

ZINC SULPHATE SOLUTION SAFETY DATA SHEET

SECTION 1. IDENTIFICATION

Product Identity: Zinc Sulphate Solution.

Trade Names and Synonyms: Zinc Sulfate Solution, Zinc Electrolyte, Neutral Zinc Sulfate.

Manufacturer:

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

Supplier:

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

Preparer:

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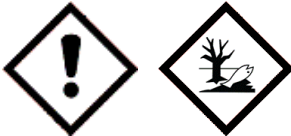
Product Use: Used as a micronutrient in fertilizer and feed supplements, may also be used as a floatation additive in mining.

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 – Category 2A Respiratory or Skin Sensitization – Does not meet criteria Mutagenicity – Does not meet criteria Carcinogenicity – Does not meet criteria Reproductive Toxicity – Does not meet criteria Specific Target Organ Toxicity Acute Exposure – Does not meet criteria Chronic Exposure – Does not meet criteria	Does not meet criteria for any Physical Hazard	Aquatic Toxicity – Short Term – Category 1

LABEL:

Symbols: 	Signal Word: WARNING
WARNING! Hazard Statements Causes serious eye irritation. Very toxic to aquatic life.	Precautionary Statements: Wear eye protection/face protection. Wash contaminated skin thoroughly after handling. Avoid release to the environment. Collect spillage. IF IN EYES: Rinse continuously with water for several minutes. If eye irritation persists: get medical advice/attention.

Emergency Overview: A clear or slightly opaque solution that does not burn or readily decompose. It consists principally of dissolved zinc sulphate. The solution is relatively non-toxic to humans and poses little immediate hazard to personnel in an emergency situation but contains a high concentration of dissolved zinc and can pose a threat to watercourses.

Potential Health Effects: Direct eye contact with the solution is likely to cause eye irritation. Dried residues may cause eye, nose & throat irritation and, when heated strongly in air, will generate zinc oxide fume. Inhalation of freshly formed zinc oxide fume can result in metal fume fever, a temporary flu-like condition (see Toxicological Information, Section 11).

Potential Environmental Effects: As this product is a solution, the contained zinc, in elevated concentrations, is directly bioavailable and is potentially toxic to aquatic and soil organisms and plants (see Ecological Information, Section 12).

SECTION 3. COMPOSITION / INFORMATION ON INGREDIENTS

COMPONENTS	CAS Registry No.	CONCENTRATION (% wt/wt)
Zinc Sulphate	7733-02-0	29-34%
Magnesium Sulphate	7487-88-9	0.4-1.5%
Manganese Sulphate	7785-87-7	0.3-0.5%

Note: See Section 8 for Occupational Exposure Guidelines.

SECTION 4. FIRST AID MEASURES

Eye Contact: *Symptoms:* Eye irritation, redness. If irritation occurs, cautiously rinse eyes with lukewarm, gently flowing water for 5 minutes, while holding the eyelids open. If eye irritation persists: Get medical advice/attention.

Skin Contact: *Symptoms:* Mild irritation. Rinse/wash with lukewarm, gently flowing water (and mild 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. Get medical advice/attention if you feel unwell or are concerned.

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

SECTION 5. FIRE FIGHTING MEASURES

Fire and Explosion Hazards: This product is not considered a fire or explosion hazard.

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.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Procedures for Cleanup: Stop release if possible to do so safely. Contain spill, isolate hazard area, and deny entry. Pump back into system if possible. Otherwise absorb with any suitable absorbent such as vermiculite or clay. Place contaminated material in suitable, labeled containers for final disposal. Dispose of waste material consistent with the requirements of waste disposal authorities.

Personal Precautions: Impervious chemical-resistant gloves, rubber boots and coveralls or other protective clothing 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 the solution.

Environmental Precautions: Spilled product can pose immediate risks to aquatic and terrestrial environments. Released product should be prevented from reaching soil or entering watercourses in the vicinity of product handling areas.

