

Cartridge 9mm FX® Toxfree® Marking

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SAFETY DATA SHEET

SECTION 1. IDENTIFICATION

Product identifier used on the label

: **Cartridge 9mm FX® Toxfree® Marking**

Product Code(s) : 9mm FX® Toxfree® Marking

Recommended use of the chemical and restrictions on use

: Small arms cartridges / ammunition.

Use pattern: Training.

FX® Marking Cartridges allow the user to experience the reality of taking a duty weapon and directly firing a non-lethal FX® Marking cartridge at a human target without inflicting injury. FX® Marking Cartridges have a unique telescopic design and patented reduced-energy technology. These cartridges produce near-normal recoil and deliver good tactical accuracy up to 7.6 meters (25 feet). Their color projectiles leave a detergent-based, water-soluble inert color mark. With a minimum of preparation, FX® can be used virtually anywhere and at any time. For use in pistols, shotguns, submachine guns, carbines and rifles. Intended for supervised training. These non-lethal rounds are fired with a weapon conversion kit for safe and reliable functioning.

Chemical family : Explosive article. Toxfree®. Lead-free cartridge designed to reduce health and safety hazards by eliminating exposure to lead and other heavy metals.

Name, address, and telephone number of the manufacturer:

General Dynamics Ordnance and Tactical Systems - Canada Inc.

5, Montée des Arsenaux
Repentigny, QC, Canada
J5Z 2P4

Manufacturer's Telephone # : (450) 581-3080

24 Hr. Emergency Tel # : (888) 992-3330 (Canada / U.S.A.)
(514) 981-5228 (International)

Name, address, and telephone number of the supplier:

Refer to manufacturer

SECTION 2. HAZARDS IDENTIFICATION

Classification of the chemical

WHMIS information: This product is not a WHMIS controlled product in Canada. Explosive. The Controlled Products Regulations (CPR) do not apply to explosives [Hazardous Products Act Section 12(a)].

OSHA: This material is classified as hazardous under OSHA regulations (29CFR 1910.1200) (Hazcom 2012). Classification: Explosives - Division 1.4

Label elements

The following label information is applicable only to the United States according to OSHA Regulations (29 CFR 1910.1200) (Hazcom 2012):

Signal Word

Warning!

Hazard statement(s)

Fire or projection hazard.

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Precautionary statement(s)

Keep away from heat, open flames and hot surfaces. - No smoking.
Do not subject to excessive friction or mechanical shock.
Wear face protection.
In case of fire: Evacuate area.
DO NOT fight fire when fire reaches explosives.
Fight fire with normal precautions from a reasonable distance.
Store in accordance with local regulations.
Dispose of contents/container in accordance with local regulation.

The following label information is applicable only to Canada according to the Canadian Controlled Products Regulations (CPR/WHMIS):

The Controlled Products Regulations (CPR) do not apply to explosives [Hazardous Products Act Section 12(a)]. As such, this product does not require a WHMIS Supplier label.

Other hazards

This product is an explosive article which is composed of a finished cartridge containing various components that are sealed completely within the cartridge. Under normal conditions of handling, no exposure to any of the harmful components inside the cartridge is expected and no health effects are generally expected as supplied.

When cartridges are fired, or otherwise discharged, gases, fumes and projections may be formed. These gases, fumes and projections may contain trace amounts of the components inside the cartridges. These gases, fumes and projections may be irritating to the eyes, skin and respiratory tract. See TOXICOLOGICAL INFORMATION, Section 11.

Environmental precautions: Avoid release to the environment.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Cartridges consist of a copper alloy cartridge case, a plastic deformable projectile, a plastic sabot, a small pistol primer and a double base smokeless powder propellant.

The projectile is filled with blue, green, red, white, orange or yellow detergent-based, water-soluble coloured marking compound.

See the following table for chemicals present in each component.

