

## LEAD-CADMIUM METAL MATERIAL SAFETY DATA SHEET

### SECTION 1. PRODUCT AND COMPANY IDENTIFICATION

**Product Identity:** Lead-Cadmium

**Manufacturer:**

Teck Metals Ltd.  
Trail Operations  
Trail, British Columbia  
V1R 4L8

Emergency Telephone: 250-364-4214

**Supplier:**

Teck Metals Ltd.  
#1700 – 11 King Street West  
Toronto, Ontario  
M5H 4C7

**MSDS Preparer:**

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

**Date of Last MSDS Revision/Edit:** August 18, 2010.

**Product Use:** Cable sheathing.

### SECTION 2. COMPOSITION / INFORMATION ON INGREDIENTS

Hazardous Ingredient	Approximate Percent by Weight	CAS Number	Occupational Exposure Limits (OELs)		LD <sub>50</sub> / LC <sub>50</sub> Species and Route
Lead	99.5 to 99.9%	7439-92-1	OSHA PEL	0.05 mg/m <sup>3</sup>	No Data
			ACGIH TLV	0.05 mg/m <sup>3</sup>	
			NIOSH REL	0.05mg/m <sup>3</sup>	
Cadmium	0.06 to 0.14%	7440-43-9	OSHA PEL	0.005 mg/m <sup>3</sup>	LD <sub>50</sub> , rat, oral 225 mg/kg
			OSHA SECAL*	0.015 or 0.05 mg/m <sup>3</sup>	LD <sub>50</sub> , mouse, oral 636 mg/kg
			ACGIH TLV	0.01 mg/m <sup>3</sup> (total dust)	
			NIOSH REL	0.002 mg/m <sup>3</sup> (respirable) Lowest feasible level	

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, SECAL – Separate Engineering Control Airborne Limit.

\*Separate Engineering Control Airborne Limits: to be achieved in specified processes and workplaces where it is not possible to achieve the PEL through engineering and work practices alone. The OSHA SECAL for cadmium is 0.015 or 0.050 mg/m<sup>3</sup>, depending on the processes involved. See Table 1 of 29 CFR § 1910.1027.

**Trade Names and Synonyms:** Lead-Cadmium; Pb-Cd.

### SECTION 3. HAZARDS IDENTIFICATION

**Emergency Overview:** A silvery-grey heavy, soft metal that does not burn in bulk. Clouds of finely-divided dust are a moderate fire and explosion hazard, however. When heated strongly in air, highly toxic lead and cadmium oxide fumes can be generated. Inhalation or ingestion of lead-cadmium dust or fume may produce both acute and chronic health effects. Freshly-formed cadmium fume is an intense pulmonary irritant and may result in development of pulmonary edema several hours after exposure. Possible cancer and reproductive hazard. SCBA and full protective clothing required for fire emergency response personnel.

**Potential Health Effects:** Inhalation or ingestion of dust or fumes may result in irritation of the nose, throat and upper airways, 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 in order to prevent absorbed lead crossing the placental barrier and causing infant neurological disorders. Due to the presence of lead and cadmium which are classified as possible carcinogens or carcinogens by various regulatory and advisory bodies, this product is considered carcinogenic. (See Toxicological Information, Section 11)

**Potential Environmental Effects:** Lead-cadmium metal has low bioavailability, but its constituent compounds can be potentially toxic to organisms (particularly aquatic) at low concentrations. Lead and cadmium have the potential to bioaccumulate in plants and animals in both aquatic and terrestrial environments. (See Ecological Information, Section 12).

**EU Risk Phrase(s):** R61 - May cause harm to unborn child; R62 – Risk of impaired fertility; R33 - Danger of cumulative effects; R45 – May cause cancer; R20/22 – Harmful by inhalation and if swallowed.

#### 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 chemical. 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 victim from exposure area to fresh air immediately. If breathing has stopped, trained personnel should begin artificial respiration. Medical oxygen may be administered by trained personnel, where breathing is difficult. If the heart has stopped, immediately start cardiopulmonary resuscitation (CPR), or automated external defibrillation (AED). Quickly transport victim to an emergency care facility.

**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 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. Highly toxic fumes of lead and cadmium oxide may evolve in fires. 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.

