1 PRODUCT AND COMPANY IDENTIFICATION

Trade name: 296 Flux-Cored Lead-Free Solder

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

Solder

Professional use of solder

1.3 Details of the supplier of the safety data sheet

Manufacturer/Supplier:

Kester Inc.
800 West Thomsdale Avenue
Itasca, IL 60143 USA
Tel (630) 616-4000
Tel International 00 1 630 616-4000

ITW Specialty Materials (Suzhou) Co., Ltd.
Heng Qiao Road
Wujiang Economic Development Zone
Suzhou, Jiangsu 215200 China
Tel +86 512 8206808

Kester GmbH
Ganghofer Strasse 45
D-82216 Gernlinden Germany
Tel +49 (0) 8142 4785 0

Information department: Product Compliance: EHS_Kester@kester.com

1.4 Emergency telephone number:

CHEMTREC 24-Hour Emergency Response  Telephone Number : (800) 424-9300
CHEMTREC 24-Hour Emergency Response (Outside US & Canada) Telephone Number : (703) 527-3887

2 HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008

GHS07

Skin Sens. 1  H317  May cause an allergic skin reaction.

2.2 Label elements

Labelling according to Regulation (EC) No 1272/2008

The product is classified and labeled according to the CLP regulation.

Hazard pictograms

GHS07

Signal word Warning

Hazard-determining components of labeling:

Organic acid

Hazard statements

H317 May cause an allergic skin reaction.

Precautionary statements

P280 Wear protective gloves/protective clothing/eye protection/face protection.

(Contd. on page 2)
Trade name: 296 Flux-Cored Lead-Free Solder

(Contd. of page 1)

P363 Wash contaminated clothing before reuse.
P333+P313 If skin irritation or rash occurs: Get medical advice/attention.
P302+P352 IF ON SKIN: Wash with plenty of soap and water.
P402 Store in a dry place.
P501 Dispose of contents/container in accordance with local/regional/national/international regulations.

Hazard description:
WHMIS Symbols

Classification system:
NFPA ratings (scale 0 - 4)

Health = 0
Fire = 0
Reactivity = 0

HMIS-ratings (scale 0 - 4)

Health = *0
Fire = 0
Reactivity = 0

2.3 Other hazards
Results of PBT and vPvB assessment
PBT: Not applicable.
vPvB: Not applicable.

3 COMPOSITION OF MIXTURE

Description: Mixture of the substances listed below with nonhazardous additions.

<table>
<thead>
<tr>
<th>CAS No.</th>
<th>Description</th>
<th>% Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAS: 7440-31-5 EINECS: 231-141-8</td>
<td>TIN (Sn)</td>
<td>85-100%</td>
</tr>
<tr>
<td>CAS: 7440-22-4 EINECS: 231-131-3</td>
<td>SILVER (Ag)</td>
<td>1.0-3.0%</td>
</tr>
<tr>
<td>Organic acid</td>
<td></td>
<td>0.1-&lt;1%</td>
</tr>
</tbody>
</table>

4 FIRST AID MEASURES

4.1 Description of first aid measures
General information: Follow general first aid procedures.
After inhalation: Supply fresh air; consult doctor in case of complaints.
After skin contact: Immediately wash with water and soap and rinse thoroughly.
After eye contact: Rinse opened eye for several minutes under running water.
After swallowing: Seek immediate medical advice.

4.2 Most important symptoms and effects, both acute and delayed No further relevant information available.

(Contd. on page 3)
Trade name: 296 Flux-Cored Lead-Free Solder

4.3 Indication of any immediate medical attention and special treatment needed
No further relevant information available.

5 FIREFIGHTING MEASURES

5.1 Extinguishing media
Suitable extinguishing agents:
CO2, extinguishing powder or water spray. Fight larger fires with water spray or alcohol resistant foam.

