SECTION 1. IDENTIFICATION

Product identifier used on the label

: **Ammonium Chloride**

Product Code(s)

: None reported.

Recommended use of the chemical and restrictions on use

: Industrial use
  Use pattern: Professional Use Only
  Recommended restrictions None known.

Chemical family

: Inorganic ammonium salt

Name, address, and telephone number of the supplier:

Comet Chemical Company Ltd.
3463 Thomas Street
Innisfill, ON, Canada
L9S 3W4
705-436-5580

24 Hr. Emergency Tel # : TERRAPURE ENVIRONMENTAL : 800-567-7455

SECTION 2. HAZARDS IDENTIFICATION

Classification of the chemical

White crystals (solid). Odorless.

This material is classified as hazardous under U.S. OSHA regulations (29CFR 1910.1200) (Hazcom 2012) and Canadian WHMIS regulations (Hazardous Products Regulations) (WHMIS 2015).

Hazard classification:

Acute toxicity, oral - Category 4
Serious eye damage/eye irritation - Category 2A

Label elements

_Hazard pictogram(s)_

_Signal Word_

Warning!

_Hazard statement(s)_

Harmful if swallowed.
Causes serious eye irritation.
Ammonium Chloride
SDS Preparation Date (mm/dd/yyyy): 08/31/2016

SAFETY DATA SHEET

Precautionary statement(s)

Wash thoroughly after handling.
Do not eat, drink or smoke when using this product.
Wear eye/face protection.

IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
If eye irritation persists: Get medical advice/attention.
If swallowed: Call a poison center/doctor if you feel unwell.
Rinse mouth.
Do NOT induce vomiting.

Dispose of contents/container in accordance with local regulation.

Other hazards
Other hazards which do not result in classification:

Ingestion may cause gastrointestinal irritation, nausea, vomiting and diarrhea. May be mildly irritating to skin and respiratory system.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Pure substance

<table>
<thead>
<tr>
<th>Chemical name</th>
<th>Common name and synonyms</th>
<th>CAS #</th>
<th>Concentration (% by weight)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ammonium chloride</td>
<td>Ammonium muriate</td>
<td>12125-02-9</td>
<td>100.00</td>
</tr>
</tbody>
</table>

SECTION 4. FIRST-AID MEASURES

Description of first aid measures

Ingestion: Do NOT induce vomiting. Have victim rinse mouth with water, then give one to two glasses of water to drink. Never give anything by mouth to an unconscious person. Call a physician.

Inhalation: If inhaled, move to fresh air. If breathing is difficult, give oxygen by qualified medical personnel only. If breathing has stopped, give artificial respiration. Obtain medical attention if symptoms develop and persist.

Skin contact: Wash off immediately with plenty of water. Remove and wash contaminated clothing before re-use. If irritation or symptoms develop, seek medical attention.

Eye contact: Immediately flush eyes with running water for at least 5 to 10 minutes. If irritation persists, seek prompt medical attention.

Most important symptoms and effects, both acute and delayed

Causes serious eye irritation. Symptoms may include tearing, redness and discomfort. Direct skin contact may cause slight or mild, transient irritation. Harmful if swallowed. Ingestion may cause gastrointestinal irritation, nausea, vomiting and diarrhea.

Indication of any immediate medical attention and special treatment needed

Treat symptomatically.

SECTION 5. FIRE-FIGHTING MEASURES

Extinguishing media

Suitable extinguishing media

Use media suitable to the surrounding fire such as water fog or fine spray, alcohol foams, carbon dioxide and dry chemical.

Unsuitable extinguishing media

Do not use a solid water stream as it may scatter and spread fire.
SAFETY DATA SHEET

Special hazards arising from the substance or mixture / Conditions of flammability

: Burning may produce irritating, toxic and obnoxious fumes.

Flammability classification (OSHA 29 CFR 1910.106)

: Not flammable.

