



SAFETY DATA SHEET

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

1.1 Product Identifier: GOLD CONTAINING ALLOYS

SDS Number: SDS-971

Revised Date: 17 OCTOBER 2018

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

Product Use: Industrial Use (Mixture) – Metal Mixture for industrial applications. Review alloy table for exact product identification. Note: this SDS covers various metal mixtures with gold metal as the base material.

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:

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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****China: Emergency 86+ 4008417580***** 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

Carcinogen listed in

IARC

OSHA

 Not Listed**2.1 Classification:****2.2 Label Elements**

Signal word: None

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
P301 + P314	IF SWALLOWED: 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)

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

- Eye Contact:** In general may cause irritation. 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:** Ingestion may cause irritation or harm.
- Inhalation:** Inhalation of fume or dust may cause local irritation to the respiratory system. Inhalation of fume or dust may be harmful. Inhalation of indium may cause additional respiratory issues.
- Skin Contact:** Normal handling of solid metal should not cause any adverse health effects. Hot molten metal may cause burns to the skin. Wear protective equipment when handling molten

metal. Protect skin when grinding/cutting, may cause irritation. Antimony, zinc, nickel have been known to cause dermatitis.

Chronic:

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

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 or kidney system. May be harmful if inhaled.

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

NICKEL: poison by ingestion. Can cause pulmonary asthma and hypersensitivity.

CADMIUM– toxic by inhalation. Cadmium is irritating to the respiratory tract. Cadmium is listed as a carcinogen.

SECTION 3. COMPOSITION / INFORMATION ON INGREDIENTS

3.2 Mixture:

Components	% wt	CAS Registry #/ EINECS#
TIN	*	7440-31-5/231-141-8
SILVER	*	7440-22-4/231-131-3
INDIUM	*	7440-74-6/231-180-0
COPPER	*	7440-50-8/231-159-6
ANTIMONY	*	7440-36-0/231-146-5
ZINC	*	7440-66-6/231-175-3
NICKEL	*	7440-02-0/231-111-4
GERMANIUM	*	7440-56-4/231-164-3
INDIUM	*	7440-74-6/231-180-0
GOLD	*	7440-57-5/231-165-9
SILICON	*	7440-21-3/231-130-8
CADMIUM	*	7440-43-9/ 231-152-8

* See Alloy Table at end of document 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.

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, 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.

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.

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	-
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	-
COPPER	*	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	-
INDIUM	*	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

ANTIMONY	*	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	-		
NICKEL	*	7440-02-0/231-111-4		
		(France)	1	-
		(Belgium)	1	-
		(Spain)	1	-
		(Portugal)	1.5	-
		(Finland)	1	-
		(Denmark)	0.05	-
		(Switzerland)	0.5	-
		(Poland)	0.25	-
		(Norway)	0.05	-
(Ireland)	0.5	-		
ZINC	*	7440-66-6/231-175-3	NE	NE
GERMANIUM	*	7440-56-4/231-164-3	N.E.	N.E.
GOLD	*	7440-57-5/231-180-0	N.E.	N.E.
SILICON	*	7440-21-3/231-130-8		
		(UK)	10	30

		(France)	10	-
		(Belgium)	10	-
		(Spain)	10	-
		(Denmark)	10	-
		(Switzerland)	3	-
		(Norway)	10	20
		(Croatia)	10	-
		(Ireland)	10	-
		(Estonia)	10	-
		Greece	10	-
		(Iceland)	10	20
CADMIUM	*	7440-43-9/231-152-8		
		(UK)	0.025	0.075
		(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
<p>N.E. = Not established TWA = time weighted average STEL = short term exposure limit</p> <p>Ceiling Limit = Never to exceed</p>				

8.2 Exposure Controls:

Engineering Controls: Use with proper equipment with adequate exhaust ventilation and other safety features specifically designed for use with solder applications or other industrial uses when melting, grinding and cutting metals. Control concentration of all components with established exposure limits so they are not exceeded. Use exhaust ventilation when heating product. Air emission control equipment may be necessary based on the local governmental requirements for contaminants entering the atmosphere. Emissions contain irritating and harmful metal fumes.

Personal protection:

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

Respiratory: An approved or EU compliant CE marked air-purifying respirator with a fume/organic chemical cartridge is recommended under certain circumstances (i.e. when re-flowing manually on a plate instead of a ventilated re-flow furnace) where airborne concentrations are expected to be elevated or exceed exposure limits.

Skin: Hot gloves for handling molten metal. Sleeve protectors for molten metal. Work gloves for handling solid metal as necessary. Nitrile gloves for handling delicate metal parts.

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. Eyewash in area.

