

1. PRODUCT AND COMPANY IDENTIFICATION

Product Name	Life Raft, Self-Inflating, Aviation Type						
Trade Names							
Model	Part No.	Model	Part No.	Model	Part No.	Model	Part No.
EAM-2B	R0074-()	T4S	R1350-()	T9	R0103A()	T14AS	R1400-()
EAM-5	R0070-()	T4AS	R1200-()	T9S	R1450-()	T25	R0372A()
EAM-8	R0097-()	T6	R0102A()	T10AS	R1300-()	T32	R1700-()
EAM-12	R0098-()	T6A	R0425A()	T11AS	R1570-()	T36	R1900-()
T2	R0100A()	T6AX	R1750-()	T12	R0297A()	T46	R0202A()
T4	R0101A()	T7AS	R1500-()	T12AS	R1650-()	T56	R2000-()
Company	Eastern Aero Marine 5502 NW 37 th Avenue Miami, Florida 33142						
Telephone	(800) 255-3924						
Fax	(305) 637-8632						
Emergency Phone Number	(813) 248-0585						

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

UN Number	UN2990
UN Proper Shipping Name	Life Saving Appliance, Self-Inflating
Transport Hazard Class(es)	Class 9
Packing Group	N/A

15. REGULATORY INFORMATION

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

16. OTHER INFORMATION

Revision Level	Original
Other	Supplier's Safety Data Sheets can be found on our website at 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
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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 1272/2008 (CLP)/REACH 1907/2006 [amended by 453/2010]
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.

DSD/DPD

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

WHMIS

- 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**

Hazardous Components					
Chemical Name	Identifiers	%(weight)	LD50/LC50	Classifications According to Regulation/Directive	Comments
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.

7.2 Conditions for safe storage, including any incompatibilities

Storage

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

7.3 Specific end use(s)

- No data available

Section 8 - Exposure Controls/Personal Protection

8.1 Control parameters

Exposure Limits/Guidelines						
	Result	ACGIH	Canada Ontario	Canada Quebec	NIOSH	OSHA
Carbon dioxide (124-38-9)	STELs	30000 ppm STEL	30000 ppm STEL	30000 ppm STEV; 54000 mg/m3 STEV	30000 ppm STEL; 54000 mg/m3 STEL	Not established
	TWAs	5000 ppm TWA	5000 ppm TWA	5000 ppm TWAEV; 9000 mg/m3 TWAEV	5000 ppm TWA; 9000 mg/m3 TWA	5000 ppm TWA; 9000 mg/m3 TWA

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



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
 STEV = Short Term Exposure Value
 TWA = Time-Weighted Averages are based on 8h/day, 40h/week exposures

ACGIH = American Conference of Governmental Industrial Hygiene
 NIOSH = National Institute of Occupational Safety and Health
 OSHA = Occupational Safety and Health Administration

Section 9 - Physical and Chemical Properties**9.1 Information on Physical and Chemical Properties**

Material Description			
Physical Form	Gas	Appearance/Description	Colorless gas with no odor.
Color	Colorless	Odor	Odorless
Taste	Data lacking	Particulate Type	Not relevant
Particulate Size	Not relevant	Aerosol Type	Not relevant
Odor Threshold	Not relevant	Physical and Chemical Properties	Data lacking
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 an oxidizing gas.		
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 (ΔH_c)	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 coefficient	Data lacking

Coefficient of water/oil distribution	Data lacking	Bioaccumulation Factor	Data lacking
Bioconcentration Factor	Data lacking	Biochemical Oxygen Demand BOD/BOD5	Data lacking
Chemical Oxygen Demand	Data lacking	Persistence	Data lacking
Degradation	Data lacking		

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

Carbon Dioxide (gas) 124-38-9								
Test Type	Dosage	Route	Species	Duration	Results	Test Class	Target Organs	Comments
Acute Toxicity	= 470000 ppm	Inhalation	Rat	30 Minute(s)	LC50	NDA	NDA	NDA
Reproductive	= 2 pph	Inhalation	Mouse	8 Hour(s)	TCLo	NDA	NDA	NDA
Reproductive	= 13 pph	Inhalation	Rabbit	4 Hour(s)	TCLo	NDA	NDA	NDA
Reproductive	= 6 pph	Inhalation	Rat	24 Hour(s)	TCLo	NDA	NDA	NDA
GHS Properties				Classification				
Acute toxicity				EU/CLP • Classification criteria not met OSHA HCS 2012 • Classification criteria not met				
Aspiration Hazard				EU/CLP • Classification criteria not met OSHA HCS 2012 • Classification criteria not met				