Hazardous combustion products

: Hydrogen chloride; Ammonia; Nitrogen oxides.

Special protective equipment and precautions for firefighters

Protective equipment for fire-fighters

: Firefighters must use standard protective equipment including flame retardant coat, helmet with face shield, gloves, rubber boots, and in enclosed spaces, SCBA.

Special fire-fighting procedures

: Firefighters should wear proper protective equipment and self-contained breathing apparatus with full face piece operated in positive pressure mode. Move containers from fire area if safe to do so. Water spray may be useful in cooling equipment exposed to heat and flame.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures

: Restrict access to area until completion of clean-up. Ensure clean-up is conducted by trained personnel only. Wear suitable protective equipment. Refer to protective measures listed in sections 7 and 8. Restrict access to area until completion of clean-up.

Environmental precautions

: Ensure spilled product does not enter drains, sewers, waterways, or confined spaces.

Methods and material for containment and cleaning up

: Ventilate area of release. Stop spill or leak at source if safely possible. Dike for water control. Contain and absorb spilled liquid with non-combustible, inert absorbent material (e.g. sand), then place absorbent material into a container for later disposal (see Section 13).

Special spill response procedures

: In case of transportation accident, contact TERRAPURE ENVIRONMENTAL at 1-800-567-7455. EPA/CERCLA Reportable quantity (RQ): Ammonium chloride (5000 lbs / 2270 kg)

SECTION 7. HANDLING AND STORAGE

Precautions for safe handling

: Use only in well-ventilated areas. Wear eye/face protection. Avoid breathing vapours or mists. Avoid contact with eyes, skin and clothing. Keep away from extreme heat and flame. Do not eat, drink or smoke when using this product. Keep away from incompatibles. Keep containers tightly closed when not in use. Wash thoroughly after handling.

Conditions for safe storage

: Storage area should be clearly identified, clear of obstruction and accessible only to trained and authorized personnel. Store away from incompatible materials. No smoking in the area.

Incompatible materials

: Strong oxidizers (e.g. Chlorine, Peroxides, etc.). strong acids and bases.
SAFETY DATA SHEET

SECTION 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Exposure Limits:

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>ACGIH TLV</th>
<th>OSHA PEL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>TWA</td>
<td>STEL</td>
</tr>
<tr>
<td>Ammonium chloride</td>
<td>10 mg/m³ (fume)</td>
<td>20 mg/m³ (fume)</td>
</tr>
</tbody>
</table>

Exposure controls

Ventilation and engineering measures:
- Use in a well-ventilated area. Use general or local exhaust ventilation to maintain air concentrations below recommended exposure limits.

Respiratory protection:
- If airbourne concentrations are above the permissible exposure limit or are not known, use NIOSH-approved respirators. Advice should be sought from respiratory protection specialists.

Skin protection:
- Gloves impervious to the material are recommended. Advice should be sought from glove suppliers.

Eye / face protection:
- Wear eye/face protection. Safety glasses with side-shields or chemical splash goggles, depending on workplace standards.

Other protective equipment:
- An eyewash station and safety shower should be made available in the immediate working area.

General hygiene considerations:
- Avoid breathing vapour or mist. Avoid contact with skin, eyes and clothing. Wash contaminated clothing before reuse. Do not eat, drink, smoke or use cosmetics while working with this product. Upon completion of work, wash hands before eating, drinking, smoking or use of toilet facilities. Remove soiled clothing and wash it thoroughly before reuse. Handle in accordance with good industrial hygiene and safety practice.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance:
- White crystals (solid).

Odour:
- Odorless.

Odour threshold:
- N/Av

pH:
- 5.5

Melting/Freezing point:
- Sublimes at 338°C

Initial boiling point and boiling range:
- 520°C

Flash point:
- Not available.

Flashpoint (Method):
- Not applicable.

Evaporation rate (BuAe = 1):
- Not available.

Flammability (solid, gas):
- Not applicable.