5.2 Special hazards arising from the substance or mixture
Nitrogen oxides (NOx)
In case of fire, the following can be released:

5.3 Advice for firefighters
Protective equipment: No special measures required.

6 ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Ensure adequate ventilation

6.2 Environmental precautions:
Do not allow to enter sewers/surface or ground water.

6.3 Methods and material for containment and cleaning up:
Allow to solidify. Pick up mechanically.
Dispose contaminated material as waste according to item 13.

6.4 Reference to other sections
See Section 7 for information on safe handling.
See Section 8 for information on personal protection equipment.
See Section 13 for disposal information.

Protective Action Criteria for Chemicals

<table>
<thead>
<tr>
<th>PAC-1:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>CAS: 7440-31-5 TIN (Sn)</td>
<td>6 mg/m3</td>
</tr>
<tr>
<td>CAS: 7440-22-4 SILVER (Ag)</td>
<td>0.3 mg/m3</td>
</tr>
<tr>
<td>CAS: 7440-50-8 COPPER (Cu)</td>
<td>3 mg/m3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PAC-2:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>CAS: 7440-31-5 TIN (Sn)</td>
<td>67 mg/m3</td>
</tr>
<tr>
<td>CAS: 7440-22-4 SILVER (Ag)</td>
<td>170 mg/m3</td>
</tr>
<tr>
<td>CAS: 7440-50-8 COPPER (Cu)</td>
<td>33 mg/m3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PAC-3:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>CAS: 7440-31-5 TIN (Sn)</td>
<td>400 mg/m3</td>
</tr>
<tr>
<td>CAS: 7440-22-4 SILVER (Ag)</td>
<td>990 mg/m3</td>
</tr>
<tr>
<td>CAS: 7440-50-8 COPPER (Cu)</td>
<td>200 mg/m3</td>
</tr>
</tbody>
</table>

7 HANDLING AND STORAGE

7.1 Precautions for safe handling
Prevent formation of dust.
Information about protection against explosions and fires: No special measures required.

7.2 Conditions for safe storage, including any incompatibilities
Storage:
Requirements to be met by storerooms and receptacles: Store in a cool location.
Information about storage in one common storage facility: Not required.
Further information about storage conditions: None.

(Contd. on page 4)
8 EXPOSURE CONTROLS / PERSONAL PROTECTION

Additional information about design of technical systems: No further data; see item 7.

8.1 Control parameters

Components with limit values that require monitoring at the workplace:
The following constituents are the only constituents of the product which have a PEL, TLV or other recommended exposure limit.
The following constituent is the only constituent of the product which has a PEL, TLV or other recommended exposure limit. At this time, the remaining constituent has no known exposure limits.

<table>
<thead>
<tr>
<th>CAS: 7440-31-5 TIN (Sn)</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>PEL</td>
<td>Long-term value: 2 mg/m³</td>
<td>metal</td>
</tr>
<tr>
<td>REL</td>
<td>Long-term value: 2 mg/m³</td>
<td></td>
</tr>
<tr>
<td>TLV</td>
<td>Long-term value: 2 mg/m³</td>
<td>metal</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CAS: 7440-22-4 SILVER (Ag)</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>PEL</td>
<td>Long-term value: 0.01 mg/m³</td>
<td></td>
</tr>
<tr>
<td>REL</td>
<td>Long-term value: 0.01 mg/m³</td>
<td></td>
</tr>
<tr>
<td>TLV</td>
<td>Long-term value: 0.1 mg/m³</td>
<td>metal: dust and fume</td>
</tr>
</tbody>
</table>

Additional information:
PEL = Permissible Exposure Limit (OSHA)
TLV = Threshold Limit Value (ACGIH)
OSHA = Occupational Safety and Health Administration
ACGIH = American Conference of Governmental Industrial Hygienists

8.2 Exposure controls

Personal protective equipment:

General protective and hygienic measures:
The usual precautionary measures for handling chemicals should be followed.
Keep away from foodstuffs, beverages and feed.
Immediately remove all soiled and contaminated clothing.
Wash hands before breaks and at the end of work.

