

FERROUS SULPHATE MATERIAL SAFETY DATA SHEET

SECTION 1. PRODUCT AND COMPANY IDENTIFICATION

Product Identity: Ferrous Sulphate

Manufacturer:

Various
(Please contact supplier for further information)

Supplier:

Teck Cominco American Incorporated
15918 East Euclid Avenue
P.O. Box 3087
Spokane, WA 99216-1815
Emergency Telephone: 250-364-4214

MSDS Preparer:

Teck Cominco Metals Ltd.
600 - 200 Burrard Street
Vancouver, British Columbia
V6C 3L9

Date of Last MSDS Revision/Edit: December 15, 2003.

Product Uses: Water treatment, chemical manufacturing, hazardous waste treatment, and, where licenced and labeled correctly, fertilizer and animal feed component.

SECTION 2. COMPOSITION / INFORMATION ON INGREDIENTS

Hazardous Ingredients	Approximate Percent by Weight	C.A.S. Number	Occupational Exposure Limits (OELs)	LD ₅₀ /LC ₅₀ Species and Route
Ferrous Sulphate Heptahydrate	>98%	7782-63-0	OSHA PEL ACGIH TLV NIOSH REL	None Listed LD ₅₀ orl-rat 2140 mg/kg 1 mg/m ³ * 1 mg/m ³ *
Sulphuric Acid	<2%	7664-93-9	OSHA PEL ACGIH TLV NIOSH REL	LD ₅₀ orl-rat 2140 mg/kg LC ₅₀ ihl-rat 510 mg/m ³ /2hr LC ₅₀ ihl-mouse 320 mg/m ³ /2hr

*1 mg/m³ time-weighted average (soluble iron salts as Fe)

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.

Trade Names and Synonyms: Ferrous Sulfate, Ferrous Sulphate Heptahydrate, Iron (II) Sulphate, Green Vitriol, Copperas

SECTION 3. HAZARDS IDENTIFICATION

Emergency Overview: Moist blue-green odourless crystals. Non-combustible but excessive heat may decompose the material, liberating irritating and toxic sulphur dioxide gas. Freely soluble in water. Contact with water in an emergency situation may generate an acidic solution that can pose a threat to water courses. The material is mildly irritating to eyes and skin but is relatively non-toxic and poses little immediate hazard to emergency response personnel.

Potential Health Effects: Skin or eye contact may cause irritation and possible eye tissue damage. Inhalation may irritate the nose, throat, and respiratory tract. Relatively non-toxic by ingestion. This material is not listed as a human carcinogen by OSHA, NTP, ACGIH, IARC or the EU. (see Toxicological Information, Section 11)

Potential Environmental Effects: This product is highly water soluble and its acidic properties can be hazardous in the aquatic and terrestrial environments. (see Ecological Information, Section 12)

EU Risk Phrase(s): R22 – Harmful if swallowed; R36/37/38 – Irritating to eyes, respiratory system and skin.

SECTION 4. FIRST AID MEASURES

Eye Contact: Immediately flush with warm running water, including under the eyelids, for at least 15 minutes. Seek medical attention immediately.

Skin Contact: Remove contaminated clothing and wash affected area with soap and warm water. Launder contaminated clothing before reuse. Seek medical attention if irritation develops or persists.

Inhalation: Remove victim from exposure area to fresh air immediately. If breathing has stopped, give artificial respiration. Medical oxygen may be administered, if available, where breathing is difficult. Seek medical attention immediately.

Ingestion: If victim is conscious and can swallow, dilute stomach contents with 2-4 cupfuls of water or milk. Do not induce vomiting. Seek medical attention immediately and bring a copy of this MSDS. Never give anything by mouth to an unconscious person.

SECTION 5. FIRE FIGHTING MEASURES

Fire and Explosion Hazards: This product is non-combustible and is not considered to be 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. Do not release runoff from fire control methods to sewers or waterways.

Fire Fighting: 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 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 recovery or disposal. Treat or dispose of waste material in accordance with all local, regional, 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 ferrous sulphate dust.

