

TIN-LEAD EUTECTIC ALLOY MATERIAL SAFETY DATA SHEET

SECTION 1. PRODUCT AND COMPANY IDENTIFICATION

Product Identity: This MSDS applies to the following grades of Tin-Lead Eutectic Alloy

- Standard Tin-Lead Alloy
- Low Alpha Tin-Lead Alloy
- Ultra Low Alpha Tin-Lead Alloy

Manufacturer:

Teck Metals Ltd.
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V1R 4L8
Emergency Telephone: 250-364-4214

Supplier:

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Product Use: Production of tin-lead solder, manufacture of electronic devices.

SECTION 2. COMPOSITION / INFORMATION ON INGREDIENTS

Hazardous Ingredients	Approximate Percent by Weight	CAS Number	Occupational Exposure Limits (OELs)		LD ₅₀ / LC ₅₀ Species and Route
Tin	63%	7440-31-5	OSHA PEL	2.0 mg/m ³	No Data
			ACGIH TLV	2.0 mg/m ³	
			NIOSH REL	2.0 mg/m ³	
Lead	37%	7439-92-1	OSHA PEL	0.05 mg/m ³	No Data
			ACGIH TLV	0.05 mg/m ³	
			NIOSH REL	0.05 mg/m ³	

NOTE: OELs for individual jurisdictions may differ from OSHA PELs. Check with local authorities for the applicable OELs in your jurisdiction. OSHA - Occupational Safety and Health Administration; ACGIH - American Conference of Governmental Industrial Hygienists; NIOSH - National Institute for Occupational Safety and Health. OEL – Occupational Exposure Limit, PEL – Permissible Exposure Limit, TLV – Threshold Limit Value, REL – Recommended Exposure Limit.

The OSHA PEL for tin metal and inorganic compounds (except tin oxides) is 2 mg Sn/m³. OSHA does not give a specific PEL for tin oxides but NIOSH and ACGIH give a time-weighted average exposure limit of 2 mg Sn/m³ for tin oxides.

Trade Names and Synonyms: LC628, 63/37 Sn/Pb

SECTION 3. HAZARDS IDENTIFICATION

Emergency Overview: A silvery-grey, heavy, soft metal that does not burn in bulk. Finely-divided dust clouds are a moderate fire and explosion hazard, however. This alloy contains 37% lead and fumes generated in a fire situation present the risk of lead inhalation and absorption. Possible cancer and reproductive hazard due to the lead content. SCBA and full protective clothing required for fire emergency response personnel.

Potential Health Effects: Inhalation or ingestion of lead-containing dust or fumes may result in headache, nausea, vomiting, abdominal spasms, fatigue, sleep disturbances, weight loss, anemia and leg, arm, and joint pain. Prolonged exposure may also cause central nervous system damage, gastrointestinal disturbances, anemia, kidney dysfunction and possible reproductive effects. Pregnant women should be protected from excessive exposure to prevent lead crossing the placental barrier and causing

infant neurological disorders. Lead is considered a potential human carcinogen by IARC, ACGIH and NTP (see Toxicological Information, Section 11).

Potential Environmental Effects: The product, a tin-lead alloy, is unlikely to yield direct ecological effects, as the constituent metals (i.e., tin and lead), are generally not readily bioavailable. However, processing of the product or extended exposure in both aquatic and terrestrial environments may lead to the release of tin and lead compounds in more bioavailable, and therefore, potentially toxic, forms (see Ecological Information, Section 12).

EU Risk Phrase(s): R61 - May cause harm to the unborn child; R62 - Possible risk of impaired fertility; R20/22 - Harmful by inhalation and if swallowed; R33 - Danger of cumulative effects.

SECTION 4. FIRST AID MEASURES

Eye Contact: Do not allow victim to rub eye(s). Let the eye(s) water naturally for a few minutes. If particle/dust does not dislodge, flush with lukewarm, gently flowing water for 5 minutes or until particle/dust is removed, while holding eyelid(s) open. If irritation persists, immediately obtain medical attention. DO NOT attempt to manually remove anything stuck to the eye.

Skin Contact: *Dust:* Remove contaminated clothing, shoes and leather goods (e.g., watchbands, belts). Quickly and gently blot or brush away excess material. Wash gently and thoroughly with lukewarm gently flowing water and non-abrasive soap for 5 minutes. If irritation persists, repeat flushing. Obtain medical advice. Completely decontaminate clothing, shoes and leather goods before reuse or else discard. *Molten Metal:* Flush contact area to solidify and cool but do not attempt to remove encrusted material or clothing. Cover burns and seek medical attention immediately.

