

## ZINC CONCENTRATE SAFETY DATA SHEET

**SECTION 1. IDENTIFICATION**

**Product Identity:** Pend Oreille Zinc Concentrate

**Trade Names and Synonyms:** Zinc Concentrate.

**Manufacturer:**

Teck Washington Incorporated  
Pend Oreille Mine  
1382 Pend Oreille Mine Road  
P.O. Box 7  
Metaline Falls, WA 99153  
Emergency Telephone: (250) 364-4214

**Supplier:**

Teck Washington Incorporated  
Pend Oreille Mine  
1382 Pend Oreille Mine Road  
P.O. Box 7  
Metaline Falls, WA 99153

**Preparer:**

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Vancouver, British Columbia  
V6C 0B3

**Date of Last Review:** September 10, 2018.

**Date of Last Edit:** September 10, 2018.

**Product Use:** Zinc concentrate is used in the production of zinc metal and zinc alloys.

**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 <b>Carcinogenicity – Category 1</b> <b>Reproductive Toxicity – Category 1A</b> Specific Target Organ Toxicity: Acute Exposure – Does not meet criteria Chronic Exposure – Does not meet criteria	Does not meet criteria for any Physical Hazard	<b>Aquatic Toxicity – Long Term - Category 3</b>

**LABEL:**

<p><b>Symbols:</b></p> <div style="text-align: center;">  </div>	<p><b>Signal Word:</b></p> <p style="text-align: center;"><b>DANGER</b></p>
<p style="text-align: center;"><b><u>Hazard Statements:</u></b></p> <p><b>DANGER!</b>                      May cause cancer through inhalation of dust.                      May damage fertility or the unborn child.                      Harmful to aquatic life with long lasting effects.</p>	<p style="text-align: center;"><b><u>Precautionary Statements:</u></b></p> <p>Obtain special instructions before use.                      Do not handle until all safety precautions have been read and understood.                      Wear protective gloves and protective clothing.                      Avoid release to the environment.                      If exposed or concerned: Get medical advice/attention.</p>

**Emergency Overview:** A dark green-brown, heavy, soil-like material that is not flammable or combustible under normal conditions of transport and storage. However, when heated strongly in air it will burn, releasing toxic and irritating sulfur dioxide gas as well as zinc oxide and possible lead and cadmium oxide fumes. Contact with strong acids will generate flammable and highly toxic hydrogen sulfide gas (H<sub>2</sub>S). Possible cancer hazard due to lead, cadmium and silica content. Possible reproductive hazard due to the lead content. SCBA and full protective clothing required for fire emergency response personnel, especially due to the potential for release of highly irritating SO<sub>2</sub> gas in a fire situation.

**Potential Health Effects:** *Caution: The toxicological properties of this material have not been fully investigated. The information contained in this SDS is therefore based on information in the technical and scientific literature about the material's constituent compounds.*

Concentrate dust is irritating to the nose, throat and respiratory tract. Inhalation or ingestion of very high concentrations of concentrate dust may result in lead and cadmium absorption. Pregnant women should be protected from excessive exposure to prevent lead crossing the placental barrier and causing infant neurological disorders. 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). The NTP has listed lead and lead compounds as Reasonably Anticipated to be a Human Carcinogen. OSHA does not currently list lead as a human carcinogen. Cadmium is classified as an A2 Carcinogen by the ACGIH and as a Group 1 Carcinogen by IARC (see Toxicological Information, Section 11).

**Potential Environmental Effects:** Zinc concentrate is relatively insoluble in water and its constituent metals have low direct bioavailability. However, extended exposure in aquatic and terrestrial environments can lead to the release of constituent metals in bioavailable forms, which may result in toxicity to organisms in these environments.

### SECTION 3. COMPOSITION / INFORMATION ON INGREDIENTS

HAZARDOUS COMPONENTS	CAS Registry No.	CONCENTRATION (% wt./wt.)
Zinc Sulfide	1314-98-3	86 to 92%
Iron Sulfide	1317-37-9	3 to 6%
Lead Sulfide	1314-87-0	1 to 2%
Silica	14808-60-7	0.2 to 0.5%
Cadmium Sulfide	1306-23-6	0.1 to 0.3%

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. 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.