Upper flammable limit (% by vol.):
- Not available.

Oxidizing properties:
- None known.

Explosive properties:
- Not explosive.

Vapour pressure:
- Not available.

Vapour density:
- 1.8 (Air = 1)
Relative density / Specific gravity :
: 1.09 (water = 1)
Solubility in water :
: Soluble.
Other solubility(ies) :
: Very soluble in liquid ammonia; moderately soluble in methanol and absolute alcohol; slightly soluble in ethanol; practically insoluble in acetone, diethyl ether and ethyl acetate.
Partition coefficient: n-octanol/water or Coefficient of water/oil distribution :
: -4.37
Auto-ignition temperature :
: Not available.
Decomposition temperature :
: Not available.
Viscosity :
: Not available.
Volatile (% by weight) :
: Not available.
Volatile organic Compounds (VOC's) :
: N/Av
Absolute pressure of container :
: N/Ap
Flame projection length :
: N/Ap
Other physical/chemical comments :
: None known or reported by the manufacturer.

SECTION 10. STABILITY AND REACTIVITY
Reactivity :
: Not normally reactive.
Chemical stability :
: Material is stable under normal conditions.
Possibility of hazardous reactions :
: Hazardous polymerization does not occur.
Conditions to avoid :
: Avoid excessive heat, sparks and open flame. Avoid contact with incompatible materials.
Incompatible materials :
: See Section 7 (Handling and Storage) for further details.
Hazardous decomposition products :
: None known, refer to hazardous combustion products in Section 5.

SECTION 11. TOXICOLOGICAL INFORMATION
Information on likely routes of exposure:
Routes of entry inhalation :
: YES
Routes of entry skin & eye :
: YES
Routes of entry Ingestion :
: YES
Routes of exposure skin absorption :
: NO

Potential Health Effects:
Signs and symptoms of short-term (acute) exposure
Sign and symptoms Inhalation :
: If product is heated or mists are formed, inhalation may cause irritation to the nose, throat and respiratory tract.
Sign and symptoms ingestion :
: Ingestion may irritate digestive tract and cause nausea, vomiting and diarrhea.
Sign and symptoms skin :
: Direct skin contact may result in little or no irritation.
SAFETY DATA SHEET

Sign and symptoms eyes : Causes serious eye irritation. Symptoms may include tearing, redness and discomfort.

Potential Chronic Health Effects

Mutagenicity : Not expected to be mutagenic in humans.
Carcinogenicity : No components are listed as carcinogens by ACGIH, IARC, OSHA or NTP.
Reproductive effects & Teratogenicity : Not expected to cause reproductive effects.
Sensitization to material : Not expected to be a skin or respiratory sensitizer.
Specific target organ effects : This material is not classified as hazardous under U.S. OSHA regulations (29CFR 1910.1200) (Hazcom 2012) and Canadian WHMIS regulations (Hazardous Products Regulations) (WHMIS 2015).

Medical conditions aggravated by overexposure : None known.
Synergistic materials : Not available.
Toxicological data : See below for individual ingredient acute toxicity data.

<table>
<thead>
<tr>
<th>Chemical name</th>
<th>LC50(4hr) inh, rat</th>
<th>LD50 (Oral, rat)</th>
<th>LD50 (Rabbit, dermal)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ammonium chloride</td>
<td>N/Av</td>
<td>1220 mg/kg</td>
<td>&gt;2000 mg/kg</td>
</tr>
</tbody>
</table>

Other important toxicological hazards : None known or reported by the manufacturer.

SECTION 12. ECOLOGICAL INFORMATION

Ecotoxicity : Not expected to be harmful to aquatic organisms. Do not allow material to contaminate ground water system. See the following tables for individual ingredient ecotoxicity data.

