



COMET AURORA ORANGE HAND SMOKE

Drew Marine Signal and Safety Australia Pty Ltd

Chemwatch: 66-6772

Version No: 2.1.1.1

Safety Data Sheet according to WHS and ADG requirements

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S.GHS.AUS.EN

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

Product Identifier

| | |
|-------------------------------|--------------------------------|
| Product name | COMET AURORA ORANGE HAND SMOKE |
| Synonyms | Not Available |
| Proper shipping name | SIGNAL DEVICES, HAND |
| Other means of identification | Not Available |

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

| | |
|--------------------------|---|
| Relevant identified uses | Use according to manufacturer's directions. Signalling device. |
|--------------------------|---|

Details of the supplier of the safety data sheet

| | | |
|-------------------------|--|---|
| Registered company name | Drew Marine Signal and Safety Australia Pty Ltd | Drew Marine Signal and Safety Germany GmbH |
| Address | Suite 2, Level 11, 276 Flinders Street, Melbourne, Vic, 3000, Australia; PO Box 158, Collins Street West, Vic 8007 Australia | Vieländer Weg 147 Bremerhaven 27574 Germany |
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| Website | www.aurora-marine.com | www.signalandsafety.com |
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Emergency telephone number


| | | |
|-----------------------------------|-----------------|--|
| Association / Organisation | Not Available | Consultant Lutz Harder GmbH |
| Emergency telephone numbers | +800 2436 2255 | +49 178 433 7434 |
| Other emergency telephone numbers | +61 3 9573 3112 | 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

Classification of the substance or mixture

| | |
|--------------------|--|
| Poisons Schedule | Not Applicable |
| Classification [1] | Explosive Division 1.4 |
| Legend: | 1. Classified by Chemwatch; 2. Classification drawn from HSIS ; 3. Classification drawn from EC Directive 1272/2008 - Annex VI |

Label elements

| | |
|--------------------|---|
| GHS label elements |  |
| SIGNAL WORD | WARNING |

Hazard statement(s)

| | |
|------|----------------------------|
| H204 | Fire or projection hazard. |
|------|----------------------------|

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. |
| P240 | Ground/bond container and receiving equipment. |

Continued...

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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. |

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

| CAS No | %[weight] | Name |
|---------------|-----------|-------------------------------|
| | | device contains |
| 842-07-9 | 30-60 | <u>C.I. Solvent Yellow 14</u> |
| 3811-04-9 | 10-30 | <u>potassium chlorate</u> |
| 63-42-3 | 10-30 | <u>alpha-lactose</u> |
| 1332-58-7 | 10-30 | <u>kaolin</u> |
| 9004-53-9 | <10 | <u>dextrins</u> |
| 1314-13-2 | <10 | <u>zinc oxide</u> |
| 557-05-1 | <10 | <u>zinc stearate</u> |
| Not Available | <10 | pyrodex p. |
| 7440-42-8 | <10 | <u>boron</u> |
| 7757-79-1 | <10 | <u>potassium nitrate</u> |
| 10022-31-8 | <10 | <u>barium nitrate</u> |

SECTION 4 FIRST AID MEASURES

Description of first aid measures

| | |
|---------------------|---|
| Eye Contact | <p>If this product comes in contact with eyes:</p> <ul style="list-style-type: none"> ▶ 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 | <p>If skin contact occurs:</p> <ul style="list-style-type: none"> ▶ 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 | <ul style="list-style-type: none"> ▶ 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 | <p>Not considered a normal route of entry.</p> <ul style="list-style-type: none"> ▶ 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 casualty can comfortably drink. ▶ Seek medical advice. |

Indication of any immediate medical attention and special treatment needed

Treat symptomatically.

SECTION 5 FIREFIGHTING 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. Fight all fires from a remote and explosion resistant site.

