

## 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>	<b>1-888-922-3330 (Canada/U.S.A.) 1-514-981-5228 (International)</b>
<b>EMERGENCY RESPONSE PLAN:</b>	<b>ERP2-1388</b>
<b>MATERIAL:</b>	<b>CARTRIDGE 5.56 MM CQT</b>
<b>ISSUE DATE:</b>	June 30, 2009

### SECTION #1: PRODUCT INFORMATION

<b>Product Family:</b>	<b>ALWAYS ON TARGET®</b>
<b>Proper Shipping Name:</b>	<b>CARTRIDGES FOR WEAPONS, INERT PROJECTILE; or 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 (brass)</b>				
Copper	42	7440-50-8	Not established	Not established
Zinc	18	7440-66-6	Not established	Not established
<b>Projectile</b>				
Acetal	3	105-57-7	4570mg/kg oral-rat	4000 mg/kg oral rat
Formaldehyde	<0.1	50-00-0	800 mg/kg oral rat	287 ppm Inha.-Rat
<b>Sabot (aluminium alloy)</b>				
Aluminium (dust)	34	7429-90-5	Not established	Not established
<b>Sealing Disc</b>				
Acetal	0.1-1	105-57-7	4570 mg/kg oral rat	4000 mg/kg oral rat
Formaldehyde	<0.1	50-00-0	800 mg/kg oral rat	287 ppm Inha.-Rat
<b>Propellant</b>				
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	<0.1	55-63-0	29.2 mg/kg dermal rat	Not established

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

COMPONENTS	%	CAS NUMBER	LD <sub>50</sub> OF MATERIAL (SPECIES AND ROUTE)	LC <sub>50</sub> OF MATERIAL (SPECIES)
Ethyl Centralite	<0.1	85-98-3	Not established	Not established
Diphenylamine	<0.1	122-39-4	300 mg/kg oral g- pig	Not established
Graphite	<0.1	7782-42-5	>10 000 mg/kg oral rat	>64 400 mg/m <sup>3</sup> rat
<b>Primer</b>				
<b>Primer cup</b>				
Copper	1	7440-50-8	Not established	Not established
Zinc	0.1-1	7440-66-6	Not established	Not established
<b>Primer composition</b>				
Lead Styphnate (as lead)	<0.1	15245-44-0	Not established	Not established
Tetrazene	<0.1	31330-63-9	Not established	Not established
Antimony Sulfide (as antimony)	<0.1	1345-04-6	7000 mg/kg oral rat	Not established
Barium Nitrate (as soluble barium compounds)	<0.1	10022-31-8	355 mg/kg oral rat	Not established
Aluminium powder	<0.1	7429-90-5	Not established	Not established
Pentaerythritol (PETN)	<0.1	115-77-5	18500 mg/kg oral mouse	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>	None
<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>	Small caliber cartridge, brass case and aluminium alloy sabot with an acetal projectile
<b>Odour:</b>	None
<b>Odour Threshold:</b>	None
<b>Flammable:</b>	Yes (propellant)
<b>Pyrophoric:</b>	Not established
<b>Explosive:</b>	Yes (primer)
<b>Unstable:</b>	No
<b>Water Reactive:</b>	Yes (primer)

**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.

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.

Fire may produce irritating, corrosive and/or toxic gases.

<b>Extinguishing Media:</b>	Water
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**Special Fire Fighting Instructions:**

Sabot is made 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. 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 CO<sub>2</sub>, 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 (165 feet) in all directions.

The evacuation radius will vary according the atmospheric conditions.

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

<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, Sulfur and Sulfur Oxides. Other dust and fumes may also be produced. (lead, barium, aluminium and antimony)

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

<b>Oxidizer:</b>	Yes (primer formulation)
<b>Organic Peroxide:</b>	No
<b>Corrosive:</b>	No
<b>Compressed gas:</b>	No
<b>Irritant:</b>	Yes (propellant formulation)
<b>Skin Hazard:</b>	Yes (propellant formulation)
<b>Eye Hazard:</b>	Yes
<b>Toxic Agent:</b>	No
<b>Sensitizer:</b>	No
<b>Carcinogen:</b>	No
<b>Reproductive Toxin:</b>	Yes (lead)
<b>Blood Toxin:</b>	Yes (lead and diphenylamine)
<b>Nervous System Toxin:</b>	Yes (lead)
<b>Lung Toxin:</b>	Yes (aluminium and antimony)
<b>Liver Toxin:</b>	Yes (diphenylamine)

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**SECTION # 6: TOXICOLOGICAL PROPERTIES**

**Kidney Toxin:** Yes (lead and 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. \*

**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 (brass)</b>			
Copper (dust)	1 mg/m <sup>3</sup>	1 mg/m <sup>3</sup>	Irritation, Gastrointestinal (GI), Metal fever
Zinc (zinc oxide dust)	2 mg/m <sup>3</sup>	5 mg/m <sup>3</sup>	Metal fume fever
<b>Projectile</b>			
Acetal	Not established	Not established	
Formaldehyde*	0.3ppm	0.75ppm	A2, Sensitizer, Irritation, cancer
<b>Sealing disc</b>			
Acetal	Not established	Not established	
Formaldehyde*	0.3ppm	0.75ppm	A2, Sensitizer, Irritation, cancer
<b>Sabot (aluminium alloy)</b>			
Aluminium (dust)	1 mg / m <sup>3</sup>	5 mg / m <sup>3</sup>	Lower respiratory tract irritation, A4, neurotoxicity
<b>Propellant</b>			
Nitrocellulose	Not established	Not established	
Potassium Nitrate	Not established	Not established	Eye and skin Irritation
Nitroglycerine	0.05 ppm	0.2 ppm	Skin, Cardiovascular System (CVS)
Ethyl centralite	Not established	Not established	
Diphenylamine	10 mg/m <sup>3</sup>	10 mg/m <sup>3</sup>	A4, Liver, Kidney, Blood

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**SECTION # 6: TOXICOLOGICAL PROPERTIES**

Graphite	2 mg/m <sup>3</sup>	2.5 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 (CNS), Blood, Kidney, Reproductive
Tetrazene	Not established	Not established	
Antimony Sulfide	0.5 mg/m <sup>3</sup>	0.5 mg/m <sup>3</sup>	Irritation, Lung, Cardiovascular System (CVS)
Barium Nitrate (as soluble barium compounds)	0.5 mg/m <sup>3</sup>	0.5 mg/m <sup>3</sup>	A4, Irritation, Gastrointestinal (GI), Muscle
Aluminium (pyropowder)	1 mg/m <sup>3</sup>	5 mg/m <sup>3</sup>	Lung, A4, Pneumoconiosis, neurotoxicity
Pentaerythritol (PETN)	10 mg/m <sup>3</sup>	15 mg/m <sup>3</sup>	Eye and Upper respiratory tract irritation

**\* 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 carcinogen in experimental animals at dose(s), by route(s) of exposure, at site(s), of histologic type(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:**

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 fresh 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 gases (toujours utiliser la meme forme gases ou 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>	June 30, 2009

**NOTICE OF READER**

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