Inhalation: Remove source of contamination or move victim from exposure area to fresh air. Obtain medical advice.

Ingestion: NEVER give anything by mouth if victim is rapidly losing consciousness, or is unconscious or convulsing. Have victim rinse mouth thoroughly with water. DO NOT INDUCE VOMITING. Have victim drink 2 – 8 oz. (60 – 240 ml) of water. If vomiting occurs naturally, have victim rinse mouth with water again. Obtain medical advice and bring a copy of this MSDS.

SECTION 5. FIRE FIGHTING MEASURES

Fire and Explosion Hazards: Massive metal is not flammable or combustible. Finely-divided dust or powder is a moderate fire hazard and moderate explosion hazard when dispersed in the air at high concentrations and exposed to heat, flame, or other ignition sources. Explosions may also occur under certain circumstances upon contact with certain incompatible materials (see Stability and Reactivity, Section 10).

Extinguishing Media: Use any means of extinction appropriate for surrounding fire conditions such as water spray, carbon dioxide, dry chemical, or foam.

Fire Fighting: If possible, move material from fire area and cool material exposed to flame. Apply water, carbon dioxide, foam or dry chemical. Lead and tin oxide fumes may evolve in a fire. Fire fighters must be fully trained and wear full protective clothing including an approved, self-contained breathing apparatus which supplies a positive air pressure within a full face-piece mask. Do not use direct water streams on fires where molten metal is present, due to the risk of a steam explosion that could potentially eject molten metal uncontrollably. Use a fine water mist on the front-running edge of the spill and on the top of the molten metal to cool and solidify it.

Flashpoint and Method: Not Applicable.

Upper and Lower Flammable Limit: Not Applicable.

Autoignition Temperature: Not Applicable.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Procedures for Cleanup: Material is recyclable. Control source of spillage if possible to do so safely. Clean up spilled material immediately, observing precautions in Section 8, Personal Protection. Molten metal should be allowed to solidify before cleanup. Once solidified, wear gloves, pick up and return to process. Powder or dust should be cleaned up using methods that will minimize dust generation (e.g., vacuum solids.). Return uncontaminated spilled material to the process if possible. Place contaminated material in suitable labelled containers for later recovery or disposal. Treat or dispose of waste material in accordance with all local, regional, and national requirements.

Personal Precautions: Persons responding to an accidental release should wear protective clothing, gloves and a respirator (see also Section 8). Close-fitting safety goggles may be necessary in some circumstances to prevent eye contact with dust and

fume. Where molten metal is involved, wear heat-resistant gloves and suitable clothing for protection from radiant heat and hot-metal splash as well as a respirator to protect against inhalation of fumes. Workers should wash and change clothing following cleanup of a spill to prevent personal contamination with lead dust.

Environmental Precautions: The constituent metals in this product (an alloy) have relatively low bioavailability; however, compounds of the constituent metals (in particular, lead), under certain chemical conditions, can yield toxic effects to aquatic and terrestrial plants and animals. Releases of the product to water and soil should, therefore, be prevented.

SECTION 7. HANDLING AND STORAGE

Store in a dry, covered area away from incompatible materials and food or feedstuffs. Ingots suspected of containing moisture should be THOROUGHLY DRIED before being added to a molten bath. Otherwise, entrained moisture could expand explosively and spatter molten metal out of the bath. Use with adequate ventilation. Always follow good hygiene and housekeeping practices. Do not eat, drink or smoke while working with this material. Thoroughly wash hands after handling and before eating, drinking or smoking in appropriate, designated areas only.

EU Safety Phrase(s): S53 - Avoid exposure - obtain special instructions before use; S45 - In case of accident, or if you feel unwell, seek medical advice immediately (show the label where possible).

SECTION 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Protective Clothing: Gloves and shop coat or other work clothing with long sleeves are recommended to prevent prolonged or repeated direct skin contact when this product is processed. Where hot or molten metal is handled, heat resistant gloves, goggles or face shield, and clothing to protect from hot metal splash and radiant heat should be worn. Appropriate eye protection should be worn where fume or dust is generated. Safety type boots are recommended.

Ventilation: Use adequate local or general ventilation to maintain the concentration of lead and tin fumes in the working environment well below recommended occupational exposure limits. Supply sufficient replacement air to make up for air removed by the exhaust system. Local exhaust is recommended for melting, casting, welding, grinding and flame cutting or burning.

Respirators: Where alloy dust or fumes are generated and cannot be controlled to within acceptable levels by engineering means, use appropriate NIOSH-approved respiratory protection equipment (a 42CFR84 Class N, R or P-100 particulate filter cartridge).

