



Safety Data Sheet (SDS)

According to Regulation (EC) No 1907/2006 (REACH)

Section 1: Identification of the Substance/Mixture and the Company/Undertaking

Product Name: Indium (In)

Synonyms: Indium Bar, Indium Ingot, Indium Wire, Indium Sheet

Recommended Uses: Industrial use alloying

Uses Advised Against: unknown

Manufacturer:

Materials Science International, Inc.

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Columbus, OH 43228-3620, USA

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Chemtrec: (800)424-9300 or Poison Center: (800)562-8236

Section 2: Hazards Identification

CLASSIFICATION:

Acute toxicity-inhalation (Category 4)

Acute toxicity- dermal (Category 4)

Acute toxicity – oral (Category 4)

Skin irritant – (Category 2)

Eye irritant – (Category 2A)

Specific target organ toxicity- single exposure (Category 3)

PRIMARY ROUTES OF ENTRY:	(√)Eye	(√)Inhalation	(√)Skin	(√)Ingestion
CARCINOGEN LISTED IN:	NTP	IARC	OSHA	(√)Not Listed

GHS:



Signal Word: Warning

Appearance:

Metallic, light yellow

Physical state: Solid

Odor: Odorless

NOTE: Materials Science International, Inc. does not recommend, manufacture, market or endorse any of its products for human consumption.

Warning: This product contains a chemical known to the State of California to cause cancer and birth defects (or other reproductive harm). (Trace levels of lead not intentionally added as a metal product)

Hazard statement(s)

H302	Harmful if swallowed
H315	Causes skin irritation
H319	Causes serious eye irritation
H332	Harmful if inhaled
H335	May cause respiratory irritation

Precautionary statement(s)

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 + P341	IF INHALED: If breathing is difficult, remove victim to fresh air and keep at rest in a position comfortable for breathing
P305 + P351	IF IN EYES: Rinse continuously with water for several minutes (15 mins)

POTENTIAL HEALTH EFFECTS:

Eye Contact: Contact with powdered metal alloy or fume from molten metal may cause irritation. Severe eye irritation/damage may result from hot molten metal being splashed into the eyes. Wear safety glasses and face shield when working with molten metal. Dust may cause irritation.

Ingestion: Ingestion of dust or fume may cause irritation. May be hazardous by ingestion.

Inhalation: Inhalation of fume or dust may cause local irritation to the respiratory system. Inhalation of fume or dust may be harmful.

Skin Contact: Normal handling of metal form should not cause any adverse health effects. Causes skin irritation. Hot molten metal may cause burns to the skin. Wear protective equipment when handling molten metal.

Chronic: Indium may cause damage to respiratory system. Kidney and liver damage from injection of indium compounds has been reported based on limited animal testing. Target organs: teeth and gums.

Response IF exposed or concerned: Get medical advice/attention

IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing IF

SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell. Rinse mouth thoroughly.

Precautionary Statements – Storage Store locked up

Precautionary Statements – Disposal

Dispose of contents/container to an approved waste disposal plant.

Other information - Very toxic to aquatic life with long lasting effects.

Section 3: Composition / Information on Ingredient

Material	% by Wt.	CAS #	OSHA Exposure Limit
Indium	100	7440-74-6/231-180-0	2.10 mg/m ³

PRODUCT DOES NOT CONTAIN ANY LISTED EU REACH SUBSTANCES OF VERY HIGH CONCERN (SVHC)

Symbol: Xn

Risk Phrases: R20/21/22

N.E. = Not established

Section 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.

Section 5: Fire / Fighting Measures

Suitable extinguishing media: Dry chemical, foam or CO₂

Specific hazards arising from the chemical: May give off toxic fumes in a fire, including lead fumes.

Explosion data:

Sensitivity to Mechanical Impact: None known.

Sensitivity to Static Discharge: None known.

Protective equipment and precautions for firefighters

As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear. Lead is not considered to be a fire hazard.

Powder/dust is flammable when heated or exposed to flame.

