

## SIGNAL CARTRIDGE, CAL. 4, SINGLE STAR WHITE

Drew Marine Signal and Safety Germany GmbH

Chemwatch: 66-6776

Version No: 3.1.1.1

Safety Data Sheet (Conforms to Regulation (EU) No 2015/830)

Issue Date: 17/02/2017

Print Date: 18/02/2017

S.REACH.GBR.EN

### SECTION 1 IDENTIFICATION OF THE SUBSTANCE / MIXTURE AND OF THE COMPANY / UNDERTAKING

#### 1.1. Product Identifier

<b>Product name</b>	SIGNAL CARTRIDGE, CAL. 4, SINGLE STAR WHITE
<b>Synonyms</b>	Art. 9182100
<b>Proper shipping name</b>	CARTRIDGES, SIGNAL
<b>Other means of identification</b>	Not Available

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

<b>Relevant identified uses</b>	Use according to manufacturer's directions. Sea distress signal. Coloured signal cartridge for use with calibre 4 (26.5 mm) Signal Pistol. The white colour is used for collision warning.
<b>Uses advised against</b>	Not Applicable

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

<b>Registered company name</b>	Drew Marine Signal and Safety Germany GmbH
<b>Address</b>	Vieländer Weg 147 Bremerhaven 27574 Germany
<b>Telephone</b>	+49 471 3930
<b>Fax</b>	+49 471 3932 10
<b>Website</b>	www.signalandsafety.com
<b>Email</b>	info@signalandsafety.com

#### 1.4. Emergency telephone number


<b>Association / Organisation</b>	Consultant Lutz Harder GmbH
<b>Emergency telephone numbers</b>	+49 178 433 7434
<b>Other emergency telephone numbers</b>	CHEMWATCH: From within the US and CANADA: 1 877 715 9305 OR call +613 9573 3112. From outside the US and Canada: +800 2436 2255 (+800 CHEMCALL) or +61 3 9573 3112

### SECTION 2 HAZARDS IDENTIFICATION

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

<b>Classification according to regulation (EC) No 1272/2008 [CLP] <sup>[1]</sup></b>	H204 - Explosive Division 1.4
<b>Legend:</b>	1. Classified by Chemwatch; 2. Classification drawn from EC Directive 67/548/EEC - Annex I ; 3. Classification drawn from EC Directive 1272/2008 - Annex VI

#### 2.2. Label elements

<b>CLP label elements</b>	
<b>SIGNAL WORD</b>	<b>WARNING</b>

#### Hazard statement(s)

<b>H204</b>	Fire or projection hazard.
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#### Precautionary statement(s) Prevention

<b>P210</b>	Keep away from heat/sparks/open flames/hot surfaces. No smoking.
<b>P250</b>	Do not subject to grinding/shock/sources of friction.
<b>P280</b>	Wear protective gloves/protective clothing/eye protection/face protection.
<b>P240</b>	Ground/bond container and receiving equipment.

**Precautionary statement(s) Response**

<b>P370+P380</b>	In case of fire: Evacuate area.
<b>P372</b>	Explosion risk in case of fire.
<b>P374</b>	Fight fire with normal precautions from a reasonable distance.
<b>P373</b>	DO NOT fight fire when fire reaches explosives.

**Precautionary statement(s) Storage**

<b>P401</b>	Store according to local regulations for explosives.
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**Precautionary statement(s) Disposal**

<b>P501</b>	Dispose of contents/container in accordance with local regulations.
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REACH - Art.57-59: The mixture does not contain Substances of Very High Concern (SVHC) at the SDS print date.

**SECTION 3 COMPOSITION / INFORMATION ON INGREDIENTS****3.1.Substances**

See 'Composition on ingredients' in Section 3.2

**3.2.Mixtures**

1.CAS No 2.EC No 3.Index No 4.REACH No	%[weight]	Name	Classification according to regulation (EC) No 1272/2008 [CLP]
		hermetically sealed device contains;	
		polytechnic materials of;	
1.7439-95-4 2.231-104-6 3.012-001-00-3, 012-002-00-9 4.01-2119537203-49-XXXX, 01-2119940954-29-XXXX	30-60	<u>magnesium</u>	Emit Flammable Gases with Water Category 1, Pyrophoric Solid Category 1; H260, H250 <sup>[3]</sup>
1.10022-31-8 2.233-020-5 3.Not Available 4.01-2119986880-22-XXXX	30-60	<u>barium nitrate</u>	Oxidizing Solid Category 2, Acute Toxicity (Oral) Category 4, Acute Toxicity (Inhalation) Category 4, Eye Irritation Category 2; H272, H302, H332, H319 <sup>[1]</sup>
1.7757-79-1 2.231-818-8 3.Not Available 4.01-2119488224-35-XXXX	10-30	<u>potassium nitrate</u>	Oxidizing Solid Category 3, Acute Toxicity (Oral) Category 4, Eye Irritation Category 2; H272, H302, H319 <sup>[1]</sup>
1.7704-34-9. 2.231-722-6 3.016-094-00-1 4.01-2119487295-27-XXXX, 01-2119520616-43-XXXX, 01-2119520710-53-XXXX, 01-2119502516-47-XXXX, 01-2119422098-42-XXXX	1-5	<u>sulfur</u>	Flammable Solid Category 2, Skin Corrosion/Irritation Category 2, Eye Irritation Category 2; H228, H315, H319 <sup>[1]</sup>
1.10042-76-9 2.233-131-9 3.Not Available 4.01-2119615605-42-XXXX	1-5	<u>strontium nitrate</u>	Oxidizing Solid Category 3, Skin Corrosion/Irritation Category 2, Eye Irritation Category 2, Specific target organ toxicity - single exposure Category 3 (respiratory tract irritation); H272, H315, H319, H335 <sup>[1]</sup>
1.7429-90-5 2.231-072-3 3.013-001-00-6, 013-002-00-1 4.01-2119529243-45-XXXX	<1	<u>aluminium</u>	Emit Flammable Gases with Water Category 3, Pyrophoric Solid Category 1; H261, H250 <sup>[3]</sup>

