

# IRT™ Rifle & Pistol Ammunition

## Safety Data Sheet

According to Regulation (EC) No. 1907/2006 (REACH) with its amendment Regulation (EU) 2015/830



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## SECTION 1: Identification of the substance/mixture and of the company/undertaking

### 1.1. Product identifier

Product form : Mixture  
Product Name : IRT™ Rifle & Pistol Ammunition  
Synonyms : American Eagle Indoor Range Training™, IRT™, American Eagle Non-Toxic Primer

### 1.2. Relevant identified uses of the substance or mixture and uses advised against

#### 1.2.1. Relevant identified uses

Use of the substance/mixture : Small Arms Ammunition.

#### 1.2.2. Uses advised against

No additional information available

### 1.3. Details of the supplier of the safety data sheet

#### Company

Federal Cartridge Company  
900 Ehlen Drive  
Anoka, MN 55303  
USA  
T 1-800-635-7656

dangerous.goods@vistaoutdoor.com

### 1.4. Emergency telephone number

Emergency number : 1-800-424-9300 (Inside US), 01-703-527-3887 (Outside US) - (CHEMTREC, Day or Night)

## SECTION 2: Hazards identification

### 2.1. Classification of the substance or mixture

#### Classification according to Regulation (EC) No. 1272/2008 [CLP]

Expl. 1.4	H204
Acute Tox. 2 (Oral)	H300
Acute Tox. 1 (Dermal)	H310
Acute Tox. 2 (Inhalation:dust,mist)	H330
STOT RE 2	H373
Aquatic Chronic 3	H412

Full text of hazard classes and H-statements : see section 16

#### Adverse physicochemical, human health and environmental effects

No additional information available

### 2.2. Label elements

#### Labelling according to Regulation (EC) No. 1272/2008 [CLP]

Hazard pictograms (CLP) :



GHS01

Signal word (CLP) : Danger

Hazard statements (CLP) : H204 - Fire or projection hazard  
H300+H310+H330 - Fatal if swallowed, in contact with skin or if inhaled  
H373 - May cause damage to organs through prolonged or repeated exposure  
H412 - Harmful to aquatic life with long lasting effects

Precautionary statements (CLP) : P210 - Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.  
P260 - Do not breathe vapors, mist, or spray.  
P264 - Wash hands, forearms, and other exposed areas thoroughly after handling.  
P270 - Do not eat, drink or smoke when using this product.  
P271 - Use only outdoors or in a well-ventilated area.  
P273 - Avoid release to the environment.  
P280 - Wear protective gloves, protective clothing, and eye protection.  
P284 - [In case of inadequate ventilation] wear respiratory protection .

# IRT™ Rifle & Pistol Ammunition

## Safety Data Sheet

According to Regulation (EC) No. 1907/2006 (REACH) with its amendment Regulation (EU) 2015/830

P301+P310 - IF SWALLOWED: Immediately call a POISON CENTER or doctor.  
P302+P352 - IF ON SKIN: Wash with plenty of water.  
P304+P340 - IF INHALED: Remove person to fresh air and keep comfortable for breathing.  
P310 - Immediately call a POISON CENTER or doctor.  
P314 - Get medical advice/attention if you feel unwell.  
P320 - Specific treatment is urgent (see section 4 on this SDS).  
P321 - Specific treatment (see section 4 on this SDS).  
P330 - Rinse mouth.  
P361+P364 - Take off immediately all contaminated clothing and wash it before reuse.  
P370+P380 - In case of fire: evacuate area.  
P401 - Store in accordance with local, regional, national, and international regulations.  
P403+P233 - Store in a well-ventilated place. Keep container tightly closed.  
P405 - Store locked up.  
P501 - Dispose of contents/container in accordance with local, regional, national, and international regulations.

### 2.3. Other hazards

Other hazards not contributing to the classification

: Many of the health hazards listed above are associated with the internal contents of the ammunition and the propellant. When in its unfired state some of these hazards may not be applicable. Safe handling practices should still be observed. Exposure may aggravate pre-existing eye, skin, or respiratory conditions. If heated to the point of fume generation, zinc fumes may cause metal fume fever. Otherwise, zinc is non-toxic. This product contains copper, aluminum, lead, zinc, tin, and antimony in a solid massive state. Lead in its powder form (diameter < 1mm) is a known reproductive hazard and causes damage to the central nervous system, blood and kidneys through prolonged or repeated exposure by inhalation or ingestion. The lead in this product is fully encapsulated by a copper jacket, care should be taken to avoid firing at hard surfaces. Additional hazardous products may be formed during processing, see hazardous decomposition products. Toxic or irritating substances may be released during the firing of ammunition. Care should be taken in the cleaning of range facilities to minimize the exposure potential to these substances.

## SECTION 3: Composition/information on ingredients

### 3.1. Substance

Not applicable

### 3.2. Mixture

Name	Product identifier	%	Classification according to Regulation (EC) No. 1272/2008 [CLP]
Copper	(CAS No) 7440-50-8 (EC no) 231-159-6	26,95 - 55,84	Not classified
Aluminum	(CAS No) 7429-90-5 (EC no) 231-072-3 (EC index no) 013-002-00-1	<= 29,002	Flam. Sol. 1, H228 Water-react. 2, H261
Nitrocellulose	(CAS No) 9004-70-0 (EC no) 618-392-2 (EC index no) 603-037-00-6	5,405 - 24,01	Expl. 1.1, H201
Lead	(CAS No) 7439-92-1 (EC no) 231-100-4	<= 18	Not classified

# IRT™ Rifle & Pistol Ammunition

## Safety Data Sheet

According to Regulation (EC) No. 1907/2006 (REACH) with its amendment Regulation (EU) 2015/830

Name	Product identifier	%	Classification according to Regulation (EC) No. 1272/2008 [CLP]
Zinc	(CAS No) 7440-66-6 (EC no) 231-175-3 (EC index no) 030-001-01-9	1,545 - 12,23	Not classified
Nitroglycerin	(CAS No) 55-63-0 (EC no) 200-240-8 (EC index no) 603-034-00-X	0,405 - 10,01	Unst. Expl, H200 Acute Tox. 2 (Oral), H300 Acute Tox. 1 (Dermal), H310 Acute Tox. 2 (Inhalation:dust,mist), H330 STOT RE 2, H373 Aquatic Chronic 2, H411
Tin	(CAS No) 7440-31-5 (EC no) 231-141-8	<= 7,5	Not classified
Antimony	(CAS No) 7440-36-0 (EC no) 231-146-5	<= 3	Not classified
Diazodinitrophenol	(CAS No) 4682-03-5 (EC no) 225-134-9	0,015 - 0,03	Unst. Expl, H200
Strontium nitrate	(CAS No) 10042-76-9 (EC no) 233-131-9	0,01 - 0,02	Ox. Sol. 1, H271 Eye Dam. 1, H318
1-Tetrazene-1-carboximidic acid, 4-(aminoiminomethyl)-, 2-nitrosohydrazide	(CAS No) 109-27-3 (EC no) 203-659-4	0,004 - 0,008	Unst. Expl, H200

Full text of H-statements: see section 16

## SECTION 4: First aid measures

### 4.1. Description of first aid measures

- First-aid measures general : Never give anything by mouth to an unconscious person. If you feel unwell, seek medical advice (show the label where possible).
- First-aid measures after inhalation : When symptoms occur: go into open air and ventilate suspected area. If inhaled, remove to fresh air and keep at rest in a position comfortable for breathing. Call a POISON CENTER or doctor/physician.
- First-aid measures after skin contact : Remove contaminated clothing. Drench affected area with water for at least 15 minutes. Obtain medical attention if irritation develops or persists. Wash contaminated clothing before reuse.
- First-aid measures after eye contact : Rinse cautiously with water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Obtain medical attention.
- First-aid measures after ingestion : Rinse mouth. Do NOT induce vomiting. Call a physician or poison control center immediately.

### 4.2. Most important symptoms and effects, both acute and delayed

- Symptoms/injuries : Fatal if inhaled. Fatal in contact with skin. Fatal if swallowed. May cause damage to organs (circulatory system) through prolonged or repeated exposure (inhalation).
- Symptoms/injuries after inhalation : Fatal if inhaled. May cause respiratory irritation.
- Symptoms/injuries after skin contact : Fatal in contact with skin.
- Symptoms/injuries after eye contact : May cause slight irritation to eyes.
- Symptoms/injuries after ingestion : Fatal if swallowed. Ingestion may cause adverse effects.
- Chronic symptoms : May cause damage to organs (circulatory system) through prolonged or repeated exposure (inhalation).

