SAFETY DATA SHEET

This safety data sheet represents a family grouping of all metal mixes that are blended with the same flux known as NC-SMQ 230. A table is provided that lists all metal groupings and their identification. Unless otherwise stated, the health and safety information provided within is applicable to all products.

1. PRODUCT AND COMPANY IDENTIFICATION

Product Identifier: INDALLOY WITH NC-SMQ230 FLUX VEHICLE
SDS Number: SDS-IN 640
Revised Date: 11 JUNE 2018

Product Use: Industrial Use - No-clean solder paste consisting of a flux vehicle blended with 83-92 weight percent pre-alloyed metal powder. See alloy table of metal mixture combinations. An alloy table is provided for all metal mix combinations with the same flux. Review alloy table.

MANUFACTURER:

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2. HAZARDS IDENTIFICATION

GHS:

Lead free products

Signal Word: Warning
Hazard statement(s)

H317  May cause an allergic skin reaction
H319  Causes serious eye irritation
H334  May cause allergy or asthma symptoms or breathing difficulties if inhaled
H335  May cause respiratory irritation
EUH208  Contains rosin. May produce an allergic reaction

Precautionary statement(s)
P233  Keep container tightly closed
P261  Avoid breathing dust/fume/gas/mist/vapors/spray
P270  Do not eat, drink or smoke when using this product
P273  Avoid release to the environment
P280  Wear protective gloves/protective clothing/eye protection/face protection
P362 + P364  Take off contaminated clothing and wash before reuse
P301 + P314  IF SWALLOWED: Get Medical advice/attention if you feel unwell
P302 +P352  IF ON SKIN: Wash with plenty of soap and water
P304 + 341  IF INHALED: If breathing is difficult, remove victim to fresh air and keep at rest in a position comfortable for breathing
P305 + 351  IF IN EYES: Rinse continuously with water for several minutes (15 mins)
P501  Dispose of content/containers in accordance with applicable regulations.

Lead containing products

Signal Word: Warning
Hazard statement(s)

H303  May be harmful if swallowed
H317  May cause an allergic skin reaction
H319  Causes serious eye irritation
H334  May cause allergy or asthma symptoms or breathing difficulties if inhaled
H335  May cause respiratory irritation
H351  Suspected of causing cancer
H361  Suspected of damaging fertility or the unborn child
H373  May cause damage to organs through prolonged or repeated exposure
H410  Very toxic to aquatic life with long lasting effects
EUH201A  Warning! Contains lead. Review listing.
EUH208  Contains rosin. May produce an allergic reaction

Precautionary statement(s)
P233  Keep container tightly closed
P261  Avoid breathing dust/fume/gas/mist/vapors/spray
P270  Do not eat, drink or smoke when using this product
P273  Avoid release to the environment
P280  Wear protective gloves/protective clothing/eye protection/face protection
P362 + P364  Take off contaminated clothing and wash before reuse
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P305 + 351 IF IN EYES: Rinse continuously with water for several minutes (15 mins)
P501 Dispose of content/containers in accordance with applicable regulations.

Classification
Eye irritation-Category 2A
Skin irritation-Category 3
Carcinogenicity (Category 2) (lead)
Reproductive toxicity (Category 2) (lead)
Acute aquatic toxicity – Category 1 for lead containing products
Chronic aquatic toxicity – Category 1 for lead containing products

PRIMARY ROUTES OF ENTRY: Carcinogen listed in
- Eye  - Inhalation  - Skin  - Ingestion  - NTP  - IARC  - OSHA  - Not Listed

POTENTIAL HEALTH EFFECTS:
Eye Contact: Contact with material at room temperature or fume from material at typical re-flow temperatures over 100°C may cause eye irritation.

Ingestion: This product contains alloy powder and organic chemicals. May cause irritation or harm.

Inhalation: Vapors or fumes from this material at typical re-flow temperatures over 100°C may cause local irritation to the respiratory system. May be harmful if inhaled.

Skin Contact: May cause skin irritation. ANTIMONY and COBALT has been known to cause dermatitis.

Chronic: SILVER: Chronic skin contact or ingestion of silver powder, salts or fume can result in a condition known as Argyria, a condition with bluish pigmentation of the skin and eyes.

