1. PRODUCT AND COMPANY IDENTIFICATION

**PRODUCT NAME:** Silver Metal Pieces  
**GENERAL USE:** Physical vapor deposition of thin films

**MANUFACTURER**  
Kurt J Lesker Company  
United States  
1925 Route 51  
Jefferson Hills, PA 15025  
**Customer Service:** 412-387-9200  
**E-Mail:** msds@lesker.com  
Kurt J Lesker Company LTD  
United Kingdom  
15-16 Burgess Road  
Hastings, East Sussex, TN35 4NR  
England  
**Customer Service:** +44 (0) 1424 458100

**24 HR. EMERGENCY TELEPHONE NUMBERS**  
24-Hour Emergency Response provided by  
3E Global Incident Response Hotline  
When calling, refer to Kurt J Lesker Company  
Global Response Access Code: 333594  
North America [USA, Canada, Mexico]: 1-866-519-4752  
Mainland China: (+86) 4001 2001 74  
Europe: {int'l call prefix}-1-760-476-3961  
Asia Pacific: {int'l call prefix}-1-760-476-3960  
Middle East & Africa: {int'l call prefix}-1-760-476-3959

2. HAZARDS IDENTIFICATION

**GHS CLASSIFICATIONS**

**Health:**  
This substance or mixture is not hazardous and is not classified under GHS.

**EMERGENCY OVERVIEW**

**PHYSICAL APPEARANCE:** Solid  
**IMMEDIATE CONCERNS:** Negligible fire or explosion hazard in bulk form. Powdered material may form explosive dust-air mixtures.

**POTENTIAL HEALTH EFFECTS**

**EYES:** Contact may cause eye irritation.  
**SKIN:** May cause skin irritation.  
**INGESTION:** Low ingestion hazard in normal use.  
**INHALATION:** May be harmful if inhaled. May cause respiratory irritation.

**REPRODUCTIVE TOXICITY**

**REPRODUCTIVE EFFECTS:** Not Available  
**TERATOGENIC EFFECTS:** Not Available  
**CARCINOGENICITY:** Not listed as a human carcinogen
MUTAGENICITY: Not Available

ROUTES OF ENTRY: Ingestion, Inhalation

PHYSICAL HAZARDS: Dusts at sufficient concentrations can form explosive mixtures with air.

3. COMPOSITION / INFORMATION ON INGREDIENTS

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>Wt.%</th>
<th>CAS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Silver</td>
<td>100</td>
<td>7440-22-4</td>
</tr>
</tbody>
</table>

4. FIRST AID MEASURES

EYES: Immediately flush eyes with plenty of water. Get medical attention, if irritation persists.

SKIN: Wash with soap and water. Get medical attention if irritation develops or persists.

INGESTION: Rinse mouth. Get medical advice/attention. Low ingestion hazard in normal use.

INHALATION: No specific treatment is necessary since this material is not likely to be hazardous by inhalation. If exposed to excessive levels of dusts or fumes, remove to fresh air and get medical attention if cough or other symptoms develop.

SIGNS AND SYMPTOMS OF OVEREXPOSURE

ACUTE TOXICITY: Poses little or no immediate hazard.

CHRONIC EFFECTS: Chronic exposure to silver may cause argyria, which is characterized by a permanent blue-gray discoloration of the skin, eyes, and finger nails.

5. FIRE FIGHTING MEASURES

FLAMMABLE CLASS: Noncombustible except as a powder.

EXTINGUISHING MEDIA: Use a Class D dry powder extinguisher, dolomite, dry sand, graphite, or soda ash. Do not use carbon dioxide, sodium bicarbonate, halogenated extinguishing agents, foam, or water.

EXPLOSION HAZARDS: Dusts at sufficient concentrations can form explosive mixtures with air.

FIRE FIGHTING PROCEDURES: As in any fire, wear self-contained breathing apparatus pressure-demand, (MSHA/NIOSH approved or equivalent) and full protective gear.

