LEAD METAL SAFETY DATA SHEET

SECTION 1. IDENTIFICATION

Product Identity: Lead Metal

Trade Names and Synonyms: Lead; Pb; Plumbum; Metallic Lead; Inorganic Lead; ASTM B29; TADANAC Lead, Low-Alpha Lead.

Manufacturer:

Teck Metals Ltd. Trail Operations Trail, British Columbia V1R 4L8 Emergency Telephone: 250-364-4214

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Supplier: Teck Metals Ltd. #600-100 Wellington Street West Toronto, Ontario M5H 1H1

Preparer: Teck Metals Ltd. Suite 3300 – 550 Burrard Street Vancouver, British Columbia V6C 0B3

Product Use: Used as a construction material for tank linings, piping, and equipment used in the manufacture of sulphuric acid and the refining and processing of petroleum; used in x-ray and atomic radiation shielding; used in the manufacture of tetraethyl lead, paint pigments, organic and inorganic lead compounds, lead shot, lead wire for bullets, ballast, and lead solders; used as a bearing metal or alloy; used in the manufacture of storage batteries, ceramics, plastics, and electronic devices; used in the metallurgy of steel and other metals; and used in the form of lead oxide for batteries.

This product has been classified in accordance with the hazard criteria of the Hazardous Products Regulation SOR/2015-17 and this SDS contains all the information required by both the HPR and the OSHA Hazard Communication Standard of 2012 (29 CFR 1910.1200(g) and Appendix D.

SECTION 2. HAZARDS IDENTIFICATION

CLASSIFICATION:

Health		Physical	Environmental
Acute Toxicity (Oral, Inhalation) Skin Corrosion/Irritation Eye Damage/Eye Irritation Respiratory or Skin Sensitization Mutagonicity	 does not meet criteria 	Does not meet criteria for any Physical Hazard	Aquatic Toxicity – Short Term (Acute) Category 3
Carcinogenicity Reproductive Toxicity Specific Target Organ Toxicity Chronic Exposure	 – Gategory 2 – Category 1A – Category 1 		

LABEL:

Symbols:	Signal Word:	
	DANGER	
Hazard Statements DANGER! Causes damage to kidneys, blood-forming systems, central nervous system through prolonged or repeated exposure. May damage the unborn child. May cause harm to breast-fed children. Suspected of damaging fertility. Suspected of causing cancer. Harmful to aquatic life.	Precautionary Statements: Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Wear protective gloves/protective clothing/eye protection. Do not breathe dust or fumes. Wash hands thoroughly after handling. Do not eat, drink or smoke when using this product. If exposed or concerned or you feel unwell: Get medical advice/attention. Avoid release to the environment	

Emergency Overview: A bluish white to silvery-grey, heavy, soft metal that does not burn in bulk but will melt readily at temperature above 300°C to form a molten metal pool. Finely divided lead dust clouds may be a moderate fire and explosion hazard, however. When heated strongly in air, highly toxic lead oxide fumes will be generated. Inhalation or ingestion of lead fumes may produce both acute and chronic health effects. Possible cancer and reproductive hazard. SCBA and full protective clothing are required for fire emergency response personnel.

Potential Health Effects: While this product is not considered hazardous in the form in which it is sold, this Safety Data Sheet contains valuable information essential to the safe handling and proper use of this product. Inhalation or ingestion of lead 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, hypertension, gastrointestinal disturbances, anemia, kidney dysfunction and possible reproductive effects. Pregnant women should be protected from excessive exposure to dust/fume in order to prevent lead crossing the placental barrier and causing infant neurological disorders. Lead and inorganic 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 lists lead and lead compounds as Reasonably Anticipated to be a Human Carcinogen. OSHA and the EU does not currently list lead as a human carcinogen. (See Toxicological Information, Section 11)

Potential Environmental Effects: Lead metal has relatively low bioavailability; however, compounds which it forms with other elements can be toxic to both aquatic and terrestrial organisms at low concentrations. These compounds can be particularly toxic in the aquatic environment. Lead bioaccumulates in plants and animals in both aquatic and terrestrial environments (see Ecological Information, Section 12).

SECTION 3. COMPOSITION / INFORMATION ON INGREDIENTS

HAZARDOUS COMPONENTS	CAS Registry No.	CONCENTRATION (% wt/wt)
Lead	7439-92-1	99+%

Note: see Section 8 for Occupational Exposure Guidelines.

