**SECTION 1- PRODUCT AND COMPANY IDENTIFICATION**

Product Name: Centerfire loaded Rounds

Chemical Name: Mixture – Metal Alloy

Synonyms: Cartridges, small arms ammunition 9mm Luger, .40 S&W, .45 AUTO, .223 Remington

Chemical Family: Metal mixture

Formula: Not applicable - mixture

Product Use: Centerfire Rifle and Pistol Loaded Ammunition

Company Address: T1 Ammunition, LLC 1226 Zacchini Ave, Sarasota FL, 34237 USA

Technical Information: 941.366.6794

Emergency Telephone Number: 941.366.6794

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**SECTION 2 - COMPOSITION / INFORMATION ON INGREDIENTS**

<table>
<thead>
<tr>
<th>CAS Number</th>
<th>Components</th>
<th>Components % By Weight</th>
<th>EINECS/ ELINCS #</th>
<th>EU Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>7439-92-1</td>
<td>Lead</td>
<td>0.5 - 10</td>
<td>231-100-4</td>
<td>T, N* R1-33-50/53-62</td>
</tr>
<tr>
<td>7440-50-8</td>
<td>Copper</td>
<td>30 - 55</td>
<td>231-159-6</td>
<td>None None</td>
</tr>
<tr>
<td>7440-66-6</td>
<td>Zinc</td>
<td>5 - 15</td>
<td>231-175-3</td>
<td>F (as dust or powder) R 15-17</td>
</tr>
<tr>
<td>9004-70-0</td>
<td>Nitrocellulose</td>
<td>10 - 20</td>
<td>Not listed</td>
<td>E* R 2</td>
</tr>
<tr>
<td>55-63-0</td>
<td>Nitroglycerin</td>
<td>1 - 2</td>
<td>200-240-8</td>
<td>E, T+, N R 3-26/27/28-33-51-53</td>
</tr>
</tbody>
</table>
SECTION 3 - HAZARDS IDENTIFICATION

CAUTION!
EXPLOSIVE! KEEP AWAY FROM HEAT. DO NOT SUBJECT TO MECHANICAL SHOCK. PARTICLES FROM FIRING MAY BE HARMFUL IF INHALED. DO NOT TAKE INTERNALLY.

HAZARD RATINGS (for dust or fume) Degree of hazard (0 = low, 4 = extreme)
Hazardous Materials Identification System (HMIS)
Health: 0 Flammability: 0
Physical Hazard: Explosive: 2

HUMAN THRESHOLD RESPONSE DATA
Odor Threshold: Unknown
Irritation Threshold: Unknown
Immediately Dangerous to Life or Health (IDLH) Value(s): The IDLH for this product is not known. The IDLH for copper and lead is 100 mg/m³. The IDLH for nitroglycerin is 75 mg/m³.

POTENTIAL HEALTH EFFECTS
This product is composed of a finished metal alloy cartridge which contains the various components completely sealed within. Therefore, under normal handling of this product, no exposure to any harmful materials will occur. When the ammunition is fired, a small amount of particles may be generated which may be slightly irritating to the eyes and the respiratory tract. The particles may contain trace amounts of these harmful substances:

Lead: Ingestion of large amounts of lead can cause abdominal pain, constipation, cramps, nausea and/or vomiting. Chronic exposure to lead can cause kidney damage, anemia, reproductive effects, developmental effects and permanent nervous system damage in humans including changes in cognitive function.
Nitroglycerin: Will produce dilation of blood vessels and drop in blood pressure which may affect the heart. It has also been shown to cause methemoglobinemia (cyanosis).
Copper: Inhalation of high concentrations of metallic copper dusts or fumes may cause nasal irritation and/or nausea, vomiting and stomach pain. It is unlikely that the amount of particles that someone would be exposed to from firing a loaded round would be sufficient to cause any of these effects.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: There are no medical conditions known to be aggravated by exposure to this product in its solid form. Exposure to lead can aggravate anemia, cardiovascular and respiratory disease.

POTENTIAL ENVIRONMENTAL EFFECTS: Product has not been tested for environmental properties. Lead shot has been shown to be toxic to aquatic species.

SECTION 4 - FIRST AID MEASURES

EYE CONTACT: Immediately flush out fume or particles with large amounts of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. If eye irritation develops, call a physician at once.

SKIN CONTACT: Wash skin with plenty of soap and water.