SECTION 7. HANDLING AND STORAGE

Precautions for Safe Handling: Avoid generating mist or aerosol and its release into the work environment. Do not perform any welding, cutting or other hot work on empty vessels, containers, or piping until all liquid and/or dried residues have been cleared. Always practice good personal hygiene. Refrain from eating, drinking or smoking in work areas. Thoroughly wash hands after handling and before eating, drinking or smoking in appropriate designated areas only.

Conditions for Safe Storage: Store in a dry, cool, well-ventilated area away from incompatible substances. Inspect storage area periodically for damage or leaks.

SECTION 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Occupational Exposure Guidelines (OEGs): (Time-Weighted Average (TWA) concentration over 8 hr unless otherwise indicated)

Component	ACGIH TLV	OSHA PEL	NIOSH REL
Zinc Sulphate	None Established	None Established	None Established
Magnesium Sulphate	None Established	None Established	None Established
Manganese Sulphate	0.02 mg Mn/m ³ Respirable 0.1 mg Mn/m ³ Inhalable	5 mg Mn/m ³ Ceiling	1 mg Mn/m ³ TWA

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: 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 aerosol mists well below recommended occupational exposure limits.

Protective Clothing: Impervious, chemical-resistant gloves are recommended when handling bulk solution. Eye protection should be worn where mist is generated and where any possibility exists that eye contact may occur.

Respirators: Where liquid aerosol mists are generated and cannot be controlled to within acceptable levels, use appropriate NIOSH-approved respiratory protection equipment (42 CFR 84 Class N, R or P-95 particulate filter as a minimum).

General Hygiene Considerations: Always practice good personal hygiene. Refrain from eating, drinking, or smoking in work areas. Thoroughly wash hands after handling and before eating, drinking, or smoking in appropriate designated areas only.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance: Clear to slightly opaque liquid	Odour: None	Odour Threshold: Not Applicable	pH: Approx. 4.5 – 5.0
Vapour Pressure: Negligible @ 20°C	Vapour Density: Not Applicable	Freezing Point/Range: Not Available	Boiling Point/Range: Not Available
Relative Density (Water = 1): 1.25- 1.35	Evaporation Rate: Not Applicable	Coefficient of Water/Oil Distribution: Not Available	Solubility: Aqueous Solution
Flashpoint: Non- Flammable Liquid	Flammable Limits (LEL/UEL): Not Applicable	Auto-ignition Temperature: None	Decomposition Temperature: None
Viscosity: Not Available			

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: None have been identified.

Hazardous Decomposition Products: High temperature operations such as oxy-acetylene cutting, electric arc welding or overheating of dried residues will generate zinc oxide fume which, on inhalation in sufficient quantity, can produce metal fume fever. Under such conditions, sulphur dioxide will also be generated and can cause respiratory distress.

SECTION 11. TOXICOLOGICAL INFORMATION

General: In the form in which this product is sold it is relatively non-toxic. The major route of exposure would be through the generation and inhalation of aerosol mist, or the generation of zinc oxide fume through welding or burning around dried residues.

Acute:

Skin/Eye: Contact with liquid is likely to cause eye irritation and may cause local skin irritation but would not result in permanent tissue damage. Dust or fume from burning or welding on dried residues may also cause local irritation.

Inhalation: Acute inhalation of mists may result in some mild irritation of the nose, throat and/or upper respiratory passages. Symptoms may include discomfort, coughing, tingling sensation, sneezing and/or shortness of breath and wheezing. Excessive heating of dried zinc sulphate residues will generate zinc oxide fume. If inhaled, this fume can result in the condition called metal fume fever. The symptoms of metal fume fever will occur within 3 to 10 hours of exposure, 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: Zinc sulphate is very astringent, and when ingested in excessive quantities can irritate the stomach, resulting in nausea and spontaneous vomiting.

Chronic: Prolonged skin contact with zinc sulphate solution may cause skin dermatitis. Zinc, magnesium and manganese are not listed as carcinogens 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).