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
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
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:** None known
- 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.
- 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
Corrosivity:	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 (may be harmful)		
Interactive effects:	None known		

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

May cause irritation or harm by inhalation.

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: No (National Toxicity Program)
Listing OSHA: No (US Occupational Safety & Health Administration)
 IARC: No (UN International Agency for Research on Cancer)

RTECS# NL1050000 (indium), VM3500000 (silver), XP7320000 (tin), GL7900000 (fume/copper), CC4025000 (antimony), QR5950000 (nickel), EU9800000 (cadmium)

RTECS – Registry of Toxic Effects of Chemical Substances

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.

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.

SECTION 14. TRANSPORT INFORMATION

Transport in accordance with applicable international 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

14.6 Special precautions for user: None

14.7 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

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

Revised Date: 17 OCTOBER 2018

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 metal mixture	%Gold Au	%Tin Sn	%Silicon Si	%Germanium Ge	%Indium In	%Silver Ag	%Antimony Sb	%Nickel Ni	%Copper Cu	%Zinc Zn	%Cadmium Cd	RoHS 2/3 Compliance (2011/65/EU)	Mass Density
177 (75Au/25In)	75	-	-	-	25	-	-	-	-	-	-	Yes	13.70
178 (82Au/18In)	82	-	-	-	18	-	-	-	-	-	-	Yes	14.90
182 (80Au/20In)	80	20	-	-	-	-	-	-	-	-	-	Yes	14.51
183 (88Au/Ge12)	88	-	-	12	-	-	-	-	-	-	-	Yes	14.67
184 (96.76Au/3.24 Si)	96.76	-	3.24	-	-	-	-	-	-	-	-	Yes	15.4
187 (38Au/17Ge/45 Ag)	38	-	-	17	-	45	-	-	-	-	-	Yes	10.58
194 (98Au/2Si)	98	-	2	-	-	-	-	-	-	-	-	Yes	16.92
195 (80Au/20Cu)	80	-	-	-	-	-	-	-	20	-	-	Yes	15.67
196 (82Au/18Ni)	82	-	-	-	-	-	-	18	-	-	-	Yes	15.92
198 (50Au/50Ag)	50	-	-	-	-	50	-	-	-	-	-	Yes	13.60
199 (99.4Au/0.6Sb)	99.4	-	-	-	-	-	0.6	-	-	-	-	Yes	19.08
200 (100Au)	100	-	-	-	-	-	-	-	-	-	-	Yes	19.30
238 (10Au/90Sn)	10	90	-	-	-	-	-	-	-	-	-	Yes	7.78
NS (9.5Au/90Sn/0.5Sb)	9.5	90	-	-	-	-	0.5	-	-	-	-	Yes	7.73
NS (9.5Au/90Sn/0.5Sb)	9.5	90	-	-	-	-	0.5	-	-	-	-	Yes	7.78
NS (10Au/90Sn)	10	90	-	-	-	-	-	-	-	-	-	Yes	11.05
NS (70Au/30Sn)	70	30	-	-	-	-	-	-	-	-	-	Yes	13.65
NS (73Au/27Sn)	73	27	-	-	-	-	-	-	-	-	-	Yes	13.35

Indalloy metal mixture	%Gold Au	%Tin Sn	%Silicon Si	%Germanium Ge	%Indium In	%Silver Ag	%Antimony Sb	%Nickel Ni	%Copper Cu	%Zinc Zn	%Cadmium Cd	RoHS 2/3 Compliance (2011/65/EU)	Mass Density
NS (75Au/25Sn)	75	25	-	-	-	-	-	-	-	-	-	Yes	13.56
NS (78Au/22Sn)	78	22	-	-	-	-	-	-	-	-	-	Yes	14.16
NS (79Au/21Sn)	79	21	-	-	-	-	-	-	-	-	-	Yes	14.33
NS (79.2Au/19.8Sn/1Ag)	79.2	19.8	-	-	-	1	-	-	-	-	-	Yes	14.45
NS (81.05Au/0.62Sn/7.7Ag/7.4Ni/2.6Zn/0.63Cd)	81.05	0.62	-	-	-	7.7	-	-	7.4	2.6	0.63	No	15.92
NS (81.5Au/10Ge/8.5Ag)	81.5	-	-	10	-	8.5	-	-	-	-	-	Yes	14.47
NS (87Au/12Ge/1In)	87	-	-	12	1	-	-	-	-	-	-	Yes	14.49

NS = NON STANDARD ALLOY MIX

***RoHS 2 = Restriction of Hazardous Substances (2011/65/EU)**

***RoHS 3 = products do not contain any listed phthalates**

<http://www.indium.com>