



SAFETY DATA SHEET

To better serve all of our customers Indium Corporation has generated one SDS 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.

SECTION 1. IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

1.1 Product Identifier: INDIUM MIXED WITH VARIOUS METAL ALLOYS (lead free)

SDS Number: SDS-4375A

Revised Date: 13 MARCH 2018

1.2 Relevant Identified uses of the substance or mixture and uses advised against

Product : INDUSTRIAL USE - INDIUM METAL MIXED WITH OTHER ALLOYS. SEE ALLOY TABLE.

1.3 Details of the supplier of the safety data sheet

MANUFACTURER/SUPPLIER/IMPORTER:

In America:

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1.4 Emergency telephone number**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****SECTION 2. HAZARDS IDENTIFICATION****PRIMARY ROUTES OF ENTRY:**

√Eye √Inhalation √Skin √Ingestion

CARCINOGEN LISTED IN:

NTP IARC OSHA √Not Listed

2.1 Classification:

Mixture

2.2 Label Elements

General GHS:



Signal Word: Warning

Hazard statement(s)

H335 May cause respiratory irritation

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 +P364 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 (15 mins)

Classification:

Specific target organ toxicity-single exposure (Category 3)-respiratory system

2.3 OTHER HAZARDS:**POTENTIAL HEALTH EFFECTS:**

Eye Contact: 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. Wear safety glasses and face shield when working with molten metal. Dusts are irritating to eyes.

Ingestion: May cause irritation. 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.

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. Nickel may cause skin sensitivity or dermatitis. Antimony may cause dermatitis

Chronic:

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.

ZINC: Prolonged exposure to high concentrations of zinc fumes may cause “zinc shakes” an involuntary twitching of the muscles. Otherwise, zinc is non-toxic.

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. Chronic exposure to tin dusts and fume may result in “stannosis” a mild form of pneumoconiosis.

NICKEL: May cause a form of dermatitis known as nickel itch. Intestinal irritation, which may cause disorders, convulsions and asphyxia.

ALUMINUM: inhalation of finely divided aluminum powder may cause pulmonary fibrosis.

Target organ: indium- teeth/gums

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

SECTION 3. COMPOSITION / INFORMATION ON INGREDIENTS

3.2 Mixture:

Components	% wt	CAS Registry/ #EINECS#
INDIUM	50 - 99	7440-74-6/231-180-0
NICKEL	(trace levels of nickel mesh)	7440-02-0/231-111-4
ZINC	1-15	7440-66-6/231-175-3
COPPER	1-10	7440-50-8/231-159-6
SILVER	1 -10	7440-22-4/231-131-3
TIN	1 - 50	7440-31-5/231-141-8
ANTIMONY	1-10	7440-36-0 /231-146-5
GERMANIUM	1	7440-56-4/231-164-3

GOLD	1	7440-57-5/231-180-0
PALLADIUM	1	7440-05-3/231-115-6
ALUMINUM	1	7429-90-5/231-072-3

N.E. = Not established EU = European Union Occupational Exposure Limits
<http://www.indium.com>

SECTION 4. FIRST AID MEASURES

4.1 Description of 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: Do not induce vomiting. 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.

4.2 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. When applicable, exposure to lead fume may cause harm. Sign of overexposure is anemia.

4.3 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.

SECTION 5. FIRE FIGHTING MEASURES

5.1 Extinguishing Media:

Use extinguishers appropriate for the surrounding fire conditions. Water, CO2 or foam media.

5.2 Special hazards arising from the substance or mixture:

May produce toxic fumes of carbon monoxide if burning or metal oxide fumes. Massive metal is not flammable; however dust or powder may be flammable.

5.3 Advice for Firefighters

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

Material product is not flammable. Dusts may form combustible material.

SECTION 6. ACCIDENTAL RELEASE MEASURES

6.1 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.

