1. PRODUCT AND COMPANY IDENTIFICATION

<table>
<thead>
<tr>
<th>Product Name</th>
<th>Life Raft, Self-Inflating, Aviation Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trade Names</td>
<td></td>
</tr>
<tr>
<td>Model</td>
<td>Part No.</td>
</tr>
<tr>
<td>EAM-2B</td>
<td>R0074-(-)</td>
</tr>
<tr>
<td>EAM-5</td>
<td>R0070-(-)</td>
</tr>
<tr>
<td>EAM-8</td>
<td>R0097-(-)</td>
</tr>
<tr>
<td>EAM-12</td>
<td>R0098-(-)</td>
</tr>
<tr>
<td>T2</td>
<td>R0100A(-)</td>
</tr>
<tr>
<td>T4</td>
<td>R0101A(-)</td>
</tr>
<tr>
<td>T4</td>
<td>T4S</td>
</tr>
<tr>
<td>EAM-5</td>
<td>T4S</td>
</tr>
<tr>
<td>EAM-8</td>
<td>T6</td>
</tr>
<tr>
<td>EAM-12</td>
<td>T6A</td>
</tr>
<tr>
<td>T2</td>
<td>T6AX</td>
</tr>
<tr>
<td>T4</td>
<td>T7AS</td>
</tr>
<tr>
<td>Company</td>
<td>Eastern Aero Marine</td>
</tr>
<tr>
<td>Telephone</td>
<td>(800) 255-3924</td>
</tr>
<tr>
<td>Fax</td>
<td>(305) 637-8632</td>
</tr>
<tr>
<td>Emergency Phone Number</td>
<td>(813) 248-0585</td>
</tr>
</tbody>
</table>

2. HAZARDS IDENTIFICATION

- Carbon Dioxide, Compressed
- Nitrogen, Compressed
- Pyrotechnic Signaling Device (flares) including Signaling Devices, Hand, Cartridges, Signal

Symbol(s) or pictogram(s) Refer to supplier’s Safety Data Sheets for specific information on components.

Hazard statement(s) Refer to supplier’s Safety Data Sheets for specific information on components.

Precautionary statement(s) Refer to supplier’s Safety Data Sheets for specific information on components.

Hazards not otherwise classified Refer to supplier’s Safety Data Sheets for specific information on components.

3. COMPOSITION/INFORMATION ON INGREDIENTS

N/A. Refer to supplier’s Safety Data Sheets for specific information on components.

4. FIRST AID MEASURES

Inhalation Provide patient with fresh air and seek medical advice.
Skin Contact Do not use solvents. Wash with soap and water.
Eye Contact Irrigate thoroughly with water and seek medical advice.
Ingestion Get medical aid immediately.

5. FIREFIGHTING MEASURES

Suitable Extinguishing Media Large volumes of water.
Specific Hazards From Combustion Refer to supplier’s Safety Data Sheets for specific information on components.
Personal Protection Use air-ventilated full mask and full protective clothing.
6. ACCIDENTAL RELEASE MEASURES

Hazardous materials are contained in sealed units within packed life raft. Spills should pose no threat if sealed units are not breached. Refer to supplier’s Safety Data Sheets for specific information on components.

7. HANDLING AND STORAGE

These units should be stored in a cool dry area, away from danger of sparks, heat or flames. Do not drop the packed life raft. Do not pull the inflation lanyard (painter line) on the raft. Only lift the packed raft by its handles on its carrying case. Opening the life raft case may cause the raft to inflate. Life raft can cause injury if inflated close to people or in a confined area. Refer to supplier’s Safety Data Sheets for specific information on components.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

If inflated in a confined area, either intentionally or by accident, provide ventilation to disperse CO₂ gases. Refer to supplier’s Safety Data Sheets for specific information on components.

9. PHYSICAL AND CHEMICAL PROPERTIES

Refer to supplier’s Safety Data Sheets for specific information on components.

10. STABILITY AND REACTIVITY

Life raft is stable if stored in the original package in cool and dry conditions. Do not subject life raft to high temperatures or excessively humid conditions. Refer to supplier’s Safety Data Sheets for specific information on components.

11. TOXICOLOGICAL INFORMATION

N/A. Refer to supplier’s Safety Data Sheets for specific information on components.

12. ECOLOGICAL INFORMATION

N/A. Refer to supplier’s Safety Data Sheets for specific information on components.

13. DISPOSAL CONSIDERATIONS

The life raft may be disposed of as domestic waste in accordance with local laws and regulations. Refer to supplier’s Safety Data Sheets for specific disposal information of components.

14. TRANSPORT INFORMATION

<table>
<thead>
<tr>
<th>UN Number</th>
<th>UN2990</th>
</tr>
</thead>
<tbody>
<tr>
<td>UN Proper Shipping Name</td>
<td>Life Saving Appliance, Self-Inflating</td>
</tr>
<tr>
<td>Transport Hazard Class(es)</td>
<td>Class 9</td>
</tr>
<tr>
<td>Packing Group</td>
<td>N/A</td>
</tr>
</tbody>
</table>

15. REGULATORY INFORMATION

N/A. Refer to supplier’s Safety Data Sheets for specific information on components.

16. OTHER INFORMATION

Revision Level
Original

Supplier’s Safety Data Sheets can be found on our website at [www.eamworldwide.com/technical-data/](http://www.eamworldwide.com/technical-data/)
Safety Data Sheet

Section 1: Identification of the Substance/Mixture and of the Company/Undertaking

1.1 Product identifier

Product Name  • Carbon Dioxide (gas)
CAS Number  • 124-38-9
Product Code  • MSDS No. 10040
EC Number  • 204-696-9

1.2 Relevant identified uses of the substance or mixture and uses advised against

Relevant identified use(s)  • Medical and general analytical or synthetic chemical uses

1.3 Details of the supplier of the safety data sheet

Manufacturer  • Air Liquide
2700 Post Oak Blvd.
Houston, TX 77056
United States
www.us.airliquide.com

Telephone (Technical)  • 713-896-2896
Telephone (Technical)  • 800-819-1704

1.4 Emergency telephone number

Manufacturer  • 800-424-9300 - CHEMTREC
Manufacturer  • +1 703-527-3887 - Outside United States

Section 2: Hazards Identification

EU/EEC

According to EU Directive 67/548/EEC (DSD) or 1999/45/EC (DPD)

2.1 Classification of the substance or mixture

CLP  • Compressed Gas - H280
DSD/DPD  • Classification criteria not met and currently not classified under Annex I of the Directive

2.2 Label Elements

CLP

WARNING

Hazard statements  • H280 - Contains gas under pressure; may explode if heated
Precautionary statements

Storage/Disposal
- P403 - Store in a well-ventilated place.
- Mixtures containing carbon dioxide can increase respiration and heart rate.

2.3 Other Hazards

CLP
- This material is a simple asphyxiant. May displace or reduce oxygen available for breathing especially in confined spaces. According to Regulation (EC) No. 1272/2008 (CLP) this material is considered hazardous.

DSD/DPD
- This material is a simple asphyxiant. May displace or reduce oxygen available for breathing especially in confined spaces. This product is not considered dangerous under the European Directive 67/548/EEC.

United States (US)
According to OSHA 29 CFR 1910.1200 HCS

2.1 Classification of the substance or mixture

OSHA HCS 2012
- Compressed Gas - H280
  - Simple Asphyxiant

2.2 Label elements

OSHA HCS 2012

WARNING

Hazard statements
- H280 - Contains gas under pressure; may explode if heated
  - May displace oxygen and cause rapid suffocation.

Precautionary statements

Storage/Disposal
- P403 - Store in a well-ventilated place.

HCS 2012 Other
Information
- Mixtures containing carbon dioxide can increase respiration and heart rate.

2.3 Other hazards

OSHA HCS 2012
- Contact with gas or liquefied gas will cause burns, severe injury and/or frostbite. Under United States Regulations (29 CFR 1910.1200 - Hazard Communication Standard), this product is considered hazardous.

Canada
According to WHMIS

2.1 Classification of the substance or mixture

WHMIS
- Compressed Gas - A

2.2 Label elements

WHMIS

- Compressed Gas - A

2.3 Other hazards

- Compressed Gas - A
This material is a simple asphyxiant. May displace or reduce oxygen available for breathing especially in confined spaces. Contact with gas or liquefied gas will cause burns, severe injury and/or frostbite. In Canada, the product mentioned above is considered hazardous under the Workplace Hazardous Materials Information System (WHMIS).

### Section 3 - Composition/Information on Ingredients

#### 3.1 Substances

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>Identifiers</th>
<th>% (weight)</th>
<th>LD50/LC50</th>
<th>Classifications According to Regulation/Directive</th>
<th>Comments</th>
</tr>
</thead>
</table>
| Carbon dioxide      | CAS:124-38-9  
EC Number: 204-696-9 | > 99%       | Inhalation-Rat LC50 • 470000 ppm 30 Minute(s) | EU DSD/DPD: R20  
EU CLP: Compressed Gas  
OSHA HCS 2012: Compressed Gas | NDA |

#### 3.2 Mixtures

- Material does not meet the criteria of a mixture.

See Section 11 for Toxicological Information.

### Section 4 - First Aid Measures

#### 4.1 Description of first aid measures

**Inhalation**
- IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Administer oxygen if breathing is difficult. Give artificial respiration if victim is not breathing. If signs/symptoms continue, get medical attention.

**Skin**
- If frostbite has occurred, seek medical attention immediately; do NOT rub the affected area(s) or flush them with water. In order to prevent further tissue damage, do NOT attempt to remove frozen clothing from frostbitten areas. If frostbite has not occurred, immediately and thoroughly wash contaminated skin with soap and water.

**Eye**
- If eye tissue is frozen, seek medical attention immediately; if tissue is not frozen, immediately and thoroughly flush the eyes with large amounts of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. If irritation, pain, swelling, lacrimation or photophobia persist, get medical attention as soon as possible.

**Ingestion**
- If frostbite has occurred, seek medical attention immediately; do NOT rub the affected area(s) or flush them with water. Never give anything by mouth to an unconscious person. Do NOT induce vomiting.

#### 4.2 Most important symptoms and effects, both acute and delayed

- Refer to Section 11 - Toxicological Information.

#### 4.3 Indication of any immediate medical attention and special treatment needed

**Notes to Physician**
- All treatments should be based on observed signs and symptoms of distress in the patient. Consideration should be given to the possibility that overexposure to materials other than this product may have occurred.

### 4.4 Other information

- Ensure that medical personnel are aware of the material(s) involved and take
precautions to protect themselves. RESCUERS SHOULD NOT ATTEMPT TO RETRIEVE VICTIMS OF EXPOSURE TO GASES WITHOUT ADEQUATE PERSONAL PROTECTIVE EQUIPMENT. At a minimum, Self-Contained Breathing Apparatus must be worn. Victim(s) who experience any adverse effect after over-exposure to this gas mixture must be taken for medical attention. Rescuers should be taken for medical attention if necessary. Take a copy of the label and the MSDS to physician or other health professional with victim(s).

Section 5 - Firefighting Measures

5.1 Extinguishing media

Suitable Extinguishing Media  Use extinguishing agent suitable for type of surrounding fire.

Unsuitable Extinguishing Media  No data available

5.2 Special hazards arising from the substance or mixture

Unusual Fire and Explosion Hazards  Containers may explode when heated. Ruptured cylinders may rocket.

Hazardous Combustion Products  No data available

5.3 Advice for firefighters

- Structural firefighters’ protective clothing provides limited protection in fire situations ONLY: it is not effective in spill situations where direct contact with the substance is possible.
- Always wear thermal protective clothing when handling refrigerated/cryogenic liquids.
- Wear positive pressure self-contained breathing apparatus (SCBA).
- Move containers from fire area if you can do it without risk.
- FIRE: If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (1/2 mile) in all directions; also, consider initial evacuation for 800 meters (1/2 mile) in all directions.
- FIRE INVOLVING TANKS: Fight fire from maximum distance or use unmanned hose holders or monitor nozzles.
- FIRE INVOLVING TANKS: Cool containers with flooding quantities of water until well after fire is out.
- FIRE INVOLVING TANKS: Do not direct water at source of leak or safety devices; icing may occur.
- FIRE INVOLVING TANKS: Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank.
- FIRE INVOLVING TANKS: ALWAYS stay away from tanks engulfed in fire.

Section 6 - Accidental Release Measures

6.1 Personal precautions, protective equipment and emergency procedures

Personal Precautions  Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Do not touch or walk through spilled material. Ventilate the area before entry.

Emergency Procedures  Stop leak if you can do it without risk. Keep unauthorized personnel away. Keep out of low areas. Stay upwind. Do not direct water at spill or source of leak. LARGE SPILL: Consider initial downwind evacuation for at least 500 meters (1/3 mile)

6.2 Environmental precautions

- No special environmental precautions necessary.

6.3 Methods and material for containment and cleaning up

Containment/Clean-up Measures  Stop leak if you can do it without risk. Do not direct water at spill or source of leak.
Use water spray to reduce vapors; do not put water directly on leak, spill area or inside container. If possible, turn leaking containers so that gas escapes rather than liquid. Isolate area until gas has dispersed. Ventilate the area.

6.4 Reference to other sections

- No data available

### Section 7 - Handling and Storage

#### 7.1 Precautions for safe handling

**Handling**

- Use only with adequate ventilation. Ventilate closed spaces before entering. Be aware of any signs of dizziness or fatigue, especially if work is done in a poorly ventilated area; exposures to fatal concentrations of this gas mixture could occur without any significant warning symptoms, due to olfactory fatigue or oxygen deficiency. Cylinders should be firmly secured to prevent falling or being knocked-over. Do not attempt to repair, adjust, or in any other way modify cylinders. If there is a malfunction or another type of operational problem, contact nearest distributor immediately. Empty containers retain product residue and can be hazardous. Do not cut, weld, puncture or incinerate container.

**Storage**

- Store in a cool, dry, well-ventilated place. Do not allow area where cylinders are stored to exceed 52°C (125°F). Protect cylinders against physical damage. Cylinders should be firmly secured to prevent falling or being knocked-over.

#### 7.2 Conditions for safe storage, including any incompatibilities

- No data available

#### 7.3 Specific end use(s)

- No data available

### Section 8 - Exposure Controls/Personal Protection

#### 8.1 Control parameters

<table>
<thead>
<tr>
<th>Exposure Limits/Guidelines</th>
<th>Result</th>
<th>ACGIH</th>
<th>Canada Ontario</th>
<th>Canada Quebec</th>
<th>NIOSH</th>
<th>OSHA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbon dioxide (124-38-9)</td>
<td>STELs</td>
<td>30000 ppm STEL</td>
<td>30000 ppm STEL</td>
<td>30000 ppm STEV; 54000 mg/m3 STEV</td>
<td>30000 ppm STEL; 54000 mg/m3 STEL</td>
<td>Not established</td>
</tr>
<tr>
<td>TWAs</td>
<td>5000 ppm TWA</td>
<td>5000 ppm TWA</td>
<td>5000 ppm TWA</td>
<td>5000 ppm TWA; 9000 mg/m3 TWA</td>
<td>5000 ppm TWA; 9000 mg/m3 TWA</td>
<td>5000 ppm TWA; 9000 mg/m3 TWA</td>
</tr>
</tbody>
</table>

#### 8.2 Exposure controls

**Engineering Measures/Controls**

- Good general ventilation should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level.