Ecotoxicity data:

<table>
<thead>
<tr>
<th>Ingredients</th>
<th>CAS No</th>
<th>Toxicity to Fish</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>LC50 / 96h</td>
</tr>
<tr>
<td>Ammonium chloride</td>
<td>12125-02-9</td>
<td>209 mg/L (Cyprinus carpio)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Ingredients</th>
<th>CAS No</th>
<th>Toxicity to Daphnia</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>EC50 / 48h</td>
</tr>
<tr>
<td>Ammonium chloride</td>
<td>12125-02-9</td>
<td>101mg/L (Daphnia magna)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Ingredients</th>
<th>CAS No</th>
<th>Toxicity to Algae</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>EC50 / 96h or 72h</td>
</tr>
<tr>
<td>Ammonium chloride</td>
<td>12125-02-9</td>
<td>N/Av</td>
</tr>
</tbody>
</table>
SAFETY DATA SHEET

Persistence and degradability

Biodegradation is not applicable to inorganic substances.

Bioaccumulation potential

Not expected to bioaccumulate.

<table>
<thead>
<tr>
<th>Components</th>
<th>Partition coefficient n-octanol/water (log Kow)</th>
<th>Bioconcentration factor (BCF)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ammonium chloride (CAS 12125-02-9)</td>
<td>N/Ap</td>
<td>N/Ap</td>
</tr>
</tbody>
</table>

Mobility in soil

High water solubility indicates a high mobility in soil.

Other Adverse Environmental effects

No information available.

SECTION 13. DISPOSAL CONSIDERATIONS

Handling for Disposal

Handle waste according to recommendations in Section 7.

Methods of Disposal

Dispose in accordance with all applicable federal, state, provincial and local regulations.

RCRA

Under the RCRA, it is the responsibility of the waste generator to determine the proper waste identification and disposal method. For disposal of unused or waste material, check with local, provincial and federal environmental agencies.

SECTION 14. TRANSPORTATION INFORMATION

<table>
<thead>
<tr>
<th>Regulatory Information</th>
<th>UN Number</th>
<th>UN proper shipping name</th>
<th>Transport hazard class(es)</th>
<th>Packing Group</th>
<th>Label</th>
</tr>
</thead>
<tbody>
<tr>
<td>49CFR/DOT</td>
<td>None.</td>
<td>Not regulated.</td>
<td>not regulated</td>
<td>none</td>
<td></td>
</tr>
<tr>
<td>49CFR/DOT Additional information</td>
<td>None.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TDG</td>
<td>None.</td>
<td>Not regulated.</td>
<td>Not regulated</td>
<td>none</td>
<td></td>
</tr>
<tr>
<td>TDG Additional information</td>
<td>None.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Special precautions for user

None known or reported by the manufacturer.

Environmental hazards

This substance does not meet the criteria for an environmentally hazardous substance according to the IMDG Code. See ECOLOGICAL INFORMATION, Section 12.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

Not available.

SECTION 15 - REGULATORY INFORMATION

US Federal Information:

Components listed below are present on the following U.S. Federal chemical lists:
Ammonium chloride
SDS Preparation Date (mm/dd/yyyy): 08/31/2016

SAFETY DATA SHEET

<table>
<thead>
<tr>
<th>Ingredients</th>
<th>CAS #</th>
<th>TSCA Inventory</th>
<th>CERCLA Reportable Quantity(RQ) (40 CFR 117.302):</th>
<th>SARA TITLE III: Sec. 302, Extremely Hazardous Substance, 40 CFR 355:</th>
<th>SARA TITLE III: Sec. 313, 40 CFR 372, Specific Toxic Chemical Toxic Chemical de minimus Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ammonium chloride</td>
<td>12125-02-9</td>
<td>Yes</td>
<td>5000 lb/ 2270 kg</td>
<td>N/Av</td>
<td>No</td>
</tr>
</tbody>
</table>

SARA TITLE III: Sec. 311 and 312, SDS Requirements, 40 CFR 370 Hazard Classes: Acute Health Hazard Under SARA Sections 311 and 312, the EPA has established threshold quantities for the reporting of hazardous chemicals. The current thresholds are 500 pounds for the threshold planning quantity (TPQ), whichever is lower, for extremely hazardous substances and 10,000 pounds for all other hazardous chemicals.

