SECTION 1: Identification

1.1. Identification
Product form : Mixture
Trade name : SILVALOY® 299
Product code : A0000170

1.2. Recommended use and restrictions on use
Recommended use : Alloys for brazing/soldering and other metallurgical processes

1.3. Supplier
Lucas-Milhaupt, Inc.
5656 South Pennsylvania Ave.
Cudahy, WI 53110 - USA
T (414) 769-6000
LM_SDSinfo@lucasmilhaupt.com - www.Lucasmilhaupt.com

1.4. Emergency telephone number
Emergency number : CHEMTREC within the USA and Canada: 1-800-424-9300
CHEMTREC outside the USA and Canada +1 701-741-5970

SECTION 2: Hazard(s) identification

2.1. Classification of the substance or mixture
GHS US classification
Skin sensitisation, Category 1 H317 May cause an allergic skin reaction.
Carcinogenicity, Category 1B H350 May cause cancer.
Specific target organ toxicity — Repeated exposure, Category 1 H372 Causes damage to organs through prolonged or repeated exposure.
Full text of H statements : see section 16

2.2. GHS Label elements, including precautionary statements
GHS US labelling
Hazard pictograms (GHS US) :

Signal word (GHS US) : Danger
Hazard statements (GHS US) : H317 - May cause an allergic skin reaction.
H350 - May cause cancer.
H372 - Causes damage to organs through prolonged or repeated exposure.
Precautionary statements (GHS US) : P201 - Obtain special instructions before use.
P202 - Do not handle until all safety precautions have been read and understood.
P260 - Do not breathe dust/fume/gas/mist/vapours/spray.
P261 - Avoid breathing dust/fume/gas/mist/vapours/spray.
P264 - Wash hands, forearms and face thoroughly after handling.
P270 - Do not eat, drink or smoke when using this product.
P272 - Contaminated work clothing must not be allowed out of the workplace.
P280 - Wear protective gloves/protective clothing/eye protection/face protection.
P302+P352 - If on skin: Wash with plenty of water.
P308+P313 - If exposed or concerned: Get medical advice/attention.
P314 - Get medical advice/attention if you feel unwell.
P321 - Specific treatment (see supplemental first aid instruction on this label).
P333+P313 - If skin irritation or rash occurs: Get medical advice/attention.
P363 - Wash contaminated clothing before reuse.
P405 - Store locked up.
P501 - Dispose of contents/container to hazardous or special waste collection point, in accordance with local, regional, national and/or international regulation.
2.3. Other hazards which do not result in classification

No additional information available

2.4. Unknown acute toxicity (GHS US)

Not applicable

SECTION 3: Composition/information on ingredients

3.1. Substances

Not applicable

3.2. Mixtures

<table>
<thead>
<tr>
<th>Name</th>
<th>Product identifier</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Copper</td>
<td>(CAS-No.) 7440-50-8</td>
<td>35 - 37</td>
</tr>
<tr>
<td>Zinc</td>
<td>(CAS-No.) 7440-66-6</td>
<td>31 - 33</td>
</tr>
<tr>
<td>Silver</td>
<td>(CAS-No.) 7440-22-4</td>
<td>29 - 31</td>
</tr>
<tr>
<td>Nickel</td>
<td>(CAS-No.) 7440-02-0</td>
<td>1.75 - 2.25</td>
</tr>
</tbody>
</table>

Full text of hazard classes and H-statements: see section 16

SECTION 4: First-aid measures

4.1. Description of first aid measures

First-aid measures general: IF exposed or concerned: Get medical advice/attention. Call a poison center or a doctor if you feel unwell.

First-aid measures after inhalation: Remove person to fresh air and keep comfortable for breathing.

First-aid measures after skin contact: Take off contaminated clothing. If skin irritation or rash occurs: Get medical advice/attention. Wash skin with plenty of water.

First-aid measures after eye contact: Rinse eyes with water as a precaution.

First-aid measures after ingestion: Call a poison center or a doctor if you feel unwell. Rinse mouth.

4.2. Most important symptoms and effects (acute and delayed)

Symptoms/effects after skin contact: May cause an allergic skin reaction.

4.3. Immediate medical attention and special treatment, if necessary

Treat symptomatically.