### 4.3. Indication of any immediate medical attention and special treatment needed

If exposed or concerned, get medical advice and attention. If medical advice is needed, have product container or label at hand.

## SECTION 5: Firefighting measures

### 5.1. Extinguishing media

- Suitable extinguishing media : Fight fires using normal precautions from a reasonable distance.
- Unsuitable extinguishing media : None

### 5.2. Special hazards arising from the substance or mixture

- Fire hazard : May ignite if heated to 250 °F (121 °C) causing projection of unconfined cartridges.
- Explosion hazard : Explosion risk in case of fire.

# IRT™ Rifle & Pistol Ammunition

## Safety Data Sheet

According to Regulation (EC) No. 1907/2006 (REACH) with its amendment Regulation (EU) 2015/830

Reactivity	: May detonate with friction, impact, and heat.
Hazardous decomposition products in case of fire	: Carbon oxides (CO, CO <sub>2</sub> ). Nitrogen oxides. Lead compounds. Metal oxides. Zinc oxides. Oxides of antimony.
<b>5.3. Advice for firefighters</b>	
Precautionary measures fire	: Exercise caution when fighting any chemical fire.
Firefighting instructions	: DO NOT fight fire when fire reaches explosives, evacuate area. In case of fire: Evacuate area. Fight fire remotely due to the risk of explosion. Do not breathe fumes from fires or vapours from decomposition. Do not allow run-off from firefighting to enter drains or water courses.
Protection during firefighting	: Do not enter fire area without proper protective equipment, including respiratory protection.

## SECTION 6: Accidental release measures

### 6.1. Personal precautions, protective equipment and emergency procedures

General measures : Avoid all contact with skin, eyes, or clothing. Avoid breathing dust. Keep away from heat, hot surfaces, sparks, open flames, and other ignition sources. No smoking.

#### 6.1.1. For non-emergency personnel

Protective equipment : Use appropriate personal protection equipment (PPE).  
Emergency procedures : Evacuate unnecessary personnel.

#### 6.1.2. For emergency responders

Protective equipment : Equip cleanup crew with proper protection.  
Emergency procedures : Eliminate ignition sources. Evacuate unnecessary personnel. Stop leak if safe to do so. Ventilate area.

### 6.2. Environmental precautions

Prevent entry to sewers and public waters.

### 6.3. Methods and material for containment and cleaning up

For containment : Contain solid spills with appropriate barriers and prevent migration and entry into sewers or streams.  
Methods for cleaning up : Clean up spills immediately and dispose of waste safely. Eliminate all ignition sources. Take up mechanically (sweeping, shovelling) and collect in suitable container for disposal. Use only non-sparking tools. Ventilate area. Contact competent authorities after a spill.

### 6.4. Reference to other sections

See Heading 8. Exposure controls and personal protection. See Section 13, Disposal Considerations.

## SECTION 7: Handling and storage

### 7.1. Precautions for safe handling

Additional hazards when processed : Projectiles from fired ammunition can cause puncture wounds. Avoid striking the primer of unchambered cartridges. Remove ammunition from service if any of the following conditions have occurred: corrosion, physical damage, exposure to oil or spray type lubricants.  
Precautions for safe handling : Avoid all unnecessary exposure. Use appropriate personal protection equipment (PPE).  
Hygiene measures : Handle in accordance with good industrial hygiene and safety procedures. Wash hands and other exposed areas with mild soap and water before eating, drinking, or smoking and again when leaving work.

### 7.2. Conditions for safe storage, including any incompatibilities

Technical measures : Comply with applicable regulations.  
Storage conditions : Store in a dry, cool and well-ventilated place. Keep container closed when not in use. Keep only in original container. Keep/Store away from oil and lubricants, sources of ignition, direct sunlight, extremely high or low temperatures, incompatible materials. Keep in fireproof place. Do not store in leather case for extended periods.  
Incompatible products : Strong acids. Strong bases. Strong oxidizers. Alkalis. Ammonia. Corrosive liquids. Oils and lubricants.  
Heat and ignition sources : Do not expose to heat, or ignition sources as this could cause an explosion. If heated above 121 °C (250 °F) may explode.

# IRT™ Rifle & Pistol Ammunition

## Safety Data Sheet

According to Regulation (EC) No. 1907/2006 (REACH) with its amendment Regulation (EU) 2015/830

### 7.3. Specific end use(s)

Small Arms Ammunition

## SECTION 8: Exposure controls/personal protection

### 8.1. Control parameters

Tin (7440-31-5)		
Austria	MAK (mg/m <sup>3</sup> )	2 mg/m <sup>3</sup> (inhalable fraction)
Austria	MAK Short time value (mg/m <sup>3</sup> )	4 mg/m <sup>3</sup> (inhalable fraction)
Belgium	Limit value (mg/m <sup>3</sup> )	2 mg/m <sup>3</sup>
Belgium	OEL chemical category (BE)	Skin
Croatia	GVI (granična vrijednost izloženosti) (mg/m <sup>3</sup> )	2 mg/m <sup>3</sup>
Cyprus	OEL TWA (mg/m <sup>3</sup> )	2 mg/m <sup>3</sup>
Greece	OEL TWA (mg/m <sup>3</sup> )	2 mg/m <sup>3</sup>
USA ACGIH	ACGIH TWA (mg/m <sup>3</sup> )	2 mg/m <sup>3</sup>
Spain	VLA-ED (mg/m <sup>3</sup> )	2 mg/m <sup>3</sup>
Switzerland	OEL chemical category (CH)	Skin notation
Finland	HTP-arvo (8h) (mg/m <sup>3</sup> )	2 mg/m <sup>3</sup>
Ireland	OEL (8 hours ref) (mg/m <sup>3</sup> )	2 mg/m <sup>3</sup>
Ireland	OEL (15 min ref) (mg/m <sup>3</sup> )	6 mg/m <sup>3</sup> (calculated)
Malta	OEL TWA (mg/m <sup>3</sup> )	2 mg/m <sup>3</sup>
Poland	NDS (mg/m <sup>3</sup> )	2 mg/m <sup>3</sup> (inhalable fraction)
Slovenia	OEL TWA (mg/m <sup>3</sup> )	0,1 mg/m <sup>3</sup> (inhalable fraction) 2 mg/m <sup>3</sup> (inhalable fraction)
Slovenia	OEL chemical category (SL)	Potential for cutaneous absorption
Sweden	nivågränsvärde (NVG) (mg/m <sup>3</sup> )	2 mg/m <sup>3</sup> (total inhalable dust)
Portugal	OEL TWA (mg/m <sup>3</sup> )	2 mg/m <sup>3</sup>
Antimony (7440-36-0)		
Austria	MAK (mg/m <sup>3</sup> )	0,5 mg/m <sup>3</sup> (inhalable fraction)
Austria	MAK Short time value (mg/m <sup>3</sup> )	5 mg/m <sup>3</sup> (inhalable fraction)
Belgium	Limit value (mg/m <sup>3</sup> )	0,5 mg/m <sup>3</sup>
Bulgaria	OEL TWA (mg/m <sup>3</sup> )	0,5 mg/m <sup>3</sup>
Croatia	GVI (granična vrijednost izloženosti) (mg/m <sup>3</sup> )	0,5 mg/m <sup>3</sup>
France	VME (mg/m <sup>3</sup> )	0,5 mg/m <sup>3</sup>
France	OEL chemical category (FR)	Carcinogen categories 1A, 1B, 2
Greece	OEL TWA (mg/m <sup>3</sup> )	0,5 mg/m <sup>3</sup>
USA ACGIH	ACGIH TWA (mg/m <sup>3</sup> )	0,5 mg/m <sup>3</sup>
Latvia	OEL TWA (mg/m <sup>3</sup> )	0,2 mg/m <sup>3</sup> (metallic dust)
Spain	VLA-ED (mg/m <sup>3</sup> )	0,5 mg/m <sup>3</sup>
Switzerland	VME (mg/m <sup>3</sup> )	0,5 mg/m <sup>3</sup> (inhalable dust)
Netherlands	Grenswaarde TGG 8H (mg/m <sup>3</sup> )	0,5 mg/m <sup>3</sup>
United Kingdom	WEL TWA (mg/m <sup>3</sup> )	0,5 mg/m <sup>3</sup>
United Kingdom	WEL STEL (mg/m <sup>3</sup> )	1,5 mg/m <sup>3</sup> (calculated)
Czech Republic	Expoziční limity (PEL) (mg/m <sup>3</sup> )	0,5 mg/m <sup>3</sup>
Denmark	Grænseværdie (langvarig) (mg/m <sup>3</sup> )	0,5 mg/m <sup>3</sup> (powder)
Estonia	OEL TWA (mg/m <sup>3</sup> )	0,5 mg/m <sup>3</sup>
Finland	HTP-arvo (8h) (mg/m <sup>3</sup> )	0,5 mg/m <sup>3</sup>
Hungary	AK-érték	0,5 mg/m <sup>3</sup>