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<u>Chemical name</u>	<u>CAS #</u>	<u>Concentration</u>
The cartridge case contains the following components:		
Copper	7440-50-8	54.8%
Zinc	7440-66-6	23.49%
The primer contains the following chemicals:		
Tetracene	109-27-3	< 0.10%
Diazodinitrophenol (DDNP)	87-31-0	< 0.10%
Nitrocellulose	9004-70-0	< 0.10%
Pentaerythrite tetranitrate (pentaerythritol tetranitrate; PETN)	78-11-5	< 0.10%
Potassium nitrate	7757-79-1	< 0.10%
Aluminum oxide silicate (Al ₂ O ₅ Si)	12141-46-7	< 0.10%
Zirconium	7440-67-7	< 0.10%
Copper	7440-50-8	0.24 - 0.33%
Zinc	7440-66-6	0.08 - 0.13%
The projectile contains the following chemicals:		
Polypropylene	9003-07-0	3.84%
The projectile's marking compound contains the following chemicals:		
Barium sulfate	7727-43-7	2.37%
Sodium lauryl sulfate	151-21-3	2.07%
Water	7732-18-5	0.89%
Various dyes	Proprietary	0.30%
Propylene glycol	57-55-6	0.30%
The propellant contains the following chemicals:		
Nitrocellulose	9004-70-0	< 0.31%
Nitroglycerin	55-63-0	< 0.13%
Diphenylamine	122-39-4	< 0.01%
Dibutyl phthalate	84-74-2	< 0.1%
Graphite	7782-42-5	< 0.01%
Potassium sulfate	7778-80-5	< 0.01%
Calcium carbonate	1317-65-3	< 0.01%
Polyester adipate	Proprietary	< 0.1%
1,3-diethyl 1,3-diphenylurea (Ethyl centralite)	85-98-3	< 0.10%
Rosin	8050-09-7	< 0.10%
Potassium nitrate	7757-79-1	< 0.01%
Ethyl acetate	141-78-6	< 0.01%
N-Nitrosodiphenylamine	86-30-6	< 0.01%
Tin dioxide	18282-10-5	< 0.01%
The Sabot contains the following chemicals:		
Acetal	105-57-7	11.22%

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Note: The exact concentrations of the above listed chemicals are being withheld as a trade secret. Concentrations listed above are the final concentration in the complete finished cartridge.

SECTION 4. FIRST-AID MEASURES

Description of first aid measures

- Ingestion* : If ingested, immediately call a physician. Inducing vomiting should only be performed under direct supervision of medical personnel. Never give anything by mouth to an unconscious person.
- Inhalation* : None required under normal conditions. If cartridges are fired, or otherwise discharged and gases, fumes or projections are formed and inhaled, the following treatment may be necessary:
Immediately remove person to fresh air. Obtain medical attention if symptoms develop and persist.
- Skin contact* : None required when used as intended. If cartridges are fired, or otherwise discharged, the following treatment may be necessary for skin contact with gases, fumes or projections that may be formed:
Remove contaminated clothing. Wash affected areas with soap and water. Seek medical attention if symptoms develop or persist, or if projection has caused any injury.
- Eye contact* : None required when used as intended. If cartridges are fired, or otherwise discharged, the following treatment may be necessary for eye contact with gases, fumes or projections that may be formed. Immediately flush eyes with running water for at least 15 minutes. If irritation or symptoms develop, seek medical attention. Remove contact lenses if present and easy to do.

Most important symptoms and effects, both acute and delayed

- : When cartridges are fired, or otherwise discharged, gases, fumes and projections may be formed. These gases, fumes and projections may contain trace amounts of the components inside the cartridges. These gases, fumes and projections may be irritating to the eyes, skin and respiratory tract.

Indication of any immediate medical attention and special treatment needed

- : Treat symptomatically.

SECTION 5. FIRE-FIGHTING MEASURES

Extinguishing media

- Suitable extinguishing media* : Use flooding quantities of water to fight fires. If water is not available, use carbon dioxide (CO₂), dry chemical or dirt.
- Unsuitable extinguishing media* : None known.

Special hazards arising from the substance or mixture / Conditions of flammability

- : Explosive! Fire or projection hazard Cartridges may ignite and explode if heated to 120°C (248°F) independant of air. Cartridges may ignite and explode if the primer is struck.

Flammability classification (OSHA 29 CFR 1910.106)

- : Not applicable.

