

MATERIAL SAFETY DATA SHEET

MANUFACTURER:	GENERAL DYNAMICS ORDNANCE AND TACTICAL SYSTEMS – CANADA INC. 5, Montée des Arsenaux Le Gardeur, Québec, Canada J5Z 2P4
EMERGENCY PHONE NUMBER: 24-HOUR NUMBER:	1-888-922-3330 (Canada/U.S.A.) 1-514-981-5228 (International)
EMERGENCY RESPONSE PLAN:	ERP2-1388
MATERIAL:	5.56mm FX[®] Marking Cartridge, Training Ammunition (Red, Blue, Orange, Green, Yellow, White and Purple)
ISSUE DATE:	November, 2007

SECTION #1: PRODUCT INFORMATION

Product Family:	SIMUNITION[®] FX[®] Marking Cartridge, Training Ammunition
Proper Shipping Name:	CARTRIDGES, SMALL ARMS
Class:	1.4S, UN0012

SECTION #2: HAZARDOUS INGREDIENTS

COMPONENTS	%	CAS NUMBER	LD ₅₀ OF MATERIAL (SPECIES AND ROUTE)	LC ₅₀ OF MATERIAL (SPECIES)
Cartridge case				
Copper	43	7440-50-8	Not established	Not established
Zinc	18	7440-66-6	Not established	Not established
Projectile				
Polypropylene	1	9003-07-0	Not established	Not established
Various dye	0.1-1	Various	Not established	Not established
Sodium laurylsulfate	0.1-1	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	0.1-1	7727-43-7	Not established	Not established
Sabot				
Aluminium	32	7429-90-5	Not established	Not established
Propellant				
Nitrocellulose	0.1-1	9004-70-0	Not established	Not established
Potassium nitrate	<0.1	7757-79-1	3750 mg/kg oral rat	Not established
Nitroglycerine	<0.1	55-63-0	105 mg/kg oral rat	Not established

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SECTION # 2: HAZARDOUS INGREDIENTS

COMPONENTS	%	CAS NUMBER	LD ₅₀ OF MATERIAL (SPECIES AND ROUTE)	LC ₅₀ OF MATERIAL (SPECIES)
Ethylcentralite	<0.1	89-98-3	200 mg/kg ipr. mouse	Not established
Diphenylamine	<0.1	122-39-4	300 mg/kg oral guinea pig	Not established
Graphite	<0.1	7782-42-5	Not established	Not established
Primer				
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
Tetracene	<0.1	31330-63-9	Not established	Not established

SECTION # 3: PHYSICAL DATA

PHYSICAL DATA:

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

SECTION # 4: FIRE & EXPLOSION DATA

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

Extinguishing Media:	Water
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Special Fire Fighting Instructions:**Cargo fires:**

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 to atmospheric conditions.

Supplemental Information:

Transportation Emergencies: Contact

1-888-922-3330 (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

Stability	Stable under normal use conditions
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SECTION # 5: REACTIVITY DATA	
Polymerization	Will not occur
Conditions to avoid	Individual cartridges may ignite if the primer is struck. Cartridge may ignite if heated to 120°C (250°F) independent of air
Incompatible Materials	Oils, Acids, Alkalis, Ammonia and other corrosive materials
Hazardous Decomposition Materials	Nitrogen Oxides, Carbon and Carbon Oxides, Sulfur and Sulfur Oxides, Ammoniac and Hydrogen Cyanide. Other dust and fumes may also be produced. (barium, antimony and lead)

SECTION # 6: TOXICOLOGICAL PROPERTIES	
Physical Hazards:	
Oxidizer:	Yes
Organic Peroxide:	No
Corrosive:	No
Compressed gas:	No
Irritant:	Yes
Skin Hazard:	Yes
Eye Hazard:	Yes
Toxic Agent:	No
Sensitizer:	No
Carcinogen:	No
Reproductive Toxin:	No
Blood Toxin:	Yes (lead and diphenylamine)
Nervous System Toxin:	Yes (lead)
Lung Toxin:	Yes (graphite)
Liver Toxin:	Yes (diphenylamine)
Kidney Toxin:	Yes (diphenylamine)
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. *	

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SECTION # 6: TOXICOLOGICAL PROPERTIES

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

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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
Cartridge case			
Copper (as dust)	1 mg/m ³	1 mg/m ³	Irritation, Metal fume fever, Gastrointestinal
Zinc (as zinc oxide)	2 mg/m ³	5 mg/m ³	Metal fume fever
Projectile			
Polypropylene	Not established	Not established	
Various dye	Not established	Not established	
Sodium laurylsulfate	Not established	Not established	
Propylene glycol	Not established	Not established	
Barium sulphate	10 mg/m ³	15 mg/m ³	Pneumoconiosis
Sabot			
Aluminium (as dust)	10 mg/m ³	15 mg/m ³	Lower respiratory tract irritation
Propellant			
Nitrocellulose	Not established	Not established	
Potassium nitrate	Not established	Not established	
Nitroglycerine	0.05 ppm	0.2 ppm	Skin, Vasodilation
Ethylcentralite	Not established	Not established	
Diphenylamine	10 mg/m ³	10 mg/m ³	A4, Liver & Kidney damage, hematologic effects
Graphite	2 mg/m ³	Not established	Pneumoconiosis
Primer			
Lead styphnate (as lead)	0.05 mg/m ³	0.05 mg/m ³	A3, BEI, Central nervous system impairment, Peripheral nervous system impairment, Hematologic effects
Barium nitrate (as soluble compounds)	0.5 mg/m ³	0.5 mg/m ³	A4, Eye, Skin and Gastrointestinal irritation, Muscular stimulation
Antimony sulfide	0.5 mg/m ³	0.5 mg/m ³	Skin, Upper respiratory tract irritation
Aluminium pyro powder	5 mg/m ³	5 mg/m ³	Lower respiratory tract
Pentaerythritol (PETN)	10 mg/m ³	15 mg/m ³	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

SECTION # 6: TOXICOLOGICAL PROPERTIES

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 conform 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:

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:

SECTION # 7: PREVENTIVE MEASURES

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:**

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

Prepared by	Health and Security Department
Phone number:	(450) 581-3080
Date:	November, 2007

NOTICE OF READER

Even though great care has been taken in the preparation of the present document GENERAL DYNAMICS ORDNANCE AND TACTICAL SYSTEMS – CANADA INC. offer no warranties and/or representation as to the accuracy or completeness of the information contained herein. GENERAL DYNAMICS ORDNANCE AND TACTICAL SYSTEMS – CANADA INC. will not assume responsibility towards the suitability of this information in regards to the user's intended purposes or the consequences of its use. The reader should determine the suitability of the information for their individual purpose.