

## Combined Systems MODEL 4090-1 CTG 40mm 100 METER WARNING SIGNAL

Winchester Australia Ltd

Chemwatch Hazard Alert Code: 4

Chemwatch: 4898-62

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Safety Data Sheet according to WHS and ADG requirements

Initial Date: Not Available

L.G.H.S. AUS. EN

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

#### Product Identifier

Product name	Combined Systems MODEL 4090-1 CTG 40mm 100 METER WARNING SIGNAL
Synonyms	Not Available
Proper shipping name	CARTRIDGES FOR WEAPONS with bursting charge†
Other means of identification	Not Available

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

Relevant identified uses	Explosive product.
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#### Details of the manufacturer/importer

Registered company name	Winchester Australia Ltd
Address	65 Hays Road Moolap, Geelong 3224 VIC Australia
Telephone	+61 3 5245 2400
Fax	+61 3 5248 2409
Website	Not Available
Email	Not Available

#### Emergency telephone number

Association / Organisation	Not Available
Emergency telephone numbers	+61 3 5245 2400 (office hours)
Other emergency telephone numbers	04 17 090 554; 04 18 158 337 (AH)

### SECTION 2 HAZARDS IDENTIFICATION

#### Classification of the substance or mixture

**HAZARDOUS CHEMICAL. DANGEROUS GOODS.** According to the Model WHS Regulations and the ADG Code.


#### CHEMWATCH HAZARD RATINGS

	Min	Max	
Flammability	1		
Toxicity	2		
Body Contact	2		
Reactivity	4		
Chronic	0		

0 = Minimum  
1 = Low  
2 = Moderate  
3 = High  
4 = Extreme

Poisons Schedule	Exempt
GHS Classification [1]	Explosive Division 1.4, Acute Toxicity (Inhalation) Category 4, STOT - SE (Resp. Irr.) Category 3, Chronic Aquatic Hazard Category 3
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	 
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SIGNAL WORD	<b>WARNING</b>
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#### Hazard statement(s)

H204	Fire or projection hazard
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H332	Harmful if inhaled
H335	May cause respiratory irritation
H412	Harmful to aquatic life with long lasting effects

**Precautionary statement(s) Prevention**

P210	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P250	Do not subject to grinding/shock/sources of friction.
P271	Use only outdoors or in a well-ventilated area.
P280	Wear protective gloves/protective clothing/eye protection/face protection.
P240	Ground/bond container and receiving equipment.
P261	Avoid breathing dust/fume/gas/mist/vapours/spray.
P273	Avoid release to the environment.

**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.
P312	Call a POISON CENTER/doctor/physician/first aider/ff you feel unwell.
P304+P340	IF INHALED: Remove person to fresh air and keep comfortable for breathing.

**Precautionary statement(s) Storage**

P405	Store locked up.
P401	Store according to local regulations for explosives
P403+P233	Store in a well-ventilated place. Keep container tightly closed.

**Precautionary statement(s) Disposal**

P501	Dispose of contents/container to authorised chemical landfill or if organic to high temperature incineration
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**SECTION 3 COMPOSITION / INFORMATION ON INGREDIENTS****Substances**

See section below for composition of Mixtures

**Mixtures**

CAS No	%[weight]	Name
7778-74-7	25-50	<u>potassium perchlorate</u>
7757-79-1	10-25	<u>potassium nitrate</u>
7429-90-5	10-25	<u>aluminium powder coated</u>
7439-95-4	10-25	<u>magnesium powder, pyrophoric</u>
9004-70-0	<10	<u>nitrocellulose</u>
55-63-0	<10	<u>nitroglycerin</u>
7440-44-0	<10	<u>carbon, activated</u>
7704-34-9	<10	<u>sulfur</u>
7440-32-6	<10	<u>titanium</u>
63918-97-8	<1	<u>lead styphnate</u>
7440-66-6	<1	<u>zinc powder - pyrophoric</u>
10022-31-8	<1	<u>barium nitrate</u>
122-39-4	<0.1	<u>diphenylamine</u>

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

<b>Eye Contact</b>	<p>If this product comes in contact with eyes:</p> <ul style="list-style-type: none"> <li>▶ Wash out immediately with water.</li> <li>▶ If irritation continues, seek medical attention.</li> <li>▶ Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.</li> </ul>
<b>Skin Contact</b>	<p>If skin or hair contact occurs:</p> <ul style="list-style-type: none"> <li>▶ Flush skin and hair with running water (and soap if available).</li> <li>▶ Seek medical attention in event of irritation.</li> </ul>

