



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

SAFETY DATA SHEET

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

1.1 Product Identifier: CADMIUM CONTAINING METALS

SDS Number: SDS-4030

Revised Date: 21 NOVEMBER 2016

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

Product Use: Industrial Use (Mixture) – Metal alloy for industrial applications. 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.

1.3 Details of the supplier of the safety data sheet

MANUFACTURER/SUPPLIER/IMPORTER:

In America:

The Indium Corporation of 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 NTP IARC OSHA Not Listed

Carcinogen listed in

2.1 Classification:

1272/2008/CE (CLP) (GHS)

2.2 Label Elements

General GHS:



for cadmium containing products

Signal Word: Danger

Hazard statement(s)

H301	Toxic if swallowed
H331	Toxic if inhaled (cadmium)
H332	Harmful if inhaled (lead)
H333	May be harmful by inhalation (indium)
H341	Suspected of causing genetic defects (cadmium)
H350	May cause cancer (cadmium)
H351	Suspected of causing cancer (lead)
H361	Suspected of damaging fertility or the unborn child (cadmium) (lead)
H372	Causes damage to organs through prolonged or repeated exposure (cadmium)
H373	May cause damage to organs through prolonged or repeated exposure (applicable to lead containing product)
H410	Very toxic to aquatic life with long lasting effects
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. Review document. Comply with safety instructions.

Precautionary statement(s)

P233 Keep container tightly closed

P260	Do not breathe 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
P284	Wear respiratory protection
P362 + P364	Take off contaminated clothing and wash before reuse
P301 + P310	IF SWALLOWED: Immediate call a POISON CENTER or doctor/physician
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)
P501-2	Metal may have reclaim value. Contact recycler

Note: the GHS classification of these metal mixtures will vary slightly depending on the % and constituents of the other metals mixed with cadmium. Review information and review the exact metal mixture being used. Consult the alloy table at the end of the document. If the product does not contain any lead then those hazards are not included in the review.

The list of hazards noted above are general and based on the use of the material. If solid metal, it does not pose a hazard.

If cut, is ground or if in powder form material can be hazardous. Everything noted above can be applicable.

Classification:

Summary of classifications for cadmium

Acute toxicity, Oral - Category 3

Acute toxicity, inhalation - Category 1

Germ cell mutagenicity- Category 2

Carcinogenicity- Category 1B

Reproductive toxicity- Category 2

Specific target organ-repeated exposure-Category 1

Acute aquatic toxicity- Category 1 (H400)

Chronic aquatic toxicity- Category 1 (H410)

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.

Ingestion: Ingestion of dust may cause headache, nausea, abdominal pain, fatigue and pain in the legs, arms and joints. May be harmful or fatal.

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. Inhalation of cadmium fume or dust can cause metal fume fever. Inhalation of cadmium may be fatal.

Skin Contact: May cause skin irritation. Hot molten metal may cause burns to the skin. Wear protective equipment when handling molten metal.

Chronic:

TIN: Has been shown to increase incidence of sarcoma in animal tests. Prolonged exposure of tin dust or fumes may produce distinctive changes in the lungs with no apparent complications.

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.

INDIUM: May cause damage to respiratory system if inhaled over long exposure.

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. May cause cancer.

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.

Metal solid form such as wire, ribbon, preforms do not pose a hazard when handling as is.

SECTION 3. COMPOSITION / INFORMATION ON INGREDIENTS

3.2 Mixture:

Components	% wt	CAS Registry #/ EINECS#
TIN	*	7440-31-5/231-141-8
CADMIUM	*	7440-43-9/231-152-8
LEAD	*	7439-92-1/231-100-4
SILVER	*	7440-22-4/231-131-3
COPPER	*	7440-50-8 /231-159-6
INDIUM	*	7440-74-6/231-180-0
ZINC	*	7440-66-6

* See Alloy Table for breakdown of percentages of alloy mixtures

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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: 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.

4.2 Most important symptoms and effect, both acute and delayed:

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.