LEAD: Prolonged exposure to vapors or fumes at higher temperatures may cause respiratory irritation and systematic lead poisoning. Symptoms of lead poisoning include headache, nausea, abdominal pain, muscle and joint pain and damage to the nervous system, blood system and kidneys.

TIN: Has been shown to increase incidence of sarcoma in animal tests.

COPPER: Overexposure to fumes of copper may cause metal fume fever (chills, muscle aches, nausea, fever; dry throat, cough, weakness, lassitude); metallic or sweet taste; discoloration of skin and hair.

BISMUTH: May cause kidney damage.

COBALT: Inhalation of dust may cause pulmonary damage. Animal carcinogen and suspected human carcinogen.

IRON: Inhalation of large amounts of iron dust may result in iron pneumoconiosis. Chronic exposure to high levels on a daily basis can result in iron being deposited in body tissues and may result in liver cirrhosis and pancreas problems.

MANGANESE: Inhalation may cause metal fume fever and/or asthma.

WARNING: This product can expose you to chemicals including [lead] which is known to the State of California to cause cancer, and birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov
NOTE: The Indium Corporation does not recommend, manufacture, market or endorse any of its products for human consumption.

WARNING: This product may contain lead. Lead may be harmful to your health. US Federal law prohibits the use of leaded solders in making joints or fittings in any private or public water supply system. Keep out of the reach of children.

3. COMPOSITION / INFORMATION ON INGREDIENTS

<table>
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<tr>
<th>Components</th>
<th>% wt</th>
<th>CAS Registry #/EINECS#</th>
<th>PEL mg/m³</th>
<th>TLV-TWA mg/m³</th>
<th>TLV-STELE mg/m³</th>
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<td>SILVER</td>
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<td></td>
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<td>0.2 (fume)</td>
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<td></td>
</tr>
<tr>
<td></td>
<td>(Canada)</td>
<td>-</td>
<td>0.2 (fume)</td>
<td>0.6 (fume)</td>
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<tr>
<td></td>
<td>(Mexico)</td>
<td>-</td>
<td>0.2 (fume)</td>
<td>2</td>
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<td></td>
<td>0.2 (fume)</td>
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<td>BISMUTH</td>
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<td></td>
<td>(Mexico)</td>
<td>-</td>
<td>0.5</td>
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<td></td>
</tr>
</tbody>
</table>
4. FIRST AID MEASURES

**Eye Contact:** Hold eyelids apart and flush eyes with plenty of tepid water for at least 15 minutes. Seek medical attention if irritation persists.

**Ingestion:** If patient is conscious, ONLY induce vomiting as directed by trained personnel. NEVER give anything by mouth to an unconscious person. Seek medical attention immediately.

**Inhalation:** Remove to fresh air. If not breathing, give artificial respiration or oxygen by trained personnel.
Seek immediate medical attention.

**Skin Contact:** Remove contaminated clothing. Wash affected area with soap and water. Wash clothing before reuse. If irritation persists, obtain medical attention.

### 5. FIRE FIGHTING MEASURES

- **Flash Point:** Not established. **Method:** Not established.
- **Auto-ignition Temperature:** Not established.
- **Flammable Limits:** Limits not established.
- **Extinguishing Media:** Use extinguishers appropriate for the surrounding fire conditions.
- **Special Fire Fighting Procedures:** Firefighters must wear NIOSH approved self-contained breathing apparatus and full protective clothing.

### 6. ACCIDENTAL RELEASE MEASURES

- **Spill or Leak Procedures:** Using a spatula, scoop up paste and place in a plastic or glass jar and tightly cap. Remove traces of paste residue using cloth rags or paper towels moistened with ethyl or isopropyl alcohol. Dispose contaminated cloth rags or paper towels following all Federal, State and Local regulations. In the EU refer to the Special Waste Regulations.

### 7. HANDLING AND STORAGE

- **Handling Precautions:** Keep containers tightly closed when not in use. Use care to avoid spills. Use only with production equipment specifically designed for use with solder paste. Wear appropriate personal protective equipment when working or handling solder paste. Always thoroughly wash your hands after handling this product. DO NOT touch or rub eyes until hands are washed.
- **Storage Precautions:** Store product in tightly capped original containers in a cool, dry area. Refer to product label for specific storage temperature requirements. Rotate stock to ensure use before expiration date on the label.

### 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

- **Engineering Controls:** Use only with production equipment (stencil printers and re-flow furnaces) with adequate ventilation and other safety features specifically designed for use with solder paste. Control concentration of all components so that the (exposure limits) are not exceeded.

