SECTION 1 IDENTIFICATION

Product Identifier

**Product name** | WHITE HANDFLARE
--- | ---
**Synonyms** | Comet white handflare, Art.-No. 9162500, Pains Wessex white handflare MK8, Item No: 9527510
**Proper shipping name** | Signal devices, hand
**Other means of identification** | Not Available

Recommended use of the chemical and restrictions on use

**Relevant identified uses** | Use according to manufacturer's directions. Sea distress signal. For collision and illumination. For use in day and night short range collision warning situations and for illuminating small areas. Fully extend handle, remove white end cap, pull toggle sharply away from body. Hold above head, outboard and downwind. Store on board in our Mini or Large Polybottles.

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><strong>Address</strong></td>
<td>Vielländer Weg 147 Bremerhaven 27574 Germany</td>
</tr>
<tr>
<td><strong>Telephone</strong></td>
<td>+49 471 3930</td>
</tr>
<tr>
<td><strong>Fax</strong></td>
<td>+49 471 3932 10</td>
</tr>
<tr>
<td><strong>Website</strong></td>
<td><a href="http://www.wescomsignal.com">www.wescomsignal.com</a></td>
</tr>
<tr>
<td><strong>Email</strong></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><strong>Emergency telephone numbers</strong></td>
<td>+49 178 433 7434</td>
</tr>
<tr>
<td><strong>Other emergency telephone numbers</strong></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

<table>
<thead>
<tr>
<th>Hazard pictogram(s)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>SIGNAL WORD</td>
<td>WARNING</td>
</tr>
</tbody>
</table>

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/sparks/open flames/hot surfaces - No smoking. |
| P250 | Do not subject to grinding/shock/sources of friction. |
| P280 | Wear protective gloves/protective clothing/eye protection/face protection. |
Precautionary statement(s) Response

- **P370**+**P380** In case of fire: Evacuate area.
- **P372** Explosion risk in case of fire.
- **P374** Fight fire with normal precautions from a reasonable distance.
- **P373** DO NOT fight fire when fire reaches explosives.
- **P305**+**P351**+**P338** IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
- **P337**+**P313** If eye irritation persists: Get medical advice/attention.

Precautionary statement(s) Storage

- **P401** Store according to local regulations for explosives.

Precautionary statement(s) Disposal

- **P501** Dispose of contents/container in accordance with local regulations.

### 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>7757-79-1</td>
<td>10-30</td>
<td><strong>potassium nitrate</strong></td>
</tr>
<tr>
<td>10042-76-9</td>
<td>10-30</td>
<td><strong>strontium nitrate</strong></td>
</tr>
<tr>
<td>10022-31-8</td>
<td>1-5</td>
<td><strong>barium nitrate</strong></td>
</tr>
<tr>
<td>7429-90-5</td>
<td>10-30</td>
<td><strong>aluminium</strong></td>
</tr>
<tr>
<td>7778-74-7</td>
<td>10-30</td>
<td><strong>potassium perchlorate</strong></td>
</tr>
<tr>
<td>7704-34-9-9</td>
<td>5-10</td>
<td><strong>sulfur</strong></td>
</tr>
<tr>
<td>9002-86-2</td>
<td>10-30</td>
<td><strong>polyvinyl chloride</strong></td>
</tr>
<tr>
<td>7439-95-4</td>
<td>30-60</td>
<td><strong>magnesium</strong></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.

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

- See Section 11

**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

| Fire Incompatibility | Avoid contact with other chemicals. |

Special protective equipment and precautions for fire-fighters

**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 flooding 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.
### 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.

### Other information
- Store cases in a well ventilated magazine licensed for the appropriate Class, Division and Compatibility Group.
- Rotate stock to prevent ageing. 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
- 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)