**Personal Protective Equipment**

**Pictograms**

- ![Pictogram]

**Respiratory**

- Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or symptoms are experienced.

**Eye/Face**

- Wear safety glasses.

**Skin/Body**

- Wear leather gloves when handling cylinders.
### Environmental Exposure Controls

Follow best practice for site management and disposal of waste. Controls should be engineered to prevent release to the environment, including procedures to prevent spills, atmospheric release and release to waterways.

### Key to abbreviations

- **STEL** = Short Term Exposure Limits are based on 15-minute exposures
- **ACGIH** = American Conference of Governmental Industrial Hygiene
- **STEV** = Short Term Exposure Value
- **NIOSH** = National Institute of Occupational Safety and Health
- **TWA** = Time-Weighted Averages are based on 8h/day, 40h/week exposures
- **OSHA** = Occupational Safety and Health Administration

---

### Section 9 - Physical and Chemical Properties

#### 9.1 Information on Physical and Chemical Properties

<table>
<thead>
<tr>
<th>Material Description</th>
<th></th>
<th>Appearance/Description</th>
<th>Colorless gas with no odor.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical Form</td>
<td>Gas</td>
<td>Odor</td>
<td>Odorless</td>
</tr>
<tr>
<td>Color</td>
<td>Colorless</td>
<td>Particulate Type</td>
<td>Not relevant</td>
</tr>
<tr>
<td>Taste</td>
<td>Data lacking</td>
<td>Aerosol Type</td>
<td>Not relevant</td>
</tr>
<tr>
<td>Particulate Size</td>
<td>Not relevant</td>
<td>Physical and Chemical Properties</td>
<td>Data lacking</td>
</tr>
<tr>
<td>Odor Threshold</td>
<td>Not relevant</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| General Properties           |              |                                |                             |
| Boiling Point                | -78.4 C(-109.12 F) | Melting Point                  | Data lacking                 |
| Decomposition Temperature    | Data lacking | Heat of Decomposition          | Data lacking                 |
| pH                           | Not relevant | Specific Gravity/Relative Density | 1.56 Water=1 |
| Density                      | Data lacking | Bulk Density                   | Data lacking                 |
| Water Solubility             | Slightly Soluble 1.45 g/L @ 20 C(68 F) | Solvent Solubility             | Data lacking                 |
| Viscosity                    | Not relevant | Explosive Properties           | Not explosive.               |
| Oxidizing Properties:        | Not relevant |                               |                             |

| Volatility                   |              |                                |                             |
| Vapor Pressure               | 816 psig @ 20 C(68 F) | Vapor Density                 | 1.53 Air=1                  |
| Evaporation Rate             | Data lacking | VOC (Wt.)                      | Data lacking                 |
| VOC (Vol.)                   | Data lacking | Volatiles (Wt.)                | Data lacking                 |
| Volatiles (Vol.)             | Data lacking |                               |                             |

| Flammability                 |              |                                |                             |
| Flash Point                  | Not relevant | UEL                            | Not relevant                 |
| LEL                          | Not relevant | Autoignition                   | Not relevant                 |
| Self-Accelerating Decomposition Temperature (SADT) | Not relevant | Heat of Combustion (ΔHc) | Not relevant |
| Burning Time                 | Not relevant | Flame Duration                 | Not relevant                 |
| Flame Height                 | Not relevant | Flame Extension                | Not relevant                 |
| Ignition Distance            | Not relevant | Flammability (solid, gas)      | Not flammable.               |

| Environmental                |              |                                |                             |
| Half-Life                    | Data lacking | Octanol/Water Partition        | Data lacking                 |

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Preparation Date: 19/September/2012
Revision Date: 19/September/2012

Format: EU CLP/REACH Language: English (US)
WHMIS, EU DSD/DPD, EU CLP, OSHA HCS 2012
9.2 Other Information

- No data available

---

### Section 10: Stability and Reactivity

**10.1 Reactivity**

- No dangerous reaction known under conditions of normal use.

**10.2 Chemical stability**

- Stable under normal temperatures and pressures.

**10.3 Possibility of hazardous reactions**

- Hazardous polymerization will not occur.

**10.4 Conditions to avoid**

- Excess heat.

**10.5 Incompatible materials**

- This material is weakly acidic and will react with alkaline materials to form carbonates and bicarbonates.

**10.6 Hazardous decomposition products**

- Under normal conditions of storage and use, hazardous decomposition products should not be produced. Carbon dioxide produces toxic carbon monoxide when heated above 1700 deg. C.

---

### Section 11 - Toxicological Information

**11.1 Information on toxicological effects**

<table>
<thead>
<tr>
<th>Test Type</th>
<th>Dosage</th>
<th>Route</th>
<th>Species</th>
<th>Duration</th>
<th>Results</th>
<th>Test Class</th>
<th>Target Organs</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute Toxicity</td>
<td>= 470000 ppm</td>
<td>Inhalation</td>
<td>Rat</td>
<td>30 Minute(s)</td>
<td>LC50</td>
<td>NDA</td>
<td>NDA</td>
<td>NDA</td>
</tr>
<tr>
<td>Reproductive</td>
<td>= 2 pph</td>
<td>Inhalation</td>
<td>Mouse</td>
<td>8 Hour(s)</td>
<td>TCLo</td>
<td>NDA</td>
<td>NDA</td>
<td>NDA</td>
</tr>
<tr>
<td>Reproductive</td>
<td>= 13 pph</td>
<td>Inhalation</td>
<td>Rabbit</td>
<td>4 Hour(s)</td>
<td>TCLo</td>
<td>NDA</td>
<td>NDA</td>
<td>NDA</td>
</tr>
<tr>
<td>Reproductive</td>
<td>= 6 pph</td>
<td>Inhalation</td>
<td>Rat</td>
<td>24 Hour(s)</td>
<td>TCLo</td>
<td>NDA</td>
<td>NDA</td>
<td>NDA</td>
</tr>
</tbody>
</table>

**GHS Properties**

<table>
<thead>
<tr>
<th>Classification</th>
<th>Acute toxicity</th>
<th>EU/CLP • Classification criteria not met</th>
<th>OSHA HCS 2012 • Classification criteria not met</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aspiration Hazard</td>
<td>EU/CLP • Classification criteria not met</td>
<td>OSHA HCS 2012 • Classification criteria not met</td>
<td></td>
</tr>
<tr>
<td>Category</td>
<td>EU/CLP Classification criteria not met</td>
<td>OSHA HCS 2012 Classification criteria not met</td>
<td></td>
</tr>
<tr>
<td>---------------------------------------</td>
<td>----------------------------------------</td>
<td>---------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>Carcinogenicity</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Germ Cell Mutagenicity</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Skin corrosion/Irritation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Skin sensitization</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>STOT-RE</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>STOT-SE</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Toxicity for Reproduction</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Respiratory sensitization</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Serious eye damage/Irritation</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Route(s) of entry/exposure**
- Inhalation, Skin and Eye

**Potential Health Effects**

**Inhalation**
- **Acute (Immediate)**
  - If this material is released in a small, poorly ventilated area (i.e. an enclosed or confined space), an oxygen-deficient environment may occur. Individuals breathing such an atmosphere may experience symptoms which include headaches, ringing in ears, dizziness, drowsiness, unconsciousness, nausea, vomiting, and depression of all the senses. Under some circumstances of over-exposure, death may occur. The following effects associated with decreased levels of oxygen: increase in breathing and pulse rate, emotional upset, abnormal fatigue, nausea, vomiting, collapse, loss of consciousness, convulsive movements, respiratory collapse and death.
- **Chronic (Delayed)**
  - No data available

**Skin**
- **Acute (Immediate)**
  - Contact with rapidly expanding gas may cause burns or frostbite.
- **Chronic (Delayed)**
  - Under normal conditions of use, no health effects are expected.

**Eye**
- **Acute (Immediate)**
  - Contact with rapidly expanding gas may cause burns or frostbite.
- **Chronic (Delayed)**
  - Under normal conditions of use, no health effects are expected.

**Ingestion**
- **Acute (Immediate)**
  - Ingestion is not anticipated to be a likely route of exposure to this product.
- **Chronic (Delayed)**
  - Ingestion is not anticipated to be a likely route of exposure to this product.

**Mutagenic Effects**
- This substance is not expected to cause mutagenic effects.

**Carcinogenic Effects**
- The components of this material are not found on the following lists: FEDERAL OSHA Z LIST, NTP and IARC; therefore, they are not considered to be, nor suspected to be, cancer-causing agents by these agencies.

**Key to abbreviations**
- TC = Toxic Concentration
- LC = Lethal Concentration
Section 12 - Ecological Information

12.1 Toxicity
- Material data lacking.

12.2 Persistence and degradability
- Material data lacking.

12.3 Bioaccumulative potential
- Material data lacking.

12.4 Mobility in Soil
- Material data lacking.

12.5 Results of PBT and vPvB assessment
- PBT and vPvB assessment has not been conducted for this material.

12.6 Other adverse effects
- Material data lacking.

Section 13 - Disposal Considerations

13.1 Waste treatment methods

Product waste
- Dispose of content and/or container in accordance with local, regional, national, and/or international regulations.

Packaging waste
- Dispose of content and/or container in accordance with local, regional, national, and/or international regulations.

Section 14 - Transport Information

<table>
<thead>
<tr>
<th>14.1 UN number</th>
<th>14.2 UN proper shipping name</th>
<th>14.3 Transport hazard class(es)</th>
<th>14.4 Packing group</th>
<th>14.5 Environmental hazards</th>
</tr>
</thead>
<tbody>
<tr>
<td>DOT UN1013</td>
<td>Carbon dioxide</td>
<td>2.2</td>
<td>NDA</td>
<td>NDA</td>
</tr>
<tr>
<td>TDG UN1013</td>
<td>CARBON DIOXIDE</td>
<td>2.2</td>
<td>NDA</td>
<td>NDA</td>
</tr>
<tr>
<td>IMO/IMDG UN1013</td>
<td>CARBON DIOXIDE</td>
<td>2.2</td>
<td>NDA</td>
<td>NDA</td>
</tr>
<tr>
<td>IATA/ICAO UN1013</td>
<td>Carbon dioxide</td>
<td>2.2</td>
<td>NDA</td>
<td>NDA</td>
</tr>
</tbody>
</table>

14.6 Special precautions for user
- Cylinders should be transported in a secure position, in a well-ventilated vehicle. The transportation of compressed gas cylinders in automobiles or in closed-body vehicles can present serious safety hazards. If transporting these cylinders in vehicles, ensure these cylinders are not exposed to extremely high temperatures (as may occur in an enclosed vehicle on a hot day). Additionally, the vehicle should be well-ventilated during transportation.

14.7 Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code
- Not relevant.
Section 15 - Regulatory Information

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

SARA Hazard Classifications
- Acute, Pressure(Sudden Release of)

<table>
<thead>
<tr>
<th>State Right To Know</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Component</strong></td>
</tr>
<tr>
<td>Carbon dioxide</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Inventory</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Component</strong></td>
</tr>
<tr>
<td>Carbon dioxide</td>
</tr>
</tbody>
</table>

Canada

- **Labor**
  - Canada - WHMIS - Classifications of Substances
    - Carbon dioxide 124-38-9 > 99% A; Uncontrolled product according to WHMIS classification criteria (solid)
  - Canada - WHMIS - Ingredient Disclosure List
    - Carbon dioxide 124-38-9 > 99% 1 %

- **Environment**
  - Canada - CEPA - Priority Substances List
    - Carbon dioxide 124-38-9 > 99% Not Listed

United States

- **Labor**
  - U.S. - OSHA - Process Safety Management - Highly Hazardous Chemicals
    - Carbon dioxide 124-38-9 > 99% Not Listed
  - U.S. - OSHA - Specifically Regulated Chemicals
    - Carbon dioxide 124-38-9 > 99% Not Listed

- **Environment**
  - U.S. - CAA (Clean Air Act) - 1990 Hazardous Air Pollutants
• Carbon dioxide 124-38-9 > 99% Not Listed

U.S. - CERCLA/SARA - Hazardous Substances and their Reportable Quantities

• Carbon dioxide 124-38-9 > 99% Not Listed

U.S. - CERCLA/SARA - Radionuclides and Their Reportable Quantities

• Carbon dioxide 124-38-9 > 99% Not Listed

U.S. - CERCLA/SARA - Section 302 Extremely Hazardous Substances EPCRA RQs

• Carbon dioxide 124-38-9 > 99% Not Listed

U.S. - CERCLA/SARA - Section 302 Extremely Hazardous Substances TPQs

• Carbon dioxide 124-38-9 > 99% Not Listed

U.S. - CERCLA/SARA - Section 313 - Emission Reporting

• Carbon dioxide 124-38-9 > 99% Not Listed

U.S. - CERCLA/SARA - Section 313 - PBT Chemical Listing

• Carbon dioxide 124-38-9 > 99% Not Listed

---

United States - California

Environment

U.S. - California - Proposition 65 - Carcinogens List

• Carbon dioxide 124-38-9 > 99% Not Listed

U.S. - California - Proposition 65 - Developmental Toxicity

• Carbon dioxide 124-38-9 > 99% Not Listed

U.S. - California - Proposition 65 - Maximum Allowable Dose Levels (MADL)

• Carbon dioxide 124-38-9 > 99% Not Listed

U.S. - California - Proposition 65 - No Significant Risk Levels (NSRL)
• Carbon dioxide 124-38-9 > 99% Not Listed

U.S. - California - Proposition 65 - Reproductive Toxicity - Female

• Carbon dioxide 124-38-9 > 99% Not Listed

U.S. - California - Proposition 65 - Reproductive Toxicity - Male

• Carbon dioxide 124-38-9 > 99% Not Listed

United States - Pennsylvania

Labor

U.S. - Pennsylvania - RTK (Right to Know) - Environmental Hazard List

• Carbon dioxide 124-38-9 > 99% Not Listed

U.S. - Pennsylvania - RTK (Right to Know) - Special Hazardous Substances

• Carbon dioxide 124-38-9 > 99% Not Listed

15.2 Chemical Safety Assessment

• No Chemical Safety Assessment has been carried out.

Section 16 - Other Information

Last Revision Date 19/September/2012
Preparation Date 19/September/2012
Disclaimer/Statement of Liability

To the best of Air Liquide’s knowledge, the information contained herein is reliable and accurate as of this date; however, accuracy, suitability or completeness are not guaranteed and no warranties of any type, either express or implied, are provided. The information contained herein relates only to this specific product. If this gas mixture is combined with other materials, all component properties must be considered. Data may be changed from time to time. Be sure to consult the latest edition.