Carcinogenicity	EU/CLP • Classification criteria not met OSHA HCS 2012 • Classification criteria not met
Germ Cell Mutagenicity	EU/CLP • Classification criteria not met OSHA HCS 2012 • Classification criteria not met
Skin corrosion/Irritation	EU/CLP • Classification criteria not met OSHA HCS 2012 • Classification criteria not met
Skin sensitization	EU/CLP • Classification criteria not met OSHA HCS 2012 • Classification criteria not met
STOT-RE	EU/CLP • Classification criteria not met OSHA HCS 2012 • Classification criteria not met
STOT-SE	EU/CLP • Classification criteria not met OSHA HCS 2012 • Classification criteria not met
Toxicity for Reproduction	EU/CLP • Classification criteria not met OSHA HCS 2012 • Classification criteria not met
Respiratory sensitization	EU/CLP • Classification criteria not met OSHA HCS 2012 • Classification criteria not met
Serious eye damage/Irritation	EU/CLP • Classification criteria not met OSHA HCS 2012 • Classification criteria not met

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

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

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)

State Right To Know				
Component	CAS	MA	NJ	PA
Carbon dioxide	124-38-9	Yes	Yes	Yes

Inventory				
Component	CAS	Canada DSL	Canada NDSL	TSCA
Carbon dioxide	124-38-9	Yes	No	Yes

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

GHS product identifier	: Nitrogen, Refrigerated Liquid
Chemical name	: nitrogen
Other means of identification	: LIN, Cryogenic Liquid Nitrogen, Liquid Nitrogen
Product use	: Synthetic/Analytical chemistry.
Synonym	: LIN, Cryogenic Liquid Nitrogen, Liquid Nitrogen
SDS #	: 001188
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 number (with hours of operation)	: 1-866-734-3438

Section 2. Hazards identification

OSHA/HCS status : This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

Classification of the substance or mixture : GASES UNDER PRESSURE - Refrigerated liquefied gas

GHS label elements

Hazard pictograms :



Signal word : Warning

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

Ingredient name	%	CAS number
NITROGEN, REFRIGERATED LIQUID	100	7727-37-9

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 : Contains gas under pressure. Contains refrigerated gas. In a fire or if heated, a pressure increase will occur and the container may burst or explode.

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.

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

Ingredient name	Exposure limits
NITROGEN, REFRIGERATED LIQUID	Oxygen Depletion [Asphyxiant]

Section 8. Exposure controls/personal protection

- Appropriate engineering controls** : Good general ventilation should be sufficient to control worker exposure to airborne contaminants.
- Environmental exposure controls** : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

Individual protection measures

- Hygiene measures** : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.
- 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.

Section 9. Physical and chemical properties

Burning time	: Not applicable.
Burning rate	: Not applicable.
Evaporation rate	: Not available.
Flammability (solid, gas)	: Not available.
Lower and upper explosive (flammable) limits	: Not available.
Vapor pressure	: Not available.
Vapor density	: 0.967 (Air = 1) Liquid Density@BP: 50.46 lb/ft ³ (808.3 kg/m ³)
Specific Volume (ft³/lb)	: 13.8889
Gas Density (lb/ft³)	: 0.072
Relative density	: Not available.
Solubility	: Not available.
Solubility in water	: 0.023 g/l
Partition coefficient: n-octanol/water	: 0.67
Auto-ignition temperature	: Not available.
Decomposition temperature	: Not available.
SADT	: Not available.
Viscosity	: Not available.

Section 10. Stability and reactivity

Reactivity	: No specific test data related to reactivity available for this product or its ingredients.
Chemical stability	: The product is stable.
Possibility of hazardous reactions	: Under normal conditions of storage and use, hazardous reactions will not occur.
Conditions to avoid	: No specific data.
Hazardous decomposition products	: Under normal conditions of storage and use, hazardous decomposition products should not be produced.
Hazardous polymerization	: Under normal conditions of storage and use, hazardous polymerization will not occur.

Section 11. Toxicological information

Information on toxicological effects

Acute toxicity

Not available.

Irritation/Corrosion

Not available.

Sensitization

Not available.

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

Product/ingredient name	LogP _{ow}	BCF	Potential
NITROGEN, REFRIGERATED LIQUID	0.67	-	low

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.