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Special hazards arising from the substrate or mixture

| | |
|----------------------|-------------------------------------|
| Fire Incompatibility | Avoid contact with other chemicals. |
|----------------------|-------------------------------------|

Advice for firefighters

| | |
|-----------------------|--|
| Fire Fighting | <p>WARNING: EXPLOSIVE MATERIALS / ARTICLES PRESENT!</p> <ul style="list-style-type: none"> ▶ 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. <p>Slight hazard when exposed to heat, flame and oxidisers.</p> |
| Fire/Explosion Hazard | <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 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. Combustion products include; carbon monoxide (CO) carbon dioxide (CO₂) other pyrolysis products typical of burning organic material</p> |
| HAZCHEM | E |

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 | <p>WARNING: EXPLOSIVE.</p> <p>BLAST and/or PROJECTION and/or FIRE HAZARD</p> <ul style="list-style-type: none"> ▶ 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 | <p>WARNING: EXPLOSIVE.</p> <ul style="list-style-type: none"> ▶ 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

| | |
|---------------|---|
| Safe handling | <ul style="list-style-type: none"> ▶ 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. |
|---------------|---|

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Other information

- ▶ Store cases in a well ventilated magazine licenced 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

| | |
|--------------------------------|---|
| Suitable container | <ul style="list-style-type: none"> ▶ 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 | <ul style="list-style-type: none"> ▶ 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

| Source | Ingredient | Material name | TWA | STEL | Peak | Notes |
|------------------------------|----------------|--|--------------------|---------------|---------------|---------------|
| Australia Exposure Standards | kaolin | Kaolin | 10 mg/m3 | Not Available | Not Available | Not Available |
| Australia Exposure Standards | zinc oxide | Zinc oxide (dust) / Zinc oxide (fume) | 10 mg/m3 / 5 mg/m3 | 10 mg/m3 | Not Available | Not Available |
| Australia Exposure Standards | zinc stearate | Stearates | 10 mg/m3 | Not Available | Not Available | Not Available |
| Australia Exposure Standards | boron | Fume (thermally generated) (respirable dust) | 2 mg/m3 | Not Available | Not Available | Not Available |
| Australia Exposure Standards | barium nitrate | Barium, soluble compounds (as Ba) | 0.5 mg/m3 | Not Available | Not Available | Not Available |

EMERGENCY LIMITS

| Ingredient | Material name | TEEL-1 | TEEL-2 | TEEL-3 |
|--------------------|---|-------------|------------|------------|
| potassium chlorate | Potassium chlorate | 2.3 mg/m3 | 25 mg/m3 | 900 mg/m3 |
| kaolin | Kaolin; (Aluminum silicate hydroxide; Fuller's earth [8031-18-3]) | 2 mg/m3 | 2 mg/m3 | 4.6 mg/m3 |
| zinc oxide | Zinc oxide | 10 mg/m3 | 15 mg/m3 | 2500 mg/m3 |
| zinc stearate | Zinc stearate | 13 mg/m3 | 13 mg/m3 | 77 mg/m3 |
| boron | Boron | 7.9 mg/m3 | 87 mg/m3 | 130 mg/m3 |
| potassium nitrate | Potassium nitrate | 0.074 mg/m3 | 0.82 mg/m3 | 600 mg/m3 |
| barium nitrate | Barium nitrate | 2.9 mg/m3 | 18 mg/m3 | 2100 mg/m3 |

| Ingredient | Original IDLH | Revised IDLH |
|------------------------|---------------|---------------|
| C.I. Solvent Yellow 14 | Not Available | Not Available |
| potassium chlorate | Not Available | Not Available |
| alpha-lactose | Not Available | Not Available |
| kaolin | Not Available | Not Available |
| dextrins | Not Available | Not Available |
| zinc oxide | 2,500 mg/m3 | 500 mg/m3 |
| zinc stearate | Not Available | Not Available |
| pyrodex p. | Not Available | Not Available |
| boron | Not Available | Not Available |
| potassium nitrate | Not Available | Not Available |
| barium nitrate | 1,100 mg/m3 | 50 mg/m3 |

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.

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| Personal protection |  |
| Eye and face protection | <ul style="list-style-type: none"> ▶ Safety glasses with side shields ▶ Chemical goggles |
| Skin protection | See Hand protection below |
| Hands/feet protection | <ul style="list-style-type: none"> ▶ Wear chemical protective gloves, e.g. PVC. ▶ Wear safety footwear or safety gumboots, e.g. Rubber |
| Body protection | See Other protection below |
| Other protection | <ul style="list-style-type: none"> ▶ 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**