Explosion Data: Sensitivity to Mechanical Impact / Static Discharge:

- : May be ignited if subjected to shock. Sensitive to mechanical impact. May be sensitive to static discharge.

Hazardous combustion products

- : Carbon oxides; sulfur oxides; Nitrogen oxides (NO_x); Metal oxides; Aldehydes; Other unidentified organic compounds.

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Special protective equipment and precautions for firefighters

Protective equipment for fire-fighters

- : Firefighters should wear an approved full-face, self-contained breathing apparatus (SCBA) and impervious clothing. 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.

Special fire-fighting procedures

- : In case of fire: Evacuate area.
DO NOT fight fire when fire reaches explosives.

Do not enter fire area without proper protection. Shield personnel from exploding cartridges. Move containers from fire area if safe to do so. Water spray may be useful in cooling equipment exposed to heat and flame.

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 directions.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures

- : Restrict access to area until completion of clean-up. Do not clean up or dispose of, except under supervision of a specialist. All persons dealing with the clean-up should wear the appropriate chemically protective equipment. Refer to protective measures listed in sections 7 and 8.

Environmental precautions : Ensure spilled product does not enter drains, sewers, waterways, or confined spaces.

Methods and material for containment and cleaning up

- : For solid, intact cartridges:
Handle spills carefully. Do not subject cartridges to mechanical shock. Ventilate the area. Remove all sources of ignition. Pick up and transfer to properly labelled containers.

If spill occurs in an area where there is a fire burning:

Large spill: Consider initial evacuation for 50 meters (150 feet) in all directions. Refer to Section 5 for firefighting instructions.

If loose powder is present:

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. Pick up and arrange disposal without creating dust.

Contact the proper local authorities.

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Special spill response procedures

- : If a spill/release in excess of the EPA reportable quantity is made into the environment, immediately notify the national response center in the United States (phone: 1-800-424-8802).
US CERCLA Reportable quantity (RQ): None reportable.

SECTION 7. HANDLING AND STORAGE

Precautions for safe handling

- : Keep away from heat, open flames and hot surfaces. - No smoking. Ground all equipment during handling. Do not subject to excessive friction or mechanical shock.
Use in a well-ventilated area. Wear suitable protective equipment during handling. For personal protection see section 8. Do not breathe fumes or dusts. Do not store near acids. Do not store near any incompatible materials (see Section 10).
In the United States, handle in accordance with 29 CFR Part 1910.109 for Explosives. While explosives are being handled or used, smoking shall not be permitted and no one near the explosives shall possess matches, open light or other fire or flame. No person shall be allowed to handle explosives while under the influence of intoxicating substances or alcohol.

Conditions for safe storage

- : Store in a cool, dry, well ventilated area, away from incompatibles. Keep away from heat. Inspect periodically for damage or leaks. Protect against physical damage. Storage area should be clearly identified, clear of obstruction and accessible only to trained and authorized personnel. No smoking in the area.
In the United States, ensure the storage requirements of 29 CFR Part 1910.109 for Explosives are met:
Small arms ammunition shall be separated from flammable liquids, flammable solids as classified in 49 CFR part 172, and from oxidizing materials, by a fire-resistive wall of 1-hour rating or by a distance of 25 feet. No quantity limitations are imposed on the storage of small arms ammunition in warehouses, retail stores, and other general occupancy facilities, except those imposed by limitations of storage facilities.

Incompatible materials

- : Acids; caustics ; Ammonia; Chlorate; Acetylene; Ammonium nitrate; fluorine; Bromine; Oils; Class A and B explosives (U.S.); Strong oxidizers (e.g. Chlorine, Peroxides, etc.).

