



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

This safety data sheet represents a family grouping of all metal mixes that are blended with the same flux coating known as NC-9. A table is provided that lists all metal groupings. To better serve all of our customers Indium Corporation has generated one MSDS, for this 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. Unless otherwise stated the health and safety information provided within is applicable to all products.

SAFETY DATA SHEET

1. PRODUCT AND COMPANY IDENTIFICATION

Product Identifier: INDALLOY WITH NC-9 FLUX COATING

SDS Number: SDS- CP4105

Revised Date: 21 FEBRUARY 2017

Product Use: Industrial Use (mixture) - Flux Coated Metal Preform for soldering applications. Flux coatings vary. See alloy table for alloy mixture listing.

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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

General GHS Information



(lead, cadmium containing)

Signal Word: Warning

Hazard statement(s)

- H303 May be harmful if swallowed (lead,cadmium)
- H317 May cause an allergic skin reaction
- H320 Causes eye irritation
- H334 May cause allergy or asthma symptoms or breathing difficulties if inhaled
- H332 Harmful if inhaled (cadmium)
- H351 Suspected of causing cancer (lead) (cadmium)
- H361 Suspected of damaging fertility or the unborn child (lead)
- H372 Causes damage to organs through prolonged or repeated exposure (cadmium)
- H373 May cause damage to organs through prolonged or repeated exposure (lead)
- H410 Very toxic to aquatic life with long lasting effects (lead) (cadmium)
- EUH201A Warning! Contains lead (applicable only to the products listed that contain lead) Review listing.
- EUH207: Warning! Contains cadmium. Dangerous fumes are formed during use. Comply with the safety instructions. (cadmium) 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
- P301 + P314 IF SWALLOWED: Get Medical advice/attention 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 in accordance with applicable local/state and federal regulations. Consider recycling metal.

Review alloy table for product used. Review applicable health, safety and environmental information.

POTENTIAL HEALTH EFFECTS:

- Eye Contact:** Contact with powdered metal or fume from molten metal may cause irritation.
- Ingestion:** May be harmful if swallowed.
- Inhalation:** Inhalation of fume or dust may cause local irritation to the respiratory system. Rosin may cause occupational asthma. Product may contain lead or cadmium which may cause harm if inhaled.

Skin Contact: Normal handling should not cause any adverse health effects. May cause skin irritation. Hot molten metal may cause burns to the skin. Wear protective equipment when handling molten metal. Rosin and Antimony may cause irritation or dermatitis.

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

BISMUTH: May cause kidney damage

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.

CADMIUM: Overexposure can cause damage to the lungs and kidneys. Cadmium is a toxic metal and ingestion or inhalation of fumes and dust can be harmful. Included effects may be obstructive lung disease such as emphysema, bone demineralization, micro-fractures and osteomalacia, gastrointestinal symptoms, rhinitis and discoloration of the teeth.

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.

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. Tissue damage of mucous membranes may follow chronic dust exposure

INDIUM: May cause damage to respiratory system if inhaled over long periods of time.

ZINC: Prolonged exposure to high concentrations of zinc fumes may cause “zinc shakes” an involuntary twitching of the muscles. Repeated inhalation may cause chronic bronchitis.

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

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. 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	TLV-TWA	TLV-STEL
			mg/m ³	mg/m ³	mg/m ³
BISMUTH	*	7440-69-9	N.E.	N.E.	N.E.
TIN	*	7440-31-5 (US)	2	2	-
		(EU)	-	2	4
		(Singapore)	2	-	-
		(Canada)	-	2	4

LEAD	*	7439-92-1 (US)	0.05	0.05	-
		(EU)	-	0.15	-
		(Canada)	-	0.05	-
		(Singapore)	0.15	-	-
		(Mexico)	-	0.15	-
		(China)	-	0.05(dust) 0.03(fume)	-
CADMIUM	*	7440-43-9 (US)	0.005	0.01	-
		(EU)	0.025	-	-
		(Singapore)	0.05	-	-
		(China)	-	0.01	0.02
		(Canada)	-	0.05	0.2
SILVER	*	7440-22-4 (US)	0.01	0.1	-
		(EU)	-	0.1	-
		(Canada)	-	0.1	0.3
		(Mexico)	-	0.1	-
		(Singapore)	0.1	-	-
COPPER	*	7440-50-8/231-159-6			
		(US)	0.1 (fume) 1(dust)	0.2 (fume)	-
		(EU)	-	0.2 (fume)	-
		(Singapore)	0.2(fume)	1(dust)	-
		(Mexico)	-	0.2	2
		(Canada)	N.E.	0.2 (fume)	0.6 (fume)
INDIUM	*	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		
GOLD	*	7440-57-5/231-165-9	N.E.	N.E.	N.E.
ZINC	*	7440-66-6	N.E.	N.E.	N.E.

