# SIGNAL CARTRIDGE, CAL. 4, SINGLE STAR WHITE

## Section 1 Identification

<table>
<thead>
<tr>
<th>Product Identifier</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Product name</td>
<td>SIGNAL CARTRIDGE, CAL. 4, SINGLE STAR WHITE</td>
</tr>
<tr>
<td>Synonyms</td>
<td>Art. 9182100</td>
</tr>
<tr>
<td>Proper shipping name</td>
<td>CARTRIDGES, SIGNAL</td>
</tr>
<tr>
<td>Other means of identification</td>
<td>Not Available</td>
</tr>
</tbody>
</table>

### Relevant use of the chemical and restrictions on use

- 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.

### Name, address, and telephone number of the chemical manufacturer, importer, or other responsible party

<table>
<thead>
<tr>
<th>Registered company name</th>
<th>WesCom Signal and Rescue Germany GmbH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Address</td>
<td>Vieländer Weg 147 Bremerhaven 27574 Germany</td>
</tr>
<tr>
<td>Telephone</td>
<td>+49 471 3930</td>
</tr>
<tr>
<td>Fax</td>
<td>+49 471 3932 10</td>
</tr>
<tr>
<td>Website</td>
<td><a href="http://www.wescomsignal.com">www.wescomsignal.com</a></td>
</tr>
<tr>
<td>Email</td>
<td><a href="mailto:info@wescomsignal.com">info@wescomsignal.com</a></td>
</tr>
</tbody>
</table>

### Emergency phone number

<table>
<thead>
<tr>
<th>Association / Organisation</th>
<th>Consultant Lutz Harder GmbH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emergency telephone numbers</td>
<td>+49 178 433 7434</td>
</tr>
<tr>
<td>Other emergency telephone numbers</td>
<td>Not Available</td>
</tr>
</tbody>
</table>

## Section 2 Hazard(s) Identification

### Classification of the substance or mixture

| Classification | Explosive Division 1.4, Eye Irritation Category 2B |

### Label elements

- **SIGNAL WORD**: WARNING
- **Hazard pictogram(s)**: [Image]

### Hazard statement(s)

- **H204**: Fire or projection hazard.
- **H320**: Causes eye irritation.

### Hazard(s) not otherwise specified

- Not Applicable

### Precautionary statement(s) Prevention

- **P210**: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
- **P234**: Keep only in original packaging.
- **P250**: Do not subject to grinding/shock/sources of friction.
- **P280**: Wear protective gloves/protective clothing/eye protection/face protection.

---

Continued...
SECTION 3 COMPOSITION / INFORMATION ON INGREDIENTS

Substances
See section below for composition of Mixtures

Mixtures

<table>
<thead>
<tr>
<th>CAS No</th>
<th>% [weight]</th>
<th>Name</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>hermetically sealed device contains; polytechnic materials of;</td>
</tr>
<tr>
<td>7439-95-4</td>
<td>30-60</td>
<td>magnesium</td>
</tr>
<tr>
<td>10022-31-8</td>
<td>30-60</td>
<td>barium nitrate</td>
</tr>
<tr>
<td>7757-79-1</td>
<td>10-30</td>
<td>potassium nitrate</td>
</tr>
<tr>
<td>7704-34-9.</td>
<td>1-5</td>
<td>sulfur</td>
</tr>
<tr>
<td>10042-76-9</td>
<td>1-5</td>
<td>strontium nitrate</td>
</tr>
<tr>
<td>7429-90-5</td>
<td>&lt;1</td>
<td>aluminium</td>
</tr>
</tbody>
</table>

The specific chemical identity and/or exact percentage (concentration) of composition has been withheld as a trade secret.

SECTION 4 FIRST-AID MEASURES

Description of first aid measures

Eye Contact
If this product comes in contact with eyes:

- Wash out immediately with water.
- If irritation continues, seek medical attention.
- Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.

Skin Contact
If skin contact occurs:

- Immediately remove all contaminated clothing, including footwear.
- Flush skin and hair with running water (and soap if available).
- Seek medical attention in event of irritation.

