

**ZINC WITH CONTROLLED LEAD
SAFETY DATA SHEET**

SECTION 1. IDENTIFICATION

Product Identity: Zinc with Controlled Lead.

Trade Names and Synonyms: Prime Western Grade Zinc, PW Zinc, PWG Zinc.

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

Supplier:
In U.S.:
Teck American Metal Sales Incorporated
501 North Riverpoint Blvd, Suite 300
Spokane, WA
USA, 99202

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

Other than U.S.:
Teck Metals Ltd.
#1700 – 11 King Street West
Toronto, Ontario
M5H 4C7

Date of Last Review: August 14, 2018.

Date of Last Edit: August 14, 2018.


Product Use: General hot-dip galvanizing, wire galvanizing, fence galvanizing.

SECTION 2. HAZARDS IDENTIFICATION

CLASSIFICATION:

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

LABEL:

Symbols: 	Signal Word: WARNING
Hazard Statements DANGER! May cause damage to organs through prolonged or repeated exposure. Suspected of causing cancer. Suspected of damaging fertility or the unborn child.	Precautionary Statements: Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Wear protective gloves and eye protection. Do not breathe fumes or dust. If exposed or concerned or you feel unwell: Get medical advice/attention.

Emergency Overview: A lustrous bluish-silver metal that does not burn in bulk but may form explosive mixtures if dispersed in air as a fine powder. Contact with acids or alkalis generates flammable hydrogen gas which can accumulate in poorly-ventilated areas. DO NOT use water or foam in fire-fighting. Apply dry chemical, sand or special powder extinguishing media. This product contains 0.5 – 1.5% lead but would not be considered to pose an immediate or acute hazard of lead intoxication for emergency response personnel. The zinc and lead in this product have no direct bioavailability and pose no immediate ecological risk.

Potential Health Effects: Metallic zinc is relatively non-toxic to humans. This product may cause mild local irritation to eyes, nose, throat and upper airways if heated to the point of fuming. Acute over-exposure to zinc oxide fume may cause metal fume fever, characterized by flu-like symptoms such as chills, fever, nausea, and vomiting. Repeated overexposure to heavy concentrations of dust or fume may cause lead absorption and consequential health effects. Zinc is not listed as a carcinogen by ACGIH, IARC, OSHA, NTP or the EU. 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 metal as *Group 2B (Possibly Carcinogenic to Humans)*. The NTP has 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 (see Toxicological Information, Section 11).

Potential Environmental Effects: The metals in this alloy product, zinc and lead, have little direct bioavailability and therefore pose negligible ecological risks. However, lead and zinc compounds have the potential to be toxic, particularly in the aquatic environment. Lead compounds can be hazardous at relatively low concentrations. Zinc and lead are known to bioaccumulate in plants and animals in aquatic and terrestrial environments (see Ecological Information, Section 12.)

SECTION 3. COMPOSITION / INFORMATION ON INGREDIENTS

COMPONENTS	CAS Registry No.	CONCENTRATION (% wt./wt.)
Zinc	7440-66-6	98.5 to 99.5%
Lead	7439-92-1	0.5 to 1.5%

Note: See Section 8 for Occupational Exposure Guidelines.

SECTION 4. FIRST AID MEASURES

Eye Contact: *Symptoms:* Mild eye irritation, redness. 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 come out, cautiously rinse eye(s) with lukewarm, gently flowing water for 5 minutes or until particle/dust is removed, while holding eyelid(s) open. If eye irritation persists, get medical advice/attention. DO NOT attempt to manually remove anything from the eye.

Skin Contact: *Symptoms:* Soiling of skin. No health effects expected. If irritation does occur, rinse with lukewarm, gently flowing water for 5 minutes or until the 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:* Coughing and irritation in heavy dust clouds. If symptoms are experienced remove source of contamination or move victim from exposure area to fresh air immediately and obtain medical advice. NOTE: Metal fume fever may develop 3-10 hours after exposure to zinc oxide fumes. If symptoms of metal fume fever (flu-like symptoms) develop, obtain medical attention.