Key to abbreviations
NDA = No Data Available
# SAFETY DATA SHEET

Nitrogen, Refrigerated Liquid

## Section 1. Identification

<table>
<thead>
<tr>
<th>GHS product identifier</th>
<th>: Nitrogen, Refrigerated Liquid</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemical name</td>
<td>: nitrogen</td>
</tr>
<tr>
<td>Other means of</td>
<td>: LIN, Cryogenic Liquid Nitrogen, Liquid Nitrogen</td>
</tr>
<tr>
<td>identification</td>
<td></td>
</tr>
<tr>
<td>Product use</td>
<td>: Synthetic/Analytical chemistry.</td>
</tr>
<tr>
<td>Synonym</td>
<td>: LIN, Cryogenic Liquid Nitrogen, Liquid Nitrogen</td>
</tr>
<tr>
<td>SDS #</td>
<td>: 001188</td>
</tr>
</tbody>
</table>
| Supplier's details     | : Airgas USA, LLC and its affiliates  
                            259 North Radnor-Chester Road  
                            Suite 100  
                            Radnor, PA 19087-5283  
                            1-610-687-5253 |
| Emergency telephone    | : 1-866-734-3438                |
| number (with hours of  |                                |
| operation)             |                                |

## Section 2. Hazards identification

<table>
<thead>
<tr>
<th>OSHA/HCS status</th>
<th>: This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).</th>
</tr>
</thead>
<tbody>
<tr>
<td>Classification of the</td>
<td>: GASES UNDER PRESSURE - Refrigerated liquefied gas</td>
</tr>
<tr>
<td>substance or mixture</td>
<td></td>
</tr>
</tbody>
</table>

**GHS label elements**

| Hazard pictograms | : ![Warning Pictogram] |

<table>
<thead>
<tr>
<th>Signal word</th>
<th>: Warning</th>
</tr>
</thead>
</table>
| Hazard statements | : Contains refrigerated gas; may cause cryogenic burns or injury.  
May cause frostbite.  
May displace oxygen and cause rapid suffocation. |

**Precautionary statements**

| General | : Read and follow all Safety Data Sheets (SDS’S) before use.  
Read label before use.  
Keep out of reach of children.  
If medical advice is needed, have product container or label at hand.  
Close valve after each use and when empty.  
Use equipment rated for cylinder pressure.  
Do not open valve until connected to equipment prepared for use.  
Use a back flow preventative device in the piping.  
Use only equipment of compatible materials of construction.  
Always keep container in upright position.  
Do not change or force fit connections.  
Avoid spills.  
Do not walk or roll equipment over spills. |
|---------|-------------------------------------------------|
| Prevention | : Wear cold insulating gloves and face shield.  
Use and store only outdoors or in a well ventilated place. |
| Response | : Thaw frosted parts with lukewarm water.  
Do not rub affected area.  
Get immediate medical attention. |
| Storage | : Store in a well-ventilated place. |
| Disposal | : Not applicable. |
Section 2. Hazards identification

Hazards not otherwise classified:
- Liquid can cause burns similar to frostbite.

Section 3. Composition/information on ingredients

Substance/mixture: Substance
Chemical name: nitrogen
Other means of identification: LIN, Cryogenic Liquid Nitrogen, Liquid Nitrogen

CAS number/other identifiers
- CAS number: 7727-37-9
- Product code: 001188

<table>
<thead>
<tr>
<th>Ingredient name</th>
<th>%</th>
<th>CAS number</th>
</tr>
</thead>
<tbody>
<tr>
<td>NITROGEN, REFRIGERATED LIQUID</td>
<td>100</td>
<td>7727-37-9</td>
</tr>
</tbody>
</table>

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

Occupational exposure limits, if available, are listed in Section 8.

Section 4. First aid measures

**Description of necessary first aid measures**

**Eye contact**: Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Get medical attention if irritation occurs.

**Inhalation**: Remove victim to fresh air and keep at rest in a position comfortable for breathing. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Get medical attention if adverse health effects persist or are severe. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband. In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.

**Skin contact**: Wash contaminated skin with soap and water. Remove contaminated clothing and shoes. Get medical attention if symptoms occur. In case of contact with liquid, warm frozen tissues slowly with lukewarm water and get medical attention. Do not rub affected area. Wash clothing before reuse. Clean shoes thoroughly before reuse.

**Ingestion**: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Get medical attention if adverse health effects persist or are severe. Ingestion of liquid can cause burns similar to frostbite. If frostbite occurs, get medical attention. Never give anything by mouth to an unconscious person. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband. As this product rapidly becomes a gas when released, refer to the inhalation section.

**Most important symptoms/effects, acute and delayed**

**Potential acute health effects**

**Eye contact**: Extremely cold material. Liquid can cause burns similar to frostbite.

**Inhalation**: Exposure to decomposition products may cause a health hazard. Serious effects may be delayed following exposure.
Section 4. First aid measures

Skin contact: Extremely cold material. Dermal contact with rapidly evaporating liquid could result in freezing of the tissues or frostbite.

Frostbite: Try to warm up the frozen tissues and seek medical attention.

Ingestion: Ingestion of liquid can cause burns similar to frostbite.

Over-exposure signs/symptoms

Eye contact: Adverse symptoms may include the following: frostbite

Inhalation: No specific data.

Skin contact: Adverse symptoms may include the following: frostbite

Ingestion: Adverse symptoms may include the following: frostbite

Indication of immediate medical attention and special treatment needed, if necessary

Notes to physician: In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.

Specific treatments: No specific treatment.

Protection of first-aiders: No action shall be taken involving any personal risk or without suitable training. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation.

See toxicological information (Section 11)

Section 5. Fire-fighting measures

Extinguishing media

Suitable extinguishing media: Use an extinguishing agent suitable for the surrounding fire.

Unsuitable extinguishing media: None known.

Specific hazards arising from the chemical

Hazardous thermal decomposition products: Decomposition products may include the following materials: nitrogen oxides

Special protective actions for fire-fighters: Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Contact supplier immediately for specialist advice. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool.

Special protective equipment for fire-fighters: Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode. For incidents involving large quantities, thermally insulated undergarments and thick textile or leather gloves should be worn.

Date of issue/Date of revision: 10/22/2014. Date of previous issue: 10/16/2014. Version: 0.05.
Section 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

For non-emergency personnel: No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Avoid breathing gas. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.

For emergency responders: If specialised clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".

Environmental precautions: Ensure emergency procedures to deal with accidental gas releases are in place to avoid contamination of the environment. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

Methods and materials for containment and cleaning up

Small spill: Immediately contact emergency personnel. Stop leak if without risk.

Large spill: Immediately contact emergency personnel. Stop leak if without risk. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

Section 7. Handling and storage

Precautions for safe handling

Protective measures: Put on appropriate personal protective equipment (see Section 8). Contains gas under pressure. Contains refrigerated gas. Do not get in eyes or on skin or clothing. Avoid breathing gas. Empty containers retain product residue and can be hazardous. Do not puncture or incinerate container. Use equipment rated for cylinder pressure. Close valve after each use and when empty. Protect cylinders from physical damage; do not drag, roll, slide, or drop. Use a suitable hand truck for cylinder movement. Never allow any unprotected part of the body to touch uninsulated pipes or vessels that contain cryogenic liquids. Prevent entrapment of liquid in closed systems or piping without pressure relief devices. Some materials may become brittle at low temperatures and will easily fracture.

Advice on general occupational hygiene: Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.

Conditions for safe storage, including any incompatibilities: Store in accordance with local regulations. Store in a segregated and approved area. Store in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10). Keep container tightly closed and sealed until ready for use. Cylinders should be stored upright, with valve protection cap in place, and firmly secured to prevent falling or being knocked over. Cylinder temperatures should not exceed 52 °C (125 °F).

Section 8. Exposure controls/personal protection

Control parameters

Occupational exposure limits

<table>
<thead>
<tr>
<th>Ingredient name</th>
<th>Exposure limits</th>
</tr>
</thead>
<tbody>
<tr>
<td>NITROGEN, REFRIGERATED LIQUID</td>
<td>Oxygen Depletion [Asphyxiant]</td>
</tr>
</tbody>
</table>

Date of issue/Date of revision: 10/22/2014. Date of previous issue: 10/16/2014. Version: 0.05
Section 8. Exposure controls/personal protection

**Hand protection**

Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. If contact with the liquid is possible, insulated gloves suitable for low temperatures should be worn. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated.

**Eye/face protection**

Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: safety glasses with side-shields.

**Skin protection**

**Hand protection**

Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. If contact with the liquid is possible, insulated gloves suitable for low temperatures should be worn. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated.

**Body protection**

Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

**Other skin protection**

Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

**Respiratory protection**

Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

Section 9. Physical and chemical properties

**Appearance**

**Physical state**

Liquid. [Cryogenic liquid]

**Color**

Colorless.

**Molecular weight**

28.01 g/mole

**Molecular formula**

N2

**Boiling/condensation point**

>10°C (>50°F)

**Melting/freezing point**

-210°C (-346°F)

**Critical temperature**

-146.95°C (-232.5°F)

**Odor**

Odorless.

**Odor threshold**

Not available.

**pH**

Not available.

**Flash point**

Not applicable.

Date of issue/Date of revision: 10/22/2014. Date of previous issue: 10/16/2014. Version: 0.05 5/12
Nitrogen, Refrigerated Liquid

Section 9. Physical and chemical properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Burning time</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>Burning rate</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>Evaporation rate</td>
<td>Not available.</td>
</tr>
<tr>
<td>Flammability (solid, gas)</td>
<td>Not available.</td>
</tr>
<tr>
<td>Lower and upper explosive (flammable) limits</td>
<td>Not available.</td>
</tr>
<tr>
<td>Vapor pressure</td>
<td>Not available.</td>
</tr>
<tr>
<td>Vapor density</td>
<td>0.967 (\text{Air} = 1) Liquid Density@BP: 50.46 lb/ft³ (808.3 kg/m³)</td>
</tr>
<tr>
<td>Specific Volume (ft³/lb)</td>
<td>13.8889</td>
</tr>
<tr>
<td>Gas Density ((\text{lb/ft}^3))</td>
<td>0.072</td>
</tr>
<tr>
<td>Relative density</td>
<td>Not available.</td>
</tr>
<tr>
<td>Solubility</td>
<td>Not available.</td>
</tr>
<tr>
<td>Solubility in water</td>
<td>0.023 g/l</td>
</tr>
<tr>
<td>Partition coefficient: n-octanol/water</td>
<td>0.67</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>SADT</td>
<td>Not available.</td>
</tr>
<tr>
<td>Viscosity</td>
<td>Not available.</td>
</tr>
</tbody>
</table>

Section 10. Stability and reactivity

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reactivity</td>
<td>No specific test data related to reactivity available for this product or its ingredients.</td>
</tr>
<tr>
<td>Chemical stability</td>
<td>The product is stable.</td>
</tr>
<tr>
<td>Possibility of hazardous reactions</td>
<td>Under normal conditions of storage and use, hazardous reactions will not occur.</td>
</tr>
<tr>
<td>Conditions to avoid</td>
<td>No specific data.</td>
</tr>
<tr>
<td>Hazardous decomposition products</td>
<td>Under normal conditions of storage and use, hazardous decomposition products should not be produced.</td>
</tr>
<tr>
<td>Hazardous polymerization</td>
<td>Under normal conditions of storage and use, hazardous polymerization will not occur.</td>
</tr>
</tbody>
</table>

Section 11. Toxicological information

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute toxicity</td>
<td>Not available.</td>
</tr>
<tr>
<td>Irritation/Corrosion</td>
<td>Not available.</td>
</tr>
<tr>
<td>Sensitization</td>
<td>Not available.</td>
</tr>
</tbody>
</table>

Date of issue/Date of revision: 10/22/2014. Date of previous issue: 10/16/2014. Version: 0.05 6/12.
Section 11. Toxicological information

**Mutagenicity**
Not available.

**Carcinogenicity**
Not available.

**Reproductive toxicity**
Not available.

**Teratogenicity**
Not available.

**Specific target organ toxicity (single exposure)**
Not available.

**Specific target organ toxicity (repeated exposure)**
Not available.

**Aspiration hazard**
Not available.

**Information on the likely routes of exposure**
Not available.

**Potential acute health effects**

**Eye contact**
Extremely cold material. Liquid can cause burns similar to frostbite.

**Inhalation**
Exposure to decomposition products may cause a health hazard. Serious effects may be delayed following exposure.

**Skin contact**
Extremely cold material. Dermal contact with rapidly evaporating liquid could result in freezing of the tissues or frostbite.

**Ingestion**
Ingestion of liquid can cause burns similar to frostbite.

**Symptoms related to the physical, chemical and toxicological characteristics**

**Eye contact**
Adverse symptoms may include the following: frostbite

**Inhalation**
No specific data.

**Skin contact**
Adverse symptoms may include the following: frostbite

**Ingestion**
Adverse symptoms may include the following: frostbite

**Delayed and immediate effects and also chronic effects from short and long term exposure**

**Short term exposure**

**Potential immediate effects**
Not available.

**Potential delayed effects**
Not available.

**Long term exposure**

**Potential immediate effects**
Not available.

**Potential delayed effects**
Not available.

**Potential chronic health effects**
Not available.
Section 11. Toxicological information

General : No known significant effects or critical hazards.
Carcinogenicity : No known significant effects or critical hazards.
Mutagenicity : No known significant effects or critical hazards.
Teratogenicity : No known significant effects or critical hazards.
Developmental effects : No known significant effects or critical hazards.
Fertility effects : No known significant effects or critical hazards.

Numerical measures of toxicity

Acute toxicity estimates
Not available.

Section 12. Ecological information

Toxicity
Not available.

Persistence and degradability
Not available.

Bioaccumulative potential

<table>
<thead>
<tr>
<th>Product/ingredient name</th>
<th>LogP_{ow}</th>
<th>BCF</th>
<th>Potential</th>
</tr>
</thead>
<tbody>
<tr>
<td>NITROGEN, REFRIGERATED LIQUID</td>
<td>0.67</td>
<td>-</td>
<td>low</td>
</tr>
</tbody>
</table>

Mobility in soil

Soil/water partition coefficient (K_{OC}) : Not available.

Other adverse effects : No known significant effects or critical hazards.

Section 13. Disposal considerations

Disposal methods : The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Empty Airgas-owned pressure vessels should be returned to Airgas. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Empty containers or liners may retain some product residues. Do not puncture or incinerate container.

Date of issue/Date of revision : 10/22/2014. Date of previous issue : 10/16/2014. Version : 0.05
Section 14. Transport information

<table>
<thead>
<tr>
<th>DOT</th>
<th>TDG</th>
<th>Mexico</th>
<th>IMDG</th>
<th>IATA</th>
</tr>
</thead>
<tbody>
<tr>
<td>UN number</td>
<td>UN1977</td>
<td>UN1977</td>
<td>UN1977</td>
<td>UN1977</td>
</tr>
<tr>
<td>UN proper shipping name</td>
<td>NITROGEN, REFRIGERATED LIQUID</td>
<td>NITROGEN, REFRIGERATED LIQUID</td>
<td>NITROGEN, REFRIGERATED LIQUID</td>
<td>NITROGEN, REFRIGERATED LIQUID</td>
</tr>
<tr>
<td>Transport hazard class(es)</td>
<td>2.2</td>
<td>2.2</td>
<td>2.2</td>
<td>2.2</td>
</tr>
<tr>
<td>Packing group</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Additional information</td>
<td>Limited quantity: Yes.</td>
<td>Explosive Limit and Limited Quantity Index 0.125</td>
<td>Passenger Carrying Road or Rail Index 75</td>
<td></td>
</tr>
<tr>
<td>Passenger aircraft</td>
<td>Quantity limitation: 75 kg</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Cargo aircraft</td>
<td>Quantity limitation: 150 kg</td>
<td>Passenger and Cargo Aircraft Quantity limitation: 75 kg</td>
<td>Cargo Aircraft Only Quantity limitation: 150 kg</td>
<td></td>
</tr>
</tbody>
</table>

“Refer to CFR 49 (or authority having jurisdiction) to determine the information required for shipment of the product.”

