### SAFETY DATA SHEET

according to Regulation (EC) No. 453/2010

Date Issued: 3/26/2012
SDS No: M-1000-050
Date Revised: 2/6/2015
Revision No: 1

Chromium metal pieces

<table>
<thead>
<tr>
<th><strong>SECTION 1: Identification of the substance/preparation and of the company/undertaking</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1.1. Product identifier</strong></td>
</tr>
<tr>
<td><strong>Product name</strong>: Chromium metal pieces</td>
</tr>
<tr>
<td><strong>1.2. Relevant identified uses of the substance or mixture and uses advised against</strong></td>
</tr>
<tr>
<td><strong>Relevant identified uses</strong>: Physical vapor deposition of thin films</td>
</tr>
<tr>
<td><strong>1.3. Details of the supplier of the safety data sheet</strong></td>
</tr>
<tr>
<td><strong>Manufacturer</strong></td>
</tr>
<tr>
<td>Kurt J Lesker Company</td>
</tr>
<tr>
<td>United States</td>
</tr>
<tr>
<td>1925 Route 51</td>
</tr>
<tr>
<td>Jefferson Hills, PA 15025</td>
</tr>
<tr>
<td><strong>Service Number</strong>: 412-387-9200</td>
</tr>
<tr>
<td><strong>E-Mail</strong>: <a href="mailto:msds@lesker.com">msds@lesker.com</a></td>
</tr>
<tr>
<td><strong>Customer Service</strong>: +44 (0) 1424 458100</td>
</tr>
<tr>
<td><strong>1.4. Emergency telephone number</strong></td>
</tr>
<tr>
<td>24-Hour Emergency Response provided by 3E Global Incident Response Hotline</td>
</tr>
<tr>
<td>When calling, refer to Kurt J Lesker Company</td>
</tr>
<tr>
<td>Global Response Access Code: 333594</td>
</tr>
<tr>
<td>North America [USA, Canada, Mexico]: 1-866-519-4752</td>
</tr>
<tr>
<td>Mainland China: (+) -86- 4001 2001 74</td>
</tr>
<tr>
<td>Europe: (+)-1-760-476-3961</td>
</tr>
<tr>
<td>Asia Pacific: (+)-1-760-476-3960</td>
</tr>
<tr>
<td>Middle East &amp; Africa: (+)-1-760-476-3959</td>
</tr>
</tbody>
</table>

### SECTION 2: Hazards identification

<table>
<thead>
<tr>
<th><strong>2.1. Classification of the substance or mixture</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Classification according to Directive 67/548/EEC</strong></td>
</tr>
<tr>
<td><strong>Classification according to Regulation (EC) No 1272/2008 [CLP]</strong></td>
</tr>
<tr>
<td><strong>Health</strong>: This substance or mixture is not hazardous and is not classified under GHS.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>2.2. Label elements</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>R&amp;S statement(s)</strong>: This material is not classified as hazardous according to Directive 67/548/EEC.</td>
</tr>
</tbody>
</table>

| **2.3. Other hazards** |
Chromium metal pieces

Immediate concerns: Negligible fire or explosion hazard in bulk form. Powdered material may form explosive dust-air mixtures.

Physical hazards: This substance is not considered hazardous in the form supplied. Dusts at sufficient concentrations can form explosive mixtures with air.

SECTION 3: Composition / information on ingredients

3.1. Substances

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>CAS</th>
<th>EINECS No.</th>
<th>Wt.%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chromium</td>
<td>7440-47-3</td>
<td>231-157-5</td>
<td>100</td>
</tr>
</tbody>
</table>

3.2. Mixtures
Not Applicable

SECTION 4: First aid measures

4.1. Description of first aid measures

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

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

Following ingestion: Rinse mouth. Get medical advice/attention.

Following 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.

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

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

SECTION 5: Fire fighting measures

5.1. Extinguishing media

Extinguishing media: Use a Class D dry powder extinguisher, dolomite, dry sand, graphite, or soda ash.

5.2. Special hazards arising from the substance or mixture

Explosion hazards: Dusts at sufficient concentrations can form explosive mixtures with air.

5.3. Advice for firefighters

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

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

General procedures: Isolate hazard area. Keep unnecessary and unprotected personnel from entering. Eliminate all ignition sources if safe to do so. Avoid
Chromium metal pieces

formation of dust. Provide appropriate exhaust ventilation where dust is formed. Avoid breathing (dust, vapor, mist, gas). Practice good chemical hygiene during and after use. Avoid release to the environment.

