



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

SAFETY DATA SHEET

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY/UNDERTAKING

Product Identifier: SOLAR TABBING RIBBON

MSDS Number: MSDS-4812

Revised Date: 14 JANUARY 2011

Product Use: Industrial Use (Mixture) – Metal alloy mix: Copper with other metals. Review alloy table for exact product identification. Note: this SDS covers various metal mixtures.

See alloy table for listing of products included under this SDS.

FOR CHEMICAL EMERGENCY ONLY PHONE *:

CHEMTREC 24 hrs.

USA: 1 (800) 424-9300

Outside USA: +1 (703) 527-3887

*** Used only for spill/leak/fire/exposure/accident**

ALL OTHER INQUIRIES: TOLL FREE: +1-800-448-9240 Indium Corporation

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2. HAZARDS IDENTIFICATION**PRIMARY ROUTES OF ENTRY:**

Eye Inhalation Skin Ingestion NTP IARC OSHA Not Listed

Carcinogen listed in**Classification:**

Xn Risk Phrases: R20/22, R36/37/38, R33, R40, R48, R61, R52/53

General GHS:

added for lead containing only

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 (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)
 EUH201A Warning! Contains lead (applicable only to the products listed that contain lead) Review listing.

Precautionary statement(s)

P233 Keep container tightly closed
 P261 Avoid breathing dust/fume/gas/mist/vapours/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

Label:

Specific labeling information for products. Please review information in metal alloy table for the specific product in question.

Lead – free :



Hazard statement(s)

Harmful if swallowed
Causes skin irritation

May cause respiratory irritation

Precautionary statement(s)

Keep container tightly closed

Avoid breathing dust/fume/gas/mist/vapours/spray

Do not eat, drink or smoke when using this product

Avoid release to the environment

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

Take off contaminated clothing and wash before reuse

IF ON SKIN: Wash with plenty of soap and water

IF INHALED: If breathing is difficult, remove victim to fresh air and keep at rest in a position comfortable for breathing

IF IN EYES: Rinse continuously with water for several minutes

Lead containing:

Signal Word: Danger

Hazard statement(s)

Harmful if swallowed

Causes skin irritation

May cause respiratory irritation

Harmful if inhaled

Suspected of causing cancer

May damage fertility or the unborn child

May cause damage to organs through prolonged or repeated exposure

Very toxic to aquatic life, may cause long lasting harmful effects to aquatic life

Warning! Contains lead. Review listing.

Precautionary statement(s)

Keep container tightly closed

Avoid breathing dust/fume/gas/mist/vapours/spray

Do not eat, drink or smoke when using this product

Avoid release to the environment

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

Take off contaminated clothing and wash before reuse

IF ON SKIN: Wash with plenty of soap and water

IF INHALED: If breathing is difficult, remove victim to fresh air and keep at rest in a position comfortable for breathing

IF IN EYES: Rinse continuously with water for several minutes

OTHER HAZARDS:**POTENTIAL HEALTH EFFECTS:**

Eye Contact: Fume from heated material at typical temperatures over 100°C may cause eye irritation. Hot materials may cause damage.

Ingestion: This product contains metal alloys, rosin and organic chemicals. May be harmful if swallowed. May cause burns to the digestive tract and systematic effects.

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

Skin Contact: May cause skin irritation or dermatitis. Rosin may cause skin sensitization. Hot material may cause burns to the skin.

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.

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

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. Signs and symptoms of exposure – anemia.

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.

3. COMPOSITION / INFORMATION ON INGREDIENTS

3.2 Mixture:

Components	% wt	CAS Registry #/ EINECS#
TIN	*	7440-31-5/231-141-8
SILVER	*	7440-22-4/231-131-3
LEAD	*	7439-92-1/231-100-4
COPPER	*	7440-50-8 /231-159-6
BISMUTH	*	7440-69-9/231-177-4

THIS PRODUCT DOES NOT CONTAIN ANY EU REPORTABLE SUBSTANCES OF VERY HIGH CONCERN (SVHC).

N.E. = Not established

* See Alloy Table for breakdown of percentages of alloy mixtures

<http://www.indium.com>

ALLOY TABLE

Metal mixed

INDALLOY	%LEAD Pb	%TIN Sn	%SILVER Ag	%COPPER Cu	%BISMUTH Bi	Specific Gravity	RoHS Compliance
42 (46Bi/34Sn/20Pb)	0.01	0.017	-	99.95	0.023	8.95	No
104 (Sn62/Pb36/Ag2)	0.018	0.031	0.001	-	-	8.96	No
109 (60Sn/40Pb)	0.02	0.03	-	99.95	-	8.96	No
121 (96.5Sn/3.5Ag)	-	0.048	0.0018	99.95	-	8.96	Yes
256 (96.5Sn/3Ag/0.5Cu)	-	0.048	0.0015	99.95	-	8.96	Yes
281 (58Bi/42Sn)	-	0.021	-	99.95	0.029	8.96	Yes
282 (57Bi/42Sn/1Ag)	-	0.021	0.0005	99.95	0.029	8.96	Yes

Non Standard = non - standard alloy mixture

***RoHS = Restriction on Hazardous Substances (review applicable exemptions that may apply)**

4. FIRST AID MEASURES**Description of 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.

Most important symptoms and effect, both acute and delayed:

Skin contact may cause irritation.
 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.