4.3 Indication of any immediate medical attention and special treatment needed:

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

Seek medical advice in situations where there has been inhalation or ingestion of lead and cadmium containing dust and fumes. Blood tests may be required for monitoring body lead and cadmium levels.

SECTION 5. FIRE FIGHTING MEASURES

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

5.3 Advice for Firefighters Fire fighters must wear approved self-contained breathing apparatus and full protective clothing.

Material product is not flammable. Metal dust in air could pose a flammable issue. No other information is available. Emits toxic fumes – thermal decomposition can lead to release of irritation gases and vapors. Fine dusts dispersed in air may ignite dust.

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. Solid metal can easily be cleaned up. Do not sweep. Vacuum solids and avoid creating dust in air. Solid metal can be picked up and returned to process.

6.2 Environmental Precautions: Metals are not generally suited for release to any body of water including drains. Avoid release to environment.

6.3 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.

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

SECTION 7. HANDLING AND STORAGE

7.1 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 contain metal fumes.

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 and other applications.

SECTION 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

8.1 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	-
		(Poland)	2	-
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	-
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	-
		(Poland)	0.05	-
ZINC	*	7440-66-6	N.E.	N.E.
CADMIUM	*	7440-43-9		
		(EU)	0.025	-
		(Belgium)	0.01	-
		(Spain)	0.002	-
		(Portugal)	0.01	-
		(Finland)	0.02	-
		(Austria)	0.03	-
		(Denmark)	0.05	-
		(Poland)	0,01	-
		(Norway)	0.05	0.15
		(Bulgaria)	0.05	-
		(Ireland)	0.025	-
		(Estonia)	0.05	-
		(Greece0)	0.025	0.1
		(Hungary)	-	0.015 ceiling

(Latvia)	0.01	0.05
(Romania)	0.05	-
(Russia)	0.01	0.05
(Slovak Republic)	0.15	0.1

N.E. = Not established

8.2 Exposure Controls:

Engineering Controls: Local exhaust ventilation or point source ventilation is required to control any air contaminants. Control concentration of all components so that their exposure levels are not exceeded. Keep exposure as low as possible. If possible work within a laboratory hood.

Personal protection:

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

Respiratory: An authority 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. Additional respiratory protection may be required based on the work performed. Avoid inhalation of cadmium containing materials in the form of fume/particulate or powder. Additionally, avoid inhalation of lead containing materials in the form of fume/particulate or powder.

Skin: Compatible chemical resistant gloves. Recommend a nitrile disposable or other chemical glove. Hot gloves for handling molten metal.

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 cadmium and or lead work practices as established under governmental guidelines.

Do not re-use product containers. Dispose of in accordance with applicable regulations. Empty containers may still have product residual.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties:

Appearance:	Solid metal	Boiling Point/Range:	Not determined
Odor:	None.	Melting Point/Freezing Point:	Not applicable
Odor Threshold:	Not established	Evaporation Rate:	Not applicable
Specific Gravity:	See alloy table	pH:	Not applicable
Vapor Pressure:	Not applicable.	Solubility in Water:	Insoluble
Vapor 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		

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:	Dust generation
10.5 Incompatible Materials:	Avoid contact with mineral acids.
10.6 Hazardous Decomposition / Combustion:	Harmful organic fumes and toxic oxide fumes may form at elevated temperatures. Metal oxide fumes.
10.7 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/harmful) ingestion (harmful)		
Interactive effects:	None known		

Symptoms related to the physical, chemical and toxicological characteristics:

May cause irritation or harm by inhalation and if ingested.

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

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

Mixture verses substance information: None known

Other Information:

Carcinogenicity:	NTP: Yes (National Toxicity Program)
Listing	OSHA: Yes (US Occupational Safety & Health Administration)
	IARC: Yes - Lead and lead compounds are listed as possible carcinogens. (International Agency for Research on Cancer)

Cadmium:

Inhalation, human, 39 mg/m³, LCLO

Oral, rat, 2330 mg/kg, LD50

Women, inhalation, dose: 129 ug/m³, 20 years

Chronic Exposure: Teratogen/Mutagen/Reproductive Hazard

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

Lead

reproductive toxicity – rat –inhalation

reproductive toxicity – rat – oral

reproductive toxicity – mouse-oral

Teratogenicity

Developmental toxicity – rat- inhalation

Developmental toxicity- rat- oral

Suspected human reproductive toxicant

GHS- Specific target organ toxicity- repeated exposure

May cause damage to organs through prolonged or repeated exposure

Other: Chronic Toxicity: Lead and Cadmium can cause potential harm to the developing fetus.