SECTION 4. FIRST AID MEASURES

Eye Contact: *Symptoms:* Eye irritation, redness. Gently brush product off face if necessary. Do not rub eye(s). Let the eye(s) water naturally for a few minutes. Look right and left, then up and down. If particle/dust does not dislodge, cautiously rinse eye(s) with lukewarm, gently flowing water for 5 minutes or until particle/dust is removed, while holding eyelid(s) open. If irritation persists, get medical advice/attention. DO NOT attempt to manually remove anything stuck to the eye.

Skin Contact: *Symptoms:* Skin soiling, mild irritation. Gently brush away excess dust. Wash gently and thoroughly with lukewarm, gently flowing water and non-abrasive soap for 5 minutes, or until product is removed. If skin irritation occurs or you feel unwell, get medical advice/attention. *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: *Symptoms:* Respiratory irritation. Remove source of exposure or move person to fresh air and keep comfortable for breathing. Seek medical attention if you feel unwell.

Ingestion: Symptoms: Stomach upset. If you feel unwell or are concerned, get medical advice/attention.

SECTION 5. FIRE FIGHTING MEASURES

Fire and Explosion Hazards: Massive metal is not flammable or combustible but will melt readily at temperatures above 328°C to form a molten metal pool. Finely divided lead dust or powder may be 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 some 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 solid material from fire area and cool any material exposed to flames to prevent melting of the metal ingots. Apply water, carbon dioxide, foam or dry chemical as appropriate to the source of the fire. 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. Highly toxic lead oxide fumes will evolve in fires where lead is heated to or near the melting point. 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.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Procedures for Cleanup: Control source of spillage if possible to do so safely. Restrict access to the area until completion of clean-up. Clean up spilled material immediately, observing precautions outlined below. Molten metal should be allowed to solidify before cleanup. If solid metal, wear gloves, pick up and return to process. If dust, wear recommended personal protective equipment (see below) and use methods which 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 spill of ingots should wear work clothing and gloves. Persons responding to an accidental release of particulates or dust 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 hot-metal splash as well as a respirator to protect against inhalation of lead fume. Workers should wash and change clothing following cleanup of a lead spill to prevent personal contamination with lead dust.

Environmental Precautions: Lead metal has low bioavailability; however, compounds which it forms with other elements can be toxic to aquatic and terrestrial organisms. Releases of the product to water and soil should be prevented.

SECTION 7. HANDLING AND STORAGE

Precautions for Safe Handling

Solid metal 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, particularly in circumstances where high heat may be applied to the product. Lead metal, in contact with wood or other surfaces, may leave traces of lead particulate that can accumulate over time. Cleaning or disposal of such surfaces requires review to ensure that any effluent or solid waste disposal meets the requirements of regulations in the applicable jurisdiction.

Conditions for Safe Storage

Store in a DRY, covered area, separate from strong acids, other incompatible materials, active metals and food or feedstuffs. No special packaging materials are required.

SECTION 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Occupational Exposure Guidelines: (Time-Weighted Average (TWA) concentration over 8 hr unless otherwise indicated)

<u>Component</u>	<u>ACGIH TLV</u>	<u>OSHA PEL</u>	NIOSH REL
Lead	0.05 mg/m ³	0.05 mg/m ³	0.05 mg/m ³

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

NOTE: The selection of the necessary level of engineering controls and personal protective equipment will vary depending upon the conditions of use and the potential for exposure. The following are therefore only general guidelines that may not fit all circumstances. Control measures to consider include:

Ventilation: Use adequate local or general ventilation to maintain the concentration of lead 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, flame cutting or burning, and use of lead powders.

Protective Clothing: Although metallic lead is not considered to be absorbable through the intact skin, basic lead carbonate that forms as a protective layer on the surface of lead metal can rub off on the skin and then be transferred by hand to mouth contact. Gloves and coveralls or other work clothing are therefore recommended to prevent prolonged or repeated direct skin contact when lead is processed Where hot or molten metal is handled, heat resistant gloves, goggles or face shield, and clothing to protect from radiant heat and hot metal splash should be worn. Safety type boots are recommended.

Respirators: Where lead 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). When exposure levels are obviously high, but the actual concentration is unknown, a self-contained breathing apparatus which supplies a positive air pressure within a full face-piece mask should be worn.