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance: Silver-grey metal	Odour: None	Physical State: Solid	pH: Not Applicable
Vapour Pressure: 1 mmHg @ 973°C (Lead) (negligible @ 20°C)	Vapour Density: Not Applicable	Boiling Point/Range: 1740°C (Lead) 2270°C (Tin)	Melting Point/Range: 245-255°C
Specific Gravity: 8.52	Evaporation Rate: Not Applicable	Coefficient of Water/Oil Distribution: Not Applicable	Odour Threshold: None
Solubility: Insoluble in water	Percent Volatile by Weight: 0%		

SECTION 10. STABILITY AND REACTIVITY

Stability & Reactivity: Massive metal is stable and not considered reactive under normal temperatures and pressures. Hazardous polymerization or runaway reactions will not occur.

Incompatibilities: This material may react vigorously with strong acids, strong oxidizers such as hydrogen peroxide, chlorine, chlorine trifluoride, and active metals such as sodium and potassium. Powdered lead fused with ammonium nitrate poses a risk of explosion. Solutions of sodium azide in contact with lead-containing materials can form lead azide, which is a detonating compound.

Hazardous Decomposition Products: High temperature operations such as oxy-acetylene cutting, electric arc welding or overheating of a molten bath will generate toxic metal oxide fumes. The fumes will contain oxides of lead and tin. The particle

size of metal fumes is largely within the respirable size range, which increases the likelihood of inhalation and deposition of the fume within the body.

SECTION 11. TOXICOLOGICAL INFORMATION

General: The major route of exposure is inhalation of fumes generated from high temperature processing. Dust generated by handling and processing also creates an inhalation and/or ingestion risk. Tin is much less toxic than lead and the health effects are therefore due principally to the lead content.

Acute:

Skin/Eye: Contact with dust or fume may cause local irritation but would not cause tissue damage.

Inhalation: Exposure to fumes of this alloy may cause headache, nausea, vomiting, abdominal spasms, fatigue, sleep disturbances, weight loss, anemia, and pain in legs, arms, and joints. An intense, short-term fume exposure could cause acute encephalopathy with seizures, coma, and death. However, short-term exposures of this magnitude are unlikely in industry today. Kidney damage, as well as anemia, can occur from acute exposure.

Ingestion: May cause headache, nausea, vomiting, dizziness and/or gastrointestinal irritation. Kidney damage, as well as anemia can occur from acute lead exposure. Other health effects such as metallic taste in the mouth and constipation or bloody diarrhea might also be expected to occur.

Chronic:

Lead can be harmful when ingested or inhaled. Overexposure to lead can cause lead poisoning, which is characterized by decreased physical fitness, fatigue, sleep disturbance, headache, aching bones and muscles, constipation, abdominal pains, and decreased appetite. These symptoms are reversible and complete recovery is possible. However, continued over-exposure to lead can lead to increased symptoms and chronic systemic disorders. The kidneys, blood, gastrointestinal tract, nervous system, male and female reproductive system can all be adversely affected by concentrations of lead in the body. Pregnant women should be protected from excessive exposure in order to prevent lead crossing the placental barrier and causing infant neurological disorders. Teratogenic and mutagenic effects from exposure to lead have been reported in some studies but not in others. The literature is inconsistent and no firm conclusions can be drawn at this time. Lead and lead compounds are listed as an *A3 Carcinogen (Confirmed Animal Carcinogen with Unknown Relevance to Humans)* by the ACGIH. IARC has listed lead compounds as *Group 2A Carcinogens (Probably Carcinogenic to Humans)* while lead metal is listed as *Group 2B (Possibly Carcinogenic to Humans)*. The NTP has also listed lead and lead compounds as *Reasonably Anticipated to be a Human Carcinogen*. OSHA and the EU do not currently list lead as a human carcinogen. Chronic overexposure to tin can result in a benign pneumoconiosis called stanosis. This form of pneumoconiosis produces progressive x-ray changes of the lungs as long as exposure exists, but there is no evidence of disability and no special complicating factors. Tin is not considered a human carcinogen by the ACGIH, IARC, NTP, OSHA or the EU.

SECTION 12. ECOLOGICAL INFORMATION

This product, a metal alloy, is relatively insoluble (and therefore not readily bioavailable); however, processing of the product or extended exposure in aquatic and terrestrial environments may lead to the release of tin and lead compounds in more bioavailable forms. Compounds of lead have been shown to yield toxic effects in aquatic organisms, especially fish, at relatively low concentrations. Water hardness, pH and dissolved organic carbon content are physico-chemical characteristics which regulate the degree of toxicity by lead in solution. Lead compounds, however, are not particularly mobile in surface water or groundwater. In soil, lead has a tendency to become highly sorbed onto soil particles in accordance with certain soil properties. Lead also has the tendency to bioaccumulate in plants and animals in both aquatic and terrestrial environments.

