Material Safety Data Sheet

Identity: **FERROVANADIUM 42% THROUGH 80% GRADE**

Common Name: **FERROVANADIUM**

CAS Number: **12604-58-9**

Section I – Manufacturer Information

Manufacturer's Name: ***Bear Metallurgical Company***
Address: ***679 East Butler Road***
Butler, PA 16002
Emergency Telephone: **(724) 283-6800** **Information Telephone: (724) 283-6800**

Date Prepared: ***2/5/06***

Section II – Hazardous Ingredients / Identity Information

Material	CAS Number	% Weight	OSHA PEL	ACGIH TLV
Ferrovanadium	12604-58-9	100 %	1 mg/m³ Dust	1 mg/m³ 3 mg/m³ Dust
Aluminum	7429-90-5	<1.5%	10 mg/m³ Total Dust 5 mg/m³ Respirable Dust	10 mg/m³ Total Dust
Silicon	7440-21-3	<3.5%	10 mg/m³ SiO2+2 (Silicon dioxide as SiO2-quartz) Respirable Dust	0.1 mg/m³ Resp. Dust (Silicon dioxide as SiO2-quartz) Respirable Dust

Note: SARA Title III, Section 313 – Listed Ingredients
Vanadium (Fume or Dust) CAS # 7440-62-2
Aluminum (Fume or Dust) CAS # 7429-90-5

EPA SARA Title III Hazard Categorization

As defined by 40 CFR 370, the product is categorized as both an "immediate (acute) health hazard", and a "delayed (chronic) health hazard."

Section III - Physical/ Chemical Characteristics

Boiling Point: NA

Freezing Point: NA

Vapor Pressure (mm Hg): NA

Specific Gravity: NA

Vapor Density (AIR= 1): NA

Evaporation Rate: NA

Melting Point: 1482º - 1521º C

Solubility in water: Insoluble

Appearance and Odor: Dark Metallic gray lumps and powder with no odor.

Section IV - Fire and Explosion Hazard Data

Flash Point: NA

Flammable Limits: NA **LEL:** NA **UEL:** NA

Extinguishing Media: Moderate fire hazard when exposed to heat or flame. Fire may be isolated and allowed to burn itself out. Do not disturb burning metal while extinguishing fire.

Special Fire Fighting Procedures: Wear protective fire-fighting clothing and self-contained breathing apparatus (SCBA).

Unusual Fire and Explosion Hazards: Slight explosion hazard when dust is exposed to flame. As with any material, high concentrations of airborne dust in an enclosed area can explode or burn if exposed to a source of ignition.

Section V- Reactivity Data

Stability: Unstable:
Stable: X

Conditions to avoid: Avoid creating concentrated airborne particulate.

Incompatibility: Oxidizers, acids.

Vanadium – Bromine trifluoride, Chlorine.
Iron – Chlorine, chlorine trifluoride, fluorine, hydrogen peroxide, nitrogen dioxide, phosphorous, sodium carbide, sulfuric acid.

Hazardous Decomposition or Byproducts: Vanadium pentoxide, Iron oxide.

Hazardous Polymerization: Will not occur

Conditions to Avoid: See Incompatibility.

Section IV- Health and Hazard Data

Route(s) of Entry: **Inhalation:** Yes **Skin:** Yes **Ingestion:** Unlikely **Other:** Eyes

Health Hazards:
Acute:
High concentrations of metallic fumes and dusts can result in irritation of the eyes, skin, mucous membranes and respiratory system.
Vanadium is an experimental ETA (equivocal tumorigenic agent).

Vanadium compounds act chiefly as irritants to the conjunctivae and respiratory tract. Prolonged exposures may lead to pulmonary involvement.

Iron dust can cause conjunctivitis, choroiditis and retinitis (siderosis of tissues if iron remains in these tissues).

Silicon dioxide or crystalline silica (quartz) is an acute irritant dust.

