

MATERIAL SAFETY DATA SHEET

MANUFACTURER	GENERAL DYNAMICS ORDNANCE AND TACTICAL SYSTEMS — CANADA INC. 5, Montée des Arsenaux Le Gardeur, Québec, Canada J5Z 2P4
CUSTOMER SERVICE	1-800-465-8255 1-860-404-0162 in USA
EMERGENCY PHONE NUMBER:	1-888-922-3330 (Canada/U.S.A.) 1-514-981-5228 (International)
MATERIAL:	9mm FX [®] Marking Training Ammunition (Red, Blue, Orange, Green, Yellow and White)
ISSUE DATE	July, 2008

SECTION #1: PRODUCT INFORMATION

Product Family:	SIMUNITION[®] FX[®] Marking, 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	59	7440-50-8	Not established	Not established
Zinc	25	7440-66-6	Not established	Not established
Projectile				
Polypropylene	4	9003-07-0	Not established	Not established
Various dyes	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
Sabot				
Acetal	12	105-57-7	4600 mg/kg oral rat	Not established
Propellant				
Nitrocellulose	0.1-1	9004-70-0	Not established	Not established
Nitroglycerin	<0.1	55-63-0	105 mg/kg oral rat	Not established
Diphenylamine	<0.1	122-39-4	300 mg/kg oral guinea pig	Not established
Ethyl centralite	<0.1	89-98-3	200 mg/kg ipr. mouse	Not established
Potassium nitrate	<0.1	7757-79-1	3750 mg/kg oral rat	Not established
Graphite	<0.1	7782-42-5	Not established	Not established

MATERIAL SAFETY DATA SHEET**SECTION # 2: HAZARDOUS INGREDIENTS**

COMPONENTS	%	CAS NUMBER	LD ₅₀ OF MATERIAL (SPECIES AND ROUTE)	LC ₅₀ OF MATERIAL (SPECIES)
Primer				
Diazodinitrophenol (DDNP)	<0.1	87-31-0	Not established	Not established
Tetrazene	<0.1	31330-63-9	Not established	Not established
PETN	<0.1	78-11-5	Not established	Not established
Nitrocellulose	<0.1	9004-70-0	Not established	Not established
Potassium Nitrate	<0.1	7757-79-1	3750 mg/kg oral rat	Not established
Aluminium Silicate	<0.1	1302-76-7	Not established	Not established
Zirconium	<0.1	7440-67-7	Not established	Not established

SECTION # 3: PHYSICAL DATA**PHYSICAL DATA:**

Boiling Point:	Not applicable
Melting Point:	Not applicable
Vapor Pressure:	Not applicable
Solubility (Water)	Marking compounds
Evaporation Rate:	Not applicable
Percent Volatile:	Not applicable
Vapor Density (AIR-1)	Not applicable
Bulk Density:	Not applicable
Appearance	Brass case & white plastic sabot with moulded thin wall polypropylene projectile filled with red, blue, orange, green, yellow, white or purple marking compound.
Odor:	Yes (marking compound, faint odor of fatty substances)
Odor Threshold	None
Flammable:	Yes
Pyrophoric:	Not applicable
Explosive:	Yes
Unstable:	No
Water Reactive:	Yes

MATERIAL SAFETY DATA SHEET**SECTION # 4: FIRE & EXPLOSION DATA**

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

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:

Sabot is made with of **acetal** which contains a very small amount of formaldehyde. In case of mass fire, this part will burn with visible flame and the hazardous gases/vapors produced will be CO and formaldehyde. Keep personnel removed and upwind of fire.

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 **WHITHOUT 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:

MATERIAL SAFETY DATA SHEET**SECTION # 4: FIRE & EXPLOSION DATA**

Transportation Emergencies: Contact MD-UN at 1-888-922-3330 (Canada/U.S.A) or 1-514-981-5228 (International). Consult the Transport Canada (DOT) Response Guide book for instructions for handling emergencies involving this product.

SECTION # 5: REACTIVITY DATA

Stability	Stable under normal use conditions
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. Other dust and fumes may also be produced. (barium and copper)

SECTION # 6: TOXICOLOGICAL PROPERTIES**Physical Hazards:**

Oxydizer:	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:	No
Nervous System Toxin:	No
Lung Toxin:	Yes
Liver Toxin:	Yes (propellant formulation)
Kidney Toxin:	Yes (propellant formulation)

Potential Health Effects:

MATERIAL SAFETY DATA SHEET**SECTION # 6: TOXICOLOGICAL PROPERTIES**

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

Ingestion: When cartridges are fired or otherwise discharged, dust vapors, and or fumes may be absorbed by the digestive system and be irritating.*

Skin Contact: After cartridges have been fired, dust, vapors, 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, vapors, 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
Cartridge case			
Copper	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			
Polypropylène	Not established	Not established	
Various dyes	Not established	Not established	
Sodium laurylsulfate	Not established	Not established	
Propylene glycol	Not established	Not established	
Barium sulfate	10 mg/m ³	15 mg/m ³	Pneumoconiosis
Sabot			
Acetal	Not established	Not established	
Propellant			
Nitrocellulose	Not established	Not established	
Nitroglycerine	0.05 ppm	0.2 ppm	Skin, Vasodilation
Diphenylamine	10 mg/m ³	10 mg/m ³	A4, Liver & Kidney damage, hematologic effects
Potassium compounds	Not established	Not established	
Ethyl centralite	Not established	Not established	
Graphite	2 mg/m ³	Not established	Pneumoconiosis
Primer			

MATERIAL SAFETY DATA SHEET**SECTION # 6: TOXICOLOGICAL PROPERTIES**

Diazodinitrophenol (DDNP)	Not established	Not established	
Tetrazene	Not established	Not established	
PETN	Not established	Not established	
Nitrocellulose	Not established	Not established	
Potassium Nitrate	Not established	Not established	
Aluminium Silicate	2 mg/m ³	Not established	A4
Zirconium	5 mg/m ³	5 mg/m ³	

CARCINOGENICITY DESIGNATION A4 - Not Classifiable as a Human Carcinogen: 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.

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.

Preventive measures during FX[®] training activities :

Special and dedicated protective equipment must be worn.

Follow recommendations in the Simunition[®] training manual.

Mandatory specialized equipment includes complete face, throat, body and groin protection. No exposed skin during training.

A cup protector is strongly recommended.

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.

MATERIAL SAFETY DATA SHEET**SECTION # 8: FIRST AID MEASURES****Eyes:**

Wash with large amounts of fresh water for 20 minutes keeping eye lids 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:	July, 2008

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.