# IRT™ Rifle & Pistol Ammunition

## Safety Data Sheet

According to Regulation (EC) No. 1907/2006 (REACH) with its amendment Regulation (EU) 2015/830

<b>Antimony (7440-36-0)</b>		
Hungary	CK-érték	2 mg/m <sup>3</sup>
Ireland	OEL (8 hours ref) (mg/m <sup>3</sup> )	0,5 mg/m <sup>3</sup>
Ireland	OEL (15 min ref) (mg/m <sup>3</sup> )	1,5 mg/m <sup>3</sup> (calculated)
Lithuania	IPRV (mg/m <sup>3</sup> )	0,5 mg/m <sup>3</sup>
Norway	Grenseverdier (AN) (mg/m <sup>3</sup> )	0,5 mg/m <sup>3</sup>
Norway	Grenseverdier (Korttidsverdi) (mg/m <sup>3</sup> )	0,5 mg/m <sup>3</sup>
Norway	OEL chemical category (NO)	Carcinogen
Poland	NDS (mg/m <sup>3</sup> )	0,5 mg/m <sup>3</sup>
Romania	OEL TWA (mg/m <sup>3</sup> )	0,20 mg/m <sup>3</sup>
Romania	OEL STEL (mg/m <sup>3</sup> )	0,50 mg/m <sup>3</sup>
Romania	Romania - BEI	1 mg/l (Medium: urine - Time: end of shift - Parameter: Antimony)
Slovakia	NPHV (priemerná) (mg/m <sup>3</sup> )	0,5 mg/m <sup>3</sup> (total dust)
Slovenia	OEL TWA (mg/m <sup>3</sup> )	0,5 mg/m <sup>3</sup> (inhalable fraction)
Slovenia	OEL STEL (mg/m <sup>3</sup> )	2 mg/m <sup>3</sup> (inhalable fraction)
Sweden	nivågränsvärde (NVG) (mg/m <sup>3</sup> )	0,25 mg/m <sup>3</sup> (total inhalable dust)
Portugal	OEL TWA (mg/m <sup>3</sup> )	0,5 mg/m <sup>3</sup>
<b>Zinc (7440-66-6)</b>		
Switzerland	VLE (mg/m <sup>3</sup> )	0,4 mg/m <sup>3</sup> (respirable dust)
Switzerland	VME (mg/m <sup>3</sup> )	0,1 mg/m <sup>3</sup> (respirable dust) 2 mg/m <sup>3</sup> (inhalable dust)
<b>Strontium nitrate (10042-76-9)</b>		
Lithuania	IPRV (mg/m <sup>3</sup> )	1 mg/m <sup>3</sup>
<b>Nitroglycerin (55-63-0)</b>		
Austria	MAK (mg/m <sup>3</sup> )	0,5 mg/m <sup>3</sup>
Austria	MAK (ppm)	0,05 ppm
Austria	MAK Short time value (mg/m <sup>3</sup> )	2 mg/m <sup>3</sup>
Austria	MAK Short time value (ppm)	0,2 ppm
Austria	OEL chemical category (AT)	Skin notation
Belgium	Limit value (mg/m <sup>3</sup> )	0,47 mg/m <sup>3</sup>
Belgium	Limit value (ppm)	0,05 ppm
Belgium	OEL chemical category (BE)	Skin
France	VME (mg/m <sup>3</sup> )	1 mg/m <sup>3</sup>
France	VME (ppm)	0,1 ppm
France	OEL chemical category (FR)	Risk of cutaneous absorption
Germany	TRGS 900 Occupational exposure limit value (mg/m <sup>3</sup> )	0,094 mg/m <sup>3</sup> (The risk of damage to the embryo or fetus can be excluded when AGW and BGW values are observed)
Germany	TRGS 900 Occupational exposure limit value (ppm)	0,01 ppm (The risk of damage to the embryo or fetus can be excluded when AGW and BGW values are observed)
Germany	TRGS 900 chemical category	Skin notation
Greece	OEL TWA (mg/m <sup>3</sup> )	2 mg/m <sup>3</sup>
Greece	OEL TWA (ppm)	0,2 ppm
Greece	OEL STEL (mg/m <sup>3</sup> )	2 mg/m <sup>3</sup>
Greece	OEL STEL (ppm)	0,2 ppm
Greece	OEL chemical category (GR)	skin - potential for cutaneous absorption
USA ACGIH	ACGIH TWA (ppm)	0,05 ppm

# IRT™ Rifle & Pistol Ammunition

## Safety Data Sheet

According to Regulation (EC) No. 1907/2006 (REACH) with its amendment Regulation (EU) 2015/830

<b>Nitroglycerin (55-63-0)</b>		
Spain	VLA-ED (mg/m <sup>3</sup> )	0,5 mg/m <sup>3</sup>
Spain	VLA-ED (ppm)	0,05 ppm
Spain	OEL chemical category (ES)	skin - potential for cutaneous exposure
Switzerland	VLE (mg/m <sup>3</sup> )	0,094 mg/m <sup>3</sup>
Switzerland	VLE (ppm)	0,01 ppm
Switzerland	VME (mg/m <sup>3</sup> )	0,094 mg/m <sup>3</sup>
Switzerland	VME (ppm)	0,01 ppm
Switzerland	OEL chemical category (CH)	Skin notation
Switzerland	Switzerland - BEI	0,5 µg/l (Medium: plasma/serum - Time: end of shift - Parameter: 1,2-Glycerine dinitrate) 0,5 µg/l (Medium: plasma/serum - Time: end of shift - Parameter: 1,3-Glycerine dinitrate)
Czech Republic	Expoziční limity (PEL) (mg/m <sup>3</sup> )	0,5 mg/m <sup>3</sup>
Czech Republic	OEL chemical category (CZ)	Potential for cutaneous absorption
Denmark	Grænseværdie (ceiling) (mg/m <sup>3</sup> )	0,2 mg/m <sup>3</sup>
Denmark	Grænseværdie (ceiling) (ppm)	0,02 ppm
Estonia	OEL TWA (mg/m <sup>3</sup> )	0,3 mg/m <sup>3</sup>
Estonia	OEL TWA (ppm)	0,03 ppm
Estonia	OEL STEL (mg/m <sup>3</sup> )	0,9 mg/m <sup>3</sup>
Estonia	OEL STEL (ppm)	0,1 ppm
Estonia	OEL chemical category (ET)	Skin notation
Finland	HTP-arvo (8h) (mg/m <sup>3</sup> )	0,3 mg/m <sup>3</sup>
Finland	HTP-arvo (8h) (ppm)	0,03 ppm
Finland	HTP-arvo (15 min)	1 mg/m <sup>3</sup>
Finland	HTP-arvo (15 min) (ppm)	0,1 ppm
Finland	OEL chemical category (FI)	Potential for cutaneous absorption
Hungary	AK-érték	0,5 mg/m <sup>3</sup>
Hungary	CK-érték	2 mg/m <sup>3</sup>
Hungary	OEL chemical category (HU)	Sensitizer, Potential for cutaneous absorption
Ireland	OEL (8 hours ref) (mg/m <sup>3</sup> )	0,5 mg/m <sup>3</sup>
Ireland	OEL (8 hours ref) (ppm)	0,05 ppm
Ireland	OEL (15 min ref) (mg/m <sup>3</sup> )	1,5 mg/m <sup>3</sup> (calculated)
Ireland	OEL (15 min ref) (ppm)	0,15 ppm (calculated)
Ireland	OEL chemical category (IE)	Potential for cutaneous absorption
Lithuania	IPRV (mg/m <sup>3</sup> )	0,3 mg/m <sup>3</sup>
Lithuania	IPRV (ppm)	0,03 ppm
Lithuania	TPRV (mg/m <sup>3</sup> )	0,9 mg/m <sup>3</sup>
Lithuania	TPRV (ppm)	0,1 ppm
Lithuania	OEL chemical category (LT)	Skin notation
Norway	Grænseværdier (AN) (mg/m <sup>3</sup> )	0,27 mg/m <sup>3</sup>
Norway	Grænseværdier (AN) (ppm)	0,03 ppm
Norway	Grænseværdier (Korttidsverdi) (mg/m <sup>3</sup> )	0,27 mg/m <sup>3</sup>
Norway	Grænseværdier (Korttidsverdi) (ppm)	0,03 ppm
Norway	OEL chemical category (NO)	Skin notation
Poland	NDS (mg/m <sup>3</sup> )	0,095 mg/m <sup>3</sup> (sum of the average weighted concentrations of compounds of the same mechanism of action cannot exceed 1)

