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: Tin (Sn)
Synonyms: Tin Bar, Tin Ingot, Tin Wire, Tin Sheet
Recommended Uses: Industrial use alloying
Uses Advised - Against: unknown
Manufacturer:

Materials Science International, Inc.
1660 Georgesville Road
Columbus, OH 43228-3620, USA
Phn# 1-614-870-0400
Fax# 1-614-878-6000

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

Section 2: Hazards Identification

Classification

Skin Corrosion/Irritation	Category 2
Eye Corrosion/Irritation	Category 2B

DANGER
Hazard Statements
Slightly hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation
Appearance:
Metallic, light yellow
Physical state: Solid
Odor: Odorless

Precautionary Statements
Prevention: Obtain special instructions before use.
Do not handle until all safety precautions have been read and understood.
Use personal protective equipment as required.
Wash face, hands and any exposed skin thoroughly after handling. Do not eat, drink or smoke when using this product. Use only outdoors or in a well-ventilated area. Do not breathe dust/fume/gas/mist/vapors/spray

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
Tin	40 - 50	7440-31-5	2.00 mg/m³

Section 4: First Aid Measures

First Aid Measures

Eye Contact:

In case of eye contact, immediately flush eyes with fresh water for at least 15 minutes while holding the eyelids open. Remove contact lenses if worn. Get medical attention if irritation persists. Do not rub affected area.

Skin Contact:

Wash off immediately with soap and plenty of water. If skin irritation persists, call a Physician.

Inhalation:

Remove to fresh air. If breathing has stopped, give artificial respiration. Get medical Attention immediately. If conscious, have victim clear nasal passages. Ingestion: Seek immediate medical attention. Rinse mouth. Drink plenty of water. Induce Vomiting, but only if victim is fully conscious.

Most important symptoms and effects, both acute and delayed

Symptoms:

Acute (short term) exposure:Lead is a potent, systemic poison; taken in large enough Doses, lead can kill in a matter of days. Acute encephalopathy may arise which develops 3 Quickly to seizures, coma and death from cardiorespiratory arrest. Chronic (long term) exposure: Chronic overexposure to lead may result in severe damage To blood forming. Nervous, urinary and reproductive systems. Some common symptoms Of chronic overexposure include loss of appetite, metallic taste in mouth, anxiety, Constipation, nausea, pallor, excessive

tiredness, weakness, insomnia, headache, Nervous irritability, muscle and joint pain, fine tremors, numbness, dizziness, Hyperactivity, colic.

Indication of any immediate medical attention and special treatment needed

Note to physicians: Treat symptomatically.

Section 5: Fire / Fighting Measures

Suitable extinguishing media: Dry chemical, foam or CO_2

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 CGR 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

Chemical Name	ACGIH TLV	OSHA PEL	NIOSH IDLH
Tin 7440-31-5	TWA: 20 mg / m^3 Sn	TWA: 2 mg / m^3 Sn	IDLH: 100 mg / m^3 Sn TWA: 2 mg / m^3 Sn

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

Physical state: Solid

Appearance: Silver

Odor: Odorless

Property	Values	Remarks *Method
pH:	Not Available	
Melting point/freezing point:	449.4°F (231.9°C)	
Boiling point/boiling range:	4544.6°F (2507°C)	
Flash Point:	Not applicable (high-melting point solid)	
Evaporation rate:	Not applicable (high-melting point solid)	
Flammability (solid, gas):	Not combustible	
Flammability Limit in Air		
Upper flammability limit:	Not combustible	
Lower flammability limit:	Not combustible	
Vapor pressure:	Negligible	
Vapor density:	Not applicable (high-melting point solid)	
Specific Gravity:	7.31 gr/cc (Water = 1)	
Water solubility: NIL	NIL	
Solubility in other solvents:	Lead compounds, soluble in 0.07 M hydrochloric acid	
Partition coefficient:	Not applicable (inorganic)	
Auto ignition temperature:	Not combustible	
Decomposition temperature:	Not combustible	
Dynamic viscosity:	Not applicable (solid)	
Explosive properties:	Not considered to be explosive	
Oxidizing properties:	Not considered to be oxidizing	
Other information		
Softening point:	Not available	
Molecular weight:	118.71 g/mole	
VOC Content (%):	Not available	
Bulk density:	Not available	

Section 10: Physical and Chemical Properties

Reactivity	Stable under normal conditions.
Chemical stability	Stable under normal conditions.
Possibility of Hazardous Reactions	None under normal processing. Hazardous polymerization does not occur.
Conditions to avoid	Avoid excessive exposure to heat.
Incompatible materials	Strong oxidizing agents.
Hazardous Decomposition 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
Tin, CAS # 7440-31-5	2207 mg Sn/kg	Not available	Not available

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 or 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.

Chemical Name	ACGIH	IARC	NTP	OSHA
Tin CAS # 7440-31-5	Not Listed	Not Listed	Not Listed	Not Listed

Reproductive toxicity:	Exposure to high levels of lead may cause adverse effects on male and female, including adverse effects on sperm quality. Prenatal exposure to lead and its compounds is also associated with adverse effects on fetal development.
STOT – single exposure:	Lead has been found to be of relatively low acute toxicity by ingestion, in contact with skin, and by inhalation, with no evidence of any local or systemic toxicity from such exposures.
STOT – repeated exposure:	Lead is a cumulative poison and may be absorbed into the body through ingestion or inhalation. Inorganic lead compounds have been documented in observational human studies to produce toxicity in multiple organ systems and body function including the hematopoietic (blood) system, kidney function, reproductive function and the central nervous system. Postnatal exposure to lead compounds is associated with impacts on neurobehavioral development in children.
Chronic toxicity:	Lead is a cumulative poison. Increasing amounts of lead can build up in the body and may reach a point where symptoms and disabilities occur. Continuous exposure may result in decreased fertility. Lead is a teratogen. Overexposure of lead by either parent before pregnancy may increase the chances of miscarriage or birth defects. May cause cancer. Contains a known or suspected reproductive toxin. May cause adverse kidney effects.
Target Organ Effects:	Lead is a cumulative poison and may be absorbed into the body through ingestion or inhalation. Inorganic lead compounds have been documented in observational human studies to produce toxicity in multiple organ systems and body function including the hematopoietic (blood) system, kidney function, reproductive function and the central nervous system. Postnatal exposure to lead compounds is associated with impacts on neurobehavioral development in children.
Aspiration hazard:	Not available.

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
Tin CAS # 7440-31-5	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

Disposal of wastes: Disposal should be in accordance with applicable regional, national and local laws and regulations.

Contaminated packaging: Disposal should be in accordance with applicable regional, national and local laws and 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

International Inventories:	
TSCA	Complies
DSL/NDSL	Complies
EINECS/ELINCS	Complies
ENCS	Complies
IECSC	Complies
KECL	Complies
PICCS	Complies
AICS	Complies
Legend:	
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
Tin CAS # 7440-31-5	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
Tin CAS # 7440-31-5	Not listed

US State Right-to-Know Regulations

Chemical Name	New Jersey	Massachusetts	Pennsylvania	Illinois	Rhode Island
Tin CAS # 7440-31-5	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	**November 13, 2015**
Revision Date	**N / A**
Revision Note	**N / A**

D I S C L A I M E R

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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