SECTION 5: Fire-fighting measures

5.1. Suitable (and unsuitable) extinguishing media

Suitable extinguishing media: Dry powder. Water spray. Foam.

Unsuitable extinguishing media: Water.

5.2. Specific hazards arising from the chemical

Reactivity: The product is non-reactive under normal conditions of use, storage and transport.

5.3. Special protective equipment and precautions for fire-fighters

Protection during firefighting: Do not attempt to take action without suitable protective equipment. Self-contained breathing apparatus. Complete protective clothing.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

6.1.1. For non-emergency personnel

Emergency procedures: Do not breathe dust/fume/gas/mist/vapours/spray. Only qualified personnel equipped with suitable protective equipment may intervene.

6.1.2. For emergency responders

Protective equipment: Do not attempt to take action without suitable protective equipment. For further information refer to section 8: “Exposure controls/personal protection”.

6.2. Environmental precautions

Avoid release to the environment. Notify authorities if product enters sewers or public waters.

6.3. Methods and material for containment and cleaning up

For containment: Collect spillage.

Methods for cleaning up: Mechanically recover the product. Notify authorities if product enters sewers or public waters.
Other information: Dispose of materials or solid residues at an authorized site.

6.4. Reference to other sections

For further information refer to section 13.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Precautions for safe handling: Ensure good ventilation of the work station. Wear personal protective equipment. Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Do not breathe dust/fume/gas/mist/vapours/spray. Avoid contact with skin and eyes. Take all necessary technical measures to avoid or minimize the release of the product on the workplace. Limit quantities of product at the minimum necessary for handling and limit the number of exposed workers. Provide local exhaust or general room ventilation. Floors, walls and other surfaces in the hazard area must be cleaned regularly.

Hygiene measures: Contaminated work clothing should not be allowed out of the workplace. Wash contaminated clothing before reuse. Do not eat, drink or smoke when using this product. Always wash hands after handling the product. Separate working clothes from town clothes. Launder separately.

7.2. Conditions for safe storage, including any incompatibilities

Storage conditions: Store locked up. Store in a well-ventilated place. Keep cool.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

<table>
<thead>
<tr>
<th>Metal</th>
<th>ACGIH TWA (mg/m³)</th>
<th>OSHA PEL (TWA) (mg/m³)</th>
<th>IDLH (mg/m³)</th>
<th>NIOSH REL (TWA) (mg/m³)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Copper (7440-50-8)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ACGIH</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OSHA</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IDLH</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NIOSH</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.2 mg/m³ (fume)</td>
<td>0.1 mg/m³ (fume)</td>
<td>100 mg/m³</td>
<td>1 mg/m³ (dust and mist)</td>
</tr>
<tr>
<td>Nickel (7440-02-0)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ACGIH</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OSHA</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IDLH</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NIOSH</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1.5 mg/m³ (inhalable particulate matter)</td>
<td>1 mg/m³</td>
<td>10 mg/m³</td>
<td>0.015 mg/m³</td>
</tr>
<tr>
<td>Silver (7440-22-4)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ACGIH</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OSHA</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IDLH</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NIOSH</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.1 mg/m³ (dust and fume)</td>
<td>0.01 mg/m³</td>
<td>10 mg/m³ (dust)</td>
<td>0.01 mg/m³ (dust)</td>
</tr>
<tr>
<td>Zinc (7440-66-6)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ACGIH</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OSHA</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IDLH</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NIOSH</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2 mg/m³ (as ZnO)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

8.2. Appropriate engineering controls

Appropriate engineering controls: Ensure good ventilation of the work station.

Environmental exposure controls: Avoid release to the environment.

8.3. Individual protection measures/Personal protective equipment

Hand protection: Protective gloves

Eye protection: Safety glasses

Skin and body protection:
Wear suitable protective clothing

**Respiratory protection:**

[In case of inadequate ventilation] wear respiratory protection.