- **Personal protection:**
  - **Eyes:** Chemical safety glasses/goggles. Face shield for splash hazards.
  - **Respirator:** An approved or compliant marked air-purifying respirator with a fume/organic chemical cartridge is recommended under certain circumstances (i.e. when re-flowing manually on a plate instead of a ventilated re-flow furnace) where airborne concentrations are expected to be elevated or exceed exposure limits.
  - **Skin:** Compatible chemical resistant gloves. Latex gloves not recommended
  - **Other:** Lab coat, eye-wash fountain in work area. Avoid the use of contact lenses in high fume areas.
  - **Work/Hygienic:** Maintain good housekeeping. Clean up spills immediately. DO NOT allow rags or
### Practices:
- Paper towels contaminated with solder paste to accumulate in the work area.  Good personal hygiene is essential.  Avoid eating, smoking or drinking in the work area.
- Wash hands thoroughly with soap and water immediately upon leaving the work area.

### 9. PHYSICAL AND CHEMICAL PROPERTIES

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance</td>
<td>Grey colored paste.</td>
</tr>
<tr>
<td>Boiling Point</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Odor</td>
<td>Mild characteristic odor.</td>
</tr>
<tr>
<td>Melting Point</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Specific Gravity</td>
<td>Not applicable</td>
</tr>
<tr>
<td>pH</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Vapor Pressure</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Solubility in Water</td>
<td>Insoluble (paste)</td>
</tr>
<tr>
<td>Vapor Density (air=1)</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Volatile Organic Compounds</td>
<td>&lt;11,260 ug/KG</td>
</tr>
</tbody>
</table>

### 10. STABILITY AND REACTIVITY

- **General:** Stable.
- **Conditions to Avoid:** Not established.
- **Incompatible Materials:** Avoid contact with acids, bases or oxidizing agents.
- **Hazardous Decomposition / Combustion:** Harmful organic fumes and toxic oxide fumes may form at elevated temperatures.
- **Hazardous Polymerization:** Will not occur.

### 11. TOXICOLOGICAL INFORMATION

<table>
<thead>
<tr>
<th>Carcinogenicity</th>
<th>NTP: No</th>
</tr>
</thead>
<tbody>
<tr>
<td>OSHA</td>
<td>No (29CFR 1910.1025 Lead)</td>
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<tr>
<td>IARC</td>
<td>Yes - Lead</td>
</tr>
<tr>
<td>LD50</td>
<td>Not established.</td>
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<tr>
<td>LC50</td>
<td>Not established.</td>
</tr>
<tr>
<td>Other</td>
<td>Chronic Toxicity: Prolonged or repeated exposure to rosin flux fume may cause workers to develop occupational asthma. Lead may cause potential harm to the developing fetus.</td>
</tr>
</tbody>
</table>

### 12. ECOLOGICAL INFORMATION

- Product not tested.

### 13. DISPOSAL CONSIDERATION

- **Waste Disposal Method:** Scrap metal alloy usually has value.  Contact a commercial reclaimer for recycling. Otherwise, dispose of in accordance with all Federal, State and Local environmental regulations. In Europe follow the Special Waste Regulations.

### 14. TRANSPORT INFORMATION

- Transport in accordance with applicable international regulations and requirements.  Not regulated under US DOT (United States Department of Transportation).
- Non - hazardous under all shipping requirements, all modes.
15. REGULATORY INFORMATION

The information in this Safety Data Sheet meets the requirements of the United States Occupational Safety and Health Act and regulations promulgated hereunder (29 CFR 1910.1200 ET. SEQ.).

![WARNING: This product can expose you to chemicals including [lead] which is known to the State of California to cause cancer, and birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov](image-url)

SARA 313 Listing - 40 CFR 372.65
- Silver
- Copper
- Antimony
- Cobalt
- Lead
- Manganese

All ingredients are listed on the EPA TSCA Inventory.

This product has been classified in accordance with the hazard criteria of the Canadian Controlled Products Regulation (CPR).

**Canadian WHMIS:**
- D2A-Materials Causing Other Toxic Effects-Very Toxic Material (Chronic) (lead).
- D2B Materials Causing Other Toxic Effects –irritant

This product has been classified in accordance with the guidelines set by the Dept. of Industrial Health of the Republic of Singapore.