Environmental Precautions: This product can pose a threat to the environment. Contamination of soil and water should be prevented.

SECTION 7. HANDLING AND STORAGE

Store in a cool, dry area away from combustible materials. Protect against physical damage to containers. Minimize dust generation and accumulation. Avoid breathing dust. 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. Remove contaminated clothing and wash before reuse.

EU Safety Phrase(s): S26 – In case of contact with the eyes, rinse immediately with plenty of water and seek medical advice.
S36 – Wear suitable protective clothing.

SECTION 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Protective Clothing: Coveralls or other work clothing, glasses or goggles, and gloves are recommended to prevent prolonged or repeated direct skin contact. Close-fitting safety goggles may be required to prevent eye contact if excessive dust is generated. Workers should wash immediately when skin becomes contaminated and at the end of each work shift. 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.

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

Respirators: Where ferrous sulphate 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: Moist blue green crystals	Odour: Odourless	Physical State: Moist solid	pH: 3 –5 (5% Sol'n)
Vapour Pressure: Negligible at 20°C	Vapour Density: Not applicable	Boiling Point/Range: Decomposes at >300°C	Freezing/Melting Point/Range: Loses water at 57 & 65°C
Specific Gravity: 1.90	Evaporation Rate: Not applicable	Coefficient of Water/Oil Distribution: No Data	Odour Threshold: Not applicable
Solubility: 48.6 g/100 g water @ 50°C	Percent Volatile by Weight: Not applicable	Other Information: Molecular Formula $\text{FeSO}_4 \cdot 7\text{H}_2\text{O}$; Molecular Weight 278.01	

SECTION 10. STABILITY AND REACTIVITY

Stability & Reactivity: This material is stable and not considered reactive under normal temperatures and pressures. This material oxidizes slowly in moist air to form a yellow-brown coating of basic ferric sulphate. Aqueous solutions are oxidized slowly by air when cold, rapidly when hot. The rate of oxidation is increased by addition of alkali or exposure to light.

Incompatibilities: Alkalis, soluble carbonates, and oxidizing agents, gold and silver salts, lead acetate, potassium iodide, sodium borate, sodium tartrate, tannin.

Hazardous Decomposition Products: Excessive heat may liberate sulphur dioxide, which is toxic and corrosive.

SECTION 11. TOXICOLOGICAL INFORMATION

General: A skin, eye and mucous membrane irritant. Only moderately toxic by ingestion. Hazards are largely those from acute exposure or direct contact rather than chronic or repeated low level exposure.

Acute:

Skin/Eye: Exposure will cause eye irritation with possible discomfort, tearing, redness or itching. If left untreated it may cause burns and some eye tissue damage. Direct skin contact will cause slight to moderate skin irritation with discomfort, rash and itching.

Inhalation: Inhalation of ferrous sulphate dust may be irritating to the respiratory system. Symptoms may include coughing, sneezing and/or shortness of breath.

Ingestion: Ingestion may result in irritation of the esophagus and gastro-intestinal disturbances (gastric distress, colic, constipation, diarrhea). Large amounts of ferrous sulphate are toxic but, in adults, fatalities are rare and almost exclusively suicidal. Smaller doses are much more toxic to children, particularly between 12 and 24 years.

Chronic: Repeated exposure to ferrous sulphate may increase iron levels in the liver, spleen and lymphatic system. Massive doses may produce damage to these organs. Ferrous sulphate 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).

SECTION 12. ECOLOGICAL INFORMATION

This product is highly water soluble and is directly acidic which can result in toxic impacts. As well, in aquatic and terrestrial environments, its ferrous iron content will oxidize, consuming oxygen and the resultant hydrolysis reactions will generate additional acidity. These will also produce ferric hydroxide precipitates that can detrimentally affect aquatic organisms.

SECTION 13. DISPOSAL CONSIDERATIONS

If material cannot be returned to process or salvage, dispose of in accordance with applicable regulations. Empty and thoroughly clean all residues from containers before reuse or disposal.

