Section 1: Product and Company Identification

PRODUCT NAME: Silver Alloys & Targets
CHEMICAL FAMILY: Metal
CHEMICAL NAME: Alloy
MANUFACTURER: Williams Advanced Materials
2978 Main Street
Buffalo, NY 14214

EMERGENCY TELEPHONE: 716-837-1000 716-838-1129 (24 hour)

Section 2: Composition/Ingredients

<table>
<thead>
<tr>
<th>MATERIAL</th>
<th>CAS No.</th>
<th>% wt.</th>
<th>* TLV, ACGIH</th>
<th>* PEL, OSHA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Silver</td>
<td>7440-22-4</td>
<td>Primary Component</td>
<td>0.1</td>
<td>0.01</td>
</tr>
<tr>
<td>Palladium</td>
<td>7440-05-3</td>
<td>Confidential</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Platinum</td>
<td>7440-06-4</td>
<td>Confidential</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

*All exposure limits are in milligram per cubic meter of air (mg/m3)
The main content of these products is Silver. Additional components may include one or more of the above.

Section 3: Hazard Identification

EMERGENCY OVERVIEW: The alloys as sold in solid form are generally not considered hazardous. However, if the process involves grinding, melting, cutting or any other process that causes a release of dust or fumes, hazardous levels of airborne particulates could be generated.

PRIMARY ROUTES OF ENTRY: Inhalation; Skin contact. TARGET ORGANS: Respiratory tract; Skin

HUMAN EFFECTS AND SYMPTOMS OF OVEREXPOSURE: Listed below are certain potential health hazards, which apply to the hazardous ingredients, found in the subject alloy(s).

SILVER: Acute - Acute toxicity data for silver is not readily available. Silver does not possess strong or significant properties indicative of overexposure
Chronic - Excessive or chronic exposure by inhalation, may lead to a condition called Argyrosis, a local or generalized discoloration of the eyes, skin and mucous membrane, where gray/blue patches pigmentation are formed.

PALLADIUM: Inhalation - Dust or fumes may be irritation to respiratory tract
Skin - May be skin sensitizer, cause contact dermatitis.
Sub-acute to Chronic - There is no data concerning poisoning due to occupational exposure to palladium. Palladium/palladium compounds have caused bone marrow, liver and kidney damage in experimental animals. Other animal experiments indicate that it may interfere with the use of energy by nerves/muscles and induce lung malfunctions.

PLATINUM: Inhalation - May cause irritation to nose and respiratory tract, if exposure is excessive or prolonged
Chronic - Exposure to platinum containing dusts or fumes may cause irritation, sensitization reactions and asthma. Effects include sneezing, coughing, tightness in the chest, and wheezing. Chronic exposure may also result in pulmonary fibrosis.

CARCINOGENIC REFERENCES:
Compounds are not listed in the 4th Annual Report on Carcinogens as prepared by the National Toxicology Program as well as the International Agency for Research on Cancer Monograph Series or by OSHA.
MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: Individuals who may have had allergic reactions to metals or sensitivity, may encounter skin rash or dermatitis, if skin contact with this product occurs. Persons with impaired pulmonary functions, may incur further impairment if dust or fumes are inhaled.

### Section 4: First Aid Measures

**FIRST AID FOR EYES:** Dust or powder should be flushed from the eyes with running water for 15 minutes. If irritation persists obtain medical assistance.

**FIRST AID FOR SKIN:** Skin cuts and abrasions can be treated by standard first aid. Skin contamination with dust or powder can be removed with soap and water. If irritation persists obtain medical assistance.

**FIRST AID FOR INGESTION:** Obtain medical assistance at once.

**FIRST AID FOR INHALATION:** Breathing difficulty, caused by inhalation of dust or fume requires removal to fresh air. If breathing has stopped perform artificial respiration and seek medical assistance at once.

### Section 5: Fire Fighting Measures

**FLASH POINT:** Non-flammable as a solid

**EXTINGUISHING MEDIA:** This material is non-combustible, for surrounding fires use appropriate extinguishing agent. Do not use water to extinguish fires around operations involving molten metal, due to the potential for steam explosion.

**SPECIAL FIRE FIGHTING PROCEDURES:** Self-contained breathing apparatus should be worn when fighting metal dust fires. High levels of dust or fine particles in the air may ignite or explode.

### Section 6: Accidental Release Measures

**SPILL OR LEAK PROCEDURES:** In solid form this material poses no special clean-up problems. Use normal clean up procedures; wet sweeping or HEPA vacuum, for clean up of dust or powder. Do not use compressed air for cleaning.