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SECTION 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

<u>Chemical Name</u>	<u>ACGIH TLV</u>		<u>OSHA PEL</u>	
	<u>TWA</u>	<u>STEL</u>	<u>PEL</u>	<u>STEL</u>
Exposure Limits:				
The cartridge case contains the following components:				
Copper	0.2 mg/m ³ (fume); 1 mg/m ³ (dust and mist)	N/Av	0.1 mg/m ³ (fume); 1 mg/m ³ (dust and mist)	N/Av
Zinc	N/Av	N/Av	N/Av	N/Av
The primer contains the following chemicals:				
Tetracene	N/Av	N/Av	N/Av	N/Av
Diazodinitrophenol (DDNP)	N/Av	N/Av	N/Av	N/Av
Nitrocellulose	N/Av	N/Av	N/Av	N/Av
Pentaerythrite tetranitrate (pentaerythritol tetranitrate; PETN)	N/Av	N/Av	N/Av	N/Av
Potassium nitrate	N/Av	N/Av	N/Av	N/Av
Aluminum oxide silicate (Al ₂ O ₅ Si)	N/Av	N/Av	N/Av	N/Av
Zirconium	5 mg/m ³	10 mg/m ³	N/Av	N/Av
Copper	0.2 mg/m ³ (fume); 1 mg/m ³ (dust and mist)	N/Av	0.1 mg/m ³ (fume); 1 mg/m ³ (dust and mist)	N/Av
Zinc	N/Av	N/Av	N/Av	N/Av
The projectile contains the following chemicals:				
Polypropylene	N/Av	N/Av	N/Av	N/Av
The projectile's marking compound contains the following chemicals:				
Barium sulfate	10 mg/m ³	N/Av	15 mg/m ³ (total dust); 5 mg/m ³ (respirable)	N/Av
Sodium lauryl sulfate	N/Av	N/Av	N/Av	N/Av
Water	N/Av	N/Av	N/Av	N/Av
Various dyes	N/Av	N/Av	N/Av	N/Av
Propylene glycol	10 mg/m ³ (AIHA WEEL)	N/Av	N/Av	N/Av
The propellant contains the following chemicals:				
Nitrocellulose	N/Av	N/Av	N/Av	N/Av
Nitroglycerin	0.05 ppm	N/Av	0.2 ppm (Ceiling) (skin)	N/Av
Diphenylamine	10 mg/m ³	N/Av	10 mg/m ³ (final rule limit)	N/Av

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Dibutyl phthalate	5 mg/m ³	N/Av	5 mg/m ³	N/Av
Graphite	2 mg/m ³ (all forms except graphite fibers, respirable fraction)	N/Av	15 mppcf	N/Av
Potassium sulfate	N/Av	N/Av	N/Av	N/Av
Calcium carbonate	N/Av	N/Av	15 mg/m ³ (total dust); 5 mg/m ³ (respirable)	N/Av
Polyester adipate	N/Av	N/Av	N/Av	N/Av
1,3-diethyl 1,3-diphenylurea (Ethyl centralite)	N/Av	N/Av	N/Av	N/Av
Rosin	N/Av	N/Av	N/Av	N/Av
Potassium nitrate	N/Av	N/Av	N/Av	N/Av
Ethyl acetate	400 ppm	N/Av	400 ppm	N/Av
N-Nitrosodiphenylamine	N/Av	N/Av	N/Av	N/Av
Tin dioxide	N/Av	N/Av	N/Av	N/Av
The Sabot contains the following chemicals:				
Acetal	N/Av	N/Av	N/Av	N/Av

Exposure controls

Ventilation and engineering measures

: Ensure adequate ventilation, especially in confined areas.

Respiratory protection

: Not required under normal conditions of handling.

Skin protection

: Not required under normal conditions of handling.

Eye / face protection

: Safety glasses with side shields should be used with this product. If necessary, refer to U.S. OSHA 29 1910.133 or Canadian CSA Standard Z94.3-02.

Other protective equipment

: Use hearing protection. Hearing protection should have an EPA-NRR of 20 or greater. If necessary refer to OSHA regulation 29 CFR 1910.95 or 1926.01. Ensure that eyewash stations and safety showers are close to the workstation location.

General hygiene considerations

: Do not breathe fumes or dusts. Do not ingest. Avoid contact with skin, eyes and clothing. Do not eat, drink or smoke when using this product. Wash thoroughly after handling. Remove and wash contaminated clothing before re-use.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance

: Brass case & white plastic sabot with moulded thin wall polypropylene projectile filled. Cartridges consist of a copper alloy cartridge case, a plastic projectile, a plastic sabot, a small pistol primer and a single or double base smokeless powder propellant. The projectile is filled with blue, green, red, white, orange or yellow detergent-based, water-soluble coloured marking compound.