Special precautions for user : Transport within user's premises: always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code : Not available.

Section 15. Regulatory information

U.S. Federal regulations : TSCA 8(a) CDR Exempt/Partial exemption: This material is listed or exempted.
United States inventory (TSCA 8b): This material is listed or exempted.

Clean Air Act Section 112 (b) Hazardous Air Pollutants (HAPs) : Not listed
Clean Air Act Section 602 Class I Substances : Not listed
Clean Air Act Section 602 Class II Substances : Not listed
DEA List I Chemicals (Precursor Chemicals) : Not listed
DEA List II Chemicals (Essential Chemicals) : Not listed
SARA 302/304 Composition/information on ingredients

Date of issue/Date of revision : 10/22/2014.  Date of previous issue : 10/16/2014.  Version : 0.05 9/12
Section 15. Regulatory information

No products were found.

SARA 304 RQ: Not applicable.
SARA 311/312: Sudden release of pressure

Composition/information on ingredients

<table>
<thead>
<tr>
<th>Name</th>
<th>%</th>
<th>Fire hazard</th>
<th>Sudden release of pressure</th>
<th>Reactive</th>
<th>Immediate (acute) health hazard</th>
<th>Delayed (chronic) health hazard</th>
</tr>
</thead>
<tbody>
<tr>
<td>NITROGEN, REFRIGERATED LIQUID</td>
<td>100</td>
<td>No.</td>
<td>Yes.</td>
<td>No.</td>
<td>No.</td>
<td>No.</td>
</tr>
</tbody>
</table>

State regulations

Massachusetts: This material is listed.
New York: This material is not listed.
New Jersey: This material is listed.
Pennsylvania: This material is listed.
Canada inventory: This material is listed or exempted.

International regulations

International lists:
Australia inventory (AICS): This material is listed or exempted.
China inventory (IECSC): This material is listed or exempted.
Japan inventory: Not determined.
Korea inventory: This material is listed or exempted.
Malaysia Inventory (EHS Register): Not determined.
New Zealand Inventory of Chemicals (NZIoC): This material is listed or exempted.
Philippines inventory (PICCS): This material is listed or exempted.
Taiwan inventory (CSNN): Not determined.

Chemical Weapons Convention List Schedule
I Chemicals: Not listed
Chemical Weapons Convention List Schedule
II Chemicals: Not listed
Chemical Weapons Convention List Schedule
III Chemicals: Not listed

Canada

WHMIS (Canada): Class A: Compressed gas.
CEPA Toxic substances: This material is not listed.
Canadian ARET: This material is not listed.
Canadian NPR: This material is not listed.
Alberta Designated Substances: This material is not listed.
Ontario Designated Substances: This material is not listed.
Quebec Designated Substances: This material is not listed.
Section 16. Other information

Canada Label requirements : Class A: Compressed gas.

Hazardous Material Information System (U.S.A.)

<table>
<thead>
<tr>
<th>Health</th>
<th>Flammability</th>
<th>Physical hazards</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>0</td>
<td>2</td>
</tr>
</tbody>
</table>

Caution: HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks. Although HMIS® ratings are not required on SDSs under 29 CFR 1910. 1200, the preparer may choose to provide them. HMIS® ratings are to be used with a fully implemented HMIS® program. HMIS® is a registered mark of the National Paint & Coatings Association (NPCA). HMIS® materials may be purchased exclusively from J. J. Keller (800) 327-6868.

The customer is responsible for determining the PPE code for this material.

National Fire Protection Association (U.S.A.)

Reprinted with permission from NFPA 704-2001, Identification of the Hazards of Materials for Emergency Response Copyright ©1997, National Fire Protection Association, Quincy, MA 02269. This reprinted material is not the complete and official position of the National Fire Protection Association, on the referenced subject which is represented only by the standard in its entirety.

Copyright ©2001, National Fire Protection Association, Quincy, MA 02269. This warning system is intended to be interpreted and applied only by properly trained individuals to identify fire, health and reactivity hazards of chemicals. The user is referred to certain limited number of chemicals with recommended classifications in NFPA 49 and NFPA 325, which would be used as a guideline only. Whether the chemicals are classified by NFPA or not, anyone using the 704 systems to classify chemicals does so at their own risk.

History
Date of printing : 10/22/2014.
Date of issue/Date of revision : 10/22/2014.
Date of previous issue : 10/16/2014.
Version : 0.05

Key to abbreviations : ATE = Acute Toxicity Estimate
BCF = Bioconcentration Factor
GHS = Globally Harmonized System of Classification and Labelling of Chemicals
IATA = International Air Transport Association
IBC = Intermediate Bulk Container
IMDG = International Maritime Dangerous Goods
LogPow = logarithm of the octanol/water partition coefficient
UN = United Nations
ACGIH – American Conference of Governmental Industrial Hygienists
AIHA – American Industrial Hygiene Association
CAS – Chemical Abstract Services
CEPA – Canadian Environmental Protection Act
CERCLA – Comprehensive Environmental Response, Compensation, and Liability Act (EPA)
CPR – Controlled Products Regulations
Section 16. Other information

DSL – Domestic Substances List
GWP – Global Warming Potential
IARC – International Agency for Research on Cancer
ICAO – International Civil Aviation Organisation
Inh – Inhalation
LC – Lethal concentration
LD – Lethal dosage
NDSL – Non-Domestic Substances List
NIOSH – National Institute for Occupational Safety and Health
TDG – Canadian Transportation of Dangerous Goods Act and Regulations
TLV – Threshold Limit Value
TSCA – Toxic Substances Control Act
WEEL – Workplace Environmental Exposure Level
WHMIS – Canadian Workplace Hazardous Material Information System

References: Not available.

Notice to reader

To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein.

Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.
SAFETY DATA SHEET

1. Product and Company Identification

<table>
<thead>
<tr>
<th>12 Ga HP (High Performance) Red Aerial Signal</th>
<th>Use: Marine emergency signal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Orion Safety Products</td>
<td></td>
</tr>
<tr>
<td>3157 North 500 West</td>
<td></td>
</tr>
<tr>
<td>Peru, IN 46970</td>
<td></td>
</tr>
</tbody>
</table>

Phone Number:

- US 1-800-851-5260
- Intl (11) 1-765-472-4375

CHEMTREC 1-800-424-9300

2. Hazards Identification

**Emergency Overview**

**Hazard Statements:**
- Fire or projection hazard
- Causes severe skin burns and eye damage (product when burning)
- Causes skin irritation (contents)
- Harmful if inhaled.
- Causes eye irritation (contents)

**Precautionary Statements:**
- Keep out of reach of children.
- Keep away from heat/sparks/open flames/hot surfaces. – no smoking.
- Keep/Store away from combustible materials.
- Protect from moisture; avoid long term immersion in water
- Keep cool. Protect from sunlight.
- Do not expose long term to temperatures exceeding 180°F
- Avoid breathing dust/smoke
- Avoid release to the environment (contents)
- Use only outdoors.
- Wear eye protection.
- Do not dismantle.

**In case of fire:** Use water deluge. Do not use dry powder or foam extinguishers!

<table>
<thead>
<tr>
<th>NFPA Rating</th>
<th>Flammability</th>
<th>Health</th>
<th>Reactivity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2</td>
<td>2</td>
<td>1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>HMIS Rating</th>
<th>Flammability</th>
<th>Health</th>
<th>Physical Hazard</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>3</td>
<td>1</td>
</tr>
</tbody>
</table>

**Explosive** Division 1.4

**Acute Toxicity** Category 5

**Skin Corrosion / Irritation** Product- Category 1A

**Contents - Category 2**

**Serious Eye Damage / Irritation** Product-Category 1

**Contents - Category 2B**

**GHS Classifications**

- Explosive
- Acute Toxicity
- Skin Corrosion / Irritation
- Serious Eye Damage / Irritation

**NFPA Rating**

- Flammability: 2
- Health: 2
- Reactivity: 1

3. Composition / Information on Ingredients

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS #</th>
<th>EINCS #</th>
<th>%age</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strontium Nitrate</td>
<td>10042-76-9</td>
<td>233-131-9</td>
<td>&lt;50%</td>
</tr>
<tr>
<td>Magnesium</td>
<td>7439-99-4</td>
<td>231-104-6</td>
<td>&lt;50%</td>
</tr>
<tr>
<td>Strontium Peroxide</td>
<td>1314-18-7</td>
<td>215-224-6</td>
<td>&lt;30%</td>
</tr>
<tr>
<td>Black Powder</td>
<td>Mixture</td>
<td>None</td>
<td>&lt;30%</td>
</tr>
<tr>
<td>Polyvinyl Chloride</td>
<td>9002-86-2</td>
<td>none</td>
<td>&lt;20%</td>
</tr>
<tr>
<td>Dextrin</td>
<td>9004-53-9</td>
<td>232-675-4</td>
<td>&lt;20%</td>
</tr>
<tr>
<td>Primer (contains small amount of lead styphate which is sealed under normal conditions)</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
</tr>
</tbody>
</table>

4. First Aid Measures

**Inhalation**

If fumes from ignition or contents are inhaled, remove to fresh air. If not breathing, give artificial respiration and get medical aid.

**Skin**

For burns, cool with water and bandage appropriately. If contents are contacted, wash with area with soap and water for 15 minutes. Remove contaminated clothing and wash before reuse. Get medical aid if burned or irritation occurs.

**Eyes**

If burned, cover eye and get medical help immediately. If contents get into eye, flush with plenty of water for at least 15 minutes, occasionally lifting the up and lower lids. Remove contact lenses if easily possible Get medical aid immediately.

**Ingestion**

Get medical aid immediately.

5. Firefighting Measures

**Extinguishing Media**

Water Deluge

**Unsuitable Extinguishing Media**

Foam and dry chemical extinguishers and suffocation are ineffective

Wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full face piece operated in the pressure demand or other positive pressure mode. Prevent further propagation of fire by spraying unburnt nearby product with water. Combat fire from a sheltered position.

**Specific Hazards Arising from the Chemical**

Only use outdoors. Use copious amounts of water to extinguish fire. Using small quantities of water on contents / broken shells can cause auto / re-ignition as contents contain magnesium. Use of water on a magnesium fire will generate hydrogen gas that may cause an explosion. Irritating fumes. Flaming projectiles may be ejected during a fire. Trace amounts of lead vapor may be produced (from ignition primer) in a fire situation.

**Flashpoint**

Not Applicable

**Flammability Limits**

Not Applicable

**Ignition Temperature**

>180°F

6. Accidental Release Measures

**Personal Precautions**

Do not breathe smoke from use or contents and avoid contact with skin and eyes. Wear flame retardant clothing with long sleeves, dust mask, rubber or nitrile gloves, safety goggles, safety shoes when cleaning up contents. Avoid

**Environmental Precautions**

Prevent dispersion of contents on soil and in water. Prevent contents from spreading or entering into drains, ditches, groundwater or rivers by using appropriate barriers.
friction on the released product. Keep away from ignition sources.

Methods for Containment and Clean-up

Use caution when cleaning up spilled product contents. Remove heat, flames, sparks and other sources of ignition. Use non-sparking tools and equipment. Prevent buildup of electrostatic charges by grounding. Clean spills in a manner that does not disperse dust into the air. Do not absorb in sawdust or other combustible absorbents. Pick up spill for recovery or disposal and place in an approved container. Wash away remainder with plenty of water. Collect wash water for approved disposal. Be very careful - magnesium powder may spontaneously ignite in presence of moisture. Magnesium powder reacts with water, producing flammable hydrogen gas.

7. Handling and Storage

Handling

Use product only in designated launcher – do not attempt to use in 12 gauge shotgun. Point launcher away from body, other people, animals or combustible products when firing. Wear eye protection during use. Turn face from launcher when firing. Follow instructions on package. Avoid contact with clothing and other combustible materials. Use outdoors only! Do not ignite or launch product inside a vehicle or building. Avoid ingestion and inhalation of smoke and contents. Wash thoroughly after handling. Avoid contact with heat sparks, and flame. Do not disassemble signal.

Storage

Store in a dry place away from direct sunlight, heat and incompatible materials. Store away from flammable materials, sources of heat, flame and sparks. Store at ambient temperature.

8. Exposure Controls / Personal Protection

<table>
<thead>
<tr>
<th>Exposure Limits</th>
<th>OSHA PEL</th>
<th>ACGIH TLV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strontium Nitrate</td>
<td>Not Established</td>
<td>Not Established</td>
</tr>
<tr>
<td>Magnesium</td>
<td>Not Established</td>
<td>Not Established</td>
</tr>
<tr>
<td>Strontium Peroxide</td>
<td>Nuisance dust 15 mg/m³</td>
<td>Nuisance dust 15 mg/m³</td>
</tr>
<tr>
<td>Black Powder</td>
<td>Not Established</td>
<td>Not Established</td>
</tr>
<tr>
<td>Polyvinyl Chloride</td>
<td>5mg/ml for the respirable portion and 15mg/ml for total dust.</td>
<td>5 and 10mg/ml, respectively</td>
</tr>
<tr>
<td>Dextrin</td>
<td>15 mg/m³ total dust</td>
<td>10 mg/m³</td>
</tr>
</tbody>
</table>

9. Physical and Chemical Properties

| Appearance (color, physical form, shape): | Plastic shotgun shell filled with grey material with primer on one end; all materials sealed / enclosed under normal conditions |
| pH: Not available | Melting Point: Not available |
| Boiling Point: Not applicable | Freezing Point: Not applicable |
| Vapor Pressure: Not applicable | Specific Gravity: Not applicable |

10. Stability and Reactivity

| Conditions to Avoid | Excessive temperatures, moisture, water, acids, and ignition sources. |
| Hazardous Decomposition Products | Oxides of Strontium and Nitrogen |

11. Toxicology Information

<table>
<thead>
<tr>
<th>Toxicology</th>
<th>Oral LD50</th>
<th>skin LD50</th>
<th>LC50</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strontium Nitrate</td>
<td>Rat: 2750 mg/kg</td>
<td>Not available</td>
<td>Not available</td>
</tr>
<tr>
<td>Magnesium</td>
<td>Rat: 230 mg/kg</td>
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<td>Not available</td>
</tr>
<tr>
<td>Strontium Peroxide</td>
<td>Not available</td>
<td>Not available</td>
<td>Not available</td>
</tr>
<tr>
<td>Black Powder</td>
<td>Not available</td>
<td>Not available</td>
<td>Not available</td>
</tr>
<tr>
<td>Polyvinyl Chloride</td>
<td>Not available</td>
<td>Not available</td>
<td>Not available</td>
</tr>
<tr>
<td>Dextrin</td>
<td>Not available</td>
<td>Not available</td>
<td>Not available</td>
</tr>
</tbody>
</table>

Acute Dose Effects

Burning shell can cause severe burns if in contact with body - product burns at an extremely high temperature. Particles from firing may be harmful if inhaled. Contact with contents may cause moderate skin and eye irritation. Inhalation of smoke or contents will cause irritation to the lungs and mucus membrane. Exposure to smoke during use may aggravate asthma if inhaled.