**Legend:** 1. Classified by Chemwatch; 2. Classification drawn from EC Directive 67/548/EEC - Annex I ; 3. Classification drawn from EC Directive 1272/2008 - Annex VI 4. Classification drawn from C&L

**SECTION 4 FIRST AID MEASURES****4.1. Description of first aid measures**

<b>General</b>	<p>If skin contact occurs:</p> <ul style="list-style-type: none"> <li>▶ Immediately remove all contaminated clothing, including footwear.</li> <li>▶ Flush skin and hair with running water (and soap if available).</li> <li>▶ Seek medical attention in event of irritation.</li> </ul> <p>If this product comes in contact with eyes:</p> <ul style="list-style-type: none"> <li>▶ Wash out immediately with water.</li> <li>▶ If irritation continues, seek medical attention.</li> <li>▶ Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.</li> <li>▶ If fumes or combustion products are inhaled remove from contaminated area.</li> <li>▶ Lay patient down. Keep warm and rested.</li> </ul>
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	<ul style="list-style-type: none"> <li>▶ Prostheses such as false teeth, which may block airway, should be removed, where possible, prior to initiating first aid procedures.</li> <li>▶ Apply artificial respiration if not breathing, preferably with a demand valve resuscitator, bag-valve mask device, or pocket mask as trained. Perform CPR if necessary.</li> <li>▶ Transport to hospital, or doctor, without delay.</li> </ul> <p>Not considered a normal route of entry.</p> <ul style="list-style-type: none"> <li>▶ <b>If swallowed do NOT induce vomiting.</b></li> <li>▶ If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration.</li> <li>▶ Observe the patient carefully.</li> <li>▶ Never give liquid to a person showing signs of being sleepy or with reduced awareness; i.e. becoming unconscious.</li> <li>▶ Give water to rinse out mouth, then provide liquid slowly and as much as casualty can comfortably drink.</li> <li>▶ Seek medical advice.</li> </ul>
<b>Eye Contact</b>	<p>If this product comes in contact with eyes:</p> <ul style="list-style-type: none"> <li>▶ Wash out immediately with water.</li> <li>▶ If irritation continues, seek medical attention.</li> <li>▶ Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.</li> </ul>
<b>Skin Contact</b>	<p>If skin contact occurs:</p> <ul style="list-style-type: none"> <li>▶ Immediately remove all contaminated clothing, including footwear.</li> <li>▶ Flush skin and hair with running water (and soap if available).</li> <li>▶ Seek medical attention in event of irritation.</li> </ul>
<b>Inhalation</b>	<ul style="list-style-type: none"> <li>▶ If fumes or combustion products are inhaled remove from contaminated area.</li> <li>▶ Lay patient down. Keep warm and rested.</li> <li>▶ Prostheses such as false teeth, which may block airway, should be removed, where possible, prior to initiating first aid procedures.</li> <li>▶ Apply artificial respiration if not breathing, preferably with a demand valve resuscitator, bag-valve mask device, or pocket mask as trained. Perform CPR if necessary.</li> <li>▶ Transport to hospital, or doctor, without delay.</li> </ul>
<b>Ingestion</b>	<p>Not considered a normal route of entry.</p> <ul style="list-style-type: none"> <li>▶ <b>If swallowed do NOT induce vomiting.</b></li> <li>▶ If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration.</li> <li>▶ Observe the patient carefully.</li> <li>▶ Never give liquid to a person showing signs of being sleepy or with reduced awareness; i.e. becoming unconscious.</li> <li>▶ Give water to rinse out mouth, then provide liquid slowly and as much as casualty can comfortably drink.</li> <li>▶ Seek medical advice.</li> </ul>

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

See Section 11

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

Treat symptomatically.

## SECTION 5 FIREFIGHTING MEASURES

### 5.1. Extinguishing media

**DANGER:** Deliver media remotely.

- ▶ For minor fires: Flooding quantities only.
  - ▶ For large fires: **Do not attempt to extinguish.**
- [Apply by mechanical means only.]