Breathing equipment:
When ventilation is not sufficient to remove fumes from the breathing zone, a safety approved respirator or self-contained breathing apparatus should be worn.
Not necessary if room is well-ventilated.
Use suitable respiratory protective device in case of insufficient ventilation.

Protection of hands:

Protective gloves

Material of gloves:
Nitrile rubber, NBR
Natural rubber, NR

Penetration time of glove material:
The exact break through time has to be found out by the manufacturer of the protective gloves and has to be observed.
9 PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

General Information
Appearance:
Form: Solid
Color: Silver grey
Odor: Mild
pH-value: Not applicable.

Change in condition
Melting point/Melting range: Undetermined.
Boiling point/Boiling range: 2362 °C (4284 °F)
Flash point: Not applicable.

Flammability (solid, gaseous): Not determined.
Auto igniting: Product is not selfigniting.
Danger of explosion: Product does not present an explosion hazard.

Vapor pressure: Not applicable.
Density at 20 °C (68 °F): 7.31 g/cm³ (61.002 lbs/gal)
Vapor density: Not applicable.

Solubility in / Miscibility with Water: Insoluble.

Solvent content:
Organic solvents: 0.2 %
Solids content: 100.0 %

10 STABILITY AND REACTIVITY

10.1 Reactivity: No further relevant information available.
10.2 Chemical stability
Thermal decomposition / conditions to be avoided: No decomposition if used according to specifications.
10.3 Possibility of hazardous reactions: No dangerous reactions known.
10.4 Conditions to avoid: No further relevant information available.
10.5 Incompatible materials: Strong acids, strong oxidizers.
10.6 Hazardous decomposition products: No dangerous decomposition products known.
11 TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects
Acute toxicity: Based on available data, the classification criteria are not met.

LD/LC50 values that are relevant for classification:

<table>
<thead>
<tr>
<th>Route</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oral</td>
<td>LD50 &gt; 4000 mg/kg (rat)</td>
</tr>
<tr>
<td>Dermal</td>
<td>LD50 &gt;2500 mg/kg (rabbit)</td>
</tr>
</tbody>
</table>

Primary irritant effect:
on the skin: Based on available data, the classification criteria are not met.
on the eye: Based on available data, the classification criteria are not met.

Sensitization: May cause an allergic skin reaction.

Additional toxicological information:

Carcinogenic categories

IARC (International Agency for Research on Cancer)
None of the ingredients is listed.

NTP (National Toxicology Program)
None of the ingredients is listed.

OSHA-Ca (Occupational Safety & Health Administration)
None of the ingredients is listed.

12 ECOLOGICAL INFORMATION

12.1 Toxicity
Aquatic toxicity: No further relevant information available.

Additional ecological information:

General notes:
Do not allow undiluted product or large quantities of it to reach ground water, water course or sewage system.

12.5 Results of PBT and vPvB assessment
PBT: Not applicable.
vPvB: Not applicable.

13 DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods
Recommendation:
Disposal must be made according to official regulations.
Must not be disposed of together with household garbage. Do not allow product to reach sewage system.

Uncleaned packagings:
Recommendation: Disposal must be made according to official regulations.

14 TRANSPORT INFORMATION

14.1 UN-Number
DOT, ADR, ADN, IMDG, IATA
Not applicable
14.2 UN proper shipping name
DOT, ADR, ADN                      Not applicable
IMDG, IATA                         Not applicable

14.3 Transport hazard class(es)
DOT, ADR, ADN, IMDG, IATA
Class                                Not applicable

14.4 Packing group
DOT, IMDG, IATA                      Not applicable
Marine pollutant:                    No

14.6 Special precautions for user
Not applicable.

14.7 Transport in bulk according to Annex II of
MARPOL73/78 and the IBC Code
Not applicable.

UN "Model Regulation":               Not applicable

15 REGULATORY INFORMATION

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture
All ingredients are listed on the following Government Inventories:
China: Inventory of Existing Chemical Substances in China (IECSC)
Korea: Korea Existing Chemicals List (ECL)
Europe: European Inventory of Existing Commercial Chemical Substances (EINECS)
Japan: Inventory of Existing and New Chemical Substances (ENCS)
Philippines: Philippine Inventory of Chemicals and Chemical Substances (PICCS)
USA: TSCA (Toxic Substances Control Act) TSCA Inventory of Chemical Substances

USA The following information relates to product regulation specific to the USA.