Indication of any immediate medical attention and special treatment needed:

No specific special treatment information is available on this mixture. Review data provided in this document to understand the hazards when working with the product. No other information is available at this time.

5. FIRE FIGHTING MEASURES

Extinguishing Media: Use extinguishers appropriate for the surrounding fire conditions. Water, CO2, foam media.

Special hazards arising from the substance or mixture:

May produce toxic fumes of carbon monoxide if burning or metal oxide fumes.

Advice for Firefighters

Firefighters must wear approved self-contained breathing apparatus and full protective clothing.

Material product is not flammable. No other information is available.

6. ACCIDENTAL RELEASE MEASURES**Personal precautions, protective equipment and emergency procedures:****For non-emergency personnel:**

Keep away from the spill. Remove sources of ignition. Keep exhaust ventilation system running. In the event of a fire evacuate area.

For emergency responders:

Wear safety glasses, gloves when cleaning up any spill. Other equipment may be necessary based on the immediate area and other chemicals unrelated to the product that may be in use. Adequate ventilation should be available. Keep unnecessary personnel away from area during clean up. Solid metal can easily be cleaned up.

Environmental Precautions: Metals not suited for release to any body of water including drains.

Methods and material for containment and cleaning up:

Spill or leak procedures: Solid metal can be picked up and placed into metal container. If hot allow to cool then place into metal container. Recycle metal.

Reference to other sections: See Section 8 for exposure levels.

7. HANDLING AND STORAGE**Precautions**

Keep containers tightly closed when not in use. Use care to avoid spills. Wear appropriate personal protective equipment when working or handling product. Always thoroughly wash your hands after handling this product. DO NOT touch or rub eyes until hands are washed. Do not eat, drink or smoke when handling this product. Utilize exhaust ventilation when heating product. Emissions may contain metal fumes.

Conditions for Safe Storage, including any incompatibilities:

Storage Precautions: Store product in tightly capped original containers in a cool, dry area. Refer to product label and product data sheet for specific storage temperature requirements. Rotate stock to ensure use before expiration date.

Specific End Use(s): Soldering applications.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Control Parameters:

			<u>TWA</u>	<u>STEL</u>
		<u>CAS#/EINECS#</u>	mg/m3	mg/m3
TIN	*	7440-31-5/231-141-8		
		(UK)	2	4
		(Belgium)	2	-
		(Germany)	2	-
		(Netherlands)	2	-
		(Spain)	2	-
SILVER	*	7440-22-4/231-131-3		
		(UK)	0.1	0.3
		(Belgium)	0.1	-
		(France)	0.1	-
		(Germany)	0.1	-
		(Netherlands)	0.1	-
	(Spain)	0.1	-	
LEAD	*	7439-92-1/231-100-4		
		(UK)	0.15	-
		(France)	0.1	-
		(Spain)	0.15	-
		(Italy)	0.15	-
		(Portugal)	0.05	-
		(Finland)	0.1	-
		(Denmark)	0.05	-
		(Austria)	0.1	0.4
		(Switzerland)	0.1	0.8
		(Poland)	0.05	-
		(Norway)	0.05	-
	(Ireland)	0.15	-	

COPPER	*	7440-50-8 /231-159-6	(UK)	-	0.2 (fume)	-
BISMUTH	*	7440-69-9/231-177-4	N.E.	N.E.	N.E.	N.E.

N.E. = Not established

Exposure Controls:

Engineering Controls: Use with proper equipment with adequate exhaust ventilation and other safety features specifically designed for use with metal workings. Control concentration of all components with established exposure limits so they are not exceeded. Use exhaust ventilation when heating product. Air emission control equipment may be necessary based on the local governmental requirements for contaminants entering the atmosphere. Emissions may contain metal fumes.

Personal protection:

Eyes: Chemical safety glasses/goggles. Face shield for molten metal.

Respiratory: An approved or EU compliant CE 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. Recommend a work glove or nitril disposable or other chemical glove. Hot gloves for handling molten metal. Use of gloves depends on the work activity.

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. 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, if applicable.

9. PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties:

Appearance:	Solid metal	Boiling Point/Range:	2593C (copper)
Odor:	None.	Melting Point/Freezing Point:	1083C (copper)
Odor Threshold:	Not established	Evaporation Rate:	Not applicable
Specific Gravity:	See alloy table	pH:	Not applicable
Vapour Pressure:	Not applicable.	Solubility in Water:	Insoluble
Vapour Density:	(air=1) Not applicable.	Partition coefficient:	Not established
Relative Density:	Not established	Flammability:	Not applicable
Flash Point:	Not applicable	Method:	Not applicable
Auto-ignition Temperature:	Not applicable	Flammable Limits:	Limits not established
UEL/LEL Limits:	Not applicable	Decomposition Temp:	Not applicable
Viscosity:	Not established	Explosive properties:	Not applicable

Oxidizing Properties: Not established

Other Information: Above data for the whole mixture.