Section 6: Accidental Release Measures

Personal precautions, protective equipment and emergency procedures

Personal precautions: Evaluate personnel to safe areas. Avoid contact with skin, eyes and inhalation of dusts. Use personal protection recommended in Section 8.

For emergency responders: Wear respiratory protection. Wear proper personal protective equipment (gloves and goggles). Wear appropriate outer garment to protect clothing.

Environmental precautions

Environmental precautions: Prevent entry into waterways, sewers, surface drainage systems and poorly ventilated areas.

Methods and material for containment and cleaning up

Methods for containment: Avoid creating dust. Safely stop source of spill. Restrict non-essential personnel from area. All personnel involved in spill cleanup should avoid skin and eye contact by wearing appropriate personal protection equipment. Do not breathe dust.

Methods for cleaning up: Avoid dust formation. Clean up dusts with high efficiency particulate air (HEPA) filtered vacuum equipment or by wet cleaning.

Prevention of secondary hazards: Clean contaminated objects and area thoroughly observing environmental regulations.

Section 7: Handling and Storage

Precautions for safe handling

Advice on safe handling: Use personal protection recommended in Section 8. Avoid generation of dust. Be familiar with the requirements set forth in the OSHA Lead Standard, 29 CFR 1910.1025.

Conditions for safe storage, including any incompatibilities

Storage Conditions: Keep containers tightly closed in a dry, cool and well-ventilated place. Incompatible materials: Strong oxidizing agents.

Section 8: Exposure Controls / Personal Protection

Control parameters - Exposure Guidelines

Components	% wt	CAS Registry #	PEL mg/m ³	TLV-TWA mg/m ³	TLV-STEL mg/m ³
INDIUM	100	7440-74-6/231-180-0			
	(USA)		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

Appropriate Engineering Controls

Engineering Controls: Use contained process enclosures, local exhaust ventilation or other engineering controls to maintain aerosols below the exposure limit. If user operations generate dust, fume or mist use ventilation to keep exposure to airborne contaminants below the exposure limit.

Individual protection measures, such as personal protective equipment

Eye/face protection: Use safety glasses with side shields or chemical goggles.

Skin and body protection: Protective clothing is required if exposure exceeds the PEL or TLV or where possibility of skin or eye irritation exists. Full body cotton or disposable coveralls and disposable gloves should be worn during use and handling. Clothing should be left at work site and be properly disposed of or laundered after use. The wash water should be disposed of in accordance with local, state and federal regulations. Personal clothing should be protected from contamination.

Respiratory protection: If engineering controls cannot maintain airborne concentrations below exposure limits, use appropriate, approved respiratory protection (a 42 CFR 84 class N, R, or P-100 particulate filter cartridge). When exposure levels are unknown, a self-contained breathing apparatus which supplies a positive air pressure within a full face-piece mask should be worn. Utilization of respiratory equipment should be in accordance with 29 CFR 1910.1025 and 29 CFR 1910.134

General Hygiene Considerations: Do not eat, drink or smoke when using this product. Contaminated work clothing should not be allowed out of the workplace. Wear disposable gloves and eye/face protection. Wash face, hands and any exposed skin thoroughly after handling.

Section 9: Physical and Chemical Properties

Appearance:	Lustrous silver-white metal, soft, malleable and ductile
Boiling Point:	2080 degC (3776o degF)
Odor:	Odorless.
Melting Point:	156.7 degC (314 degF)
Specific Gravity:	7.31 g/cc
pH:	Not applicable
Vapor Pressure:	<0.01 mmHg @25C
Solubility in Water:	Insoluble
Vapor Density:	(air=1) Not applicable.
Molecular Weight:	114.82

Section 10: Physical and Chemical Properties

<u>Reactivity</u>	Stable under normal conditions.
<u>Chemical stability</u>	Stable under normal conditions.
<u>Possibility of Hazardous Reactions</u>	None under normal processing. Hazardous polymerization does not occur.
<u>Conditions to avoid</u>	Avoid excessive exposure to heat.
<u>Incompatible materials</u>	Strong oxidizing agents.
<u>Hazardous Decomposition</u>	Products Lead oxide fumes.

