



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

MATERIAL SAFETY DATA SHEET

1. PRODUCT AND COMPANY IDENTIFICATION

Product Identifier: TIN BASED ALLOYS (NO LEAD)

MSDS Number: MSDS-972

Revised Date: 21 DECEMBER 2004

Product Use: Alloy Metal Mix

MANUFACTURER:

In America:

The Indium Corporation of America
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Information: (315) 853-4900

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CHEMTREC 24 hrs.
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In Asia:

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Singapore 628908
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2. COMPOSITION / INFORMATION ON INGREDIENTS

Components	% wt	CAS Registry #	PEL mg/m ³	TLV-TWA mg/m ³	TLV-STEL mg/m ³
Tin	*	7440-31-5	2	2	-
		(EU)	-	2	4
		(Canada)	-	2	4
		(Singapore)	2	-	-
Silver	*	7440-22-4	0.01	0.1	-
		(EU)	-	0.1	-
		(Canada)	-	0.1	0.3
		(Mexico)	-	0.1	-
		(Singapore)	0.1	-	-
Indium	*	7440-74-6	0.1	0.1	-

		(EU)	-	0.1	0.3
		(Canada)	-	0.1	0.3
		(Mexico)	-	0.1	0.3
		(Singapore)	0.1	-	-
		(China)	-	0.1	0.3
Copper	*	7440-50-8	0.1	0.2	-
		(EU)	-	0.2(fume)	2(dust)
		(Canada)	-	0.2	0.6
		(Mexico)	-	0.2	2
		(Singapore)	0.2 (fume)	1 (dust)	-
		(China)	-	1(dust)	2.5(dust)
			-	0.2(fume)	0.6(fume)
Antimony	*	7440-36-0	0.5	0.5	-
		(EU)	0.5	-	-
		(Canada)	-	0.5	1.5
		(Mexico)	-	0.5	-
		(Singapore)	0.5	-	-
		(China)	-	0.5	-
Zinc	*	7440-66-6	N.E.	N.E.	N.E.
Nickel	*	7440-02-0	1	1.5	-
		(Canada)	-	1	2
		(Mexico)	-	1	-
		(Singapore)	1	-	-
		(China)	-	1	2.5
Aluminum	*	7429-90-5	10	10	-
		(EU)	-	10	-
		(Canada)	-	10	20
		(Mexico)	5	-	-
		(Singapore)	10	-	-
		(China)	-	3	-

