To better serve all of our customers Indium Corporation has generated one MSDS for this single product to be used within the United States as well as internationally. Some of the regulatory information contained within may not be applicable to the customer’s individual state or country. See alloy table for product listing.

**1. PRODUCT AND COMPANY IDENTIFICATION**

**Product Identifier:** INDALLOY WITH TIN AND LEAD

**MSDS Number:** MSDS-IN 039

**Revised Date:** 15 MAY 2013

**Product Use:** INDUSTRIAL USE (mixture) - METAL ALLOYS CONSISTING OF ONLY TIN AND LEAD

**MANUFACTURER:**

**In America:**
The Indium Corporation of America
1676 Lincoln Ave., Utica NY 13502
Information: (315) 853-4900
nswarts@indium.com

**EMERGENCY PHONE:**
CHEMTREC 24 hrs.
USA: 1 (800) 424-9300
Outside USA: +1 (703) 527-3887

**In Europe:**
Indium Corporation of Europe
7 Newmarket Ct.
Kingston, Milton Keynes, UK, MK 10 OAG
Information: +44 [0] 1908 580400

**In China:**
Indium Corporation (Suzhou) Co., Ltd
No. 428 Xinglong Street
Suzhou Industrial Park
Suchun Industrial Square
Unit No. 14-C
Jiangsu Province, China 215126
Information: (86) 512-6283-4900

**In Asia:**
Asia-Pacific Operations-Singapore
29 Kian Teck Avenue
Singapore 628908
Information: +65 6268-8678
2. HAZARDS IDENTIFICATION

<table>
<thead>
<tr>
<th>PRIMARY ROUTES OF ENTRY:</th>
<th>CARCINOGEN LISTED IN:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eye</td>
<td>Not Listed</td>
</tr>
<tr>
<td>Inhalation</td>
<td>IARC</td>
</tr>
<tr>
<td>Skin</td>
<td>OSHA</td>
</tr>
<tr>
<td>Ingestion</td>
<td>NTP</td>
</tr>
</tbody>
</table>

GHS:

Signal Word: Warning

Hazard statement(s)
- H302 Harmful if swallowed
- H315 Causes skin irritation
- H335 May cause respiratory irritation
- H332 Harmful if inhaled
- H351 Suspected of causing cancer (lead)
- H360 May damage fertility or the unborn child (lead)
- H373 May cause damage to organs through prolonged or repeated exposure (lead)
- H400+H413 Very toxic to aquatic life, may cause long lasting harmful effects to aquatic life
- EUH201A Warning! Contains lead

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 Take off contaminated clothing and wash before reuse
- P301 + P312 IF SWALLOWED: Call a POISON CENTER or doctor/physician 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 contents by recycling if possible otherwise dispose of via a approved waste handler.

POTENTIAL HEALTH EFFECTS:

**Eye Contact:** Contact with powered metal alloy or fume from molten metal may cause irritation. Severe eye damage may result from hot molten metal being splashed into the eyes. Wear safety glasses and face shield when working with molten metal.

**Ingestion:** Ingestion of dust may cause headache, nausea, abdominal pain, fatigue and pain in the legs, arms and joints. May be harmful.

**Inhalation:** Inhalation of fume or dust may cause local irritation to the respiratory system. Inhalation of fume or dust may cause headache, nausea, abdominal pain, fatigue and pain in the legs, arms and joints. Inhalation can be harmful.

**Skin Contact:** Normal handling of solid metal should not cause any adverse health effects. Hot molten metal may cause burns to the skin. Wear protective equipment when handling molten metal. Protect skin when grinding/cutting, may cause irritation.
Chronic:

**TIN:** Has been shown to increase incidence of sarcoma in animal tests. Chronic exposure may result in “stannosis” a mild form of pneumoconiosis.

**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.

Exposure to metal fumes may cause irritation to the respiratory system. Long term exposure by inhalation to metal fumes may cause illness such as metal fume fever.

Exposure to lead fume may cause harm. Sign of overexposure is anemia.

**WARNING:** This product contains a chemical known to the State of California to cause cancer and/or birth defects (or other reproductive harm). (lead)

**NOTE:** The Indium Corporation does not recommend, manufacturer, market or endorse any of its products for human consumption.