This product has been classified in accordance with the Mexican guidelines, NOM-018-STPS-2015 and NOM-010-STPS-2014.

For compliance with EU Directive 2011/65/EU, Restriction of Hazardous Substances (RoHS), see Alloy Table.

**Japan:**
- Poisonous and Deleterious Substance Control Law (PDSCL): No ingredients are listed.
- Fire Service Law (FSL): Not regulated/not dangerous.
- Industrial Safety and Health Law (ISHL): ingredients are listed
- PRTR and Promotion of Chemical Management law, Class I Substance: Not applicable.
- Waste Disposal and Public Cleaning Law: Specific Harmful Industrial Wastes: Some contents of the family grouping may contain lead within the solder paste. Review alloy table and product label/ purchased and used.
- Class II Designated Chemical Substances: No ingredients are listed.
- Ingredients are listed on the Japanese Inventory Chemical Substance List/Industrial Safety and Health Law Substance List.
- Review SDS and apply regulations where applicable.

**Malaysia:**
This product has been classified in accordance with: Malaysian – OCCUPATIONAL SAFETY AND HEALTH (CLASSIFICATION, LABELING AND SAFETY DATA SHEET OF HAZARDOUS CHEMICALS) REGULATION OCTOBER 2013 – (CLASS). (GHS)

In China:
Decree No. 591: Regulations on the Control over Safety of Hazardous Chemicals
GB 30000.2-29-2013, Rules for classification and labeling of chemicals. (GHS)
GB/T 16483-2008, GB/T 17517-2013
This product has been classified using the Chinese Occupational Limit for Hazardous Agents in the Workplace, GBZ2-2007.
All ingredients are listed on the China Chemical Inventory.

16. OTHER INFORMATION

<table>
<thead>
<tr>
<th>HMIS Hazard Rating</th>
<th>Health:</th>
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<tbody>
<tr>
<td></td>
<td>Fire:</td>
<td>1</td>
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<tr>
<td></td>
<td>Physical Hazard:</td>
<td>0</td>
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</table>

Revised Date: 11 JUNE 2018
Prepared by: Nancy Swarts, Indium Corporation of America
Approved by: Nancy Swarts, Indium Corporation of America

The information and recommendations contained herein are, to the best of The Indium Corporation of America's knowledge and belief, accurate and reliable as of the date issued. The Indium Corporation of America does not warrant or guarantee their accuracy or reliability, and The Indium Corporation of America shall not be liable for any loss or damage arising out of the user thereof. The information and recommendations are offered for the user's consideration and examination, and it is the user's responsibility to satisfy itself that they are suitable and complete for its particular use. If buyer repackages this product, legal counsel should be consulted to insure proper health, safety and other necessary information is included on the container.
## ALLOY TABLE