Inhalation	<ul style="list-style-type: none"> <li>▶ If fumes or combustion products are inhaled remove from contaminated area.</li> <li>▶ Lay patient down. Keep warm and rested.</li> <li>▶ Prostheses such as false teeth, which may block airway, should be removed, where possible, prior to initiating first aid procedures.</li> <li>▶ Apply artificial respiration if not breathing, preferably with a demand valve resuscitator, bag-valve mask device, or pocket mask as trained. Perform CPR if necessary.</li> <li>▶ Transport to hospital, or doctor.</li> </ul>
Ingestion	<ul style="list-style-type: none"> <li>▶ Not considered a normal route of entry.</li> </ul> <p>Not normally a hazard due to physical form of product.</p>

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

Treat symptomatically.

## SECTION 5 FIREFIGHTING MEASURES

### Extinguishing media

- ▶ **WARNING:** Deliver water spray or fog from a safe distance only.

### Special hazards arising from the substrate or mixture

Fire Incompatibility	<ul style="list-style-type: none"> <li>▶ Avoid contamination with oxidising agents i.e. nitrates, oxidising acids, chlorine bleaches, pool chlorine etc. as ignition may result</li> <li>▶ Avoid strong acids, acid chlorides, acid anhydrides and chloroformates.</li> </ul>
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### Advice for firefighters

Fire Fighting	<p><b>WARNING: EXPLOSIVE MATERIALS / ARTICLES PRESENT!</b></p> <ul style="list-style-type: none"> <li>▶ Evacuate all personnel and move upwind.</li> <li>▶ Prevent re-entry.</li> <li>▶ Alert Fire Brigade and tell them location and nature of hazard.</li> <li>▶ May detonate and burning material may be propelled from fire.</li> <li>▶ Wear full-body protective clothing with breathing apparatus.</li> <li>▶ Prevent, by any means available, spillage and fire effluent from entering drains and water courses.</li> <li>▶ Fight fire from safe distances and from protected locations.</li> <li>▶ Use flooding quantities of water.</li> <li>▶ <b>DO NOT</b> approach containers or packages suspected to be hot.</li> <li>▶ Cool any exposed containers not involved in fire from a protected location.</li> <li>▶ Equipment should be thoroughly decontaminated after use.</li> </ul>
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 E explosives are articles containing a secondary detonating explosive substance, without means of initiation, with a propelling charge (other than one containing a flammable liquid or gel or hypergolic liquids)</p> <p>Decomposition may produce toxic fumes of: carbon dioxide (CO<sub>2</sub>) nitrogen oxides (NO<sub>x</sub>) metal oxides. Individual devices will randomly explode. Will not mass explode if multiple devices are involved. In unusual cases, shrapnel may be thrown from exploding devices under containment.</p>

## SECTION 6 ACCIDENTAL RELEASE MEASURES

### Personal precautions, protective equipment and emergency procedures

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

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

### Conditions for safe storage, including any incompatibilities

<b>Suitable container</b>	<ul style="list-style-type: none"> <li>▶ All packaging for Class 1 Goods shall be in accordance with the requirements of the relevant Code for the transport of Dangerous Goods.</li> <li>▶ Class 1 is unique in that the type of packaging used frequently has a very decisive effect on the hazard and therefore on the assignment to a particular division</li> </ul>
<b>Storage incompatibility</b>	<ul style="list-style-type: none"> <li>▶ Reacts with acids producing flammable / explosive hydrogen (H<sub>2</sub>) gas</li> <li>▶ Avoid reaction with oxidising agents</li> <li>▶ Avoid strong acids, acid chlorides, acid anhydrides and chloroformates.</li> <li>▶ strong alkalis</li> </ul>



- X** — Must not be stored together  
**0** — May be stored together with specific preventions  
**+** — May be stored together