**WARNING:** This product contains 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>
<thead>
<tr>
<th>Components</th>
<th>% wt</th>
<th>CAS Registry #/EINECS#</th>
</tr>
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<tbody>
<tr>
<td>TIN</td>
<td>*</td>
<td>7440-31-5/231-141-8</td>
</tr>
<tr>
<td>LEAD</td>
<td>*</td>
<td>7439-92-1/231-100-4</td>
</tr>
</tbody>
</table>

**DOES NOT CONTAIN ANY EU SUBSTANCES OF VERY HIGH CONCERN (SVHC)**

Symbol: $X_n$  
Risk Phrases: R20/22, R36/37/38, R33, R40, R48, R50/53, R61  
N.E. = Not established  
* See alloy table
## ALLOY TABLE - Mixture

<table>
<thead>
<tr>
<th>INDALLOY (METAL)</th>
<th>%TIN Sn</th>
<th>%LEAD Pb</th>
<th>RoHS* Compliance</th>
<th>LIQUIDUS °C/°F</th>
<th>SOLIDUS °C/°F</th>
<th>DENSITY (gm/cm³)</th>
</tr>
</thead>
<tbody>
<tr>
<td>106(Sn63)</td>
<td>63</td>
<td>37</td>
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<td>183C/361F</td>
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<tr>
<td>107</td>
<td>65</td>
<td>35</td>
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<td>184C/363F</td>
<td>183C/361F</td>
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<tr>
<td>108</td>
<td>70</td>
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<td>186C/367F</td>
<td>183C/361F</td>
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<tr>
<td>109</td>
<td>60</td>
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<tr>
<td>110</td>
<td>75</td>
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<td>112</td>
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<tr>
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<td>45</td>
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<tr>
<td>114</td>
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<td>NO</td>
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<tr>
<td>116</td>
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<tr>
<td>118</td>
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<td>120</td>
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<td>122</td>
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<td>145</td>
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</table>

<table>
<thead>
<tr>
<th>INDALLOY (METAL)</th>
<th>%TIN Sn</th>
<th>%LEAD Pb</th>
<th>RoHS* Compliance</th>
<th>LIQUIDUS °C/°F</th>
<th>SOLIDUS °C/°F</th>
<th>DENSITY (gm/cm³)</th>
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<tbody>
<tr>
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<td>159</td>
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<td>90</td>
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<td>275C/527F</td>
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<tr>
<td>171</td>
<td>5</td>
<td>95</td>
<td>YES</td>
<td>312C/594F</td>
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<td>213</td>
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<td>89.50</td>
<td>NO</td>
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<td>275C/527F</td>
<td>10.75</td>
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### Non Standard Alloy Mixture

<table>
<thead>
<tr>
<th></th>
<th>%TIN Sn</th>
<th>%LEAD Pb</th>
<th>RoHS* Compliance</th>
<th>LIQUIDUS °C/°F</th>
<th>SOLIDUS °C/°F</th>
<th>DENSITY (gm/cm³)</th>
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<tbody>
<tr>
<td>Non-Standard</td>
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<td>98</td>
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<tr>
<td>Non-Standard</td>
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<td>97</td>
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<td>Non-Standard</td>
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<td>38.1</td>
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<td>-</td>
<td>8.43</td>
</tr>
</tbody>
</table>

*RoHS = Restriction on Hazardous Substances (Review for any applicable exemptions that may apply)
4. FIRST AID MEASURES

**Eye Contact:** Hold eyelids apart and flush eyes with plenty of 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. Massive metal is not flammable; however dust or powder may be flammable.

**Extinguishing Media:** Use extinguishers appropriate for the surrounding fire conditions. Never add water to molten metal.

**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:** Contain spill. If molten, cool to allow metal to solidify. If a solid metal, wear gloves, pick up and return to process. If dust, wear recommended personal protective equipment. DO NOT SWEEP, avoid generation of dust. Ventilation required. Use a vacuum, place in barrels and return to process if applicable. Otherwise, dispose of following all Federal, State and Local regulations. In the EU refer to the Special Waste Regulations. Metal has reclaim value.

7. HANDLING AND STORAGE

**Handling Precautions:** Only dry metals should be added to molten bath. If working with molten metals, or exposed to fume or dust, use appropriate personal protective equipment.

**Storage Precautions:** Store product in a cool, dry area away from incompatible materials.
### 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

<table>
<thead>
<tr>
<th>CAS/EINECS#</th>
<th>PEL (mg/m³)</th>
<th>TLV-TWA (mg/m³)</th>
<th>TLV-STEL (mg/m³)</th>
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<tbody>
<tr>
<td>TIN</td>
<td>*</td>
<td>7440-31-5/231-141-8</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(US) 2</td>
<td>2</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>(EU) -</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>(Canada) -</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>(Singapore)</td>
<td>2</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>(Germany) -</td>
<td>2</td>
<td>-</td>
</tr>
<tr>
<td>LEAD</td>
<td>*</td>
<td>7439-92-1/231-100-4</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(US) 0.05</td>
<td>0.05</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>(EU) -</td>
<td>0.15</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>(Canada) -</td>
<td>0.05</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>(China) -</td>
<td>0.05(dust)</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>- 0.03(fume)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>(Mexico) 0.15</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>(Singapore)</td>
<td>0.15</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>(Germany) -</td>
<td>0.05</td>
<td>-</td>
</tr>
</tbody>
</table>

Symbol: X
Risk Phrases: R20/22, R36/37/38, R33, R40, R48, R50/53, R61
N.E. = Not established
* See alloy table

Lead and Tin: Immediately Dangerous to Life and Health: 100 mg/m³ (Pb)

### Engineering Controls:
Exhaust ventilation is required to control any air contaminants containing lead. Control concentration of all components so that their permissible exposure limits are not exceeded.