Inhalation

- If fumes or combustion products are inhaled remove from contaminated area.
- Lay patient down. Keep warm and rested.
- Prostheses such as false teeth, which may block airway, should be removed, where possible, prior to initiating first aid procedures.
- 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.
- Transport to hospital, or doctor, without delay.

Ingestion

- Not considered a normal route of entry.
- If swallowed do NOT induce vomiting.
- If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration.
- Observe the patient carefully.
- Never give liquid to a person showing signs of being sleepy or with reduced awareness; i.e. becoming unconscious.
- Give water to rinse out mouth, then provide liquid slowly and as much as casually can comfortably drink.
- Seek medical advice.

Indication of any immediate medical attention and special treatment needed

Treat symptomatically.

SECTION 5 FIRE-FIGHTING MEASURES

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.

Special hazards arising from the substrate or mixture

Continued...
Fire Incompatibility
Avoid contact with other chemicals.

Special protective equipment and precautions for fire-fighters

**WARNING:** EXPLOSIVE MATERIALS / ARTICLES PRESENT!
- Evacuate all personnel and move upwind.
- Prevent re-entry.
- Alert Fire Brigade and tell them location and nature of hazard.
- May detonate and burning material may be propelled from fire.
- Wear full-body protective clothing with breathing apparatus.
- Prevent, by any means available, spillage and fire effluent from entering drains and water courses.
- Fight fire from safe distances and from protected locations.
- Use floating quantities of water.
- **DO NOT** approach containers or packages suspected to be hot.
- Cool any exposed containers not involved in fire from a protected location.
- Equipment should be thoroughly decontaminated after use.
- Slight hazard when exposed to heat, flame and oxidisers.

Fire/Fire Fighting

**WARNING:** EXPLOSIVE MATERIALS / ARTICLES PRESENT!
- Evacuate all personnel and move upwind.
- Prevent re-entry.
- Alert Fire Brigade and tell them location and nature of hazard.
- May detonate and burning material may be propelled from fire.
- Wear full-body protective clothing with breathing apparatus.
- Prevent, by any means available, spillage and fire effluent from entering drains and water courses.
- Fight fire from safe distances and from protected locations.
- Use floating quantities of water.
- **DO NOT** approach containers or packages suspected to be hot.
- Cool any exposed containers not involved in fire from a protected location.
- Equipment should be thoroughly decontaminated after use.
- Slight hazard when exposed to heat, flame and oxidisers.

Fire/Explosion Hazard

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.

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).

Combustible. Will burn if ignited.

Combustion products include:
- carbon monoxide (CO)
- carbon dioxide (CO2)
- other pyrolysis products typical of burning organic material.

**SECTION 6 ACCIDENTAL RELEASE MEASURES**

**Personal precautions, protective equipment and emergency procedures**
See section 8

**Environmental precautions**
See section 12

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

**Minor Spills**

**WARNING:** EXPLOSIVE.
- BLAST and/or PROJECTION and/or FIRE HAZARD
- Clean up all spills immediately.
- Avoid inhalation of the material and avoid contact with eyes and skin.
- Wear impervious gloves and safety glasses.
- Remove all ignition sources.
- Use spark-free tools when handling.
- Sweep into non-sparking containers or barrels and moisten with water.
- Place spilled material in clean, sealable, labelled container for disposal.
- Flush area with large amounts of water.

**Major Spills**

**WARNING:** EXPLOSIVE.
- Clear area of personnel and move upwind.
- Alert Fire Brigade and tell them location and nature of hazard.
- May be violently or explosively reactive.
- Wear full body protective clothing with breathing apparatus.
- Consider evacuation (or protect in place).
- In case of transport accident notify Police, Emergency Authority, Competent Explosives Authority or Manufacturer.
- No smoking, naked lights, heat or ignition sources.
- Increase ventilation.
- Use extreme caution to prevent physical shock.
- Use only spark-free shovels and explosion-proof equipment.
- Collect recoverable material and segregate from spilled material.
- Wash spill area with large quantities of water.