Section 11: Toxicological Information

Information on likely routes of exposure

Hazardous exposure to lead compounds can occur only when product is heated, oxidized or otherwise processed or damaged to create dust, vapor or fume.

Inhalation:	Inhalation of lead dust or fumes may cause irritation of upper respiratory tract and lungs
Eye contact:	Lead compounds may cause eye irritation
Ingestion:	Acute ingestion of lead compounds may cause abdominal pain, nausea, vomiting, diarrhea and severe cramping. This may lead to rapidly systemic toxicity and must be treated by a physician.
Component information:	Lead is slowly absorbed by ingestion and inhalation and poorly absorbed through the skin. If absorbed, lead will accumulate in the body with low rates of excretion, leading to long-term build up. Part of risk management is to take blood samples from

workers for analysis to ensure that exposure levels are acceptable.

Chemical Name	Oral LD50	Dermal LD50	Inhalation LC50
Indium, CAS # 7440-74-6	2100 mg In/kg	Not available	Not available

Chemical Name	ACGIH	IARC	NTP	OSHA
Indium CAS # 7440-74-6	Not Listed	Not Listed	Not Listed	Not Listed

Information on toxicological effects

Symptoms: Not available.

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

Skin corrosion / irritation: Lead metal granules or dust: May cause skin irritation by mechanical action. Lead metal foil, shot or sheets: Not likely to cause skin irritation.

Serious eye damage / eye irritation: Lead metal granules or dust: Can irritate eyes by mechanical action. Lead metal foil, shot or sheets: No hazard. Will not cause eye irritation.

Inhalation: In an industrial setting, exposure to lead mainly occurs from inhalation of dust or fumes. Lead dust or fumes: Can irritate the upper respiratory tract (nose, throat) as well as the bronchi and lungs by mechanical action. Lead dust can be absorbed through the respiratory system. However, inhaled lead does not accumulate in the lungs. All of an inhaled dose is eventually absorbed or transferred to the gastrointestinal tract. Inhalation effects of exposure to fumes or dust or inorganic lead may not develop quickly. Symptoms may include metallic taste, chest pain, decreased physical fitness, fatigue, sleep disturbance, headache, and irritability, reduces memory, mood and personality changes, aching bones and muscles, constipation, abdominal pains, decreasing appetite. Inhalation of large amounts may lead to ataxia, delirium, convulsions/seizures, coma, and death. Lead metal foil, shot, or sheets: Not an inhalation hazard unless metal is heated. If metal is heated, fumes will be released. Inhalation of these fumes may cause "fume metal fever", which is characterized by flulike symptoms. Symptoms may include metallic taste, fever, nausea, vomiting, chills, cough, weakness, chest pain, generalized muscle pain/aches, and increased white blood cell count.

Ingestion: Lead metal granules or dust: The Symptoms of lead poisoning include abdominal pain or cramps (lead colic), spasms, nausea, vomiting, headache, muscle weakness, hallucinations, distorted perceptions, "lead line" on the gums, metallic taste, loss of appetite, insomnia, dizziness and other symptoms similar to that of inhalation. Acute poisoning may result in high lead levels in the blood and urine, shock, coma and death in extreme cases. Lead metal foil, shot or sheets: Not an ingestion hazard for usual industrial handling.

Carcinogenic effects: Epidemiology studies of workers exposed to inorganic lead compounds have found a limited association with stomach cancer. This has led to the classification by IARC that inorganic lead compounds are probably carcinogenic to humans.

Numerical measures of toxicity – Product Information

The following values are calculated based on chapter 3.1 of the GHS document.

Inhalation LC50:

Soluble lead compounds are listed as a marine pollution according to DOT.

Section 12: Ecological Information

Environmental Fate

Lead is very persistent in soil and sediments. No data on environmental degradation. Mobility of metallic lead between ecological compartments is slow. Bioaccumulation of lead occurs in aquatic and terrestrial animals and plants, but little bioaccumulation occurs through the food chain. Most studies include lead compounds and not elemental lead.