Section 14. Transport information

	DOT	TDG	Mexico	IMDG	IATA
UN number	UN1977	UN1977	UN1977	UN1977	UN1977
UN proper shipping name	NITROGEN, REFRIGERATED LIQUID	NITROGEN, REFRIGERATED LIQUID	NITROGEN, REFRIGERATED LIQUID	NITROGEN, REFRIGERATED LIQUID	NITROGEN, REFRIGERATED LIQUID
Transport hazard class(es)	2.2 	2.2 	2.2 	2.2 	2.2
Packing group	-	-	-	-	-
Environment	No.	No.	No.	No.	No.
Additional information	<u>Limited quantity</u> Yes. <u>Packaging instruction</u> Passenger aircraft Quantity limitation: 75 kg Cargo aircraft Quantity limitation: 150 kg	<u>Explosive Limit and Limited Quantity Index</u> 0.125 <u>Passenger Carrying Road or Rail Index</u> 75	-	-	<u>Passenger and Cargo Aircraft</u> Quantity limitation: 75 kg <u>Cargo Aircraft Only</u> Quantity limitation: 150 kg

“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

Classification : Sudden release of pressure

Composition/information on ingredients

Name	%	Fire hazard	Sudden release of pressure	Reactive	Immediate (acute) health hazard	Delayed (chronic) health hazard
NITROGEN, REFRIGERATED LIQUID	100	No.	Yes.	No.	No.	No.

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 NPRI: 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.)

Health	3
Flammability	0
Physical hazards	2

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.)



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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

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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
- MARPOL 73/78 = International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978. ("Marpol" = marine pollution)
- 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)
- CFR – United States Code of Federal Regulations
- CPR – Controlled Products Regulations

Date of issue/Date of revision

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Version : 0.05

11/12

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.

✔ Indicates information that has changed from previously issued version.

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

12 Ga HP (High Performance) Red Aerial Signal

Orion Safety Products
3157 North 500 West
Peru, IN 46970

Use: Marine 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



Danger

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

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!

NFPA Rating

Flammability 2
Health 2
Reactivity 1

HMIS Rating

Flammability 1
Health 3
Physical Hazard 1

3. Composition / Information on Ingredients

Component	CAS #	EINCS #	%age
Strontium Nitrate	10042-76-9	233-131-9	<50%
Magnesium	7439-95-4	231-104-6	<50%
Strontium Peroxide	1314-18-7	215-224-6	<30%
Black Powder	Mixture	None	<30%
Polyvinyl Chloride	9002-86-2	none	<20%
Dextrin	9004-53-9	232-675-4	<20%
Primer <i>(contains small amount of lead styphnate which is sealed under normal conditions)</i>	n/a	n/a	n/a

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

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 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** >180F

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 food and beverages. Store away from flammable materials, sources of heat, flame and sparks. Store at ambient temperature.

8. Exposure Controls / Personal Protection

Exposure Limits	OSHA PEL	ACGIH TLV
Strontium Nitrate	Not Established	Not Established
Magnesium	Not Established	Not Established
Strontium Peroxide	Nuisance dust 15 mg/m ³ .	Nuisance dust 15 mg/m ³ .
Black Powder	Not Established	Not Established
Polyvinyl Chloride	5mg/ml for the respirable portion and 15mg/ml for total dust.	5 and 10mg/ml, respectively
Dextrin	15 mg/m ³ total dust	10 mg/m ³

Engineering Controls Use product outdoors only! When cleaning up contents, use local and/or general exhaust.
Eye / Face Protection Turn face from launcher when firing. Wear safety glasses or goggles during use and when cleaning up spilled contents.
Skin Protection None under normal conditions when using product unless prolonged handling is anticipated. When cleaning up spilled contents, wear 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 t 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): 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	Solubility: Not available
Boiling Point: Not applicable	Freezing Point: Not applicable	Evaporation Rate: Not applicable
Vapor Pressure: Not applicable	Specific Gravity: 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 Excessive temperatures, moisture, water, acids, and ignition sources.	Incompatible Materials Reducing Agents, Organic Materials, Finely Powdered Metals, Acids, Water, Halogens, Hydrogen Fluoride.	Hazardous Decomposition Products Oxides of Strontium and Nitrogen
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11. Toxicology Information

Toxicology	Oral LD50	skin LD50	LC50
Strontium Nitrate	Rat 2750 mg/kg	Not available	Not available
Magnesium	Rat: 230 mg/kg	Not available	Not available
Strontium Peroxide	Not available	Not available	Not available
Black Powder	Not available	Not available	Not available
Polyvinyl Chloride	Not available	Not available	Not available
Dextrin	Not available	Not available	Not available

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.