ANTIMONY	*	7440-36-0/231-146-5			
		(US)	0.5	0.5	-
		(EU)	0.5	-	-
		(Canada)	-	0.5	1.5
		(Mexico)	N.E.	0.5	-
		(Singapore)	0.5	-	-
		(China)	-	0.5	-
GERMANIUM	*	7440-56-4	N.E.	N.E.	N.E.
SILICON	*	7440-21-3	15(total) 5 (resp)	10 (total) 5 (resp)	-
ROSIN	0.4 - 5	65997-05-9	N.E.	N.E.	N.E.
		(EU)	0.05	-	0.15
PROPRIETARY	0.1 - 2		N.E.	N.E.	N.E.

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:** Not applicable
- Flammable Limits:** Flammable in the form of dust when exposed to heat or flame.
- Extinguishing Media:** Use extinguishers appropriate for the surrounding fire conditions. Use water spray, carbon dioxide, or foam. Do not allow water run-off to enter sewers or waterways.
- 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 HEPA (high efficiency particulate filter) filter respirator and other personal

protective clothing. (See Exposure Controls/Personal Protection Section).
 Clean up spill without generating or dispersing dust into the air. Vacuum solids instead of sweeping. Reduce airborne dust and prevent scattering by moistening with water. Place spilt material in a container and dispose of in accordance with applicable regulations.

7. HANDLING AND STORAGE

Handling Precautions: Avoid breathing vapors from heated material and dusts from powder form. 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 is recommended to control any fume or dust air contaminants. Keep exposures as low as possible. Avoid exposure to dust and fume containing lead and/or cadmium.

Personal protection:

Eyes: Chemical safety glasses/goggles and face shield with molten metal. Safety glasses should be worn at all times.

Respirator: An approved or compliant marked air-purifying respirator with a fume/dust HEPA type 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, clothing such as lab coat, coveralls, apron and boots.

Other: Eye-wash fountain/shower in work area. Avoid the use of contact lenses in high fume and dust areas. Regular shower facilities and industry laundry service may be required. Review regulations regarding lead and cadmium proper work practices, if applicable.

Work/Hygienic Maintain good housekeeping. Clean up spills immediately. Good personal hygiene is essential especially when working with lead and cadmium products.
 Avoid eating, smoking or drinking in the lead/cadmium work areas. Wash hands and face thoroughly with soap and water immediately upon leaving the work area and before eating.

9. PHYSICAL AND CHEMICAL PROPERTIES

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

10. STABILITY AND REACTIVITY

General: Stable.
Conditions to Avoid: Not established
Incompatible Materials: Not established
Hazardous Decomposition / Combustion: Toxic fumes are emitted at elevated temperatures.
Hazardous Polymerization: Will not occur.

11. TOXICOLOGICAL INFORMATION

Carcinogenicity: **NTP(National Toxicity Program):** No
OSHA (Occupational Safety & Health Administration): Yes, Cadmium is listed as a possible carcinogen.
IARC (International Agency for Research on Cancer): Yes – lead and lead compounds and cadmium and cadmium compounds are listed as possible carcinogens.
LD50: Not established. **LC50:** Not established.

Other: Prolonged or repeated exposure to rosin flux fume may cause workers to develop occupational asthma. Lead and cadmium can cause potential harm to the developing fetus.
 Cadmium: Suspected human reproductive toxicant. Causes damage to organs through prolonged or repeated exposure.