---

**SECTION 9: Physical and chemical properties**

9.1. Information on basic physical and chemical properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical state</td>
<td>Solid</td>
</tr>
<tr>
<td>Appearance</td>
<td>White to light yellow metallic luster, various forms.</td>
</tr>
<tr>
<td>Colour</td>
<td>No data available</td>
</tr>
<tr>
<td>Odour</td>
<td>No data available</td>
</tr>
<tr>
<td>Odour threshold</td>
<td>No data available</td>
</tr>
<tr>
<td>pH</td>
<td>No data available</td>
</tr>
<tr>
<td>Melting point</td>
<td>1450 °F</td>
</tr>
<tr>
<td>Freezing point</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Boiling point</td>
<td>No data available</td>
</tr>
<tr>
<td>Flash point</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Relative evaporation rate (butylacetate=1)</td>
<td>No data available</td>
</tr>
<tr>
<td>Flammability (solid, gas)</td>
<td>Non flammable</td>
</tr>
<tr>
<td>Vapour pressure</td>
<td>No data available</td>
</tr>
<tr>
<td>Relative vapour density at 20 °C</td>
<td>No data available</td>
</tr>
<tr>
<td>Relative density</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Solubility</td>
<td>No data available</td>
</tr>
<tr>
<td>Log Pow</td>
<td>No data available</td>
</tr>
<tr>
<td>Auto-ignition temperature</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Decomposition temperature</td>
<td>No data available</td>
</tr>
<tr>
<td>Viscosity, kinematic</td>
<td>No data available</td>
</tr>
<tr>
<td>Viscosity, dynamic</td>
<td>No data available</td>
</tr>
<tr>
<td>Explosive limits</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Explosive properties</td>
<td>No data available</td>
</tr>
<tr>
<td>Oxidising properties</td>
<td>No data available</td>
</tr>
</tbody>
</table>

9.2. Other information

No additional information available

---

**SECTION 10: Stability and reactivity**

10.1. Reactivity

The product is non-reactive under normal conditions of use, storage and transport.

10.2. Chemical stability

Stable under normal conditions.

10.3. Possibility of hazardous reactions

No dangerous reactions known under normal conditions of use.

10.4. Conditions to avoid

None under recommended storage and handling conditions (see section 7).

10.5. Incompatible materials

No additional information available

10.6. Hazardous decomposition products

Under normal conditions of storage and use, hazardous decomposition products should not be produced.

---

**SECTION 11: Toxicological information**

11.1. Information on toxicological effects

<table>
<thead>
<tr>
<th>Effect</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute toxicity (oral)</td>
<td>Not classified</td>
</tr>
<tr>
<td>Acute toxicity (dermal)</td>
<td>Not classified</td>
</tr>
</tbody>
</table>
**SILVALOY® 299**

*Safety Data Sheet*

according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

**Acute toxicity (inhalation)**

<table>
<thead>
<tr>
<th>Substance</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nickel (7440-02-0)</td>
<td>Not classified</td>
</tr>
<tr>
<td>Silver (7440-22-4)</td>
<td>Not classified</td>
</tr>
<tr>
<td>Zinc (7440-66-6)</td>
<td>Not classified</td>
</tr>
</tbody>
</table>

**Nickel (7440-02-0)**

- **LD50 oral rat**: > 9000 mg/kg
- **LC50 inhalation rat (mg/l)**: > 10.2 mg/l (Exposure time: 1 h)

**Silver (7440-22-4)**

- **LD50 oral rat**: > 5000 mg/kg
- **LD50 dermal rat**: > 2000 mg/kg

**Zinc (7440-66-6)**

- **LD50 oral rat**: 630 mg/kg

**Skin corrosion/irritation**

- Not classified

**Serious eye damage/irritation**

- Not classified

**Respiratory or skin sensitisation**

- May cause an allergic skin reaction.

**Carcinogenicity**

- Nickel (7440-02-0): IARC group 2B - Possibly carcinogenic to humans
- National Toxicity Program (NTP) Status: Reasonably anticipated to be Human Carcinogen
- In OSHA Hazard Communication Carcinogen list: Yes

**STOT - repeated exposure**

- May cause an allergic skin reaction.

**STOT - single exposure**

- Not classified

**Aspiration hazard**

- Not classified

**Viscosity, kinematic**

- No data available

**Symptoms/effects after skin contact**

- May cause an allergic skin reaction.

**SECTION 12: Ecological information**

**12.1. Toxicity**

*Ecology - general*: Very toxic to aquatic life.