6.2. 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.

6.3. Methods and material for containment and cleaning up

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.

6.4. Reference to other sections

SECTION 7: Handling and storage

7.1. Precautions for safe handling

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

Handling: Keep away from heat and flame. Avoid formation of dust. Provide appropriate exhaust ventilation where dust is formed. Do not breathe (dust, vapor, mist, gas). Avoid contact with eyes, skin, and clothing. Wash thoroughly after handling.

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

7.2. Conditions for safe storage, including any incompatibilities

7.3. Specific end use(s)

SECTION 8: Exposure controls / personal protection

8.1. Control parameters

8.2. Exposure controls

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

Eye/face protection: Wear safety glasses.

Skin protection: Wear protective gloves.

Respiratory protection: 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,
Chromium metal pieces

or any other circumstances where air purifying respirators may not provide adequate protection.

Work hygienic practices : Practice good chemical hygiene during and after use.

Additional information :

### COMPONENT EXPOSURE LIMITS

<table>
<thead>
<tr>
<th>Component</th>
<th>Location, Type</th>
<th>Value (mg/m3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chromium</td>
<td>ACGIH TLV TWA</td>
<td>0.5</td>
</tr>
<tr>
<td></td>
<td>OSHA OEL TWA</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>NIOSH REL TWA</td>
<td>0.5</td>
</tr>
<tr>
<td>Canada - AB, BC, ON, PQ</td>
<td>TWA</td>
<td>0.5</td>
</tr>
<tr>
<td>Europe TWA</td>
<td>0.5</td>
<td></td>
</tr>
<tr>
<td>Hungary TWA</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>UK WEL TWA</td>
<td>0.5</td>
<td></td>
</tr>
</tbody>
</table>

### SECTION 9: Physical and chemical properties

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

**Physical state** : Solid

**Colour** : Lusterous grey

**Odour** : None

**pH** : NA = Not Applicable

**Melting temperature** : 1857°C

**Boiling temperature** : 2672°C

**Flash point** : NA = Not Applicable

**Flammable limits** : NA = Not Applicable

**Vapor pressure** : 1 mm Hg at 1616°C

**Vapor density** : NA = Not Applicable

**Density** : 7.14 at 25°C

**Solubility in water** : Insoluble

**Auto-ignition temperature** : NA = Not Applicable

**Molecular weight** : 51.996

#### 9.2. Other information

**Percent volatile** : NA = Not Applicable

### SECTION 10: Stability and reactivity

#### 10.1. Reactivity

**Stable** : Yes
Chromium metal pieces

10.2. Chemical stability

10.3. Possibility of hazardous reactions

Hazardous decomposition : No

10.4. Conditions to avoid

10.5. Incompatible materials

Incompatible materials : Strong acids, Strong bases, Oxidizing materials.

10.6. Hazardous decomposition products

Hazardous decomposition products : Toxic metal fumes

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute
Dermal LD$_{50}$ : Not Available
Skin absorption : Not Available
Oral LD$_{50}$ : Not Available
Inhalation LC$_{50}$ : Not Available
Mutagenicity : Not Available
Reproductive effect : Not Available

SECTION 12: Ecological information

12.1. Toxicity

Aquatic toxicity (acute)
96-hour LC$_{50}$ : 14.3 mg/L (Cyprinus carpio)
48-hour EC$_{50}$ : .07 mg/L (Daphnia magna)

12.2. Persistence and degradability

Persistence and degradability : Not Available

12.3. Bioaccumulative potential

Bioaccumulative potential : Not Available

12.4. Mobility in soil

12.5. Results of PBT and vPvB assessment

12.6. Other adverse effects

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Product disposal : Contact a licensed waste disposal company.
Disposal method : Dispose of according to applicable federal, state, provincial, and local regulations.
Empty container : Follow all MSDS/label precautions even after container is emptied because it may retain product residues.
Chromium metal pieces

SECTION 14: Transport information

14.1. UN number

14.2. UN proper shipping name
UN proper shipping name : Not Regulated

14.3. Transport hazard class(es)

14.4. Packing group

14.5. Environmental hazards

14.6. Special precautions for user

14.7. Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code

SECTION 15: Regulatory information

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

National regulations (Germany)
(WGK) classification : Not listed

15.2. Chemical safety assessment

SECTION 16: Other information

Approved by : EHS DEPT
Prepared by : E Bolton
Information contact : fluids@lesker.com
Revision summary : This MSDS replaces the 7/25/2012 MSDS.
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