SAFETY DATA SHEET
(in accordance with Regulation (EU) 2015/830)

AMMONIUM PERCHLORATE

SECTION 1: IDENTIFICATION OF THE SUBSTANCE AND OF THE COMPANY/UNDERTAKING.

1.1 Product identifier.
Product Name: AMMONIUM PERCHLORATE
Chemical Name: AMMONIUM PERCHLORATE
Index No: 017-009-00-0
CAS No: 7790-98-9
EC No: 232-235-1
REACH Nº: 01-2119490079-30-0002

1.2 Relevant identified uses of the substance and uses advised against.
Pyrotechnical compositions

Uses advised against:
Uses other than those recommended.

1.3 Details of the supplier of the safety data sheet.
Company: ALDEBARÁN SISTEMAS SL
Address: C/Jerónimo Zurita, 10, entlo izda, 50001
City: Zaragoza
Province: Zaragoza
Telephone: 0034976796134
E-mail: aldebaran@aldebaransistemas.com

1.4 Emergency telephone number: 0034915620420 (Available 24 hours)

SECTION 2: HAZARDS IDENTIFICATION.

2.1 Classification of the substance.
In accordance with Regulation (EU) No 1272/2008:
Eye Irrit. 2: Causes serious eye irritation.
Ox. Sol. 1: May cause fire or explosion; strong oxidiser.
STOT RE 2: May cause damage to organs through prolonged or repeated exposure.

2.2 Label elements.
Labelling in accordance with Regulation (EU) No 1272/2008:
Pictograms:

Signal Word: Danger
H statements:
H271 May cause fire or explosion; strong oxidiser.
H319 Causes serious eye irritation.
H373 May cause damage to organs through prolonged or repeated exposure.

-Continued on next page.-
P statements:

P210  Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P220  Keep away from clothing and other combustible materials.
P260  Do not breathe dust/fume/gas/mist/vapours/spray.
P264  Wash ... thoroughly after handling.
P280  Wear protective gloves/protective clothing/eye protection/face protection.
P283  Wear fire resistant or flame retardant clothing.
P305+P351+P338  IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P306+P360  IF ON CLOTHING: rinse immediately contaminated clothing and skin with plenty of water before removing clothes.
P314   Get medical advice/attention if you feel unwell.
P337+P313  If eye irritation persists: Get medical advice/attention.
P370+P378  In case of fire: Use special media to extinguish.
P371+P380+P375  In case of major fire and large quantities: Evacuate area. Fight fire remotely due to the risk of explosion.
P420   Store separately.
P501   Dispose of contents/container to local/national normative

Contains:
AMMONIUM PERCHLORATE

2.3 Other hazards.
In normal use conditions and in its original form, the product itself does not involve any other risk for health and the environment.

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS.

3.1 Substances.
Chemical Name:  AMMONIUM PERCHLORATE
Index No:  017-009-00-0
CAS No:  7790-98-9
EC No:  232-235-1
REACH Nº:  01-2119490079-30-0002

3.2 Mixtures.
Not Applicable.

SECTION 4: FIRST AID MEASURES.

4.1 Description of first aid measures.
In case of doubt or when symptoms of feeling unwell persist, get medical attention. Never administer anything orally to persons who are unconscious.

Inhalation.
Take the victim into open air; keep them warm and calm. If breathing is irregular or stops, perform artificial respiration.

Eye contact.
Remove contact lenses, if present and if it is easy to do. Wash eyes with plenty of clean and cool water for at least 10 minutes while pulling eyelids up, and seek medical assistance. Don't let the person to rub the affected eye.

Skin contact.
Remove contaminated clothing. Wash skin vigorously with water and soap or a suitable skin cleaner. NEVER use solvents or thinners.
Ingestion.
If accidentally ingested, seek immediate medical attention. Keep calm. NEVER induce vomiting.

4.2 Most important symptoms and effects, both acute and delayed.
Irritant Product, repeated or prolonged contact with skin or mucous membranes can cause redness, blisters or dermatitis, inhalation of spray mist or particles in suspension may cause irritation of the respiratory tract, some symptoms may not be immediate. Long-term chronic exposure may result in injury to certain organs or tissues.

4.3 Indication of any immediate medical attention and special treatment needed.
In case of doubt or when symptoms of feeling unwell persist, get medical attention. Never administer anything orally to persons who are unconscious. Keep the person comfortable. Turn him/her over to the left side and stay there while waiting for medical care.

SECTION 5: FIREFIGHTING MEASURES.

5.1 Extinguishing media.
Suitable extinguishing media:
Use water spray. Do not use for the direct jetting of water.

5.2 Special hazards arising from the substance.
Special risks.
The fire can produce a thick black smoke. As a result of thermal decomposition, hazardous products may be formed: carbon monoxide, carbon dioxide. Exposure to products of combustion or decomposition can be harmful to health.