**Copper (7440-50-8)**

- **LC50 fish 1**: 0.0068 - 0.0156 mg/l (Exposure time: 96 h - Species: Pimephales promelas)
- **EC50 Daphnia 1**: 0.03 mg/l (Exposure time: 48 h - Species: Daphnia magna [Static])
- **LC50 fish 2**: < 0.3 mg/l (Exposure time: 96 h - Species: Pimephales promelas [static])

**Nickel (7440-02-0)**

- **LC50 fish 1**: > 100 mg/l (Exposure time: 96 h - Species: Brachydanio rerio)
- **EC50 Daphnia 1**: > 100 mg/l (Exposure time: 48 h - Species: Daphnia magna)
- **LC50 fish 2**: 1.3 mg/l (Exposure time: 96 h - Species: Cyprinus carpio [semi-static])
- **EC50 Daphnia 2**: 1 mg/l (Exposure time: 48 h - Species: Daphnia magna [Static])

**Silver (7440-22-4)**

- **LC50 fish 1**: 0.00155 - 0.00293 mg/l (Exposure time: 96 h - Species: Pimephales promelas [static])
- **EC50 Daphnia 1**: 0.00024 mg/l (Exposure time: 48 h - Species: Daphnia magna [Static])
- **LC50 fish 2**: 0.0062 mg/l (Exposure time: 96 h - Species: Oncorhynchus mykiss [flow-through])

**Zinc (7440-66-6)**

- **LC50 fish 1**: 2.16 - 3.05 mg/l (Exposure time: 96 h - Species: Pimephales promelas [flow-through])
- **EC50 Daphnia 1**: 0.139 - 0.908 mg/l (Exposure time: 48 h - Species: Daphnia magna [Static])
- **LC50 fish 2**: 0.211 - 0.269 mg/l (Exposure time: 96 h - Species: Pimephales promelas [semi-static])
12.2. Persistence and degradability
No additional information available

12.3. Bioaccumulative potential
No additional information available

12.4. Mobility in soil
No additional information available

12.5. Other adverse effects
No additional information available

SECTION 13: Disposal considerations

13.1. Disposal methods
Waste treatment methods: Dispose of contents/container in accordance with licensed collector’s sorting instructions.

SECTION 14: Transport information

Department of Transportation (DOT)
In accordance with DOT
Not regulated

Transportation of Dangerous Goods
Not applicable

Transport by sea
Not applicable

Air transport
Not applicable

SECTION 15: Regulatory information

15.1. US Federal regulations

<table>
<thead>
<tr>
<th>Substance</th>
<th>Listed on the United States TSCA (Toxic Substances Control Act) inventory</th>
<th>Subject to reporting requirements of United States SARA Section 313</th>
<th>CERCLA RQ</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>Copper (7440-50-8)</td>
<td>Listed on the United States TSCA (Toxic Substances Control Act) inventory</td>
<td>Subject to reporting requirements of United States SARA Section 313</td>
<td>5000 lb no reporting of releases of this hazardous substance is required if the diameter of the pieces of the solid metal released is &gt;100 µm</td>
<td></td>
</tr>
<tr>
<td>Nickel (7440-02-0)</td>
<td>Listed on the United States TSCA (Toxic Substances Control Act) inventory</td>
<td>Subject to reporting requirements of United States SARA Section 313</td>
<td>100 lb no reporting of releases of this hazardous substance is required if the diameter of the pieces of the solid metal released is &gt;100 µm</td>
<td></td>
</tr>
<tr>
<td>Silver (7440-22-4)</td>
<td>Listed on the United States TSCA (Toxic Substances Control Act) inventory</td>
<td>Subject to reporting requirements of United States SARA Section 313</td>
<td>1000 lb no reporting of releases of this hazardous substance is required if the diameter of the pieces of the solid metal released is &gt;100 µm</td>
<td></td>
</tr>
</tbody>
</table>
SILVALOY® 299
Safety Data Sheet
according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

15.2. International regulations

**Copper (7440-50-8)**
Listed on the TCSI (Taiwan Chemical Substance Inventory)

**Nickel (7440-02-0)**
Listed on the TCSI (Taiwan Chemical Substance Inventory)

**Silver (7440-22-4)**
Listed on the TCSI (Taiwan Chemical Substance Inventory)

**Zinc (7440-66-6)**
Listed on the TCSI (Taiwan Chemical Substance Inventory)

15.3. US State regulations

**WARNING:** This product can expose you to Nickel, which is known to the State of California to cause cancer. For more information go to www.P65Warnings.ca.gov.