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

**SECTION 7 HANDLING AND STORAGE**

**Precautions for safe handling**

- Handle gently. Use good occupational work practice.
- Observe manufacturer's storage and handling recommendations contained within this SDS.
- Avoid all personal contact, including inhalation.
- Avoid smoking, naked lights, heat or ignition sources.
- Explosives must not be struck with metal implements.
- Avoid mechanical and thermal shock and friction.
- Use in a well ventilated area.
- Avoid contact with incompatible materials.
- When handling DO NOT eat, drink or smoke.
- Avoid physical damage to containers.
- Always wash hands with soap and water after handling.
Work clothes should be laundered separately.

Store cases in a well-ventilated magazine licensed for the appropriate Class, Division and Compatibility Group.

Rotate stock to prevent aging. Use on FIFO (first in-first out) basis.

Observe manufacturer’s storage and handling recommendations contained within this SDS.

Store in a cool place in original containers.

Keep containers securely sealed.

No smoking, naked lights, heat or ignition sources.

Store in an isolated area away from other materials.

Keep storage area free of debris, waste and combustibles.

Protect containers against physical damage.

Check regularly for spills and leaks.

NOTE: If explosives need to be destroyed contact the Competent Authority.

Store away from incompatible materials.

Keep out of reach of children.

### CONDITIONS FOR SAFE STORAGE, INCLUDING ANY INCOMPATIBILITIES

#### Suitable container

- All packaging for Class 1 Goods shall be in accordance with the requirements of the relevant Code for the transport of Dangerous Goods.

- 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.

#### Storage incompatibility

- Avoid contact with other explosives, pyrotechnics, solvents, adhesives, paints, cleaners and unauthorized metals, plastics, packing equipment and materials.

- Avoid contamination with acids, alkalis, reducing agents, amines and phosphorus.

- Explosion hazard may follow contact with incompatible materials.