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

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

Aquatic Toxicity	Persistence / Degradability	Bioaccumulation / Accumulation	Mobility in Environmental Media
Strontium Nitrate: <i>Acute toxicity - Fishes, Carassius auratus, LC100, 9,615 mg/l; Chronic toxicity - Fishes, Gasterosteus aculeatus, LC100, 2.912 mg/l</i>	No information found	No information found	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

United States & International	shipping name	hazard class	ID Number	packing group	EX Number	Reportable Quantities
	Flares, Aerial	1.4G	UN0403	II	EX-2004110275	none

15. Regulatory Information

US Regulations	TSCA	CERCLA	CWA	CAA	SARA 313	SARA 302	Acute	Chronic	Fire	Reactivity	Pressure
Strontium Nitrate	Yes	No	No	No	No	No	No	No	No	No	No
Magnesium	Yes	No	No	No	No	No	No	No	No	No	No
Strontium Peroxide	Yes	No	No	No	No	No	None	None	None	None	None
Black Powder	Not stated	Not stated	Not stated	Not stated	Not stated	Not stated	Not stated	Not stated	Not stated	Not stated	Not stated
Polyvinyl Chloride	Yes	No	No	No	No	No	Not stated	Not stated	Not stated	Not stated	Not stated

US States	Prop 65	NJ	PA	Canada	WHMIS	DSL	Europe	wgk
Strontium Nitrate	No	1743	No		No results	Yes		2
Magnesium	No	1136	Yes		No results	Yes		nwg
Strontium Peroxide	No	1745	No		No results	Yes		not listed
Black Powder	Not stated	Not stated	Not stated		Not stated	Not stated		Not stated
Polyvinyl Chloride	No	3622	No		No results	Yes		not listed

16. Other Information

Revision Information: March 2015

Risk and Safety Phrases:

R10 Flammable
 R38 Irritating to skin (contents)
 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.
 S17 Keep away from combustible material
 S16 Keep away from sources of ignition
 S2 Keep out of the reach of children.

S8 Keep container dry.
 S13 Keep away from food, drink and animal foodstuffs.
 S24 Avoid contact with skin.
 S25 Avoid contact with eyes.
 S29 Do not empty into drains.
 S41, In case of fire and / or explosion do not breathe fumes
 S43 In case of fire use water
 S39 Wear eye / face protection.
 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
 NTP: National Toxicology Program
 IARC: International Agency for Research on Cancer

TSCA: toxic substance control act - US
 CERCLA: comprehensive environmental response, compensation and liability act - US
 CWA: clean water act - US
 CAA: clean air act - US
 SARA: superfund amendments and reauthorization act - US
 PROP 65: California's Proposition 65 list
 WHMIS: workplace hazardous materials information system - Canada
 DSL: Domestic Substances List - Canada
 WGK: water hazard classes - Germany

Legal Statement:

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Safety Data Sheet

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Supersedes: Version 4 dated 12 September 2011

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
Telefax 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
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Explosive Division 1.3 – H203 Acute Toxic Category 4 – H302 Eye Irritant Category 2 – H319	Explosive – R2 Harmful –R22-R36
For full wording of Hazard statements see Section 16	For full wording of Risk phrases see Section 16

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.



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

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

Also contains -

Magnesium powder stabilised with polymerised linseed oil

Under DPD EC1999/45



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Substances	CAS No.	EC No.	%	Gram	Symbol & Risk phrases
Strontium nitrate	10042-76-9	233-131-9	31.35	47.5	O, Xn: R8-22-36
Potassium perchlorate	7778-74-7	231-912-9	24.09	36.5	O, Xn: R9-22
Potassium nitrate	7757-79-1	231-818-8	3.17	4.8	O, N: R8-50
Sulphur	7704-34-9	231-722-6	0.46	0.7	Xi: R36/37/38 52/53

For full wording of H-statements and R-phrases see Section 16.

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.
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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



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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/cm ³)	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.



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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



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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 II of MARPOL 73/ 78 and the IBC Code	Not applicable

	Non US market	Non US market	USA market
Transport	In Fibre Board Box	In Steel Cage +	In Steel Cage +



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Classification		Fibre Board Box	Fibre Board Box
Article Number (Order article No.)	340100 (340100)	340100 (340170)	340100 (340180)
- UN No.	0195	0506	0403
- Proper shipping name	Signals, distress, ship	Signals, distress	Flares, aerial
- Transport Class	1.3G	1.4S	1.4G
- Packing Instruction	P135	P135	P135
Label	1.3	1.4	1.4
IMO-IMDG code			
- EMS code	F-B, S-X	F-B, S-X	F-B, S-X
EX number (DOT/USA)	N/A	N/A	2007050373
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 ESIS web site



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Version number 5
Date prepared 24.10.14
Supersedes Version 4 dated 12.09.11
Nature of revision New emergency telephone number. REACH registration numbers introduced for strontium nitrate, potassium nitrate, potassium perchlorate and sulphur.

Mixture classified under CLP (EC1272/2008) by calculation based on ingredient information.