### 5.2. Special hazards arising from the substrate or mixture

<b>Fire Incompatibility</b>	Avoid contact with other chemicals.
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### 5.3. Advice for firefighters

<b>Fire Fighting</b>	<p><b>WARNING:</b> EXPLOSIVE MATERIALS / ARTICLES PRESENT!</p> <ul style="list-style-type: none"> <li>▶ Evacuate all personnel and move upwind.</li> <li>▶ Prevent re-entry.</li> <li>▶ Alert Fire Brigade and tell them location and nature of hazard.</li> <li>▶ May detonate and burning material may be propelled from fire.</li> <li>▶ Wear full-body protective clothing with breathing apparatus.</li> <li>▶ Prevent, by any means available, spillage and fire effluent from entering drains and water courses.</li> <li>▶ Fight fire from safe distances and from protected locations.</li> <li>▶ Use flooding quantities of water.</li> <li>▶ <b>DO NOT</b> approach containers or packages suspected to be hot.</li> <li>▶ Cool any exposed containers not involved in fire from a protected location.</li> <li>▶ Equipment should be thoroughly decontaminated after use.</li> </ul> <p>Slight hazard when exposed to heat, flame and oxidisers.</p>
<b>Fire/Explosion Hazard</b>	<p>Division 1.4 Substances, mixtures and articles which present no significant hazard: substances, mixtures and articles which present only a small hazard in the event of ignition or initiation. The effects are largely confined to the package and no projection of fragments of appreciable size or range is to be expected. An external fire shall not cause virtually instantaneous explosion of almost the entire contents of the package.</p> <p>Compatibility Group G explosives are pyrotechnic substances, or article containing a pyrotechnic substances, or article containing both an explosive substance and an illuminating, incendiary, tear- or smoke-producing substance (other than a water-activated article or one containing white phosphorus, phosphides, a pyrophoric substance, a flammable liquid or gel, or hypergolic liquids).</p> <p>Combustible. Will burn if ignited.</p> <p>Combustion products include:</p> <ul style="list-style-type: none"> <li>, carbon monoxide (CO)</li> <li>, carbon dioxide (CO2)</li> <li>, other pyrolysis products typical of burning organic material.</li> </ul>

## SECTION 6 ACCIDENTAL RELEASE MEASURES

**6.1. Personal precautions, protective equipment and emergency procedures**

See section 8

**6.2. Environmental precautions**

See section 12

**6.3. Methods and material for containment and cleaning up**

<b>Minor Spills</b>	<p><b>WARNING: EXPLOSIVE.</b> BLAST and/or PROJECTION and/or FIRE HAZARD</p> <ul style="list-style-type: none"> <li>▶ Clean up all spills immediately.</li> <li>▶ Avoid inhalation of the material and avoid contact with eyes and skin.</li> <li>▶ Wear impervious gloves and safety glasses.</li> <li>▶ Remove all ignition sources.</li> <li>▶ Use spark-free tools when handling.</li> <li>▶ Sweep into non-sparking containers or barrels and moisten with water.</li> <li>▶ Place spilled material in clean, sealable, labelled container for disposal.</li> <li>▶ Flush area with large amounts of water.</li> </ul>
<b>Major Spills</b>	<p><b>WARNING: EXPLOSIVE.</b></p> <ul style="list-style-type: none"> <li>▶ Clear area of personnel and move upwind.</li> <li>▶ Alert Fire Brigade and tell them location and nature of hazard.</li> <li>▶ May be violently or explosively reactive.</li> <li>▶ Wear full body protective clothing with breathing apparatus.</li> <li>▶ Consider evacuation (or protect in place).</li> <li>▶ In case of transport accident notify Police, Emergency Authority, Competent Explosives Authority or Manufacturer.</li> <li>▶ No smoking, naked lights, heat or ignition sources.</li> <li>▶ Increase ventilation.</li> <li>▶ Use extreme caution to prevent physical shock.</li> <li>▶ Use only spark-free shovels and explosion-proof equipment.</li> <li>▶ Collect recoverable material and segregate from spilled material.</li> <li>▶ Wash spill area with large quantities of water.</li> </ul>

**6.4. Reference to other sections**

Personal Protective Equipment advice is contained in Section 8 of the SDS.

**SECTION 7 HANDLING AND STORAGE****7.1. Precautions for safe handling**

<b>Safe handling</b>	<ul style="list-style-type: none"> <li>▶ Handle gently. Use good occupational work practice.</li> <li>▶ Observe manufacturer's storage and handling recommendations contained within this SDS.</li> <li>▶ Avoid all personal contact, including inhalation.</li> <li>▶ Avoid smoking, naked lights, heat or ignition sources.</li> <li>▶ Explosives must not be struck with metal implements.</li> <li>▶ Avoid mechanical and thermal shock and friction.</li> <li>▶ Use in a well ventilated area.</li> <li>▶ Avoid contact with incompatible materials.</li> <li>▶ <b>When handling DO NOT eat, drink or smoke.</b></li> <li>▶ Avoid physical damage to containers.</li> <li>▶ Always wash hands with soap and water after handling.</li> <li>▶ Work clothes should be laundered separately.</li> </ul>
<b>Fire and explosion protection</b>	See section 5
<b>Other information</b>	<ul style="list-style-type: none"> <li>▶ Store cases in a well ventilated magazine licensed for the appropriate Class, Division and Compatibility Group.</li> <li>▶ Rotate stock to prevent ageing. Use on FIFO (first in-first out) basis.</li> <li>▶ Observe manufacturer's storage and handling recommendations contained within this SDS.</li> <li>▶ Store in a cool place in original containers.</li> <li>▶ Keep containers securely sealed.</li> <li>▶ No smoking, naked lights, heat or ignition sources.</li> <li>▶ Store in an isolated area away from other materials.</li> <li>▶ Keep storage area free of debris, waste and combustibles.</li> <li>▶ Protect containers against physical damage.</li> <li>▶ Check regularly for spills and leaks</li> </ul> <p><b>NOTE:</b> If explosives need to be destroyed contact the Competent Authority.</p> <ul style="list-style-type: none"> <li>▶ Store away from incompatible materials.</li> </ul> <p>Keep out of reach of children.</p>

