

## IRON CALCINE MATERIAL SAFETY DATA SHEET

### SECTION 1. PRODUCT AND COMPANY IDENTIFICATION

**Product Identity:** Iron Calcine

**Manufacturer:**

Teck Metals Ltd.  
P.O. Bag 2000  
Kimberley, B.C.  
V1A 3E1  
Emergency Telephone: 1-800-807-6038

**Supplier:**

Teck Metals Ltd.  
601 Knighton Road  
Kimberley, B.C.  
V1A 1C7

**MSDS Preparer:**

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

**Date of last Edit:** June 1, 2009.

**Product Use:** Used in cement manufacturing.

### 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
Iron Oxide	88%	1309-37-1	ACGIH TLV NIOSH REL 5 mg/m <sup>3</sup> ( <i>resp.</i> ) 5 mg Fe/m <sup>3</sup>	No Data
Silica	5%	14808-60-7	ACGIH TLV NIOSH REL 0.025 mg/m <sup>3</sup> ( <i>resp.</i> ) 0.05 mg/m <sup>3</sup> ( <i>resp.</i> )	No Data
Aluminum Oxide (Alumina)	2%	1344-28-1	ACGIH TLV NIOSH REL 10 mg/m <sup>3</sup> None Established	No Data
Lead (as Lead Oxide)	1%	1317-36-8	ACGIH TLV NIOSH REL 0.05 mg Pb/m <sup>3</sup> <0.10 mg Pb/m <sup>3</sup>	No Data

NOTE: OELs for individual jurisdictions may differ from ACGIH TLVs or NIOSH RELs. Check with local authorities for the applicable OELs in your jurisdiction.

ACGIH - American Conference of Governmental Industrial Hygienists; NIOSH - National Institute for Occupational Safety and Health. OEL – Occupational Exposure Limit, TLV – Threshold Limit Value, REL – Recommended Exposure Limit, (*resp.*) indicates the respirable dust size fraction of the total airborne dust.

**Trade Names and Synonyms:** Iron oxide, ferric oxide.

### SECTION 3. HAZARDS IDENTIFICATION

**Emergency Overview:** A fine-textured granular material consisting principally of iron oxide plus small amounts of silica, aluminum and lead oxides. Approximately 60% of the particles are smaller than 325 mesh (i.e., <44 microns).

**Potential Health Effects:** Direct eye contact may cause local “foreign body” irritation but no tissue damage. Skin contact may cause mild irritation in sensitive individuals. Inhalation of airborne dust may cause mild respiratory irritation but iron oxide has a very low toxicity. Concentrations of silica, alumina and lead are relatively low and unlikely to result in significant hazard except under extreme circumstances. Iron oxide is listed by both the IARC and the ACGIH as *Not Classifiable as a Human Carcinogen*. Crystalline silica and lead, however, are variously classified as *Carcinogens*, *Suspect Carcinogens* or *Possible Carcinogens* by IARC, ACGIH and the NTP (see Toxicological Information, Section 11).

**Potential Environmental Effects:** Iron calcine is known to be insoluble in water and therefore its constituents have low bioavailability. However, long-term exposure in aquatic and terrestrial environments or processing of the product can lead to the release of metal compounds in bioavailable forms. Compounds of lead, in particular, can cause potentially toxic effects on organisms. (see Ecological Information, Section 12)

## 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 the eyelid(s) open. If irritation persists, obtain medical attention. DO NOT attempt to manually remove anything stuck to the eye.

**Skin Contact:** No health effects expected. If irritation does occur, flush with lukewarm, gently flowing water for 5 minutes or until the chemical is removed. If irritation persists, obtain medical advice.

**Inhalation:** If symptoms are experienced remove source of contamination or move victim to fresh air. Obtain medical advice.

**Ingestion:** If swallowed, no specific intervention is indicated as iron calcine is not likely to be hazardous by ingestion. However, if irritation or discomfort occurs, obtain medical advice.