R-phrases used in document

R2	Risk of explosion by shock, friction, fire or other sources of ignition
R8	Contact with combustible material may cause fire
R9	Explosive when mixed with combustible material
R22	Harmful if swallowed
R36	Irritating to eyes
R36/37/38	Irritating to eyes, respiratory system and skin
R50	Very toxic to aquatic organisms
R52/53	Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment

H-statements used in document

H203	Explosive; fire, blast or projection hazard
H271	May cause fire or explosion; strong oxidiser
H272	May intensify fire; oxidiser
H302	Harmful if swallowed
H315	Causes skin irritation
H319	Causes serious eye irritation

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



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- 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

Use: Distress Signal

CIL / Orion

Phone Number: 450-566-0655

533 Argenteuil

LACHUTE, Quebec Canada J8H3Y2

EMERGENCY 613-996-6666

2. Hazards Identification

Emergency Overview



Danger

GHS Classifications

Explosive	Division 1.4
Acute Toxicity	Category 4
Skin Corrosion / Irritation	Product- Category 1A Contents - Category 2
Serious Eye Damage / Irritation	Product-Category 1 Contents - Category 2B
Respiratory or Skin Sensitization	Contents - Category 1
STOT - Repeated Exposure	Contents - Category 2
Aquatic Hazard (Acute/Chronic)	Category 1

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

NFPA Rating

Flammability 2
Health 2
Reactivity 1

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!

HMIS Rating

Flammability 1
Health 3
Physical Hazard 1

3. Composition / Information on Ingredients

Component	CAS #	EINCS #	%age
1-Amino-Anthraquinone	82-45-1	201-423-5	20-40%
Magnesium	7439-95-4	231-104-6	10-30%
Strontium Nitrate	10042-76-9	233-131-9	10-30%
Potassium Chlorate	3811-04-9	231-100-4	1-20%
Potassium Perchlorate	7778-74-7	231-912-9	1-20%
Lactose	63-42-3	238-691-8	1-20%
Polyvinyl Chloride	9002-86-2	200-831-0	1-20%

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.
Protective Equipment and Precautions for Firefighters	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



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Explosives
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LACHUTE, Québec
Canada J8H 3Y2

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Fax: (450) 566-0677

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.

Storage

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

8. Exposure Controls / Personal Protection

Exposure Limits	OSHA PEL	ACGIH TLV
1-Amino-Anthraquinone	No data available	No data available
Magnesium	Not established	Not established
Strontium Nitrate	Not established	Not established
Potassium Perchlorate	Nuisance dust 15 mg/m ³	Nuisance dust 15 mg/m ³
Potassium Chlorate	Not established	Not established
Lactose	Nuisance particulate, 15 mg/m ³ of total dust	Nuisance particulate 10 mg/m ³ of total dust
Polyvinyl Chloride	5mg/ml for the respirable portion and 15mg/ml for total dust.	5 and 10mg/ml, respectively

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
Boiling Point	Not applicable	Freezing Point:	Not applicable
Vapour Pressure:	Not applicable	Specific Gravity	Not applicable
		Solubility:	Not available
		Evaporation Rate:	Not applicable
		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. Toxicology Information

Toxicology	Oral LD50	skin LD50	LC50
1-Amino-Anthraquinone	Rat: 1500 mg/kg	No data available	Not stated
Magnesium	Rat: >2000 mg/kg	Not available	Not available
Strontium Nitrate	Rat: 2750 mg/kg	Not stated	Not stated
Potassium Perchlorate	Rat: 2100 mg/kg	Not stated	Not stated
Potassium Chlorate	Rat 1870 mg/kg	No information found	No information found
Lactose	Rat > 10000 mg/kg	No information found	No information found
Polyvinyl Chloride	The product is biologically inert.	Not available	Not available

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, dyspnoea, and death..