Odour

: Odourless.

Odour threshold

: N/Av

pH

: N/Av

Melting/Freezing point

: N/Av

Initial boiling point and boiling range

: N/Av

Flash point

: N/Av

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Flashpoint (Method) : N/Av
Evaporation rate (BuAe = 1) : N/Av
Flammability (solid, gas) : Not applicable.
Lower flammable limit (% by vol.)
: N/Av
Upper flammable limit (% by vol.)
: N/Av
Oxidizing properties : None known.
Explosive properties : Explosive
Vapour pressure : N/Av
Vapour density : N/Av
Relative density / Specific gravity
: N/Av
Solubility in water : Insoluble. If loose powder is present, may be water reactive.
Other solubility(ies) : No information available.
Partition coefficient: n-octanol/water or Coefficient of water/oil distribution
: N/Av
Auto-ignition temperature : Primer component 120°C (250°F)
Decomposition temperature : N/Av
Viscosity : N/Av
Volatiles (% by weight) : N/Av
Volatile organic Compounds (VOC's)
: N/Av
Absolute pressure of container
: N/Av
Flame projection length : N/Av
Other physical/chemical comments
: No additional information.

SECTION 10. STABILITY AND REACTIVITY

Reactivity : Cartridge may ignite if the primer is struck or if heated to 120°C (248°F).
Chemical stability : Stable under normal conditions.
Possibility of hazardous reactions
: Sensitive to mechanical impact / static discharge. Hazardous polymerization does not occur.
Conditions to avoid : Avoid heat, open flames, sparks, static electricity and electrical equipment. Avoid contact with incompatible materials.
Incompatible materials : Acids; caustics ; Ammonia; Chlorate; Acetylene; Ammonium nitrate; fluorine; Bromine; Oils; Class A and B explosives (U.S.); Strong oxidizers (e.g. Chlorine, Peroxides, etc.).
Hazardous decomposition products
: None known, refer to hazardous combustion products in Section 5.

SECTION 11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure:

Routes of entry inhalation : YES
Routes of entry skin & eye : YES
Routes of entry Ingestion : YES

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Routes of exposure skin absorption

: NO

Potential Health Effects:

Signs and symptoms of short-term (acute) exposure

Sign and symptoms Inhalation

: When cartridges are fired, or otherwise discharged, gases, fumes and projections may be formed. These gases, fumes and projections may contain trace amounts of the components inside the cartridges. These gases, fumes and projections may be irritating to the respiratory tract.

Sign and symptoms ingestion

: Ingestion of complete cartridges or dusts may cause gastrointestinal discomfort, including nausea, cramping, vomiting and diarrhea.

Sign and symptoms skin

: When cartridges are fired, or otherwise discharged, gases, fumes and projections may be formed. These gases, fumes and projections may contain trace amounts of the components inside the cartridges. These gases, fumes and projections may be irritating to the skin. Fragmented projections from primers can cause puncture wounds or cuts.

Sign and symptoms eyes

: When cartridges are fired, or otherwise discharged, gases, fumes and projections may be formed. These gases, fumes and projections may contain trace amounts of the components inside the cartridges. These gases, fumes and projections may be irritating to the eyes. Fragmented projections from primers can cause puncture wounds or cuts.

This product is an explosive article which is composed of a finished cartridge containing various components that are sealed completely within the cartridge. Under normal conditions of handling, no exposure to any of the harmful components inside the cartridge is expected and no health effects are generally expected as supplied.

Potential Chronic Health Effects

: When cartridges are fired, or otherwise discharged, gases, fumes and projections may be formed. These gases, fumes and projections may contain trace amounts of the components inside the cartridges. Inner cartridge components include: diphenylamine. Chronic exposure to diphenylamine can cause kidney and liver damage, and blood system effects (methemoglobinemia).

Mutagenicity

: Not considered to be a hazard.
Under normal conditions of handling, no exposure to any of the harmful components inside the cartridge is expected and no health effects are generally expected as supplied.
When cartridges are fired, or otherwise discharged, gases, fumes and projections may be formed. These gases, fumes and projections may contain trace amounts of the components inside the cartridges.

