOGICAL INFORMATION
Toxicity Not classified
Persistence and Degradability Not available
Bioaccumulative Potential Not available
Mobility in Soil Not available

Other Adverse Effects
Other Information: Avoid release to the environment.

SECTION 13: DISPOSAL CONSIDERATIONS
Waste Disposal Recommendations: Dispose of waste material in accordance with all local, regional, national, and international regulations.

SECTION 14: TRANSPORT INFORMATION
14.1 In Accordance with DOT
Proper Shipping Name: CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S. (CONTAINS ALUMINUM SULFATE)
Hazard Class: 8
Identification Number: UN3264
Label Codes: 8
Packing Group: III
ERG Number: 154

14.2 In Accordance with IMDG
Proper Shipping Name: CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S. (CONTAINS ALUMINUM SULFATE)
Hazard Class: 8
Identification Number: UN3264
Packing Group: III
Label Codes: 8
EmS-No. (Fire): F-A
EmS-No. (Spillage): S-B
**Aluminum Sulfate – 48%**

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### 14.3 In Accordance with IATA

<table>
<thead>
<tr>
<th>Proper Shipping Name</th>
<th>CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S. (CONTAINS ALUMINUM SULFATE)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Packing Group</td>
<td>III</td>
</tr>
<tr>
<td>Identification Number</td>
<td>UN3264</td>
</tr>
<tr>
<td>Hazard Class</td>
<td>8</td>
</tr>
<tr>
<td>Label Codes</td>
<td>8</td>
</tr>
<tr>
<td>ERG Code (IATA)</td>
<td>8L</td>
</tr>
</tbody>
</table>

### 14.4 In Accordance with TDG

<table>
<thead>
<tr>
<th>Proper Shipping Name</th>
<th>CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S. (CONTAINS ALUMINUM SULFATE)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Packing Group</td>
<td>III</td>
</tr>
<tr>
<td>Hazard Class</td>
<td>8</td>
</tr>
<tr>
<td>Identification Number</td>
<td>UN3264</td>
</tr>
<tr>
<td>Label Codes</td>
<td>8</td>
</tr>
</tbody>
</table>

### SECTION 15: REGULATORY INFORMATION

#### US Federal Regulations

**Aluminum Sulfate – 48%**

<table>
<thead>
<tr>
<th>SARA Section 311/312 Hazard Classes</th>
<th>Immediate (acute) health hazard</th>
</tr>
</thead>
</table>

**Water (7732-18-5)**

- Listed on the United States TSCA (Toxic Substances Control Act) inventory

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

- Listed on the United States TSCA (Toxic Substances Control Act) inventory

#### US State Regulations

**Aluminum Sulfate – 48%**

<table>
<thead>
<tr>
<th>Sulfuric acid, aluminum salt (3:2) (10043-01-3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>U.S. - Massachusetts - Right To Know List</td>
</tr>
<tr>
<td>U.S. - New Jersey - Right to Know Hazardous Substance List</td>
</tr>
<tr>
<td>U.S. - Pennsylvania - RTK (Right to Know) - Environmental Hazard List</td>
</tr>
<tr>
<td>U.S. - Pennsylvania - RTK (Right to Know) List</td>
</tr>
</tbody>
</table>

#### Canadian Regulations

**Aluminum Sulfate – 48%**

<table>
<thead>
<tr>
<th>WHMIS Classification Class</th>
<th>D Division 2 Subdivision B - Toxic material causing other toxic effects Class E - Corrosive Material</th>
</tr>
</thead>
</table>

**Water (7732-18-5)**

- Listed on the Canadian DSL (Domestic Substances List)

<table>
<thead>
<tr>
<th>WHMIS Classification</th>
<th>Uncontrolled product according to WHMIS classification criteria</th>
</tr>
</thead>
</table>

**Aluminum Sulfate – 48% (3:2) (10043-01-3)**

- Listed on the Canadian DSL (Domestic Substances List)

<table>
<thead>
<tr>
<th>WHMIS Classification</th>
<th>Class E - Corrosive Material</th>
</tr>
</thead>
</table>

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

Revision date: 05/01/15
Other Information: This document has been prepared in accordance with the SDS requirements of the OSHA Hazard Communication Standard 29 CFR 1910.1200.

GHS Full Text Phrases:

<table>
<thead>
<tr>
<th>Aquatic Acute 3</th>
<th>Hazardous to the aquatic environment - Acute Hazard Category 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eye Dam. 1</td>
<td>Serious eye damage/eye irritation Category 1</td>
</tr>
<tr>
<td>Met. Corr. 1</td>
<td>Corrosive to metals Category 1</td>
</tr>
<tr>
<td>Skin Corr. 1A</td>
<td>Skin corrosion/irritation Category 1A</td>
</tr>
<tr>
<td>H290</td>
<td>May be corrosive to metals</td>
</tr>
<tr>
<td>H314</td>
<td>Causes severe skin burns and eye damage</td>
</tr>
<tr>
<td>H318</td>
<td>Causes serious eye damage</td>
</tr>
<tr>
<td>H402</td>
<td>Harmful to aquatic life</td>
</tr>
</tbody>
</table>

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 Northstar Chemical Inc. and its affiliates assume no responsibility.