# IRT™ Rifle & Pistol Ammunition

## Safety Data Sheet

According to Regulation (EC) No. 1907/2006 (REACH) with its amendment Regulation (EU) 2015/830

<b>Nitroglycerin (55-63-0)</b>		
Poland	NDSCh (mg/m <sup>3</sup> )	0,19 mg/m <sup>3</sup> (When Ethylene glycol dinitrate (Nitroglycol, EGDN) is also present in the work place, it is necessary to take into account the sum of the quotient of the average weighted concentrations of both compounds to their MAC values, which may not exceed a value of 1)
Romania	OEL TWA (mg/m <sup>3</sup> )	0,05 mg/m <sup>3</sup>
Romania	OEL TWA (ppm)	0,006 ppm
Romania	OEL STEL (mg/m <sup>3</sup> )	2 mg/m <sup>3</sup>
Romania	OEL STEL (ppm)	0,25 ppm
Romania	OEL chemical category (RO)	Skin notation
Slovakia	NPHV (priemerná) (mg/m <sup>3</sup> )	0,47 mg/m <sup>3</sup>
Slovakia	NPHV (priemerná) (ppm)	0,05 ppm
Slovakia	NPHV (Hraničná) (mg/m <sup>3</sup> )	0,9 mg/m <sup>3</sup>
Slovakia	OEL chemical category (SK)	Potential for cutaneous absorption
Slovenia	OEL TWA (mg/m <sup>3</sup> )	0,47 mg/m <sup>3</sup>
Slovenia	OEL TWA (ppm)	0,05 ppm
Slovenia	OEL STEL (mg/m <sup>3</sup> )	1,88 mg/m <sup>3</sup>
Slovenia	OEL STEL (ppm)	0,2 ppm
Slovenia	OEL chemical category (SL)	Potential for cutaneous absorption
Sweden	nivågränsvärde (NVG) (mg/m <sup>3</sup> )	0,3 mg/m <sup>3</sup>
Sweden	nivågränsvärde (NVG) (ppm)	0,03 ppm
Sweden	kortidsvärde (KTV) (mg/m <sup>3</sup> )	0,9 mg/m <sup>3</sup>
Sweden	kortidsvärde (KTV) (ppm)	0,1 ppm
Sweden	OEL chemical category (SE)	Skin notation
Portugal	OEL TWA (ppm)	0,05 ppm
Portugal	OEL chemical category (PT)	skin - potential for cutaneous exposure
<b>Aluminum (7429-90-5)</b>		
Austria	MAK (mg/m <sup>3</sup> )	10 mg/m <sup>3</sup> (inhalable fraction)
Austria	MAK Short time value (mg/m <sup>3</sup> )	20 mg/m <sup>3</sup> (inhalable fraction)
Belgium	Limit value (mg/m <sup>3</sup> )	1 mg/m <sup>3</sup>
Bulgaria	OEL TWA (mg/m <sup>3</sup> )	10,0 mg/m <sup>3</sup> (metal dust) 1,5 mg/m <sup>3</sup> (respirable fraction)
Croatia	GVI (granična vrijednost izloženosti) (mg/m <sup>3</sup> )	10 mg/m <sup>3</sup> (total dust) 4 mg/m <sup>3</sup> (respirable dust)
Croatia	Croatia – BEI	200 mg/l (Medium: urine - Time: at the end of the shift - Parameter: Aluminum)
France	VME (mg/m <sup>3</sup> )	10 mg/m <sup>3</sup> (metal) 5 mg/m <sup>3</sup> (dust)
Greece	OEL TWA (mg/m <sup>3</sup> )	10 mg/m <sup>3</sup> (inhalable fraction) 5 mg/m <sup>3</sup> (respirable fraction)
USA ACGIH	ACGIH TWA (mg/m <sup>3</sup> )	1 mg/m <sup>3</sup> (respirable fraction)
Latvia	OEL TWA (mg/m <sup>3</sup> )	2 mg/m <sup>3</sup>
Spain	VLA-ED (mg/m <sup>3</sup> )	10 mg/m <sup>3</sup> (dust)
Switzerland	VME (mg/m <sup>3</sup> )	3 mg/m <sup>3</sup> (respirable dust)
Switzerland	Switzerland - BEI	60 µg/g creatinine (Medium: urine - Time: no restrictions - Parameter: Aluminum)
United Kingdom	WEL TWA (mg/m <sup>3</sup> )	10 mg/m <sup>3</sup> (inhalable dust) 4 mg/m <sup>3</sup> (respirable dust)



# IRT™ Rifle & Pistol Ammunition

## Safety Data Sheet

According to Regulation (EC) No. 1907/2006 (REACH) with its amendment Regulation (EU) 2015/830

<b>Aluminum (7429-90-5)</b>		
United Kingdom	WEL STEL (mg/m <sup>3</sup> )	30 mg/m <sup>3</sup> (calculated-inhalable dust) 12 mg/m <sup>3</sup> (calculated-respirable dust)
Czech Republic	Expoziční limity (PEL) (mg/m <sup>3</sup> )	10,0 mg/m <sup>3</sup> (dust)
Denmark	Grænseværdie (langvarig) (mg/m <sup>3</sup> )	5 mg/m <sup>3</sup> (dust, fume and powder, total) 2 mg/m <sup>3</sup> (dust and powder, respirable)
Estonia	OEL TWA (mg/m <sup>3</sup> )	10 mg/m <sup>3</sup> (total dust) 4 mg/m <sup>3</sup> (respirable dust)
Hungary	AK-érték	6 mg/m <sup>3</sup> (respirable dust)
Ireland	OEL (8 hours ref) (mg/m <sup>3</sup> )	1 mg/m <sup>3</sup> (respirable dust)
Ireland	OEL (15 min ref) (mg/m <sup>3</sup> )	3 mg/m <sup>3</sup> (calculated-respirable dust)
Lithuania	IPRV (mg/m <sup>3</sup> )	5 mg/m <sup>3</sup> (inhalable fraction) 2 mg/m <sup>3</sup> (respirable fraction) 1 mg/m <sup>3</sup>
Norway	Grænseværdier (AN) (mg/m <sup>3</sup> )	5 mg/m <sup>3</sup> (pyrotechnical-powder)
Norway	Grænseværdier (Korttidsverdi) (mg/m <sup>3</sup> )	5 mg/m <sup>3</sup> (pyrotechnical-powder)
Poland	NDS (mg/m <sup>3</sup> )	2,5 mg/m <sup>3</sup> (inhalable fraction) 1,2 mg/m <sup>3</sup> (respirable fraction)
Romania	OEL TWA (mg/m <sup>3</sup> )	3 mg/m <sup>3</sup> (dust) 1 mg/m <sup>3</sup> (fume)
Romania	OEL STEL (mg/m <sup>3</sup> )	10 mg/m <sup>3</sup> (powder) 3 mg/m <sup>3</sup> (fume)
Romania	Romania – BEI	200 µg/l (Medium: urine - Time: end of shift - Parameter: Aluminum)
Slovakia	NPHV (priemerná) (mg/m <sup>3</sup> )	1,5 mg/m <sup>3</sup> (metal) 6 mg/m <sup>3</sup> (total aerosol)
Slovakia	Slovakia – BEI	60 µg/g creatinine (Medium: urine - Time: not critical - Parameter: Aluminum)
Sweden	nivågränsvärde (NVG) (mg/m <sup>3</sup> )	5 mg/m <sup>3</sup> (total dust) 2 mg/m <sup>3</sup> (respirable dust)
Portugal	OEL TWA (mg/m <sup>3</sup> )	10 mg/m <sup>3</sup> (metal dust)
<b>Copper (7440-50-8)</b>		
Austria	MAK (mg/m <sup>3</sup> )	1 mg/m <sup>3</sup> (inhalable fraction) 0,1 mg/m <sup>3</sup> (respirable fraction, smoke)
Austria	MAK Short time value (mg/m <sup>3</sup> )	4 mg/m <sup>3</sup> (inhalable fraction) 0,4 mg/m <sup>3</sup> (respirable fraction, smoke)
Belgium	Limit value (mg/m <sup>3</sup> )	0,2 mg/m <sup>3</sup> (fume) 1 mg/m <sup>3</sup> (dust and mist)
Bulgaria	OEL TWA (mg/m <sup>3</sup> )	0,1 mg/m <sup>3</sup> (metal vapor)
Croatia	GVI (granična vrijednost izloženosti) (mg/m <sup>3</sup> )	0,2 mg/m <sup>3</sup> (fume) 1 mg/m <sup>3</sup> (dust)
Croatia	KGVI (kratkotrajna granična vrijednost izloženosti) (mg/m <sup>3</sup> )	2 mg/m <sup>3</sup> (dust and fumes)
France	VLE (mg/m <sup>3</sup> )	2 mg/m <sup>3</sup> (dust)
France	VME (mg/m <sup>3</sup> )	0,2 mg/m <sup>3</sup> (fume) 1 mg/m <sup>3</sup> (dust)
Greece	OEL TWA (mg/m <sup>3</sup> )	0,2 mg/m <sup>3</sup> (fume) 1 mg/m <sup>3</sup> (dust)
Greece	OEL STEL (mg/m <sup>3</sup> )	2 mg/m <sup>3</sup> (dust)
USA ACGIH	ACGIH TWA (mg/m <sup>3</sup> )	0,2 mg/m <sup>3</sup> (fume)
Latvia	OEL TWA (mg/m <sup>3</sup> )	0,5 mg/m <sup>3</sup>