**Flashpoint and Method:** Not Applicable.

**Upper and Lower Flammable Limit:** Not Applicable.

**Autoignition Temperature:** Not Applicable.

#### 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 in Section 8, Personal Protection. 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 Section 8) 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 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 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.

**Environmental Precautions:** While lead-cadmium metal has low bioavailability, its constituent compounds can potentially be toxic. Releases of the product to water and soil should be prevented.

## SECTION 7. HANDLING AND STORAGE

Store lead-cadmium metal in a DRY, covered area, separate from strong acids, other incompatible materials, active metals 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. Always practice good personal hygiene. Refrain from eating, drinking, or smoking in work areas. Thoroughly wash hands before eating, drinking, or smoking in appropriate, designated areas as well as at the end of the workday. No special packaging materials are required.

**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 label where possible); S22 - Do not inhale dust.

## SECTION 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

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

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.

**Ventilation:** Use adequate local or general ventilation to maintain the concentration of lead and cadmium fumes in the working environment well below their respective 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 lead-cadmium 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.

## SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

<b>Appearance:</b> Silver-grey metal	<b>Odour:</b> None	<b>Physical State:</b> Solid	<b>pH:</b> Not Applicable
<b>Vapour Pressure:</b> Negligible @ 20°C (1.3 mm Hg at 970°C)	<b>Vapour Density:</b> Not Applicable	<b>Boiling Point/Range:</b> 1,740°C	<b>Melting Point/Range:</b> 320°C
<b>Specific Gravity:</b> 11.3	<b>Evaporation Rate:</b> Not Applicable	<b>Coefficient of Water/Oil Distribution:</b> Not Applicable	<b>Odour Threshold:</b> None
<b>Solubility:</b> Insoluble in water			

## 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 surfaces will tarnish rapidly due to the formation of an insoluble protective layer of basic lead carbonate.

**Incompatibilities:** This product reacts vigorously with strong acids and bases, strong oxidizing agents such as peroxides, chlorates, nitrates, and halogen or interhalogen compounds such as chlorine trifluoride. Powdered 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-cadmium metal can form lead azide, which is a detonating compound. Strong reactions can also occur between the molten metal and active metals such as sodium, potassium, lithium and calcium.

**Hazardous Decomposition Products:** High temperature operations such as oxy-acetylene cutting or burning, electric arc welding or overheating a molten bath will generate highly toxic fumes of lead oxide and cadmium oxide. Both are 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:** The lead and cadmium components of this alloy, when used in a process, may produce both acute and chronic health hazards. The primary routes of exposure to lead-cadmium metal are by inhalation or ingestion of dust and fumes. Initial and periodic medical examinations are advised for persons repeatedly exposed to levels above the exposure limits of lead or cadmium dust or fumes.

**Acute:**

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

**Inhalation:** Exposure to dust or fume may cause headache, nausea, vomiting, abdominal spasms, dryness and irritation of the nose and throat, coughing, metallic taste, fatigue, sleep disturbances, weight loss, anemia, and pain in legs, arms, and joints. An intense, short-term exposure could cause pulmonary congestion and edema as well as acute encephalopathy with seizures, coma, and death. However, short-term exposure of this magnitude is unlikely in industry today. Kidney damage, as well as anemia, can occur from acute exposure.

**Ingestion:** Symptoms due to ingestion of dust or fume would be similar to those from inhalation. Other health effects such as constipation or bloody diarrhea might also be expected to occur.

**Chronic:**

Prolonged exposure to dust and fume from this metal 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 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 and cadmium poisoning. Chronic over-exposure to lead has been implicated as a causative agency 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 has recently 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. Cadmium and cadmium compounds are listed as *Group 1 (Carcinogenic to Humans)* by IARC. ACGIH classify cadmium as a *Suspected Human Carcinogen (A2)*. The NTP classifies cadmium as a *Known Human Carcinogen*, OSHA lists cadmium as a *Carcinogen*, and the EU classifies cadmium as a *Cat. 2 (Probable) Carcinogen*.

**SECTION 12. ECOLOGICAL INFORMATION**

While lead-cadmium metal is relatively insoluble, its processing or extended exposure in aquatic and terrestrial environments may lead to the release of lead and cadmium compounds in more bioavailable forms. Compounds of both metals can potentially be toxic to aquatic organisms, especially fish, at low concentrations. Water hardness, pH and dissolved organic carbon content are three major factors which regulate the degree of lead and cadmium toxicity. While lead compounds are not particularly mobile in surface water or groundwater, cadmium compounds are highly mobile in these media.