| | | | |
|---|---|--|----------------|
| Appearance | Steel tube which contains the consolidated smoke composition. The igniter plug contains a friction-sensitive primer which is actuated when the friction wire is pulled. The igniter plug also contains a pyrotechnic delay element (about 2 second duration) which allows for safe functioning. The orange smoke produced burns for up to 1 minute. | | |
| Physical state | Manufactured | Relative density (Water = 1) | Not Applicable |
| Odour | Not Available | Partition coefficient n-octanol / water | Not Available |
| Odour threshold | Not Available | Auto-ignition temperature (°C) | Not Applicable |
| pH (as supplied) | Not Applicable | Decomposition temperature | Not Available |
| Melting point / freezing point (°C) | Not Applicable | Viscosity (cSt) | Not Applicable |
| Initial boiling point and boiling range (°C) | Not Applicable | Molecular weight (g/mol) | Not Applicable |
| Flash point (°C) | Not Available | Taste | Not Available |
| Evaporation rate | Not Applicable | Explosive properties | Not Available |
| Flammability | Not Available | Oxidising properties | Not Available |
| Upper Explosive Limit (%) | Not Available | Surface Tension (dyn/cm or mN/m) | Not Applicable |
| Lower Explosive Limit (%) | Not Available | Volatile Component (%vol) | Not Applicable |
| Vapour pressure (kPa) | Not Applicable | Gas group | Not Available |
| Solubility in water (g/L) | Immiscible | pH as a solution (1%) | Not Applicable |
| Vapour density (Air = 1) | Not Applicable | VOC g/L | Not Available |

SECTION 10 STABILITY AND REACTIVITY

| | |
|---|--|
| Reactivity | See section 7 |
| Chemical stability | <ul style="list-style-type: none"> ▶ 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**

| | |
|----------------|--|
| Inhaled | Not normally a hazard due to physical form of product. |
|----------------|--|

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| | |
|---------------------|--|
| | Inhalation of vapour is more likely at higher than normal temperatures. The vapour is discomforting |
| Ingestion | Not normally a hazard due to physical form of product. |
| Skin Contact | Not normally a hazard due to physical form of product. The vapour is discomforting |
| Eye | Not normally a hazard due to physical form of product. The vapour is discomforting |
| Chronic | ► Generally not applicable. |

| COMET AURORA ORANGE HAND SMOKE | TOXICITY | IRRITATION |
|--------------------------------|---|------------------------------------|
| | Not Available | Not Available |
| C.I. Solvent Yellow 14 | TOXICITY | IRRITATION |
| | Not Available | Not Available |
| potassium chlorate | TOXICITY | IRRITATION |
| | dermal (rat) LD50: >2000 mg/kg ^[1] | Nil reported |
| | Oral (rat) LD50: 1870 mg/kg ^[2] | |
| alpha-lactose | TOXICITY | IRRITATION |
| | Oral (rat) LD50: >10000 mg/kg ^[2] | Nil reported |
| kaolin | TOXICITY | IRRITATION |
| | Not Available | Not Available |
| dextrins | TOXICITY | IRRITATION |
| | Not Available | Not Available |
| zinc oxide | TOXICITY | IRRITATION |
| | Oral (rat) LD50: >5000 mg/kg ^[1] | Eye (rabbit) : 500 mg/24 h - mild |
| | | Skin (rabbit) : 500 mg/24 h - mild |
| zinc stearate | TOXICITY | IRRITATION |
| | Oral (rat) LD50: >10000 mg/kg ^[2] | Nil reported |
| boron | TOXICITY | IRRITATION |
| | Oral (rat) LD50: 650 mg/kg ^[2] | Not Available |
| potassium nitrate | TOXICITY | IRRITATION |
| | dermal (rat) LD50: >5000 mg/kg ^[1] | Nil reported |
| | Oral (rat) LD50: >2000 mg/kg ^[1] | |
| barium nitrate | TOXICITY | IRRITATION |
| | Oral (rat) LD50: 355 mg/kg ^[2] | Eye (rabbit):100 mg/24h - moderate |
| | | Skin (rabbit): 500 mg/24h - mild |