### SECTION 8 EXPOSURE CONTROLS / PERSONAL PROTECTION

#### Control parameters

- **OCCUPATIONAL EXPOSURE LIMITS (OEL)**

<table>
<thead>
<tr>
<th>Source</th>
<th>Ingredient</th>
<th>Material name</th>
<th>TWA</th>
<th>STEL</th>
<th>Peak</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Canada - Saskatchewan Occupational Health and Safety Regulations - Contamination Limits</td>
<td>magnesium</td>
<td>Particles (Insoluble or Poorly Soluble) Not Otherwise Specified: Respirable fraction ++</td>
<td>3 mg/m³</td>
<td>6 mg/m³</td>
<td>Not Available</td>
<td>Not Available</td>
</tr>
<tr>
<td>Canada - Saskatchewan Occupational Health and Safety Regulations - Contamination Limits</td>
<td>magnesium</td>
<td>Particles (Insoluble or Poorly Soluble) Not Otherwise Specified: Inhalable fraction ++</td>
<td>10 mg/m³</td>
<td>20 mg/m³</td>
<td>Not Available</td>
<td>Not Available</td>
</tr>
<tr>
<td>Canada - Ontario Occupational Exposure Limits</td>
<td>magnesium</td>
<td>Particles (Insoluble or Poorly Soluble) Not Otherwise Specified (PNOS)</td>
<td>10, 3 mg/m³</td>
<td>Not Available</td>
<td>Not Available</td>
<td>Not Available</td>
</tr>
<tr>
<td>Canada - Northwest Territories Occupational Exposure Limits (English)</td>
<td>magnesium</td>
<td>Particles (Insoluble or Poorly Soluble) Not Otherwise Specified: Inhalable fraction</td>
<td>10 mg/m³</td>
<td>20 mg/m³</td>
<td>Not Available</td>
<td>Not Available</td>
</tr>
<tr>
<td>Canada - Northwest Territories Occupational Exposure Limits (English)</td>
<td>magnesium</td>
<td>Particles (Insoluble or Poorly Soluble) Not Otherwise Specified: Respirable fraction</td>
<td>3 mg/m³</td>
<td>6 mg/m³</td>
<td>Not Available</td>
<td>Not Available</td>
</tr>
<tr>
<td>Canada - Yukon Permissible Concentrations for Airborne Contaminant Substances</td>
<td>barium nitrate</td>
<td>Barium (soluble compounds) (as Ba)</td>
<td>0.5 mg/m³</td>
<td>0.5 mg/m³</td>
<td>Not Available</td>
<td>Not Available</td>
</tr>
<tr>
<td>Canada - Saskatchewan Occupational Health and Safety Regulations - Contamination Limits</td>
<td>barium nitrate</td>
<td>Barium and soluble compounds, (as Ba)</td>
<td>0.5 mg/m³</td>
<td>1.5 mg/m³</td>
<td>Not Available</td>
<td>Not Available</td>
</tr>
<tr>
<td>Canada - Manitoba Occupational Exposure Limits</td>
<td>barium nitrate</td>
<td>Not Available</td>
<td>0.5 mg/m³</td>
<td>Not Available</td>
<td>Not Available</td>
<td>Not Available</td>
</tr>
<tr>
<td>Canada - Northwest Territories Occupational Exposure Limits (English)</td>
<td>barium nitrate</td>
<td>Barium and soluble compounds, (as Ba)</td>
<td>0.5 mg/m³</td>
<td>1.5 mg/m³</td>
<td>Not Available</td>
<td>Not Available</td>
</tr>
<tr>
<td>Canada - British Columbia Occupational Exposure Limits</td>
<td>barium nitrate</td>
<td>Barium and soluble compounds, as Ba</td>
<td>0.5 mg/m³</td>
<td>Not Available</td>
<td>Not Available</td>
<td>Not Available</td>
</tr>
<tr>
<td>Canada - Prince Edward Island Occupational Exposure Limits</td>
<td>barium nitrate</td>
<td>Barium and soluble compounds, as Ba(1996)</td>
<td>0.5 mg/m³</td>
<td>Not Available</td>
<td>Not Available</td>
<td>TLV Basis: Eye, skin, &amp; GI in: muscular stim</td>
</tr>
<tr>
<td>Canada - Alberta Occupational Exposure Limits</td>
<td>sulfur</td>
<td>Sulphur</td>
<td>10 mg/m³</td>
<td>Not Available</td>
<td>Not Available</td>
<td>Not Available</td>
</tr>
<tr>
<td>Canada - Saskatchewan Occupational Health and Safety Regulations - Contamination Limits</td>
<td>sulfur</td>
<td>Particles (Insoluble or Poorly Soluble) Not Otherwise Specified: Inhalable fraction ++</td>
<td>10 mg/m³</td>
<td>20 mg/m³</td>
<td>Not Available</td>
<td>Not Available</td>
</tr>
<tr>
<td>Canada - Saskatchewan Occupational Health and Safety Regulations - Contamination Limits</td>
<td>sulfur</td>
<td>Particles (Insoluble or Poorly Soluble) Not Otherwise Specified: Respirable fraction ++</td>
<td>3 mg/m³</td>
<td>6 mg/m³</td>
<td>Not Available</td>
<td>Not Available</td>
</tr>
<tr>
<td>Canada - Ontario Occupational Exposure Limits</td>
<td>sulfur</td>
<td>Particles (Insoluble or Poorly Soluble) Not Otherwise Specified (PNOS)</td>
<td>10, 3 mg/m³</td>
<td>Not Available</td>
<td>Not Available</td>
<td>Not Available</td>
</tr>
</tbody>
</table>
### Exposure controls

#### Appropriate engineering controls

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.

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.

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.

#### Personal protection

- Safety glasses with side shields
- Chemical goggles

#### Eye and face protection

- Safety glasses with side shields
- Chemical goggles

#### Skin protection

- See Hand protection below

#### Hands/feet protection

- Wear chemical protective gloves, e.g., PVC
- Wear safety footwear or safety gumboots, e.g., Rubber

#### Body protection

- See Other protection below
Other protection

- Fire resistant/ heat resistant gloves where practical, otherwise
- Heavy-duty chemically resistant gloves capable of providing short-term protection against spontaneous ignition.
- Safety footwear
- Hard hat
- Ear Protection.

