

FERROUS GRANULES MATERIAL SAFETY DATA SHEET

SECTION 1. PRODUCT AND COMPANY IDENTIFICATION

Product Identity: Ferrous Granules.

NOTE: In the form in which it is sold this product is not regulated. This Material Safety Data Sheet is provided for information purposes only.

Manufacturer:

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

Supplier:

Teck American Incorporated
Industrial Chemicals
501 North Riverpoint Blvd., Suite 300,
Spokane, WA. 99202

MSDS Preparer:

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

Date of Most Recent Edit of MSDS: April 6, 2010.

Product Use: Used in the production of Portland Cement.

SECTION 2. COMPOSITION / INFORMATION ON INGREDIENTS

Ingredient	Approximate Percent by Weight	CAS Number	Occupational Exposure Limits (OELs) (also see footnote)		LD ₅₀ / LC ₅₀ Species and Route
Ferrous Granules*	95-98%	175448-53-0	OSHA PEL	None established	No Data
			ACGIH TLV	None established	
			NIOSH REL	None established	
Consisting of:					
Iron (present as Iron Orthosilicate)	24 – 31% (as Fe)	13918-37-1	OSHA PEL	None established †	No Data
			ACGIH TLV	None established †	
			NIOSH REL	None established †	
Calcium (present as Calcium Silicate & Calcium Aluminate)	14 – 20% (as CaO)	12168-85-3 10034-77-2 12042-68-1	OSHA PEL	15 mg/m ³ (total) / 5 mg/m ³ (respirable)	No Data
			ACGIH TLV	10 mg/m ³	
			NIOSH REL	10 mg/m ³ (total) / 5 mg/m ³ (respirable)	
Zinc (present as Zinc Silicate)	0.3 – 3.5% (as Zn)	13597-65-4	OSHA PEL	None established †	No Data
			ACGIH TLV	None established †	
			NIOSH REL	None established †	
Lead (present as Lead Silicate)	0.01 – <0.10% (as Pb)	10099-76-0	OSHA PEL	0.05 mg/m ³	No Data
			ACGIH TLV	0.05 mg Pb/m ³	
			NIOSH REL	0.05 mg Pb/m ³	
Copper	0.4 – 1.5% (as Cu)	7440-50-8	OSHA PEL	1.mg Cu/m ³	LD ₅₀ , mouse, oral >5,000 mg/kg
			ACGIH TLV	1.mg Cu/m ³	
			NIOSH REL	1.mg Cu/m ³	
Manganese	0.5- 2.5% (as Mn)	7439-96-5	OSHA PEL	5.mg Mn/m ³ (Ceiling)	LD ₅₀ , rat, oral 9,000 mg/kg
			ACGIH TLV	0.2.mg Mn/m ³	
			NIOSH REL	1.mg Mn/m ³	

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.

† – NOTE: The oxide forms of these elements could be generated in the event of fuming of Ferrous Granules under very high heat, and these oxides do have specific occupational exposure limits in most jurisdictions.

*Under the Canadian Environmental Protection Act 1999, New Substances Notification Regulations, Ferrous Granules is considered a single substance. Its associated CAS number is present on the Domestic Substances List. Under the U.S. Toxic Substances Control Act, Ferrous Granules is treated as a mixture of several components, each of which is present on the TSCA Chemical Inventory.

Trade Names and Synonyms: None.

SECTION 3. HAZARDS IDENTIFICATION

Emergency Overview: A black granular material that is not flammable or combustible. This product is relatively non-toxic and does not pose an immediate hazard to the health of emergency response personnel or to the environment in an emergency situation.

Potential Health Effects: Acute exposure to very dusty conditions may result in mild respiratory irritation and possible eye and skin irritation due to abrasion of the granules on tissues. No chronic health effects have been identified for this material. This product does not contain reportable levels of human carcinogens as defined by the Occupational Safety and Health Administration (OSHA), the National Toxicology Program (NTP), the International Agency for Research on Cancer (IARC), or the American Conference of Governmental Industrial Hygienists (ACGIH) (see Toxicological Information, Section 11)

Potential Environmental Effects: The product is considered to have a high degree of intrinsic physical and chemical stability and is therefore unlikely to be toxic to plants and animals in the environment. However, small quantities of dissolved constituent metals (i.e., cadmium, copper, lead, nickel, manganese and zinc) may be present in runoff or drainage from storage piles at concentrations which exceed water quality criteria (to protect aquatic life).

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: No health effects expected. If irritation does occur, flush with lukewarm, gently flowing water for 5 minutes. 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 this material 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 product is not considered a fire or explosion hazard. It does not burn and will not support combustion.

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

Fire Fighting: As with any fire, fire fighters 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 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. 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, regional, and national requirements.

Personal Precautions: Persons responding to an accidental release should wear protective clothing, gloves and a dust respirator (see also Section 8). Close-fitting safety goggles may be necessary in some circumstances to prevent eye contact with dust.

Environmental Precautions: Care should be taken to prevent the release of this product to both aquatic and terrestrial environments. Measures to control dust generation from storage piles should be applied in dry, dusty locations.

SECTION 7. HANDLING AND STORAGE

Store in a dry, covered area where possible. As the runoff or drainage from product storage piles may contain small concentrations of dissolved metals, care should be taken in its management and discharge to prevent impacts and satisfy local regulatory requirements.

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. Appropriate eye protection should be worn where dust is generated. Safety type boots are recommended.

Ventilation: Use adequate local or general ventilation to maintain the concentration of dust in the work environment well below recommended occupational exposure limits.

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-95 particulate filter cartridge).