## 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	aluminium powder coated	Aluminium (metal dust) / Aluminium (welding fumes) (as Al) / Aluminium, pyro powders (as Al)	10 mg/m <sup>3</sup> / 5 mg/m <sup>3</sup>	Not Available	Not Available	Not Available
Australia Exposure Standards	magnesium powder, pyrophoric	Fume (thermally generated) (respirable dust)(g)	2 mg/m <sup>3</sup>	Not Available	Not Available	Not Available
Australia Exposure Standards	nitrocellulose	Fume (thermally generated) (respirable dust)(g)	2 mg/m <sup>3</sup>	Not Available	Not Available	Not Available
Australia Exposure Standards	nitroglycerin	Nitroglycerin (NG)	0.46 mg/m <sup>3</sup> / 0.05 ppm	Not Available	Not Available	Sk
Australia Exposure Standards	carbon, activated	Fume (thermally generated) (respirable dust)(g)	2 mg/m <sup>3</sup>	Not Available	Not Available	Not Available
Australia Exposure Standards	sulfur	Fume (thermally generated) (respirable dust)(g)	2 mg/m <sup>3</sup>	Not Available	Not Available	Not Available
Australia Exposure Standards	titanium	Fume (thermally generated) (respirable dust)(g)	2 mg/m <sup>3</sup>	Not Available	Not Available	Not Available
Australia Exposure Standards	zinc powder - pyrophoric	Fume (thermally generated) (respirable dust)(g)	2 mg/m <sup>3</sup>	Not Available	Not Available	Not Available
Australia Exposure Standards	barium nitrate	Barium, soluble compounds (as Ba)	0.5 mg/m <sup>3</sup>	Not Available	Not Available	Not Available
Australia Exposure Standards	diphenylamine	Diphenylamine	10 mg/m <sup>3</sup>	Not Available	Not Available	Not Available

#### EMERGENCY LIMITS

Ingredient	Material name	TEEL-1	TEEL-2	TEEL-3
potassium perchlorate	Potassium perchlorate	23 mg/m <sup>3</sup>	250 mg/m <sup>3</sup>	1500 mg/m <sup>3</sup>
potassium nitrate	Potassium nitrate	0.074 mg/m <sup>3</sup>	0.82 mg/m <sup>3</sup>	600 mg/m <sup>3</sup>
aluminium powder coated	Aluminum	3 mg/m <sup>3</sup>	33 mg/m <sup>3</sup>	200 mg/m <sup>3</sup>


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magnesium powder, pyrophoric	Magnesium	0.016 mg/m3	0.17 mg/m3	1 mg/m3
nitrocellulose	Pyroxylin; (Cellulose tetranitrate)	15 mg/m3	170 mg/m3	990 mg/m3
nitroglycerin	Nitroglycerin	0.1 mg/m3	2 mg/m3	500 mg/m3
carbon, activated	Carbon; (Graphite, synthetic)	6 mg/m3	16 mg/m3	95 mg/m3
sulfur	Sulfur	2.8 mg/m3	31 mg/m3	190 mg/m3
titanium	Titanium	0.12 mg/m3	1.3 mg/m3	7.7 mg/m3
zinc powder - pyrophoric	Zinc	1.9 mg/m3	21 mg/m3	120 mg/m3
barium nitrate	Barium nitrate	2.9 mg/m3	18 mg/m3	2100 mg/m3
diphenylamine	Diphenylamine	30 mg/m3	65 mg/m3	220 mg/m3

Ingredient	Original IDLH	Revised IDLH
potassium perchlorate	Not Available	Not Available
potassium nitrate	Not Available	Not Available
aluminium powder coated	Not Available	Not Available
magnesium powder, pyrophoric	Not Available	Not Available
nitrocellulose	Not Available	Not Available
nitroglycerin	500 mg/m3	75 mg/m3
carbon, activated	Not Available	Not Available
sulfur	Not Available	Not Available
titanium	Not Available	Not Available
lead styphnate	700 mg/m3	100 mg/m3
zinc powder - pyrophoric	Not Available	Not Available
barium nitrate	1,100 mg/m3	50 mg/m3
diphenylamine	Not Available	Not Available