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Fax: (450) 566-0677

Irritation	Contents can cause skin, eye and mucous membrane irritation or dermatitis. Inhalation will cause irritation to the lungs and mucus membrane.	Corrosivity	Contact with burning product will cause burns to eyes and skin. Contact with potassium chlorate in contents with skin may cause burns, especially if skin is wet or moist,
Carcinogenicity	None of the ingredients are suspect to be a carcinogen.	Reproductive Effects	No information found
Genetic Effects	No information found	Neurological 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	Persistence / Degradability	Bioaccumulation / Accumulation	Mobility in Environmental Media
<u>1-Aminoanthraquinone</u> : Fish: 48h LC50:>30 mg/L (<i>Oryzias latipes</i>); EC50 - <i>Daphnia magna</i> (Water flea) - > 82.3 mg/l - 48 h - Toxic to aquatic life.	1-Aminoanthraquinone: 0 % (by BOD), 2 % (by HPLC)	1-Aminoanthraquinone: 50 - 150 (conc. 30 ug/L), 55 - 137 (conc. 3 ug/L)	Strontium Nitrate: Water:: considerable solubility and mobility; Soil/sediments non-significant adsorption
<u>Magnesium</u> : Fishes <i>Pimephales promelas</i> LC50(98hr) 541 mg/L; Fishes, <i>Daphnia magna</i> , LC50(48hr) 140 mg/L			
<u>Strontium Nitrate</u> : Acute toxicity - Fishes, <i>Carassius auratus</i> , LC100, 9,615 mg/l; Chronic toxicity - Fishes, <i>Gasterosteus aculeatus</i> , LC100, 2,912 mg/l			
<u>Potassium Chlorate</u> : fish: LC50 <i>oncorhynchus mykiss</i> (rainbow trout) 1750 mg/l - 96 hr, EC50 <i>daphnia magna</i> (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

Shipping Name	Hazard Class	ID Number	Packing Group	EX Number	Reportable Quantities	Net Explosive Quantity
Signal Devices, Hand	1.4G	UN0191	II	EX-2011021134	none	0.06 kg/unit

15. Regulatory Information

US Regulations	TSCA	CERCLA	CWA	CAA	SARA 313	SARA 302	Acute	Chronic	Fire	Reactivity	Pressure
1-Amino-Anthraquinone	yes	no	no	no	no	no	no	no	no	no	no
Magnesium	8(b)	no	no	no	no	no	no	yes	yes	no	no
Strontium Nitrate	yes	no	no	no	no	no	yes	no	no	yes	no
Potassium Perchlorate	yes	no	no	no	no	no	yes	yes	no	yes	no
Potassium Chlorate	yes	no	no	no	no	no	yes	yes	no	yes	no
Lactose	yes	no	no	no	no	no	no	no	no	no	no
Polyvinyl Chloride	yes	no	no	no	no	no	yes	no	no	no	no

US States	Prop 65	NJ	PA	Canada	WHMIS	DSL	Europe	wgk
1-Amino-Anthraquinone	no	no	no		D2B - toxic	yes		1
Magnesium	no	1136	yes		No results	yes		nwg
Strontium Nitrate	no	1743	no		No results	yes		2
Potassium Perchlorate	no	1577	no		C - Oxidizing material	yes		1
Potassium Chlorate	no	1560	no		No results	yes		2
Lactose	no	no	no		No results	yes		not listed
Polyvinyl Chloride	no	3622	no		No results	yes		not listed



Div: EVANinc

Explosives
EXPERTS
Explosifs

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Tel.: (450) 566-0655
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16. Other Information

Revision Information: May, 2014

Risk and Safety Phrases:

- R10 Flammable
- R38, Irritating 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.
- S17 Keep away from combustible material
- S16 Keep away from sources of ignition
- S2 Keep out of the reach of children.

- S8 Keep container dry.
- S13 Keep away from food, drink and animal foodstuffs.
- S24 Avoid contact with skin.
- S25 Avoid contact with eyes.
- S29 Do not empty into drains.
- S41, In case of fire and / or explosion do not breathe fumes
- S43 In case of fire use water
- 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
- NTP: National Toxicology Program
- IARC: International Agency for Research on Cancer

- TSCA: toxic substance control act - US
- CERCLA: comprehensive environmental response, compensation and liability act - US
- CWA: clean water act - US
- CAA: clean air act - US
- SARA: superfund amendments and reauthorization act - US
- PROP 65: California's Proposition 65 list
- WHMIS: workplace hazardous materials information system - Canada
- DSL: Domestic Substances List - Canada
- WGK: water hazard classes - Germany

Legal Statement:

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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



Danger

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

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

NFPA Rating

Flammability	2
Health	2
Reactivity	1

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!

HMS Rating

Flammability	1
Health	3
Physical Hazard	1

3. Composition / Information on Ingredients

Component	CAS #	EINCS #	%age
Strontium Nitrate	10042-76-9	233-131-9	<50%
Magnesium	7439-95-4	231-104-6	<50%
Strontium Peroxide	1314-18-7	215-224-6	<50%
Polyvinyl chloride	9002-86-2	none	<20%
Black Powder	mixture	mixture	<20%
Dextrin	9004-53-9	232-675-4	<20%
Primer	n/a	n/a	n/a

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

Extinguishing Media	Water Deluge	Unsuitable Extinguishing Media	Foam and dry chemical extinguishers and suffocation are ineffective
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	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** >180F

6. Accidental Release Measures

Personal Precautions	Environmental 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.	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	OSHA PEL	ACGIH TLV
Strontium Nitrate	Not Established	Not Established
Magnesium	unknown	unknown
Strontium Peroxide	nuisance dust 15 mg/m ³ .	nuisance dust 15 mg/m ³ .
Polyvinyl chloride	5mg/ml for the respirable portion and 15mg/ml ¹ for total dust.	5 and 10mg/ml, respectively
Black Powder	Not established	Not established
Dextrin	15 mg/m ³ total dust	10 mg/m ³

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.