**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:** Product is not considered a fire or explosion hazard. However, concentrate will burn if strongly heated in a fire situation, releasing toxic and irritating sulfur dioxide gas (SO<sub>2</sub>). Contact with strong acids will generate flammable and highly toxic hydrogen sulfide gas (H<sub>2</sub>S). The ignition temperature of zinc concentrate is approximately 700 – 800°C.

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

**Fire Fighting:** Toxic fumes of sulfur dioxide will result from combustion. 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 cleanup. Clean up spilled material immediately, observing precautions in Section 8, Personal Protection and using methods that will minimize dust generation (e.g., vacuum solids, dampen material and shovel or wet sweep). Return uncontaminated spilled material to the process if possible. Place contaminated material in suitable labeled containers for 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 coveralls or other 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. Workers should wash and change clothing following cleanup of a spill to prevent personal contamination with lead-containing dust.

**Environmental Precautions:** The handling, shipment, storage and processing of this material requires appropriate controls and care to prevent spillage or gradual accumulation in terrestrial and aquatic environments. Spilled material should be promptly cleaned up.

## SECTION 7. HANDLING AND STORAGE

**Precautions for Safe Handling:** Some sulfide concentrates may slowly oxidize in storage and generate sulfur dioxide as well as deplete the oxygen content of a confined space. The atmosphere within confined spaces containing concentrate must be tested before entry and the area thoroughly ventilated or self-contained breathing apparatus used, if conditions warrant.

Avoid breathing dust. Avoid excessive heat. Avoid contact with acids, oxidizers and combustible materials. Minimize dust generation and accumulation.

**Conditions for Safe Storage:** Store in a cool, dry area.

**Autoignition:** Some sulfide concentrates may oxidize and generate heat, which accumulates in storage piles. If material is to be stored for an extended period, the temperature of piles should be monitored.

**Means of Control:** If heating of the concentrate is detected, the material should be sealed from air or oxygen in one of the following ways:

1. Leave the piles totally intact, do not open them up or try to spread them around.
2. Tamp or compact the surface of the piles.
3. Spray the pile with water. Resort to an organic binder only if needed because it can cause formation of hard lumps and subsequent problems for future processing. Suggestions for organic binders include Aerospray 70A Binder, Coherex, Igepal CA-720 and lignin sulphonate, a pulp mill by-product.
4. For smaller piles, cover them with a tarp that will prevent exposure of the material to air.
5. If inside a building or ship's hold, keep all doors closed as much as possible.

## 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 Sulfide	None Established*	None Established*	None Established*
Iron Sulfide	None Established*	None Established*	None Established*
Lead Sulfide	0.05 mg Pb/m <sup>3</sup>	0.05 mg Pb/m <sup>3</sup>	0.05 mg Pb/m <sup>3</sup>
Silica (as respirable quartz)	0.025 mg/m <sup>3</sup> (respirable SiO <sub>2</sub> )	4 mg/m <sup>3</sup> (respirable dust)** 12 mg/m <sup>3</sup> (total dust)**	0.050 mg/m <sup>3</sup> (respirable SiO <sub>2</sub> )
Cadmium Sulfide	0.01 mg/m <sup>3</sup> (total Cd) 0.002 mg/m <sup>3</sup> (respirable Cd)	0.005 mg Cd/m <sup>3</sup> {OSHA SECAL - 0.015/0.05 mg/m <sup>3</sup> }	Lowest feasible level

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. SECAL – Special Engineering Control Airborne Limits.

\* - NOTE: While there are no established OELs for zinc sulfide and iron sulfide as such, there are OELs for their respective oxides, which may be formed during burning, welding or other fuming processes. The OSHA PEL for zinc oxide dust is 15 mg/m<sup>3</sup> (total) and 5 mg/m<sup>3</sup> (respirable); the OSHA PEL for zinc oxide fume is 5 mg/m<sup>3</sup>. The ACGIH TLV for zinc oxide is 2 mg/m<sup>3</sup> (respirable fraction) with a Short Term Exposure Limit (STEL) of 10 mg/m<sup>3</sup> (respirable fraction). The NIOSH REL for zinc oxide (dust or fume) is 5 mg/m<sup>3</sup> 10 hr TWA with a 15 mg/m<sup>3</sup>.ceiling for zinc oxide dust and a 10 mg/m<sup>3</sup> STEL for zinc oxide fume (15 min. sample).