### Personal protection:

**Eyes:** Chemical safety glasses/goggles and face shield with molten metal.

**Respirator:** An authority approved or compliant marked air-purifying respirator with a fume/dust chemical cartridge is recommended under certain circumstances where airborne concentrations are expected to be elevated or if in powder form. Avoid inhalation of lead dust. Additional respiratory protection may be required based on the work conditions.

**Skin:** Gloves-leather or impervious (vinyl) type. Heat resistant gloves if handling hot metal. Safety type boots. Personal protective equipment is recommended when working with molten metal to avoid burns.

**Other:** Lab coat, safety shower and eye-wash fountain in work area. Avoid the use of contact lenses in high fume areas.

**Work/Hygienic Practices:** Maintain good housekeeping. Clean up spills immediately. 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. Follow standard lead work practices as established under...
9. PHYSICAL AND CHEMICAL PROPERTIES

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
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</thead>
<tbody>
<tr>
<td>Appearance</td>
<td>Silver grey solid metal</td>
</tr>
<tr>
<td>Boiling Point</td>
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</tr>
<tr>
<td>Odor</td>
<td>Odorless</td>
</tr>
<tr>
<td>Melting Point</td>
<td>See Table</td>
</tr>
<tr>
<td>Specific Gravity</td>
<td>See Table</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</td>
</tr>
<tr>
<td>Vapor Density</td>
<td>(air=1) Not applicable</td>
</tr>
<tr>
<td>Flash point</td>
<td>Not applicable</td>
</tr>
</tbody>
</table>

10. STABILITY AND REACTIVITY

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

11. TOXICOLOGICAL INFORMATION

Carcinogenicity: National Toxicity Program (NTP): No
                          Occupational Safety & Health Administration (OSHA): No
                          U.N. International Agency for Research on Cancer (IARC): Yes

LD50: Not established     LC50: Not established

Other: Chronic Toxicity: Lead can cause potential harm to the developing fetus.

Irritancy of Product: Not established
                      Mutagenicity: Not established

Sensitization to Product: Not established
                         Teratogenicity: Not established

Reproductive Toxicity: No specific data is available
                      Synergistic Products: Not established

RTECS#: Lead – OF7525000  RTECS#: Tin – XP7320000  (Registry of Toxic Effects of Chemical Substances)

12. ECOLOGICAL INFORMATION

Product mixture not tested.

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
Avoid release to environment.
13. DISPOSAL CONSIDERATION

Waste Disposal Method: Scrap metal alloy usually has value. Contact a commercial reclamer 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.

14. TRANSPORT INFORMATION

Transport in accordance with applicable regulations and requirements. Not regulated under US DOT (United States Department of Transportation).

Not hazardous under shipping modes/ regulations.

UN - none


15. REGULATORY INFORMATION

The information in this Material 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).

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 regulations: NOM-018-STPS-2000 and NOM-010-STPS-1999.

This product has been classified using the Chinese Occupational Exposure Limit for Hazardous Agents in the Workplace, GBZ2-2002.

California PROP 65(Safe Drinking Water Standard): WARNING : This product contains a chemical known to the State of California to cause cancer and/or birth defects (or other reproductive harm). (lead)

SARA 313 Listing - 40 CFR 372.65: Lead CAS# 7439-92-1

All ingredients are listed on the EPA TSCA Inventory.

Most of the ingredients are listed on the Canadian Domestic Substance List.

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

EC Classification, Packaging and Labeling Requirements:
Symbol and Hazard Classification of Product

X_n
**Risk Phrases:**
- R20/22 Harmful by inhalation and if swallowed
- R36/37/38 Irritating to eyes, respiratory system and skin
- R33 Danger of cumulative effects (lead)
- R40 Limited evidence of carcinogenic effect (lead)
- R48 Danger of serious damage to health by prolonged exposure (lead)
- R50/53 Very toxic to aquatic environment and may cause long-term adverse effects in the aquatic environment
- R61 May cause harm to the unborn child (lead)

**Safety Phrases:**
- S20/21 When using do not eat, drink or smoke
- S22 Do not breathe dust
- S23 Do not breathe fumes
- S24/25 Avoid contact with skin and eyes
- S27 Take off immediately all contaminated clothing
- S28 After contact with skin wash immediately with plenty of soap and water
- S36/37/39 Wear suitable protective clothing, gloves and eye/face protection
- S62 If swallowed, do not induce vomiting seek medical advice immediately and show container or label
- S7 Keep container tightly closed

### 16. OTHER INFORMATION

**HMIS Hazard Rating:**
- Health: 2
- Fire: 1
- Reactivity: 0

**Revised Date:** 15 MAY 2013
**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. The Indium Corporation does not recommend, manufacturer, market or endorse any of its products for human consumption.