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

| | |
|-------------------------------|---|
| C.I. SOLVENT YELLOW 14 | <p>The following information refers to contact allergens as a group and may not be specific to this product. Contact allergies quickly manifest themselves as contact eczema, more rarely as urticaria or Quincke's oedema. The pathogenesis of contact eczema involves a cell-mediated (T lymphocytes) immune reaction of the delayed type. Other allergic skin reactions, e.g. contact urticaria, involve antibody-mediated immune reactions. The significance of the contact allergen is not simply determined by its sensitisation potential: the distribution of the substance and the opportunities for contact with it are equally important. A weakly sensitising substance which is widely distributed can be a more important allergen than one with stronger sensitising potential with which few individuals come into contact. From a clinical point of view, substances are noteworthy if they produce an allergic test reaction in more than 1% of the persons tested.</p> <p>Detailed analysis of molecular structure indicates that the azo colourant can split off cancer-causing arylamines. The azo linkage, a double bond between two nitrogen atoms, is considered the most unstable part of an azo dye.</p> <p>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. Bladder tumors recorded. Carcinogenic by RTECS criteria.</p> |
| ALPHA-LACTOSE | Equivocal tumorigenic agent by RTECS criteria. |
| KAOLIN | <p>for bentonite clays: Bentonite (CAS No. 1302-78-9) consists of a group of clays formed by crystallisation of vitreous volcanic ashes that were deposited in water. The expected acute oral toxicity of bentonite in humans is very low (LD50>15 g/kg). However, severe anterior segment inflammation, uveitis and retrocneal abscess from eye exposure were reported when bentonite had been used as a prophypaste.</p> |

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|---|--|
| | In a 33 day dietary (2 and 6%) and a 90 day dietary (1, 3 and 5%) studies in chickens, no changes in behaviour, overall state, clinical and biochemical parameters and electrolytic composition of the blood. Repeat dietary administration of bentonite did not affect calcium or phosphorus metabolism. However, larger amounts caused decreased growth, muscle weakness, and death with marked changes in both calcium and phosphorus metabolism. Bentonite did not cause fibrosis after 1 year exposure of 60 mg dust (<5 um) in a rat study. However, in a second rat study, where 5 um particles were intratracheally instilled at 5, 15 and 45 mg/rat, dose-related fibrosis was observed. Bentonite clay dust is believed to be responsible for bronchial asthma in workers at a processing plant in USA. Ingestion of bentonite without adequate liquids may result in intestinal obstruction in humans. Hypokalaemia and microcytic iron-deficiency anaemia may occur in patients after repeat doses of clay. Chronic ingestion has been reported to cause myositis. |
| ZINC STEARATE | Fatty acid salts of low acute toxicity. Their potential to irritate the skin and eyes is dependent on chain length. |
| BORON | Elemental boron produces lower foetal body weight in rats. As dose levels increase the effects seen include rib effects, increased foetal cardiovascular malformations in the rabbit and severe testicular pathology in the rat, including testicular atrophy and sterility. Reduced foetal weight also occurs in mice. |
| BARIUM NITRATE | The material may produce moderate eye irritation leading to inflammation. Repeated or prolonged exposure to irritants may produce conjunctivitis. |
| C.I. SOLVENT YELLOW 14 & KAOLIN & DEXTRINS | No significant acute toxicological data identified in literature search. |
| ZINC OXIDE & BARIUM NITRATE | 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. |
| ZINC STEARATE & BORON | 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. |

| | | | |
|--|---|---------------------------------|---|
| Acute Toxicity | ☐ | Carcinogenicity | ☐ |
| Skin Irritation/Corrosion | ☐ | Reproductivity | ☐ |
| Serious Eye Damage/Irritation | ☐ | STOT - Single Exposure | ☐ |
| Respiratory or Skin sensitisation | ☐ | STOT - Repeated Exposure | ☐ |
| Mutagenicity | ☐ | Aspiration Hazard | ☐ |

Legend: ✘ – Data available but does not fill the criteria for classification
✔ – Data required to make classification available
☐ – Data Not Available to make classification