The OSHA PEL for iron oxide fume is 10 mg/m<sup>3</sup>. The NIOSH REL for iron oxide dust and fume is 5 mg/m<sup>3</sup> (as Fe) and the ACGIH TLV is 5mg/m<sup>3</sup> of iron oxide dust/fume (respirable fraction).

Cadmium SECAL: The airborne concentration to be achieved in specified processes and work places where it is not possible to achieve the PEL through engineering and work practices alone. The OSHA SECAL for cadmium is 0.015 or 0.05 mg/m<sup>3</sup>, depending on the processes involved. See Table 1 of 29 CFR § 1910.1027.

\*\* - NOTE: The OSHA PEL for silica applies to the total airborne zinc concentrate dust concentration and has been calculated based on the maximum percent SiO<sub>2</sub> in the sample using the formulas: Respirable Dust PEL = 10 mg/m<sup>3</sup>/(%SiO<sub>2</sub> + 2); Total Dust PEL = 30 mg/m<sup>3</sup>/(%SiO<sub>2</sub> + 2).

*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 concentrate dust in the working environment well below the appropriate occupational exposure limits. Supply sufficient replacement air to make up for air removed by the exhaust system.

**Protective Clothing:** Coveralls or other work clothing and gloves are recommended to prevent prolonged or repeated direct skin contact. Work clothing should be removed immediately if it becomes heavily contaminated and should be changed daily and laundered before reuse if there is reasonable probability that the clothing may be contaminated.

**Respirators:** Where zinc concentrate dust is 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:** Avoid breathing dust. Always practice good personal hygiene. Refrain from eating, drinking or smoking in work areas. Workers should wash immediately when skin becomes contaminated and at the end of each work shift.

## SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

<b>Appearance:</b> Dark green-brown, fine-grained powder	<b>Odour:</b> Weak organic odour from entrained flotation reagents	<b>Odour Threshold:</b> No Available	<b>pH:</b> Not Applicable
<b>Vapour Pressure:</b> Negligible @ 20°C	<b>Vapour Density:</b> Not Applicable	<b>Melting Point/Range:</b> Will burn first unless in an inert atmosphere	<b>Boiling Point/Range:</b> Not Applicable
<b>Relative Density</b> (Water = 1): 2.0 (Bulk Specific Gravity)	<b>Evaporation Rate:</b> Not Applicable	<b>Coefficient of Water/Oil Distribution:</b> Not Applicable	<b>Solubility:</b> Essentially insoluble
<b>Flammability:</b> Non-combustible solid.	<b>Flammable Limits (LEL/UEL):</b> Not Applicable	<b>Auto-ignition Temperature:</b> Not Applicable	<b>Decomposition Temperature:</b> >1,000°C
<b>Percent Volatiles:</b> 9 – 12% (moisture)			

## SECTION 10. STABILITY AND REACTIVITY

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

**Incompatibilities:** Reacts violently with iodine pentachloride. Incompatible with iodine monochloride, hydrogen peroxide, strong oxidizers, and strong acids.

**Hazardous Decomposition Products:** May release highly toxic and flammable hydrogen sulfide gas on contact with strong acids. This material can decompose at high temperatures forming toxic and irritating sulfur dioxide gas and zinc oxides as well as small amounts of lead and cadmium oxides.

## SECTION 11. TOXICOLOGICAL INFORMATION

**General:** In the powder form in which this product is sold, the metals are present as sulfides that are relatively insoluble and poorly absorbed within the body. However, high temperature operations such as oxy-acetylene cutting, electric arc welding or arc-air gouging on dust-contaminated surfaces will generate zinc oxide fume that also contains some lead and cadmium

oxides. These oxides are 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. The primary route of exposure would be through inhalation of metal oxide fumes, composed principally of zinc oxide and including some lead and cadmium oxides.

