



**INDIUM CORPORATION OF AMERICA®\EUROPE®\ASIA-PACIFIC®  
INDIUM CORPORATION (SUZHOU)®**

**SAFETY DATA SHEET**

**1. PRODUCT AND COMPANY IDENTIFICATION**

**Product Identifier:** INDALLOY WITH RMA-E FLUX VEHICLE

**MSDS Number:** MSDS-IN 354-B

**Revised Date:** 17 MAY 2012

**Product Use:** Rosin-based mildly activated solder paste consisting of a flux vehicle blended with a 83-92 % pre-alloyed metal powder.

**MANUFACTURER:**

**In America:**

The Indium Corporation of America  
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## 2. HAZARDS IDENTIFICATION

### PRIMARY ROUTES OF ENTRY:

Eye   
 Inhalation   
 Skin   
 Ingestion   
 NTP

### Carcinogen listed in

IARC    OSHA    Not Listed  
 See Section 11

GHS:



lead and antimony containing products

Signal Word: Warning

Hazard statement(s)

H315	Causes skin irritation
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
H332	Harmful if inhaled
H351	Suspected of causing cancer (lead)
H360	May damage fertility or the unborn child (applicable to lead containing product)
H373	May cause damage to organs through prolonged or repeated exposure (applicable to lead containing product)
H400+H413	Very toxic to aquatic life, may cause long lasting harmful effects to aquatic life (lead)
H401+H413	Toxic to aquatic life, may cause long lasting harmful effects to aquatic life (antimony)
EUH201A	Warning! Contains lead (applicable only to the products listed that contain 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	Take off contaminated clothing and wash before reuse
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

### 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 may contain lead alloy powder and organic chemicals. Harmful if swallowed. May cause systematic lead poisoning and burns to the digestive tract. Symptoms of lead poisoning

include headache, nausea, abdominal pain, muscle and joint pain and damage to the nervous system, blood system and kidneys.

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

**Skin Contact:** May cause skin irritation. ANTIMONY has been known to 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.

BISMUTH: May cause kidney damage.

INDIUM: May cause damage to respiratory system.

**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, 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

Components	% wt	CAS Registry #	PEL mg/m <sup>3</sup>	TLV-TWA mg/m <sup>3</sup>	TLV-STEL mg/m <sup>3</sup>
TIN	+	7440-31-5/231-141-8			
		(US)	2	2	-
		(EU)	-	2	4
		(Canada)	-	2	4
		(Singapore)	2	-	-
LEAD	+	7439-92-1			
		(US)	0.05	0.05	-

		(EU)	-	0.15	-
		(Canada)	0.05	0.05	-
		(Singapore)	0.15	-	-
		(Mexico)	-	0.15	-
		(China)	-	0.05(dust) 0.03 (fume)	-
<b>SILVER</b>	+	7440-22-4/231-131-3			
		(US)	0.01	0.1	-
		(EU)	-	0.1	-
		(Canada)	-	0.1	0.3
		(Singapore)	0.1	-	-
		(Mexico)	-	0.1	-
<b>GOLD</b>	+	7440-57-5	N.E.	N.E.	N.E.
<b>ANTIMONY</b>	+	7440-36-0/231-146-5			
		(US)	0.5	0.5	-
		(EU)	0.5	-	-
		(Canada)	-	0.5	1.5
		(Singapore)	0.5	-	-
		(Mexico)	-	0.5	-
		(China)	-	0.5	-
<b>GERMANIUM</b>	+	7440-56-4	N.E.	N.E.	N.E.
<b>BISMUTH</b>	+	7440-69-9/231-177-4	N.E.	N.E.	N.E.
<b>INDIUM</b>	+	7440-74-6/231-180-0			
		(US)	0.1	0.1	-
		(EU)	-	0.1	0.3
		(Canada)	-	0.1	0.3
		(Singapore)	0.1	-	-
		(Mexico)	-	0.1	0.3
		(China)	-	0.1	0.3

<b>ROSIN</b>	4.5- 11	65997-05-9 (US)	N.E.	N.E.	N.E.
		(EU)	0.05	N.E.	0.15 (sensitiser)
<b>POLYGYCOL ETHER</b>	2.0 – 6.0	9038-95-3	N.E.	N.E.	N.E.
<b>PROPRIETARY</b>	1.0 – 2.0	-	N.E.	N.E.	N.E.