### INGREDIENT DATA

<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>US NIOSH Recommended Exposure Limits (RELS)</td>
<td>barium nitrate</td>
<td>Barium dinitrate, Barium(II) nitrate (1:2), Barium salt of nitric acid</td>
<td>0.5 mg/m³</td>
<td>Not Available</td>
<td>Not Available</td>
<td>[<em>Note: The REL also applies to other soluble barium compounds (as Ba) except Barium sulfate.</em>]</td>
</tr>
<tr>
<td>US NIOSH Recommended Exposure Limits (RELS)</td>
<td>aluminium</td>
<td>Aluminium, Aluminium metal, Aluminium powder, Elemental aluminium</td>
<td>10 (total), 5 (resp) mg/m³</td>
<td>Not Available</td>
<td>Not Available</td>
<td>Not Available</td>
</tr>
<tr>
<td>US OSHA Permissible Exposure Levels (PELs) - Table Z1</td>
<td>aluminium</td>
<td>Aluminium, metal</td>
<td>15 mg/m³</td>
<td>Not Available</td>
<td>Not Available</td>
<td>Total dust (as Al)</td>
</tr>
<tr>
<td>US OSHA Permissible Exposure Levels (PELs) - Table Z1</td>
<td>aluminium</td>
<td>Aluminium, metal - Respirable fraction</td>
<td>5 mg/m³</td>
<td>Not Available</td>
<td>Not Available</td>
<td>Not Available</td>
</tr>
<tr>
<td>US ACGIH Threshold Limit Values (TLV)</td>
<td>polyvinyl chloride</td>
<td>Polyvinyl chloride</td>
<td>1 mg/m³</td>
<td>Not Available</td>
<td>Not Available</td>
<td>TLV® Basis: Pneumoconiosis; LRT irr; pulm func changes</td>
</tr>
</tbody>
</table>

#### EMERGENCY LIMITS

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Material name</th>
<th>TEEL-1</th>
<th>TEEL-2</th>
<th>TEEL-3</th>
</tr>
</thead>
<tbody>
<tr>
<td>potassium nitrate</td>
<td>Potassium nitrate</td>
<td>9 mg/m³</td>
<td>100 mg/m³</td>
<td>600 mg/m³</td>
</tr>
<tr>
<td>strontium nitrate</td>
<td>Strontium nitrate</td>
<td>5.7 mg/m³</td>
<td>62 mg/m³</td>
<td>370 mg/m³</td>
</tr>
<tr>
<td>barium nitrate</td>
<td>Barium nitrate</td>
<td>2.9 mg/m³</td>
<td>350 mg/m³</td>
<td>2,100 mg/m³</td>
</tr>
<tr>
<td>potassium perchlorate</td>
<td>Potassium perchlorate</td>
<td>6.3 mg/m³</td>
<td>69 mg/m³</td>
<td>420 mg/m³</td>
</tr>
<tr>
<td>sulfur</td>
<td>Sulfur</td>
<td>30 mg/m³</td>
<td>330 mg/m³</td>
<td>2,000 mg/m³</td>
</tr>
<tr>
<td>polyvinyl chloride</td>
<td>Polyvinyl chloride</td>
<td>3 mg/m³</td>
<td>33 mg/m³</td>
<td>200 mg/m³</td>
</tr>
<tr>
<td>magnesium</td>
<td>Magnesium</td>
<td>18 mg/m³</td>
<td>200 mg/m³</td>
<td>1,200 mg/m³</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Original IDLH</th>
<th>Revised IDLH</th>
</tr>
</thead>
<tbody>
<tr>
<td>potassium nitrate</td>
<td>Not Available</td>
<td>Not Available</td>
</tr>
<tr>
<td>strontium nitrate</td>
<td>Not Available</td>
<td>Not Available</td>
</tr>
<tr>
<td>barium nitrate</td>
<td>50 mg/m³</td>
<td>Not Available</td>
</tr>
<tr>
<td>aluminium</td>
<td>Not Available</td>
<td>Not Available</td>
</tr>
<tr>
<td>potassium perchlorate</td>
<td>Not Available</td>
<td>Not Available</td>
</tr>
<tr>
<td>sulfur</td>
<td>Not Available</td>
<td>Not Available</td>
</tr>
<tr>
<td>polyvinyl chloride</td>
<td>Not Available</td>
<td>Not Available</td>
</tr>
</tbody>
</table>

Continued...
Material Data

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

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>Steel tube with orange/yellow outer casing pressed with black/grey polytechnical ingredients, contains ignitor and a grip.</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 Applicable</td>
</tr>
<tr>
<td>Melting point / freezing point (°C)</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>Initial boiling point and boiling range (°C)</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>Flash point (°C)</td>
<td>160</td>
</tr>
<tr>
<td>Flash point (°C)</td>
<td>Taste</td>
</tr>
<tr>
<td>Evaporation rate</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>Flammability</td>
<td>Not Applicable</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>
</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