5.3 Advice for firefighters.
Refrigerate tanks, cisterns or containers near the source of heat or fire with water. Take into account the direction of the wind. Prevent products used in fire fighting from entering drains, sewers or water courses.

Fire protection equipment.
Depending on the magnitude of the fire, it may be necessary to wear protective clothing against heat, self-contained breathing apparatus, gloves, goggles or face masks and boots.

SECTION 6: ACCIDENTAL RELEASE MEASURES.

6.1 Personal precautions, protective equipment and emergency procedures.
For exposure control and individual protection measures, see section 8.

6.2 Environmental precautions.
Prevent the contamination of drains, surface or subterranean waters, and the ground.

6.3 Methods and material for containment and cleaning up.
The contaminated area should be immediately cleaned with an appropriate de-contaminator. Pour the decontaminator on the remains in an opened container and let it act various days until no further reaction is produced.

6.4 Reference to other sections.
For exposure control and individual protection measures, see section 8. For later elimination of waste, follow the recommendations under section 13.

-Continued on next page.-
SECTION 7: HANDLING AND STORAGE.

7.1 Precautions for safe handling.
For personal protection, see section 8. Never use pressure to empty the containers. They are not pressure-resistant containers.
In the application area, smoking, eating, and drinking must be prohibited.
Follow legislation on occupational health and safety.
Keep the product in containers made of a material identical to the original.

7.2 Conditions for safe storage, including any incompatibilities.
Store according to local legislation. Observe indications on the label. Store the containers between 5 and 35º C, in a dry and well-ventilated place, far from sources of heat and direct solar light. Keep far away from ignition points. Keep away from oxidising agents and from highly acidic or alkaline materials. Do not smoke. Prevent the entry of non-authorised persons. Once the containers are open, they must be carefully closed and placed vertically to prevent spills.
Classification and threshold amount of storage in accordance with Annex 1 to Directive 2012/18/EU (SEVESO III):

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
<th>Lower-tier requirements</th>
<th>Upper-tier requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>P8</td>
<td>OXIDISING LIQUIDS AND SOLIDS</td>
<td>50</td>
<td>200</td>
</tr>
</tbody>
</table>

7.3 Specific end use(s).
Pyrotechnical mixtures

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION.

8.1 Control parameters.
The product does NOT contain substances with Professional Exposure Environmental Limit Values. The product does NOT contain substances with Biological Limit Values. Concentration levels DNEL/DMEL:

<table>
<thead>
<tr>
<th>Name</th>
<th>DNEL/DMEL</th>
<th>Type</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>AMMONIUM PERCHLORATE</td>
<td>DNEL (Workers)</td>
<td>Inhalation, Long-term, Systemic effects</td>
<td>0,28 (mg/m³)</td>
</tr>
<tr>
<td>CAS No: 7790-98-9</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EC No: 232-235-1</td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

DNEL: Derived No Effect Level, level of exposure to the substance below which adverse effects are not anticipated.
DMEL: Derived Minimal Effect Level, exposure level corresponding to a low risk, that risk should be considered a tolerable minimum.

8.2 Exposure controls.

Measures of a technical nature:
Provide adequate ventilation, which can be achieved by using good local exhaust-ventilation and a good general exhaust system.

<table>
<thead>
<tr>
<th>Concentration: 100 %</th>
<th>Uses: Pyrotechnical compositions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breathing protection:</td>
<td>PPE: Particle filter mask</td>
</tr>
</tbody>
</table>
SAFETY DATA SHEET
(in accordance with Regulation (EU) 2015/830)

AMMONIUM PERCHLORATE

Characteristics: «CE» marking, category III. Made of filtering material, it covers nose, mouth and chin.
CEN standards: EN 149
Maintenance: Check for any tears, defects, etc. before use. Since it is disposable individual protection equipment, it should be replaced after use.
Observations: Does not protect worker unless properly adjusted. Follow the manufacturer's instructions regarding suitable use of the equipment.
Filter Type needed: P2

Hand protection:
PPE: Protective gloves against chemicals.
Characteristics: «CE» marking, category III.
CEN standards: EN 374-1, En 374-2, EN 374-3, EN 420
Maintenance: Do not make any changes to the gloves that may alter their resistance, or apply paints, solvents or adhesives.
Observations: Gloves should be of the appropriate size and fit the user's hand well, not being too loose or too tight.