# IRT™ Rifle & Pistol Ammunition

## Safety Data Sheet

According to Regulation (EC) No. 1907/2006 (REACH) with its amendment Regulation (EU) 2015/830

<b>Copper (7440-50-8)</b>		
Spain	VLA-ED (mg/m <sup>3</sup> )	0,2 mg/m <sup>3</sup> (fume) 1 mg/m <sup>3</sup> (dust and mist)
Switzerland	VLE (mg/m <sup>3</sup> )	0,2 mg/m <sup>3</sup> (inhalable dust)
Switzerland	VME (mg/m <sup>3</sup> )	0,1 mg/m <sup>3</sup> (inhalable dust)
Netherlands	Grenswaarde TGG 8H (mg/m <sup>3</sup> )	0,1 mg/m <sup>3</sup> (inhalable fraction)
United Kingdom	WEL TWA (mg/m <sup>3</sup> )	1 mg/m <sup>3</sup> (dust and mists) 0,2 mg/m <sup>3</sup> (fume)
United Kingdom	WEL STEL (mg/m <sup>3</sup> )	0,6 mg/m <sup>3</sup> (calculated-fume) 2 mg/m <sup>3</sup> (dust and mist)
Czech Republic	Expoziční limity (PEL) (mg/m <sup>3</sup> )	1 mg/m <sup>3</sup> (dust) 0,1 mg/m <sup>3</sup> (fume)
Denmark	Grænseværdie (langvarig) (mg/m <sup>3</sup> )	1,0 mg/m <sup>3</sup> (dust and powder) 0,1 mg/m <sup>3</sup> (fume)
Estonia	OEL TWA (mg/m <sup>3</sup> )	1 mg/m <sup>3</sup> (total dust) 0,2 mg/m <sup>3</sup> (respirable dust)
Finland	HTP-arvo (8h) (mg/m <sup>3</sup> )	1 mg/m <sup>3</sup> 0,1 mg/m <sup>3</sup> (respirable dust and fume)
Hungary	AK-érték	1 mg/m <sup>3</sup> 0,1 mg/m <sup>3</sup> (fume)
Hungary	CK-érték	4 mg/m <sup>3</sup> 0,4 mg/m <sup>3</sup> (fume)
Ireland	OEL (8 hours ref) (mg/m <sup>3</sup> )	0,2 mg/m <sup>3</sup> (fume) 1 mg/m <sup>3</sup> (dust and mist)
Ireland	OEL (15 min ref) (mg/m <sup>3</sup> )	0,6 mg/m <sup>3</sup> (calculated-fume) 2 mg/m <sup>3</sup> (dust and mist)
Lithuania	IPRV (mg/m <sup>3</sup> )	1 mg/m <sup>3</sup> (inhalable fraction) 0,2 mg/m <sup>3</sup> (respirable fraction)
Norway	Grenseverdier (AN) (mg/m <sup>3</sup> )	0,1 mg/m <sup>3</sup> (fume) 1 mg/m <sup>3</sup> (dust)
Norway	Grenseverdier (Korttidsverdi) (mg/m <sup>3</sup> )	0,1 mg/m <sup>3</sup> (fume) 1 mg/m <sup>3</sup> (dust)
Poland	NDS (mg/m <sup>3</sup> )	0,2 mg/m <sup>3</sup>
Romania	OEL TWA (mg/m <sup>3</sup> )	0,50 mg/m <sup>3</sup> (powder)
Romania	OEL STEL (mg/m <sup>3</sup> )	0,20 mg/m <sup>3</sup> (fume) 1,50 mg/m <sup>3</sup> (dust)
Slovakia	NPHV (priemerná) (mg/m <sup>3</sup> )	1 mg/m <sup>3</sup> (dust) 0,1 mg/m <sup>3</sup> (fume)
Slovakia	NPHV (Hraničná) (mg/m <sup>3</sup> )	2 mg/m <sup>3</sup> (dust) 0,2 mg/m <sup>3</sup> (fume)
Slovenia	OEL TWA (mg/m <sup>3</sup> )	1 mg/m <sup>3</sup> (inhalable fraction) 0,1 mg/m <sup>3</sup> (respirable fraction, fume)
Slovenia	OEL STEL (mg/m <sup>3</sup> )	4 mg/m <sup>3</sup> (inhalable fraction) 0,4 mg/m <sup>3</sup> (respirable fraction, fume)
Sweden	nivågränsvärde (NVG) (mg/m <sup>3</sup> )	1 mg/m <sup>3</sup> (total dust) 0,2 mg/m <sup>3</sup> (respirable dust)
Portugal	OEL TWA (mg/m <sup>3</sup> )	0,2 mg/m <sup>3</sup> (fume) 1 mg/m <sup>3</sup> (dust and mist)

# IRT™ Rifle & Pistol Ammunition

## Safety Data Sheet

According to Regulation (EC) No. 1907/2006 (REACH) with its amendment Regulation (EU) 2015/830

Lead (7439-92-1)		
EU	European BEI	(Medium: blood - Time: no restriction - Parameter: Lead (binding biological limit value) 0,075 mg/m <sup>3</sup> (Medium: air - Time: 40 hours per week - Parameter: Lead (TWA medical surveillance threshold in air measured as a time weighted average over 40 hours per week) (Medium: blood - Time: no restriction - Parameter: Lead (medical surveillance threshold measured in individual workers)
Austria	MAK (mg/m <sup>3</sup> )	0,1 mg/m <sup>3</sup> (inhalable fraction)
Austria	MAK Short time value (mg/m <sup>3</sup> )	0,4 mg/m <sup>3</sup> (inhalable fraction)
Bulgaria	OEL TWA (mg/m <sup>3</sup> )	0,05 mg/m <sup>3</sup>
Bulgaria	Bulgaria – BEI	300 µg/l (Medium: blood - Time: not fixed - Parameter: Lead (for women under 45 years old) 400 µg/l (Medium: blood - Time: not fixed - Parameter: Lead)
Croatia	GVI (granična vrijednost izloženosti) (mg/m <sup>3</sup> )	0,15 mg/m <sup>3</sup>
Croatia	OEL chemical category (HR)	Reproductive Toxin category 1
Croatia	Croatia – BEI	(Medium: blood - Time: not critical - Parameter: Lead (Medical surveillance should be carried out when the limit value of Lead in blood of workers >40 µg/100mL blood) (Medium: urine - Time: single sample or urine collected over 24 hours - Parameter: Lead (For all results that are expressed on Creatinine, Creatinine concentration <0.5 g/L and >3.0 g/L should not be considered) (Medium: blood - Time: not critical - Parameter: .delta.-Aminolevulinic acid dehydratase) (Medium: blood - Time: after exposure during 2-3 months (light protected sample) - Parameter: Protoporphyrin in erythrocytes (Interference of Iron deficiency (anemia sideropenic))
Cyprus	OEL TWA (mg/m <sup>3</sup> )	0,15 mg/m <sup>3</sup>
France	VME (mg/m <sup>3</sup> )	0,1 mg/m <sup>3</sup> (restrictive limit)
France	OEL chemical category (FR)	Carcinogen categories 1A, 1B, 2, Reproductive Toxin categories 1A, 1B, 2
France	France – BEI	400 µg/l (Medium: blood - Parameter: Lead (biological limit value, men) 300 µg/l (Medium: blood - Parameter: Lead (biological limit value, women) 200 µg/l (Medium: blood - Parameter: Lead (medical surveillance value, men) 100 µg/l (Medium: blood - Parameter: Lead (medical surveillance value, women)
Germany	TRGS 903 (BGW)	300 µg/l (Medium: whole blood - Time: no restriction - Parameter: Lead (women age below 45 years) 400 µg/l (Medium: whole blood - Time: no restriction - Parameter: Lead (women 45 years and older)
Gibraltar	OEL TWA (mg/m <sup>3</sup> )	0,15 mg/m <sup>3</sup>