Symbol: X_n

Risk Phrases: R20/21/22 R36/37/38

* See alloy table

N.E. = Not Established

Alloy Table

%

Indalloy	Tin	Indium	Aluminum	Silver	Antimony	Nickel	Zinc	Copper	RoHS* Compliance	Liquidus C/F ⁰	Mass Density
121	96.5	-	-	3.5	-	-	-	-	YES	221/430	7.36
123	97.5	-	-	2.5	-	-	-	-	YES	226/439	7.34
132	95	-	-	5	-	-	-	-	YES	240/464	7.39
156	90	-	-	10	-	-	--	-	YES	295/563	7.51
160	97	-	-	--	-	-	-	3	YES	300/572	7.32
201	91	-	-	-	-	-	9	-	YES	199/390	7.27
208	8	-	-	7	-	-	-	85	YES	985/1805	8.87
209	65	-	-	25	-	-	-	10	YES	233/451	7.80
214	10	-	-	60	-	-	-	30	YES	720/1328	9.58
217	5	-	-	56	-	-	17	22	YES	650/1202	9.21
221	6	-	-	63	-	2.5	-	28.5	YES	800/1472	9.71
226	83.6	8.8	-	-	-	-	7.6	-	YES	187/369	7.27
224	46	52.2	-	-	--	-	1.8	-	YES	108/226	7.27
232	93.6	-	-	4.7	-	-	-	1.7	YES	217/423	7.40
241	95.5	-	-	3.8	-	-	-	0.7	YES	217/423	7.40
243	99	---	-	-	-	-	-	1	YES	227/441	7.31
244	99.3	-	-	--	-	-	-	0.7	YES	227/441	7.31
246	95.5	-	-	4	-	-	-	0.5	YES	217/423	7.40
251	96.2	--	-	2.5	0.5	--	-	0.8	YES	217/423	7.37
252	95.5	-	-	3.9	-	-	-	0.6	YES	217/423	7.40
256	96.5	-	-	3	-	-	-	0.5	YES	218/424	7.40
Non Standard	91.25	-	-	-	-	-	8.75	-	YES	199/390	7.27
Non Standard	91	-	0.06	-	-	-	8.94	-	YES	-	7.26
Non Standard	93	-	-	-	-	-	--	7	YES	-	7.32
Non Standard	96.3	-	-	3	-	-	-	0.7	YES	218/424	7.40
Non Standard	95.7	-	-	3.4	-	-	-	0.9	YES	218/424	7.36
Non Standard	9605	-	-	3	-	-	-	0.5	YES	218/424	7.40
Non Standard	92.5	-	-	3.5	-	-	-	4	YES	-	7.41
Non Standard	85	-	-	-	15	-	-	-	YES	300/572	7.31
Non Standard	88	-	-	-	-	-	-	12	YES	-	7.45
Non Standard	82	-	-	18	-	-	-	-	YES	295/563	7.71
Non Standard	90	-	-	-	10	-	-	-	YES	248/478	7.25
Non Standard	95	-	-	3.8	-	-	0.5	0.7	YES	-	7.37
Non Standard	94.8	-	-	3.8	-	-	0.7	0.7	YES	-	7.37
Non Standard	95.4	-	-	3.8	-	-	0.1	0.7	YES	-	7.37
Non Standard	96	-	-	4	-	-	-	-	YES	240/465	7.40
Non Standard	82	-	-	18	-	-	-	-	YES	295/563	7.71
Non Standard	88	-	-	12	-	-	-	-	YES	-	7.56
Non Standard	96.3	-	-	3.7	-	-	-	-	YES	221/430	7.42
Non Standard	85.9	10	-	3.1	-	-	-	1	YES	200/393	7.37
Non Standard	95.5	-	-	3.5	-	-	-	1	YES	218/424	7.40
Non Standard	95.9	-	-	3.4	-	-	-	0.7	YES	218/424	7.40
Non Standard	96.3	-	-	3.2	-	-	-	0.5	YES	218/424	7.38

Standard											
Non Standard	30	65	-	4.5	-	-	-	0.5	YES	-	7.41
Non Standard	94	3		2.5	-	-	-	0.5	YES	-	7.34

*RoHS = Restriction on Hazardous Substances

- http://europa.eu.int/comm/environment/waste/weee_index.tm
- <http://www.pbfree.com>

3. HAZARDS IDENTIFICATION

PRIMARY ROUTES OF ENTRY:

Eye
 Inhalation
 Skin
 Ingestion
NTP
IARC
OSHA
 *Not Listed

Carcinogen listed in

*See Section 11

POTENTIAL HEALTH EFFECTS:

Eye Contact: Mechanical irritant. Contact with powdered metal alloy or fume from molten metal may cause irritation. Severe eye damage may result from hot molten metal being splashed into the eyes.

Ingestion: Not generally considered toxic, but large amounts may cause gastrointestinal disturbances due to local irritation.

Inhalation: Dust may cause irritation to the respiratory tract. Inhalation of zinc dust may cause a sweet taste, throat dryness, cough nausea and fever.

Skin Contact: Mechanical irritant on contact, cannot be absorbed through skin. Hot molten metal may cause burns to the skin. **Antimony, Zinc and Nickel** – have been known to cause dermatitis.

Chronic: Prolonged inhalation may cause pneumoconiosis, producing distinctive changes in the lungs with no apparent disability or complications.

Silver – chronic skin contact or ingestion of silver dusts, salts or fume can result in a condition known as Argyria, a condition with bluish pigmentation of the skin and eyes.

Indium – may cause damage to respiratory system if inhaled over long periods of exposure.

Copper – over exposure to fumes may cause metal fume fever (chills, muscle aches, fever, dry throat, cough, weakness, lassitude), metallic or sweet taste, discoloration of skin and hair.

Nickel – poison by ingestion. Can cause pulmonary asthma, and hypersensitivity.

Tin – prolonged inhalation of dust or fume may result in irritation of the lungs.

Aluminum – inhalation of finely divided powder has been reported to cause pulmonary fibrosis.

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

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

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 applicable		
Flammable Limits:	Fine dusts and powders could be a potential explosion hazard.		
Extinguishing Media:	Use extinguishers appropriate for the surrounding fire conditions. Use dry sand, sodium chloride, or dolomite. Water, A/B/C extinguishers and halogenated agents are not recommended.		
Special Fire Fighting Procedures:	Firefighters wear an approved self-contained breathing apparatus and full protective clothing.		