General Hygiene Considerations: Do not eat, drink or smoke in work areas. Thoroughly wash hands before eating, drinking, or smoking in appropriate, designated areas as well as at the end of the workday. A double locker-shower system with separate clean and dirty sides is usually required for lead handling operations to avoid cross-contamination of street clothes. Contaminated clothing should be changed frequently and laundered before each reuse. Inform laundry personnel of contaminants' hazards. Workers should not take dirty work clothes home and launder them with other personal clothing.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance: Malleable, bluish white to silvery-grey solid metal	Odour: None	Odour Threshold: Not Applicable	pH: Not Applicable
Vapour Pressure:	Vapour Density:	Melting Point/Range:	Boiling Point/Range:
(negligible @ 20°C)	Not Applicable	328°C	1,740°C
Relative Density (Water = 1):	Evaporation Rate:	Coefficient of Water/Oil	Solubility:
11.34	Not Applicable	Distribution: Not Applicable	Insoluble in water
Flammability:	Flammable Limits (LEL/UEL):	Auto-ignition Temperature:	Decomposition Temperature:
Non-combustible solid	Not Applicable	None	None

NOTE: Flash point and viscosity are not relevant physical properties of this product and therefore have not been included above.

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. Freshly cut or cast lead surfaces tarnish rapidly due to the formation of an insoluble protective layer of basic lead carbonate.

Incompatibilities: Lead reacts vigorously with strong acids (e.g. hot concentrated nitric acid, boiling concentrated hydrochloric acid, etc.), strong oxidizers such as peroxides, chlorates, nitrates and halogen or interhalogen compounds such as chlorine trifluoride. Powdered lead metal in contact with disodium acetylide, chlorine trifluoride, sodium carbide or fused ammonium nitrate poses a risk of explosion. Solutions of sodium azide in contact with lead metal can form lead azide, which is a detonating compound. Vigorous reactions can also occur between molten lead and active metals, such as sodium, potassium, lithium and calcium. A lead-zirconium alloy (10-70% Zr) will ignite when struck with a hammer.

Hazardous Decomposition Products: High temperature operations such as oxyacetylene cutting or burning, electric arc welding or overheating a molten bath will generate highly toxic lead oxide fume. Lead oxide is highly soluble in body fluids and the particle size of the 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: It should be noted that simple handling and non-thermal processing of lead billets does not present any significant health hazards to workers. The primary routes of exposure to lead are inhalation or ingestion of dust and fumes generated from processing the lead. Lead accumulates in bone and body organs once it enters the body. Elimination from the body is slow. Initial and periodic medical examinations are advised for persons repeatedly exposed to levels at or above the exposure limits of lead dust or fumes. Once lead enters the body, it can affect a variety of organ systems, including the nervous system, kidneys, reproductive system, blood formation system.

Acute:

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

Inhalation: Exposure to lead dust or fume may cause headache, nausea, vomiting, abdominal spasms, fatigue, sleep disturbances, weight loss, anemia, and pain in legs, arms, and joints. An intense, short-term exposure to lead 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: Symptoms due to ingestion of lead dust or fume would be similar to those from inhalation. Other health effects such as metallic taste in the mouth and constipation or bloody diarrhea might also occur.

Chronic:

Prolonged exposure to lead dust and fume may produce many of the symptoms of short-term exposure and may also cause central nervous system damage, gastrointestinal disturbances, anemia, and, rarely, wrist drop. Reduced hemoglobin production has been associated with low lead exposures. Symptoms of central nervous system damage due to moderate lead exposure include fatigue, headaches, tremors and hypertension. Very high lead exposure can result in lead encephalopathy with symptoms of hallucinations, convulsions, and delirium. Kidney dysfunction and possible injury has also been associated with chronic lead poisoning. Chronic over-exposure to lead has been implicated as a causative agent for the impairment of male and female reproductive capacity. Pregnant women should be protected from excessive exposure as lead can cross the placental barrier and unborn children may suffer neurological damage or developmental problems due to excessive lead exposure. 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 lists 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.