# IRT™ Rifle & Pistol Ammunition

## Safety Data Sheet

According to Regulation (EC) No. 1907/2006 (REACH) with its amendment Regulation (EU) 2015/830

<b>Lead (7439-92-1)</b>		
Gibraltar	Gibraltar – BEI	(Medium: blood - Time: no restriction - Parameter: Lead (binding biological limit value) 0,075 mg/m <sup>3</sup> (Medium: air - Time: 40 hours per week - Parameter: Lead (medical surveillance threshold measured in individual employees) (Medium: blood - Time: no restriction - Parameter: Lead (medical surveillance threshold measured in individual employees)
Greece	OEL TWA (mg/m <sup>3</sup> )	0,15 mg/m <sup>3</sup>
USA ACGIH	ACGIH TWA (mg/m <sup>3</sup> )	0,05 mg/m <sup>3</sup>
Italy	OEL TWA (mg/m <sup>3</sup> )	0,075 mg/m <sup>3</sup>
Italy	Italy – BEI	(Medium: blood - Time: end of workweek (Lead remediation must be performed when workers of fertile age have Lead in blood levels >40 µg/100mL)
Latvia	OEL TWA (mg/m <sup>3</sup> )	0,005 mg/m <sup>3</sup>
Latvia	Latvia – BEI	(Medium: blood - Parameter: Lead (reference value in blood for occupationally unexposed population ≤10 µg/100 mL) (Medium: urine - Parameter: Coproporphyrin (reference value 22-57µg/g Creatinine) (Medium: urine - Parameter: Aminolevulinic acid (reference value 0.5-2.5mg/g Creatinine)
Spain	VLA-ED (mg/m <sup>3</sup> )	0,15 mg/m <sup>3</sup>
Spain	OEL chemical category (ES)	TR1A
Spain	Spain – BEI	(Medium: blood - Time: not critical - Parameter: Lead (3,K)
Switzerland	VLE (mg/m <sup>3</sup> )	0,8 mg/m <sup>3</sup> (inhalable dust)
Switzerland	VME (mg/m <sup>3</sup> )	0,1 mg/m <sup>3</sup> (inhalable dust)
Switzerland	OEL chemical category (CH)	Category C3 carcinogen, Category 1 developmental toxin, Category 3 reproductive toxin
Switzerland	Switzerland - BEI	400 µg/l (Medium: whole blood - Time: no restrictions - Parameter: Lead (men and women over 45 years old, X) 100 µg/l (Medium: whole blood - Time: no restrictions - Parameter: Lead (women less than 45 years old, X)
United Kingdom	WEL TWA (mg/m <sup>3</sup> )	0,15 mg/m <sup>3</sup>
United Kingdom	WEL STEL (mg/m <sup>3</sup> )	0,45 mg/m <sup>3</sup> (calculated)
Czech Republic	Expoziční limity (PEL) (mg/m <sup>3</sup> )	0,05 mg/m <sup>3</sup>

# IRT™ Rifle & Pistol Ammunition

## Safety Data Sheet

According to Regulation (EC) No. 1907/2006 (REACH) with its amendment Regulation (EU) 2015/830

<b>Lead (7439-92-1)</b>		
Czech Republic	Czech Republic - BEI	(Medium: urine - Time: discretionary - Parameter: 5-Aminolevulinic acid (For short term continual exposures <=30 calendar days) (Medium: urine - Time: discretionary - Parameter: Coproporphyrin (For short term continual exposures <=30 calendar days) (Medium: urine - Time: discretionary - Parameter: 5-Aminolevulinic acid (For short term continual exposures <=30 calendar days) (Medium: urine - Time: discretionary - Parameter: Coproporphyrin (For short term continual exposures <=30 calendar days) 0,4 mg/l (Medium: blood - Time: discretionary - Parameter: Lead)
Denmark	Grænseværdie (langvarig) (mg/m <sup>3</sup> )	0,05 mg/m <sup>3</sup> (dust, fume and powder)
Denmark	Denmark – BEI	(Medium: blood - Parameter: Lead)
Estonia	OEL TWA (mg/m <sup>3</sup> )	0,1 mg/m <sup>3</sup> (total dust) 0,05 mg/m <sup>3</sup> (respirable dust)
Estonia	OEL chemical category (ET)	Reproductive toxin
Finland	HTP-arvo (8h) (mg/m <sup>3</sup> )	0,1 mg/m <sup>3</sup> (all works)
Finland	Finland – BEI	(Medium: blood - Time: not critical - Parameter: Lead)
Hungary	AK-érték	0,15 mg/m <sup>3</sup>
Hungary	OEL chemical category (HU)	Repr1A
Ireland	OEL (8 hours ref) (mg/m <sup>3</sup> )	0,15 mg/m <sup>3</sup>
Ireland	OEL (15 min ref) (mg/m <sup>3</sup> )	0,45 mg/m <sup>3</sup> (calculated)
Lithuania	IPRV (mg/m <sup>3</sup> )	0,15 mg/m <sup>3</sup> (inhalable fraction) 0,07 mg/m <sup>3</sup> (respirable fraction)
Lithuania	OEL chemical category (LT)	Reproductive toxin inhalable and respirable fraction
Luxembourg	OEL TWA (mg/m <sup>3</sup> )	0,15 mg/m <sup>3</sup>
Luxembourg	Luxembourg - BEI	(Medium: blood - Parameter: Lead) 0,075 mg/m <sup>3</sup> (Medium: blood - Parameter: Lead (medical surveillance threshold in air measured as a time weighted average over 40 hours per week) (Medium: blood - Parameter: Lead (medical surveillance threshold measured in individual workers)
Norway	Grenseverdier (AN) (mg/m <sup>3</sup> )	0,05 mg/m <sup>3</sup> (dust and fume)
Norway	Grenseverdier (Korttidsverdi) (mg/m <sup>3</sup> )	0,05 mg/m <sup>3</sup> (dust and fume)
Norway	OEL chemical category (NO)	Potential reproductive hazard
Poland	NDS (mg/m <sup>3</sup> )	0,05 mg/m <sup>3</sup>
Romania	OEL TWA (mg/m <sup>3</sup> )	0,05 mg/m <sup>3</sup>
Romania	OEL STEL (mg/m <sup>3</sup> )	0,10 mg/m <sup>3</sup>

# IRT™ Rifle & Pistol Ammunition

## Safety Data Sheet

According to Regulation (EC) No. 1907/2006 (REACH) with its amendment Regulation (EU) 2015/830

Lead (7439-92-1)		
Romania	Romania – BEI	150 µg/l (Medium: urine - Time: end of shift - Parameter: Lead) (Medium: blood - Time: end of shift - Parameter: Lead) (Medium: hair - Time: end of shift - Parameter: Lead) 10 mg/l (Medium: urine - Time: end of shift - Parameter: .delta.-Aminolevulinic acid) 300 µg/l (Medium: urine - Time: end of shift - Parameter: Coproporphyrin) (Medium: blood - Time: end of shift - Parameter: Erythrocytes protoporphyrin)
Slovakia	NPHV (priemerná) (mg/m <sup>3</sup> )	0,15 mg/m <sup>3</sup>
Slovakia	Slovakia – BEI	400 µg/l (Medium: blood - Time: not critical - Parameter: Lead) 100 µg/l (Medium: blood - Time: not critical - Parameter: Lead (women younger than 45 years of age)) 15 mg/l (Medium: urine - Time: not critical - Parameter: .delta.-Aminolevulinic acid) 6 mg/l (Medium: urine - Time: not critical - Parameter: .delta.-Aminolevulinic acid (women younger than 45 years of age)) 0,30 mg/l (Medium: urine - Time: not critical - Parameter: Coproporphyrins)
Slovenia	OEL TWA (mg/m <sup>3</sup> )	0,1 mg/m <sup>3</sup> (inhalable fraction)
Slovenia	OEL STEL (mg/m <sup>3</sup> )	0,4 mg/m <sup>3</sup> (inhalable fraction)
Slovenia	OEL chemical category (SL)	Category 1, Category 3
Sweden	nivågränsvärde (NVG) (mg/m <sup>3</sup> )	0,1 mg/m <sup>3</sup> (total inhalable dust) 0,05 mg/m <sup>3</sup> (total respirable dust)
Portugal	OEL TWA (mg/m <sup>3</sup> )	0,15 mg/m <sup>3</sup> (mandatory indicative limit value)
Portugal	OEL chemical category (PT)	A3 - Confirmed Animal Carcinogen with Unknown Relevance to Humans

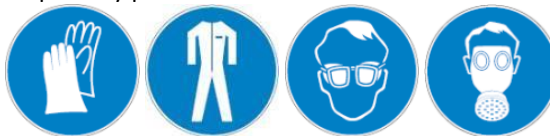
## 8.2. Exposure controls

Appropriate engineering controls

: Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure. Ensure adequate ventilation, especially in confined areas. Ensure all national/local regulations are observed.