In soil, lead tends to become highly sorbed onto soil particles in accordance with physical soil properties; however, cadmium is generally more mobile and bioavailable, especially in acidic soils. Both metals bioaccumulate in plants and animals in aquatic and terrestrial environments. Cadmium accumulates strongly in organisms based on its high mobility in soil and water; this can be of a particular concern for plants that are used as food by animals.

**SECTION 13. DISPOSAL CONSIDERATIONS**

If material cannot be returned to process or salvage, dispose of in accordance with applicable regulations.

**SECTION 14. TRANSPORT INFORMATION**

PROPER SHIPPING NAME.....Not a regulated product in ingot form  
TRANSPORT CANADA CLASSIFICATION.....Not applicable

AND U.S. DOT HAZARD Classification ..... Not Applicable  
TRANSPORT CANADA PRODUCT IDENTIFICATION NUMBER ..... Not applicable  
U.S. DOT PRODUCT IDENTIFICATION NUMBER ..... Not Applicable  
MARINE POLLUTANT ..... No  
IMO CLASSIFICATION ..... Not regulated

## SECTION 15. REGULATORY INFORMATION

### U.S.

INGREDIENTS LISTED ON TSCA INVENTORY ..... Yes

HAZARDOUS UNDER HAZARD COMMUNICATION STANDARD: ..... Lead ..... Yes  
Cadmium ..... Yes

CERCLA SECTION 103 HAZARDOUS SUBSTANCES: ..... Lead ..... Yes ..... RQ: 10 lbs. (4.54 kg.)\*  
Cadmium ..... Yes ..... RQ: 10 lbs. (4.54 kg.)\*

\*reporting not required when diameter of the pieces of solid metal released is equal to or exceeds 100 micrometers (0.004 inches).

EPCRA SECTION 302 EXTREMELY HAZARDOUS SUBSTANCES ..... 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 ..... Lead ..... CAS No. 7439-92-1 Percent by Weight: 99.5% to 99.9%  
Cadmium CAS No. 7440-43-9 Percent by Weight: 0.06% to 0.14%

### CANADIAN:

Ingredients Listed on Domestic Substances List ..... Yes

WHMIS CLASSIFICATION: ..... D2A, Material causing other toxic effects – Very Toxic

### EUROPEAN UNION:

Ingredients Listed on the European Inventory

of Existing Commercial Chemical Substances (EINECS) ..... Yes

EU Classification ..... Toxic, Repr. Category 1 and 3 Toxic; Carc. Cat. 2, Muta  
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 plus updates, Seventh Edition.
- American Conference of Governmental Industrial Hygienists, 2009, Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices.
- American Conference of Governmental Industrial Hygienists, Guide to Occupational Exposure Values – 2009.
- Bretherick's Handbook of Reactive Chemical Hazards, 20th Anniversary Edition. (P. G. Urban Ed.) 1995.
- Canadian Centre for Occupational Health and Safety, Hamilton, ON., CHEMINFO Record No. 608 Lead (Rev. 2009-05).
- Canadian Centre for Occupational Health and Safety, Hamilton, ON., CHEMINFO Record No. 3454 Cadmium (Rev. 2009-04).
- European Economic Community, Commission Directives 91/155/EEC and 67/548/EEC.
- 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 – 2009, (multi-volume work), World Health Organization, Geneva.
- International Chemical Safety Cards (WHO/IPCS/ILO), ICSC:0052 – Lead (Oct 2002) and ICSC:0020 – Cadmium (April 2005).
- 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 (HSDB) on-line.
- Patty's Toxicology, Fifth Edition, 2001: E. Bingham, B. Cohrssen & C.H. Powell, Ed.
- U.S. Department of Health and Human Services, National Institute of Environmental Health Sciences, National Toxicology Program (NTP), 11<sup>th</sup> Report on Carcinogens, January 2005.
- U.S. Department 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. Department of Health and Human Services, Public Health Service, Agency for Toxic Substances and Disease Registry, Draft Toxicological Profile for Cadmium (September 2008) and Toxicological Profile for Lead (September 2005).
- U.S. Occupational Safety and Health Administration, 1989, Code of Federal Regulations, Title 29, Part 1910.

**Notice to Reader**

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