

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:	(450) 581-3080
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, Green, Orange, Yellow, White)
ISSUE DATE	December 2008

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	LD₅₀ OF MATERIAL (SPECIES AND ROUTE)	LC₅₀ OF MATERIAL (SPECIES)
CARTRIDGE CASE (BRASS)				
▪ Copper (dust)	52	7440-50-8	Not established	Not established
▪ Zinc (as zinc oxide dust)	22	7440-66-6	Not established	Not established
PROJECTILE				
▪ Polypropylene	1.5	9010-79-1	Not established	Not established
▪ <i>Marking compound</i>				
▪ Various Dyes	<0.1	Not established	Not established	Not established
▪ Sodium Lauryl Sulfate	0.1-1	151-21-3	1280 mg/kg oral Rat	3900 mg/kg oral Rat
▪ Barium Sulfate	0.1-1	7727-43-7	Not established	Not established
SABOT AND SEALING DISC				
▪ Acetal	19.9	105-57-7	4570 mg/kg oral rat	4000 mg/kg oral rat
▪ Formaldehyde	<0.1	50-00-0	800 mg/kg oral-Rat	0.82 mg/li Inha.-Rat

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SECTION # 2: HAZARDOUS INGREDIENTS

COMPONENTS	%	CAS NUMBER	LD ₅₀ OF MATERIAL (SPECIES AND ROUTE)	LC ₅₀ OF MATERIAL (SPECIES)
PROPELLANT				
▪ Nitrocellulose	0.1-1	9004-70-0	Not established	Not established
▪ Potassium Nitrate	<0.1	7751-79-1	3015 mg/kg ora	Not established
▪ Nitroglycerine (skin)	<0.1	55-63-0	105 mg/kg oral rat	Not established
▪ Ethyl centralite	<0.1	85-98-3	Not established	Not established
▪ Diphenylamine (DPA)	<0.1	122-39-4	300 mg/kg oral g- pig	Not established
▪ Graphite	<0.1	7782-42-5	Not established	Not established
PRIMER CUP				
▪ Copper (dust)	1.6	7440-50-8	Not established	Not established
▪ Zinc (as zinc oxide dust)	0.1-1	7440-66-6	Not established	Not established
PRIMER				
▪ Lead Styphnate	<0.1	15245-44-0	Not established	Not established
▪ Barium Nitrate	<0.1	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 Powder	<0.1	7429-90-5	Not established	Not established
▪ PETN (Pentaerythritol)	<0.1	115-77-5	25500 mg/kg oral mus	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
Vapor Pressure:	Not applicable
Solubility (Water)	Marking compounds only
Evaporation Rate:	Not applicable
Percent Volatile:	Not applicable
Vapor Density (AIR-1)	Not applicable
Bulk Density:	Not applicable
Appearance	Brass casewith molded thin walled polypropylene projectile filled with colored marking compound. Small amount of propellant
Odor:	Yes (marking compound, faint odor of fatty substances)
Odor Threshold	None
Flammable:	Yes (propellant)
Pyrophoric:	Not applicable
Explosive:	Yes (primer)

SECTION # 3: PHYSICAL DATA

Unstable:	No
Water Reactive:	No

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 independent of air. Unconfined ignited cartridges can produce low velocity metallic fragments which may cause eye injury or superficial skin wounds if unprotected by standard firefighter turnout gear.

Extinguishing Media:	Water
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Special Fire Fighting Instructions:

- Cool containing vessel with water jet in order to prevent ignition.
- Use flooding quantities of water.
- Consider evacuation for 15 meters (50 feet) in all directions.

Wear full firefighter protective equipment including face shield or SCBA Use wide fog pattern nozzle to stop any low velocity fragments. Use water to cool ordinary combustibles below ignition temperature of 120° C.

Sealing Disc 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/vapours produced will be CO and formaldehyde. Keep personnel removed and upwind of fire.

Supplemental Information:

- 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.

