

## MATERIAL SAFETY DATA SHEET

<b>MANUFACTURER:</b>	<b>GENERAL DYNAMICS ORDNANCE AND TACTICAL SYSTEMS – CANADA INC.</b> 5, Montée des Arsenaux Le Gardeur, Québec, Canada J5Z 2P4
<b>EMERGENCY PHONE NUMBER:</b>	<b>(450) 581-3080</b>
<b>24-HOUR NUMBER:</b>	1-888-992-3330 (Canada/U.S.A.) 1-514-981-5228 (International)
<b>EMERGENCY RESPONSE PLAN:</b>	<b>ERP2-1388</b>
<b>MATERIAL:</b>	<b>0.38 mm FX<sup>®</sup> Marking Cartridge, Training Ammunition</b> (Red and Blue)
<b>ISSUE DATE:</b>	January 18, 2008

### SECTION #1: PRODUCT INFORMATION

<b>Product Family:</b>	<b>SIMUMITION<sup>®</sup> FX<sup>®</sup> Marking Cartridge, Training Ammunition</b>
<b>Proper Shipping Name:</b>	<b>CARTRIDGES, SMALL ARMS</b>
<b>Class:</b>	<b>1.4S, UN0012</b>

### SECTION #2: HAZARDOUS INGREDIENTS

COMPONENTS	%	CAS NUMBER	LD <sub>50</sub> OF MATERIAL (SPECIES AND ROUTE)	LC <sub>50</sub> OF MATERIAL (SPECIES)
<b>Cartridge case</b>				
Copper	54	7440-50-8	Not established	Not established
Zinc	23	7440-66-6	Not established	Not established
<b>Projectile</b>				
Polypropylene	4	9003-07-0	Not established	Not established
Various dye	0.1-1	Various	Not established	Not established
Sodium laurylsulfate	2	151-21-3	1288 mg/kg oral rat	Not established
Propylene glycol	0.1-1	57-55-6	20 g/kg oral rat	Not established
Barium sulfate	3	7727-43-7	Not established	Not established
<b>Primer</b>				
Lead styphnate	0.1-1	15245-44-0	Not established	Not established
Barium nitrate	0.1-1	10022-31-8	355 mg/kg oral rat	Not established
Antimony sulfide	<0.1	1345-04-6	209 mg/kg ipr mouse	Not established
Aluminium	<0.1	7429-90-5	Not established	Not established
Pentaerythritol (PETN)	<0.1	115-77-5	25500 mg/kg oral mouse	Not established

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**SECTION # 2: HAZARDOUS INGREDIENTS**

COMPONENTS	%	CAS NUMBER	LD <sub>50</sub> OF MATERIAL (SPECIES AND ROUTE)	LC <sub>50</sub> OF MATERIAL (SPECIES)
Tetracene	<0.1	31330-63-9	Not established	Not established

**SECTION # 3: PHYSICAL DATA**

**PHYSICAL DATA:**

<b>Boiling Point:</b>	Not Applicable
<b>Melting Point:</b>	Not Applicable
<b>Vapour Pressure:</b>	Not Applicable
<b>Solubility (Water):</b>	Yes (projectile composition)
<b>Evaporation Rate:</b>	Not Applicable
<b>Percent Volatile:</b>	Not Applicable
<b>Vapour Density (AIR-1):</b>	Not Applicable
<b>Bulk Density:</b>	Not Applicable
<b>Appearance:</b>	Brass case & white plastic sabot with moulded thin wall polypropylene projectile filled with red or blue marking compound.
<b>Odour:</b>	None
<b>Odour Threshold:</b>	None
<b>Flammable:</b>	Yes
<b>Pyrophoric:</b>	Not established
<b>Explosive:</b>	Yes
<b>Unstable:</b>	No
<b>Water Reactive:</b>	Yes

**SECTION # 4: FIRE & EXPLOSION DATA**

<b>Flash Point:</b>	Not Established
<b>Auto Ignition Temperature:</b>	120°C (250°F) (primer formulation)
<b>Upper Explosive Limits (%):</b>	Not Established
<b>Lower Explosive Limits (%):</b>	Not Established

**Fire and Explosion Hazards:**

May ignite if heated to 120°C (250°F) independent of air.  
Moderate fire; Expect minor explosions and hot fragments.  
Fire may produce irritating, corrosive and/or toxic gases.

<b>Extinguishing Media:</b>	Water
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**Cargo fires:**

**SECTION # 4: FIRE & EXPLOSION DATA**

Packages bearing the 1.4S label or packages containing material classified as 1.4S are designed or packaged in such manner that when involved in a fire, may burn vigorously with localized detonations and projection of fragments.

Effects are usually confined to immediate vicinity of packages.