Ingestion: *Symptoms:* Stomach upset, nausea, diarrhea. If swallowed, no specific intervention is indicated as this material is not likely to be hazardous by ingestion. However, if you are concerned or you feel unwell, obtain medical advice.

SECTION 5. FIRE FIGHTING MEASURES

Fire and Explosion Hazards: Massive metal is difficult to ignite and is not considered a fire or explosion hazard. However, finely-divided metallic dust may form flammable or explosive dust clouds when dispersed in the air at high concentrations and exposed to heat, flame or other ignition sources. Bulk dust in a damp state may heat spontaneously and ignite on exposure to air. Contact with acids and alkali hydroxides results in evolution of hydrogen gas which is potentially explosive. Mixtures with potassium chlorate or fused ammonium nitrate may explode on impact.

Extinguishing Media: Apply dry chemical, dry sand, or special powder extinguishing media. Water may be ineffective for extinguishing a fire but should be used to keep fire-exposed billets, ingots and castings cool. Do NOT use water, carbon dioxide, foam or Halon fire extinguishing agents on molten metal.

Fire Fighting: If possible, move material from fire area and cool material exposed to flame. If this is not possible, cool fire-exposed material by applying hose streams or fogs. Take extreme caution to prevent water contact with molten or burning zinc. Apply dry chemical, sand, or special powder extinguishing media. Zinc oxide fumes and highly toxic lead oxide fumes 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.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Procedures for Cleanup: Control source of release if possible to do so safely. Clean up spilled material immediately, observing precautions in Section 8, Personal Protection. Molten metal should be allowed to cool and harden 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 or dampen material and wet sweep/shovel, etc.). Return uncontaminated spilled material to the process if possible. Place contaminated material in suitable containers for later recovery or disposal. Treat or dispose of waste material in accordance with all local, state/provincial, and national requirements.

Personal Precautions: Protective clothing, gloves, and a respirator are recommended for persons responding to an accidental release (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.

Environmental Precautions: The zinc and lead in this product have no direct bioavailability and pose no immediate ecological risk but their compounds, particularly those of lead, can pose a threat to aquatic and terrestrial environments. Contamination of water and soil should be prevented.

SECTION 7. HANDLING AND STORAGE

Precautions for Safe Handling: 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.

Conditions for Safe Storage: Store metal in a DRY, covered area, away from incompatible materials. 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>	<u>NIOSH REL</u>
Zinc	None established†	None established†	None established†
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: While there is no established OEL for zinc as such, there are OELs for the zinc oxide which is formed during burning, welding or other fuming processes.

The OSHA PEL final rule limits for zinc oxide dust are 10 mg/m³ (total) and 5 mg/m³ (respirable); the OSHA PEL final rule limit for zinc oxide fume is 5 mg/m³. Note that the OSHA PEL final rule limits are currently non-enforceable due to a court decision. The OSHA PEL transitional limits therefore remain in force at present. They are 15 mg/m³ (total) and 5 mg/m³ (respirable) while the transitional PEL for zinc oxide fume is 5 mg/m³. The ACGIH TLV for zinc oxide is 2 mg/m³ (respirable fraction) with a Short Term Exposure Limit (STEL) of 10 mg/m³ (respirable fraction). The NIOSH REL for zinc oxide (dust or fume) is 5 mg/m³ 10 hr TWA with a 15 mg/m³ ceiling limit (15 minute sample) for zinc oxide dust and a 10 mg/m³ STEL for zinc oxide fume (15 minute sample).

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 zinc and lead oxide 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. Where metallic particles of zinc are being collected and transported by a ventilation system, use a non-sparking, grounded ventilation system separate from other exhaust ventilation systems. Locate dust collectors and fans outdoors if possible and provide dust collectors with explosion vents or blow out panels. Refer to appropriate NFPA Standards 484, 654, and/or 68 for specific guidance.

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

Respirators: Where zinc / lead oxide 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).