Material: PVC (polyvinyl chloride) Breakthrough time (min.): > 480 Material thickness (mm): 0,35

Eye protection:
PPE: Protective goggles against particle impacts.
Characteristics: «CE» marking, category II. Eye protector against dust and smoke.
CEN standards: EN 165, EN 166, EN 167, EN 168
Maintenance: Visibility through lenses should be ideal. Therefore, these parts should be cleaned daily. Protectors should be disinfected periodically following the manufacturer's instructions.
Observations: Some signs of wear and tear include: yellow colouring of the lenses, superficial scratching of the lenses, scraping etc.

Skin protection:
PPE: Anti-static protective clothing.
Characteristics: «CE» marking, category II. Protective clothing should not be too tight or loose in order not to obstruct the user's movements.
CEN standards: EN 340, EN 1149-1, EN 1149-2, EN 1149-3, EN 1149-5
Maintenance: In order to guarantee uniform protection, follow the washing and maintenance instructions provided by the manufacturer.
Observations: The protective clothing should offer a level of comfort in line with the level of protection provided in terms of the hazard against which it protects, bearing in mind environmental conditions, the user's level of activity and the expected time of use.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES.

9.1 Information on basic physical and chemical properties.
Appearance: Powder
Colour: N.A./N.A.
Odour: N.A./N.A.
Odour threshold: N.A./N.A.
\( \text{pH} = 4,0-6,5 \ A \ 20^\circ \text{C} \)
Melting point: It decomposes when heated °C
Boiling Point: N.A./N.A.
Flash point: N.A./N.A.
Evaporation rate: N.A./N.A.
Inflammability (solid, gas): N.A./N.A.
Lower Explosive Limit: N.A./N.A.
Upper Explosive Limit: N.A./N.A.
Vapour pressure: N.A./N.A.
Vapour density: N.A./N.A.
Relative density: 1.95
Solubility: 234 g/l at 20°C
Liposolubility: N.A./N.A.
Hydrosolubility: N.A./N.A.
Partition coefficient (n-octanol/water): N.A./N.A.
Auto-ignition temperature: N.A./N.A.
Decomposition temperature: 300°C
Viscosity: N.A./N.A.

9.2 Other information.
Pour point: N.A./N.A.
Blink: N.A./N.A.
Kinematic viscosity: N.A./N.A.
N.A./N.A. = Not Available/Not Applicable due to the nature of the product

SECTION 10: STABILITY AND REACTIVITY.

10.1 Reactivity.
If the storage conditions are satisfied, does not produce dangerous reactions.

10.2 Chemical stability.
Unstable in contact with:
- Bases.

10.3 Possibility of hazardous reactions.
May cause fire or explosion; strong oxidiser.
Neutralization can occur on contact with bases.

10.4 Conditions to avoid.
Avoid the following conditions:
- high temperature
- Contact with incompatible materials.
- Avoid contact with bases.

10.5 Incompatible materials.
Avoid the following materials:
- Bases.
- Flammable materials.
- Explosives materials.
- Corrosive materials.

10.6 Hazardous decomposition products.
Depending on conditions of use, can be generated the following products:
- Oxygen.
- Corrosive vapors or gases.

-Continued on next page.-
- Oxidizing gases or vapors.

SECTION 11: TOXICOLOGICAL INFORMATION.

IRRITANT PREPARATION. Splatters in the eyes can cause irritation.

11.1 Information on toxicological effects.
There are no tested data available on the product.
Repeated or prolonged contact with the product can cause the elimination of oil from the skin, giving rise to non-allergic contact dermatitis and absorption of the product through the skin.
Splatters in the eyes can cause irritation and reversible damage.

a) acute toxicity;
Not conclusive data for classification.

b) skin corrosion/irritation;
Not conclusive data for classification.

c) serious eye damage/irritation;
Product classified:
Eye irritation, Category 2: Causes serious eye irritation.

d) respiratory or skin sensitisation;
Not conclusive data for classification.

e) germ cell mutagenicity;
Not conclusive data for classification.

f) carcinogenicity;
Not conclusive data for classification.

g) reproductive toxicity;
Not conclusive data for classification.

h) STOT-single exposure;
Not conclusive data for classification.

i) STOT-repeated exposure;
Product classified:
Specific target organ toxicity following a repeated exposure, Category 2: May cause damage to organs through prolonged or repeated exposure.

j) aspiration hazard;
Not conclusive data for classification.

SECTION 12: ECOLOGICAL INFORMATION.

12.1 Toxicity.

There is no information available on the biodegradability of the substances present.

12.2 Persistence and degradability.

There is no information available on the degradability of the substances present.
No information is available regarding the degradability. No information is available about persistence and degradability of the product.
12.3 Bioaccumulative potential.
No information is available regarding the bioaccumulation.