Carcinogenicity

: Not known to be carcinogenic.
Under normal conditions of handling, no exposure to any of the harmful components inside the cartridge is expected and no health effects are generally expected as supplied.
When cartridges are fired, or otherwise discharged, gases, fumes and projections may be formed. These gases, fumes and projections may contain trace amounts of the components inside the cartridges.

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Reproductive effects & Teratogenicity

- : Not expected to cause reproductive effects.
Under normal conditions of handling, no exposure to any of the harmful components inside the cartridge is expected and no health effects are generally expected as supplied.
When cartridges are fired, or otherwise discharged, gases, fumes and projections may be formed. These gases, fumes and projections may contain trace amounts of the components inside the cartridges.
Inner cartridge components include: Dibutyl phthalate.
Dibutyl phthalate may be fetotoxic, embryotoxic and/or teratogenic in the absence of maternal toxicity, based on animal data.
Dibutyl phthalate may produce harmful effects on male fertility (testicular atrophy and infertility), based on animal data. Dibutyl phthalate may also cause reduced fertility in females, based on animal data.

Senitization to material : Not expected to be a skin or respiratory sensitizer.

Specific target organ effects : Under normal conditions of handling, no exposure to any of the harmful components inside the cartridge is expected and no health effects are generally expected as supplied.
When cartridges are fired, or otherwise discharged, gases, fumes and projections may be formed. These gases, fumes and projections may contain trace amounts of the components inside the cartridges.

Irritancy : Not a hazard under normal conditions of use.

Medical conditions aggravated by overexposure : Pre-existing skin, eye and respiratory disorders.

Synergistic materials : Not available.

Toxicological data : There is no available data for the product itself, only for the ingredients. See below for individual ingredient acute toxicity data.

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<u>Chemical name</u>	<u>LC₅₀(4hr)</u> <u>inh, rat</u>	<u>LD₅₀</u>	
		<u>(Oral, rat)</u>	<u>(Rabbit, dermal)</u>
The cartridge case contains the following components:			
Copper	N/Av	> 2500 mg/kg	> 2000 mg/kg
Zinc	N/Av	N/Av	N/Av
The primer contains the following chemicals:			
Tetracene	N/Av	N/Av	N/Av
Diazodinitrophenol (DDNP)	N/Av	N/Av	N/Av
Nitrocellulose	N/Av	> 5000 mg/kg	N/Av
Pentaerythrite tetranitrate (pentaerythritol tetranitrate; PETN)	N/Av	1660 mg/kg	N/Av
Potassium nitrate	N/Av	3015 mg/kg	N/Av
Aluminum oxide silicate (Al ₂ O ₅ Si)	N/Av	N/Av	N/Av
Zirconium	N/Av	N/Av	N/Av
Copper	N/Av	> 2500 mg/kg	> 2000 mg/kg
Zinc	N/Av	N/Av	N/Av
The projectile contains the following chemicals:			
Polypropylene	N/Av	N/Av	N/Av
The projectile's marking compound contains the following chemicals:			
Barium sulfate	N/Av	N/Av	N/Av
Sodium lauryl sulfate	> 3.9 mg/L	1280 mg/kg (35%)	600 mg/kg
Water	N/Av	> 90 mL/kg	N/Av
Various dyes	N/Av	N/Av	N/Av
Propylene glycol	N/Av	21 800 mg/kg	20 800 mg/kg
The propellant contains the following chemicals:			
Nitrocellulose	N/Av	> 5000 mg/kg	N/Av
Nitroglycerin	N/Av	105 mg/kg	> 280 mg/kg
Diphenylamine	N/Av	1120 mg/kg	> 5000 mg/kg
Dibutyl phthalate	≥ 15.68 mg/L	6300 mg/kg	4200 mg/kg
Graphite	> 64.4 mg/L	> 10 000 mg/kg	N/Av
Potassium sulfate	N/Av	6600 mg/kg	N/Av
Calcium carbonate	N/Av	6450 mg/kg	N/Av
Polyester adipate	N/Av	N/Av	N/Av
1,3-diethyl 1,3-diphenylurea (Ethyl centralite)	N/Av	2750 mg/kg	N/Av
Rosin	N/Av	7600 mg/kg	> 2000 mg/kg