INHALATION: If symptoms of lung irritation occur (coughing, wheezing or breathing difficulty), remove from exposure area to fresh air immediately. If breathing has stopped, perform artificial respiration. Keep affected person warm and at rest. Get medical attention.

INGESTION: If ingested, immediately call a physician.
SECTION 5 - FIRE FIGHTING MEASURES

<table>
<thead>
<tr>
<th>PROPERTY</th>
<th>VALUE</th>
<th>PROPERTY</th>
<th>VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Explosive</td>
<td>Yes</td>
<td>Flammable</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Combustible</td>
<td>Not applicable</td>
<td>Pyrophoric</td>
<td>No</td>
</tr>
<tr>
<td>Flash Point (˚C):</td>
<td>Not applicable</td>
<td>Burning Rate of Material:</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Lower Explosive Limit:</td>
<td>Not applicable</td>
<td>Autoignition Temp.:</td>
<td>No data</td>
</tr>
<tr>
<td>Upper Explosive Limit:</td>
<td>Not applicable</td>
<td>Flammability Classification: (defined by 29 CFR 1910.1200)</td>
<td>Explosive</td>
</tr>
</tbody>
</table>

UNUSUAL FIRE AND EXPLOSION HAZARDS: If fire reaches cargo, do not fight. Evacuate all persons, including emergency responders from the area for 1500 feet (1/3 mile) in all directions.

EXTINGUISHING MEDIA: Flood area with water. If no water is available, carbon dioxide, dry chemical or earth may be used. If the fire reaches the cargo, withdraw and let fire burn.

SPECIAL FIREFIGHTING PROCEDURES: In case of fire, use normal fire fighting equipment. Protection concerns must also address the potential of the physical characteristic of this product as explosive.

SECTION 6 - ACCIDENTAL RELEASE MEASURES

Spills of this material should be handled carefully. Do not subject materials to mechanical shock. A spill of this material will normally not require emergency response team capabilities. If, however, a large spill occurs, call the National Response Center 1-800-424-8802 or CHEMTREC 1-800-424-930 for technical assistance.

SECTION 7 - HANDLING AND STORAGE

HANDLING: No special requirements
STORAGE: No special requirements
Shelf Life Limitations: Not known
Incompatible Materials for Packaging: None known
Incompatible Materials for Storage or Transport: Acids, Class A & B explosives, strong oxidizers, and caustics
CONDITIONS TO AVOID: Mechanical impact or shock and electrical discharge
SECTION - 8 EXPOSURE CONTROLS/PERSONAL PROTECTION

<table>
<thead>
<tr>
<th>CAS #</th>
<th>CHEMICAL NAME</th>
<th>ACGIH TLV</th>
<th>OSHA PEL</th>
<th>INTERNATIONAL OELS</th>
</tr>
</thead>
<tbody>
<tr>
<td>7440-50-8</td>
<td>Copper</td>
<td>0.2 mg/m³ (fume), 1 mg/m³ (dusts and mists)</td>
<td>0.1 mg/m³ (fume) 1 mg/m³ (dusts and mists)</td>
<td>Austria, Belgium, Canada: 0.2 mg/m³ (fumes), 1 mg/m³ (dusts) Denmark: 1.0 mg/m³ (dust and powder) Germany (MAK): 0.1 mg/m³ (fume), 1 mg/m³ (dusts and mists)</td>
</tr>
<tr>
<td>7439-92-1</td>
<td>Lead</td>
<td>0.05 mg/m³</td>
<td>0.05 mg/m³</td>
<td>Austria, Denmark, Germany, Sweden, Switzerland: 0.1 mg/m³ Norway, Poland: 0.05 mg/m³</td>
</tr>
<tr>
<td>7440-66-6</td>
<td>Zinc</td>
<td>None established</td>
<td>None established</td>
<td>None established</td>
</tr>
<tr>
<td>9004-70-0</td>
<td>Nitrocellulose</td>
<td>None established</td>
<td>None established</td>
<td>None established</td>
</tr>
<tr>
<td>55-63-0</td>
<td>Nitroglycerin</td>
<td>0.05 ppm (0.46 mg/m³) Skin</td>
<td>Ceiling – 0.2 ppm (2 mg/m³) Skin</td>
<td>Denmark: 0.02 ppm (0.2 mg/m³) Norway, Sweden: 0.03 ppm (0.3 mg/m³) Austria, Belgium, Germany, The Netherlands, Poland, Switzerland: 0.05 ppm (0.47 mg/m³), skin Finland, France: 0.1 ppm (0.9 mg/m³), skin U.K.: 0.2 ppm (2 mg/m³), skin</td>
</tr>
</tbody>
</table>

ENGINEERING CONTROLS: Local exhaust ventilation is recommended if significant dusting occurs or fumes are generated. Otherwise, use general exhaust ventilation. Use hearing protection.