Continued...
SECTION 11 TOXICOLOGICAL INFORMATION

Information on toxicological effects

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

### WHITE HANDFLARE

<table>
<thead>
<tr>
<th>TOXICITY</th>
<th>IRRITATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not Available</td>
<td>Not Available</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>potassium nitrate</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>TOXICITY</td>
<td>IRRITATION</td>
</tr>
<tr>
<td>dermal (rat) LD50: &gt;5000 mg/kg[^1]</td>
<td>Not Available</td>
</tr>
<tr>
<td>Oral (rat) LD50: &gt;2000 mg/kg[^1]</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>strontium nitrate</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>TOXICITY</td>
<td>IRRITATION</td>
</tr>
<tr>
<td>Oral (rat) LD50: 1892 mg/kg[^2]</td>
<td>Not Available</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>barium nitrate</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>TOXICITY</td>
<td>IRRITATION</td>
</tr>
<tr>
<td>Oral (rat) LD50: 355 mg/kg[^2]</td>
<td>Eye (rabbit): 100 mg/24h - moderate</td>
</tr>
<tr>
<td></td>
<td>Skin (rabbit): 500 mg/24h - mild</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>aluminium</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>TOXICITY</td>
<td>IRRITATION</td>
</tr>
<tr>
<td>Oral (rat) LD50: &gt;2000 mg/kg[^1]</td>
<td>Not Available</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>potassium perchlorate</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>TOXICITY</td>
<td>IRRITATION</td>
</tr>
<tr>
<td>Not Available</td>
<td>Not Available</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>sulfur</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>TOXICITY</td>
<td>IRRITATION</td>
</tr>
<tr>
<td>dermal (rat) LD50: &gt;2000 mg/kg[^1]</td>
<td>Eye (human): 8 ppm irritant</td>
</tr>
<tr>
<td>Inhalation (rat) LC50: &gt;5.43 mg/l 4 h[^1]</td>
<td></td>
</tr>
<tr>
<td>Oral (rat) LD50: &gt;2000 mg/kg[^1]</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>polyvinyl chloride</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>TOXICITY</td>
<td>IRRITATION</td>
</tr>
<tr>
<td>Not Available</td>
<td>Not Available</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>magnesium</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>TOXICITY</td>
<td>IRRITATION</td>
</tr>
<tr>
<td>Oral (rat) LD50: &gt;2000 mg/kg[^1]</td>
<td>Not Available</td>
</tr>
</tbody>
</table>

### 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

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**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.

**POLYVINYL CHLORIDE**
The substance is classified by IARC as Group 3: NOT classifiable as to its carcinogenicity to humans. Evidence of carcinogenicity may be inadequate or limited in animal testing.

**STRONTIUM NITRATE & POLYVINYL CHLORIDE**
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 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

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Continued...
dyspnea, cough and mucus production.

**ALUMINIUM & POTASSIUM PERCHLORATE & POLYVINYL CHLORIDE**

No significant acute toxicological data identified in literature search.

<table>
<thead>
<tr>
<th>Acute Toxicity</th>
<th>Carcinogenicity</th>
<th>Reproductivity</th>
<th>Skin Irritation/Irritation</th>
<th>STOT - Single Exposure</th>
<th>STOT - Repeated Exposure</th>
<th>Mutagenicity</th>
<th>Aspiration Hazard</th>
</tr>
</thead>
<tbody>
<tr>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