6. ACCIDENTAL RELEASE MEASURES

SMALL SPILL: Clean up spills immediately, observing precautions in Protective Equipment section.

LARGE SPILL: Collect spilled material in appropriate container. Spill may be reportable. Consult section 15 for Reportable Quantities.

ENVIRONMENTAL PRECAUTIONS

WATER SPILL: This material is a water pollutant and should be prevented from contaminating soil or from entering sewage and drainage systems and bodies of water.

7. HANDLING AND STORAGE

GENERAL PROCEDURES: To avoid risks to human health and the environment, comply with the instructions for use.

HANDLING: Keep away from heat and flame. Keep container closed when not in use. Remove contaminated clothing and wash before reuse. Wash hands before eating and wash before reuse. Wash thoroughly after
handling.

**STORAGE:** Keep container closed when not in use. Store in a cool dry place.

### 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

**ENGINEERING CONTROLS:** Use process enclosures, local exhaust ventilation, or other engineering controls to control airborne levels below recommended exposure limits.

**PERSONAL PROTECTIVE EQUIPMENT**

**EYES AND FACE:** Wear safety glasses.

**SKIN:** Wear protective gloves.

**RESPIRATORY:** Not normally needed. If ventilation is inadequate and this material is handled at elevated temperatures or dusts/fumes/mists are generated a NIOSH/MSHA approved air purifying respirator with a manufacturers approved cartridge or canister may be permissible under certain circumstances where airborne concentrations are expected to exceed exposure limits. Protection provided by air purifying respirators is limited. Use a positive pressure air supplied respirator if there is any potential for an uncontrolled release, exposure levels are not known, or any other circumstances where air purifying respirators may not provide adequate protection.

**WORK HYGIENIC PRACTICES:** Practice good chemical hygiene during and after use.

**COMMENTS:**

### COMPONENT EXPOSURE LIMITS

<table>
<thead>
<tr>
<th>Component</th>
<th>Location, Type</th>
<th>Value (mg/m³)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Silver</td>
<td>ACGIH TWA</td>
<td>0.1</td>
</tr>
<tr>
<td></td>
<td>NIOSH TWA</td>
<td>0.01</td>
</tr>
<tr>
<td></td>
<td>OSHA TWA</td>
<td>0.01</td>
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<tr>
<td></td>
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<tr>
<td></td>
<td>Canada - BC TWA</td>
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<td>0.05</td>
</tr>
<tr>
<td></td>
<td>UK WEL TWA</td>
<td>0.1</td>
</tr>
</tbody>
</table>

### 9. PHYSICAL AND CHEMICAL PROPERTIES

**PHYSICAL STATE:** Solid

**ODOR:** None

**COLOR:** Characteristic

**PERCENT VOLATILE:** NA = Not Applicable

**FLASH POINT AND METHOD:** NA = Not Applicable

**FLAMMABLE LIMITS:** Not Available

**AUTOIGNITION TEMPERATURE:** NA = Not Applicable
VAPOUR PRESSURE: NA = Not Applicable
VAPOUR DENSITY: NA = Not Applicable
BOILING POINT: 2162°C
MELTING POINT: 961.76°C
SOLUBILITY IN WATER: Insoluble
DENSITY: ~ 10.5
MOLECULAR WEIGHT: 107.868

10. STABILITY AND REACTIVITY

STABLE: Yes
HAZARDOUS POLYMERIZATION: No
HAZARDOUS DECOMPOSITION PRODUCTS: Toxic metal fumes
INCOMPATIBLE MATERIALS: Strong acids, Oxidizing materials, Halogens, Ammonia, Acetylene.

11. TOXICOLOGICAL INFORMATION

ACUTE

DERMAL LD₅₀: > 2000 mg/kg
Notes: Rat
ORAL LD₅₀: > 5000 mg/kg
Notes: Rat

CHRONIC: Chronic exposure to silver may cause argyria, which is characterized by a permanent blue-gray discoloration of the skin, eyes, and finger nails.