EYE / FACE PROTECTION: Use safety glasses.

SKIN PROTECTION: Not normally needed

RESPIRATORY PROTECTION: Respiratory protection not normally needed.

GENERAL HYGIENE: Do not eat, drink, or smoke while using this product. Wash hands thoroughly after use.

SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES

<table>
<thead>
<tr>
<th>PROPERTY</th>
<th>VALUE</th>
<th>PROPERTY</th>
<th>VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance:</td>
<td>Cylindrical brass cartridge</td>
<td>Vapor Density (air = 1):</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Odor:</td>
<td>None</td>
<td>Boiling Point (°F):</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Molecular Weight:</td>
<td>Not applicable - Mixture</td>
<td>Melting point</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Physical State:</td>
<td>Solid</td>
<td>Specific gravity (g/cc):</td>
<td>Not applicable</td>
</tr>
<tr>
<td>pH:</td>
<td>Not applicable</td>
<td>Bulk Density</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Vapor Pressure (mm Hg):</td>
<td>Not applicable</td>
<td>Viscosity (cps):</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Vapor Density</td>
<td>Not applicable</td>
<td>Decomposition Temperature:</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Solubility in Water (20°C):</td>
<td>Insoluble</td>
<td>Evaporation Rate:</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Volatiles, Percent by volume:</td>
<td>Not applicable</td>
<td>Octanol/water partition coefficient:</td>
<td>Not applicable</td>
</tr>
</tbody>
</table>

SECTION 10 - STABILITY AND REACTIVITY

STABILITY: Stable under normal temperatures and pressure.

MATERIALS TO AVOID: Acids, Class A & B explosives, strong oxidizers, and caustics

HAZARDOUS DECOMPOSITION PRODUCTS: Nitrogen oxides, carbon monoxide, lead oxides, carbon dioxide, and lead dust/fume

HAZARDOUS POLYMERIZATION: Will not occur.

OTHER: Cartridge may detonate if case is punctured or severely damaged.
For Product:

<table>
<thead>
<tr>
<th>For Components:</th>
<th>Copper</th>
<th>Lead</th>
<th>Nitrocellulose</th>
<th>Zinc</th>
<th>Nitroglycerin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oral LD50</td>
<td>Not applicable for product</td>
<td>3.5 mg/kg (mouse, intraperitoneal)</td>
<td>No data</td>
<td>&gt; 5 g/kg (rat)</td>
<td>No data</td>
</tr>
<tr>
<td>Dermal LD50</td>
<td>Not applicable for product</td>
<td>375 mg/kg (rabbit, subcutaneous)</td>
<td>No data</td>
<td>No data</td>
<td>No data</td>
</tr>
<tr>
<td>Inhalation LC50</td>
<td>Not applicable for product</td>
<td>Particles generated from firing may be slightly toxic.</td>
<td>No data</td>
<td>No data</td>
<td>No data</td>
</tr>
<tr>
<td>Iritation</td>
<td>Not a skin or eye irritant as a loaded round.</td>
<td>Respiratory irritant</td>
<td>Not irritating</td>
<td>No data</td>
<td>Eye irritant</td>
</tr>
</tbody>
</table>

**SUBCHRONIC/CHRONIC TOXICITY:**
Lead has caused blood, kidney and nervous system damage in laboratory animals.

**CARCINOGENICITY:**
The International Agency for Research on Cancer (IARC) lists lead as possibly carcinogenic to humans, group 2B.

**MUTAGENICITY:**
This product is not known or reported to be mutagenic. Lead has been shown to be mutagenic in several in vitro assays.

**REPRODUCTIVE, TERATOGENICITY, OR DEVELOPMENTAL EFFECTS:**
This product is not known or reported to cause reproductive or developmental effects. Lead has been shown to affect fetal development including birth defects and reduce male reproductive function in laboratory animals.

**NEUROLOGICAL EFFECTS:**
This product is not known or reported to cause neurological effects. Lead has caused peripheral and central nervous system damage and behavioral effects in laboratory animals.