SECTION 14. TRANSPORT INFORMATION

Transport Canada Classification.....Not Regulated
U.S. DOT Hazard Classification.....Class 9, Packing Group III
U.S. DOT Shipping Name.....Environmentally Hazardous Substance, Solid, n.o.s.
(Ferrous Sulphate)
RQ.....1,000lb (454 kg.)
U.S. DOT Product Identification NumberUN3077
Marine Pollutant.....No
IMO ClassificationNot Regulated

SECTION 15. REGULATORY INFORMATION

U.S.:

Ingredients Listed on TSCA Inventory.....Sulphuric Acid - Yes
Ferrous Sulphate CAS #7782-63-0 is not on the TSCA Inventory. It is a hydrate and exempt from TSCA Inventory requirements. CAS #7720-78-7 (Ferrous Sulphate Anhydrous) is on the Inventory

Hazardous Under Hazard Communication Standard.....Yes

CERCLA Section 103 Hazardous Substances.....Ferrous Sulphate – Yes – RQ: 1,000lb (454 kg.)
Sulphuric Acid – Yes – RQ: 1,000lb. (454kg.)

EPCRA Section 302 Extremely Hazardous SubstanceSulphuric Acid – Yes

EPCRA Section 311/312 Hazard CategoriesImmediate (Acute) Health Hazard – Irritant

EPCRA Section 313 Toxic Release Inventory (Supplier Notification):.....Sulphuric Acid
CAS #7664-93-9
Percent by Weight: <2

CANADIAN:

Ingredients Listed on DSL.....Sulphuric Acid - Yes
CAS #7782-63-0 is not on the DSL. It is a hydrate and exempt from DSL requirements. CAS #7720-78-7 (Ferrous Sulphate Anhydrous) is on the DSL

WHMIS ClassificationD2B (Skin & Eye Irritant)

EUROPEAN UNION:

Ingredients Listed on the European Inventory
of Existing Commercial Chemical Substances (EINECS):.....Sulphuric Acid – Yes
Anhydrous form of Ferrous Sulphate is on EINECS
EU Classification:.....Harmful

SECTION 16. OTHER INFORMATION

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

- ? American Conference of Governmental Industrial Hygienists, 1991, Documentation of the Threshold Limit Values and Biological Exposure Indices, Sixth Edition, plus Supplements.
- ? American Conference of Governmental Industrial Hygienists, 2002, Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices.
- ? American Conference of Governmental Industrial Hygienists, Guide to Occupational Exposure Values - 2002.
- ? Bingham, Cohrssen & Powell, 2001, Patty's Toxicology, Fifth Edition.
- ? Canadian Centre for Occupational Health and Safety (CCOHS) CHEMpendium Chemical Information Data Base.
- ? European Economic Community, Commission Directives 91/155/EEC and 67/548/EEC.
- ? Industry Canada, SOR/88-66, Controlled Products Regulations.
- ? International Agency for Research on Cancer (IARC), Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Man, 1972 – 2000, (multi-volume work), World Health Organization, Geneva.
- ? Merck & Co., Inc., 2001, The Merck Index, An Encyclopedia of Chemicals, Drugs, and Biologicals, Thirteenth Edition.
- ? U.S. Department of Health and Human Services, National Institute for Occupational Safety and Health, 1990, NIOSH Pocket Guide to Chemical Hazards. CD-ROM Edition DHHS (NIOSH) Publication No 99-115, April 1999.
- ? U.S. Department of Health and Human Services, National Institute for Occupational Safety and Health, Registry of Toxic Effects of Chemical Substances (RTECS) May 2000.
- ? U.S. Department of Health and Human Services, National Institute for Occupational Safety and Health, National Toxicology Program (NTP), 9th Report on Carcinogens, May 2000.
- ? U.S. National Library of Medicine, Hazardous Substance Data Bank (HSDB) Record No 465 (2002/11/08) – Ferrous Sulfate.
- ? U.S. Occupational Safety and Health Administration, 1989, Code of Federal Regulations, Title 29, Part 1910.
- ? Urben, P. G., 1995, Bretherick's Handbook of Reactive Chemical Hazards, Fifth Edition.

Notice to Reader

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