**7.2. Conditions for safe storage, including any incompatibilities**

<b>Suitable container</b>	<ul style="list-style-type: none"> <li>▶ All packaging for Class 1 Goods shall be in accordance with the requirements of the relevant Code for the transport of Dangerous Goods.</li> <li>▶ Class 1 is unique in that the type of packaging used frequently has a very decisive effect on the hazard and therefore on the assignment to a particular division</li> </ul>
<b>Storage incompatibility</b>	<ul style="list-style-type: none"> <li>▶ Avoid contact with other explosives, pyrotechnics, solvents, adhesives, paints, cleaners and unauthorized metals, plastics, packing equipment and materials.</li> <li>▶ Avoid contamination with acids, alkalis, reducing agents, amines and phosphorus.</li> <li>▶ Explosion hazard may follow contact with incompatible materials</li> </ul>

**7.3. Specific end use(s)**

See section 1.2

**SECTION 8 EXPOSURE CONTROLS / PERSONAL PROTECTION**

## 8.1. Control parameters

### DERIVED NO EFFECT LEVEL (DNEL)

Not Available

### PREDICTED NO EFFECT LEVEL (PNEC)

Not Available

### OCCUPATIONAL EXPOSURE LIMITS (OEL)

#### INGREDIENT DATA


Source	Ingredient	Material name	TWA	STEL	Peak	Notes
UK Workplace Exposure Limits (WELs)	barium nitrate	Barium compounds, soluble (as Ba)	0.5 mg/m3	Not Available	Not Available	Not Available
European Union (EU) Commission Directive 2006/15/EC establishing a second list of indicative occupational exposure limit values (IOELVs)	barium nitrate	Barium (soluble compounds as Ba)	0,5 mg/m3	Not Available	Not Available	Not Available
EU Consolidated List of Indicative Occupational Exposure Limit Values (IOELVs)	barium nitrate	Barium (soluble compounds as Ba)	0.5 mg/m3	Not Available	Not Available	Not Available
UK Workplace Exposure Limits (WELs)	aluminium	Aluminium metal inhalable dust / Aluminium metal respirable dust	10 mg/m3 / 4 mg/m3	Not Available	Not Available	Not Available

#### EMERGENCY LIMITS

Ingredient	Material name	TEEL-1	TEEL-2	TEEL-3
magnesium	Magnesium	18 mg/m3	200 mg/m3	1,200 mg/m3
barium nitrate	Barium nitrate	2.9 mg/m3	350 mg/m3	2,100 mg/m3
potassium nitrate	Potassium nitrate	9 mg/m3	100 mg/m3	600 mg/m3
sulfur	Sulfur	30 mg/m3	330 mg/m3	2,000 mg/m3
strontium nitrate	Strontium nitrate	5.7 mg/m3	62 mg/m3	370 mg/m3

Ingredient	Original IDLH	Revised IDLH
magnesium	Not Available	Not Available
barium nitrate	1,100 mg/m3	50 mg/m3
potassium nitrate	Not Available	Not Available
sulfur	Not Available	Not Available
strontium nitrate	Not Available	Not Available
aluminium	Not Available	Not Available

## 8.2. Exposure controls

<b>8.2.1. Appropriate engineering controls</b>	<p>Engineering controls for explosive articles are designed to reduce or eliminate fragmentation and/or blast effects either by suppression of the source of detonation or by protection at the exposed location, or both. Barricades, shields, contained detonation chambers, and "zero quantity-distance (Q-D)" magazines are examples of engineering controls.</p> <p>Engineering controls are designed and tested in a rigorous fashion. The construction of the engineering control must be carefully duplicated in field applications to assure it will function properly.</p> <p>It is thus imperative that engineering controls be built exactly in accordance with the design package, and that they be used only for the articles (e.g.munitions) for which they are authorised.</p>
<b>8.2.2. Personal protection</b>	
<b>Eye and face protection</b>	<ul style="list-style-type: none"> <li>▶ Safety glasses with side shields</li> <li>▶ Chemical goggles</li> </ul>
<b>Skin protection</b>	See Hand protection below
<b>Hands/feet protection</b>	<ul style="list-style-type: none"> <li>▶ Wear chemical protective gloves, e.g. PVC.</li> <li>▶ Wear safety footwear or safety gumboots, e.g. Rubber</li> </ul>
<b>Body protection</b>	See Other protection below
<b>Other protection</b>	<ul style="list-style-type: none"> <li>▶ Fire resistant/ heat resistant gloves where practical, otherwise</li> <li>▶ Heavy-duty chemically resistant gloves capable of providing short-term protection against spontaneous ignition.</li> <li>▶ Safety footwear</li> </ul> <p>Hard hat  Ear Protection.</p>
<b>Thermal hazards</b>	Not Available

### Respiratory protection

Respiratory protection not normally required due to the physical form of the product.