6.2 Environmental Precautions: Material has reclaim value. Material is non-hazardous. It however does contain metals and organic chemicals which may not be suited for release to any body of water including drains.

6.3 Methods and material for containment and cleaning up:

Spill or leak procedures: If molten allow to cool then place into metals reclaim container. If solid wire pieces pick up and place into container for reclaim or reuse. DO NOT SWEEP. Use a vacuum, place in barrels and return to process if applicable.

6.4 Reference to other sections: See Section 8 for exposure levels. Section 13 for disposal.

SECTION 7. HANDLING AND STORAGE

7.1 Precautions For Safe Handling:

Keep containers tightly closed when not in use. Use care to avoid spills. Use only with production equipment specifically designed for the task. 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. Do not eat, drink or smoke when handling this product. Utilize exhaust ventilation when heating product. Emissions contain metal.

7.2 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.

7.3 Specific End Use(s): Soldering applications

SECTION 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

8.1 Control Parameters:

Components	% wt	CAS Registry/ #EINECS#	TLV-TWA mg/m ³	TLV-STEL mg/m ³
INDIUM	50-99	7440-74-6/231-180-0		
		(UK)	0.1	0.3
		(Belgium)	0.1	-

		(Spain)	0.1	-
		(Portugal)	0.1	-
		(Finland)	0.1	-
		(Denmark)	0.1	-
		(Austria)	0.1	0.2
		(Switzerland)	0.1	-
		(Norway)	0.1	-
		(Ireland)	0.1	0.3
NICKEL	(trace levels of nickel mesh)	7440-02-0/231-111-4		
		(EU)	0.5	1.5
		(France)	1	-
		(Belgium)	1	-
		(Spain)	1	-
		(Portugal)	1.5	-
		(Finland)	1	-
		(Austria)	-	2
		(Poland)	0.25	-
		(Norway)	0.05	0.15
		(Bulgaria)	0.05	-
		(Croatia)	0.5	-
		(Ireland)	0.5	-
		(Estonia)	0.5	-
		(Greece)	1	-
		(Hungary)	0.1	0.1
		(Romania)	0.1	0.5
		(Lithuania)	0.5	-
		(Slovenia)	-	2
		(Russia)	0.05	-
		(Czech Republic)	0.5	1
ZINC	1-15	7440-66-6/231-175-3	NE	NE

COPPER	1-10	7440-50-8 /231-159-6	(UK)	0.2 (fume)	0.6(fume)
			(France)	2	0.2(fume)
			(Belgium)	1	-
				0.2(fume)	
			(Spain)	1	-
				0.2(fume)	
			(Portugal)	1	0.2(fume)
			(Netherlands)	0.1	-
			(Finland)	1	-
				0.1	
			(Denmark)	1	-
				0.1	
			(Austria)	1	4
				0.1(fume)	0.4
			(Switzerland)	0.1	0.2
			(Norway)	1	0.1
			(Ireland)	1	2
	0.2 (fume)				
	(Poland)	0.2	-		
SILVER	1-10	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	-
			(Poland)	0.05	-
TIN	1-50	7440-31-5/231-141-8	(UK)	2	4
			(Belgium)	2	-
			(Germany)	2	-
			(Netherlands)	2	-
			(Spain)	2	-

		(Poland)	2	-
ANTIMONY	1-10	7440-36-0/231-146-5		
		(UK)	0.5	-
		(France)	0.5	-
		(Belgium)	0.5	-
		(Spain)	0.5	-
		(Portugal)	0.5	-
		(The Netherlands)	0.5	-
		(Finland)	0.5	-
		(Denmark)	0.5	-
		(Austria)	0.5	5
		(Switzerland)	0.5	-
		(Poland)	0.5	-
		(Norway)	0.5	-
		(Ireland)	0.5	-
GERMANIUM	1	7440-56-4/231-164-3	N.E.	N.E.
GOLD	1	7440-57-5/231-180-0	N.E.	N.E.
PALLADIUM	1	7440-05-3/231-115-6	N.E.	N.E.
ALUMINUM	1	7429-90-5/231-072-3		
		(UK)	10	30
			4	12
		(France)	10	-
			5	-
		(Belgium)	1	-
		(Spain)	10	-
			5	-
		(Germany)	4	-
			1.5	-
		(Portugal)	10	-
			5	-
		(Austria)	20	-
			10	-
		(Denmark)	5	-
			2	-