Tin compounds have similar geochemical and ecological properties to those of lead but are considerably less toxic to aquatic and terrestrial organisms.

SECTION 13. DISPOSAL CONSIDERATIONS

If material cannot be returned to process or salvage, dispose of only in accordance with applicable local, state/provincial and federal regulations. Waste material meets the requirements of a hazardous waste in most jurisdictions. It is the responsibility of the waste generator to determine the toxicity and physical properties of the material generated in order to determine the proper waste classification and disposal methods.

SECTION 14. TRANSPORT INFORMATION

Transport Canada and U.S. DOT Hazard Classification Not a regulated product in ingot form.

Marine Pollutant..... No.

IMO Classification..... Not regulated.

SECTION 15. REGULATORY INFORMATION

U.S.

Ingredients Listed on TSCA Inventory Yes

Hazardous Under Hazard Communication Standard Yes

CERCLA Section 103 Hazardous Substances Lead.....RQ: 10lb. (4.54 kg.)*
* reporting not required when diameter of the pieces of solid metal released is equal to or exceeds 100 micrometers.

EPCRA Section 302 Extremely Hazardous Substance No Ingredients Qualify

EPCRA Section 311/312 Hazard Categories Delayed (chronic) health hazard - Carcinogen
Delayed (chronic) health hazard – Reproductive Toxin

EPCRA Section 313 Toxic Release Inventory (Supplier Notification): Lead.....CAS No. 7439-92-1
Percent by Weight: 37%

CANADIAN:

Ingredients Listed on DSL: Yes

WHMIS Classification: D2A - Materials Causing other Toxic Effects - Very Toxic

EUROPEAN UNION:

Ingredients Listed on the European Inventory
of Existing Commercial Chemical Substances (EINECS): Yes

EU Classification:..... Toxic, Rep. Cat. 1 and Rep. Cat. 3

SECTION 16. OTHER INFORMATION

The information in this Material Safety Data Sheet is based on the following references:

- American Conference of Governmental Industrial Hygienists, 2004, Documentation of the Threshold Limit Values and Biological Exposure Indices, Seventh Edition plus updates.
- American Conference of Governmental Industrial Hygienists, 2012, Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices.
- American Conference of Governmental Industrial Hygienists, 2012, Guide to Occupational Exposure Values.
- Bretherick's Handbook of Reactive Chemical Hazards, 20th Anniversary Edition (P. G. Urban, Ed.), 1995.
- Commission de la santé et la sécurité du travail, Service du répertoire toxicologique, Étain, 2000-01 et Plomb 2007-04.
- European Regulation (EC) No 1272/2008 on classification, labelling and packaging of substances and mixtures, amending and repealing directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No 1907/2006 (REACH).
- Handbook on the Toxicology of Metals, 3rd ed., Gunnar F. Nordberg, Bruce A. Fowler, Monica Nordberg and Lars Friberg, Editors, Academic Press, New York, NY (2007) Tin – Chapter 42.
- Industry Canada, SOR/88-66, Controlled Products Regulations, as amended.
- International Agency for Research on Cancer (IARC), Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Man, 1972 – present, (multi-volume work), World Health Organization, Geneva.
- Merck & Co., Inc., 2001, The Merck Index, An Encyclopedia of Chemicals, Drugs, and Biologicals, Thirteenth Edition.
- National Library of Medicine, National Toxicology Information Program, Hazardous Substance Data Bank (on-line version).
- Patty's Toxicology, Fifth Edition, 2001: E Bingham, B Cohrssen & C H Powell, Ed.
- Sax, N. Irving & Lewis, Richard J., Sr., 1987, Hawley's Condensed Chemical Dictionary, Eleventh Edition.
- U.S. Dept. of Health and Human Services, National Institute of Environmental Health Sciences, National Toxicology Program (NTP), 12th Report on Carcinogens, June 2011.
- U.S. Dept. of Health and Human Services, National Institute for Occupational Safety and Health, NIOSH Pocket Guide to Chemical Hazards. CD-ROM Edition September 2005.
- U.S. Dept. of Health and Human Services, National Institute for Occupational Safety and Health, Registry of Toxic Effects of Chemical Substances (RTECS) (CCOHS web version, last accessed 14-May-2012).
- U.S. Occupational Safety and Health Administration, 1989, Code of Federal Regulations, Title 29, Part 1910.

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