*NOTE: The toxicological properties of this material have not been fully investigated. The information contained in this SDS is therefore based on information in the technical and scientific literature about the material's constituent compounds.*

**Acute:**

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

**Inhalation:** Exposure to dust or fume is irritating to the nose, throat and respiratory tract with dryness and irritation of the nose and throat, possible tightness of the chest, coughing and metallic taste. It may cause headache, as well as gastrointestinal disturbances with nausea, vomiting, diarrhea, abdominal spasms, fatigue, sleep disturbances, weight loss, anemia, and pain in legs, arms, and joints. An intense, short-term exposure to welding/burning fumes could cause congestion and pulmonary edema. However, short-term exposures of this magnitude are unlikely in industry today. Less intense short-term exposure could 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 zinc metal fume fever. An acute, short-term exposure to high levels of oxide fumes could also result in the absorption of lead and cadmium in the body. Kidney damage, as well as anemia, can then result 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 occur.

**Chronic:**

The chronic health effects of zinc concentrate have not been fully investigated. Prolonged exposure to zinc concentrate dust may be expected to produce many of the symptoms of short-term exposure and may also cause central nervous system damage, gastrointestinal disturbances, kidney dysfunction, anemia, and possible skin rashes or dermatitis. 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 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. 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)*. The NTP has listed lead and lead compounds as *Reasonably Anticipated to be a Human Carcinogen*. OSHA does not currently list lead as a human carcinogen. IARC has classified cadmium and certain cadmium compounds as a *Group 1 Carcinogen (Carcinogenic to Humans)* while ACGIH classifies cadmium as a *Suspected Human Carcinogen (A2)*. The NTP classifies cadmium as a *Known Human Carcinogen* and OSHA lists cadmium as a *Carcinogen*. IARC has classified crystalline silica of respirable particle size as a *Group 1 Carcinogen (Carcinogenic to Humans)* while ACGIH classifies it as a *Suspected Human Carcinogen (A2)*. The NTP recently reclassified silica as a *Known Human Carcinogen*. OSHA does not list silica as a carcinogen.

**Animal Toxicity:**

<u>Hazardous Ingredient:</u>	<u>Acute Oral Toxicity:</u>	<u>Acute Dermal Toxicity:</u>	<u>Acute Inhalation Toxicity:</u>
Zinc Sulfide	>2000 mg/kg <sup>†</sup>	>2000 mg/kg*	>5.04 mg/L <sup>‡</sup>
Iron Sulfide	>2000 mg/kg <sup>†</sup>	No data	No data
Lead Sulfide	No data	No data	No data
Silica	No data	No data	No data
Cadmium Sulfide	7080 mg/kg <sup>†</sup>	No data	No data

<sup>†</sup> LD<sub>50</sub>, Rat, Oral,

\* LD<sub>50</sub>, Rat, Dermal

<sup>‡</sup> LC<sub>50</sub>, Rat, Inhalation, 4 hour

## SECTION 12. ECOLOGICAL INFORMATION

Zinc concentrate is relatively insoluble in water and its constituent metals have low direct bioavailability. However, extended exposure in aquatic and terrestrial environments can lead to the release of constituent metals in bioavailable forms, which can potentially result in toxicity to organisms in these environments. The mobility of zinc and lead is media-dependent. They can bind with inorganic and organic ligands, reducing their mobility and bioavailability in soil and water. Bioavailability is also regulated by other factors such as pH and hardness.

**Zinc:** Zinc can be toxic to aquatic organisms. In aquatic systems, zinc bioaccumulates in both plants and animals. Zinc also bioaccumulates in terrestrial plants, vertebrates and mammals, with plant uptake from soil dependent on species, soil pH, and soil composition. In general, zinc does not biomagnify through food chains.

**Lead:** Lead compounds are highly persistent in water. Dissolved lead compounds bioaccumulate in aquatic and terrestrial plants and animals. Lead may occur as sorbed ions or surface coatings on sediment particles or may be carried in colloidal particles in surface water. Most lead is strongly retained in soil, resulting in relatively little mobility.