If fire threatens cargo area containing packages bearing the 1.4S label or packages containing material classified as 1.4S, consider isolating at least 15 meters (50 feet) in all directions. Fight fire with normal precautions from a reasonable distance.

**Tire or vehicle fires:**

**Use plenty of water - FLOOD it! If water is not available, use CO2, dry chemical or dirt.**

If possible, and WITHOUT RISK, use unmanned hose holders or monitor nozzles from maximum distance to prevent fire from spreading to cargo area.

Pay special attention to the tire fires as re-ignition may occur. Stand by with extinguisher ready.

**Evacuation:**

Large spill: Consider initial evacuation for 50 meters (150 feet) in all direction.

The evacuation radius will vary according the atmospheric conditions.

**Supplemental Information:**

Transportation Emergencies: Contact

1-888-992-3330 (Canada/U.S.A.) 1-514-981-5228 (International). Consult the Transport Canada Response Guide book for instructions for handling emergencies involving this product.

**SECTION # 5: REACTIVITY DATA**

<b>Stability</b>	Stable under normal use conditions
<b>Polymerization</b>	Will not occur
<b>Conditions to avoid</b>	Individual cartridges may ignite if the primer is struck. Cartridge may ignite if heated to 120°C (250°F) independent of air
<b>Incompatible Materials</b>	Oils, Acids, Alkalis, Ammonia and other corrosive materials
<b>Hazardous Decomposition Materials</b>	Nitrogen Oxides, Carbon and Carbon Oxides, Sulphur and Sulphur Oxides, Ammoniac and Hydrogen Cyanide. Other dust and fumes may also be produced. (barium, antimony and lead)

**SECTION # 6: TOXICOLOGICAL PROPERTIES**

**Physical Hazards:**

<b>Oxidizer:</b>	Yes
<b>Organic Peroxide:</b>	No

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**SECTION # 6: TOXICOLOGICAL PROPERTIES**

<b>Corrosive:</b>	No
<b>Compressed gas:</b>	No
<b>Irritant:</b>	Yes
<b>Skin Hazard:</b>	Yes
<b>Eye Hazard:</b>	Yes
<b>Toxic Agent:</b>	No
<b>Sensitizer:</b>	No
<b>Carcinogen:</b>	No
<b>Reproductive Toxin:</b>	No
<b>Blood Toxin:</b>	Yes (lead)
<b>Nervous System Toxin:</b>	Yes (lead)
<b>Lung Toxin:</b>	Yes (barium)
<b>Liver Toxin:</b>	No
<b>Kidney Toxin:</b>	No

**Potential Health Effects:**

**Inhalation:** After cartridges have been fired, dust, vapours, and/or fumes may be irritating to the respiratory system. \*

**Ingestion:** After cartridges have been fired, dust vapours, and or fumes may be absorbed by the digestive system and be irritating. \*

**Skin Contact:** After cartridges have been fired, dust, vapours, and/or fumes may cause irritation. \*

**Skin Absorption:** After cartridges have been fired, dust can be absorbed through the pores if left on the skin. \*

**Eye Contact:** After cartridges have been fired, dust, vapours, and/or fumes may cause irritation. \*

**Effects of Overexposure to products of combustion:**

**Acute Overexposure:** If left untreated, weakness, vomiting, loss of appetite, uncoordinated body movements, convulsion, stupor, and possibly coma may occur. Damage is possible to the reproductive systems in both males and females. \*

**SECTION # 6: TOXICOLOGICAL PROPERTIES**

**Exposure Limits of Material:**

COMPONENTS	ACGIH TLV (TWA)	OSHA PEL (TWA)	REMARKS
<b>Cartridge case</b>			
Copper (as dust)	1 mg/m <sup>3</sup>	1 mg/m <sup>3</sup>	Irritation, Metal fume fever, Gastrointestinal

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**SECTION # 6: TOXICOLOGICAL PROPERTIES**

Zinc (as zinc oxide)	2 mg/m <sup>3</sup>	5 mg/m <sup>3</sup>	Metal fume fever
<b>Projectile</b>			
Polypropylene	Not established	Not established	
Various dye	Not established	Not established	
Sodium laurylsulfate	Not established	Not established	
Propylene glycol	Not established	Not established	
Barium sulfate	10 mg/m <sup>3</sup>	15 mg/m <sup>3</sup>	Pneumoconiosis
<b>Primer</b>			
Lead styphnate (as lead)	0.05 mg/m <sup>3</sup>	0.05 mg/m <sup>3</sup>	A3, BEI, Central nervous system and peripheral nervous system impairment, Hematologic effects
Barium nitrate (as soluble compounds)	0.5 mg/m <sup>3</sup>	0.5 mg/m <sup>3</sup>	A4, Eye, Skin and Gastrointestinal irritation, Muscular stimulation
Antimony sulfide	0.5 mg/m <sup>3</sup>	0.5 mg/m <sup>3</sup>	Skin, Upper respiratory tract irritation
Aluminium pyro powder	5 mg/m <sup>3</sup>	5 mg/m <sup>3</sup>	Lower respiratory tract
Pentaerythritol (PETN)	10 mg/m <sup>3</sup>	15 mg/m <sup>3</sup>	Eye and Upper respiratory tract irritation
Tetracene	Not established	Not established	

