SAFETY DATA SHEET

This safety data sheet represents a family grouping of all metal mixes that are blended with the same flux known as Indium 1.38HF. A product table is provided that lists all metal groupings.

1. PRODUCT AND COMPANY IDENTIFICATION

Product Identifier: INDALLOY WITH INDIUM 1.38HF FLUX VEHICLE

SDS Number: SDS-5341 Revised Date: 13 AUGUST 2018

Product Use: Industrial Use (mixture) - Solder paste consisting of a flux vehicle blended with an 83-92 % pre-alloyed metal powder. Review alloy table for product mixtures.

MANUFACTURER:

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The Indium Corporation of America®,
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Suzhou Industrial Park
Suchun Industrial Square
Unit No. 14-C
Jiangsu Province, China  215126
Information: (86) 512-6283-4900
2. HAZARDS IDENTIFICATION

PRIMARY ROUTES OF ENTRY:

<table>
<thead>
<tr>
<th>Route</th>
<th>Carcinogen listed by agency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eye</td>
<td>NTP</td>
</tr>
<tr>
<td>Inhalation</td>
<td>IARC</td>
</tr>
<tr>
<td>Skin</td>
<td>OSHA</td>
</tr>
<tr>
<td>Ingestion</td>
<td>Not Listed</td>
</tr>
</tbody>
</table>

*See Section 11

GHS:
Lead free products

Signal Word: Warning

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 if you feel unwell
P302 +P352  IF ON SKIN: Wash with plenty of soap and water
P304 + P341  IF INHALED: If breathing is difficult, remove victim to fresh air and keep at rest in a position comfortable for breathing
P305 + P351  IF IN EYES: Rinse continuously with water for several minutes (15 mins)

Lead containing products

Signal Word: Warning

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 harmful 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
P301 + P314: IF SWALLOWED: Get Medical advice if you feel unwell
P302 + P352: IF ON SKIN: Wash with plenty of soap and water
P304 + P341: IF INHALED: If breathing is difficult, remove victim to fresh air and keep at rest in a position comfortable for breathing
P305 + P351: IF IN EYES: Rinse continuously with water for several minutes (15 mins)

Classification:
Carcinogenicity (Category 2) (lead)
Reproductive toxicity (Category 2) (lead)
Skin sensitizer-Category 1B
Respiratory sensitizer-Category 1B
Eye irritation-Category 2A
Acute aquatic toxicity – Category 1 for lead containing products (H400)
Chronic aquatic toxicity – Category 1 for lead containing products (H410)

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 severe eye irritation.

**Ingestion:**
This product contains alloy metal powder and organic chemicals. May be harmful if swallowed.

**Inhalation:**
Vapors or fumes from this material at typical re-flow temperatures over 100°C may cause local irritation or harm to the respiratory system. When heated, rosin may be a respiratory sensitizer.

**Skin Contact:**
May cause skin irritation. Rosin and Antimony may cause dermatitis.

**Chronic:**
**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.

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

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

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

**WARNING:** This product can expose you to chemicals including [lead] which is known to the State of California to cause cancer, and can cause 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 contains lead. Lead may be harmful to your health. Federal law prohibits the use of leaded solder in making joints and fittings of any private or public water supply system. Keep out of the reach of children.
## 3. COMPOSITION / INFORMATION ON INGREDIENTS

<table>
<thead>
<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-STEL mg/m³</th>
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<td>LEAD</td>
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<td>0.03(fume)</td>
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<td>(Singapore) 0.2(fume)</td>
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<tr>
<td>Indalloy Alloy</td>
<td>% TIN Sn</td>
<td>% SILVER Ag</td>
<td>% LEAD Pb</td>
<td>% BISMUTH Bi</td>
<td>% COPPER Cu</td>
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<td>151 (92.5Pb/5Sn/2.5Ag)</td>
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<td>209 (65Sn/25Ag/10Sb)</td>
<td>54-60</td>
<td>20.8-23</td>
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<td>228 (88Pb/10Sn/2Ag)</td>
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<tr>
<td>256 (96.5Sn/3Ag/0.5Cu)</td>
<td>80-88.8</td>
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<tr>
<td>Non Standard (83.25Bi/10.5Ag/6.25Sn/0.05Cu)</td>
<td>5.1-5.7</td>
<td>8.7-9.7</td>
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<td>69.1-76.6</td>
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</tbody>
</table>

N.E. = Not established  * See Alloy 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:** Limits not established. Not flammable.