SECTION 12 ECOLOGICAL INFORMATION

Toxicity

| Ingredient | Endpoint | Test Duration (hr) | Species | Value | Source |
|------------------------|----------|--------------------|-------------------------------|-----------------|--------|
| C.I. Solvent Yellow 14 | LC50 | 96 | Fish | 0.251mg/L | 3 |
| C.I. Solvent Yellow 14 | EC50 | 96 | Algae or other aquatic plants | 0.097mg/L | 3 |
| potassium chlorate | LC50 | 96 | Fish | 1.71819mg/L | 3 |
| potassium chlorate | EC50 | 48 | Crustacea | >1000mg/L | 2 |
| potassium chlorate | EC50 | 72 | Algae or other aquatic plants | 1.9mg/L | 4 |
| potassium chlorate | EC50 | 72 | Algae or other aquatic plants | 1.9mg/L | 2 |
| potassium chlorate | NOEC | 72 | Algae or other aquatic plants | <0.5mg/L | 4 |
| alpha-lactose | LC50 | 96 | Fish | 7.45058mg/L | 3 |
| alpha-lactose | EC50 | 96 | Algae or other aquatic plants | 17857.93905mg/L | 3 |
| alpha-lactose | EC50 | 384 | Crustacea | 42.76118mg/L | 3 |
| zinc oxide | LC50 | 96 | Fish | 0.112mg/L | 2 |
| zinc oxide | EC50 | 48 | Crustacea | 0.105mg/L | 2 |
| zinc oxide | EC50 | 72 | Algae or other aquatic plants | 0.042mg/L | 4 |
| zinc oxide | BCF | 336 | Fish | 4376.673mg/L | 4 |
| zinc oxide | EC20 | 72 | Algae or other aquatic plants | 0.023mg/L | 4 |
| zinc oxide | NOEC | 72 | Algae or other aquatic plants | 0.000013mg/L | 2 |
| zinc stearate | LC50 | 96 | Fish | 0.439mg/L | 2 |
| zinc stearate | EC50 | 48 | Crustacea | 0.413mg/L | 2 |
| zinc stearate | EC50 | 72 | Algae or other aquatic plants | 0.996659994mg/L | 2 |
| zinc stearate | EC50 | 24 | Crustacea | 0.5mg/L | 2 |
| zinc stearate | NOEC | 240 | Algae or other aquatic plants | 0.1mg/L | 2 |
| boron | LC50 | 96 | Fish | 74mg/L | 2 |
| boron | EC50 | 48 | Crustacea | 230mg/L | 5 |
| boron | EC50 | 96 | Algae or other aquatic plants | 15.4mg/L | 2 |
| boron | BCF | 336 | Algae or other aquatic plants | 8.5mg/L | 4 |
| boron | EC50 | 336 | Algae or other aquatic plants | 8.5mg/L | 4 |

Continued...

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| | | | | | |
|-------------------|------|-----|-------------------------------|--------------|---|
| boron | NOEC | 576 | Fish | 0.001mg/L | 5 |
| potassium nitrate | LC50 | 96 | Fish | 22.5mg/L | 4 |
| potassium nitrate | EC50 | 48 | Crustacea | 490mg/L | 2 |
| potassium nitrate | EC50 | 96 | Algae or other aquatic plants | 1181.887mg/L | 3 |
| potassium nitrate | EC50 | 96 | Crustacea | 39mg/L | 2 |
| potassium nitrate | NOEC | 96 | Fish | 98.9mg/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 |

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

Persistence and degradability

| Ingredient | Persistence: Water/Soil | Persistence: Air |
|------------------------|---------------------------|-----------------------------|
| C.I. Solvent Yellow 14 | LOW (Half-life = 56 days) | LOW (Half-life = 1.36 days) |
| potassium chlorate | HIGH | HIGH |
| alpha-lactose | LOW | LOW |
| zinc stearate | LOW | LOW |
| potassium nitrate | LOW | LOW |

Bioaccumulative potential

| Ingredient | Bioaccumulation |
|------------------------|------------------------|
| C.I. Solvent Yellow 14 | HIGH (LogKOW = 5.5069) |
| potassium chlorate | LOW (LogKOW = -4.6296) |
| alpha-lactose | LOW (LogKOW = -5.1249) |
| zinc oxide | LOW (BCF = 217) |
| zinc stearate | LOW (LogKOW = 7.9444) |
| potassium nitrate | LOW (LogKOW = 0.209) |

Mobility in soil

| Ingredient | Mobility |
|------------------------|-------------------|
| C.I. Solvent Yellow 14 | LOW (KOC = 36620) |
| potassium chlorate | LOW (KOC = 35.04) |
| alpha-lactose | LOW (KOC = 10) |
| zinc stearate | LOW (KOC = 11670) |
| potassium nitrate | LOW (KOC = 14.3) |

