SAFETY DATA SHEET
according to Regulation (EC) No. 453/2010

Date Issued: 3/23/2012
SDS No: M-1000-035
Date Revised: 10/28/2014
Revision No: 1

Cobalt metal pieces

SECTION 1: Identification of the substance/preparation and of the company/undertaking

1.1. Product identifier

Product name: Cobalt metal pieces

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

Relevant identified uses: Physical vapor deposition of thin films

1.3. Details of the supplier of the safety data sheet

Manufacturer:
Kurt J Lesker Company
United States
1925 Route 51
Jefferson Hills, PA 15025

Service Number: 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

1.4. Emergency telephone number

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: {+}-1-760-476-3961
Asia Pacific: {+}-1-760-476-3960
Middle East & Africa: {+}-1-760-476-3959

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

Classification according to Directive 67/548/EEC

Danger symbols: Xn
R phrases: R42/43, R53

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

Health: Respiratory Sensitization, Category 1
Skin Sensitization, Category 1

Environmental: Chronic Hazards to the Aquatic Environment, Category 4

2.2. Label elements
Cobalt metal pieces

Classification according to Directive 67/548/EEC

Hazard pictogram(s) : Xn

Harmful

R&S statement(s) :
R42/43: May cause sensitization by inhalation and skin contact.
R53: May cause long-term adverse effects in the aquatic environment.
S2: Keep out of the reach of children.
S22: Do not breathe dust.
S24: Avoid contact with skin.
S37: Wear suitable gloves.
S61: Avoid release to the environment. Refer to special instructions/safety data sheets.

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

Hazard pictogram(s) : ☑️

Health hazard

Signal Word : DANGER

Hazard statement(s) :
H334: May cause allergy or asthma symptoms or breathing difficulties if inhaled.
H317: May cause an allergic skin reaction.
H413: May cause long lasting harmful effects to aquatic life.

Precautionary statement(s)

Prevention :
P261: Avoid breathing dust/fume/gas/mist/vapours/spray.
P285: In case of inadequate ventilation wear respiratory protection.
P273: Avoid release to the environment.

Response :
P304+P341: IF INHALED: If breathing is difficult, remove to fresh air and keep at rest in a position comfortable for breathing.
P342+P311: If experiencing respiratory symptoms: Call a POISON CENTER or doctor/physician.
P302+P352: IF ON SKIN: Wash with plenty of soap and water.

2.3. Other hazards

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
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Cobalt metal pieces

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>CAS No.</th>
<th>EINECS No.</th>
<th>Wt.%</th>
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<td>Cobalt</td>
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</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: Remove to fresh air. If not breathing, give artificial respiration or give oxygen by trained personnel. Seek immediate medical attention.

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/NIOHS 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 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
Cobalt metal pieces

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. 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.

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 with side shields (or goggles) and a face shield.

Skin protection: Wear protective gloves/protective clothing/eye protection/face protection. Wash contaminated clothing before reuse.

Respiratory protection: 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.

Additional information: COMPONENT EXPOSURE LIMITS
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Cobalt metal pieces

<table>
<thead>
<tr>
<th>Component</th>
<th>Location, Type</th>
<th>Value (mg/m3)</th>
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</tbody>
</table>

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

- **Physical state**: Solid
- **Colour**: Light grey
- **Odour**: None
- **pH**: NA = Not Applicable
- **Melting temperature**: 1493°C
- **Boiling temperature**: 2900°C
- **Flash point**: NA = Not Applicable
- **Flammable limits**: NA = Not Applicable
- **Vapor pressure**: Not Available
- **Vapor density**: NA = Not Applicable
- **Density**: 8.9 at 25°C
- **Solubility in water**: Insoluble
- **Auto-ignition temperature**: NA = Not Applicable
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Cobalt metal pieces

| Molecular weight | 58.69 |

9.2. Other information

Percent volatile : NA = Not Applicable

SECTION 10: Stability and reactivity

10.1. Reactivity

Stable : Yes

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, Oxidizing materials, Acetylene, Hydrazinium nitrate, Ammonium Nitrate.

10.6. Hazardous decomposition products

Hazardous decomposition products : Toxic metal fumes

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute

Eyes : May cause mild transient irritation but there is no evidence of long term harmful effects from available information.

Dermal LD₅₀ : Not Available

Skin absorption : Not Available

Oral LD₅₀ : 6171 mg/kg

Notes : Rat

Inhalation LC₅₀ : Not Available

Sensitisation : May cause skin sensitization. May cause allergic respiratory reaction.

Mutagenicity : Not Available

Reproductive effect : Not Available

Target organs : Lungs, Respiratory tract

SECTION 12: Ecological information

12.1. Toxicity

Aquatic toxicity (acute) : Not Available

12.2. Persistence and degradability

Persistence and degradability : Not Available

12.3. Bioaccumulative potential

Bioaccumulative potential : 14 day Bioconcentration Factor (BCF) =500 (Penaeus aztecus)
Cobalt metal pieces

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.

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)

- **Primary hazard class/division**: Not Regulated

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: nwg- Not hazardous

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.
- **Manufacturer disclaimer**: Kurt J. Lesker Company ("KJLC") believes the information contained in this Material Safety Data Sheet is accurate as of the "Date of Last Revision" specified. The information relates only to typical properties of the product. Do not use the information for product performance or specification purposes. The information is for use by technically skilled persons at their own risk. KJLC MAKES NO EXPRESS OR IMPLIED WARRANTY OF ANY KIND, INCLUDING WITHOUT LIMITATION WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE, WITH RESPECT TO THE PRODUCT OR THE INFORMATION. The information may not be valid for product use in combination with any other product or material or in any process. KJLC expressly disclaims any liability arising from any use of
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