Thermal hazards

Not Available

Respiratory protection

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

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

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

SECTION 10 STABILITY AND REACTIVITY

Reactivity

See section 7

Chemical stability

- Presence of shock and friction
- Presence of heat source and ignition source
- Product is considered stable under normal handling conditions.
- Stable under normal storage conditions.
- Hazardous polymerization will not occur.

Avoid contact with other chemicals.

Possibility of hazardous reactions

See section 7

Conditions to avoid

See section 7

Incompatible materials

See section 7

Hazardous decomposition products

See section 5

SECTION 11 TOXICOLOGICAL INFORMATION

Information on toxicological effects

<table>
<thead>
<tr>
<th>Route</th>
<th>Toxicity</th>
<th>Irritation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inhaled</td>
<td>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.</td>
<td></td>
</tr>
<tr>
<td>Ingestion</td>
<td>Not normally a hazard due to physical form of product.</td>
<td></td>
</tr>
<tr>
<td>Skin Contact</td>
<td>Not normally a hazard due to physical form of product. The vapour is discomforting</td>
<td></td>
</tr>
<tr>
<td>Eye</td>
<td>Not normally a hazard due to physical form of product. The vapour is discomforting</td>
<td></td>
</tr>
<tr>
<td>Chronic</td>
<td>Generally not applicable. 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.</td>
<td></td>
</tr>
</tbody>
</table>

SIGNAL CARTRIDGE, CAL. 4, SINGLE STAR WHITE

TOXICITY: Not Available
IRRITATION: Not Available
### TOXICITY

#### magnesium

**TOXICITY**
- Oral (rat) LD50: >2000 mg/kg

**IRRITATION**
- Not Available

#### barium nitrate

**TOXICITY**
- Oral (rat) LD50: 355 mg/kg

**IRRITATION**
- Eye (rabbit): 100 mg/24h - moderate
- Skin (rabbit): 500 mg/24h - mild

#### potassium nitrate

**TOXICITY**
- dermal (rat) LD50: >5000 mg/kg

**IRRITATION**
- Not Available

**STOT - Single Exposure**
- Oral (rat) LD50: >2000 mg/kg

#### sulfur

**TOXICITY**
- dermal (rat) LD50: >2000 mg/kg

**IRRITATION**
- Eye (human): 8 ppm irritant

**Inhalation (rat) LC50:**
- >5.43 mg/l 4 h

**STOT - Single Exposure**
- Oral (rat) LD50: >2000 mg/kg

#### strontium nitrate

**TOXICITY**
- Oral (rat) LD50: 1892 mg/kg

**IRRITATION**
- Not Available

**STOT - Single Exposure**
- Oral (rat) LD50: >2000 mg/kg

#### aluminium

**TOXICITY**
- Oral (rat) LD50: >2000 mg/kg

**IRRITATION**
- Not Available

**STOT - Single Exposure**
- Oral (rat) LD50: >2000 mg/kg

---

#### Legend:
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

---

### BARIUM NITRATE

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 a contact dermatitis (nonallergic). This form of dermatitis is often characterised by skin redness (erythema) and swelling of the epidermis. Histologically there may be intercellular oedema of the spongy layer (spongiosis) and intracellular oedema of the epidermis.

### STRONTIUM NITRATE

Asthma-like symptoms may continue for months or even years after exposure to the material ceases. This may be due to a non-allergic condition known as reactive airways dysfunction syndrome (RADS) which can occur following exposure to high levels of highly irritating compounds. 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.

### ALUMINIUM

No significant acute toxicological data identified in literature search.