NIOSH RTECS# EU9800000 Cadmium	NIOSH RTECS# NL105000 Indium
NIOSH RTECS# OF7525000 Lead	NIOSH RTECS# VM3500000 Silver
NIOSH RTECS# XP7320000 Tin	NIOSH RTECS# GL5325000 (dust) Copper
	#GL7900000 (fume) Copper
NIOSH RTECS# VW0400000 Silicon	

Product mixtures not tested.

12. ECOLOGICAL INFORMATION

Product mixtures 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

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

Antimony –. Toxicity to fish – mortality NOEC (sheepshead minnow) 6.2 mg/l – 96h. Toxic to aquatic organisms, may cause long term adverse effects in the aquatic environment.

Cadmium – mortality LOEC-rainbow trout-0.0015 mg/l-96h
 Mortality NOEC -Daphnia 0.019 mg/l- 24h
 Mortality LOEC-Daphnia 0.039 mg/l – 24h
 Biconcentration factor (BCF) - 55

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. Do not dispose of down any drain or waterway.

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 modes (ground/IATA/Ocean). Not regulated under US DOT/IATA/IMDG.

North American Emergency Guide Book – Not applicable

UN – none

Marine Pollutant: No

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.).

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

SARA 313 Listing - 40 CFR 372.65 – Lead, Silver, Cadmium, Antimony

EPA Genetic Toxicology Program – Lead CAS# 7439-92-1, Cadmium CAS# 7440-43-9

Ingredient is listed on the USEPA TSCA Inventory.

New Jersey Right To Know – Tin #1858, Silver #1669, Lead #1096, Copper #0528, Cadmium #0305 and Indium #1025

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).
D1A – Materials causing immediate and serious toxic effects –Very Toxic Material (cadmium)
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 the Mexican regulations: NOM-018-STPS-2015 and NOM-010-STPS-2014.

In China:

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 using the Chinese Occupational Exposure Limit for Hazardous Agents in the Workplace, GBZ2-2007.

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).

Ingredients are listed on the Canadian Domestic Substance List.

Ingredients are listed on the Philippines Inventory of Chemicals

Ingredients are listed on the Korean Existing Inventory of Chemicals.

Ingredients are listed on the China Inventory of Chemicals.

16. OTHER INFORMATION

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

Revised Date: 21 FEBRUARY 2017

Prepared by: Nancy Swarts, Indium Corporation of America

Approved by: Nancy Swarts, Indium Corporation of America

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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.

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ALLOY TABLE

% Metal Alloy Content Only

INDALLOY	RoHS 2** Compliance	%TIN Sn	%ANTIMONY Sb	%INDIUM In	%SILVER Ag	%COPPER Cu	%LEAD Pb	%CADMIUM Cd	GERMANIUM Ge	%BISMUTH Bi	%ZINC Zn	%GOLD Au	%SILICON Si
1E (In52/Sn48)	Yes	48	-	52	-	-	-	-	-	-	-	-	-
3 90In/10Ag	Yes	-	-	90	10	-	-	-	-	-	-	-	-
4 (100 In)	Yes	-	-	99.99	-	-	-	-	-	-	-	-	-
7 (50In/50Pb)	No	-	-	50	-	-	50	-	-	-	-	-	-
104 Sn62/Pb36/ Ag2)	No	62	-	-	2	-	36	-	-	-	-	-	-
106 (Sn63/Pb37)	No	63	-	-	-	-	37	-	-	-	-	-	-
109 (Sn60/Pb40)	No	60	-	-	-	-	40	-	-	-	-	-	-
121 (Sn96.5/ Ag3.5)	Yes	96.5	-	-	3.5	-	-	-	-	-	-	-	-
133 (92Sn/5Sb)	Yes	95	5	-	-	-	-	-	-	-	-	-	-
145 (Pb75/Sn25)	No	25	-	-	-	-	75	-	-	-	-	-	-
151 Pb 92.5/5Sn/ 2.5Ag)	Yes**	5	-	-	2.5	-	92.5	-	-	-	-	-	-
164 (Pb92.5/5In/ Ag2.5)	Yes**	-	-	5	2.5	-	92.5	-	-	-	-	-	-
165 (Pb97.5/Sn1 /Ag1.5)	Yes**	1	-	-	1.5	-	97.5	-	-	-	-	-	-
171	Yes**	5	-	-	-	-	95	-	-	-	-	-	-