N.E. = Not established      + See alloy table

**PRODUCT CONTAINS A EU LISTED SUBSTANCES OF VERY HIGH CONCERN (SVHC) (HBCD) 0.16-0.34%**

## ALLOY TABLE

Indalloy	%TIN	%SILVER	%LEAD	%ANTIMONY	%INDIUM	%GOLD	%GERMANIUM	%BISMUTH	RoHS* Compliance
1 (50In/50Sn)	41.5-46.0	-	-	-	41.5-46.0	-	-	-	YES
1E (52In/48Sn)	39.8-44.2	-	-	-	43.2-47.8	-	-	-	YES
2 80In/15Pb/ 5Ag)	-	4.2-4.6	12.5-13.8	-	66.4-73.6	-	-	-	NO
3 (90In/10Ag)	-	8.3-9.2	-	-	74.7-82.8	-	-	-	YES
4 (100In)	-	-	-	-	83.0-92.0	-	-	-	YES
7 50In/50Pb)	-	-	41.5-46.0	-	41.5-46.0	-	-	-	NO
9 (70Sn/18Pb/ 12In)	58.1-64.4	-	14.9-16.6	-	10-11	-	-	-	NO
10 (75Pb/25In)	-	-	63.3-69.0	-	20.8-23.0	-	-	-	NO
11 (95Pb/5In)	-	-	78.9-87.4	-	4.2-4.6	-	-	-	YES
42 (46Bi/34Sn/ 20Pb)	28.2-31.3	-	16.6-18.4	-	-	-	-	38.2-42.3	NO
53 (67Bi/33In)	-	-	-	-	27.4-30.4	-	-	55.6-61.6	YES
70 (40In/40Sn/ 20Pb)	33.2-36.8	-	16.6-18.4	-	33.2-36.8	-	-	-	NO
97 (43Sn/43Pb)	36.7-39.6	-	36.7-39.6	-	-	-	-	11.6-12.9	NO

b/14Bi)									
104/Sn62 (62.5Sn/36 .1Pb/1.4A g)	51.9-57.5	1.2-1.8	29.9-33.2	-	-	-	-	-	NO
106/Sn63 (63Sn/37P b)	52.3-58.0	-	30.7-34.0	-	-	-	-	-	NO
109 (60Sn/40P b)	49.8-55.2	-	33.2-36.8	-	-	-	-	-	NO
116 (50Sn/50P b)	41.5-46.0	-	41.5-46.0	-	-	-	-	-	NO
118 (90Sn/10P b)	74.7-82.8	-	8.3-9.2	-	-	-	-	-	NO
121 (96.5Sn/3. 5Ag)	80.1-88.8	1.2-1.8	-	-	-	-	-	-	YES
122 (95Sn/5Pb )	78.9-87.4	-	4.2-4.6	-	-	-	-	-	NO
123 (97.5Sn/2. 5Ag)	80.9-89.7	2.1-2.3	-	-	-	-	-	-	YES
127 (60Pb/37S n/3Ag)	30.7-34.0	2.5-2.8	49.8-55.2	-	-	-	-	-	NO
130 (60Pb/40S n)	33.2-36.8	-	49.8-55.2	-	-	-	-	-	NO
132 (95Sn/5Ag )	78.9-87.4	4.2-4.6	-	-	-	-	-	-	YES
133 (95Sn/5Sb )	78.9-87.4	-	-	4.2-4.6	-	-	-	-	YES
141 (70Pb/30S n)	24.9-27.6	-	58.1-64.4	-	-	-	-	-	NO
143 (90Pb/10S b)	-	-	74.4-82.8	8.3-9.2	-	-	-	-	YES
145 (75Pb/25S n)	20.8-23.0	-	62.3-69.0	-	-	-	-	-	NO
149 (80Pb/20S n)	16.6-18.4	-	66.4-73.6	-	-	-	-	-	NO
150 (81Pb/19I n)	-	-	67.2-74.5	-	15.8-17.5	-	-	-	NO
151 (92.5Pb/5 Sn/2.5Ag)	4.2-4.6	2.0-2.3	76.8-85.0	-	-	-	-	-	YES

Indalloy	%TIN	%SILVER	%LEAD	%ANTIMONY	%INDIUM	%GOLD	%GERMANIUM	%BISMUTH	RoHS* Compliance
155 (90Pb/5Ag/5Sn)	4.2-4.6	4.2-4.6	74.7-82.8	-	-	-	-	-	YES
159 (90Pb/10Sn)	8.3-9.2	-	74.7-82.8	-	-	-	-	-	YES
161 (97.5Pb/2.5Ag)	-	2.1-2.3	80.9-89.7	-	-	-	-	-	YES
164 (92.5Pb/5In/2.5Ag)	-	2.1-2.3	76.8-85.1	-	4.2-4.6	-	-	-	YES
165 (97.5Pb/1.5Ag/1Sn)	0.8-0.9	1.2-1.4	80.9-89.7	-	-	-	-	-	YES
171 (95Pb/5Sn)	4.2-4.6	-	78.9-87.4	-	-	-	-	-	YES
175 (95Pb/5Ag)	-	4.2-4.6	78.9-87.4	-	-	-	-	-	YES
182 (80Au/20Sn)	16.6-18.4	-	-	-	-	66.4-73.6	-	-	YES
183 (88Au/12Ge)	-	-	-	-	-	73.0-81.0	10.0-11.0	-	YES
204 (70In/30Pb)	-	--	24.9-27.6	-	58.1-64.4	-	-	-	NO
205 (60In/40Pb)	-	-	33.2-36.8	-	49.8-55.2	-	-	-	NO
206 (60Pb/40In)	-	-	49.8-55.2	-	33.2-36.8	-	-	-	NO
209 (65Sn/25Ag/10Sb)	54.0-59.8	20.8-23.0	-	8.3-9.2	-	-	-	-	YES
227 (77.2Sn/20In/2.8Ag)	64.0-71.0	2.3-2.6	-	-	16.6-18.4	-	-	-	YES
228 (88Pb/10Sn/2Ag)	8.3-9.2	1.7-1.8	73.0-81.0	-	-	-	-	-	YES
230 (54Sn/26Pb/20In Dopant Cu)	44.8-49.7	-	21.6-23.9	-	16.6-18.4	-	-	-	NO
233 (85Pb/10Sb/5Sn)	4.2-4.6	-	70.6-78.2	8.3-9.2	-	-	-	-	YES
240 (46Sn/46Pb/8Bi)	38.2-42.3	-	38.2-42.3	-	-	-	-	6.6-7.4	NO