Animal Toxicity:

<u>Ingredient:</u>	<u>Acute Oral Toxicity:</u>	<u>Acute Dermal Toxicity:</u>	<u>Acute Inhalation Toxicity:</u>
Zinc Sulphate	LD ₅₀ 1,538 mg/kg [†]	No data	No data
Magnesium Sulphate	LD ₅₀ >5,000 mg/kg [†]	No data	No data
Manganese Sulphate	LD ₅₀ 2,150 mg/kg [†]	No data	LC ₅₀ >4.45 mg/L [‡]

[†] LD₅₀, Rat, Oral,

[‡] LC₅₀, Rat, Inhalation, 4 hour

SECTION 12. ECOLOGICAL INFORMATION

In elevated concentrations, zinc sulphate in solution is potentially toxic to aquatic and terrestrial organisms. However, processes in the environment may alter its bioavailability in diluted form. In aquatic systems, zinc has the potential to bioaccumulate in both plants and animals. In terrestrial systems, the mobility of zinc in soil depends primarily on soil conditions, such as cation exchange capacity, pH, redox potential, and chemical species present in the soil. Zinc also bioaccumulates in terrestrial plants, vertebrates, and mammals, with plant uptake from soil dependent on plant species, soil pH, and soil composition.

SECTION 13. DISPOSAL CONSIDERATIONS

Do not wash down drain. Dike area around spill and pump uncontaminated solution back to process if possible, then absorb any remaining liquid in a solid absorbent such as vermiculite or clay. Place contaminated material in suitable, labeled containers for final disposal. Dispose of waste material consistent with the requirements of waste disposal authorities.

SECTION 14. TRANSPORT INFORMATION

PROPER SHIPPING NAME U.S. DOT..... Environmentally Hazardous Substance, Liquid, n.o.s.
 (contains Zinc Sulfate)
 TRANSPORT CANADA CLASSIFICATION..... Not regulated
 U.S. DOT CLASSIFICATION Class 9, Packing Group III (RQ)
 PRODUCT IDENTIFICATION NUMBER UN3082
 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 Sulfate..... RQ: 1,000lbs.
 Manganese Compounds... RQ: None Assigned
 EPCRA SECTION 302 EXTREMELY HAZARDOUS SUBSTANCE..... No Ingredients Qualify
 EPCRA SECTION 311/312 HAZARD CATEGORIES..... Eye/Skin Irritant

EPCRA SECTION 313 TOXIC RELEASE INVENTORY:..... Zinc Compounds (Zinc Sulfate)
CAS No. 7733-02-0
Percent by Weight..... 29-34%
Manganese Compounds (Manganese Sulfate)
CAS No. 7785-87-7
Percent by Weight..... 0.3-0.5%

CANADA

INGREDIENTS LISTED ON DOMESTIC SUBSTANCES LIST Yes.

SECTION 16. OTHER INFORMATION

Date of Original Issue: May 9, 2001 **Version:** 01 (*First edition*)
Date of Latest Revision: August 14, 2018 **Version:** 11

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, Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices.
- American Conference of Governmental Industrial Hygienists, 2018, 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 Chemical Information Data Base, 2015.
- 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.
- Patty's Toxicology, Fifth Edition, 2001: E. Bingham, B. Cohrssen & C.H. Powell, Ed.
- 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) online version last accessed 2018-07-31.
- U.S. Department of Health and Human Services, National Institute for Occupational Safety and Health, National Toxicology Program (NTP), 14th Report on Carcinogens, November 2016.
- U.S. Occupational Safety and Health Administration, 1989, Code of Federal Regulations, Title 29, Part 1910.1000 and 1910.1200.

Acronyms not spelled out elsewhere in the SDS:

CAS: Chemical Abstracts Service
CERCLA: Comprehensive Environmental Response, Compensation, and Liability Act
DOT: Department of Transport
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

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