MATERIAL DATA

Exposure controls

Appropriate engineering controls	Normally used outdoors
Personal protection	
Eye and face protection	<ul style="list-style-type: none"> <li>▶ Chemical goggles.</li> <li>▶ Full face shield may be required for supplementary but never for primary protection of eyes.</li> <li>▶ Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants. A written policy document, describing the wearing of lenses or restrictions on use, should be created for each workplace or task. This should include a review of lens absorption and adsorption for the class of chemicals in use and an account of injury experience. Medical and first-aid personnel should be trained in their removal and suitable equipment should be readily available. In the event of chemical exposure, begin eye irrigation immediately and remove contact lens as soon as practicable. Lens should be removed at the first signs of eye redness or irritation - lens should be removed in a clean environment only after workers have washed hands thoroughly. [CDC NIOSH Current Intelligence Bulletin 59]. [AS/NZS 1336 or national equivalent]</li> </ul>
Skin protection	See Hand protection below
Hands/feet protection	Wear physical protective gloves, e.g. leather <ul style="list-style-type: none"> <li>▶ Heavy weight Rubber gloves</li> <li>▶ Rubber boots</li> </ul> Non-sparking or conductive footwear essential. Conductive footwear describes a boot or shoe with a sole made from a conductive compound chemically bound to the bottom components, for permanent control to electrically ground the foot and shall dissipate static electricity from the body to reduce the possibility of ignition of volatile compounds. Electrical resistance must range between 0 to 500,000 ohms. Conductive shoes should be stored in lockers close to the room in which they are worn. Personnel who have been issued conductive footwear should not wear them from their place of work to their homes and return.
Body protection	See Other protection below
Other protection	For handling explosives or explosive compositions: <ul style="list-style-type: none"> <li>▶ Wear close-fitting flame-protection treated clothing closed at the neck and sleeves.</li> <li>▶ Cotton underwear, socks and conductive shoes are recommended to avoid human static discharge.</li> </ul>
Thermal hazards	Not Available

Recommended material(s)

GLOVE SELECTION INDEX

Glove selection is based on a modified presentation of the:

"Forsberg Clothing Performance Index".

The effect(s) of the following substance(s) are taken into account in the **computer-generated** selection:

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Material	CPI
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Respiratory protection

Type A-P Filter of sufficient capacity (AS/NZS 1716 & 1715, EN 143:2000 & 149:2001, ANSI Z88 or national equivalent)

Where the concentration of gas/particulates in the breathing zone, approaches or exceeds the "Exposure Standard" (or ES), respiratory protection is required.

Degree of protection varies with both face-piece and Class of filter, the nature of protection varies with Type of filter.

Required Minimum Protection Factor	Half-Face Respirator	Full-Face Respirator	Powered Air Respirator
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\* CPI - Chemwatch Performance Index

A: Best Selection

B: Satisfactory; may degrade after 4 hours continuous immersion

C: Poor to Dangerous Choice for other than short term immersion

**NOTE:** As a series of factors will influence the actual performance of the glove, a final selection must be based on detailed observation. -

\* Where the glove is to be used on a short term, casual or infrequent basis, factors such as "feel" or convenience (e.g. disposability), may dictate a choice of gloves which might otherwise be unsuitable following long-term or frequent use. A qualified practitioner should be consulted.

up to 10 x ES	A-AUS P2	-	A-PAPR-AUS / Class 1 P2
up to 50 x ES	-	A-AUS / Class 1 P2	-
up to 100 x ES	-	A-2 P2	A-PAPR-2 P2 ^

^ - Full-face

A(All classes) = Organic vapours, B AUS or B1 = Acid gasses, B2 = Acid gas or hydrogen cyanide(HCN), B3 = Acid gas or hydrogen cyanide(HCN), E = Sulfur dioxide(SO<sub>2</sub>), G = Agricultural chemicals, K = Ammonia(NH<sub>3</sub>), Hg = Mercury, NO = Oxides of nitrogen, MB = Methyl bromide, AX = Low boiling point organic compounds(below 65 degC)

## SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

### Information on basic physical and chemical properties

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

## SECTION 10 STABILITY AND REACTIVITY

<b>Reactivity</b>	See section 7
<b>Chemical stability</b>	<ul style="list-style-type: none"> <li>▶ Presence of open flame</li> <li>▶ Presence of shock and friction</li> <li>▶ Presence of heat source and ignition source</li> <li>▶ Product is considered stable under normal handling conditions.</li> <li>▶ Stable under normal storage conditions.</li> <li>▶ Hazardous polymerization will not occur.</li> </ul> Avoid contact with other chemicals.  Cartridge may detonate if case is punctured or severely damaged.
<b>Possibility of hazardous reactions</b>	See section 7
<b>Conditions to avoid</b>	See section 7
<b>Incompatible materials</b>	See section 7
<b>Hazardous decomposition products</b>	See section 5