#### Acute Toxicity

- Carcinogenicity

#### Skin Irritation/Corrosion

- Reproductivity

#### Serious Eye Damage/Irritation

- STOT - Single Exposure

#### Respiratory or Skin sensitisation

- STOT - Repeated Exposure

- Mutagenicity

- Aspiration Hazard

---

### SECTION 12 ECOLOGICAL INFORMATION

#### Toxicity

<table>
<thead>
<tr>
<th>SIGNAL CARTRIDGE, CAL. 4, SINGLE STAR WHITE</th>
<th>ENDPOINT</th>
<th>TEST DURATION (HR)</th>
<th>SPECIES</th>
<th>VALUE</th>
<th>SOURCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>magnesium</td>
<td>Not Available</td>
<td>Not Available</td>
<td>Not Available</td>
<td>Not Available</td>
<td>Not Available</td>
</tr>
<tr>
<td>LC50</td>
<td>96</td>
<td>Fish</td>
<td>541mg/L</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>EC50</td>
<td>72</td>
<td>Algae or other aquatic plants</td>
<td>&gt;300mg/L</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>NOEC</td>
<td>72</td>
<td>Algae or other aquatic plants</td>
<td>&gt;25.5mg/L</td>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>barium nitrate</th>
<th>ENDPOINT</th>
<th>TEST DURATION (HR)</th>
<th>SPECIES</th>
<th>VALUE</th>
<th>SOURCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>LC50</td>
<td>96</td>
<td>Fish</td>
<td>&gt;3.5mg/L</td>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>
### Persistence and degradability

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Persistence: Water/Soil</th>
<th>Persistence: Air</th>
</tr>
</thead>
<tbody>
<tr>
<td>potassium nitrate</td>
<td>LOW</td>
<td>LOW</td>
</tr>
<tr>
<td>sulfur</td>
<td>LOW</td>
<td>LOW</td>
</tr>
</tbody>
</table>

### Bioaccumulative potential

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Bioaccumulation</th>
</tr>
</thead>
<tbody>
<tr>
<td>potassium nitrate</td>
<td>LOW (LogKOW = 0.209)</td>
</tr>
<tr>
<td>sulfur</td>
<td>LOW (LogKOW = 0.229)</td>
</tr>
</tbody>
</table>

### Mobility in soil

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Mobility</th>
</tr>
</thead>
<tbody>
<tr>
<td>potassium nitrate</td>
<td>LOW (KOC = 14.3)</td>
</tr>
<tr>
<td>sulfur</td>
<td>LOW (KOC = 14.3)</td>
</tr>
</tbody>
</table>

### SECTION 13 DISPOSAL CONSIDERATIONS

#### Waste treatment methods

- Explosives must not be thrown away, buried, discarded or placed with garbage.
- Explosives which are surplus, deteriorated or considered unsafe for transport, storage or use shall be destroyed and the statutory authorities shall be notified.
- 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. Refer to local Waste Disposal Authority and supplier for suitable disposal procedure.

### SECTION 14 TRANSPORT INFORMATION

#### Labels Required

- **Marine Pollutant**: NO

#### Land transport (TDG)

- **UN number**: 0312
### Transport in bulk according to Annex II of MARPOL and the IBC code

Not Applicable

### SECTION 15 REGULATORY INFORMATION

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

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all the information required by the Controlled Products Regulations.

**MAGNESIUM(7439-95-4)** IS FOUND ON THE FOLLOWING REGULATORY LISTS

- Canada - Northwest Territories Occupational Exposure Limits (English)
- Canada - Alberta Occupational Exposure Limits
- Canada - Nova Scotia Occupational Exposure Limits
- Canada - Ontario Occupational Exposure Limits
- Canada - Saskatchewan Occupational Health and Safety Regulations - Contamination Limits

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

- Canada - Northwest Territories Occupational Exposure Limits (English)
- Canada - British Columbia Occupational Exposure Limits
- Canada - Nova Scotia Occupational Exposure Limits
- Canada - Prince Edward Island Occupational Exposure Limits
- Canada - Saskatchewan Occupational Health and Safety Regulations - Contamination Limits
- Canada - Yukon Permissible Concentrations for Airborne Contaminant Substances

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

- Canada - Northwest Territories Occupational Exposure Limits (English)
- Canada - Saskatchewan Occupational Health and Safety Regulations - Contamination Limits
- Canada - Canada Domestic Substances List (DSL)

---

**Chemwatch:** 66-6776  
**Version No:** 3.1.1.1  
**Page 9 of 10**  
**Issue Date:** 17/02/2017  
**Print Date:** 21/10/2017  
SIGNAL CARTRIDGE, CAL. 4, SINGLE STAR WHITE  
**Issue Date:** 17/02/2017  
**Print Date:** 21/10/2017