Personal protective equipment

: Gloves. Protective clothing. Protective goggles. Insufficient ventilation: wear respiratory protection.



Materials for protective clothing

: Chemically resistant materials and fabrics.

Hand protection

: Wear chemically resistant protective gloves.

Eye protection

: Chemical safety goggles.

Skin and body protection

: Wear suitable protective clothing.

Respiratory protection

: If exposure limits are exceeded or irritation is experienced, approved respiratory protection should be worn. In case of inadequate ventilation, oxygen deficient atmosphere, or where exposure levels are not known wear approved respiratory protection.

Consumer exposure controls

: If noise levels exceed local, regional, or national limits use appropriate hearing protection.

Other information

: When using, do not eat, drink or smoke.

# IRT™ Rifle & Pistol Ammunition

## Safety Data Sheet

According to Regulation (EC) No. 1907/2006 (REACH) with its amendment Regulation (EU) 2015/830

### SECTION 9: Physical and chemical properties

#### 9.1. Information on basic physical and chemical properties

Physical state	: Solid
Colour	: Brass or aluminum
Odour	: None
Odour threshold	: No data available
pH	: No data available
Evaporation rate	: No data available
Melting point	: No data available
Freezing point	: No data available
Boiling point	: No data available
Flash point	: No data available
Auto-ignition temperature	: No data available
Decomposition temperature	: No data available
Flammability (solid, gas)	: No data available
Vapour pressure	: No data available
Relative vapour density at 20 °C	: No data available
Solubility	: No data available
Partition coefficient: n-octanol/water	: No data available
Viscosity	: No data available
Explosive properties	: Class 1.4 - Explosives (with no significant blast hazard) 49 CFR 173.50.
Oxidising properties	: No data available
Explosive limits	: No data available

#### 9.2. Other information

VOC content : 34 %

### SECTION 10: Stability and reactivity

#### 10.1. Reactivity

May detonate with friction, impact, and heat.

#### 10.2. Chemical stability

Stable under normal conditions.

#### 10.3. Possibility of hazardous reactions

Hazardous polymerization will not occur.

#### 10.4. Conditions to avoid

Direct sunlight. Extremely high or low temperatures. Sparks, heat, open flame and other sources of ignition. Incompatible materials.

#### 10.5. Incompatible materials

Strong acids. Strong bases. Strong oxidizers. Alkalis. Ammonia. Corrosive liquids. Oils and Lubricants.

#### 10.6. Hazardous decomposition products

Carbon oxides (CO, CO<sub>2</sub>). Nitrogen oxides. Oxides of lead. Lead fumes. Metal oxides. Zinc oxides. Oxides of antimony.

### SECTION 11: Toxicological information

#### 11.1. Information on toxicological effects

Acute toxicity : Oral: Fatal if swallowed. Dermal: Not classified Inhalation:dust,mist: Irritant.

IRT Rifle & Pistol Ammunition	
ATE CLP (oral)	49,68 mg/kg bodyweight
ATE CLP (dermal)	49,95 mg/kg bodyweight
ATE CLP (dust,mist)	0,50 mg/l/4h
Tin (7440-31-5)	
LD50 oral rat	700 mg/kg
Antimony (7440-36-0)	
LD50 oral rat	7 g/kg
ATE CLP (oral)	7.000,00 mg/kg bodyweight

# IRT™ Rifle & Pistol Ammunition

## Safety Data Sheet

According to Regulation (EC) No. 1907/2006 (REACH) with its amendment Regulation (EU) 2015/830

<b>Strontium nitrate (10042-76-9)</b>	
LD50 oral rat	> 2000 mg/kg (Species: Wistar)
LC50 inhalation rat (Dust/Mist - mg/l/4h)	> 4,5 mg/l/4h (Species: Wistar)
<b>Nitrocellulose (9004-70-0)</b>	
LD50 oral rat	5000 mg/kg
<b>Nitroglycerin (55-63-0)</b>	
LD50 oral rat	100 mg/kg
LD50 oral	685 mg/kg
LD50 dermal rabbit	> 280 mg/kg
ATE CLP (oral)	5,00 mg/kg bodyweight
ATE CLP (dermal)	5,00 mg/kg bodyweight
ATE CLP (dust,mist)	0,05 mg/l/4h
Skin corrosion/irritation	: Not classified
Serious eye damage/irritation	: Not classified
Respiratory or skin sensitisation	: Not classified
Germ cell mutagenicity	: Not classified
Carcinogenicity	: Not classified
<b>Lead (7439-92-1)</b>	
IARC group	2A
National Toxicology Program (NTP) Status	Reasonably anticipated to be Human Carcinogen.
Reproductive toxicity	: Not classified
Specific target organ toxicity (single exposure)	: Not classified
Specific target organ toxicity (repeated exposure)	: May cause damage to organs through prolonged or repeated exposure.
Aspiration hazard	: Not classified
Symptoms/Injuries After Inhalation	: May cause respiratory irritation.
Symptoms/Injuries After Skin Contact	: Not classified
Symptoms/Injuries After Eye Contact	: May cause slight irritation to eyes.
Symptoms/Injuries After Ingestion	: Fatal if swallowed. Ingestion may cause adverse effects.
Chronic Symptoms	: May cause damage to organs (circulatory system) through prolonged or repeated exposure (inhalation).
Potential adverse human health effects and symptoms	: Fatal if swallowed.

## SECTION 12: Ecological information

### 12.1. Toxicity

Ecology - general : Harmful to aquatic life with long lasting effects.

<b>Zinc (7440-66-6)</b>	
LC50 fish 1	2,16 - 3,05 mg/l (Exposure time: 96 h - Species: Pimephales promelas [flow-through])
EC50 Daphnia 1	0,139 - 0,908 mg/l (Exposure time: 48 h - Species: Daphnia magna [Static])
LC50 fish 2	0,211 - 0,269 mg/l (Exposure time: 96 h - Species: Pimephales promelas [semi-static])
ErC50 (algae)	0,15 mg/l
<b>1-Tetrazene-1-carboximidic acid, 4-(aminoiminomethyl)-, 2-nitrosohydrazide (109-27-3)</b>	
EC50 Daphnia 1	0,14 mg/l
<b>Nitrocellulose (9004-70-0)</b>	
ErC50 (algae)	579 mg/l
<b>Nitroglycerin (55-63-0)</b>	
LC50 fish 1	0,87 - 3,25 mg/l (Exposure time: 96 h - Species: Lepomis macrochirus [flow-through])
EC50 Daphnia 1	46 - 55 mg/l (Exposure time: 48 h - Species: Daphnia magna)



# IRT™ Rifle & Pistol Ammunition

## Safety Data Sheet

According to Regulation (EC) No. 1907/2006 (REACH) with its amendment Regulation (EU) 2015/830

<b>Nitroglycerin (55-63-0)</b>	
LC50 fish 2	0,87 - 2,21 mg/l (Exposure time: 96 h - Species: Lepomis macrochirus [static])
EC50 Daphnia 2	38 - 55 mg/l (Exposure time: 48 h - Species: Daphnia magna [Static])
ErC50 (algae)	0,4 mg/l
NOEC chronic fish	0,03 mg/l
<b>Copper (7440-50-8)</b>	
LC50 fish 1	0,0068 (0,0068 - 0,0156) mg/l (Exposure time: 96 h - Species: Pimephales promelas)
EC50 Daphnia 1	0,03 mg/l (Exposure time: 48 h - Species: Daphnia magna [Static])
EC50 other aquatic organisms 1	0,0426 (0,0426 - 0,0535) mg/l (Exposure time: 72 h - Species: Pseudokirchneriella subcapitata [static])
LC50 fish 2	0,3 mg/l (Exposure time: 96 h - Species: Pimephales promelas [static])
EC50 other aquatic organisms 2	0,031 (0,031 - 0,054) mg/l (Exposure time: 96 h - Species: Pseudokirchneriella subcapitata [static])
<b>Lead (7439-92-1)</b>	
LC50 fish 1	0,44 mg/l (Exposure time: 96 h - Species: Cyprinus carpio [semi-static])
EC50 Daphnia 1	600 µg/l (Exposure time: 48 h - Species: water flea)
LC50 fish 2	1,17 mg/l (Exposure time: 96 h - Species: Oncorhynchus mykiss [flow-through])

### 12.2. Persistence and degradability

<b>IRT Rifle &amp; Pistol Ammunition</b>	
Persistence and degradability	Not established.
<b>Copper (7440-50-8)</b>	
Persistence and degradability	Not readily biodegradable.