SECTION 13 DISPOSAL CONSIDERATIONS**Waste treatment methods**

| | |
|-------------------------------------|---|
| Product / Packaging disposal | <ul style="list-style-type: none"> 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. <p>Refer to local Waste Disposal Authority and supplier for suitable disposal procedure.</p> |
|-------------------------------------|---|

SECTION 14 TRANSPORT INFORMATION**Labels Required**

| | |
|-------------------------|---|
| |  |
| Marine Pollutant | NO |
| HAZCHEM | E |

Land transport (ADG)

| | |
|--------------------------------|----------------------|
| 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 | Special provisions | Not Applicable |
| | Limited quantity | 0 |

Air transport (ICAO-IATA / DGR)

| | | |
|-------------------------------------|---|----------------|
| UN number | 0191 | |
| UN proper shipping name | Signal devices, hand | |
| Transport hazard class(es) | 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 |
| | Passenger and Cargo Limited Maximum Qty / Pack | Forbidden |

Sea transport (IMDG-Code / GGVSee)

| | | |
|-------------------------------------|----------------------|----------------|
| UN number | 0191 | |
| UN proper shipping name | SIGNAL DEVICES, HAND | |
| Transport hazard class(es) | IMDG Class | 1.4G |
| | IMDG Subrisk | Not Applicable |
| Packing group | Not Applicable | |
| Environmental hazard | Not Applicable | |
| Special precautions for user | EMS Number | F-B, S-X |
| | Special provisions | Not Applicable |
| | Limited Quantities | 0 |

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****C.I. SOLVENT YELLOW 14(842-07-9) IS FOUND ON THE FOLLOWING REGULATORY LISTS**Australia Hazardous Substances Information System - Consolidated Lists
Australia Inventory of Chemical Substances (AICS)

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

POTASSIUM CHLORATE(3811-04-9) IS FOUND ON THE FOLLOWING REGULATORY LISTS

Australia Hazardous Substances Information System - Consolidated Lists

Australia Inventory of Chemical Substances (AICS)

ALPHA-LACTOSE(63-42-3) IS FOUND ON THE FOLLOWING REGULATORY LISTS

Australia Inventory of Chemical Substances (AICS)

KAOLIN(1332-58-7) IS FOUND ON THE FOLLOWING REGULATORY LISTS

Australia Exposure Standards

Australia Inventory of Chemical Substances (AICS)

DEXTRINS(9004-53-9) IS FOUND ON THE FOLLOWING REGULATORY LISTS

Australia Inventory of Chemical Substances (AICS)

ZINC OXIDE(1314-13-2) IS FOUND ON THE FOLLOWING REGULATORY LISTSAustralia Exposure Standards
Australia Hazardous Substances Information System - Consolidated ListsAustralia Inventory of Chemical Substances (AICS)
International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs

COMET AURORA ORANGE HAND SMOKE

ZINC STEARATE(557-05-1) IS FOUND ON THE FOLLOWING REGULATORY LISTS

Australia Exposure Standards

Australia Inventory of Chemical Substances (AICS)

BORON(7440-42-8) IS FOUND ON THE FOLLOWING REGULATORY LISTS

Australia Exposure Standards

Australia Inventory of Chemical Substances (AICS)

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

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

Australia Inventory of Chemical Substances (AICS)

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

Australia Exposure Standards

Australia Hazardous Substances Information System - Consolidated Lists

Australia Inventory of Chemical Substances (AICS)

| National Inventory | Status |
|-------------------------------|--|
| Australia - AICS | Y |
| Canada - DSL | Y |
| Canada - NDSL | N (dextrins; alpha-lactose; kaolin; barium nitrate; C.I. Solvent Yellow 14; boron; zinc stearate; potassium chlorate; potassium nitrate) |
| China - IECSC | N (potassium chlorate) |
| Europe - EINEC / ELINCS / NLP | Y |
| Japan - ENCS | N (alpha-lactose; kaolin; boron; zinc stearate) |
| 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**

| Name | CAS No |
|----------------|--|
| alpha-lactose | 63-42-3, 5989-81-1, 14641-93-1, 64044-51-5, 10039-26-6 |
| zinc oxide | 1314-13-2, 175449-32-8 |
| barium nitrate | 10022-31-8, 34053-87-7 |

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.

A list of reference resources used to assist the committee may be found at:

www.chemwatch.net

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.