**INTERACTIONS WITH OTHER CHEMICALS WHICH ENHANCE TOXICITY:**
None known or reported.

**SECTION 12 - ECOLOGICAL INFORMATION**

**ECOTOXICITY:**
No data is available on this product. Individual constituents are as follows:
Copper: The toxicity of copper to aquatic organisms varies significantly not only with the species, but also with the physical and chemical characteristics of the water, such as its temperature, hardness, turbidity and carbon dioxide content. Copper concentration varying from 0.1 to 1.0 mg/l have been found by various investigators to be not toxic for most fish. However, concentrations of 0.015 to 3.0 mg/l have been reported as toxic, particularly in soft water to many kinds of fish, crustacean, mollusks, insects, and plankton.

Lead: LC 50 (48 hrs.) to bluegill (Lepomis macrochirus) is reported to be 2-5 mg/l. Lead is toxic to waterfowl.

Nitrocellulose: LC50 > 1000 mg/l (fish, invertebrates, algae)

Nitroglycerin: Bluegill, 96 hour LC50 = 1.228 mg/l (static)

Zinc: The following concentrations of zinc have been reported as lethal to fish:

Rainbow trout fingerlings: 0.13 mg/l, 12 – 24 hours

Bluegill sunfish: 6 hr TLM = 1.9 – 3.6 mg/l (soft water, 30°C) Rainbow trout: 4 mg/l (hard water) 3 days

Sticklebacks: 1 mg/l (soft water) 24 hrs.

The presence of copper appears to have a synergistic effect on the toxicity of zinc towards fish.
**SECTION 12 - ECOLOGICAL INFORMATION**

MOBILITY: Dissolved lead from degraded bullets may migrate through soil.

PERSISTANCE/DEGRADABILITY: Not biodegradable. Bullets may fragment and decompose in soil leading to accumulation of lead.

BIOACCUMULATION: No data

**SECTION 13 - DISPOSAL CONSIDERATIONS**

Care must be taken to prevent environmental contamination from the use of this material. The user of this material has the responsibility to dispose of unused material, residues and containers in compliance with all relevant local, state and federal laws and regulations regarding treatment, storage and disposal for hazardous and nonhazardous wastes.

**SECTION 14 - TRANSPORT INFORMATION**

<table>
<thead>
<tr>
<th>U.S. DOT</th>
<th>RID/ADR</th>
<th>IMDG</th>
<th>IATA</th>
<th>IMO</th>
<th>Canada TDG</th>
</tr>
</thead>
</table>

- PROPER SHIPPING NAME: Cartridges, small arms (other than blanks)
- HAZARD CLASS: Explosive, 1.4S
- UN NO.: UN 0012
- PACKING GROUP: II
- HAZARD LABEL/PLACARD: None required
- REPORTABLE QUANTITY: Not applicable
- LABEL STATEMENTS: None for highway, water, rail. - Air requires 1.4s label

**SECTION 15 - REGULATORY INFORMATION**

EUROPEAN REGULATIONS

Hazard Classification

- Danger Symbol: E Explosive
- Risk Phrases: R2 Risk of explosion by shock, friction, fire or other sources of ignition
- Safety Phrases: S2 Keep out of reach of children.

German WGK Classification: Not known.

DSL LIST: The components of this product are on the DSL or are exempt from reporting under the New Substances Notification Regulations.

IDL: Lead, Copper

WHMIS: This product is not subject to WHMIS. It is regulated as a Class 6 Explosive in Canada.
SECTION 16 - OTHER INFORMATION

REVISIONS:
PREPARED BY: T1 Ammunition, LLC
NOTICE: THE INFORMATION IN THIS MSDS SHOULD BE PROVIDED TO ALL WHO WILL USE, HANDLE, STORE, TRANSPORT, OR OTHERWISE BE EXPOSED TO THIS PRODUCT. THIS INFORMATION HAS BEEN PREPARED FOR THE GUIDANCE OF PLANT ENGINEERING, OPERATIONS AND MANAGEMENT AND FOR PERSONS WORKING WITH OR HANDLING THIS PRODUCT. T1 AMMUNITION BELIEVES THIS INFORMATION TO BE RELIABLE AND CURRENT AS OF THE DATE OF PUBLICATION, BUT MAKES NO WARRANTY THAT IT IS.