## SECTION 13. DISPOSAL CONSIDERATIONS

If material cannot be returned to process or salvage, dispose of only in accordance with applicable regulations. Spilled concentrate would meet the criteria for 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 CLASSIFICATION.....	Not regulated
U.S. DOT HAZARD CLASSIFICATION .....	Class 9, Packing Group III
U.S. PROPER SHIPPING NAME .....	Environmentally Hazardous Substance, Solid, n.o.s. (contains lead sulfide)
U.S. DOT RQ .....	Lead Sulfide 10 lbs.
U.S. DOT PRODUCT IDENTIFICATION NUMBER .....	UN3077
MARINE POLLUTANT .....	No
IMO IMSBC Code CLASSIFICATION .....	MHB - Materials Hazardous Only in Bulk Group A and B
IMO MARPOL V Classification: .....	Not Harmful to the Marine Environment.

## SECTION 15. REGULATORY INFORMATION

### U.S.

INGREDIENTS LISTED ON TSCA INVENTORY .....	Yes
HAZARDOUS UNDER HAZARD COMMUNICATION STANDARD.....	Lead Sulfide..... Yes Cadmium Sulfide ..... Yes Silica ..... Yes
CERCLA SECTION 103 HAZARDOUS SUBSTANCES .....	Lead Sulfide..... RQ: 10 lbs. (4.54 kg.) Zinc Compounds..... RQ: None assigned Cadmium Compounds ...RQ: None assigned
EPCRA SECTION 302 EXTREMELY HAZARDOUS SUBSTANCE .....	None of the 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 Compounds (Lead Sulfide) CAS No 1314-87-0 Percent by Weight: ..... 1 to 2%  Zinc Compounds (Zinc Sulfide) CAS No 1314-98-3 Percent by Weight: ..... 86 to 92%  Cadmium Compounds (Cadmium Sulfide) CAS 1306-23-6 Percent by Weight ..... 0.1 to 0.3%

## SECTION 16. OTHER INFORMATION

**Date of Original Issue:** January 27, 2004 **Version:** 01 (*First edition*)

**Date of Latest Revision:** September 10, 2018 **Version:** 08

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, 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, 20<sup>th</sup> Anniversary Edition. (P. G. Urben Ed.) 1995.
- Canadian Centre for Occupational Health and Safety (CCOHS), Hamilton, ON., CHEMINFO Record No. 608 – Lead.
- Canadian Centre for Occupational Health and Safety (CCOHS), Hamilton, ON., CHEMINFO Record No. 548 – Zinc.
- Canadian Centre for Occupational Health and Safety (CCOHS), Hamilton, ON., CHEMINFO Record No. 3454 – Cadmium.
- 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.
- International Chemical Safety Cards (WHO/IPCS/ILO), ICSC:0052 – Lead, ICSC 0208 – Zinc Oxide, ICSC 0404 – Cadmium Sulphide.
- Merck & Co., Inc., 2001, The Merck Index, An Encyclopedia of Chemicals, Drugs, and Biologicals, 13<sup>th</sup> Edition.
- National Library of Medicine, National Toxicology Information Program, Hazardous Substance Data Bank (HSDB) online.
- Patty's Toxicology; 5<sup>th</sup> Edition, 2001, Bingham, Cohrssen & Powell, Editors.
- 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 of Environmental Health Sciences, National Toxicology Program (NTP), 14<sup>th</sup> Report on Carcinogens, November 2016.
- U.S. Department of Health and Human Services, Public Health Service, Agency for Toxic Substances and Disease Registry, Update Toxicological Profile for Lead.
- U.S. Department of Health and Human Services, Public Health Service, Agency for Toxic Substances and Disease Registry, Update Toxicological Profile for Zinc.
- U.S. Department of Health and Human Services, Public Health Service, Agency for Toxic Substances and Disease Registry, Toxicological Profile for Cadmium.
- U.S. Occupational Safety and Health Administration, 1989, Code of Federal Regulations, Title 29, Part 1910.1000 and Part 1910.1200.

### Acronyms not spelled out elsewhere in the SDS:

CAS: Chemical Abstract 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%  
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 Washington Incorporated 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.