**8.2.3. Environmental exposure controls**

See section 12

**SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES****9.1. Information on basic physical and chemical properties**

<b>Appearance</b>	Cartridge with white colour plastic outer casing pressed with black/grey polytechnical ingredients.		
<b>Physical state</b>	Manufactured	<b>Relative density (Water = 1)</b>	Not Applicable
<b>Odour</b>	Not Available	<b>Partition coefficient n-octanol / water</b>	Not Available
<b>Odour threshold</b>	Not Available	<b>Auto-ignition temperature (°C)</b>	>160
<b>pH (as supplied)</b>	Not Applicable	<b>Decomposition temperature</b>	Not Available
<b>Melting point / freezing point (°C)</b>	Not Applicable	<b>Viscosity (cSt)</b>	Not Applicable
<b>Initial boiling point and boiling range (°C)</b>	Not Applicable	<b>Molecular weight (g/mol)</b>	Not Applicable
<b>Flash point (°C)</b>	Not Available	<b>Taste</b>	Not Available
<b>Evaporation rate</b>	Not Applicable	<b>Explosive properties</b>	Not Available
<b>Flammability</b>	Not Available	<b>Oxidising properties</b>	Not Available
<b>Upper Explosive Limit (%)</b>	Not Available	<b>Surface Tension (dyn/cm or mN/m)</b>	Not Applicable
<b>Lower Explosive Limit (%)</b>	Not Available	<b>Volatile Component (%vol)</b>	Not Applicable
<b>Vapour pressure (kPa)</b>	Not Applicable	<b>Gas group</b>	Not Available
<b>Solubility in water (g/L)</b>	Immiscible	<b>pH as a solution (1%)</b>	Not Applicable
<b>Vapour density (Air = 1)</b>	Not Applicable	<b>VOC g/L</b>	Not Available

**9.2. Other information**

Not Available

**SECTION 10 STABILITY AND REACTIVITY**

<b>10.1. Reactivity</b>	See section 7.2
<b>10.2. Chemical stability</b>	<ul style="list-style-type: none"> <li>▶ Presence of shock and friction</li> <li>▶ Presence of heat source and ignition source</li> <li>▶ Product is considered stable under normal handling conditions.</li> <li>▶ Stable under normal storage conditions.</li> <li>▶ Hazardous polymerization will not occur.</li> </ul> Avoid contact with other chemicals.
<b>10.3. Possibility of hazardous reactions</b>	See section 7.2
<b>10.4. Conditions to avoid</b>	See section 7.2
<b>10.5. Incompatible materials</b>	See section 7.2
<b>10.6. Hazardous decomposition products</b>	See section 5.3

**SECTION 11 TOXICOLOGICAL INFORMATION****11.1. Information on toxicological effects**

<b>Inhaled</b>	Not normally a hazard due to physical form of product. Inhalation of vapour is more likely at higher than normal temperatures. The vapour is discomforting	
<b>Ingestion</b>	Not normally a hazard due to physical form of product.	
<b>Skin Contact</b>	Not normally a hazard due to physical form of product. The vapour is discomforting	
<b>Eye</b>	Not normally a hazard due to physical form of product. The vapour is discomforting	
<b>Chronic</b>	<ul style="list-style-type: none"> <li>▶ Generally not applicable.</li> </ul>  Principal hazards are related to the explosive/ decomposition by products of the cartridge, if inadvertently discharged or launched without adequate control and safety measures in place. Normal exposure to the article by all route is considered to be practically non-harmful. Over exposure to fumes from firing is harmful.	
<b>SIGNAL CARTRIDGE, CAL. 4, SINGLE STAR WHITE</b>	<b>TOXICITY</b>	<b>IRRITATION</b>
	Not Available	Not Available

## SIGNAL CARTRIDGE, CAL. 4, SINGLE STAR WHITE

magnesium	<b>TOXICITY</b>	<b>IRRITATION</b>
	Oral (rat) LD50: >2000 mg/kg <sup>[1]</sup>	Not Available
barium nitrate	<b>TOXICITY</b>	<b>IRRITATION</b>
	Oral (rat) LD50: 355 mg/kg <sup>[2]</sup>	Eye (rabbit): 100 mg/24h - moderate Skin (rabbit): 500 mg/24h - mild
potassium nitrate	<b>TOXICITY</b>	<b>IRRITATION</b>
	dermal (rat) LD50: >5000 mg/kg <sup>[1]</sup> Oral (rat) LD50: >2000 mg/kg <sup>[1]</sup>	Not Available
sulfur	<b>TOXICITY</b>	<b>IRRITATION</b>
	dermal (rat) LD50: >2000 mg/kg <sup>[1]</sup> Inhalation (rat) LC50: >5.43 mg/L/4hr <sup>[1]</sup> Oral (rat) LD50: >2000 mg/kg <sup>[1]</sup>	Eye (human): 8 ppm irritant
strontium nitrate	<b>TOXICITY</b>	<b>IRRITATION</b>
	Oral (rat) LD50: 1892 mg/kg <sup>[2]</sup>	Not Available
aluminium	<b>TOXICITY</b>	<b>IRRITATION</b>
	Oral (rat) LD50: >2000 mg/kg <sup>[1]</sup>	Not Available
<b>Legend:</b>	1. Value obtained from Europe ECHA Registered Substances - Acute toxicity 2.* Value obtained from manufacturer's SDS. Unless otherwise specified data extracted from RTECS - Register of Toxic Effect of chemical Substances	