Cadmium: See NIOSH RTECS# EU9800000 for additional information.

Lead: See NIOSH RTECS# OF7525000 for additional information.

Indium: See NIOSH RTECS #NL1050000 for additional information.

SECTION 12. ECOLOGICAL INFORMATION

Product mixtures not tested.

12.1 Toxicity: No information available

12.2 Persistence and degradability: No information available

12.3 Bio accumulative 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.

Cadmium:

4.26 mg/l LC50 96h 0.0244 mg/l EC50 = 48h

0.003mg/l LC50 96h

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

Very toxic to aquatic life with long-lasting effects.

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

Bio concentration factor (BCF): 12

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): Product mixtures do not contain any PBB or PBDT brominated compounds.

Note that product mixtures does contain cadmium and some products also contain lead and are therefore not complaint with RoHS. Users should review their particular use for any applicable exemptions that may apply. Review alloy table for products.

Follow applicable waste rules and hazards of assessment for classification (hazard group category) for disposal. Lead = (H5/H10/H14).

SECTION 14. TRANSPORT INFORMATION

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

Solid metal form (wire/chips/preform/ribbon): Non - hazardous under shipping. UN – none Marine Pollutant: No
Non cadmium or lead containing powder form is non – hazardous for shipping all modes.

Note: Lead Containing Powder Form and Cadmium Containing Powder Form: DOT/IATA/IMDG, only if it meets or exceeds the reportable quantity (RQ), in a single package.

Reportable Quantity (RQ): 10 lbs (lead) Reportable Quantity (RQ): 10 lbs (cadmium)

RQ, UN 3077, Environmentally Hazardous Substance, Solid, N.O.S., 9, PG III (cadmium) Note: add lead if applicable.



IMDG: EHS-Mark required (ADR 2.2.9.1.10, IMDG code 2.10.3) for single packaging and combination packaging's containing inner packaging's with Dangerous Goods > 5L liquids or > 5 kg for solids.

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.

Cadmium- Included in the Candidate List of Substances of Very High Concern (SVHC)- Regulation EC No. 1907/2006 (REACH)

15.2 Chemical safety assessment: None performed for mixture.

SECTION 16. OTHER INFORMATION

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

Revised Date: 21 NOVEMBER 2016
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.

ALLOY TABLE

INDALLOY	%TIN	%LEAD	%CADMIUM	%INDIUM	%SILVER	%ZINC	LIQUIDUS °C/°F	SPECIFIC GRAVITY
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	Sn	Pb	Cd	In	Ag	Zn		(gm/cm ³)
8	42	-	14	44	-	-	93/199	7.45
13	15	9.6	5.4	70	-	-	257/125	7.63
103	67.8	-	32.2	-	-	-	177/351	7.67
181	51.2	30.6	18.2	-	-	-	145/293	8.45
185	-	-	95	-	5	-	395/743	8.73
253	-	-	26	74	-	-	123/253	7.62
NS	50	32	18	-	-	-	-	8.50
NS	66.5	-	29	-	-	4.5	-	7.62
NS	-	-	30.3	2.6	67.10	-	-	9.76
NS	-	99.2	0.8	-	-	-	-	11.32
NS	99.2	-	0.8	-	-	-	-	7.29
NS	-	99.7	0.3	-	-	-	-	11.34
NS	99.7	-	0.3	-	-	-	-	7.28
CADMIUM	-	-	100	-	-	-	321/609	8.65

NS = NON STANDARD ALLOY MIX

***RoHS – The above products do not meet the requirements under the EU Directive Restriction of Hazardous Substances. Cadmium levels exceed the regulations. Lead exceeds RoHS limits in some products, where there may not be any exemptions.**