Irritation: Irritating to the skin and eyes on contact. Inhalation will

Corrosivity: May cause eye or skin burns if in contact with burning shell.
cause irritation to the lungs and mucus membrane.

### Carcinogenicity
None of the ingredients are listed by NTP, IARC or regulated as a Carcinogen by OSHA

### Reproductive Effects
No information found

### Genetic Effects
No information found

### Neurological Effects
No information found

### Developmental Effects
No information found

### Sensitization
No information found

### Target Organ Effects
Eye, skin and lungs

#### 12. Ecological Information

<table>
<thead>
<tr>
<th>Aquatic Toxicity</th>
<th>Persistence / Bioaccumulation / Mobility in Environmental Media</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strontium Nitrate: Acute toxicity - Fishes, Carassius auratus, LC100, 9.615 mg/l; Chronic toxicity - Fishes, Gasterosteus aculeatus, LC100, 2.912 mg/l</td>
<td>No information found</td>
</tr>
</tbody>
</table>

#### 13. Disposal Considerations (for spills and leakage)
Dispose of contaminated product and materials used in cleaning up spills or leaks in the manner approved for pyrotechnic material. Consult appropriate federal, state, and local regulatory agencies to ascertain proper disposal procedures. Open burning is preferred method of disposal for pyrotechnic materials..

#### 14. Transportation Information

<table>
<thead>
<tr>
<th>shipping name</th>
<th>hazard class</th>
<th>ID Number</th>
<th>packing group</th>
<th>EX Number</th>
<th>Reportable Quantities</th>
</tr>
</thead>
<tbody>
<tr>
<td>United States &amp; International</td>
<td>Flares, Aerial</td>
<td>1.4G</td>
<td>UN10403</td>
<td>II</td>
<td>EX-2004110275</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>none</td>
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</table>

#### 15. Regulatory Information

<table>
<thead>
<tr>
<th>US Regulations</th>
<th>TSCA</th>
<th>CERCLA</th>
<th>CWA</th>
<th>CAA</th>
<th>SARA 313</th>
<th>SARA 302</th>
<th>Acute</th>
<th>Chronic</th>
<th>Fire</th>
<th>Reactivity</th>
<th>Pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strontium Nitrate</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Strontium Peroxide</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Black Powder</td>
<td>Not stated</td>
<td>Not stated</td>
<td>Not stated</td>
<td>Not stated</td>
<td>Not stated</td>
<td>Not stated</td>
<td>Not stated</td>
<td>Not stated</td>
<td>Not stated</td>
<td>Not stated</td>
<td></td>
</tr>
<tr>
<td>Polyvinyl Chloride</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Not stated</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>US States</th>
<th>Prop 65</th>
<th>NJ</th>
<th>PA</th>
<th>Canada</th>
<th>WHMIS</th>
<th>DSL</th>
<th>Europe</th>
<th>wgk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strontium Nitrate</td>
<td>No</td>
<td>1743</td>
<td>No</td>
<td>No results</td>
<td>Yes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Magnesium</td>
<td>No</td>
<td>1136</td>
<td>Yes</td>
<td>No results</td>
<td>Yes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Strontium Peroxide</td>
<td>No</td>
<td>1745</td>
<td>No</td>
<td>No results</td>
<td>Yes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black Powder</td>
<td>Not stated</td>
<td>Not stated</td>
<td>Not stated</td>
<td>Not stated</td>
<td>Not stated</td>
<td>Not stated</td>
<td>Not stated</td>
<td>Not stated</td>
</tr>
<tr>
<td>Polyvinyl Chloride</td>
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<td>3622</td>
<td>No</td>
<td>No results</td>
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<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### 16. Other Information

<table>
<thead>
<tr>
<th>Risk and Safety Phrases:</th>
<th>Key / Legend:</th>
</tr>
</thead>
<tbody>
<tr>
<td>R10 Flammable</td>
<td>HMIS: hazardous material identification system</td>
</tr>
<tr>
<td>R11 Irritating to skin (contents)</td>
<td>NFPA: national fire protection association</td>
</tr>
<tr>
<td>R20 Harmful by inhalation.</td>
<td>CAS: Chemical Abstracts Service number</td>
</tr>
<tr>
<td>R21 Harmful if in contact with skin.</td>
<td>EINECS: European inventory of existing chemical substances</td>
</tr>
<tr>
<td>R22 Harmful if swallowed.</td>
<td>OSHA PEL: occupational safety and health administration permissible exposure limit</td>
</tr>
<tr>
<td>R40 Causes burns.</td>
<td>NIOSH TLV: national institute of occupational safety and health Threshold Limit Value</td>
</tr>
<tr>
<td>R41 Irritating to eyes.</td>
<td>NTP: National Toxicology Program</td>
</tr>
<tr>
<td>R47 Irritating to respiratory system.</td>
<td>IARC: International Agency for Research on Cancer</td>
</tr>
<tr>
<td>S16 Keep away from sources of ignition</td>
<td>TSCA: toxic substance control act - US</td>
</tr>
<tr>
<td>S17 Keep away from combustible material</td>
<td>CERCLA: comprehensive environmental response, compensation and liability act – US</td>
</tr>
<tr>
<td>S19 Keep container dry.</td>
<td>CWA: clean water act - US</td>
</tr>
<tr>
<td>S20 Avoid food, drink and animal foodstuffs.</td>
<td>CAA: clean air act - US</td>
</tr>
<tr>
<td>S21 Avoid contact with eyes.</td>
<td>SARA: superfund amendments and reauthorization act – US</td>
</tr>
<tr>
<td>S22 Do not empty into drains.</td>
<td>PROP 65: California’s Proposition 65 list</td>
</tr>
<tr>
<td>S41, in case of fire and / or explosion do not breathe fumes</td>
<td>WHMIS: workplace hazards materials information system - Canada</td>
</tr>
<tr>
<td>S43 In case of fire use water</td>
<td>DSL: Domestic Substances List - Canada</td>
</tr>
<tr>
<td>S53 In case of fire use water</td>
<td>WGK: water hazard classes - Germany</td>
</tr>
</tbody>
</table>

| Legal Statement: | |
|-----------------||
| This information is accurate to the best knowledge Orion Safety Products. Orion Safety Products makes no representations or warranties, either express or implied, including without limitation any warranties of merchantability or fitness for a particular purpose, with respect to the information set forth herein or the product to which the information refers. Accordingly, Orion Safety Products will not be responsible for damages resulting from use or reliance upon this information. Any person utilizing this document should seek competent professional advice to verify and assume responsibility for the suitability of this information to their particular situation. | |
### SECTION 1 IDENTIFICATION OF THE SUBSTANCE/ MIXTURE AND OF THE COMPANY/ UNDERTAKING

#### 1.1. Product identifier

Product Name: Ikaros Parachute Rocket Red  
Article Nos.: 340100 (Order article Nos. 340100, 340170 and 340180)  
Chemical name: 50 g of propellant composition, 6.5 g of black powder and 95 g of red illuminating composition  
Document number: SDS Ikaros Parachute Rocket Red – ed5

#### 1.2. Relevant identified uses of the substance or mixture and uses advised against

Use: Distress signal  
Uses advised against: None specified

#### 1.3. Details of the supplier of the safety data sheet

Company/Manufacturer: Hansson PyroTech AB / Nammo LIAB AB  
Company address: P O Box 154, SE-711 23 Lindesberg, Sweden  
E-mail, internet: info@hansson-pyrotech.com  
www.hansson-pyrotech.com  
Telephone number: +46 581 871 00  
Telex number: +46 581 872 51

#### 1.4. Emergency telephone number

Emergency telephone number: +46 581 87 111 (Available 24 hours)  
Contact person: Ask for officer on duty at Nammo LIAB AB

### SECTION 2 HAZARDS IDENTIFICATION

#### 2.1. Classification of the substance or mixture

- **Main health hazard**: Hazards refer to contents of rocket  
- **Inhalation**: May be mildly irritating to respiratory system  
- **Skin contact**: May be mildly irritating to skin. Contact with exhaust flame or burning flare can cause severe burns  
- **Eye contact**: Irritating to eyes  
- **Ingestion**: Harmful if swallowed  
- **Fire and explosive hazards**: Risk of explosion by shock, friction, fire or other sources of ignition.  
- **Environmental hazards**: Not classified as hazardous to the environment

| CLP Classification | DPD Classification |
2.2. Label elements

DANGER
Contains: Strontium nitrate and Potassium perchlorate
H203 – Explosive; fire, blast or projection hazard.
H302 – Harmful if swallowed.
H319 – Causes serious eye irritation.

Contents: Strontium nitrate and Potassium perchlorate

P102 - Keep out of reach of children.
P210 - Keep away from heat/sparks/open flames/hot surfaces. – No smoking.
P501 – Dispose of contents / container to authorised waste disposal facility.
P370+ P378 - In case of fire: Use water for extinction.
P309+ P311 - If exposed or if you feel unwell: Call a POISON CENTER or doctor/physician.
P301+ P310 – IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician.

2.3. Other hazards

May be mildly irritating to skin and respiratory system. Contact with exhaust flame or burning flare can cause severe burns.

SECTION 3 COMPOSITION/ INFORMATION ON INGREDIENTS

3.2. Mixtures

Hazardous component(s)

Under CLP EC1272/2008

<table>
<thead>
<tr>
<th>Substances</th>
<th>CAS No.</th>
<th>REACH Registration No.</th>
<th>%</th>
<th>Gram</th>
<th>CLP Hazard Category &amp; H Statements</th>
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<tbody>
<tr>
<td>Strontium nitrate</td>
<td>10042-76-9</td>
<td>01-2120007501-75</td>
<td>31.35</td>
<td>47.5</td>
<td>Oxidising Solid Cat 3 – H272</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Acute Toxic Cat 4 – H302</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Eye Irritant Cat 2 – H319</td>
</tr>
<tr>
<td>Potassium perchlorate</td>
<td>7778-74-7</td>
<td>01-2120021000-89</td>
<td>24.09</td>
<td>36.5</td>
<td>Oxidising Solid Cat 1 – H271</td>
</tr>
<tr>
<td>Potassium nitrate</td>
<td>7757-79-1</td>
<td>01-2119488224-35</td>
<td>3.17</td>
<td>4.8</td>
<td>Oxidising Solid Cat 3 – H272</td>
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<tr>
<td>Sulphur</td>
<td>7704-34-9</td>
<td>01-2119487295-27</td>
<td>0.46</td>
<td>0.7</td>
<td>Skin Irritant Cat 2 – H315</td>
</tr>
</tbody>
</table>

Also contains - Magnesium powder stabilised with polymerised linseed oil
SECTION 4  FIRST-AID MEASURES

4.1. Description of first aid measures

After inhalation  Move patient to fresh air.
After skin contact  If burned, wash with plenty of water for at least 20 min.
After eye contact  Keep eyelids apart. Wash with a lot of water. If needed visit physician.
After ingestion  Contact a physician.

4.2. Most important symptoms and effects, both acute and delayed

Contact with exhaust flame or burning flare can cause severe burns. Harmful if swallowed.

4.3. Indication of any immediate medical attention and special treatment needed

None other than above.

SECTION 5  FIRE-FIGHTING MEASURES

5.1. Extinguishing media

- Suitable extinguishing media  Use any fire extinguishing media at early stages of fire. Once the product has ignited it cannot be extinguished.
- Not to be used  No restriction.

5.2. Special hazards arising from the substance or mixture

Product is explosive, evolving large quantities of gases and emitting large quantities of heat radiation if involved in fire.

5.3. Advice for fire-fighters  Normal equipment.

SECTION 6  ACCIDENTAL RELEASE MEASURES

6.1. Personal precautions, protective equipment and emergency procedures

Personal precautions  Normal industrial hygiene, use protective gloves.
6.2. Environmental precautions

Do not let waste reach drains, sewers and bodies of water or leak into ground.

6.3. Methods and material for containment and cleaning up

Collect using non-sparking tools, reuse if undamaged. Otherwise, keep for disposal by experts.

6.4. Reference to other sections

See Sections 8 & 13.

SECTION 7 HANDLING AND STORAGE

7.1. Precautions for safe handling

Avoid dropping the signal on hard surfaces.

7.2. Conditions for safe storage, including any incompatibilities

Storage Temperature should not exceed +75°C

7.3. Specific end use(s)

Distress signal

SECTION 8 PERSONAL PROTECTION/ EXPOSURE CONTROLS

8.1. Control parameters

None set

8.2. Exposure controls

Recommended engineering controls No fire, sparks or welding close to the items. If cleaning up spillage, use tools which can not strike sparks.

Personal protective equipment Normally none needed. But in case of spillage:

- Respiratory protection In case of dust use particle filter mask such as EN143 Type P or EN149 Type FFP-S.
- Hand protection Leather or similar protective gloves.
- Eye protection Shatter-proof glasses or goggles.
- Skin protection Normal industrial hygiene

Specific hygiene measures No smoking.

Further information Always check applicability with your supplier of protective equipment.

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

9.1. Information on basic physical and chemical properties
Appearance: Dark red plastic tube with red plastic lids and orange label

Odour: None

Odour threshold value: Not applicable

pH (concentrated product): Not applicable

Melting point (°C): Not determined

Boiling point/range (°C): Not applicable

Flash point (°C): Not applicable

Evaporation rate: Not applicable

Flammability: Contents are flammable

Explosive properties: Intrinsically explosive. Contains rocket motor and very hot and intense burning red flare.

Vapour pressure (mbar at 25°C): Not applicable

Vapour density: Not applicable

Density at 20°C (g/cm³): Not determined

Solubility in water (% by weight): Insoluble

Solubility in solvents: Not determined

Partition coefficient (log Pow): Not applicable

Autoignition temperature (°C): > 250

Decomposition temperature (°C): Not determined

Viscosity: Not applicable

Oxidising properties: Contents have oxidising properties

9.2. Other information

Note: These are typical values and do not constitute a specification

SECTION 10  STABILITY AND REACTIVITY

10.1. Reactivity

Stable product under recommended storage and handling conditions.

10.2. Chemical stability

Stable product under recommended storage and handling conditions.

10.3. Possibility of hazardous reactions

Stable product under recommended storage and handling conditions.
10.4. Conditions to avoid

High temperatures, above 75 °C

10.5. Incompatible materials

Not applicable.

10.6. Hazardous decomposition products

Product is explosive, evolving large quantities of gases and emitting large quantities of heat radiation if involved in fire.

SECTION 11  TOXICOLOGICAL INFORMATION

11.1. Information on toxicological effects

No data available on mixture. Data based on individual components shown below.

Hazardous ingredients: Potassium perchlorate, Strontium nitrate, and Sulphur.