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Potassium nitrate	N/Av	3015 mg/kg	N/Av
Ethyl acetate	8000 - 16 000 ppm (28.8 - 57.7 mg/L)	10 200 mg/kg	> 18 000 mg/kg
N-Nitrosodiphenylamine	N/Av	1825 mg/kg	> 7940 mg/kg
Tin dioxide	N/Av	> 20 000 mg/kg	N/Av
The Sabot contains the following chemicals:			
Acetal	> 4000 ppm	4600 mg/kg	8254 mg/kg

Other important toxicological hazards

: None known or reported by the manufacturer.

SECTION 12. ECOLOGICAL INFORMATION

Ecotoxicity

: No data is available on the product itself. The product should not be allowed to enter drains or water courses, or be deposited where it can affect ground or surface waters. Contains: Zinc; Nitroglycerin; diphenylamine; Dibutyl phthalate; 1,3-Diethyl 1.3-diphenylurea; Sodium lauryl sulfate.

The acute toxicity of zinc powder is (WHO 2001, EHC # 221):

Toxicity to daphnia - EC50/48h/daphnia = 0.07 mg/L

Toxicity to algae - EC50/72h/algae = 0.15 mg/L

The acute toxicity of Nitroglycerin is (literature);

Toxicity to fish - LC50/96h/bluegill sunfish = 1.28 mg/L

Toxicity to daphnia - EC50/48h/daphnia = 17.23 mg/L

Toxicity to algae - EC50/96h/green algae = 1.15 mg/L

The acute toxicity of diphenylamine is (literature):

Toxicity to fish - LC50/96h/Fathead minnows = 3.79 mg/L

Toxicity to daphnia

EC50/48h/daphnia = 0.31 mg/L

NOEC = 0.16 mg/L

Toxicity to algae - EC50/72h/algae = 1.5 mg/L

The acute toxicity of dibutyl phthalate is (literature):

Toxicity to fish - LC50/96h/ yellow perch = 0.35 mg/L

Toxicity to daphnia

EC50/48h/daphnia = 3.7 mg/L

NOEC = 0.96 mg/L

Toxicity to algae - EC50/96h/green algae = 0.4 mg/L

The acute toxicity of Sodium lauryl sulfate is (literature):

Toxicity to fish - LC50/96h/ Macrones vittatus (striped catfish) = 1.39 mg/L

Toxicity to algae - EC50/72h/algae = 53 mg/L

Persistence and degradability

: The product itself has not been tested. Not expected to be rapidly biodegradable.

Bioaccumulation potential

: The product itself has not been tested.

Mobility in soil

: The product itself has not been tested.

Other Adverse Environmental effects

: None known.

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SECTION 13. DISPOSAL CONSIDERATIONS

- Handling for Disposal** : Handle waste according to recommendations in Section 7. Empty product containers may contain hazardous product residue.
- Methods of Disposal** : 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.
Dispose in accordance with all applicable federal, state, provincial and local regulations.
- RCRA** : If this product, as supplied, becomes a waste in the United States, it may meet the criteria of a hazardous waste as defined under RCRA, Title 40 CFR 261. It is the responsibility of the waste generator to determine the proper waste identification and disposal method. For disposal of unused or waste material, check with local, state and federal environmental agencies.

SECTION 14. TRANSPORTATION INFORMATION

Regulatory Information	UN Number	UN proper shipping name	Transport hazard class(es)	Packing Group	Label
TDG	UN0012	CARTRIDGES, SMALL ARMS	1.4S	II	
TDG Additional information	Placards are not required in accordance with TDG Section 4.17. Explosive Limit Index: 25 kg ERG #: 114				
49CFR/DOT	UN0012	Cartridges, small arms	1.4S	II	
49CFR/DOT Additional information	Until December 31, 2013, may be marked as "Cartridges, small arms" and reclassified as "ORM-D" material.				

Special precautions for user : Avoid shock and friction. Appropriate advice on safety must accompany the package.

Environmental hazards : See ECOLOGICAL INFORMATION, Section 12.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code
: Not applicable.