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance: Black Granular Material	Odour: None	Physical State: Solid	pH: Not Applicable
Vapour Pressure: Negligible @ 25°C	Vapour Density: Not Applicable	Boiling Point/Range: No Data	Melting Point/Range: 1125 – 1150 °C
Specific Gravity: 3.55	Evaporation Rate: Not Applicable	Coefficient of Water/Oil Distribution: Not Applicable	Odour Threshold: Not Applicable
Solubility in Water: Insoluble	Particle Size: 99% > 75 µm	Bulk Density: 2,430 lbs/yd ³ (1,442 kg/m ³)	

SECTION 10. STABILITY AND REACTIVITY

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

Incompatibilities: None have been identified.

Hazardous Decomposition Products: Iron oxides as well as minor amounts of zinc, copper and manganese oxide fume may be liberated when in the molten state.

SECTION 11. TOXICOLOGICAL INFORMATION

General: In the solid granular form in which this material is sold it is relatively non-toxic. Normal handling should not cause either acute or chronic health effects.

Acute:

Skin/Eye: Eye or skin contact with Ferrous Granules may cause local irritation due to the mechanical abrasion of the granules but would not cause tissue damage.

Inhalation: High concentrations of airborne dust may be irritating to the nose, throat and respiratory passages. Lead and any other heavy metals are present at very low concentrations (i.e. <0.1% Pb) and in insoluble forms. Therefore, except under the

most extreme conditions of overexposure, they are unlikely to represent a potential health risk. The major route of potential exposure would be through the generation and inhalation of fumes from molten Ferrous Granules. Such fumes would contain principally iron oxides as well as some zinc, copper and manganese oxides. The inhalation of iron oxide fume can lead to pulmonary siderosis, a relatively benign pneumoconiosis in which pulmonary reaction is minimal. If excessive quantities of zinc or copper oxide fume are inhaled, it can result in a 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.

Ingestion: The constituents of Ferrous Granules have minimal oral toxicity. The lead content is sufficiently low and in an insoluble form so that acute lead poisoning would be extremely unlikely.

Chronic: No chronic health effects have been identified from the inhalation or ingestion of Ferrous Granules. 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. Chronic lead intoxication is extremely unlikely due to the very low lead content and the insoluble form of the lead present (lead silicate). The silica content of this material is present as various metal silicates and no measurable free silica is present, in either amorphous or crystalline form. This product does not contain reportable levels of human carcinogens as defined by the Occupational Safety and Health Administration (OSHA), the National Toxicology Program (NTP), the International Agency for Research on Cancer (IARC), and the American Conference of Governmental Industrial Hygienists (ACGIH).

SECTION 12. ECOLOGICAL INFORMATION

The product is considered to have a high degree of intrinsic physical and chemical stability and is therefore unlikely to be toxic to plants and animals in the environment. However, small quantities of dissolved constituent metals (i.e., cadmium, copper, lead, nickel, manganese and zinc) as sulphate salts may be present in runoff or drainage from storage piles at concentrations which exceed water quality criteria (to protect aquatic life). The fate of the constituent metals in runoff and their respective bioavailabilities will be determined by specific physico-chemical conditions in the receiving environment.

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 regulated.
TRANSPORT CANADA AND U.S. DOT CLASSIFICATION..... Not applicable.
TRANSPORT CANADA AND U.S. DOT PID Not applicable.
MARINE POLLUTANT No.
IMO CLASSIFICATION..... Not applicable.

SECTION 15. REGULATORY INFORMATION

U.S.
INGREDIENTS LISTED ON TSCA INVENTORY Yes

HAZARDOUS UNDER HAZARD COMMUNICATION STANDARD..... No

CERCLA SECTION 103 HAZARDOUS SUBSTANCES Zinc..... Yes RQ: 1000 lb. (454 kg.)*
Copper..Yes RQ: 5000 lb. (2270 kg.)
Manganese Compounds... Yes RQ: None established

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

EPCRA SECTION 302 EXTREMELY HAZARDOUS SUBSTANCE..... No ingredients apply.

EPCRA SECTION 311/312 HAZARD CATEGORIES..... No hazard categories apply.

EPCRA SECTION 313 TOXIC RELEASE INVENTORY

This product contains reportable levels of the following toxic chemicals subject to the Toxic Release Reporting Requirements:
Zinc (as by-product Dust or Fume)
Percent by Weight: 0.3 – 3.5%
CAS No. 7440-66-6

Copper
Percent by Weight: 0.4 – 1.5%
CAS No. 7440-50-8

Manganese
Percent by Weight: 0.5 – 2.5%
CAS No. 7439-96-5

CANADIAN:

LISTED ON THE DOMESTIC SUBSTANCES LIST Yes

WHMIS CLASSIFICATION: Not a Controlled Product.

SECTION 16. OTHER INFORMATION

- 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, 2009, Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices.
- American Conference of Governmental Industrial Hygienists, 2009, Guide to Occupational Exposure Values.
- Bretherick's Handbook of Reactive Chemical Hazards, 20th Anniversary Edition. P.G. Urban Ed. 1995.
- Canadian Centre for Occupational Health and Safety (CCOHS) CHEMpendium On-Line Chemical Information 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 – 2009, (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, Fifth Edition, 2001: E. Bingham, B. Cohnsen & C.H. Powell, Ed.
- Sax, N. Irving & Lewis, Richard J., Sr., 1987, Hawley's Condensed Chemical Dictionary, Eleventh Edition.
- 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 Web Access subscription.
- U.S. Occupational Safety and Health Administration, 1989, Code of Federal Regulations, Title 29, Part 1910.

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