<b>BARIUM NITRATE</b>	The material may produce moderate eye irritation leading to inflammation. Repeated or prolonged exposure to irritants may produce conjunctivitis. The material may cause skin irritation after prolonged or repeated exposure and may produce on contact skin redness, swelling, the production of vesicles, scaling and thickening of the skin.
<b>STRONTIUM NITRATE</b>	Asthma-like symptoms may continue for months or even years after exposure to the material ceases. This may be due to a non-allergenic condition known as reactive airways dysfunction syndrome (RADS) which can occur following exposure to high levels of highly irritating compound. Key criteria for the diagnosis of RADS include the absence of preceding respiratory disease, in a non-atopic individual, with abrupt onset of persistent asthma-like symptoms within minutes to hours of a documented exposure to the irritant. A reversible airflow pattern, on spirometry, with the presence of moderate to severe bronchial hyperreactivity on methacholine challenge testing and the lack of minimal lymphocytic inflammation, without eosinophilia, have also been included in the criteria for diagnosis of RADS. RADS (or asthma) following an irritating inhalation is an infrequent disorder with rates related to the concentration of and duration of exposure to the irritating substance. Industrial bronchitis, on the other hand, is a disorder that occurs as result of exposure due to high concentrations of irritating substance (often particulate in nature) and is completely reversible after exposure ceases. The disorder is characterised by dyspnea, cough and mucus production.
<b>ALUMINIUM</b>	No significant acute toxicological data identified in literature search.

<b>Acute Toxicity</b>	☒	<b>Carcinogenicity</b>	☒
<b>Skin Irritation/Corrosion</b>	☒	<b>Reproductivity</b>	☒
<b>Serious Eye Damage/Irritation</b>	☒	<b>STOT - Single Exposure</b>	☒
<b>Respiratory or Skin sensitisation</b>	☒	<b>STOT - Repeated Exposure</b>	☒
<b>Mutagenicity</b>	☒	<b>Aspiration Hazard</b>	☒

**Legend:** ✗ – Data available but does not fill the criteria for classification  
✔ – Data available to make classification  
☒ – Data Not Available to make classification

## SECTION 12 ECOLOGICAL INFORMATION

## 12.1. Toxicity

Ingredient	Endpoint	Test Duration (hr)	Species	Value	Source
magnesium	LC50	96	Fish	541mg/L	2
magnesium	EC50	72	Algae or other aquatic plants	>20mg/L	2
magnesium	EC50	72	Algae or other aquatic plants	>20mg/L	2
magnesium	NOEC	72	Algae or other aquatic plants	>25.5mg/L	2
barium nitrate	LC50	96	Fish	>3.5mg/L	2
barium nitrate	EC50	72	Algae or other aquatic plants	>1.92mg/L	2
barium nitrate	EC50	72	Algae or other aquatic plants	>34.31mg/L	2
barium nitrate	NOEC	72	Algae or other aquatic plants	>=1.92mg/L	2
potassium nitrate	LC50	96	Fish	22.5mg/L	4
potassium nitrate	EC50	96	Algae or other aquatic plants	1181.887mg/L	3

Continued...

## SIGNAL CARTRIDGE, CAL. 4, SINGLE STAR WHITE

potassium nitrate	EC50	384	Crustacea	49.116mg/L	3
sulfur	LC50	96	Fish	<14mg/L	4
sulfur	EC50	48	Crustacea	>5000mg/L	4
sulfur	EC50	96	Algae or other aquatic plants	623.589mg/L	3
sulfur	EC50	384	Crustacea	26.113mg/L	3
sulfur	NOEC	504	Crustacea	>0.0025mg/L	2
strontium nitrate	LC50	96	Fish	>40.3mg/L	2
strontium nitrate	EC50	72	Algae or other aquatic plants	>43.3mg/L	2
strontium nitrate	EC50	72	Algae or other aquatic plants	>43.3mg/L	2
strontium nitrate	NOEC	96	Fish	>=40.3mg/L	2
aluminium	LC50	96	Fish	0.078-0.108mg/L	2
aluminium	EC50	48	Crustacea	0.7364mg/L	2
aluminium	EC50	96	Algae or other aquatic plants	0.0054mg/L	2
aluminium	BCF	360	Algae or other aquatic plants	9mg/L	4
aluminium	EC50	120	Fish	0.000051mg/L	5
aluminium	NOEC	72	Algae or other aquatic plants	>=0.004mg/L	2