US State Right to Know Laws:

The following chemicals are specifically listed by individual States:

<table>
<thead>
<tr>
<th>Ingredients</th>
<th>CAS #</th>
<th>California Proposition 65 Listed</th>
<th>Type of Toxicity</th>
<th>State &quot;Right to Know&quot; Lists CA MA MN NJ PA RI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ammonium chloride</td>
<td>12125-02-9</td>
<td>No</td>
<td>N/Av</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Canadian Information:

WHMIS information: Refer to Section 2 for a WHMIS Classification for this product.
Canadian Environmental Protection Act (CEPA) information: All ingredients listed appear on the Domestic Substances List (DSL).

International Information:

Components listed below are present on the following International Inventory list:

<table>
<thead>
<tr>
<th>Ingredients</th>
<th>CAS #</th>
<th>European EINECs</th>
<th>Australia AICS</th>
<th>Philippines PICCS</th>
<th>Japan ENCS</th>
<th>Korea KECl/KECl</th>
<th>China IECSC</th>
<th>NewZealand IOC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ammonium chloride</td>
<td>12125-02-9</td>
<td>235-186-4</td>
<td>Present</td>
<td>Present</td>
<td>(1)-218</td>
<td>KE-01645</td>
<td>Present</td>
<td>HSR002899</td>
</tr>
</tbody>
</table>

SECTION 16. OTHER INFORMATION

Legend:  
ACGIH: American Conference of Governmental Industrial Hygienists  
CAS: Chemical Abstract Services  
CERCLA: Comprehensive Environmental Response, Compensation, and Liability Act of 1980  
CFR: Code of Federal Regulations  
CSA: Canadian Standards Association  
DOT: Department of Transportation  
EPA: Environmental Protection Agency  
HMIS: Hazardous Materials Identification System  
HSDB: Hazardous Substances Data Bank  
IARC: International Agency for Research on Cancer  
Inh: Inhalation  
LC: Lethal Concentration  
LD: Lethal Dose  
MN: Minnesota  
N/Ap: Not Applicable  
N/Av: Not Available
SAFETY DATA SHEET

NFPA: National Fire Protection Association
NIOSH: National Institute of Occupational Safety and Health
NJ: New Jersey
NTP: National Toxicology Program
OECD: Organisation for Economic Co-operation and Development
OSHA: Occupational Safety and Health Administration
PA: Pennsylvania
PEL: Permissible exposure limit
RCRA: Resource Conservation and Recovery Act
RI: Rhode Island
RTECS: Registry of Toxic Effects of Chemical Substances
SARA: Superfund Amendments and Reauthorization Act
STEL: Short Term Exposure Limit
TLV: Threshold Limit Values
TWA: Time Weighted Average
WHMIS: Workplace Hazardous Materials Identification System

References:
1. ACGIH, Threshold Limit Values for Chemical Substances and Physical Agents & Biological Exposure Indices for 2016
3. Canadian Centre for Occupational Health and Safety, CCHInfoWeb databases, 2016(Chempendium, HSDB and RTECs).
4. Material Safety Data Sheets from manufacturer.
5. US EPA Title III List of Lists - 2016 version.

Preparation Date (mm/dd/yyyy): 08/31/2016

Other special considerations for handling:
Provide adequate information, instruction and training for operators.

Prepared for:
Comet Chemical Company Ltd.
3463 Thomas Street,
Innisfill, ON L9S 3W4
Information (M-F 8:00-5:00): 705-436-5580
www.cometchemical.com

Prepared by:
ICC The Compliance Center Inc.
Telephone: (888) 442-9628 (U.S.); (888) 977-4834 (Canada)
http://www.thecompliancecenter.com

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