Environmental Toxicity

Soluble lead compounds are listed as a marine pollution according to DOT.

Chemical Name	Algae/aquatic plants	Fish	Toxicity to micro-organisms	Crustacean
Indium CAS # 7440-74-6	None Listed	None Listed	None Listed	None Listed

Bio-accumulation

While lead metal and its compounds are generally insoluble, its processing or extended exposure in aquatic and terrestrial environments may lead to the release of lead in bioavailable forms. Lead compounds are not particularly mobile in the aquatic environments, but can be toxic for organisms, especially fish, at low concentrations. Water hardness, pH and

dissolved organic carbon content are factors which regulate the degree of toxicity. In soil, lead compounds are generally not very bioavailable.

Mobility

Lead and lead compounds will partially settle out due to their fairly low solubility and partially dissolve. In soil, lead and lead compounds are generally not very mobile or bio-available, as they can be strongly absorbed on soil particles, increasingly over time. It also forms complexes with organic matter and clay minerals that limit its mobility. When released into the soil, this material is not expected to leach into groundwater.

Other adverse effects Not available.

Section 13: Ecological Information

Waste Treatment Methods

<u>Disposal of wastes:</u>	Disposal should be in accordance with applicable regional, national and local laws and regulations.
<u>Contaminated packaging:</u>	Disposal should be in accordance with applicable regional, national and local laws and regulations.
<u>Disposal Consideration:</u>	Scrap indium metal alloy 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 Special Waste Regulations.

Section 14: Transport Information

Note: This product is not regulated for domestic transport by land, air or rail.

Under 49 CFR 171.8, individual packages that contain lead metal (<100 micrometers) below the reportable quantity (RQ) are not regulated.

Under 49 CFR 171.4, except when transporting aboard a vessel, the requirements of this subchapter specific to marine pollutants do not apply to non-bulk packaging transported by motor vehicles, rail cars and aircrafts.

DOT

Proper shipping name Not applicable

Hazard Class Packing Group	Not applicable
Reportable Quantity (RQ)	Not applicable
Marine pollutant	Soluble lead compounds are listed as a marine pollutant according to DOT.
Emergency Response Guide	Not applicable

Section 15: Regulatory Information

<u>International Inventories:</u>	
TSCA	Complies
DSL/NDSL	Complies
EINECS/ELINCS	Complies
ENCS	Complies
IECSC	Complies
KECL	Complies
PICCS	Complies
AICS	Complies
<u>Legend:</u>	
TSCA	United States Toxic Substances Control Act Section 8(b) Inventory
DSL/NDSL	Canadian Domestic Substances List/Non-Domestic Substances List
EINECS/ELINCS	European Inventory of Existing Chemical Substances/European List of Notified Chemical Substances
ENCS	Japan Existing and New Chemical Substances
IECSC	China Inventory of Existing Chemical Substances
KECL	Korean Existing and Evaluated Chemical Substances
PICCS	Philippines Inventory of Chemicals and Chemical Substances
AICS	Australia Inventory of Chemicals and Substances
US Federal Regulations SARA 313	Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product contains a chemical or chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372.

CWA (Clean Water Act)

This product contains the following substances which are regulated pollutants pursuant to the Clean Water Act (40 CFR 122.21 and 40 CFR 122.42)

Chemical Name	CWA – Reportable Quantities	CWA – Priority Pollutants	CWA – Hazardous Substances
Indium CAS # 7440-74-6	none	none	none

CERCLA

This material, as supplied, contains one or more substances regulated as a hazardous substances under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302).

US State Regulations California Proposition 65

This product contains a chemical known to the state of California to cause birth defects or other reproductive harm.