10. STABILITY AND REACTIVITY

Reactivity: Stable.

Chemical Stability: Stable

Possibility of Hazardous Reactions: Not established

Conditions To Avoid: None known

Incompatible Materials: Avoid contact with acids, bases or oxidizing agents.

Hazardous Decomposition / Combustion: Harmful metal oxide fumes may form at elevated temperatures..

Hazardous Polymerization: Will not occur.

11. TOXICOLOGICAL INFORMATION

Information on toxicological effects:

Acute toxicity: Not established

Irritation: Not established

Corrosivity: Not applicable

Sensitization: Not available

Repeated dose toxicity: Not established

Carcinogenicity: Not established

Likely Routes of Entry: eyes (irritation) /skin (irritation) /inhalation (irritation) ingestion (may be harmful)

Interactive effects: None known

Mutagenicity: Not established

Toxicity for Reproduction: Not Established

Absence of specific data: None available (not tested)

Symptoms related to the physical, chemical and toxicological characteristics:

May cause irritation by skin and inhalation.

Delayed and immediate effects as well as chronic effects from short and long-term exposure:

Exposure to lead fume, if applicable, may cause harm by inhalation and ingestion. Chronic exposures to lead fume, if applicable, can cause potential harm to the developing fetus. Lead exposure can be toxic.

Mixture verses substance information: None known

Other Information:

Carcinogenicity: **NTP:** No (National Toxicity Program)

Listing **OSHA:** No (US Occupational Safety & Health Administration)

IARC: Yes - Lead and lead compounds are listed as possible carcinogens. (International Agency for Research on Cancer)

Copper - LD50 – intraperitoneal mouse 3.5 mg/kg.

Silver – LD50 oral – rat > 5,000 mg/kg

Lead – Suspected human reproductive toxicant. May cause damage to organs through prolonged or repeated exposure. Reproductive toxicity – rat –inhalation, oral/ effects on newborn.

12. ECOLOGICAL INFORMATION

This section is subject to future development. Product metal mixtures not tested.

Toxicity: No information available

Persistence and degradability: No information available

Bioaccumulative potential: No information available

Mobility in soil: No information available

Results of PBT and vPvB assessments: No data is available

Other adverse effects: No information is available for mixture. Avoid release to environment.

Copper – Toxicity to daphnia and other aquatic invertebrates mortality NOEC – Daphnia 0.004 mg/l – 24h.

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

13. DISPOSAL CONSIDERATION

Waste treatment method: Scrap metal alloy usually has value. Contact a commercial reclaimer for recycling. Otherwise, dispose of in accordance with environmental regulations. Containerize material and classify according to applicable regulations. No pre-treatment on site is recommended. Do not dispose of down any drain or waterway. Utilize the same personal protective equipment as the user when handling for disposal.

RoHS (Restriction of Hazardous Substances): some of the product mixtures are RoHS compliant because they are lead free. Product mixtures do not contain any PBB or PBDB brominated compounds.

RoHS – Note that some of the product mixtures do contain lead and are therefore not compliant with RoHS. Users should review their particular use for any applicable exemptions that may apply. Review alloy table for products.

14. TRANSPORT INFORMATION

Transport in accordance with applicable regulations and requirements.

Not regulated/non - hazardous under US DOT (United States Department of Transportation).

Not regulated/non - hazardous under international shipping requirements.

UN proper shipping name: None

Transport hazard class(s): None

Packing group: None

Environmental hazards: None

Special precautions for user: None

Transport in bulk: Not applicable

15. REGULATORY INFORMATION

Safety, health and environmental regulations/legislation specific for the substance or mixture:

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.).

All ingredients are listed on the USEPA TSCA Inventory.

All ingredients are listed on EINECS. Note Rosin was recently listed under the No Longer Polymer List, Notification of New Chemical Substances in Accordance with Directive 67/548/EEC.

Safety data sheet was developed using EC 1907/2006 amended as of 20 May 2010 EU No 453/2010 and information as stated under regulation EC No 1272/2008 CLP Regulation.

GHS = Global Harmonized System

CLP= Classification, labeling and packaging

Product does not contain any substances ozone depleting substances and therefore not subject to EC 2037/2000.

Chemical safety assessment: None performed for mixture.

16. OTHER INFORMATION

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

Risk Phrases:

- R36/37/38 Irritating to eyes, respiratory system and skin
- R20/21/22 Harmful by inhalation and if swallowed
- 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)
- R52/53 Harmful to aquatic organisms and may cause long-term effects in the aquatic environment (lead)

Safety Phrases:

- S20/21 When using do not eat, drink or smoke
- 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
- S7 Keep container tightly closed

Revised Date: 14 JANUARY 2011

Prepared by: Nancy Swarts, The Indium Corporation of America, nswarts@indium.com

Approved by: Nancy Swarts, The Indium Corporation of America

Changes provided on this SDS were based on the requirements of EU No. 453/2010 of May 20, 2010 regarding amendments to EC No. 1907/2006 of the European Parliament and of the Council on the Registration, Evaluation, Authorization and Restriction of Chemicals (REACH).

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.