(a) acute toxicity
Strontium nitrate: LD$_{50}$ oral rat 1892 mg/kg Harmful by ingestion
Calculated product ATE = 901 mg/kg

(b) skin corrosion/irritation
Sulphur: Skin irritant category 2 under CLP

(c) serious eye damage/irritation
Strontium nitrate: Eye irritant category 2 under CLP

(d) respiratory or skin sensitisation
No ingredients classified as sensitisers

(e) germ cell mutagenicity
No deleterious effects known.

(f) carcinogenicity
No deleterious effects known.

(g) reproductive toxicity
No deleterious effects known.

(h) STOT-single exposure
No deleterious effects known.

(i) STOT-repeated exposure
No deleterious effects known.

(j) aspiration hazard
No deleterious effects known.

Likely routes of exposure
Contact with skin

Symptoms related to the physical, chemical and toxicological characteristics
Powders may be mildly irritating to the skin, eyes and respiratory tract. May cause gastric irritation, nausea and vomiting.

Delayed and immediate effects as well as chronic effects from short and long-term exposure
No deleterious effects known.

Other information
None

SECTION 12  ECOLOGICAL INFORMATION

12.1. Toxicity
Supersedes: Version 4 dated 12 September 2011

No data available on mixture. Data based on individual components shown below.

Potassium perchlorate

EC₅₀ Daphnia magna 24h: 670mg/l Not harmful.

12.2. Persistence and degradability

Not applicable – contains inorganic materials and is in form of solid article.

12.3. Bioaccumulative potential

Mobility

No test data on product.

12.4. Mobility in soil

None – product in form of solid article.

12.5. Results of PBT and vPvB assessment

Does not fulfil the criteria for classification as PBT or vPvB.

12.6. Other adverse effects

Not a Marine pollutant (IMDG Code).

SECTION 13 DISPOSAL CONSIDERATIONS

13.1. Waste treatment methods

Disposal of waste materials

Waste should be kept in separate container.

NO SMOKING!

Destruction must only be done by experts. Used product may be disposed as ordinary plastic/metallic waste.

DO NOT TRY TO DISMANTLE THE PRODUCT!

Contaminated packing

May burn rapidly.

SECTION 14 TRANSPORT INFORMATION

14.1. UN numbers

See table below

14.2. UN proper shipping name

See table below

14.3. Transport hazard class(es)

See table below

14.4. Packing group

Not applicable

14.5. Environmental hazards

None

14.6. Special precautions for user

See P Statements in Section 2.2

14.7. Transport in bulk according to Annex I I of MARPOL 73/78 and the IBC Code

Not applicable

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<tr>
<th>Transport</th>
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<th>Non US market</th>
<th>USA market</th>
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</thead>
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<tr>
<td>In Fibre Board Box</td>
<td>In Steel Cage +</td>
<td>In Steel Cage +</td>
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### Classification

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<th>Fibre Board Box</th>
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</thead>
<tbody>
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<tr>
<td>- UN No.</td>
<td>0195</td>
<td>0506</td>
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<tr>
<td>- Proper shipping name</td>
<td>Signals, distress, ship</td>
<td>Signals, distress</td>
</tr>
<tr>
<td>- Transport Class</td>
<td>1.3G</td>
<td>1.4S</td>
</tr>
<tr>
<td>- Packing Instruction</td>
<td>P135</td>
<td>P135</td>
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<tr>
<td>Label</td>
<td>1.3</td>
<td>1.4</td>
</tr>
</tbody>
</table>

**IMO-IMDG code**

- EMS code                          | F-B, S-X             | F-B, S-X             |
- EX number (DOT/USA)               | N/A                  | N/A                  |

**Swedish Rescue Service Agency Cert. No.**

- 2009-4265                         | 2009-4265            | 711/4817/2004

**Comment**

Not classified as Marine Pollutants

### SECTION 15 REGULATORY INFORMATION

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

None specified

15.2. Chemical Safety Assessment

A Chemical Safety Assessment has not been carried out on this mixture.

### SECTION 16 OTHER INFORMATION

Inventories -

All ingredients listed in EINECS.

Sources of data used in this SDS

- In-house data files
- Literature such as Sax’s Dangerous Properties of Industrial Materials, the RSC Dictionary of Substances and their Effects, RTECS
- CLP Annex VI Tables 3.1 & 3.2
- Sources of key data used
- Suppliers’ Safety Data Sheets
- RTECS, EU ESI S web site
Based on EU Regulation 1907/2006 as amended by 453/2010
The current Material Safety Data Sheet was defined by Hansson PyroTech AB on the basis of knowledge of the product at the date of issue.

Therefore, data provided in this form can not be considered as exhaustive.

It is the duty of the operator
- to develop under his own responsibility, the safety dispositions regarding the operation of the product taking into account the data from this form
- to pass to all users and operators the appropriate safety data and warning regarding the risks mentioned in the documentation relative to the utilisation of the product
to be cautious of possible risks faced when the product is used for other utilisation than those for which it has been designed
SAFETY DATA SHEET

1. Product and Company Identification

Day and Night, Smoke and Light N. 2
CIL / Orion
533 Argenteuil
LACHUTE, Quebec Canada J8H3Y2

Use: Distress Signal
Phone Number: 450-566-0655
EMERGENCY 613-996-6666

2. Hazards Identification

Emergency Overview

Hazard Statements:
- Fire or projection hazard
- Harmful if swallowed
- Very toxic to aquatic life with long lasting effects
- Burning flare causes severe skin burns and eye damage
- Contents cause skin and eye irritation
- May cause allergic reaction to individuals sensitive to milk proteins
- May cause damage to thyroid through ingestion of contents after prolonged or repeated exposure

Precautionary Statements:
- Keep out of reach of children.
- Keep away from heat/sparks/open flames/hot surfaces. – no smoking.
- Keep/Store away from combustible materials.
- Use only non-sparking tools
- Avoid breathing dust/smoke
- Do not ignite inside a building, vehicle or boat cabin.
- Do not dismantle.
- Allow signal to burn to completion.
- Avoid release to the environment.(contents)
- Use personal protective equipment as required.
- In case of fire: use water deluge. Do not use dry powder or foam extinguishers!

NFPA Rating
- Flammability: 2
- Health: 2
- Reactivity: 1

HMIS Rating
- Flammability: 1
- Health: 3
- Physical Hazard: 1

3. Composition / Information on Ingredients

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS #</th>
<th>EINCS #</th>
<th>%age</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-Amino-Anthraquinone</td>
<td>82-45-1</td>
<td>201-423-5</td>
<td>20-40%</td>
</tr>
<tr>
<td>Magnesium</td>
<td>7439-95-4</td>
<td>231-104-6</td>
<td>10-30%</td>
</tr>
<tr>
<td>Strontium Nitrate</td>
<td>10042-76-9</td>
<td>233-131-9</td>
<td>10-30%</td>
</tr>
<tr>
<td>Potassium Chlorate</td>
<td>3811-04-9</td>
<td>231-100-4</td>
<td>1-20%</td>
</tr>
<tr>
<td>Potassium Perchlorate</td>
<td>7778-64-7</td>
<td>231-912-9</td>
<td>1-20%</td>
</tr>
<tr>
<td>Lactose</td>
<td>63-42-3</td>
<td>238-691-8</td>
<td>1-20%</td>
</tr>
<tr>
<td>Polyvinyl Chloride</td>
<td>9002-86-2</td>
<td>200-831-0</td>
<td>1-20%</td>
</tr>
</tbody>
</table>

4. First Aid Measures

Inhalation
If fumes from ignition or contents are inhaled, remove to fresh air. If not breathing, give artificial respiration and get medical aid.

Skin
For burns, cool with water and bandage appropriately. If contents are contacted, wash with area with soap and water for 15 minutes. Remove contaminated clothing and wash before reuse. Get medical aid if burned or irritation occurs.

Eyes
If burned, cover eye and get medical help immediately. If contents get into eye, flush with plenty of water for at least 15 minutes, occasionally lifting the up and lower lids. Remove contact lenses if easily possible Get medical aid immediately.

Ingestion
Get medical aid immediately.

5. Firefighting Measures

Extinguishing Media
Water deluge

Unsuitable Extinguishing Media
Foam and dry chemical extinguishers and suffocation are ineffective.

Use NIOSH/MSHA approved self-contained breathing apparatus when this material is involved in a fire. If a large number of signals are involved in a fire, explosion is possible.

Specific Hazards Arising from the Chemical
Flame and sparks and dense smoke are ejected out the open ends of the flare when it functions. Use copious amounts of water to extinguish fire. Using small quantities of water on contents can cause auto / re-ignition as contents contain magnesium. Use of water on a magnesium fire will generate hydrogen gas that may cause an explosion.

Flashpoint | Not Applicable
---|---
Flammability Limits | Not Applicable
Ignition Temperature | >400°F
6. Accidental Release Measures

**Personal Precautions**

Do not breathe contents and avoid contact with skin and eyes. If significant amounts of dust are present, wear chemical safety goggles, Viton or Norfoil gloves, clothing designed to prevent or minimize skin contact and a NIOSH/MSHA approved dust respirator. Keep away from ignition sources.

**Environmental Precautions**

Prevent dispersion of contents on soil and in water. Prevent contents from spreading or entering into drains, ditches, groundwater or rivers by using appropriate barriers.

**Methods for Containment and Clean-up**

Be sure all ignition sources are removed before beginning the cleaning operation. Use caution when cleaning up spilled product contents. Use non-static forming broom and dust pan to clean up dust. Undamaged signals may be picked up and put back into their original shipping containers or containers approved by local, state and federal authorities. Pick up spill for recovery or disposal and place in an approved container.

7. Handling and Storage

**Handling**

Keep out of reach of children. Do not dismantle. Do not allow contents to touch eyes, skin or clothing. Flush skin areas contacted with large amount of water. Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Do not ingest contents. Avoid inhalation of smoke. Signals should be allowed to burn to completion. Unburned and partially burned signals contain potassium perchlorate which should not be allowed to come into contact with surface and ground water. Perchlorate Material – special handling may apply. See [www.dtsc.ca.gov/hazardouswaste/perchlorate](http://www.dtsc.ca.gov/hazardouswaste/perchlorate).

**Storage**

Store in a cool, dry place away from all sources of ignition.

8. Exposure Controls / Personal Protection

<table>
<thead>
<tr>
<th>Exposure Limits</th>
<th>OSHA PEL</th>
<th>ACGIH TLV</th>
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<tbody>
<tr>
<td>1-Amino-Anthraquinone</td>
<td>No data available</td>
<td>No data available</td>
</tr>
<tr>
<td>Magnesium</td>
<td>Not established</td>
<td>Not established</td>
</tr>
<tr>
<td>Strontium Nitrate</td>
<td>Not established</td>
<td>Not established</td>
</tr>
<tr>
<td>Potassium Perchlorate</td>
<td>Nuisance dust 15 mg/m³</td>
<td>Nuisance dust 15 mg/m³</td>
</tr>
<tr>
<td>Potassium Chlorate</td>
<td>Not established</td>
<td>Not established</td>
</tr>
<tr>
<td>Lactose</td>
<td>Nuisance particulate, 15 mg/m³ of total dust</td>
<td>Nuisance particulate 10 mg/m³ of total dust</td>
</tr>
<tr>
<td>Polyvinyl Chloride</td>
<td>5 mg/m³ for the respirable portion and 15 mg/m³ for total dust, 5 and 10 mg/ml, respectively</td>
<td></td>
</tr>
</tbody>
</table>

**Engineering Controls**

Use product outdoors only! When cleaning up powder, use local and/or general exhaust.

**Eye / Face Protection**

No protective equipment is required unless signals have broken open. For cleanup, wear NIOSH approved goggles to protect from dust.

**Skin Protection**

None under normal conditions when using product. For cleanup, wear NIOSH approved gloves to protect from dust.

**Respiratory Protection**

None under normal conditions when using product. For cleanup, wear NIOSH approved respirator to protect from dust.

**General Hygiene**

Use product outdoors away from combustible products.

9. Physical and Chemical Properties

| Appearance (colour, physical form, shape): | Plastic tube with red plastic cap on one end and green plastic cap on other |
| pH: | Not available |
| Melting Point: | Not available |
| Freezing Point: | Not applicable |
| Specific Gravity: | Not applicable |
| Solubility: | Not applicable |
| Evaporation Rate: | Not available |
| Vapour Density: | Not applicable |

10. Stability and Reactivity

**Chemical Stability**

Stable

**Possibility of Hazardous Reactions**

Hazardous polymerization will not occur.

**Conditions to Avoid**

Excessive temperatures, moisture, water, and ignition sources.

**Incompatible Materials**

Avoid exposure to oxidizers, strong acids and strong bases.

**Hazardous Decomposition Products**

Carbon monoxide, Carbon dioxide, Sulfur oxide.

11. Toxology Information

<table>
<thead>
<tr>
<th>Toxicology</th>
<th>Oral LD50</th>
<th>skin LD50</th>
<th>LC50</th>
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<td>Magnesium</td>
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<td>Strontium Nitrate</td>
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<td>Potassium Perchlorate</td>
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<td>Potassium Chlorate</td>
<td>Rat 1870 mg/kg</td>
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<tr>
<td>Lactose</td>
<td>Rat &gt; 10000 mg/kg</td>
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<tr>
<td>Polyvinyl Chloride</td>
<td>The product is biologically inert</td>
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<td>Not available</td>
</tr>
</tbody>
</table>

**Acute Dose Effects**

Can cause skin, eye and mucous membrane irritation; dermatitis and nausea. Contains traces of milk protein: inhalation of dust may lead to sensitization in some allergic individuals. Contact of contents with skin may cause possible burns, especially if skin is wet or moist, due to the potassium chlorate.

**Repeated Dose Effects**

Potassium chlorate may cause methemoglobinemia, cyanosis, convulsions, tachycardia, dyspnea, and death.
Irritation

Contents can cause skin, eye and mucous membrane irritation or dermatitis. Inhalation will cause irritation to the lungs and mucus membrane.

Carcinogenicity

None of the ingredients are suspect to be a carcinogen.

Genetic Effects

No information found

Developmental Effects

Perchlorate exposure at certain levels can disrupt the function of the thyroid gland by interfering with the iodide uptake and thyroid hormone production. This interference may lead to developmental defects. Scientists consider pregnant women, children, infants, and individuals with thyroid disorders to be the populations most at risk of harm from being exposed to perchlorate.

Sensitization

Contains traces of milk protein: inhalation of dust may lead to sensitization in some allergic individuals

Target Organ Effects

Eye, skin, liver, kidney, and thyroid.

12. Ecological Information

Aquatic Toxicity

1-Aminoanthraquinone: Fish: 48h LC50: >30 mg/L (Oryzias latipes); EC50 - Daphnia magna (Water flea) -> 82.3 mg/l – 48 h - Toxic to aquatic life.

Magnesium: Fishes Pimephales promelas LC50(96hr) 541 mg/L; Fishes, Daphnia magna, LC50(48hr) 140 mg/L

Strontium Nitrate: Acute toxicity - Fishes, Carassius auratus, LC100, 9,615 mg/l; Chronic toxicity - Fishes, Gasterosteus aculeatus, LC100, 2,912 mg/l

Potassium Chlorate: Fish: LC50 Oncorhynchus mykiss (rainbow trout) 1750 mg/l – 96 hr, EC50 daphnia magna (water flea) 1093 mg/l 24 hr

13. Disposal Considerations

Dispose of in a manner consistent with federal, state, and local regulations.. Refer to California Code of Regulations, Title 33, Sections 67384.1-67384.10 for additional information on handling and disposal of potassium perchlorate containing materials.