## SECTION 5. FIRE FIGHTING MEASURES

**Fire and Explosion Hazards:** This material is not flammable or combustible.

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

**Fire Fighting:** Firefighters should be fully trained and wear full protective clothing including an approved, self-contained breathing apparatus which supplies a positive air pressure within a full facepiece 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. Clean up spilled material immediately, observing precautions in Section 8 – Personal Protection and using methods which 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 labelled containers for later recovery or disposal. Treat or dispose of waste material in accordance with all local, provincial, and national requirements.

**Personal Precautions:** Gloves, protective outer garment (coveralls) and an approved dust respirator (Class N or P-100) 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.

**Environmental Precautions:** In the form in which it is sold, this product does not pose an immediate ecological hazard. However, its processing or extended exposure in the aquatic and terrestrial environments may lead to the release of its contained metal compounds in bioavailable forms. Contamination of water, soil and air should be prevented.

## SECTION 7. HANDLING AND STORAGE

Store in a cool, dry area away from incompatible materials. Contain any run-off from exposed storage piles and determine lead content before release to local waterways. Generation of iron calcine dust should be avoided. Always practice good personal hygiene. Refrain from eating, drinking, or smoking in work areas. Thoroughly wash hands before eating, drinking, or smoking in appropriately designated areas. No special packaging materials are required.

## SECTION 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

**Protective Clothing:** Leather or rubber gloves are recommended to prevent prolonged or repeated direct skin contact. Normal coveralls are satisfactory to minimize contact; however, coveralls should be laundered frequently. Safety glasses or goggles may be warranted for processes that generate airborne particulates.

**Ventilation:** Local or general ventilation should be used to maintain the working environment below recommended exposure limits for lead and silica.

**Respirators:** Where excessive 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).

## SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

<b>Appearance:</b> Red to red-black fine-textured granular material	<b>Odour:</b> None	<b>Physical State:</b> Solid	<b>pH:</b> Not applicable
<b>Vapour Pressure:</b> Negligible	<b>Vapour Density:</b> Not applicable	<b>Boiling Point/Range:</b> No data	<b>Melting Point/Range:</b> No data
<b>Specific Gravity:</b> 4-5	<b>Evaporation Rate:</b> Not applicable	<b>Coefficient of Water/Oil Distribution:</b> Not applicable	<b>Odour Threshold:</b> Not applicable
<b>Solubility in Water:</b> Insoluble	<b>Bulk Density:</b> 1500 kg/m <sup>3</sup>	<b>Particle Size:</b> 60% <325 mesh (44 microns) 90% <200 mesh (74 microns)	

## SECTION 10. STABILITY AND REACTIVITY

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

**Incompatibilities:** Iron oxide is incompatible with strong oxidizers such as hydrogen peroxide, ethylene oxide, hydrazine and calcium hypochlorite. Finely-divided iron oxide mixed with aluminum powders produce an intense exothermic reaction generating molten iron when ignited (thermite reaction).

**Hazardous Decomposition Products:** None.

## SECTION 11. TOXICOLOGICAL INFORMATION

### General:

Normal handling of solid or granular material should not cause any adverse health effects. Under dusty conditions, may cause upper respiratory irritation as well as a possible risk of lead absorption and/or silica inhalation.

### Acute:

**Skin:** May cause mild irritation in sensitive individuals.

**Eyes:** May cause physical eye irritation, as would any other "foreign body".

**Inhalation:** Airborne dust may be irritating to the nose, throat, and respiratory tract and may cause mild respiratory irritation. Concentrations of lead and silica are relatively low and unlikely to result in acute lead absorption or silicosis except under the most extreme conditions.

**Ingestion:** The principal component, iron oxide, as well as silica and aluminum oxide have minimal oral toxicity. The lead content is sufficiently low that acute lead poisoning would be highly unlikely as well.