## SECTION 11 TOXICOLOGICAL INFORMATION

### Information on toxicological effects

<b>Inhaled</b>	Not normally a hazard due to physical form of product.
<b>Ingestion</b>	Not normally a hazard due to physical form of product.
<b>Skin Contact</b>	Not normally a hazard due to physical form of product.
<b>Eye</b>	Not normally a hazard due to physical form of product.
<b>Chronic</b>	Explosive components are completely sealed within the metal alloy cartridge.  Under normal handling of this product, no exposure to harmful materials will occur.  Product may produce physical injury if mishandled. Treatment of these injuries should be based on the blast and compression effects.

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	Not Available	Not Available

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potassium perchlorate	TOXICITY	IRRITATION
	Not Available	Not Available
potassium nitrate	TOXICITY	IRRITATION
	dermal (rat) LD50: >5000 mg/kg <sup>[1]</sup>	Nil reported
	Oral (rat) LD50: >2000 mg/kg <sup>[1]</sup>	
aluminium powder coated	TOXICITY	IRRITATION
	Oral (rat) LD50: >2000 mg/kg <sup>[1]</sup>	Not Available
magnesium powder, pyrophoric	TOXICITY	IRRITATION
	Oral (rat) LD50: >2000 mg/kg <sup>[1]</sup>	Not Available
nitrocellulose	TOXICITY	IRRITATION
	Oral (rat) LD50: >5000 mg/kg <sup>[2]</sup>	Not Available
nitroglycerin	TOXICITY	IRRITATION
	dermal (rat) LD50: >9 mg/kg <sup>[1]</sup>	Not Available
	Oral (rat) LD50: 105 mg/kg <sup>[2]</sup>	
carbon, activated	TOXICITY	IRRITATION
	Not Available	Not Available
sulfur	TOXICITY	IRRITATION
	dermal (rat) LD50: >2000 mg/kg <sup>[1]</sup>	Eye (human): 8 ppm irritant
	Inhalation (rat) LC50: >5.43 mg/L4 h <sup>[1]</sup>	
	Oral (rat) LD50: >2000 mg/kg <sup>[1]</sup>	
titanium	TOXICITY	IRRITATION
	Oral (rat) LD50: >2000 mg/kg <sup>[1]</sup>	Not Available
lead styphnate	TOXICITY	IRRITATION
	dermal (rat) LD50: >2000 mg/kg <sup>[1]</sup>	Not Available
	Inhalation (rat) LC50: >5.05 mg/l4 h <sup>[1]</sup>	
	Oral (rat) LD50: >2000 mg/kg <sup>[1]</sup>	
zinc powder - pyrophoric	TOXICITY	IRRITATION
	Dermal (rabbit) LD50: 1130 mg/kg <sup>[2]</sup>	Skin(human): 0.3 mg/3d - I
	Oral (rat) LD50: >2000 mg/kg <sup>[1]</sup>	
barium nitrate	TOXICITY	IRRITATION
	Oral (rat) LD50: 355 mg/kgd <sup>[2]</sup>	Eye (rabbit): 100 mg/24h - moderate
		Skin (rabbit): 500 mg/24h - mild
diphenylamine	TOXICITY	IRRITATION
	Oral (hamster) LD50: ca 600 mg/kg <sup>[1]</sup>	Not Available
<b>Legend:</b>	1. Value obtained from Europe ECHA Registered Substances - Acute toxicity 2. * Value obtained from manufacturer's SDS. Unless otherwise specified data extracted from RTECS - Register of Toxic Effect of chemical Substances	

<b>NITROGLYCERIN</b>	<p>The material may produce severe irritation to the eye causing pronounced inflammation. Repeated or prolonged exposure to irritants may produce conjunctivitis.</p> <p>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 epidermis. Histologically there may be intercellular oedema of the spongy layer (spongiosis) and intracellular oedema of the epidermis.</p> <p>Substance has been investigated as a tumorigen, mutagen and reproductive effector. Equivocal tumorigen by RTECS criteria. Reproductive effector in rats.</p>
<b>CARBON, ACTIVATED</b>	<p>No significant acute toxicological data identified in literature search.</p> <p>The substance is classified by IARC as Group 3:</p> <p><b>NOT</b> classifiable as to its carcinogenicity to humans.</p> <p>Evidence of carcinogenicity may be inadequate or limited in animal testing.</p>