(Switzerland)	3	-
(Poland)	2.5	-
	1.2	-
(Norway)	5	5
		(pyrotechnical powder)
(Bulgaria)	10	-
	1.5	-
(Croatia)	10 (total dust)	-
	4 (respirable dust)	-
(Ireland)	1 (respirable dust)	3
(Estonia)	10 (total dust)	-
	4 (respirable dust)	-
(Czech Republic)	10 (dust)	-
(Greece)	10	-
	5	-
(Hungary)	6	-
(Iceland)	10 (dust and powder)	5 (dust and powder)
	2	-
	20 (ceiling:dust and powder)	-
	4 (ceiling)	-
(Latvia)	2	-
(Romania)	3	10
	1	3
(Lithuania)	5	-
	2	-
(Russia)	2	6 (aerosol)
(Slovak Republic)	1.5	-
	6 (aerosol)	-
(Sweden)	5 (total dust)	-
	2 (respirable dust)	-

N.E. = Not established

EU = European Union Occupational Exposure Limits

8.2 Exposure Controls:

Engineering Controls: Local exhaust ventilation is recommended to control any air contaminants. Control

concentration of all components so that their exposure levels are not exceeded. Use ventilation for safety purposes. Avoid dust generation.

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. Additional respiratory protection may be required based on the work performed and the area in which the work is performed. Evaluate.

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/dusty 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.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties:

Appearance:	Metallic solid, soft, malleable	Boiling Point/Range:	2080C(3776F) (indium)
Odor:	Odorless.	Melting Point/Freezing Point:	156.7C (314F) (indium)
Odor Threshold:	Not established	Evaporation Rate:	Not applicable
Specific Gravity:	See table (last page)	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, not flammable
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		

9.2 Other Information: Above data for the whole mixture.

SECTION 10. STABILITY AND REACTIVITY

10.1 Reactivity: Stable.

10.2 Chemical Stability: Stable

10.3 Possibility of Hazardous Reactions: Not established

10.4 Conditions To Avoid: Storage with acetylene, chlorates, chlorine...

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

10.6 Hazardous Decomposition Combustion:

Harmful organic fumes and toxic oxide fumes may form at elevated temperatures. Metal oxide fumes.

Hazardous Polymerization: Will not occur.

SECTION 11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects:

Acute toxicity: Not established

Mutagenicity: Not established

Irritation: Not established

Toxicity for Reproduction: Not Established

Corrosively: Not applicable

Absence of specific data: None available (not tested)

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

11.2 Symptoms related to the physical, chemical and toxicological characteristics:

May cause irritation by inhalation, especially during heating.

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

Mixture verses substance information: None known

Other Information:

Carcinogenicity: NTP: Yes (Nickel)

Listing OSHA: Yes (Nickel)

IARC: Yes (Nickel)

Copper - LD50 – intraperitoneal mouse 3.5 mg/kg.

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

RTECS QR5950000, for additional information (nickel)

RTECS GL 5325000, for additional information (copper)

RTECS NL 1050000 for additional information (indium)

RTECS XP7320000 for additional information (tin)

RTECS VW3500000 for additional information (silver)

RTECS CC4025000 for additional information (antimony)

RTECS BD0330000 for additional information (aluminum)

SECTION 12. ECOLOGICAL INFORMATION

Product mixtures not tested.