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 t 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	Solubility: Slight
Boiling Point: Not applicable	Freezing Point: Not applicable	Evaporation Rate: Not applicable
Vapor Pressure: Not applicable	Specific Gravity: Not applicable	Vapor Density: Not applicable

10. Stability and Reactivity

Chemical Stability Stable

Possibility of Hazardous Reactions Hazardous polymerization will not occur.

<p>Conditions to Avoid</p> <p>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</p>	<p>Incompatible Materials</p> <p>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.</p>	<p>Hazardous Decomposition Products</p> <p>Carbon monoxide, Nitrous oxides, Carbon dioxide. Magnesium hydroxides and oxides</p>
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11. Toxicology Information

Toxicology	Oral LD50	skin LD50	LC50
Strontium Nitrate	Rat 2750 mg/kg	Not Established	Not Established
Magnesium	Not Established	Not Established	Not Established
Strontium Peroxide	Not Established	Not Established	Not Established
Polyvinyl chloride	Not Established	Not Established	Not Established
Black Powder	Not Established	Not Established	Not Established
Dextrin	Not Established	Not Established	Not Established



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.

Carcinogenicity No information found

Genetic Effects No information found

Developmental Effects No information found

Target Organ Effects Eye, skin, and lungs

Repeated Dose Effects

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

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

Reproductive Effects No information found

Neurological Effects No information found

Sensitization No information found

12. Ecological Information

Aquatic Toxicity	Persistence / Degradability	Bioaccumulation / Accumulation	Mobility in Environmental Media
Strontium Nitrate: <i>Acute toxicity - Fishes, Carassius auratus, LC100, 9,615 mg/l; Chronic toxicity - Fishes, Gasterosteus aculeatus, LC100, 2,912 mg/l</i>	No information found	No information found	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

	shipping name	hazard class	ID Number	packing group	EX Number	Reportable Quantities
United States & International	Flares, aerial	1.4G	UN0403	II	XLT & SAR -EX2002110107 TWIN -EX2002110148	none

15. Regulatory Information

US Regulations	TSCA	CERCLA	CWA	CAA	SARA 313	SARA 302	Acute	Chronic	Fire	Reactivity	Pressure
Strontium Nitrate	yes	no	no	no	no	no	no	no	no	no	no
Magnesium	yes	no	no	no	no	no	no	no	no	no	no
Strontium Peroxide	yes	no	no	no	no	no	not stated	not stated	not stated	not stated	not stated
Polyvinyl chloride	yes	no	no	no	no	no	no	no	no	no	no
Black Powder	mixture	mixture	mixture	mixture	mixture	mixture	mixture	mixture	mixture	mixture	mixture
Dextrin	yes	no	no	no	no	no	no	no	no	no	no

US States	Prop 65	NJ	PA	Canada	WHMIS	DSL	Europe	wgk
Strontium Nitrate	no	1743	no		No results	yes		2
Magnesium	no	1136	yes		No results	yes		nwg
Strontium Peroxide	no	1745	no		No results	yes		not listed
Polyvinyl chloride	no	3622	no		No results	yes		not listed
Black Powder	mixture	mixture	mixture		mixture	mixture		mixture
Dextrin	no	no	no		No results	yes		1

16. Other Information

Revision Information: March 2015

Risk and Safety Phrases:

R10 Flammable
R38 Irritating to skin (contents)
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.
S17 Keep away from combustible material
S16 Keep away from sources of ignition
S2 Keep out of the reach of children.

S8 Keep container dry.
S13 Keep away from food, drink and animal foodstuffs.
S24 Avoid contact with skin.
S25 Avoid contact with eyes.
S29 Do not empty into drains.
S41, In case of fire and / or explosion do not breathe fumes
S43 In case of fire use water
S51 Use only in well ventilated areas
S39 Wear eye / face protection.