<table>
<thead>
<tr>
<th>INDALLOY MIXTURE (%Metal)</th>
<th>TIN Sn</th>
<th>LEAD Pb</th>
<th>COPPER Cu</th>
<th>SILVER Ag</th>
<th>BISMUTH Bi</th>
<th>IRON Fe</th>
<th>COBALT Co</th>
<th>MANGANESE Mn</th>
<th>ANTIMONY Sb</th>
<th>RoHS</th>
<th>2/3*</th>
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</thead>
<tbody>
<tr>
<td>97 (Sn43/Pb43/Bi14)</td>
<td>35.7-39.6</td>
<td>35.7-39.6</td>
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<td>11.6-12.9</td>
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<td>121 (Sn96.5/Ag 3.5)</td>
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RoHS indicates compliance with RoHS directive for electronic and electrical equipment. 2/3* denotes a specific RoHS classification.
<table>
<thead>
<tr>
<th>INDALLOY MIXTURE (%Metal)</th>
<th>TIN (Sn)</th>
<th>LEAD (Pb)</th>
<th>COPPER (Cu)</th>
<th>SILVER (Ag)</th>
<th>BISMUTH (Bi)</th>
<th>IRON (Fe)</th>
<th>COBALT (Co)</th>
<th>Manganese Mn</th>
<th>ANTIMONY (Sb)</th>
<th>RoHS 2/3*</th>
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<td>79.3-87.9</td>
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<td>0.42-0.46</td>
<td>3.3-3.7</td>
<td>-</td>
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<tr>
<td>249 (Sn91.8/Bi 4.8/Ag3.4)</td>
<td>76.2-84.5</td>
<td>-</td>
<td>-</td>
<td>2.8-3.1</td>
<td>4.0-4.4</td>
<td>-</td>
<td>-</td>
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<tr>
<td>252 (Sn95.5/Ag 3.9/Cu0.6)</td>
<td>79.3-87.9</td>
<td>-</td>
<td>0.50-0.55</td>
<td>3.2-3.6</td>
<td>-</td>
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<tr>
<td>256 (SAC305) (Sn96.5/Ag 3/Cu0.5)</td>
<td>80.1-88.8</td>
<td>-</td>
<td>0.41-0.46</td>
<td>2.5-2.8</td>
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<td>281 (Sn60/Bi40)</td>
<td>34.9-38.6</td>
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<td>48.1-53.4</td>
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<tr>
<td>NS (98.3Sn/1Ag0.5/Cu0.2 Mn)</td>
<td>81.5-90</td>
<td>-</td>
<td>0.42-0.46</td>
<td>0.83-0.92</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>0.17-0.18</td>
<td>-</td>
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</tr>
<tr>
<td>NS (95.8Sn/3.7Ag0.5Cu)</td>
<td>79.5-88</td>
<td>-</td>
<td>0.4 – 0.46</td>
<td>3.1-3.4</td>
<td>-</td>
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<tr>
<td>NS (95.5Sn/3.6Ag0.9Cu)</td>
<td>79.3-87.9</td>
<td>-</td>
<td>0.75-0.83</td>
<td>3-3.3</td>
<td>-</td>
<td>-</td>
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</tr>
<tr>
<td>NS (96Sn/3.7Ag0.3Cu)</td>
<td>79.7-88.3</td>
<td>-</td>
<td>0.25-0.28</td>
<td>3.1-3.4</td>
<td>-</td>
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<td>INDALLOY MIXTURE (%Metal)</td>
<td>TIN Sn</td>
<td>LEAD Pb</td>
<td>COPPER Cu</td>
<td>SILVER Ag</td>
<td>BISMUTH Bi</td>
<td>IRON Fe</td>
<td>COBALT Co</td>
<td>Manganese Mn</td>
<td>ANTIMONY Sb</td>
<td>RoHS 2/3*</td>
</tr>
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<td>---------------------------</td>
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</tr>
<tr>
<td>NS (95.4Sn/3.7Ag/0.9Cu)</td>
<td>79.2-87.8</td>
<td>-</td>
<td>0.75-0.83</td>
<td>3.1-3.4</td>
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<tr>
<td>NS (95.4Sn/0.7Cu/3.7Ag/0.2Fe)</td>
<td>79.2-87.8</td>
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<td>0.58-0.64</td>
<td>3.1-3.4</td>
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<td>0.17-0.18</td>
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<tr>
<td>NS (95.4Sn/0.6Cu/3.7Ag/0.3Co)</td>
<td>79.2-87.8</td>
<td>-</td>
<td>0.50-0.55</td>
<td>3.1-3.4</td>
<td>-</td>
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<td>0.25-0.28</td>
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<td>NS (94.5Sn/4.1Ag/1.4Cu)</td>
<td>78.4-86.9</td>
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<td>1.2-1.3</td>
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<tr>
<td>NS (96Sn/4Ag)</td>
<td>79.7-88.3</td>
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<tr>
<td>NS (95Sn/4Ag/1Sb)</td>
<td>78.9-85.5</td>
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<td>3.3-3.7</td>
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<td>0.83-0.92</td>
<td>YES</td>
</tr>
<tr>
<td>NS (94Sn/4Ag/1Cu/1Sb)</td>
<td>78.0-86.5</td>
<td>-</td>
<td>0.83-0.92</td>
<td>3.3-3.7</td>
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<td>-</td>
<td>0.83-0.92</td>
<td>YES</td>
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<tr>
<td>NS (92Sn/1.7Cu/4.7Ag/1.5Sb)</td>
<td>76.4-84.7</td>
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<td>1.4-1.6</td>
<td>3.9-4.3</td>
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<td>1.2-1.4</td>
<td>YES</td>
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</tbody>
</table>

NS = Non-standard alloy mixture

*RoHS 2 = Restriction of Hazardous Substances (2011/65/EU)

*RoHS 3 - products do not contain any listed phthalates