Chemical Name	California Proposition 65
Indium CAS # 7440-74-6	Not listed

US State Right-to-Know Regulations

Chemical Name	New Jersey	Massachusetts	Pennsylvania	Illinois	Rhode Island
Indium CAS # 7440-74-6	X	-	X	-	-

US EPA Label Information

EPA Pesticide Registration Number: Not available

Please be advised that N/A can either mean Not Applicable or No Data Has Been Established

Section 16: Other Information

Issue Date	December 15, 2015
Revision Date	N / A
Revision Note	N / A

GHS Full Text Phrases:

Acute Tox. 1 (Inhalation:dust,mist)	Acute toxicity (inhalation:dust,mist) Category 1
Acute Tox. 2 (Inhalation)	Acute toxicity (inhalation) Category 2
Acute Tox. 2 (Inhalation:dust,mist)	Acute toxicity (inhalation:dust,mist) Category 2
Acute Tox. 2 (Oral)	Acute toxicity (oral) Category 2
Acute Tox. 3 (Inhalation:dust,mist)	Acute toxicity (inhalation:dust,mist) Category 3
Acute Tox. 3 (Inhalation:gas)	Acute toxicity (inhalation:gas) Category 3
Acute Tox. 4 (Inhalation:dust,mist)	Acute toxicity (inhalation:dust,mist) Category 4
Acute Tox. 4 (Oral)	Acute toxicity (oral) Category 4
Aquatic Acute 1	Hazardous to the aquatic environment - Acute

	Hazard Category 1
Aquatic Acute 3	Hazardous to the aquatic environment - Acute Hazard Category 3
Aquatic Chronic 1	Hazardous to the aquatic environment - Chronic Hazard Category 1
Aquatic Chronic 3	Hazardous to the aquatic environment - Chronic Hazard Category 3
Carc. 1A	Carcinogenicity Category 1A
Carc. 1B	Carcinogenicity Category 1B
Carc. 2	Carcinogenicity Category 2
Comb. Dust	Combustible Dust
Compressed gas	Gases under pressure Compressed gas
Eye Dam. 1	Serious eye damage/eye irritation Category 1
Eye Irrit. 2A	Serious eye damage/eye irritation Category 2A
Flam. Sol. 1	Flammable solids Category 1
Muta. 1B	Germ cell mutagenicity Category 1B
Muta. 2	Germ cell mutagenicity Category 2
Repr. 1A	Reproductive toxicity Category 1A
Repr. 2	Reproductive toxicity Category 2
Resp. Sens. 1B	Respiratory sensitisation Category 1B
Skin Corr. 1B	Skin corrosion/irritation Category 1B
Skin Sens. 1	Skin sensitization Category 1
STOT RE 1	Specific target organ toxicity (repeated exposure) Category 1
STOT RE 2	Specific target organ toxicity (repeated exposure) Category 2
Water-react. 2	Substances and mixtures which in contact with water emit flammable gases Category 2
H228	Flammable solid
H300	Fatal if swallowed
H302	Harmful if swallowed
H280	Contains gas under pressure; may explode if heated
H261	In contact with water releases flammable gases
H314	Causes severe skin burns and eye damage
H317	May cause an allergic skin reaction
H318	Causes serious eye damage
H319	Causes serious eye irritation
H330	Fatal if inhaled
H331	Toxic if inhaled
H332	Harmful if inhaled
H334	May cause allergy or asthma symptoms or breathing difficulties if inhaled
H341	Suspected of causing genetic defects
H350	May cause cancer
H351	Suspected of causing cancer
H360	May damage fertility or the unborn child
H361	Suspected of damaging fertility or the unborn child
H372	Causes damage to organs through prolonged or repeated exposure
H373	May cause damage to organs through prolonged or repeated exposure
H400	Very toxic to aquatic life
H402	Harmful to aquatic life

H410	Very toxic to aquatic life with long lasting effects
H412	Harmful to aquatic life with long lasting effects
S20/21	When using do not eat, drink or smoke
S23	Do not breathe fumes/gas/vapor/spray
S24/25	Avoid contact with skin and eyes
S36/37/39	Wear suitable protective clothing, gloves and eye/face protection
S28	After contact with skin wash immediately with plenty of soap and water

DISCLAIMER

This information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as guidance for safe handling, use, processing, storage, transportation, disposal and is not to be considered a warranty or quality Specification.

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