Animal Toxicity:

Hazardous Ingredient:	<u>Acute Oral</u>	<u>Acute Dermal</u>	Acute Inhalation
	<u>Toxicity:</u>	<u>Toxicity:</u>	Toxicity:
Lead	No Data	No Data	No Data

SECTION 12. ECOLOGICAL INFORMATION

While lead metal is relatively insoluble, its processing or extended exposure in aquatic and terrestrial environments may lead to the release of lead compounds in more bioavailable forms. While lead compounds are not particularly mobile in the aquatic environment, they can be toxic to aquatic organisms, especially fish, at low concentrations. Lead particle size, water hardness, pH and dissolved organic carbon content are major factors which regulate the degree of toxicity. Lead in soil is generally neither very mobile nor bioavailable, as it can become strongly sorbed onto soil particles, increasingly so over time, to a degree related to physical properties of the soil. Lead bioaccumulates in plants and animals in both aquatic and terrestrial environments.

SECTION 13. DISPOSAL CONSIDERATIONS

If material cannot be returned to process or salvage, dispose of in accordance with applicable regulations. Any waste materials would meet the definition of a hazardous material 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

PROPER SHIPPING NAME	. Not a regulated product in ingot form.
TRANSPORT CANADA AND U.S. DOT CLASSIFICATION	. Not Applicable
TRANSPORT CANADA AND U.S. DOT PIN	Not Applicable
MARINE POLLUTANT	. No
IMO CLASSIFICATION	. Not Regulated

SECTION 15. REGULATORY INFORMATION

U	.S.

Ingredient Listed on TSCA Inventory	. Yes
Hazardous Under Hazard Communication Standard	. Yes
CERCLA Section 103 Hazardous Substances	. LeadRQ: 10 lbs. (4.54 kg.)* gual to or exceeds 100 micrometers (0.004 inches).
EPCRA Section 302 Extremely Hazardous Substance	. No
EPCRA Section 311/312 Hazard Categories	. Delayed (chronic) health hazard - Carcinogen Delayed (chronic) health hazard – Reproductive toxin
EPCRA Section 313 Toxic Release Inventory	. Lead CAS No. 7439-92-1 Percent by Weight - At least 99%

SECTION 16. OTHER INFORMATION

Date of Original Issue: Date of Latest Revision: 13 December 2022 Version: 01 (first edition) Version: 15

The information in this 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, 2022, Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices.
- American Conference of Governmental Industrial Hygienists, Guide to Occupational Exposure Values 2021.
- Bretherick's Handbook of Reactive Chemical Hazards, 20th Anniversary Edition. (P. G. Urben, Ed), 1995.
- Canadian Centre for Occupational Health and Safety, Hamilton, ON, CHEMINFO Record No. 608 Lead (Rev. 2009-05).
- 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).
- Health Canada, SOR/2015-17, Hazardous Products Regulations11 February 2015.
- 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.
- International Chemical Safety Cards (WHO/IPCS/ILO), ICSC:0052 Lead.
- 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 (online version).
- Patty's Toxicology, Fifth Edition, 2001: E. Bingham, B. Cohrssen & C.H. Powell, Ed.
- U.S. Dept. of Health and Human Services, National Institute of Environmental Health Sciences, National Toxicology Program (NTP), 15th Report on Carcinogens, December 2021.
- U.S. Dept. of Health and Human Services, National Institute for Occupational Safety and Health, NIOSH Pocket Guide to Chemical Hazards, on-line edition.
- U.S. Dept. of Health and Human Services, Public Health Service, Agency for Toxic Substances and Disease Registry, Toxicological Profile for Lead, September 2005.
- U.S. Occupational Safety and Health Administration, 1989, Code of Federal Regulations, Title 29, Part 1910.100 & 1910.1200

Acronyms not spelled out elsewhere in the SDS:

CAS: Chemical Abstracts Service

CERCLA: Comprehensive Environmental Response, Compensation, and Liability Act

DOT: Department of Transportation

EPCRA: Emergency Planning and Community Right- to-Know Act

IMO: International Maritime Organization

LD50, LC50: Lethal Dose 50%, Lethal Concentration 50%

OEGs: Occupational Exposure Guidelines

TSCA: Toxic Substances Control Act

Wt: Weight

Notice to Reader

Although reasonable precautions have been taken in the preparation of the data contained herein, it is offered solely for your information, consideration and investigation. Teck Metals Ltd. extends no warranty and assumes no responsibility for the accuracy of the content and expressly disclaims all liability for reliance thereon. This safety data sheet provides guidelines for the safe handling and processing of this product; it does not and cannot advise on all possible situations. Therefore, your specific use of this product should be evaluated to determine if additional precautions are required. Individuals exposed to this product should read and understand this information and be provided pertinent training prior to working with this product.