14. Transportation Information

<table>
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<th>Shipping Name</th>
<th>Hazard Class</th>
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<th>Packing Group</th>
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<th>Net Explosive Quantity</th>
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15. Regulatory Information

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<tr>
<th>US Regulations</th>
<th>TSCA</th>
<th>CERCLA</th>
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<th>CAA</th>
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<th>Fire</th>
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<th>Pressure</th>
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<td>Magnesium</td>
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16. Other Information

Revision Information: May, 2014

Risk and Safety Phrases:
R11 Flammable
R20 Harmful by inhalation.
R22 Harmful if swallowed.
R34 Causes burns
R36 Irritating to eyes.
R37 Irritating to respiratory system.
S16 Keep away from food, drink and animal foodstuffs.
S17 Keep away from combustible material
S18 Keep container dry.
S19 Keep away from sources of ignition
S2 Keep out of the reach of children.
S24 Avoid contact with skin.
S25 Avoid contact with eyes.
S29 Do not empty into drains.
S30 Do not breathe fumes
S31 Use only in well ventilated areas.

Key / Legend:
HMIS: hazardous material identification system
NFPA: national fire protection association
CAS: Chemical Abstracts Service number
EINECS: European inventory of existing chemical substances
OSHA PEL: occupational safety and health administration permissible exposure limit
NIOSH TLV: national institute of occupational safety and health Threshold Limit Value
NTP: National Toxicology Program
IARC: International Agency for Research on Cancer

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Day Night SDS  D & N  Update: May 7, 2014  Sheet 4 of 4
SAFETY DATA SHEET

1. Product and Company Identification

Skyblazer XLT and XLT, Twin
SAR Red Aerial Signal
Orion Safety Products
3157 North 500 West
Peru, IN 46970

Use: Emergency signal
Phone Number: US 1-800-851-5260
Intl (11) 1-765-472-4375
EMERGENCY CHEMTREC 1-800-424-9300

2. Hazards Identification

Emergency Overview

Hazard Statements:
- Fire or projection hazard
- Causes severe skin burns and eye damage (product when burning)
- Causes skin and eye irritation (contents)
- Harmful if inhaled or swallowed

Precautionary Statements:
- Keep out of reach of children.
- Keep away from heat/sparks/open flames/hot surfaces. – no smoking.
- Keep/Store away from combustible materials.
- Keep dry.
- Keep cool. Do not expose long term to temperatures exceeding 167°F
- Avoid breathing dust/smoke
- Use only outdoors. Do not ignite inside a building, vehicle or boat cabin.
- Wear eye protection.
- Do not dismantle.
- In case of fire: use water deluge. Do not use dry powder or foam extinguishers!

NFPA Rating
- Flammability: 2
- Health: 2
- Reactivity: 1

HMIS Rating
- Flammability: 1
- Health: 3
- Physical Hazard: 1

GHS Classifications
- Explosive: Division 1.4
- Acute Toxicity: Category 5
- Skin Corrosion / Irritation: Product- Category 1A, Contents - Category 2
- Serious Eye Damage / Irritation: Product-Category 1, Contents - Category 2B

3. Composition / Information on Ingredients

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS #</th>
<th>EINCS #</th>
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<td>233-131-9</td>
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<td>Magnesium</td>
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<td>231-104-6</td>
<td>&lt;50%</td>
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<td>1314-18-7</td>
<td>215-224-6</td>
<td>&lt;50%</td>
</tr>
<tr>
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</tr>
<tr>
<td>Black Powder</td>
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<td>mixture</td>
<td>&lt;20%</td>
</tr>
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<td>Dextrin</td>
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<td>232-675-4</td>
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<td>Primer</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
</tr>
</tbody>
</table>

4. First Aid Measures

Inhalation: If smoke or contents are inhaled, remove to fresh air. If not breathing, give artificial respiration and get medical aid.

Skin: For burns, cool with water and bandage appropriately. If contents are contacted, wash with area with soap and water for 15 minutes. Remove contaminated clothing and wash before reuse. Get medical aid if burned or irritation occurs.

Eyes: If burned, cover eye and get medical help immediately. If smoke or contents get into eye, flush with plenty of water for at least 15 minutes, occasionally lifting the up and lower lids. Remove contact lenses if easily possible. Get medical aid immediately.

Ingestion: Get medical aid immediately.

5. Firefighting Measures

Protective Equipment and Precautions for Firefighters:
- Wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full face piece operated in the pressure demand or other positive pressure mode. Prevent further propagation of fire by spraying unburnt nearby product with water. Combat fire from a sheltered position.
- Only use outdoors. Use copious amounts of water to extinguish fire. Using small quantities of water on contents / broken product can cause auto / re-ignition as contents contain magnesium. Use of water on a magnesium fire will generate hydrogen gas that may cause an explosion. Irritating fumes. Flaming projectiles may be ejected during a fire. Trace amounts of lead vapor may be produced (from ignition primer) in a fire situation.

Specific Hazards Arising from the Chemical:
- Water Deluge: Foam and dry chemical extinguishers and suffocation are ineffective
- Unsuitable Extinguishing Media: Wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full face piece operated in the pressure demand or other positive pressure mode. Prevent further propagation of fire by spraying unburnt nearby product with water. Combat fire from a sheltered position.
- Specific Hazards Arising from the Chemical: Only use outdoors. Use copious amounts of water to extinguish fire. Using small quantities of water on contents / broken product can cause auto / re-ignition as contents contain magnesium. Use of water on a magnesium fire will generate hydrogen gas that may cause an explosion. Irritating fumes. Flaming projectiles may be ejected during a fire. Trace amounts of lead vapor may be produced (from ignition primer) in a fire situation.

Flashpoint: Not Applicable
Flammability Limits: Not Applicable
Ignition Temperature: >180°F

6. Accidental Release Measures

Personal Precautions:
- Do not breathe smoke or contents and avoid contact with skin and eyes. Wear flame retardant clothing with long sleeves, dust mask, rubber or nitrile gloves, safety goggles, safety shoes when cleaning up contents. Avoid friction on the released product. Keep away from ignition sources. Contains strong dyes which will color all exposed areas.

Environmental Precautions:
- Prevent dispersion of contents on soil and in water. Prevent contents from spreading or entering into drains, ditches, groundwater or rivers by using appropriate barriers.
Methods for Containment and Clean-up

Use caution when cleaning up spilled product contents. Remove heat, flames, sparks and other sources of ignition. Use non-sparking tools and equipment. Prevent buildup of electrostatic charges by grounding. Clean spills in a manner that does not disperse dust into the air. Do not absorb in sawdust or other combustible absorbents. Pick up spill for recovery or disposal and place in an approved container. Wash away remainder with plenty of water. Collect wash water for approved disposal. Be very careful - magnesium powder may spontaneously ignite in presence of moisture. Magnesium powder reacts with water, producing flammable hydrogen gas.

7. Handling and Storage

Handling

- Point product away from body, other people, animals or combustible products when firing. Wear appropriate eye protection when using. Follow instructions on package! Do not disassemble signal. Avoid contact with clothing and other combustible materials. Use outdoors only. Do not remove bottom cap unless you are outdoors and preparing to activate signal. Do not ignite or launch product inside a vehicle, boat cabin, or building. Avoid ingestion and inhalation of smoke and contents. Wash thoroughly after handling. Avoid contact with heat, sparks, and flame.

Storage

- Store in a cool area out of direct sunlight. Do not allow long-term exposure to temperatures in excess of 180°F. Avoid long-term immersion in water, exposure to moisture, open flames or extremely high temperature. Store away from flammable materials, sources of heat, flame and sparks. Do not store partially burned signals in a vehicle, boat, closed container, warehouse, or any other building.

8. Exposure Controls / Personal Protection

Exposure Limits

<table>
<thead>
<tr>
<th>Strontium Nitrate</th>
<th>OSHA PEL</th>
<th>ACGIH TLV</th>
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<td>Magnesium</td>
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<td>unknown</td>
</tr>
<tr>
<td>Strontium Peroxide</td>
<td>nuisance dust 15 mg/m³</td>
<td>nuisance dust 15 mg/m³</td>
</tr>
<tr>
<td>Polyvinyl chloride</td>
<td>5 mg/m³ for the respirable portion and 15 mg/m³ for total dust.</td>
<td>5 mg/m³ and 10 mg/m³, respectively</td>
</tr>
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<td>Not established</td>
</tr>
<tr>
<td>Dextrin</td>
<td>15 mg/m³ total dust</td>
<td>10 mg/m³</td>
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</table>

Engineering Controls

Use product outdoors only! When cleaning up contents, use local and/or general exhaust.

Eye / Face Protection

- Turn face from product when firing. Wear safety glasses or goggles during use and when cleaning up spilled contents. None under normal conditions when using product unless prolonged handling is anticipated. Contains strong dyes which will color all exposed areas. When cleaning up spilled contents, wear full length impervious protective clothing, including gloves, boots, and a lab coat, apron or coveralls, as appropriate. Wash hands and face before eating, drinking or using tobacco products.

Skin Protection

- None under normal conditions when using product unless prolonged handling is anticipated. Contains strong dyes which will color all exposed areas. When cleaning up spilled contents, wear full length impervious protective clothing, including gloves, boots, and a lab coat, apron or coveralls, as appropriate. Wash hands and face before eating, drinking or using tobacco products.

Respiratory Protection

- None under normal conditions when using product. A particulate respirator (NIOSH type N95 or better filters) may be worn during the cleanup of spilled contents.

General Hygiene

- Use product outdoors away from combustible products. For cleanup of spilled contents, emergency showers and eye wash stations should be available. Educate and train employees in the safe use and handling of hazardous materials. Maintain good housekeeping and safety practices. Do not let contents accumulate in storage or work areas. Clean spills up promptly.

9. Physical and Chemical Properties

| Appearance (color, physical form, shape): | Orange plastic tube. |
| pH: Not available | Melting Point: >500°F |
| Boiling Point: Not applicable | Freezing Point: Not applicable |
| Vapor Pressure: Not applicable | Specific Gravity: Not applicable |
| Solubility: Slight | Evaporation Rate: Not applicable |
| Vapor Density: Not applicable | |

10. Stability and Reactivity

- Stability: Stable
- Possibility of Hazardous Reactions: Hazardous polymerization will not occur.
- Conditions to Avoid: Excessive temperatures, moisture, water, acids, Exposure of the signal to temperatures in excess of 180°F may cause weakening of the signal body. Avoid open flames, extremely high temperatures, wet conditions, and ignition sources.
- Incompatible Materials: Strong oxidizers, strong acids, oxidizing or reducing agents. Liquid acids of any kind. Hydrogen Fluoride, Avoid exposure to organic solvents which might weaken the signal body.
- Hazardous Decomposition Products: Carbon monoxide, Nitrous oxides, Carbon dioxide, Magnesium hydroxides and oxides.

11. Toxicology Information

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Acute Dose Effects

Burning signal can cause severe burns if in contact with body - product burns at an extremely high temperature. Particles from firing may be harmful if inhaled. Contact with contents may cause moderate skin and eye irritation. Inhalation of smoke or contents will cause irritation to the lungs and mucus membrane. Exposure to smoke during use may aggravate asthma if inhaled.

Irritation: Irritating to the skin and eyes on contact. Inhalation will cause irritation to the lungs and mucus membrane.

Corrosivity: May cause eye or skin burns if in contact with burning signal.

Repeated Dose Effects

No known chronic effects. Repeated or prolonged exposure to this compound is not known to aggravate medical conditions.

Carcinogenicity: No information found

Reproductive Effects: No information found

Genetic Effects: No information found

Neurological Effects: No information found

Developmental Effects: No information found

Sensitization: No information found

Target Organ Effects: Eye, skin, and lungs

12. Ecological Information

Aquatic Toxicity

Strontium Nitrate: Acute toxicity - Fishes, Carassius auratus, LC100, 9.615 mg/l; Chronic toxicity - Fishes, Gasterosteus aculeatus, LC100, 2.912 mg/l

Persistence / Degradability

No information found

Bioaccumulation / Accumulation

No information found

Mobility in Environmental Media

No information found

13. Disposal Considerations (for spills and leakage)

Dispose of contaminated product and materials used in cleaning up spills or leaks in the manner approved for pyrotechnic material. Consult appropriate federal, state, and local regulatory agencies to ascertain proper disposal procedures. Open burning is preferred method of disposal for pyrotechnic materials.

14. Transportation Information

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<th>WHMIS</th>
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</table>

16. Other Information

Revision Information: March 2015

Risk and Safety Phrases:
- R10 Flammable
- R21 Harmful in contact with skin.
- R22 Harmful if swallowed.
- R24 Avoid contact with skin.
- R25 Avoid contact with eyes.
- R26 Avoid breathing the fumes.
- R36 Irritating to eyes.
- R37 Irritating to respiratory system.
- R39 Harmful if inhaled.
- R40 Irritating to skin.
- R41 Irritating to the skin.
- R42 Irritating to the eyes.
- R43 Irritating to the respiratory system.
- R44 Irritating to the skin.
- R45 Irritating to the eyes.
- R46 Irritating to the respiratory system.
- R47 Harmful if inhaled.
- R48 Harmful if swallowed.
- R49 Irritating to the skin.
- R50 Harmful if inhaled.
- R51 Harmful if inhaled.
- R52 Harmful if swallowed.
- R53 Harmful if swallowed.
- R54 Irritating to the skin.
- R55 Irritating to the respiratory system.
- R56 Harmful if inhaled.
- R57 Harmful if inhaled.
- R58 Harmful if inhaled.
- R59 Harmful if inhaled.
- R60 Harmful if inhaled.
- R61 Harmful if inhaled.
- R62 Harmful if inhaled.
- R63 Harmful if inhaled.
- R64 Harmful if inhaled.
- R65 Harmful if inhaled.
- R66 Harmful if inhaled.
- R67 Harmful if inhaled.
- R68 Harmful if inhaled.
- R69 Harmful if inhaled.
- R70 Harmful if inhaled.
- R71 Harmful if inhaled.
- R72 Harmful if inhaled.
- R73 Harmful if inhaled.
- R74 Harmful if inhaled.
- R75 Harmful if inhaled.
- R76 Harmful if inhaled.
- R77 Harmful if inhaled.
- R78 Harmful if inhaled.
- R79 Harmful if inhaled.
- R80 Harmful if inhaled.
- R81 Harmful if inhaled.
- R82 Harmful if inhaled.
- R83 Harmful if inhaled.
- R84 Harmful if inhaled.
- R85 Harmful if inhaled.
- R86 Harmful if inhaled.
- R87 Harmful if inhaled.
- R88 Harmful if inhaled.
- R89 Harmful if inhaled.
- R90 Harmful if inhaled.
- R91 Harmful if inhaled.
- R92 Harmful if inhaled.
- R93 Harmful if inhaled.
- R94 Harmful if inhaled.
- R95 Harmful if inhaled.
- R96 Harmful if inhaled.
- R97 Harmful if inhaled.
- R98 Harmful if inhaled.
- R99 Harmful if inhaled.