General Hygiene Considerations: 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.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance: Bluish-silver lustrous metal	Odour: None	Odour Threshold: Not Applicable	pH: Not Applicable
Vapour Pressure: 1mm at 487°C (negligible @ 20°C)	Vapour Density: Not Applicable	Melting Point/Range: 417° to 420°C	Boiling Point/Range: 907°C
Relative Density (Water = 1): 7.1	Evaporation Rate: Not Applicable	Coefficient of Water/Oil Distribution: Not Applicable	Solubility: Insoluble in water
Flammability: Not Applicable. Non-combustible solid.	Flammable Limits (LEL/UEL): LEL (Zinc Dust): 500 g/m ³ ; UEL: Not Determined.	Auto-ignition Temperature: Approx. 680°C (dust cloud in air); Approx. 460°C (dust layer).	Decomposition Temperature: Oxidation starts at approx. 450°C

SECTION 10. STABILITY AND REACTIVITY

Stability & Reactivity: Massive metal is stable under normal temperatures and pressures. However, freshly-formed, fine, condensed zinc dust or powder can heat spontaneously and ignite on exposure to air when damp. Zinc metal will react with acids and strong alkalis to generate flammable hydrogen gas. A violent, explosive reaction may occur when powdered zinc is heated with sulphur. Powdered zinc will become incandescent or ignite when heated with halogen gases. Powdered zinc can also react explosively with halogenated hydrocarbons if heated. Mixtures with potassium chlorate or fused ammonium nitrate may explode on impact.

Incompatibilities: Contact with acids and alkalis will generate highly flammable hydrogen gas. Contact with acidic solutions of arsenic or antimony compounds may evolve highly toxic ARSINE or STIBINE gas. Incompatible with strong oxidizing agents such as chlorine, fluorine, bromine, sodium potassium or barium peroxide, sodium or potassium chlorate, chromium trioxide and fused ammonium nitrate. Also incompatible with elemental sulphur dust, halogenated hydrocarbons or chlorinated solvents, chlorinated rubber and solutions of sodium azide.

Hazardous Decomposition Products: High temperature operations such as oxy-acetylene cutting, electric arc welding or overheating a molten bath will generate zinc oxide fume which, on inhalation in sufficient quantity, can produce metal fume fever, a transient influenza-like illness. Thermal oxidation products will also include small amounts of lead oxide fumes which are highly toxic.

SECTION 11. TOXICOLOGICAL INFORMATION

General: In the metallic form in which this product is sold it is relatively non-toxic. Simple handling and non-thermal processing of this product does not present any significant health hazard to workers. The lead and zinc components of this alloy may represent a health hazard when present as a dense fume however. The primary route of exposure would be through the generation and inhalation of metal oxide fumes, principally composed of zinc oxide with some lead oxide as well.

Acute:

Skin/Eye: In most cases, dermal exposure to zinc or zinc compounds does not result in any noticeable toxic effects. This metal alloy is not chemically irritating to the eyes.

Inhalation: If excessive quantities of zinc oxide fume are inhaled, it can result in the condition called metal fume fever. The symptoms of metal fume fever will occur within 3 to 10 hours, and include immediate dryness and irritation of the throat, tightness of the chest, and coughing which may later be followed by flu-like symptoms of fever, malaise, perspiration, frontal headache, muscle cramps, low back pain, occasionally blurred vision, nausea, and vomiting. The symptoms are temporary and generally disappear, without medical intervention, within 24 to 48 hours of onset. There are no recognized complications, after effects, or chronic effects that result from this condition. An acute, short-term exposure to high lead levels could cause headache, nausea, vomiting, abdominal spasms, fatigue, sleep disturbances, weight loss, anemia, and pain in legs, arms, and joints. However, a short-term lead exposure of this magnitude is unlikely with this product.

Ingestion: When ingested in excessive quantities, zinc can irritate the stomach resulting in nausea and vomiting. Kidney damage, as well as anemia, can occur from acute lead exposure but ingestion of sufficient lead from this product would be all but impossible.