255 (55.5Bi/44.5Pb)	-	-	36.9-40.9	-	-	-	-	46.1-51.1	NO
281 (58Bi/42Sn)	34.9-38.6	-	-	-	-	-	-	48.1-53.4	YES
281- 338 (60Sn/40Bi)	49.8-55.2	-	-	-	-	-	-	33.2-36.8	YES
290 (97In/3Ag)	-	2.5-2.8	-	-	80.5-89.2	-	-	-	YES
NS (50Sn/47Pb/3Bi)	41.5-46.0	-	39.0-43.2	-	-	-	-	2.5-2.8	NO
NS (93.5Pb/5Sn/1.5Ag)	4.2-4.6	1.2-1.4	77.6-86.0	-	-	-	-	-	YES
NS (67Pb/33In)	-	-	55.6-61.6	-	27.4-30.4	-	-	-	NO

**NS = Non Standard Alloy**

**\*RoHS = Restriction of Hazardous Substances EU Directive 2002/95/EC (review applicable exemptions)**

#### 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, 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 of contaminated cloth rags or paper towels following all Federal, State and Local 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 (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 they're permissible exposure levels are not exceeded.

### Personal protection:

**Eyes:** Chemical safety glasses/goggles. Face shield for splash hazards.

**Respirator:** An authority 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 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.

## 9. PHYSICAL AND CHEMICAL PROPERTIES

<b>Appearance:</b>	Grey colored paste.	<b>Boiling Point:</b>	Not applicable.
<b>Odor:</b>	Mild characteristic odor.	<b>Melting Point:</b>	Not applicable
<b>Specific Gravity:</b>	Not applicable	<b>pH:</b>	Not applicable
<b>Vapor Pressure:</b>	Not applicable.	<b>Solubility in Water:</b>	Insoluble (paste)
<b>Vapor Density:</b>	(air=1) Not applicable.		

## 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.

Reviewing epidemiological studies the IARC concluded in inadequate evidence for the carcinogenicity of lead and lead compounds in humans and sufficient evidence for the carcinogenicity of inorganic lead compounds in animals. According to the IARC, the lead and lead compounds tested for carcinogenicity in animals are almost soluble salts that were selected on the basis of ease of administration. Metallic lead, lead oxide and lead tetra alkyls have not been tested adequately. The final evaluation was thus that lead and inorganic lead compounds are possibly carcinogenic to humans.

RTECS#: OF7525000 (lead) NL1050000 (indium) VM3500000 (silver) XP7320000 (tin) CC4025000 (antimony)

## 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.

## 14. TRANSPORT INFORMATION

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

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) (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.

**California PROP 65: WARNING:**

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

For Compliance with EU directive 2002/95/EC, Restriction on Hazardous Substances (RoHS) see Alloy Table.

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.

**SARA 313 Listing - 40 CFR 372.65**

Lead CAS# 7439-92-1      Silver CAS# 7440-22-4      Antimony CAS# 7440-36-0  
Polyglycol ether (1 – 4.5%)

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

All ingredients are listed on the EPA TSCA Inventory.

Some ingredients are listed on the Canadian Domestic Substance List. No more than 2.2 % by weight is listed on the Non-domestic substance list.

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

X<sub>n</sub>

**Risk Phrases:**

- R20/21/22 Harmful by inhalation, in contact with skin and if swallowed
- R36/37/38 Irritating to eyes, respiratory system and skin
- R42/43 May cause sensitization by inhalation and by skin contact
- R33 Danger of cumulative effects (lead)
- R40 Limited evidence of carcinogenic effect (lead)
- R48 Danger of serious damage to health by prolonged exposure (lead)
- R61 May cause harm to the unborn child (lead)
- R50/53 Very toxic to aquatic organisms and may cause long-term effects in the aquatic environment (lead)
- R51/53 Toxic to aquatic organisms and may cause long-term effects in the aquatic environment (antimony)

**Safety Phrases:**

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

**16. OTHER INFORMATION**

<b>HMIS Hazard Rating:</b>	<b>Health:</b>	2
	<b>Fire:</b>	1
	<b>Physical Hazard:</b>	0

**Revised Date:** 17 MAY 2012

**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.