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
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:	
Oxydizer:	Yes (primer)
Organic Peroxide:	No
Corrosive:	No
Compressed Gas:	No
Irritant:	Yes (propellant formulation)
Skin Hazard:	Yes (propellant formulation)
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:	
<ul style="list-style-type: none"> ▪ Inhalation: After cartridges have been fired, dust, vapours, and/or fumes may be irritating to the respiratory system.* ▪ Ingestion: When cartridges are fired or otherwise discharged, 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, vapours, and/or fumes can be absorbed through the pores if left on the skin.* 	

SECTION # 6: TOXICOLOGICAL PROPERTIES

- **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
CARTRIDGE CASE (BRASS), PRIMER CUP			
▪ Copper (Dust)	1 mg / m ³	1 mg / m ³	Irritation, Metal fume fever, Gastrointestinal
▪ Zinc (as zinc oxyde)	2 mg / m ³	5 mg / m ³	Metal fume fever
PROJECTILE			
▪ Polypropylene	Not established	Not established	
▪ Various Dyes	Not established	Not established	
▪ Sodium Lauryl Sulfate	Not established	Not established	
▪ Barium Sulfate	10 mg / m ³	15 mg / m ³	Insoluble in water
SABOT AND SEALING DISC			
▪ Acetal	Not established	Not established	
▪ Formaldehyde*	0.3ppm	0.75ppm	A2
PROPELLANT			
▪ Nitrocellulose	Not established	Not established	
▪ Potassium Nitrate	Not established	Not established	Eye Irritation
▪ Nitroglycerine	0.05 ppm	0.2 ppm	CVS (cardiovascular system)
▪ Ethyl centralite	Not established	Not established	
▪ Diphenylamine	10 mg/m ³	10 mg/m ³	Liver, Kidney, blood, A4
▪ Graphite	2.5 mg/m ³	2.5mg/m ³	Respirable particulate

SECTION # 6: TOXICOLOGICAL PROPERTIES

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 Powder	1 mg / m ³	5 mg / m ³	Lower respiratory tract
▪ PETN (Pentaerythritol)	10 mg/m ³	15 mg/m ³	Eye and Upper respiratory tract irritation
▪ Tetracene	Not established	Not established	

* NB: Formaldehyde: Formaldehyde is an ingredient of the polymeric matrix of the sealing disc and will not be present in air, except when complete incineration occurs, formaldehyde emission should be considered.

CARCINOGENICITY DESIGNATION A4 - Not Classifiable as a Human Carcinogen: Inadequate data on which to classify the substance as a human and/or animal carcinogen.

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.

CARCINOGENICITY DESIGNATION A3 - Animal Carcinogen: Substance is carcinogenic in laboratory animals under conditions that are not considered relevant to worker exposure. Available human studies and evidence suggest that the substance is not likely to cause cancer in humans except under unusual or unlikely routes or levels of exposure. Worker exposure to an A3 carcinogen should be controlled to levels as low as reasonably achievable below the TLV.

CARCINOGENICITY DESIGNATION A2 – Suspected Human Carcinogen: Human data are accepted as adequate in quality but are conflicting or insufficient to classify the agent as a confirmed human carcinogen; OR, the agent is carcinogenic in experimental animals at dose(s), by route(s) of exposure, at site, of historic types(s), or by mechanism(s) considered relevant to worker exposure. The A2 is used primarily when there is limited evidence of carcinogenicity in humans and sufficient evidence of carcinogenicity in experimental animals with relevance to humans.

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

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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:

- No hearing protection required, according to MIL-STD-1474D

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)
- Cool product with water before handling.
- Wet spilled material originating from damaged cartridges before removing.
- 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:

SECTION # 7: PREVENTIVE MEASURES

- Store in a dry, cool area in the original container to assure performance. Keep out of reach of children and unauthorized personnel. Avoid striking the primer of an unchambered cartridge. Remove ammunition from service if any of the following conditions have occurred:
 - Prolonged storage at or above 40°C (105 °F)
 - Evidence of corrosion
 - Physical damage
 - Exposure to oil or spray type lubricants
- Avoid prolonged exposure to the sun
- Cartridge can ignite if heated to 120°C (250°F) independent of air.

SECTION # 8: FIRST AID MEASURES

Eyes:

- Wash with large amounts of fresh water for 15 minutes keeping eyelids open. Seek medical attention

Skin:

- N/A

Inhalation:

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

Additional Information:

- N/A

* All hazards marked with an asterisk (*) are not expected to be present unless the product is fired, or otherwise discharged so that gases, 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:	December 2008

NOTICE OF READER

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