Chronic:

There is no chronic form of metal fume fever but in rare instances an acute incident may be followed by complaints such as bronchitis or pneumonia. Some workers may develop a short-term immunity (resistance) so that repeated exposure to zinc oxide fumes does not cause metal fume fever. This immunity (resistance) however is quickly lost after short absences from work (weekends or vacations). Workers exposed to finely-divided metallic zinc for up to 35 years revealed no acute or chronic illnesses attributable to zinc. Lead accumulates in bone and body organs once it enters the body. Elimination from the body is slow. Once lead enters the body, it can affect a variety of organ systems, including the nervous system, kidneys, reproductive system, blood formation, and gastrointestinal system. The primary routes of exposure to lead are ingestion or inhalation of dust and fumes. Zinc is not listed as a human carcinogen by the Occupational Safety and Health Administration (OSHA), the National Toxicology Program (NTP), the International Agency for Research on Cancer (IARC), the American Conference of Governmental Industrial Hygienists (ACGIH) or the European Union (EU). 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 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.

Animal Toxicity:

<u>Ingredients:</u>	<u>Acute Oral Toxicity:</u>	<u>Acute Dermal Toxicity:</u>	<u>Acute Inhalation Toxicity:</u>
Zinc	>5,000 mg/kg [†]	No data	>5.41 mg/L [‡]
Lead	No data	No data	No data

[†] LD₅₀, Mouse, Oral,

[‡] LC₅₀, Rat, Inhalation, 4 Hr

SECTION 12. ECOLOGICAL INFORMATION

While this product is relatively insoluble, when it is processed or is in the environment for an extended period, it may release zinc and lead compounds in more bioavailable forms. Certain compounds formed with both of these metals have the potential to be toxic to aquatic organisms, especially fish; lead can be toxic at relatively low concentrations. Water hardness, pH and dissolved organic carbon content are factors which can regulate the degree of toxicity of both metals. Lead compounds are not particularly mobile in surface water or groundwater; however, zinc compounds are mobile in both media.

In the soil compartment, lead tends to become highly sorbed onto soil particles, in accordance with physicochemical properties; however, zinc is more mobile and therefore more bioavailable, especially in acidic soils. Both lead and zinc are known to bioaccumulate 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.

SECTION 14. TRANSPORT INFORMATION

PROPER SHIPPING NAME Not a regulated product
 U.S. DOT AND TRANSPORT CANADA HAZARD CLASSIFICATION.... Not applicable
 U.S. DOT AND TRANSPORT CANADA PIN 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 Yes

CERCLA SECTION 103 HAZARDOUS SUBSTANCES..... Zinc Yes RQ: 1,000lbs. (454 kg.)*
 Lead 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 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:..... Lead
 CAS No 7439-92-1
 Percent by Weight: 0.5% to 1.5%

Zinc (Fume or Dust)
 CAS No 7440-66-6
 Percent by Weight: 98.5% to 99.5%

SECTION 16. OTHER INFORMATION

Date of Original Issue:	July 23, 1997	Version:	01 (<i>First edition</i>)
Date of Latest Revision:	August 14, 2018	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, 7th Edition plus updates.
- American Conference of Governmental Industrial Hygienists, 2018, Guide to Occupational Exposure Values.
- American Conference of Governmental Industrial Hygienists, Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices – 2018.
- Bretherick’s Handbook of Reactive Chemical Hazards, 20th Anniversary Edition. (PG Urben, Ed.), 1995.
- Canadian Centre for Occupational Health and Safety (CCOHS) Hamilton, ON, CHEMINFO Record No. 239 – Zinc Metal.
- Canadian Centre for Occupational Health and Safety (CCOHS) Hamilton, ON, CHEMINFO Record No. 608 – Lead.
- 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 Regulations, 11 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.
- 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 & CH Powell (Eds.).
- U.S. Department of Health and Human Services, National Institute of Environmental Health Sciences, National Toxicology Program (NTP), 14th Report on Carcinogens, November 2016.
- 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, National Institute for Occupational Safety and Health, Registry of Toxic Effects of Chemical Substances (RTECS), CCOHS on-line version.
- U.S. Department of Health and Human Services, Public Health Service, Agency for Toxic Substances and Disease Registry, Toxicological Profile for Lead (September 2005), and Toxicological Profile for Zinc (August 2005).
- U.S. Occupational Safety and Health Administration, 1989, Code of Federal Regulations, Title 29, Part 1910.1000 & 1900.1200.

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

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