<table>
<thead>
<tr>
<th>Component</th>
<th>Carcinogenicity</th>
<th>Developmental toxicity</th>
<th>Reproductive toxicity male</th>
<th>Reproductive toxicity female</th>
<th>No significant risk level (NSRL)</th>
<th>Maximum allowable dose level (MADL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nickel(7440-02-0)</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**State or local regulations**

<table>
<thead>
<tr>
<th>Component</th>
<th>State or local regulations</th>
</tr>
</thead>
</table>
| Copper(7440-50-8) | U.S. - Massachusetts - Right To Know List  
U.S. - New Jersey - Right to Know Hazardous Substance List  
U.S. - Pennsylvania - RTK (Right to Know) - Environmental Hazard List  
U.S. - Pennsylvania - RTK (Right to Know) List |
| Nickel(7440-02-0) | U.S. - Massachusetts - Right To Know List  
U.S. - New Jersey - Right to Know Hazardous Substance List  
U.S. - Pennsylvania - RTK (Right to Know) - Environmental Hazard List  
U.S. - Pennsylvania - RTK (Right to Know) - Special Hazardous Substances  
U.S. - Pennsylvania - RTK (Right to Know) List |
| Silver(7440-22-4) | U.S. - Massachusetts - Right To Know List  
U.S. - New Jersey - Right to Know Hazardous Substance List  
U.S. - Pennsylvania - RTK (Right to Know) - Environmental Hazard List  
U.S. - Pennsylvania - RTK (Right to Know) List |
| Zinc(7440-66-6)   | U.S. - Massachusetts - Right To Know List  
U.S. - New Jersey - Right to Know Hazardous Substance List  
U.S. - Pennsylvania - RTK (Right to Know) - Environmental Hazard List  
U.S. - Pennsylvania - RTK (Right to Know) List |

SECTION 16: Other information

according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

Full text of H-statements:

<table>
<thead>
<tr>
<th>H317</th>
<th>May cause an allergic skin reaction.</th>
</tr>
</thead>
<tbody>
<tr>
<td>H350</td>
<td>May cause cancer.</td>
</tr>
<tr>
<td>H372</td>
<td>Causes damage to organs through prolonged or repeated exposure.</td>
</tr>
</tbody>
</table>
### NFPA health hazard
- 2 - Materials that, under emergency conditions, can cause temporary incapacitation or residual injury.

### NFPA fire hazard
- 1 - Materials that must be preheated before ignition can occur.

### NFPA reactivity
- 1 - Materials that in themselves are normally stable but can become unstable at elevated temperatures and pressures.

### Hazard Rating

<table>
<thead>
<tr>
<th>Category</th>
<th>Rating</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health</td>
<td>2</td>
<td>Moderate Hazard - Temporary or minor injury may occur</td>
</tr>
<tr>
<td>* Health</td>
<td></td>
<td>* - Chronic (long-term) health effects may result from repeated overexposure</td>
</tr>
<tr>
<td>Flammability</td>
<td>1</td>
<td>Slight Hazard - Materials that must be preheated before ignition will occur.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Includes liquids, solids and semi solids having a flash point above 200 F.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(Class III B)</td>
</tr>
<tr>
<td>Physical</td>
<td>1</td>
<td>Slight Hazard - Materials that are normally stable but can become unstable</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(self-react) at high temperatures and pressures. Materials may react non-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>violently with water or undergo hazardous polymerization in the absence of</td>
</tr>
<tr>
<td></td>
<td></td>
<td>inhibitors.</td>
</tr>
<tr>
<td>Personal protection</td>
<td>B</td>
<td>Safety glasses, Gloves</td>
</tr>
</tbody>
</table>

SDS US (GHS HazCom 2012)

Although reasonable care has been taken in the preparation of this document, we extend no warranties and make no representations as to the accuracy or completeness of the information contained therein, and assume no responsibility regarding the suitability of this information for the user's intended purposes or for the consequences of its use. Each individual should make a determination as to the suitability of the information for their particular purpose(s).

Lucas-Milhaupt, Inc.