SARA (Superfund Amendments and Reauthorization Act)

Section 355 (extremely hazardous substances):
None of the ingredient is listed.

Section 313 (Specific toxic chemical listings):
CAS: 7440-22-4 SILVER (Ag)
CAS: 7440-50-8 COPPER (Cu)

Chemicals known to cause cancer:
None of the ingredients is listed.

Chemicals known to cause reproductive toxicity:
None of the ingredients is listed.

Carcinogenic categories
EPA (Environmental Protection Agency)
CAS: 7440-22-4 SILVER (Ag)     D
CAS: 7440-50-8 COPPER (Cu)      D

NIOSH-Ca (National Institute for Occupational Safety and Health)
None of the ingredients is listed.

CANADA:
Workplace Hazardous Materials Identification (WHMIS):
This product has been classified in accordance with the hazard criteria of the Canadian Controlled Products Regulation (CPR) and the Safety Data Sheet (SDS) contains all of the information required by the CPR.
**Trade name:** 296 Flux-Cored Lead-Free Solder

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**Labelling according to Regulation (EC) No 1272/2008**  
The product is classified and labeled according to the CLP regulation.  
**Hazard pictograms**

![GHS07]

**Signal word** Warning

**Hazard-determining components of labeling:**  
Organic acid  
**Hazard statements**  
H317 May cause an allergic skin reaction.

**Precautionary statements**  
P280 Wear protective gloves/protective clothing/eye protection/face protection.  
P363 Wash contaminated clothing before reuse.  
P333|P332 If skin irritation or rash occurs: Get medical advice/attention.  
P302|P352 IF ON SKIN: Wash with plenty of soap and water.  
P402 Store in a dry place.  
P501 Dispose of contents/container in accordance with local/regional/national/international regulations.

**15.2 Chemical safety assessment:** A Chemical Safety Assessment has not been carried out.

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**16 OTHER INFORMATION**

The information contained herein is based on data considered accurate and is offered solely for information, consideration and investigation. Kester extends no warranties, makes no representations and assumes no responsibility as to the accuracy, completeness or suitability of this data for any purchaser’s use. The data on this Material Safety Data Sheet relates only to this product and does not relate to use with any other material or in any process. All chemical products should be used only by, or under the direction of, technically qualified personnel who are aware of the hazards involved and the necessity for reasonable care in handling. Hazard communication regulations require that employees must be trained on how to use a Material Safety Data Sheet as a source for hazard information.

**Department issuing Safety Data Sheet (SDS):** Product Compliance / EHS Department  
**Contact:** EHS_Kester@kester.com  
**Date of preparation / last revision:** 02/10/2017 / 3  
**Abbreviations and acronyms:**  
ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)  
IMDG: International Maritime Code for Dangerous Goods  
IATA: International Air Transport Association  
GHS: Globally Harmonised System of Classification and Labelling of Chemicals  
EINECS: European Inventory of Existing Commercial Chemical Substances  
ELINCS: European List of Notified Chemical Substances  
CAS: Chemical Abstracts Service (division of the American Chemical Society)  
LC50: Lethal concentration, 50 percent  
LD50: Lethal dose, 50 percent  
PBT: Persistent, Bioaccumulative and Toxic  
SVHC: Substances of Very High Concern  
vPvB: very Persistent and very Bioaccumulative  
TLV: Threshold Limit Value  
PEL: Permissible Exposure Limit  
REL: Recommended Exposure Limit  
Acute Tox. 4: Acute toxicity – Category 4  
Eye Irrit. 2A: Serious eye damage/eye irritation – Category 2A  
Skin Sens. 1: Skin sensitisation – Category 1

* Data compared to the previous version altered.