**Flammable Limits:** Limits not established. Not flammable.

**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. Consult Product Data Sheet for additional information.
8. EXPOSURE CONTROLS / PERSONAL PROTECTION

**Engineering Controls:**
Use only with production equipment (such as 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 levels are not exceeded. Use exhaust ventilation.

**Personal protection:**

**Eyes:**
Chemical safety glasses/goggles. Face shield for any 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 or nitrile disposable to keep skin from direct contact.

**Other:**
Lab coat, eyewash fountain in work area. Avoid the use of contact lenses in high fume areas.

**Work/Hygienic Practices:**
Maintain good housekeeping. Clean up spills immediately. DO NOT allow rags or 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. When applicable use standard lead work practices.

9. PHYSICAL AND CHEMICAL PROPERTIES

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Appearance</strong></td>
<td>Grey colored paste.</td>
</tr>
<tr>
<td><strong>Odor</strong></td>
<td>Mild characteristic odor.</td>
</tr>
<tr>
<td><strong>Specific Gravity</strong></td>
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<tr>
<td><strong>Vapor Pressure</strong></td>
<td>Not applicable.</td>
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<tr>
<td><strong>Vapor Density</strong></td>
<td>(air=1) Not applicable.</td>
</tr>
<tr>
<td><strong>Boiling Point</strong></td>
<td>Not applicable.</td>
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<tr>
<td><strong>Melting Point</strong></td>
<td>Not applicable.</td>
</tr>
<tr>
<td><strong>pH</strong></td>
<td>4-8 (flux)</td>
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<tr>
<td><strong>Solubility in Water</strong></td>
<td>Insoluble (paste)</td>
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<tr>
<td><strong>Flash Point</strong></td>
<td>Not applicable.</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

**Carcinogenicity:**
- **NTP:** No
- **OSHA:** No
- **IARC:** Yes Lead and lead compounds are listed as possible carcinogens.

**LD50:**
Not established.

**LC50:**
Not established.

**Other:**
Chronic Toxicity: Prolonged or repeated exposure to rosin flux fume may cause workers to develop occupational asthma. Lead can cause potential harm to the developing fetus. Contains <1 % of other ingredients that are classified as a carcinogen.
12. ECOLOGICAL INFORMATION

Product not tested.
Contains substances that are harmful to the aquatic environment.
Lead – Toxicity to fish – mortality LOEC – rainbow trout – 1.19 mg/l – 96h. Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment. Bioaccumulation – Oncorhynchus kisutch – 2 weeks
Bioconcentration factor (BCF): 12. Fresh fish: 0.44 mg/l LC50 96h/ 1.32 mg/l LC50 96h/water Flea: 600 ug/l EC50 = 48h

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. Avoid release to the environment. Do not discharge to drain or any body of water.

14. TRANSPORT INFORMATION

Transport in accordance with applicable international regulations and requirements. Not regulated under US Department of Transportation. Non hazardous under shipping regulations.

IATA-Ground-Ocean – not regulated
UN - None

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.).

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).
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 Mexican regulations, NOM-018-STPS-2015 and NOM-101-STPS-2014.

In China:
This product has been classified using the Chinese Occupational Limit for Hazardous Agents in the Workplace, GBZ2-2007.
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 in accordance with: Malaysian – OCCUPATIONAL SAFETY AND HEALTH (CLASSIFICATION, LABELING AND SAFETY DATA SHEET OF HAZARDOUS CHEMICALS) REGULATION OCTOBER 2013 – (CLASS).

For Compliance with EU Directive 2002/95/EC, Restriction on Hazardous Substances (RoHS) - See Alloy Table.

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

SARA 313 Listing - 40 CFR 372.65
   Lead  CAS# 7439-92-1, Antimony  CAS# 7440-36-0

EPA Genetic Toxicology Program – Lead CAS# 7439-92-1

All ingredients are listed on the EPA TSCA Inventory.

16. OTHER INFORMATION

<table>
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<tr>
<th>HMIS Hazard Rating:</th>
<th>Health:</th>
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<tbody>
<tr>
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<tr>
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<td>Physical Hazard:</td>
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</table>

Revised Date: 13 AUGUST 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.