SECTION 15. REGULATORY INFORMATION

US Federal Information:

TSCA: All listed ingredients appear on the Toxic Substances Control Act (TSCA) inventory.

CERCLA Reportable Quantity (RQ) (40 CFR 117.302): None reportable.

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SARA TITLE III: Sec. 302, Extremely Hazardous Substances, 40 CFR 355: No Extremely Hazardous Substances are present in this material.

SARA TITLE III: Sec. 311 and 312, MSDS Requirements, 40 CFR 370 Hazard Classes: Explosive. Under SARA Sections 311 and 312, the EPA has established threshold quantities for the reporting of hazardous chemicals. The current thresholds are 500 pounds for the threshold planning quantity (TPQ), whichever is lower, for extremely hazardous substances and 10,000 pounds for all other hazardous chemicals.

SARA TITLE III: Sec. 313, Toxic Chemicals Notification, 40 CFR 372: This product may be subject to SARA notification requirements, since it contains Toxic Chemical constituents above their de minimus concentrations. This product contains: Copper; Zinc; Nitroglycerin; Dibutyl phthalate.

US State Right to Know Laws:

California Proposition 65: This product contains a chemical known to the State of California to cause developmental harm. This product contains a chemical known to the State of California to cause reproductive harm. Contains: Dibutyl phthalate.

Canadian Information:

Canadian Environmental Protection Act (CEPA) information: All ingredients listed appear on the Domestic Substances List (DSL).

WHMIS information: Refer to Section 2 for a WHMIS Classification for this product.

This product has been classified according to the hazard criteria of the CPR and the MSDS contains all of the information required by the CPR.

International Information:

European EINECs information: All ingredients listed appear on the European EINECs inventory.

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SECTION 16. OTHER INFORMATION

- Legend** :
- ACGIH: American Conference of Governmental Industrial Hygienists
 - AIHA: American Industrial Hygiene Association
 - CAS: Chemical Abstract Services
 - CERCLA: Comprehensive Environmental Response, Compensation, and Liability Act of 1980
 - CFR: Code of Federal Regulations
 - CSA: Canadian Standards Association
 - ECHA: European Chemicals Agency
 - DOT: Department of Transportation
 - EHC: Environmental Health Criteria
 - EPA: Environmental Protection Agency
 - HSDB: Hazardous Substances Data Bank
 - IARC: International Agency for Research on Cancer
 - Inh: Inhalation
 - LC: Lethal Concentration
 - LD: Lethal Dose
 - N/Ap: Not Applicable
 - N/Av: Not Available
 - NIOSH: National Institute of Occupational Safety and Health
 - NTP: National Toxicology Program
 - OSHA: Occupational Safety and Health Administration
 - PEL: Permissible exposure limit
 - RCRA: Resource Conservation and Recovery Act
 - RTECS: Registry of Toxic Effects of Chemical Substances
 - SARA: Superfund Amendments and Reauthorization Act
 - SDS: Safety Data Sheet / Material Safety Data Sheet
 - STEL: Short Term Exposure Limit
 - TDG: Canadian Transportation of Dangerous Goods Act & Regulations
 - TLV: Threshold Limit Values
 - TWA: Time Weighted Average
 - WEEL: Workplace Environmental Exposure Level
 - WHO: World Health Organization
 - WHMIS: Workplace Hazardous Materials Identification System
- References** :
1. ACGIH, Threshold Limit Values for Chemical Substances and Physical Agents & Biological Exposure Indices for 2013.
 2. International Agency for Research on Cancer Monographs, searched 2013.
 3. Canadian Centre for Occupational Health and Safety, CCIInfoWeb databases, 2013 (Chempendium, HSDB and RTECs).
 4. Material Safety Data Sheets from manufacturer.
 5. US EPA Title III List of Lists - October 2012 version.
 6. California Proposition 65 List - November 8, 2013 version.
 7. OECD - The Global Portal to Information on Chemical Substances - eChemPortal, 2013.
- Preparation Date (mm/dd/yyyy)** : 11/28/2013
- Revision No.** : 4
- Other special considerations for handling** :
- Provide adequate information, instruction and training for operators.

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