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.

1. PRODUCT AND COMPANY IDENTIFICATION

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

SDS Number: SDS-4375A **Revised Date:** 20 MARCH 2020

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

MANUFACTURER:

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The Indium Corporation of America®.
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2. HAZARDS IDENTIFICATION

PRIMARY ROUTES OF ENTRY: **CARCINOGEN LISTED IN:**

√Eye √Inhalation √Skin √Ingestion NTP IARC OSHA √Not Listed

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

POTENTIAL HEALTH EFFECTS:

Eye Contact: Contact with powered 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

WARNING: This product can expose you to chemicals including [trace levels of lead, nickel] which are known to the State of California to cause cancer and/or birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov

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

3. COMPOSITION / INFORMATION ON INGREDIENTS

Components	% wt	CAS Registry/ #EINECS#	PEL mg/m³	TLV-TWA mg/m³	TLV-STEL mg/m³
INDIUM	50 - 99	7440-74-6			
		(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
NICKEL	(trace levels of nickel mesh)	7440-02-0			
		(US)	1	0.015	-
		(Canada)	-	1	2
		(Singapore)	1	-	-
		(Mexico)	1	-	-
ZINC	1-15	7440-66-6			
		(US)	N.E.	N.E.	N.E.
COPPER	1-10	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)
SILVER	1 -10	7440-22-4/231-131-3			
		(US)	0.01	0.1	-
		(EU)	-	0.1	-
		(Canada)	N.E.	0.1	0.3
		(Singapore)	0.1	-	-
		(Mexico)	0.1	-	-
TIN	1 - 50	7440-31-5/231-141-8			
		(US)	2	2	-
		(EU)	-	2	4
		(Canada)	-	2	4
		(Singapore)	2	-	-
ANTIMONY	1-10	7440-36-0 (US)	0.5	0.5	-
		(EU)	0.5	-	-
		(Canada)	-	0.5	1.5
		(Singapore)	0.5	-	-
		(Mexico)	-	0.5	-
		(China)	-	0.5	-
GERMANIUM	1	7440-56-4	N.E.	N.E.	N.E.
GOLD	1	7440-57-5	N.E.	N.E.	N.E.
PALLADIUM	1	7440-05-3	N.E.	N.E.	N.E.
ALUMINUM	1	7429-90-5(US)	15	5(resp)	N.E.
		(Canada)	-	10	20
		(Singapore)	10	-	-
		(EU)	10	4(resp)	-

N.E. = Not established EU = European Union Occupational Exposure Limits

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:	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.

5. FIRE FIGHTING MEASURES

Flash Point: Not flammable **Method:** Not established.

Auto-ignition Temperature: Not applicable.

Flammable Limits:	Limits not established. Massive metal is not flammable; however dust or powder may be flammable.
Extinguishing Media:	Use extinguishers appropriate for the surrounding fire conditions. Sand, dry powder extinguisher. Do not add water or foam. Generation of hydrogen may result.
Special Fire Fighting Procedures:	Firefighters must wear NIOSH approved self-contained breathing apparatus and full protective clothing. Metal dusts may form combustible mixture.

6. ACCIDENTAL RELEASE MEASURES

Spill or Leak Procedures: Contain spill. If molten, cool to allow metal to solidify. If a solid metal, wear gloves, pick up and return to process. If dust, wear recommended personal protective equipment including respiratory protection. DO NOT SWEEP. Use a vacuum, place in barrels and return to process if applicable. Use proper ventilation. Do not allow to enter drains, sewers or waterways.
Otherwise, dispose of following all Federal, State and Local regulations.
Metal may have reclaim value.

7. HANDLING AND STORAGE

Handling Precautions:	Only dry metals should be added to molten bath. If working with molten metals, or exposed to fume or dust, use appropriate personal protective equipment. Do not eat, drink or smoke.
Storage Precautions:	Store product in a cool, dry area away from incompatible materials.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

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.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance:	Metallic solid, soft, malleable	**Boiling Point:**	2080C(3776F) (indium)
Odor:	Odorless	**Melting Point:**	156.7C (314F) (indium)
Specific Gravity:	See Table (last page)	**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:	Storage with acetylene, chlorates, chlorine…
Hazardous Decomposition / Hazardous Polymerization:	Toxic oxide fumes may form at elevated temperatures Will not occur.

11.TOXICOLOGICAL INFORMATION

Carcinogenicity:

National Toxicity Program (NTP):	yes (nickel)
Occupational Safety & Health Administration (OSHA):	yes (nickel)
U.N. International Agency for Research on Cancer (IARC):	yes (nickel)

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)

Nickel- suspected of causing cancer.

12. ECOLOGICAL INFORMATION

Product not tested.

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 Environmental Agency guidelines.

14. TRANSPORT INFORMATION

Transport in accordance with applicable regulations and requirements. Not regulated under US DOT (United States Department of Transportation)/IATA/IMDG.

Not hazardous under all shipping regulations and modes.

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.).

California PROP 65 (Safe Drinking Water Standard):

WARNING:  This product can expose you to chemicals including [trace levels of lead, nickel] which are known to the State of California to cause cancer and/or birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov

SARA 313 Listing – 40 CFR 372.65: Copper, Zinc, Silver, Nickel

All ingredients are listed on the EPA TSCA Inventory.

All ingredients are listed on the Canadian Domestic Substance List.

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

Canadian WHMIS: not classified.

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 Mexican regulations NOM-018-STPS-2015 and NOM-010-STPS-2014.

Regulatory Information China:
GB/T 16483-2008, GB/T 17519-2013, Safety Data Sheets for Chemical Products
GB 30000.2-29-2013, Rules for classification and labeling of chemicals (GHS)
Decree No. 591: Regulations on the Control Over Safety of Hazardous Chemicals.
This product has been classified using the Chinese Occupational 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).

16. OTHER INFORMATION

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

Revised Date: 20 MARCH 2020

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	%INDIUM In	%TIN Sn	%ZINC Zn	%COPPER Cu	%BISMUTH Bi	%SILVER Ag	%ANTIMONY Sb	%GERMANIUM Ge	%GOLD Au	%ALUMINUM Al	%PALIDIUM Pd	SPECIFIC GRAVITY
INDALLOY 179 (61Ag/24Cu/ 15In)	15	-	-	24	-	61	-	-	-	-	-	9.48
INDALLOY 203 (95In/5Bi)	95	-	-	-	5	-	-	-	-	-	-	7.40
INDALLOY 224 (52.2In/46Sn/1.8Zn)	52.2	46	1.8	-	-	-	-	-	-	-	-	7.27
INDALLOY 290 (97In/3Ag)	97	-	-	-	-	3	-	-	-	-	--	7.38
NON STANDARD ALLOY MIXTURES												
NS	**42**	**56**	**1**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
NS	**50**	**49.5**	**-**	**-**	**-**	**-**	**-**	**-**	**0.5**	**-**	**-**	**7.31**
NS	**59.65**	**-**	**-**	**40.35**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**7.89**
NS	**69**	**29**	**-**	**-**	**-**	**2**	**-**	**-**	**-**	**-**	**-**	**7.34**
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**
NS	**99**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**1**	**6.87**
NS	**99**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**1**	**-**	**7.18**
NS	**99**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**1**	**-**	**-**	**7.35**
NS	**99**		**-**	**-**	**-**	**-**	**-**	**1**	**-**	**-**	**-**	**7.27**