Continued...
SULFUR(7704-34-9) IS FOUND ON THE FOLLOWING REGULATORY LISTS
- Canada - Northwest Territories Occupational Exposure Limits (English)
- Canada - Alberta Occupational Exposure Limits
- Canada - Nova Scotia Occupational Exposure Limits
- Canada - Ontario Occupational Exposure Limits
- Canada - Saskatchewan Occupational Health and Safety Regulations - Contamination Limits
- Canada - Quebec Permissible Exposure Values for Airborne Contaminants (French)
- Canada Domestic Substances List (DSL)
- Canada Categorization decisions for all DSL substances

STRONTIUM NITRATE(10042-76-9) IS FOUND ON THE FOLLOWING REGULATORY LISTS
- Canada Categorization decisions for all DSL substances
- Canada Domestic Substances List (DSL)

ALUMINIUM(7429-90-5) IS FOUND ON THE FOLLOWING REGULATORY LISTS
- Canada - Northwest Territories Occupational Exposure Limits (English)
- Canada - Alberta Occupational Exposure Limits
- Canada - British Columbia Occupational Exposure Limits
- Canada - Nova Scotia Occupational Exposure Limits
- Canada - Prince Edward Island Occupational Exposure Limits
- Canada - Saskatchewan Occupational Health and Safety Regulations - Contamination Limits
- Canada Domestic Substances List (DSL)
- Canada - Quebec Permissible Exposure Values for Airborne Contaminants (French)
- Canada - Saskatchewan Occupational Health and Safety Regulations - Contamination Limits
- Canada Categorization decisions for all DSL substances
- Canada Domestic Substances List (DSL)

National Inventory

<table>
<thead>
<tr>
<th>Country</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australia - AICS</td>
<td>Y</td>
</tr>
<tr>
<td>Canada - DSL</td>
<td>Y</td>
</tr>
<tr>
<td>Canada - NDSL</td>
<td>N (strontium nitrate; sulfur; barium nitrate; magnesium; aluminium; potassium nitrate)</td>
</tr>
<tr>
<td>China - IECSC</td>
<td>Y</td>
</tr>
<tr>
<td>Europe - EINEC / ELINCS / NLP</td>
<td>Y</td>
</tr>
<tr>
<td>Japan - ENCS</td>
<td>N (sulfur; magnesium; aluminium)</td>
</tr>
<tr>
<td>Korea - KECI</td>
<td>Y</td>
</tr>
<tr>
<td>New Zealand - NZIoC</td>
<td>Y</td>
</tr>
<tr>
<td>Philippines - PICCS</td>
<td>Y</td>
</tr>
<tr>
<td>USA - TSCA</td>
<td>Y</td>
</tr>
</tbody>
</table>

Legend: 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

Other information

Ingredients with multiple cas numbers

<table>
<thead>
<tr>
<th>Name</th>
<th>CAS No</th>
</tr>
</thead>
<tbody>
<tr>
<td>barium nitrate</td>
<td>10022-31-8, 34053-87-7</td>
</tr>
<tr>
<td>strontium nitrate</td>
<td>10042-76-9, 13470-05-8</td>
</tr>
<tr>
<td>aluminium</td>
<td>7429-90-5, 91728-14-2</td>
</tr>
</tbody>
</table>

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.

Definitions and abbreviations

PC — TWA: Permissible Concentration-Time Weighted Average
PC — STEL: Permissible Concentration-Short Term Exposure Limit
IARC: International Agency for Research on Cancer
ACGIH: American Conference of Governmental Industrial Hygienists
STEL: Short Term Exposure Limit
TEEL: Temporary Emergency Exposure Limit,
IDLH: Immediately Dangerous to Life or Health Concentrations
OSF: Odour Safety Factor
NOEL: No Observed Adverse Effect Level
LOEL: Lowest Observed Adverse Effect Level
TLV: Threshold Limit Value
LOD: Limit Of Detection
OTV: Odour Threshold Value
BCF: BioConcentration Factors
BEI: Biological Exposure Index