### 12.3. Bioaccumulative potential

<b>IRT Rifle &amp; Pistol Ammunition</b>	
Bioaccumulative potential	Not established.

### 12.4. Mobility in soil

No additional information available

### 12.5. Results of PBT and vPvB assessment

No additional information available

### 12.6. Other adverse effects

Other information : Avoid release to the environment.

## SECTION 13: Disposal considerations

### 13.1. Waste treatment methods

Sewage disposal recommendations	: This material is hazardous to the aquatic environment. Keep out of sewers and waterways.
Waste disposal recommendations	: Dispose of waste material in accordance with all local, regional, national, and international regulations.
Additional information	: Hazardous waste due to potential risk of explosion.
European List of Waste (LoW) code	: 16 04 01* - waste ammunition

## SECTION 14: Transport information






In accordance with ADR / RID / IMDG / IATA / ADN

ADR	IMDG	IATA	ADN	RID
<b>14.1. UN number</b>				
0012	0012	0012	0012	0012
<b>14.2. UN proper shipping name</b>				
CARTRIDGES, SMALL ARMS	CARTRIDGES, SMALL ARMS	Cartridges, small arms	CARTRIDGES, SMALL ARMS	CARTRIDGES, SMALL ARMS
<b>14.3. Transport hazard class(es)</b>				
1.4S	1.4S	1.4S	1.4S	1.4S

# IRT™ Rifle & Pistol Ammunition

## Safety Data Sheet

According to Regulation (EC) No. 1907/2006 (REACH) with its amendment Regulation (EU) 2015/830

ADR	IMDG	IATA	ADN	RID
				
<b>14.4. Packing group</b>				
II	II	II	II	II
<b>14.5. Environmental hazards</b>				
Dangerous for the environment : No	Dangerous for the environment : No Marine pollutant : No	Dangerous for the environment : No	Dangerous for the environment : No	Dangerous for the environment : No

### 14.6. Special precautions for user

No additional information available

### 14.7. Transport in bulk according to Annex II of MARPOL and the IBC Code

Not applicable

## SECTION 15: Regulatory information

### 15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture

#### 15.1.1. EU-Regulations

The following restrictions are applicable according to Annex XVII of the REACH Regulation (EC) No 1907/2006:

3. Liquid substances or mixtures which are regarded as dangerous in accordance with Directive 1999/45/EC or are fulfilling the criteria for any of the following hazard classes or categories set out in Annex I to Regulation (EC) No 1272/2008	Nitroglycerin
3.a. Substances or mixtures fulfilling the criteria for any of the following hazard classes or categories set out in Annex I to Regulation (EC) No 1272/2008: Hazard classes 2.1 to 2.4, 2.6 and 2.7, 2.8 types A and B, 2.9, 2.10, 2.12, 2.13 categories 1 and 2, 2.14 categories 1 and 2, 2.15 types A to F	Nitroglycerin
3.b. Substances or mixtures fulfilling the criteria for any of the following hazard classes or categories set out in Annex I to Regulation (EC) No 1272/2008: Hazard classes 3.1 to 3.6, 3.7 adverse effects on sexual function and fertility or on development, 3.8 effects other than narcotic effects, 3.9 and 3.10	Nitroglycerin
3.c. Substances or mixtures fulfilling the criteria for any of the following hazard classes or categories set out in Annex I to Regulation (EC) No 1272/2008: Hazard class 4.1	Nitroglycerin
40. Substances classified as flammable gases category 1 or 2, flammable liquids categories 1, 2 or 3, flammable solids category 1 or 2, substances and mixtures which, in contact with water, emit flammable gases, category 1, 2 or 3, pyrophoric liquids category 1 or pyrophoric solids category 1, regardless of whether they appear in Part 3 of Annex VI to Regulation (EC) No 1272/2008 or not.	Nitrocellulose - Aluminum
63. Lead and its compounds	Lead

Contains no substance on the REACH candidate list

Contains no REACH Annex XIV substances

#### Tin (7440-31-5)

Listed on the EEC inventory EINECS (European Inventory of Existing Commercial Chemical Substances)

#### Antimony (7440-36-0)

Listed on the EEC inventory EINECS (European Inventory of Existing Commercial Chemical Substances)

#### Zinc (7440-66-6)

Listed on the EEC inventory EINECS (European Inventory of Existing Commercial Chemical Substances)

# IRT™ Rifle & Pistol Ammunition

## Safety Data Sheet

According to Regulation (EC) No. 1907/2006 (REACH) with its amendment Regulation (EU) 2015/830

<b>Diazodinitrophenol (4682-03-5)</b>
Listed on the EEC inventory EINECS (European Inventory of Existing Commercial Chemical Substances)
<b>1-Tetrazene-1-carboximidic acid, 4-(aminoiminomethyl)-, 2-nitrosohydrazide (109-27-3)</b>
Listed on the EEC inventory EINECS (European Inventory of Existing Commercial Chemical Substances)
<b>Strontium nitrate (10042-76-9)</b>
Listed on the EEC inventory EINECS (European Inventory of Existing Commercial Chemical Substances)
<b>Nitroglycerin (55-63-0)</b>
Listed on the EEC inventory EINECS (European Inventory of Existing Commercial Chemical Substances)
<b>Aluminum (7429-90-5)</b>
Listed on the EEC inventory EINECS (European Inventory of Existing Commercial Chemical Substances)
<b>Copper (7440-50-8)</b>
Listed on the EEC inventory EINECS (European Inventory of Existing Commercial Chemical Substances)
<b>Lead (7439-92-1)</b>
Listed on the EEC inventory EINECS (European Inventory of Existing Commercial Chemical Substances)

VOC content : 34 %

### 15.1.2. National regulations

No additional information available

### 15.2. Chemical safety assessment

No chemical safety assessment has been carried out

## SECTION 16: Other information

Indication of changes:

Section	Section Header	Change	Date Changed
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Revision date : 22/12/2016

Data sources : According to Regulation (EC) No. 1907/2006 (REACH) with its amendment Regulation (EU) 2015/830

Full text of H- and EUH-statements:

Acute Tox. 1 (Dermal)	Acute toxicity (dermal), Category 1
Acute Tox. 2 (Inhalation:dust,mist)	Acute toxicity (inhalation:dust,mist) Category 2
Acute Tox. 2 (Oral)	Acute toxicity (oral), Category 2
Aquatic Chronic 2	Hazardous to the aquatic environment — Chronic Hazard, Category 2
Aquatic Chronic 3	Hazardous to the aquatic environment — Chronic Hazard, Category 3
Expl. 1.1	Explosives, Division 1.1
Expl. 1.4	Explosives, Division 1.4
Eye Dam. 1	Serious eye damage/eye irritation, Category 1
Flam. Sol. 1	Flammable solids, Category 1
Ox. Sol. 1	Oxidising Solids, Category 1
STOT RE 2	Specific target organ toxicity — Repeated exposure, Category 2
Unst. Expl	Explosives, Unstable explosives
Water-react. 2	Substances and Mixtures which, in contact with water, emit flammable gases, Category 2
H200	Unstable explosives
H201	Explosive; mass explosion hazard
H204	Fire or projection hazard
H228	Flammable solid
H261	In contact with water releases flammable gases
H271	May cause fire or explosion; strong oxidiser
H300	Fatal if swallowed
H310	Fatal in contact with skin
H318	Causes serious eye damage
H330	Fatal if inhaled
H373	May cause damage to organs through prolonged or repeated exposure

# IRT™ Rifle & Pistol Ammunition

## Safety Data Sheet

According to Regulation (EC) No. 1907/2006 (REACH) with its amendment Regulation (EU) 2015/830

H411	Toxic to aquatic life with long lasting effects
H412	Harmful to aquatic life with long lasting effects

EU GHS SDS

*This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product.*