### Section 7: Storage and Handling

In solid form this material poses no special problems. Store metal in a dry area. Do not store adjacent to acids.

### Section 8: Exposure Control/Personal Protection

**EYE PROTECTION REQUIREMENTS:** Safety glasses are recommended.

**SKIN PROTECTION REQUIREMENTS:** Protective gloves are recommended, to prevent mechanical irritation.

**RESPIRATORY PROTECTION:** Not normally required. Use an appropriate NIOSH approved respirator if airborne dust concentration exceed the OSHA, PEL or ACGIH, TLV

**OTHER PROTECTIVE EQUIPMENT:** Eye wash fountain should be readily available in areas of use or handling.

**EXPOSURE LIMITS:** Not established for product as whole. Refer to Section 2.
VENTILATION REQUIREMENTS:

LOCAL EXHAUST: Recommended, when cutting, grinding or melting or any other operation where dust or fumes are created

GENERAL: Recommended

ENVIRONMENTAL SURVEILLANCE:
If the operation generates dust or fumes, exposure to airborne materials should be determined by having air samples taken in the employees breathing zone and work area.

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**Section 9: Physical and Chemical Properties**

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical Form</td>
<td>Solid metal</td>
</tr>
<tr>
<td>Odor</td>
<td>None</td>
</tr>
<tr>
<td>Solubility in Water</td>
<td>Insoluble</td>
</tr>
<tr>
<td>Volatile by Weight</td>
<td>Essentially zero</td>
</tr>
<tr>
<td>Density</td>
<td>Varies</td>
</tr>
<tr>
<td>Color</td>
<td>Silver/Grey</td>
</tr>
<tr>
<td>Melt Point</td>
<td>961° – 1500°</td>
</tr>
<tr>
<td>Specific Gravity</td>
<td>Varies</td>
</tr>
<tr>
<td>Vapor Pressure</td>
<td>N/A</td>
</tr>
</tbody>
</table>

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**Section 10: Reactivity**

- **Stability:** This is a stable material.
- **Hazardous Polymerization:** Will not occur.
- **Incompatibilities:** Acetylene, Ammonia, Acids and Strong Oxidizers.
- **Decomposition Products:** None under proper usage conditions.
- **Conditions to Avoid:** Conditions which create dust or fumes.

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**Section 11: Toxicological Information**

There is no information on the toxicity of this alloy. Under normal use of the solid form of this material there are few health hazards. Welding, cutting grinding or any process creating dust, fume or oxide may cause hazardous levels of certain elements, as addressed in Section 2.

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**Section 12: Ecological Information**

In solid form this material poses no special environmental problems. Metal powder or dust may have significant impact on air and water quality. Emissions, spills and releases to the environment should be controlled immediately.

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**Section 13: Disposal Considerations**

Because of its high intrinsic value this material should be reclaimed. Dispose of in accordance with all applicable Federal, State and Local Regulations.

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**Section 14: Transportation Information**

- **D.O.T. Shipping Name:** Not regulated
- **Technical Shipping Name:** Metal Alloy
- **D.O.T. Hazard Class:** None
- **UN/NA Number:** None
- **Product RQ:** None
- **Air Transport:** IATA, Dangerous Goods Regulations: Not Regulated, in solid form
Section 15: Regulatory Information

OSHA STATUS:

TSCA STATUS:
All components of this product are listed in the US Environmental Protection Agency on the TSCA Chemical Substance Inventory

RCRA STATUS:
Not regulated, in solid form

SARA TITLE III:
The constituents of this alloy contain hazardous substances, above one (1) percent, and are subject to the reporting requirements of section 313 of the Emergency Planning and Community Right to Know act of 1986 and 40CFR372.

<table>
<thead>
<tr>
<th>SUBSTANCE</th>
<th>CAS No.</th>
<th>PERCENT MAXIMUM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Silver</td>
<td>7440-22-4</td>
<td>95</td>
</tr>
</tbody>
</table>

INTERNATIONAL REGULATIONS:

CANADA – WHMIS Disclosure List:
Material does not fall into any Subdivision, Division as defined by any Section of SOR/DORS/88-66

EUROPEAN UNION
Risk Phrase
N/A

Section 16: Other Information

PREPARED BY: Lee Oman, CECM
DATE OF REVISION: July 2005

This MSDS has been revised following the guidelines outlined in the American National Standard for Hazardous Materials Z400.1.1393 “Material Safety Data Sheets – Preparation”

DISCLAIMER:
The information and recommendations are taken from sources believed to be accurate. Williams Advanced Materials makes no warranty with respect of the accuracy of the information or the suitability of the recommendations, and assumes no liability to any user thereof.