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LEAD STYPHNATE	<p>The following information refers to contact allergens as a group and may not be specific to this product.</p> <p>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>No significant acute toxicological data identified in literature search.</p>
ZINC POWDER - PYROPHORIC	<p>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 epidermis. Histologically there may be intercellular oedema of the spongy layer (spongiosis) and intracellular oedema of the epidermis.</p>
BARIUM NITRATE	<p>The material may produce moderate eye irritation leading to inflammation. Repeated or prolonged exposure to irritants may produce conjunctivitis.</p> <p>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 epidermis. Histologically there may be intercellular oedema of the spongy layer (spongiosis) and intracellular oedema of the epidermis.</p>
DIPHENYLAMINE	<p>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.</p> <p><b>Acute toxicity:</b> Diphenylamine and its substituted derivatives all show a slight to moderate order of toxicity following oral administration, with LD50 values ranging from &gt;500 to &gt; 34,000 mg/kg. Overall, the acute dermal LD50 for these materials was greater than the 2000 mg/kg limit dose indicating a very low order of toxicity.</p> <p><b>Mutagenicity:</b> Of five substituted diphenylamines tested, there was one weakly positive mutagenic response with in the bacterial mutagenicity test, with diphenylamine (122-39-4). Overall weight of evidence for this material, as well as the category indicates a negative evaluation for bacterial mutagenicity. Substituted diphenylamines have been tested for mutagenicity in tests for gene mutations and chromosomal aberrations. The assays included point mutations in bacterial cells, <i>in vitro</i> chromosomal aberrations in mammalian cells, and <i>in vivo</i> chromosomal aberrations. With one exception, the data consistently demonstrate no evidence of genotoxicity for this category of materials. This suggests that all members of the category lack genotoxicity due to their similarity in chemical structures and physicochemical properties.</p> <p><b>Repeat Dose Toxicity:</b> Diphenylamine (122-39-4) was tested in a 28 day oral study with rats. A NOAEL of 111 mg/kg/day was identified. Diphenylamine is not only the common precursor for the materials of this category, but also theoretically the most toxic of the class since it is the smallest member of the class. The addition of alkyl groups onto the diphenylamine molecule results in even lower water solubility and, therefore, becomes less bioavailable.</p> <p>Diphenylamine, styrenated (68442-68-2) was tested in a 28day oral gavage study in rats. A NOAEL of 100 mg/kg/day was identified. Diphenylamine styrenated was tested in a 28-day gavage study in rats; 100 mg/kg/day was selected as the NOAEL. Diphenylamine-, reaction products with styrene and 2,4,4-trimethylpentene (68921-45-9) was tested in a 64 week rat dietary study; a LOEL of 2500 ppm was identified.</p> <p><b>Reproductive and Developmental Toxicity:</b> Diphenylamine was administered in feed at 0.1, 0.25 or 0.5% (ca. 67, 167 or 333 mg/kg/day) to rats in a two-generation reproductive toxicity study. In general, the average size of the litters decreased as the concentration of dietary diphenylamine increased. A NOEL was not established. A developmental study was also conducted with diphenylamine in rabbits. The test article was administered by gavage at dose levels of 0, 33, 100 and 300 mg/kg/day for gestation days 7-19. The test article produced minimal effects (decreased food consumption and mean body weight) to maternal rats at 300 mg/kg/day during pregnancy; there were no other signs of maternal toxicity. NOAEL for maternal toxicity was established at 100 mg/kg/day. The NOAEL for teratogenicity/developmental effects was greater than 300 mg/kg/day.</p> <p>ADI: 0.02 mg/kg/day NOEL: 1.5 mg/kg/day</p>
POTASSIUM PERCHLORATE & ALUMINIUM POWDER COATED & MAGNESIUM POWDER, PYROPHORIC & NITROCELLULOSE & TITANIUM	<p>No significant acute toxicological data identified in literature search.</p>

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 required to make classification available  
 ✗ – Data available but does not fill the criteria for classification  
 ⊘ – Data Not Available to make classification

## SECTION 12 ECOLOGICAL INFORMATION

## Toxicity

NOT AVAILABLE

Ingredient	Endpoint	Test Duration	Effect	Value	Species	BCF
potassium perchlorate	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available
potassium nitrate	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available
aluminium powder coated	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available

Continued...