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

TSCA: toxic substance control act - US
CERCLA: comprehensive environmental response, compensation and liability act - US
CWA: clean water act - US
CAA: clean air act - US
SARA: superfund amendments and reauthorization act - US
PROP 65: California's Proposition 65 list
WHMIS: workplace hazardous materials information system - Canada
DSL: Domestic Substances List - 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)

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



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
Respiratory or Skin Sensitization	Contents - Category 1
STOT - Repeated Exposure	Contents - Category 2

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

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

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	Environmental 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.	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

Exposure Limits	OSHA PEL	ACGIH TLV
Strontium Nitrate	Not established	Not established
Sulfur	Not established	Not established
Potassium Perchlorate	Nuisance dust 15 mg/m ³	Nuisance dust 15 mg/m ³
Polyethylene	not stated	not stated
Potassium Chlorate	Not established	Not established
Shellac / Synosol	Not Established	Not Established

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

Solubility: Not available

Boiling Point Not applicable

Freezing Point: Not applicable

Evaporation Rate: Not applicable

Vapor Pressure: Not applicable

Specific Gravity 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

Toxicology	Oral LD50	skin LD50	LC50
Strontium Nitrate	Rat: 2750 mg/kg	not stated	not stated
Sulfur	Rat:>5050 mg/kg	Rat:>2020 mg/kg	Rat:>5.49 mg/L air concentration
Potassium Perchlorate	Rat: 2100 mg/kg	not stated	not stated
Polyethylene	not stated	not stated	not stated
Potassium Chlorate	Rat 1870 mg/kg	No information found	No information found
Shellac / Synosol	not stated	not stated	not stated

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.

Repeated Dose Effects

Prolonged or repeated skin contact with contents may cause dermatitis.

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.



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	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	No information found
Target Organ Effects	Eye, skin, liver, kidney, and thyroid.		

12. Ecological Information

Aquatic Toxicity	Persistence / Degradability	Bioaccumulation / Accumulation	Mobility in Environmental Media
Potassium Chlorate: <i>fish: LC50 oncorhynchus mykiss (rainbow trout) 1750 mg/l – 96 hr, EC50 daphnia magna (water flea) 1093 mg/l 24 hr</i> Strontium Nitrate: <i>Acute toxicity - Fishes, Carassius auratus, LC100, 9,615 mg/l; Chronic toxicity - Fishes, Gasterosteus aculeatus, LC100, 2,912 mg/l</i> Sulfur: <i>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) - > 5,000 mg/l - 48 h</i>	No information found	No information found	No information found

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

	shipping name	hazard class	ID Number	packing group	EX Number	Reportable Quantities
United States	Signal Devices, Hand	1.4S	UN0373	II	EX-8604106	none
International	Signal Devices, Hand	1.4S	UN0373	II	EX-8604106	

15. Regulatory Information

US Regulations	TSCA	CERCLA	CWA	CAA	SARA 313	SARA 302	Acute	Chronic	Fire	Reactivity	Pressure
Strontium Nitrate	yes	no	no	no	no	no	no	no	no	no	no
Sulfur	yes	no	no	no	no	no	no	yes	no	no	no
Potassium Perchlorate	yes	no	no	no	no	no	no	no	no	no	no
Polyethylene	yes	no	no	no	no	no	no	no	no	no	no
Potassium Chlorate	yes	no	no	no	no	no	yes	no	no	yes	no
Shellac / Synosol	no	no	no	no	no	no	yes	yes	yes	no	no

US States	Prop 65	NJ	PA	Canada	whmis	dsl	Europe	wgk
Strontium Nitrate	no	1743	no		No results	yes		2
Sulfur	no	1757	yes		No results	yes		1 / nwg
Potassium Perchlorate	no	1577	no		C - Oxidizing material	yes		1
Polyethylene	no	no	no		Does not meet criteria	yes		not listed
Potassium Chlorate	no	1560	no		No results	yes		2
Shellac / Synosol	no	no	no		No results	yes		not listed

16. Other Information

Revision Information: December, 2011

Risk and Safety Phrases:

R10 Flammable
R38, Irritating 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.
S17 Keep away from combustible material
S16 Keep away from sources of ignition
S2 Keep out of the reach of children.

S8 Keep container dry.
S13 Keep away from food, drink and animal foodstuffs.
S24 Avoid contact with skin.
S25 Avoid contact with eyes.
S29 Do not empty into drains.
S41, In case of fire and / or explosion do not breathe fumes
S43 In case of fire use water
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
NTP: National Toxicology Program
IARC: International Agency for Research on Cancer

TSCA: toxic substance control act - US
CERCLA: comprehensive environmental response, compensation and liability act – US
CWA: clean water act - US
CAA: clean air act - US
SARA: superfund amendments and reauthorization act – US
PROP 65: California's Proposition 65 list
WHMIS: workplace hazardous materials information system - Canada
DSL: Domestic Substances List - Canada
WGK: water hazard classes - Germany

Legal Statement:

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