CARCINOGENICITY

IARC: Not listed
NTP: Not listed
OSHA: Not listed
REPRODUCTIVE EFFECTS: Not Available
TERATOGENIC EFFECTS: Not Available
MUTAGENICITY: Not Available

12. ECOLOGICAL INFORMATION

BIOACCUMULATION/ACCUMULATION: Not Available

AQUATIC TOXICITY (ACUTE)

96-HOUR LC₅₀: 2.13 ug/L (Pimephales promelas)
48-HOUR EC₅₀: 0.24 ug/L (Daphnia magna)
Notes: NOEC = 2 ug/L (Daphnia magna)
13. DISPOSAL CONSIDERATIONS

DISPOSAL METHOD: Dispose of according to applicable federal, state, provincial, and local regulations. Dispose of in accordance with US EPA 40 CFR 262 for concentrations at or above the regulatory limit. Regulatory level is equal to :5 mg/L

PRODUCT DISPOSAL: Contact a licensed waste disposal company.

EMPTY CONTAINER: Follow all MSDS/label precautions even after container is emptied because it may retain product residues.

14. TRANSPORT INFORMATION

DOT (DEPARTMENT OF TRANSPORTATION)
   PROPER SHIPPING NAME: Not Regulated

ROAD AND RAIL (ADR/RID)
   PROPER SHIPPING NAME: Not Regulated

AIR (ICAO/IATA)
   SHIPPING NAME: Not Regulated

VESSEL (IMO/IMDG)
   SHIPPING NAME: Not Regulated

CANADA TRANSPORT OF DANGEROUS GOODS
   SHIPPING NAME: Not Regulated

15. REGULATORY INFORMATION

UNITED STATES

SARA TITLE III (SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT)
   313 REPORTABLE INGREDIENTS: Silver

CERCLA (COMPREHENSIVE RESPONSE, COMPENSATION, AND LIABILITY ACT)
   CERCLA RQ: 1000 lbs No reporting of release is required if the diameter of the pieces of the solid metal is larger than 100 micrometers.

TSCA (TOXIC SUBSTANCE CONTROL ACT)
   TSCA STATUS: All components of this product are included in inventory, exempt, or notified

REGULATIONS

STATE REGULATIONS:

The following components appear in one or more of the following state hazardous substances lists

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS</th>
<th>CA</th>
<th>MA</th>
<th>MN</th>
<th>NJ</th>
<th>PA</th>
<th>RI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Silver</td>
<td>7440-22-4</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

CALIFORNIA PROPOSITION 65: This product is not known to contain any components for which the State of California has found to cause cancer, birth defects or other reproductive harm.

RCRA STATUS: Listed
CLEAN WATER ACT: Listed

CANADA

WHMIS (WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM): Not Regulated

DOMESTIC SUBSTANCE LIST (INVENTORY): All components of this product are included in inventory, exempt, or notified

GENERAL COMMENTS: All components of this product are included in inventory, exempt, or notified: Australian AICS, Canadian DSL, China IECSC, European EINECS, Korean KECL, New Zealand NZIoC, Philippines PICCS, USA TSCA

16. OTHER INFORMATION

APPROVED BY: EHS DEPT

PREPARED BY: E Bolton

INFORMATION CONTACT: msds@lesker.com

REVISION SUMMARY: This MSDS replaces the 4/11/2012 MSDS. Revised: Section 1: PRODUCT CODE. Section 7: HANDLING. Section 12: GENERAL COMMENTS. Section 13: EMPTY CONTAINER, PRODUCT DISPOSAL.

<table>
<thead>
<tr>
<th>HMIS RATING</th>
<th>NFPA CODES</th>
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<tbody>
<tr>
<td>HEALTH</td>
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<tr>
<td>PHYSICAL HAZARD</td>
<td>0</td>
</tr>
<tr>
<td>PERSONAL PROTECTION</td>
<td>B</td>
</tr>
</tbody>
</table>

MANUFACTURER DISCLAIMER:

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