## Combined Systems MODEL 4090-1 CTG 40mm 100 METER WARNING SIGNAL

magnesium powder, pyrophoric	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available
nitrocellulose	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available
nitroglycerin	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available
carbon, activated	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available
sulfur	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available
titanium	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available
lead styphnate	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available
zinc powder - pyrophoric	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available
barium nitrate	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available
diphenylamine	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available

Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

**DO NOT** discharge into sewer or waterways.

### Persistence and degradability

Ingredient	Persistence: Water/Soil	Persistence: Air
potassium nitrate	LOW	LOW
nitroglycerin	LOW (Half-life = 14 days)	LOW (Half-life = 0.73 days)
sulfur	LOW	LOW
diphenylamine	LOW (Half-life = 56 days)	Not Available

### Bioaccumulative potential

Ingredient	Bioaccumulation
potassium nitrate	LOW (LogKOW = 0.209)
sulfur	LOW (LogKOW = 0.229)
diphenylamine	LOW (BCF = 253)

### Mobility in soil

Ingredient	Mobility
potassium nitrate	LOW (KOC = 14.3)
sulfur	LOW (KOC = 14.3)
diphenylamine	LOW (KOC = 1887)

## SECTION 13 DISPOSAL CONSIDERATIONS

### Waste treatment methods

<b>Product / Packaging disposal</b>	<ul style="list-style-type: none"> <li>▶ Explosives must not be thrown away, buried, discarded or placed with garbage.</li> <li>▶ Explosives which are surplus, deteriorated or considered unsafe for transport, storage or use shall be destroyed and the statutory authorities shall be notified.</li> <li>▶ This material may be disposed of by burning or detonation but the operation may only be performed under the control of a person trained in the safe destruction of explosives.</li> </ul>
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## SECTION 14 TRANSPORT INFORMATION

### Labels Required

	
<b>Marine Pollutant</b>	NO
<b>HAZCHEM</b>	Not Applicable

### Land transport (ADG)

<b>UN number</b>	0412				
<b>Packing group</b>	Not Applicable				
<b>UN proper shipping name</b>	CARTRIDGES FOR WEAPONS with bursting charge†				
<b>Environmental hazard</b>	No relevant data				
<b>Transport hazard class(es)</b>	<table style="width: 100%; border: none;"> <tr> <td style="border: none;">Class</td> <td style="border: none;">1.4E</td> </tr> <tr> <td style="border: none;">Subrisk</td> <td style="border: none;">Not Applicable</td> </tr> </table>	Class	1.4E	Subrisk	Not Applicable
Class	1.4E				
Subrisk	Not Applicable				
<b>Special precautions for user</b>	<table style="width: 100%; border: none;"> <tr> <td style="border: none;">Special provisions</td> <td style="border: none;">Not Applicable</td> </tr> <tr> <td style="border: none;">Limited quantity</td> <td style="border: none;">0</td> </tr> </table>	Special provisions	Not Applicable	Limited quantity	0
Special provisions	Not Applicable				
Limited quantity	0				

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

<b>UN number</b>	0412	
<b>Packing group</b>	Not Applicable	
<b>UN proper shipping name</b>	Cartridges for weapons with bursting charge	
<b>Environmental hazard</b>	No relevant data	
<b>Transport hazard class(es)</b>	ICAO/IATA Class	1.4E
	ICAO / IATA Subrisk	Not Applicable
	ERG Code	1L
<b>Special precautions for user</b>	Special provisions	Not Applicable
	Cargo Only Packing Instructions	130
	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)**

<b>UN number</b>	0412	
<b>Packing group</b>	Not Applicable	
<b>UN proper shipping name</b>	CARTRIDGES FOR WEAPONS with bursting charge	
<b>Environmental hazard</b>	Not Applicable	
<b>Transport hazard class(es)</b>	IMDG Class	1.4E
	IMDG Subrisk	Not Applicable
<b>Special precautions for user</b>	EMS Number	F-B , S-X
	Special provisions	Not Applicable
	Limited Quantities	0