**Legend:**

Extracted from 1. IUCLID Toxicity Data 2. Europe ECHA Registered Substances - Ecotoxicological Information - Aquatic Toxicity 3. EPIWIN Suite V3.12 - Aquatic Toxicity Data (Estimated) 4. US EPA, Ecotox database - Aquatic Toxicity Data 5. ECETOC Aquatic Hazard Assessment Data 6. NITE (Japan) - Bioconcentration Data 7. METI (Japan) - Bioconcentration Data 8. Vendor Data

**12.2. Persistence and degradability**

Ingredient	Persistence: Water/Soil	Persistence: Air
potassium nitrate	LOW	LOW
sulfur	LOW	LOW

**12.3. Bioaccumulative potential**

Ingredient	Bioaccumulation
potassium nitrate	LOW (LogKOW = 0.209)
sulfur	LOW (LogKOW = 0.229)

**12.4. Mobility in soil**

Ingredient	Mobility
potassium nitrate	LOW (KOC = 14.3)
sulfur	LOW (KOC = 14.3)

**12.5. Results of PBT and vPvB assessment**

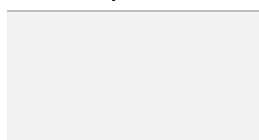
	P	B	T
Relevant available data	Not Available	Not Available	Not Available
PBT Criteria fulfilled?	Not Available	Not Available	Not Available

**12.6. Other adverse effects**

No data available

**SECTION 13 DISPOSAL CONSIDERATIONS****13.1. Waste treatment methods**

<b>Product / Packaging disposal</b>	<ul style="list-style-type: none"> <li>Explosives must not be thrown away, buried, discarded or placed with garbage.</li> <li>Explosives which are surplus, deteriorated or considered unsafe for transport, storage or use shall be destroyed and the statutory authorities shall be notified.</li> <li>This material may be disposed of by burning or detonation but the operation may only be performed under the control of a person trained in the safe destruction of explosives.</li> </ul> <p>Refer to local Waste Disposal Authority and supplier for suitable disposal procedure.</p>
<b>Waste treatment options</b>	Not Available
<b>Sewage disposal options</b>	Not Available

**SECTION 14 TRANSPORT INFORMATION****Labels Required**



Marine Pollutant	NO
HAZCHEM	1YE

**Land transport (ADR)**

14.1. UN number	0312
14.2. UN proper shipping name	CARTRIDGES, SIGNAL
14.3. Transport hazard class(es)	Class : 1.4G Subrisk : Not Applicable
14.4. Packing group	Not Applicable
14.5. Environmental hazard	Not Applicable
14.6. Special precautions for user	Hazard identification (Kemler) : Not Applicable Classification code : 1.4G Hazard Label : 1.4 Special provisions : Not Applicable Limited quantity : 0

**Air transport (ICAO-IATA / DGR)**

14.1. UN number	0312
14.2. UN proper shipping name	Cartridges, signal
14.3. Transport hazard class(es)	ICAO/IATA Class : 1.4G ICAO / IATA Subrisk : Not Applicable ERG Code : 1L
14.4. Packing group	Not Applicable
14.5. Environmental hazard	Not Applicable
14.6. Special precautions for user	Special provisions : Not Applicable Cargo Only Packing Instructions : 135 Cargo Only Maximum Qty / Pack : 75 kg Passenger and Cargo Packing Instructions : Forbidden Passenger and Cargo Maximum Qty / Pack : Forbidden Passenger and Cargo Limited Quantity Packing Instructions : Forbidden Passenger and Cargo Limited Maximum Qty / Pack : Forbidden

**Sea transport (IMDG-Code / GGVSee)**

14.1. UN number	0312
14.2. UN proper shipping name	CARTRIDGES, SIGNAL
14.3. Transport hazard class(es)	IMDG Class : 1.4G IMDG Subrisk : Not Applicable
14.4. Packing group	Not Applicable
14.5. Environmental hazard	Not Applicable
14.6. Special precautions for user	EMS Number : F-B, S-X Special provisions : Not Applicable Limited Quantities : 0

**Inland waterways transport (ADN)**

14.1. UN number	0312
14.2. UN proper shipping name	CARTRIDGES, SIGNAL
14.3. Transport hazard class(es)	1.4G : Not Applicable
14.4. Packing group	Not Applicable
14.5. Environmental hazard	Not Applicable
14.6. Special precautions for user	Classification code : 1.4G Special provisions : Not Applicable Limited quantity : 0

Equipment required	PP
Fire cones number	1

**Transport in bulk according to Annex II of MARPOL and the IBC code**

Not Applicable

**SECTION 15 REGULATORY INFORMATION****15.1. Safety, health and environmental regulations / legislation specific for the substance or mixture****MAGNESIUM(7439-95-4) IS FOUND ON THE FOLLOWING REGULATORY LISTS**

EU REACH Regulation (EC) No 1907/2006 - Annex XVII - Restrictions on the manufacture, placing on the market and use of certain dangerous substances, mixtures and articles

European Customs Inventory of Chemical Substances ECICS (English)

European Union - European Inventory of Existing Commercial Chemical Substances (EINECS) (English)

European Union (EU) Annex I to Directive 67/548/EEC on Classification and Labelling of Dangerous Substances - updated by ATP: 31