**SECTION 12 ECOLOGICAL INFORMATION**

**Toxicity**

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>ENDPOINT</th>
<th>TEST DURATION (HR)</th>
<th>SPECIES</th>
<th>VALUE</th>
<th>SOURCE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>WHITE HANDFLARE</strong></td>
<td>Not Available</td>
<td>Not Available</td>
<td>Not Available</td>
<td>Not Available</td>
<td>Not Available</td>
</tr>
<tr>
<td>potassium nitrate</td>
<td>LC50 96</td>
<td>Fish</td>
<td>22.5mg/L</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>strontium nitrate</td>
<td>LC50 96</td>
<td>Fish</td>
<td>&gt;40.3mg/L</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>EC50 72</td>
<td>Algae or other aquatic plants</td>
<td>&gt;43.3mg/L</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>NOEC 96</td>
<td>Fish</td>
<td>&gt;40.3mg/L</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>barium nitrate</td>
<td>LC50 96</td>
<td>Fish</td>
<td>&gt;3.5mg/L</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>EC50 72</td>
<td>Algae or other aquatic plants</td>
<td>&gt;1.92mg/L</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>NOEC 72</td>
<td>Algae or other aquatic plants</td>
<td>&gt;0.004mg/L</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>aluminium</td>
<td>LC50 96</td>
<td>Fish</td>
<td>0.078-0.108mg/L</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>EC50 48</td>
<td>Crustacea</td>
<td>0.7364mg/L</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>EC50 96</td>
<td>Algae or other aquatic plants</td>
<td>0.0054mg/L</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>BCF 360</td>
<td>Algae or other aquatic plants</td>
<td>9mg/L</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td></td>
<td>NOEC 72</td>
<td>Algae or other aquatic plants</td>
<td>&gt;0.004mg/L</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>potassium perchlorate</td>
<td>EC10 24</td>
<td>Algae or other aquatic plants</td>
<td>&gt;1000mg/L</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>sulfur</td>
<td>LC50 96</td>
<td>Fish</td>
<td>&lt;14mg/L</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td></td>
<td>EC50 48</td>
<td>Crustacea</td>
<td>&gt;5000mg/L</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td></td>
<td>NOEC 504</td>
<td>Crustacea</td>
<td>&gt;0.0025mg/L</td>
<td>2</td>
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<tr>
<td>polyvinyl chloride</td>
<td>Not Available</td>
<td>Not Available</td>
<td>Not Available</td>
<td>Not Available</td>
<td>Not Available</td>
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<td>magnesium</td>
<td>LC50 96</td>
<td>Fish</td>
<td>541mg/L</td>
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<tr>
<td></td>
<td>EC50 72</td>
<td>Algae or other aquatic plants</td>
<td>&gt;20mg/L</td>
<td>2</td>
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<tr>
<td></td>
<td>NOEC 72</td>
<td>Algae or other aquatic plants</td>
<td>&gt;25.5mg/L</td>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>

**Legend:**
- Data available but does not fill the criteria for classification
- Data available to make classification
- Data Not Available to make classification

**Persistence and degradability**

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Persistence: Water/Soil</th>
<th>Persistence: Air</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Continued...
### 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>
<tr>
<td>polyvinyl chloride</td>
<td>LOW (LogKOW = 1.6233)</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>
<tr>
<td>polyvinyl chloride</td>
<td>LOW (KOC = 23.74)</td>
</tr>
</tbody>
</table>

### SECTION 13 DISPOSAL CONSIDERATIONS

#### Waste treatment methods

**Product / Packaging disposal**

- 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 (DOT)

- **UN number**: 0191
- **UN proper shipping name**: Signal devices, hand
  - **Transport hazard class(es)**:
    - **Class**: 1.4G
    - **Subrisk**: Not Applicable
- **Packing group**: Not Applicable
- **Environmental hazard**: Not Applicable
- **Special precautions for user**:
  - **Hazard Label**: 1.4G
  - **Special provisions**: 381

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

- **UN number**: 0191
- **UN proper shipping name**: Signal devices, hand
  - **ICAO/IATA Class**: 1.4G
  - **ICAO / IATA Subrisk**: Not Applicable
  - **ERG Code**: 1L
- **Packing group**: Not Applicable
- **Environmental hazard**: Not Applicable
- **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
### SECTION 15 REGULATORY INFORMATION

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

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

- US - Massachusetts - Right To Know Listed Chemicals
- US - Pennsylvania - Hazardous Substance List
- US - Rhode Island Hazardous Substance List
- US EPCRA Section 313 Chemical List

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

- US - Massachusetts - Right To Know Listed Chemicals
- US - Pennsylvania - Hazardous Substance List
- US - Rhode Island Hazardous Substance List
- US EPCRA Section 313 Chemical List