### Chronic:

The inhalation of iron oxide dust or fumes can lead to pulmonary siderosis, which is a form of pneumoconiosis in which the pulmonary reaction is minimal. Prolonged overexposure to fine crystalline silica dust can lead to silicosis, a disease of the lungs with symptoms of coughing, shortness of breath, wheezing, and impaired pulmonary function. These symptoms may progress, even in the absence of continuing exposure. IARC has classified crystalline silica as *Group 1, Carcinogenic to Humans*. Prolonged overexposure by inhalation or ingestion of lead-containing dusts will result in lead absorption and an elevated blood lead level. The extent of the lead absorption risk is dependent upon several factors including the specific lead compound and the lead content of the dust. Chronic lead poisoning may cause fatigue, anemia, gastrointestinal disturbances, and possible central nervous system and kidney damage. Effects on male and female reproductive capacity are also cited in the literature. 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.

## SECTION 12. ECOLOGICAL INFORMATION

This product does not pose immediate ecological hazards; however, its processing or longer-term exposure in aquatic and terrestrial environments may lead to the release of metal compounds in more bioavailable forms. Moreover, lead can

bioaccumulate in plants and animals, in both types of environments. While lead compounds are not particularly mobile in the aquatic environment, they can potentially be toxic to aquatic organisms, especially fish, at relatively low concentrations. Water hardness, pH and dissolved organic carbon content are all factors which may regulate the degree of ecotoxicity. In soil, lead is neither very mobile nor bioavailable, as it can become strongly sorbed to soil particles, increasingly so over time, to a degree regulated by various soil properties.

Iron and aluminum compounds, both of which are components of this product, do not normally pose significant environmental concerns. However, slightly acidic conditions in watercourses may result in the presence of dissolved aluminum forms at concentrations that can potentially be toxic to fish.

### SECTION 13. DISPOSAL CONSIDERATIONS

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

### SECTION 14. TRANSPORT INFORMATION

PROPER SHIPPING NAME ..... Environmentally Hazardous Substance, Solid, n.o.s.  
(Lead)  
TRANSPORT CANADA HAZARD CLASSIFICATION ..... Class 9, Packing Group III  
TRANSPORT CANADA IDENTIFICATION NUMBER ..... UN3077  
MARINE POLLUTANT ..... No

### SECTION 15. REGULATORY INFORMATION

#### CANADIAN:

WHMIS CLASSIFICATION: ..... Controlled Product, Classification D2A (Materials Causing other Toxic Effects – Very Toxic Material).

### SECTION 16. OTHER INFORMATION

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

- American Conference of Governmental Industrial Hygienists, 2008, Documentation of the Threshold Limit Values and Biological Exposure Indices, Seventh Edition plus Supplements.
- American Conference of Governmental Industrial Hygienists, 2008, Guide to Occupational Exposure Values.
- American Conference of Governmental Industrial Hygienists, 2008, Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices.
- Bretherick's Handbook of Reactive Chemical Hazards, 20<sup>th</sup> Anniversary Edition. (P. G. Urban, Ed), 1995.
- Canadian Centre for Occupational Health and Safety (CCOHS) CHEMpendium Chemical Information On-Line Data Base.
- 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 – 2008, (multi-volume work), World Health Organization, Geneva.
- Merck & Co., Inc., 2001, The Merck Index, An Encyclopedia of Chemicals, Drugs, and Biologicals, Thirteenth Edition.
- Patty's Toxicology, 5<sup>th</sup> Edition, (E Bingham, B Cohnsen & C H Powell, Ed.) 2001.
- Sax, N. Irving, 1989, Dangerous Properties of Industrial Materials, Seventh Edition.
- 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, Toxicological Profile for Lead Updated September 2005.
- U.S. Department of Health and Human Services, Public Health Service, Agency for Toxic Substances and Disease Registry, Toxicological Profile for Silica, Updated 1995.

#### **Notice to Reader**

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