**CARCINOGENICITY DESIGNATION A4** - Agents which cause concern that they could be carcinogenic for human but which cannot be assessed conclusively because of lack of data. *In vitro* or animal studies do not provide indications of carcinogenicity which are sufficient to classify the agent into one of the other categories.

**CARCINOGENICITY DESIGNATION A3** - Confirmed Animal Carcinogen with Unknown Relevance to Humans: The agent is carcinogenic in experimental animals at a relatively high dose, by route(s) of administration, at site(s), of histologic type(s), or by mechanism(s) that may not be relevant to worker exposure. Available epidemiologic studies do not confirm an increased risk of cancer in exposed humans. Available evidence does not suggest that the agent is likely to cause cancer in humans except under uncommon or unlikely routes or levels of exposure.

**BIOLOGICAL EXPOSURE INDICES (BEIs):** The ACGIH has adopted a BEI for this chemical. BEIs provide an indication of worker exposure by measuring the chemical or its breakdown products in the body or by measuring biochemical changes resulting from exposure to the chemical. Consult the BEI documentation for further information.

**NOTE:** In many jurisdictions, exposure limits are similar to the ACGIH TLVs. Since the manner in which exposure limits are established, interpreted, and implemented can vary, obtain detailed information from the appropriate government agency in each jurisdiction.

Many jurisdictions have specific regulations requiring worksite programs for lead. Obtain detailed information from the appropriate government agency in each jurisdiction.

**SECTION # 7: PREVENTIVE MEASURES**

**General Safety Precautions:**

Avoid impact on primer which is impact sensitive

**Ventilation:**

**SECTION # 7: PREVENTIVE MEASURES**

Use in well ventilated area

**Protective Equipment – Eyes:**

Wear ANSI-approved goggles or Safety glasses.

**Protective Equipment – Gloves:**

Not generally required.

**Protective Equipment – Respirator:**

Use NIOSH approved respirator to maintain exposure level below listed PEL's and or TLV's in a non-vented area.

**Protective Equipment – Hearing Protection:**

Hearing protection recommended. Hearing protection should have an EPA-NRR of 20 or greater.

**Leak and Spill Procedure /Waste Disposal:**

Eliminate all ignition sources (no smoking, flares, sparks or flames in immediate area)

All equipment used when handling the product must be grounded.

Do not touch or walk through spilled material.

Do not operate radio transmitters within 100 meters (330 feet) of electric detonators.

Do not clean up or dispose of, except under supervision of a specialist.

The recommended means for disposing of scrap material usually involves demilitarization of cartridges (i.e.: separating all explosive elements for individual destruction, it can also be done by open detonation but it is not the preferred way.

After components are scrapped by proper incineration, the remaining scrap material should be disposed of or recycled in accordance with all applicable local, provincial (state) and federal regulations.

**Handling and Storage Precautions:**

Store in a dry, cool area. Do not crush or drop packages. Avoid heat, electrical current, and acids. Keep away from fire, heat source or direct sunlight. GENERAL DYNAMICS ORDNANCE AND TACTICAL SYSTEMS – CANADA INC. products are packaged and shipped in accordance with applicable Transport Canada Regulations. To ensure the highest level of safety while storing these products, keep product in the original packaging until ready to use. When handling product, proper anti-static procedures should be maintained if loose powder is exposed.

**SECTION # 8: FIRST AID MEASURES**

**Eyes:**

**SECTION # 8: FIRST AID MEASURES**

Wash with large amounts of fresh water for at least 20 minutes keeping eyelids open. Seek medical attention. \*

**Skin:**

Wash contaminated area with soap and water for at least 20 minutes. \*

**Inhalation:**

Remove from exposure, to fresh air. Get medical attention if experiencing effects of overexposure. \*

**Additional Information:**

\* All hazards marked with an asterisk (\*) are not expected to be present unless the product is fired, or otherwise discharged so that gasses, fumes, or projectiles are created. Normal handling and shipping should not cause exposure to these hazards.

**SECTION # 9: PREPARATION INFORMATION**

<b>Prepared by</b>	Health and Security Department
<b>Phone number:</b>	(450) 581-3080
<b>Date:</b>	January 18, 2008

**NOTICE OF READER**

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