European Union (EU) Regulation (EC) No 1272/2008 on Classification, Labelling and Packaging of Substances and Mixtures - Annex VI

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs

**BARIUM NITRATE(10022-31-8) IS FOUND ON THE FOLLOWING REGULATORY LISTS**

EU Consolidated List of Indicative Occupational Exposure Limit Values (IOELVs)

European Customs Inventory of Chemical Substances ECICS (English)

European Union - European Inventory of Existing Commercial Chemical Substances (EINECS) (English)

European Union (EU) Commission Directive 2006/15/EC establishing a second list of indicative occupational exposure limit values (IOELVs) (Spanish)

UK Workplace Exposure Limits (WELs)

**POTASSIUM NITRATE(7757-79-1) IS FOUND ON THE FOLLOWING REGULATORY LISTS**

European Customs Inventory of Chemical Substances ECICS (English)

European Union - European Inventory of Existing Commercial Chemical Substances (EINECS) (English)

**SULFUR(7704-34-9.) IS FOUND ON THE FOLLOWING REGULATORY LISTS**

EU REACH Regulation (EC) No 1907/2006 - Annex XVII - Restrictions on the manufacture, placing on the market and use of certain dangerous substances, mixtures and articles

European Customs Inventory of Chemical Substances ECICS (English)

European Union - European Inventory of Existing Commercial Chemical Substances (EINECS) (English)

European Union (EU) Annex I to Directive 67/548/EEC on Classification and Labelling of Dangerous Substances - updated by ATP: 31

European Union (EU) Regulation (EC) No 1272/2008 on Classification, Labelling and Packaging of Substances and Mixtures - Annex VI

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs

**STRONTIUM NITRATE(10042-76-9) IS FOUND ON THE FOLLOWING REGULATORY LISTS**

European Customs Inventory of Chemical Substances ECICS (English)

European Union - European Inventory of Existing Commercial Chemical Substances (EINECS) (English)

**ALUMINIUM(7429-90-5) IS FOUND ON THE FOLLOWING REGULATORY LISTS**

EU REACH Regulation (EC) No 1907/2006 - Annex XVII - Restrictions on the manufacture, placing on the market and use of certain dangerous substances, mixtures and articles

European Customs Inventory of Chemical Substances ECICS (English)

European Trade Union Confederation (ETUC) Priority List for REACH Authorisation

European Union - European Inventory of Existing Commercial Chemical Substances (EINECS) (English)

European Union (EU) Annex I to Directive 67/548/EEC on Classification and Labelling of Dangerous Substances - updated by ATP: 31

European Union (EU) Regulation (EC) No 1272/2008 on Classification, Labelling and Packaging of Substances and Mixtures - Annex VI

UK Workplace Exposure Limits (WELs)

This safety data sheet is in compliance with the following EU legislation and its adaptations - as far as applicable - : 98/24/EC, 92/85/EC, 94/33/EC, 91/689/EEC, 1999/13/EC, Commission Regulation (EU) 2015/830, Regulation (EC) No 1272/2008 and their amendments

**15.2. Chemical safety assessment**

For further information please look at the Chemical Safety Assessment and Exposure Scenarios prepared by your Supply Chain if available.

National Inventory	Status
Australia - AICS	Y
Canada - DSL	Y
Canada - NDSL	N (strontium nitrate; sulfur; barium nitrate; magnesium; aluminium; potassium nitrate)
China - IECSC	Y
Europe - EINEC / ELINCS / NLP	Y
Japan - ENCS	N (sulfur; magnesium; aluminium)
Korea - KECI	Y
New Zealand - NZIoC	Y
Philippines - PICCS	Y
USA - TSCA	Y
<b>Legend:</b>	Y = All ingredients are on the inventory N = Not determined or one or more ingredients are not on the inventory and are not exempt from listing(see specific ingredients in brackets)

**SECTION 16 OTHER INFORMATION****Full text Risk and Hazard codes**

H228 Flammable solid.

Continued...

**SIGNAL CARTRIDGE, CAL. 4, SINGLE STAR WHITE**

<b>H250</b>	Catches fire spontaneously if exposed to air.
<b>H260</b>	In contact with water releases flammable gases which may ignite spontaneously.
<b>H261</b>	In contact with water releases flammable gases.
<b>H272</b>	May intensify fire; oxidiser.
<b>H302</b>	Harmful if swallowed.
<b>H315</b>	Causes skin irritation.
<b>H319</b>	Causes serious eye irritation.
<b>H332</b>	Harmful if inhaled.
<b>H335</b>	May cause respiratory irritation.

**Other information****Ingredients with multiple cas numbers**

Name	CAS No
barium nitrate	10022-31-8, 34053-87-7
strontium nitrate	10042-76-9, 13470-05-8
aluminium	7429-90-5, 91728-14-2

Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.

The SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios. Scale of use, frequency of use and current or available engineering controls must be considered.

For detailed advice on Personal Protective Equipment, refer to the following EU CEN Standards:

EN 166 Personal eye-protection

EN 340 Protective clothing

EN 374 Protective gloves against chemicals and micro-organisms

EN 13832 Footwear protecting against chemicals

EN 133 Respiratory protective devices