Under the expected use conditions of the product, byproducts may be released that can cause skin, mucous membrane and respiratory system irritation; Irritation of the conjunctivae and nasal mucosa, moderate pathological changes in the mucous membrane (hyperplasia), wheezing, dyspnea, dryness and irritation of the throat have been observed in workers exposed. May cause a papular skin rash. When ingested, causes gastrointestinal disturbances. Also, a condition known as "metal fume fever" may occur. Symptoms consist of chills and fever (very similar and easily confused with flu symptoms), a metallic taste in the mouth, dryness and irritation of the throat. The symptoms occur a few hours after excessive exposures and usually last from 12 to 48 hours.

Chronic:
Effects associated with overexposure to metal fumes and dusts may include conjunctivitis and pneumoconiosis. Exposure to ferrovanadium dusts can cause pulmonary damage.

Silicon dioxide or crystalline silica (quartz) inhaled from occupational sources is classified as carcinogenic to humans. The prolonged inhalation of excessive levels of dusts containing free silica can cause silicosis, a fibrosis (scarring) of the lungs. Silicosis may be progressive; it may lead to disability and death. Silicosis is associated with the increased incidence of scleroderma, an autoimmune disorder manifested by a fibrosis of the skin and internal organs.

Under the expected use conditions of the product, byproducts may be released that are suspected carcinogens of the lung, liver, connective tissue and reticuloendothelial tissue. Also, exposure to these byproducts may result in the development of a benign pneumoconiosis, called siderosis, which is observable as an x-ray change. No physical impairment of lung function has been associated with siderosis. Inhalation of excessive concentrations of these byproducts may enhance the risk of lung cancer development in workers exposed to pulmonary changes.

Carcinogenicity: NTP: Yes IARC: Yes OSHA Reg.: No

Signs and Symptoms of Exposure: Exposure to metal fumes and dusts may cause respiratory irritation. Also see Health Effects (above) for more information.

Vanadium poisoning include pallor, greenish-black discoloration of the tongue, paroxysmal cough, conjunctivitis, dyspnea, pain in the chest, bronchitis, rales and rhonchi, bronchi spasm, tremor of the fingers and arms.

Medical Conditions Generally Aggravated by Exposure: Excessive dust and fume exposures may aggravate impaired respiratory systems.

Emergency and First Aid Procedures:

Inhalation: If acute overexposure to dusts or fumes occurs, remove the victim form the adverse environment and seek medical attention. Give artificial respiration if victim has stopped breathing.

Eye Contact: Should eye contact occur flush with large amounts of water for 15 minutes. Seek prompt medical attention.

Skin Contact: If dust gets on the skin, immediately wash the contaminated area with soap and water.

Ingestion: Ingestion is not a probable source of exposure to the dust or fume. If particles are ingested, give 1-2 glasses of water or milk. Induce vomiting only if the victim is fully conscious and has not convulsed. Seek prompt medical attention.

Section VII – Precautions for Safe Handling, Storage, Use and Disposal

Steps to be Taken in Cast Material is Released or Spilled: If there is a spill of this material, clean up using methods which avoid dust generation such as dry or wet vacuuming. Compressed air should not be used to clean up spills. During cleanup, skin and eye contact and inhalation of dust should be avoided as much as practical. Provide local exhaust or dilution ventilation as required. Collect material in appropriately labeled containers.

Waste Disposal Method: Dispose of in accordance with applicable regulations.

Precautions to be taken in Handling and Storing: Avoid incompatible materials. Store dry (powder-keep container tightly closed).

Other Precautions: NA

Section VIII – Control Measures

Respiratory Protection: When engineering controls are not sufficient to prevent overexposure, appropriate NIOSH approved respirators should be used, such as half-mask air –purifying respirators. A competent occupational health professional should be consulted for respirator selection.

Ventilation:
Local Exhaust: As needed, to control dust and fume.
Mechanical (General): As needed, to control dust and fume.
Special and Other: NA

Protective Gloves: As needed, to protect against chemical or physical hazards.

Eye Protection: Safety glasses with side shields are recommended when there is a reasonable probability of exposure or injury during handling.

Other Protective Clothing or Equipment: NA

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