(Pb95/5Sn)													
181 (Sn51.2/30.6Pb /18.2Cd)	No	51.2	-	-	-	-	30.6	18.2	-	-	-	-	-
INDALLOY	RoHS 2** Compliance	%TIN Sn	%ANTIMONY Sb	%INDIUM In	%SILVER Ag	%COPPER Cu	%LEAD Pb	%CADMIUM Cd	GERMANIUM Ge	%BISMUTH Bi	%ZINC Zn	%GOLD Au	%SILICON Si
182 (80Au/20Sn)	Yes	20	-	-	-	-	-	-	-	-	-	80	-
201 (Sn91/9Zn)	Yes	91	-	-	-	-	-	-	-	-	9	-	-
206 (Pb60/In40)	No	-	-	40	-	-	60	-	-	-	-	-	-
227 (77.2Sn/20In/ Ag2.8)	Yes	77.2	-	20	2.8	-	-	-	-	-	-	-	-
238 (Sn90/10Au)	Yes	90	-	-	-	-	-	-	-	-	-	10	-
241 (95.5Sn/3.8Ag/ 0.7Cu)	Yes	95.5	-	-	3.8	0.7	-	-	-	-	-	-	-
243 (99Sn/1Cu)	Yes	99	-	-	-	1	-	-	-	-	-	-	-
246 (95.5Sn/4Ag /0.5Cu)	Yes	95.5	-	-	4	0.5	-	-	-	-	-	-	-
249 (91.8Sn/4.8Bi/ 3.4Ag)	Yes	91.8	-	-	3.4	-	-	-	-	4.8	-	-	-
256 (96.5Sn/3Ag/ 0.5Cu)	Yes	96.5	-	-	3	0.5	-	-	-	-	-	-	-
281 (Bi58/Sn42)	Yes	42	-	-	-	-	-	-	-	58	-	-	-
282 (Bi57/Sn42/ 1Ag)	Yes	42	-	-	1	-	-	-	-	57	-	-	-
290 (In97/Ag3)	Yes	-	-	97	3	-	-	-	-	-	-	-	-
NS (Bi48/Sn20/ 19Pb/13Cd)	No	18.6-19.8	-	-	-	-	17.7-18.8	12.1-12.9	-	44.6-47.5	-	-	-
NS (93Pb/5Sn /1.5Ag)	Yes**	4.7-4.9	-	-	1.40-1.48	-	87-92.5	-	-	-	-	-	-

NS (Sn91.98/Sb8 /0.02Ge)	Yes	91.98	8	-	-	-	-	-	0.02	-	-	-	-
NS (96.8Au/3.2Si)	Yes	-	-	-	-	-	-	-	-	-	-	96.8	3.2

NS= NON STANDARD ALLOY MIXTURE

** See RoHS 2 statement (2011/65/EU)

RoHS Statement

RoHS 2 = Restriction of Hazardous Substances EU Directive 2011/65/EU. Please review. MSDS represents a solder related product, which is not specifically defined by RoHS. It is the customer's responsibility to determine the compliance of the product. A certificate of analysis (C of A) is available for each product. Lots of materials may vary and account for the variations in trace contaminants. Trace elements generally are compliant with RoHS established levels for cadmium and lead. Chromium and mercury are not expected to be above 10 ppm, however a copy of the C of A should be obtained to confirm. Hexavalent chromium is not contained in any of the products.

Review any applicable exemptions that may apply.

** Review high melting lead exemptions. If not taking the exemptions then the product does not meet RoHS.

<http://www.indium.com>

INDALLOY	SPECIFIC GRAVITY
1E	7.30
3	7.54
4	7.31
7	8.85
104	8.41
106	8.40
109	8.50
121	7.36
133	7.25
145	9.96
151	11.02
164	11.02

SDS – CP4105

INDALLOY WITH NC-9

165	11.28
171	11.06
181	8.45
182	14.51
201	7.27
206	9.30
227	7.25
238	7.78
241	7.40
243	7.31
246	7.40
249	7.44
256	7.40
281	8.56
282	8.57
290	7.38
NS	9.24
NS	11.03
NS	7.22