**Transport in bulk according to Annex II of MARPOL 73 / 78 and the IBC code**

Source	Ingredient	Pollution Category
IMO MARPOL 73/78 (Annex II) - List of Noxious Liquid Substances Carried in Bulk	sulfur	Z
IMO MARPOL 73/78 (Annex II) - List of Noxious Liquid Substances Carried in Bulk	diphenylamine	Y

**SECTION 15 REGULATORY INFORMATION****Safety, health and environmental regulations / legislation specific for the substance or mixture****POTASSIUM PERCHLORATE(7778-74-7) IS FOUND ON THE FOLLOWING REGULATORY LISTS**

Australia Hazardous Substances Information System - Consolidated Lists

Australia Inventory of Chemical Substances (AICS)

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

Australia Inventory of Chemical Substances (AICS)

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

Australia Exposure Standards

Australia Inventory of Chemical Substances (AICS)

Australia Hazardous Substances Information System - Consolidated Lists

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

Australia Exposure Standards

Australia Inventory of Chemical Substances (AICS)

Australia Hazardous Substances Information System - Consolidated Lists

**NITROCELLULOSE(9004-70-0) IS FOUND ON THE FOLLOWING REGULATORY LISTS**

Australia Exposure Standards

Australia Inventory of Chemical Substances (AICS)

Australia Hazardous Substances Information System - Consolidated Lists

International Air Transport Association (IATA) Dangerous Goods Regulations - Prohibited List Passenger and Cargo Aircraft

**NITROGLYCERIN(55-63-0) IS FOUND ON THE FOLLOWING REGULATORY LISTS**

Australia Exposure Standards

Australia Inventory of Chemical Substances (AICS)

Australia Hazardous Substances Information System - Consolidated Lists

International Air Transport Association (IATA) Dangerous Goods Regulations - Prohibited List Passenger and Cargo Aircraft

**CARBON, ACTIVATED(7440-44-0) IS FOUND ON THE FOLLOWING REGULATORY LISTS**

Australia Exposure Standards  
Australia Inventory of Chemical Substances (AICS)

International Air Transport Association (IATA) Dangerous Goods Regulations - Prohibited List  
Passenger and Cargo Aircraft

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

Australia Exposure Standards  
Australia Hazardous Substances Information System - Consolidated Lists

Australia Inventory of Chemical Substances (AICS)

#### TITANIUM(7440-32-6) IS FOUND ON THE FOLLOWING REGULATORY LISTS

Australia Exposure Standards  
Australia Inventory of Chemical Substances (AICS)

International Air Transport Association (IATA) Dangerous Goods Regulations - Prohibited List  
Passenger and Cargo Aircraft

#### LEAD STYPHNATE(63918-97-8) 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

International Air Transport Association (IATA) Dangerous Goods Regulations - Prohibited List  
Passenger and Cargo Aircraft

#### ZINC POWDER - PYROPHORIC(7440-66-6) IS FOUND ON THE FOLLOWING REGULATORY LISTS

Australia Exposure Standards  
Australia Hazardous Substances Information System - Consolidated Lists

Australia Inventory of Chemical Substances (AICS)

#### BIARIUM 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)

#### DIPHENYLAMINE(122-39-4) 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 (zinc powder - pyrophoric; lead styphnate; aluminium powder coated; nitrocellulose; sulfur; titanium; barium nitrate; carbon, activated; nitroglycerin; diphenylamine; potassium perchlorate; magnesium powder, pyrophoric; potassium nitrate)
China - IECSC	N (lead styphnate; nitroglycerin)
Europe - EINEC / ELINCS / NLP	N (nitrocellulose)
Japan - ENCS	N (zinc powder - pyrophoric; aluminium powder coated; sulfur; titanium; carbon, activated; magnesium powder, pyrophoric)
Korea - KECI	Y
New Zealand - NZIoC	Y
Philippines - PICCS	N (lead styphnate)
USA - TSCA	Y
<b>Legend:</b>	Y = All ingredients are on the inventory N = Not determined or one or more ingredients are not on the inventory and are not exempt from listing(see specific ingredients in brackets)

## SECTION 16 OTHER INFORMATION

### Other information

#### Ingredients with multiple cas numbers

Name	CAS No
lead styphnate	15245-44-0, 63918-97-8, 6594-85-0
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](http://www.chemwatch.net)

The (M)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.

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