12.1 Toxicity: No information available

12.2 Persistence and degradability: No information available

- 12.3 Bioaccumulative potential:** No information available
- 12.4 Mobility in soil:** No information available
- 12.5 Results of PBT and vPvB assessments:** No data is available
- 12.6 Other adverse effects:** No information is available for mixture. Avoid release to environment.
Copper – Toxicity to daphnia and other aquatic invertebrate's mortality NOEC – Daphnia 0.004 mg/l – 24h.

SECTION 13. DISPOSAL CONSIDERATION

13.1 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): RoHS 2 (2011/65/EU) compliant.

SECTION 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.

- 14.1 UN number** None
- 14.2 UN proper shipping name:** None
- 14.3 Transport hazard class(s):** None
- 14.4 Packing group:** None
- 14.5 Environmental hazards:** None
- Special precautions for user:** None

Transport in bulk: Not applicable

SECTION 15. REGULATORY INFORMATION

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

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.).

All ingredients are listed on the USEPA TSCA Inventory.

All ingredients are listed on EINECS.

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.

15.2 Chemical safety assessment: None performed for mixture.

SECTION 16. OTHER INFORMATION

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

Revised Date: 13 MARCH 2018

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.

ALLOY TABLE

INDALLOY METAL MIX	%INDIUM In	%TIN Sn	%ZINC Zn	%COPPER Cu	%BISMUTH Bi	%SILVER Ag	%ANTIMONY Sb	%GERMANIUM Ge	%GOLD Au	%ALUMINUM Al	%PALIDIUM Pd	SPECIFIC GRAVITY
179 (61Ag/24Cu/ 15In)	15	-	-	24	-	61	-	-	-	-	-	9.48
203 (95In/5Bi)	95	-	-	-	5	-	-	-	-	-	-	7.40
224 (52.2In/46Sn/ 1.8Zn)	52.2	46	1.8	-	-	-	-	-	-	-	-	7.27
290 (97In/3Ag)	97	-	-	-	-	3	-	-	-	-	--	7.38
NON STANDARD ALLOY MIXTURES												
NS	50	49.5	-	-	-	-	-	-	0.5	-	-	7.31
NS	59.65	-	-	40.35	-	-	-	-	-	-	-	7.89
NS	69.32	-	-	30.68	-	-	-	-	-	-	-	7.74
NS	70	-	-	30	-	-	-	-	-	-	-	7.73
NS	85	-	15	-	-	-	-	-	-	-	-	7.27
NS	90	-	10	-	-	--	-	-	-	-	-	7.28
NS	95	-	-	-	-	5	-	-	-	-	-	7.41
NS	95	-	5	-	-	-	-	-	-	-	-	7.29
NS	97	-	3	-	-	-	-	-	-	-	-	7.29
NS	97.5	-	2.5	-	-	-	-	-	-	-	-	7.30
NS	98	-	2	-	-	-	-	-	-	-	-	7.30
NS	98.5	-	1.5	-	-	-	-	-	-	-	-	7.30
NS	99	-	1	-	-	-	-	-	-	-	-	7.30
NS	99	-	-	1	-	-	-	-	-	-	-	7.31
NS	99	-	-	-	1	-	-	-	-	-	-	7.32
NS	99	1	-	-	-	-	-	-	-	-	-	7.30
NS	99	-	-	-	-	1	-	-	-	-	-	7.32
NS	99	-	-	-	-	-	1	-	-	-	-	7.29

INDALLOY METAL MIX	%INDIUM In	%TIN Sn	%ZINC Zn	%COPPER Cu	%BISMUTH Bi	%SILVER Ag	%ANTIMONY Sb	%GERMANIUM Ge	%GOLD Au	%ALUMINUM Al	%PALIDIUM Pd	SPECIFIC GRAVITY
NS	99	-	-	-	-	-	-	-	-	-	1	6.87
NS	99	-	-	-	-	-	-	-	-	1	-	7.18
NS	99	-	-	-	-	-	-	-	1	-	-	7.35
NS	99		-	-	-	-	-	1	-	-	-	7.27