6. ACCIDENTAL RELEASE MEASURES

Spill or Leak Procedures:	Wear respirator and other personal protective clothing. (See Exposure Controls/Personal Protection Section). Extinguish or remove all sources of ignition. Ventilate area. Clean up spill without generating or dispersing dust into the air. Vacuum solids instead of sweeping using a grounded unit. Reduce airborne dust and prevent scattering by moistening with water. Place spilt material in a container and dispose of in accordance with applicable regulations.
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7. HANDLING AND STORAGE

Handling Precautions:	Avoid breathing vapors from heated material and dusts from cutting or grinding. Avoid contact with eyes, skin and clothing. Follow routine safe handling procedures. Use with adequate ventilation.
Storage Precautions:	Keep away from heat and flame. Store in suitable, tightly capped, and labeled containers in cool dry, well-ventilated area. Empty containers may be hazardous as they contain product residue.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering Controls:	Local exhaust ventilation or point source ventilation is recommended to control any air contaminants or potential exposure. Keep exposures below regulatory limits.
Personal protection:	
Eyes:	Chemical safety glasses/goggles. Face shield recommended when handling molten metal.
Respirator:	A NIOSH approved or EU compliant CE marked air-purifying respirator with a fume/dust chemical cartridge is recommended under certain circumstances where airborne concentrations are expected to be elevated. Warning: Air purifying respirators do not protect the worker in oxygen-deficient

atmospheres.

- Skin:** Wear protective gloves. Hot gloves for handling molten metal.
- Other:** Eye-wash fountain/shower in work area. Avoid the use of contact lenses in high fume and dust 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.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance:	Solid	Boiling Point:	Not available
Odor:	Odorless	Melting Point:	See Table
Specific Gravity:	See Table	pH:	Not applicable
Vapor Pressure:	Not available	Solubility in Water:	Insoluble
Vapor Density:	(air=1) Not applicable.		

10. STABILITY AND REACTIVITY

General:	Stable.
Conditions to Avoid:	Heat, flame, ignition sources
Incompatible Materials:	Halogens, sulfur and some acids
Hazardous Decomposition / Combustion:	None
Hazardous Polymerization:	Will not occur.

11. TOXICOLOGICAL INFORMATION

Carcinogenicity:	NTP (National Toxicity Program):	Yes - Nickel	
	OSHA (Occupational Safety & Health Administration):	No	
	IARC (International Agency for Research on Cancer):	Yes - Nickel	
LD50:	Not established.	LC50:	Not established.
Other:	Nickel RTECS# QR5950000		

12. ECOLOGICAL INFORMATION

This section is subject to future development.

Biodegradability: Data not established.

Aquatic Toxicity: Data not established.

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 regulations and requirements. Not regulated under US DOT (United States Department of Transportation).

North American Emergency Guide Book – Not applicable

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.).

The information in this Material Safety Data Sheet meets the requirements of the EU under Chemicals (Hazard Information and Packaging for Supply) Regulations 1994 (CHIP 2) Regulation 6.

This product has been classified in accordance with the hazard criteria of the Commission Directive 91/155/EEC and EH40.

This product has been classified in accordance with the requirements of the Mexican regulations: NOM-018-STPS-2000 and NOM-010-STPS-1999.

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

WHMIS: Not classified.

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

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

SARA 313 Listing - 40 CFR 372.65 – Silver, Antimony, Nickel, Copper, Zinc, Aluminum
Ingredient is listed on the EPA TSCA Inventory.

California Prop 65: Warning: This product contains a chemical known to the State of California to cause cancer and birth defects (or other reproductive harm). (Nickel, contains trace amounts of lead and trace levels of other listed metals)

Ingredient is listed on the Canadian Domestic Substance List.

EC Classification, Packaging and Labeling Requirements:

Symbol and Hazard Classification of Product

X_n

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

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

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

16. OTHER INFORMATION

HMIS Hazard Rating:	Health:	1
	Fire:	1
	Reactivity:	0

Revised Date: 21 DECEMBER 2004

Prepared by: Nancy Swarts, Indium Corporation of America

Approved by: Nancy Swarts, Indium Corporation of America

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