Key / Legend:
- WHMIS: Workplace Hazardous Materials Information System
- NFPA: National Fire Protection Association
- CAS: Chemical Abstracts Service Number
- EINECS: European Inventory of Existing Chemical Substances
- OSHA PEL: Occupational Safety and Health Administration Permissible Exposure Limit
- NIOSH TLV: National Institute for Occupational Safety and Health Threshold Limit Value
- NTP: National Toxicology Program
- IARC: International Agency for Research on Cancer
- TSCA: Toxic Substances Control Act - US
- CERCLA: Comprehensive Environmental Response, Compensation, and Liability Act - US
- CWA: Clean Water Act - US
- CERCLA: Comprehensive Environmental Response, Compensation, and Liability Act - US
- CAA: Clean Air Act - US
- SARA: Superfund Amendments and Reauthorization Act of 1986
- PROP 65: California’s Proposition 65
- DSL: Domestic Substances List - CAN
- WHMIS: Workplace Hazardous Materials Information System - Canada
- WGK: Water Hazard Classes - Germany

Legal Statement:
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MATERIAL SAFETY DATA SHEET

1. Product and Company Identification

Marine Hand Held Red Flare (HHRF)  
Use: Emergency signal

Orion Safety Products  
3157 North 500 West  
Peru, IN 46970  

Phone Number: US 1-800-851-5260  
Intl (11) 1-765-472-4375  
EMERGENCY CHEMTREC 1-800-424-9300

2. Hazards Identification

Emergency Overview

Hazard Statements:
- Fire or projection hazard
- Causes severe skin burns and eye damage
- Causes skin irritation
- Causes serious eye damage
- Causes eye irritation
- May cause allergy or asthma symptoms or breathing difficulties if inhaled
- May cause damage to thyroid through ingestion after prolonged or repeated exposure

Precautionary Statements:
- Keep out of reach of children.
- Keep away from heat/sparks/open flames/hot surfaces. – No smoking.
- Keep/Store away from combustible materials.
- Protect from moisture.
- Use only non-sparking tools
- Avoid breathing dust/smoke
- Use only outdoors or in a well-ventilated area.
- Avoid release to the environment.(contents)
- Use personal protective equipment as required.
- In case of fire: use water deluge. Do not use dry powder or foam extinguishers!

NFPA Rating
- Flammability: 2
- Health: 2
- Reactivity: 1

HMIS Rating
- Flammability: 1
- Health: 3
- Physical Hazard: 1

3. Composition / Information on Ingredients

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS #</th>
<th>EINCS #</th>
<th>%age</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strontium Nitrate</td>
<td>10042-76-9</td>
<td>233-131-9</td>
<td>&gt;50%</td>
</tr>
<tr>
<td>Sulfur</td>
<td>7704-34-9</td>
<td>231-722-6</td>
<td>&lt;50%</td>
</tr>
<tr>
<td>Potassium Perchlorate</td>
<td>7778-74-7</td>
<td>231-912-9</td>
<td>&lt;50%</td>
</tr>
<tr>
<td>Polyethylene</td>
<td>9002-88-4</td>
<td>none</td>
<td>&lt;20%</td>
</tr>
<tr>
<td>Potassium Chlorate</td>
<td>3811-04-9</td>
<td>231-100-4</td>
<td>&lt;20%</td>
</tr>
<tr>
<td>Shellac / Synosol mixture</td>
<td>mixture</td>
<td>none</td>
<td>&lt;20%</td>
</tr>
</tbody>
</table>

4. First Aid Measures

Inhalation
If fumes from ignition or contents are inhaled, remove to fresh air. If not breathing, give artificial respiration and get medical aid.

Skin
For burns, cool with water and bandage appropriately. If contents are contacted, wash with area with soap and water for 15 minutes. Remove contaminated clothing and wash before reuse. Get medical aid if burned or irritation occurs.

Eyes
If burned, cover eye and get medical help immediately. If contents get into eye, flush with plenty of water for at least 15 minutes, occasionally lifting the up and lower lids. Remove contact lenses if easily possible Get medical aid immediately.

Ingestion
Get medical aid immediately.

5. Firefighting Measures

Extinguishing Media
Water

Unsuitable Extinguishing Media
Foam or dry chemical. Suffocation.

Protective Equipment and Precautions for Firefighters
Wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full face piece operated in the pressure demand or other positive pressure mode. Prevent further propagation of fire by spraying unburnt nearby product with water. Combat fire from a sheltered position.

Specific Hazards Arising from the Chemical
Flame and sparks are ejected out the open end of the flare when it functions. Do not point flare at any part of the body or flammable material. Only use outdoors – smoke is harmful.

Flashpoint
Not Applicable

Flammability Limits
Not Applicable

Ignition Temperature
>180F

6. Accidental Release Measures

Personal Precautions
Do not breathe contents and avoid contact with skin and eyes. Wear flame retardant clothing with long sleeves, dust mask, rubber or nitrile gloves, safety goggles, safety shoes. Avoid friction on the released product. Keep away from ignition sources.

Environmental Precautions
Prevent dispersion of contents on soil and in water. Prevent contents from spreading or entering into drains, ditches, groundwater or rivers by using appropriate barriers.
Methods for Containment and Clean-up

Use caution when cleaning up spilled product contents. Remove heat, flames, sparks and other sources of ignition. Use non-sparking tools and equipment. Prevent buildup of electrostatic charges by grounding. Clean spills in a manner that does not disperse dust into the air. Do not absorb in sawdust or other combustible absorbents. Pick up spill for recovery or disposal and place in an approved container. Wash away remainder with plenty of water. Collect wash water for approved disposal.

7. Handling and Storage

Handling
Hold and point flare away from body when igniting. Avoid contact with clothing and other combustible materials. Wear eye protection during use. Follow instructions on package. Use outdoors only! Do not ignite or burn product inside a vehicle or building. Flares should be allowed to burn to completion. Unburned and partially burned flares contain potassium perchlorate which should not be allowed to come into contact with surface and ground water. Perchlorate Material – special handling may apply. See www.dtsc.ca.gov/hazardouswaste/perchlorate. Avoid ingestion and inhalation of smoke and contents. Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Avoid contact with skin and eyes. Avoid contact with heat sparks, and flame.

Storage
Store in a dry place away from direct sunlight, heat and incompatible materials. Store away from food and beverages. Store away from flammable materials, sources of heat, flame and sparks. Store at ambient temperature.

8. Exposure Controls / Personal Protection

<table>
<thead>
<tr>
<th>Exposure Limits</th>
<th>OSHA PEL</th>
<th>ACGIH TLV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strontium Nitrate</td>
<td>Not established</td>
<td>Not established</td>
</tr>
<tr>
<td>Sulfur</td>
<td>Not established</td>
<td>Not established</td>
</tr>
<tr>
<td>Potassium Perchlorate</td>
<td>Nuisance dust 15 mg/m³</td>
<td>Nuisance dust 15 mg/m³</td>
</tr>
<tr>
<td>Polyethylene</td>
<td>Not stated</td>
<td>Not stated</td>
</tr>
<tr>
<td>Potassium Chlorate</td>
<td>Not established</td>
<td>Not established</td>
</tr>
<tr>
<td>Shellac / Synosol</td>
<td>Not Established</td>
<td>Not Established</td>
</tr>
</tbody>
</table>

Engineering Controls
Use product outdoors only! When cleaning up powder, use local and/or general exhaust.

Eye / Face Protection
Safety glasses or goggles

Skin Protection
None under normal conditions when using product unless prolonged handling is anticipated. Impervious protective clothing, including gloves, boots, and a lab coat, apron or coveralls, as appropriate, when cleaning up spilled product. Wash hands and face before eating, drinking or using tobacco products.

Respiratory Protection
None under normal conditions when using product. A particulate respirator (NIOSH T N95 or better filters) may be worn during the cleanup of spilled materials.

General Hygiene
Use product outdoors away from combustible products. For cleanup of spilled materials, emergency showers and eye wash stations should be available. Educate and train employees in the safe use and handling of hazardous materials.

9. Physical and Chemical Properties

| Appearance (color, physical form, shape): | Red paper tube with plastic cap on one end |
| pH: | Not available |
| Melting Point: | Not available |
| Freezing Point: | Not applicable |
| Specific Gravity: | Not applicable |
| Solubility: | Not available |
| Evaporation Rate: | Not applicable |
| Vapor Density: | Not applicable |

10. Stability and Reactivity

Chemical Stability
Stable

Possibility of Hazardous Reactions
Hazardous polymerization will not occur.

Conditions to Avoid
Combustible materials, heat, flames, sparks and other sources of ignition. Moisture.

Incompatible Materials
Strong acids, strong fuels, ammonia salts, and strong bases.

Hazardous Decomposition Products
Carbon monoxide, carbon dioxide, sulfur oxides, and nitrogen oxides.

11. Toxicology Information

<table>
<thead>
<tr>
<th>Toxicology</th>
<th>Oral LD50</th>
<th>skin LD50</th>
<th>LC50</th>
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</thead>
<tbody>
<tr>
<td>Strontium Nitrate</td>
<td>Rat: 2750 mg/kg</td>
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<td>not stated</td>
</tr>
<tr>
<td>Sulfur</td>
<td>Rat:&gt;5050 mg/kg</td>
<td>Rat:&gt;2020 mg/kg</td>
<td>Rat:&gt;5.49 mg/L air concentration</td>
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<td>Potassium Perchlorate</td>
<td>Rat: 2100 mg/kg</td>
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<td>Polyethylene</td>
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<tr>
<td>Potassium Chlorate</td>
<td>Rat 1870 mg/kg</td>
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<tr>
<td>Shellac / Synosol</td>
<td>not stated</td>
<td>not stated</td>
<td>not stated</td>
</tr>
</tbody>
</table>

Acute Dose Effects
Burning flare can cause severe burns if in contact with body. Contents may cause moderate eye irritation or burns. Contact with skin causes irritation and possible burns, especially if skin is wet or moist. Ingestion of contents may cause gastrointestinal irritation with nausea, vomiting and diarrhea. Inhalation of smoke or contents will cause irritation to the lungs and mucus membrane. Individuals with known allergies to sulfide drugs may also have allergic reactions to elemental sulfur.

Irritation
Irritating to the skin and eyes on contact. Inhalation will cause irritation to the lungs and mucus membrane.

Corrosivity
May cause eye burns and contact with skin causes irritation and possible burns, especially if skin is wet or moist due to the potassium chlorate.

Repeated Dose Effects
Prolonged or repeated skin contact with contents may cause dermatitis.
Carcinogenicity: None of the ingredients are listed by NTP, IARC or regulated as a Carcinogen by OSHA.

Reproductive Effects: No information found.

Genetic Effects: No information found.

Neurological Effects: No information found.

Sensitization: No information found.

Developmental Effects: Perchlorate exposure at certain levels can disrupt the function of the thyroid gland by interfering with the iodide uptake and thyroid hormone production. This interference may lead to developmental defects. Scientists consider pregnant women, children, infants, and individuals with thyroid disorders to be the populations most at risk of harm from being exposed to perchlorate.

Eye, skin, liver, kidney, and thyroid.

12. Ecological Information

<table>
<thead>
<tr>
<th>Aquatic Toxicity</th>
<th>Persistence / Degradability</th>
<th>Bioaccumulation / Accumulation</th>
<th>Mobility in Environmental Media</th>
</tr>
</thead>
<tbody>
<tr>
<td>Potassium Chlorate: fish: LC50 oncorhynchus mykiss (rainbow trout) 1750 mg/l - 96 hr, EC50 daphnia magna (water flea) 1093 mg/l 24 hr</td>
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<td>No information found</td>
<td>No information found</td>
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<tr>
<td>Strontium Nitrate: Acute toxicity - Fishes, Carassius auratus, LC100, 9,615 mg/l; Chronic toxicity - Fishes, Gasterosteus aculeatus, LC100, 2,912 mg/l</td>
<td>No information found</td>
<td>No information found</td>
<td>No information found</td>
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<tr>
<td>Sulfur: Toxicity to fish LC50 - Oncorhynchus mykiss (rainbow trout) - 180 mg/l - 96 h Toxicity to daphnia and other aquatic invertebrates: EC50 - Daphnia magna (Water flea) - &gt; 5,000 mg/l - 48 h</td>
<td>No information found</td>
<td>No information found</td>
<td>No information found</td>
</tr>
</tbody>
</table>

13. Disposal Considerations

Finished product is considered reactive and could ignite. Burning is the preferred method of disposal of pyrotechnic materials; product is considered inert after ignition. If quantities are too large to destroy by test firing, consult factory. Flares should be allowed to burn to completion. Partially burned, unburned flares, spilled contents, and ash from burned flares should be disposed of in accordance with federal, state, and local requirements. Do not store partially burned flares in a vehicle, closed container, warehouse, or any other building. Refer to California Code of Regulations, Title 33, Sections 67384.1-67384.10 for additional information on handling and disposal of potassium perchlorate containing materials.

14. Transportation Information

<table>
<thead>
<tr>
<th>shipping name</th>
<th>hazard class</th>
<th>ID Number</th>
<th>packing group</th>
<th>EX Number</th>
<th>Reportable Quantities</th>
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<tbody>
<tr>
<td>United States</td>
<td>Signal Devices, Hand</td>
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<td>UN0373</td>
<td>II</td>
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<td>EX-8604106</td>
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15. Regulatory Information

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<tr>
<th>US Regulations</th>
<th>TSCA</th>
<th>CERCLA</th>
<th>CWA</th>
<th>CAA</th>
<th>SARA 313</th>
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<td>no</td>
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<tr>
<td>Potassium Perchlorate</td>
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<td>no</td>
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<td>no</td>
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<tr>
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<td>Shellac / Synosol</td>
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<table>
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<tr>
<th>US States</th>
<th>Prop 65</th>
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<th>PA</th>
<th>Canada</th>
<th>whmis</th>
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<th>Europe</th>
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<tbody>
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<td>dsl</td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

HHRF: Page 3 of 4 December 2011
16. Other Information

Revision Information: December, 2011

Risk and Safety Phrases:
R10 Flammable
R48, Imitating to skin
R20 Harmful by inhalation.
R21 Harmful in contact with skin.
R22 Harmful if swallowed.
R34 Causes burns.
R36 Irritating to eyes.
R37 Irritating to respiratory system.
S16 Keep out of the reach of children.
S17 Keep away from combustible material.
S18 Keep container dry.
S19 Keep away from food, drink and animal foodstuffs.
S20 Avoid contact with skin.
S21 Avoid contact with eyes.
S22 Do not empty into drains.
S41, In case of fire and / or explosion do not breathe fumes.
S43 In case of fire use water.
S44 Avoid contact with skin.
S45 Avoid contact with eyes.
S51 Use only in well ventilated areas.

Key / Legend:
HMIS: hazardous material identification system
NFPA: national fire protection association
CAS: Chemical Abstracts Service number
EINECS: European inventory of existing chemical substances
OSHA PEL: occupational safety and health administration permissible exposure limit
NIOSH TLV: national institute of occupational safety and health Threshold Limit Value
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