12.4 Mobility in soil.
No information is available about the mobility in soil.
The product must not be allowed to go into sewers or waterways.
Prevent penetration into the ground.

12.5 Results of PBT and vPvB assessment.
No information is available about the results of PBT and vPvB assessment of the product.

12.6 Other adverse effects.
No information is available about other adverse effects for the environment.

SECTION 13 DISPOSAL CONSIDERATIONS.

13.1 Waste treatment methods.
Do not dump into sewers or waterways. Waste and empty containers must be handled and eliminated according to current, local/national legislation.

SECTION 14: TRANSPORT INFORMATION.

Transport following ADR rules for road transport, RID rules for railway, ADN for inner waterways, IMDG for sea, and ICAO/IATA for air transport.

Land: Transport by road: ADR, Transport by rail: RID.
Transport documentation: Consignment note and written instructions

Sea: Transport by ship: IMDG.
Transport documentation: Bill of lading

Air: Transport by plane: ICAO/IATA.
Transport document: Airway bill.

14.1 UN number.
UN No: UN1442

14.2 UN proper shipping name.
Description:
ADR: UN 1442, AMMONIUM PERCHLORATE, 5.1, PG II, (E)
IMDG: UN 1442, AMMONIUM PERCHLORATE, 5.1, PG II
ICAO/IATA: UN 1442, AMMONIUM PERCHLORATE, 5.1, PG II

14.3 Transport hazard class(es).
Class(es): 5.1

14.4 Packing group.
Packing group: II

14.5 Environmental hazards.
Marine pollutant: No

14.6 Special precautions for user.
Labels: 5.1

-Continued on next page.-
Hazard number: 50
ADR LQ: 1 kg
IMDG LQ: 1 kg
ICAO LQ: 2.5 kg

Provisions concerning carriage in bulk ADR:
VC1  Carriage in bulk in sheeted vehicles, sheeted containers or sheeted bulk containers is permitted.
VC2  Carriage in bulk in closed vehicles, closed containers or closed bulk containers is permitted.
AP6  If the vehicle or container is made of wood or other combustible material, an impermeable surfacing resistant to combustion or a coating of sodium silicate or similar substance shall be provided. Sheeting shall also be impermeable and non-combustible.
AP7  Carriage in bulk shall only be as a full load.

Transport by ship, FEm – Emergency sheets (F – Fire, S – Spills): F-H,S-Q
Proceed in accordance with point 6.

IMDG Code segregation group: 13 Perchlorates

14.7 Transport in bulk according to Annex II of MARPOL and the IBC Code.
The product is not transported in bulk.

SECTION 15: REGULATORY INFORMATION.

15.1 Safety, health and environmental regulations/legislation specific for the substance.

Product classification according to Annex I of Directive 2012/18/EU (SEVESO III): P8
The product is not affected by Regulation (EU) No 528/2012 concerning the making available on the market and use of biocidal products.
The product is not affected by the procedure established Regulation (EU) No 649/2012, concerning the export and import of dangerous chemicals.

15.2 Chemical safety assessment.
No Chemical Safety Assessment has been carried out for this substance/mixture by the supplier.

SECTION 16: OTHER INFORMATION.

Classification codes:
Eye Irrit. 2 : Eye irritation, Category 2
Ox. Sol. 1 : Oxidising solid, Category 1
STOT RE 2 : Specific target organ toxicity following a repeated exposure, Category 2

Sections changed compared with the previous version:
1,2,3,4,8,11,16
AMMONIUM PERCHLORATE

It is advisable to carry out basic training with regard to health and safety at work in order to handle this product correctly.

Abbreviations and acronyms used:
ADR: European Agreement concerning the International Carriage of Dangerous Goods by Road.
CEN: European Committee for Standardization.
DMEL: Derived Minimal Effect Level, exposure level corresponding to a low risk, that risk should be considered a tolerable minimum.
DNEL: Derived No Effect Level, level of exposure to the substance below which adverse effects are not anticipated.
PPE: Personal protection equipment.
IATA: International Air Transport Association.
ICAO: International Civil Aviation Organization.
RID: Regulations Concerning the International Transport of Dangerous Goods by Rail.

Key literature references and sources for data:
http://eur-lex.europa.eu/homepage.html
http://echa.europa.eu/


The information in this Safety Data Sheet on the Preparation is based on current knowledge and on current EC and national laws, as far as the working conditions of the users is beyond our knowledge and control. The product must not be used for purposes other than those that are specified without first having written instructions on how to handle. It is always the responsibility of the user to take the appropriate measures in order to comply with the requirements established by current legislation. The information contained in this Safety Sheet only states a description of the safety requirements for the preparation, and it must not be considered as a guarantee of its properties.