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

- US - Alaska Limits for Air Contaminants
- US - California Permissible Exposure Limits for Chemical Contaminants
- US - Hawaii Air Contaminant Limits
- US - Idaho - Limits for Air Contaminants
- US - Massachusetts - Right To Know Listed Chemicals
- US - Michigan Exposure Limits for Air Contaminants
- US - Minnesota Permissible Exposure Limits (PELs)
- US - Oregon Permissible Exposure Limits (Z-1)
- US - Pennsylvania - Hazardous Substance List
- US - Rhode Island Hazardous Substance List
- US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants
- US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants

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

- US - Alaska Limits for Air Contaminants
- US - California Permissible Exposure Limits for Chemical Contaminants
- US - Hawaii Air Contaminant Limits
- US - Massachusetts - Right To Know Listed Chemicals
- US - Michigan Exposure Limits for Air Contaminants
- US - Minnesota Permissible Exposure Limits (PELs)
- US - Oregon Permissible Exposure Limits (Z-1)
- US - Pennsylvania - Hazardous Substance List
- US - Rhode Island Hazardous Substance List
- US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants
- US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants

**POTASSIUM PERCHLORATE (7778-74-7) IS FOUND ON THE FOLLOWING REGULATORY LISTS**

- US - Massachusetts - Right To Know Listed Chemicals
- US - Pennsylvania - Hazardous Substance List
- US - Rhode Island Hazardous Substance List
- US ATSDR Minimal Risk Levels for Hazardous Substances (MRLs)

**SULFUR (7704-34-8) IS FOUND ON THE FOLLOWING REGULATORY LISTS**

- US - Massachusetts - Right To Know Listed Chemicals
- US - Pennsylvania - Hazardous Substance List
- US - Rhode Island Hazardous Substance List
- US ATSDR Minimal Risk Levels for Hazardous Substances (MRLs)
POLYVINYL CHLORIDE (9002-86-2) IS FOUND ON THE FOLLOWING REGULATORY LISTS

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs
US - Hawaii Air Contaminant Limits
US ACGIH Threshold Limit Values (TLV) - Carcinogens

US List of Active Substances Exempt from the TSCA Inventory Notifications (Active-Inactive) Rule
US TSCA Chemical Substance Inventory - Interim List of Active Substances

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

US - California OEHHA/ARB - Chronic Reference Exposure Levels and Target Organs (CRELs)
US - California Permissible Exposure Limits for Chemical Contaminants
US - Hawaii Air Contaminant Limits
US - Massachusetts - Right To Know Listed Chemicals
US - Michigan Exposure Limits for Air Contaminants
US - Oregon Permissible Exposure Limits (Z-1)
US - Pennsylvania - Hazardous Substance List

US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory
US TSCA Chemical Substance Inventory - Interim List of Active Substances

Federal Regulations
Superfund Amendments and Reauthorization Act of 1986 (SARA)

SECTION 311/312 HAZARD CATEGORIES
Immediate (acute) health hazard
Yes
Delayed (chronic) health hazard
No
Fire hazard
No
Pressure hazard
Yes
Reactivity hazard
No

US EPA CERCLA HAZARDOUS SUBSTANCES AND REPORTABLE QUANTITIES (40 CFR 302.4)
None Reported

State Regulations
US. CALIFORNIA PROPOSITION 65
None Reported

National Inventory
Status
Australia - AICS
Y
Canada - DSL
Y
Canada - NDSL
N (strontium nitrate; sulfur; barium nitrate; magnesium; polyvinyl chloride; aluminum; potassium perchlorate; potassium nitate)
China - IEOSC
Y
Europe - EINEC / ELINCS / NLP
N (polyvinyl chloride)
Japan - ENCS
N (sulfur; magnesium; aluminum)
Korea - KECI
Y
New Zealand - NZIoC
Y
Philippines - PICCS
Y
USA - TSCA
Y

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>strontium nitrate</td>
<td>10042-76-9, 13470-05-8</td>
</tr>
<tr>
<td>barium nitrate</td>
<td>10022-31-8, 34053-87-7</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
NOAEL: No Observed Adverse Effect Level
LOAEL: Lowest Observed Adverse Effect Level
TLV: Threshold Limit Value
LOD: Limit Of Detection
OTV: Odour Threshold Value
BCF: BioConcentration Factors
BEI: Biological Exposure Index