

Copper Concentrate

Section 1. Identification of the Substance and Company

1.1 Product Identification:

Product Name: Copper Concentrate

Synonyms: VBN Copper Concentrate, Cu Concentrate, VBN Cu Concentrate

EC No: Not available

CAS No: Not available

1.2 Uses

Identified uses:

Intermediate product used for the recovery of metal values.

Company Identification:

Manufactured by:

Vale Newfoundland and Labrador Limited
Suite 700, Blaine Johnston Centre
10 Fort William Place, St. John's Newfoundland
A1C 1K4
Email: msds@vale.com

Distributed by:

Vale Canada Limited
200 Bay St., Royal Bank Plaza
Suite 1500, South Tower, PO Box 70
Toronto, Ontario, Canada, M5J 2K2

EU REACH Contact

H2 Compliance
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Cork, Republic of Ireland
Tel: +353-21-486-8121

Imported into the EU by:

Vale Holdings BV, Piet Heinkade 55, 1019GM,
Amsterdam, The Netherlands
Tel No 31 20 308 5644 214

For Fire, Spill, or chemical emergency call CHEMTREC: +1 703-527-3887

For Europe Call CHEMTREC: + 44 870 8200418

On Vale property, please follow your appropriate spill procedures

Section 2. Hazards Identification

2.1 Classification of the Substance:

Aquatic acute – Category 2

Hazard Pictograms:	No symbol
Signal Word:	No signal word
Hazard Statements:	H401: Toxic to aquatic life
Precautionary Statements:	P273, P501

2.2 Label elements

Product identifier: Copper Concentrate

Hazard Statements: H401: Toxic to aquatic life

Precautionary Statements: P273: Avoid release to the environment.
 P501: Dispose of contents/container in accordance to local/regional/national/international regulations

Section 3. Composition

Substance Mixture (MCS)

Typical Analysis: %

Hazardous Ingredients	Typical Composition (%)	C.A.S. Number
Chalcopyrite, CuFeS ₂	80-100	1308-56-1
Pyrrhotite Fe _{n-1} Sn	5-20	1310-50-5
Pentlandite (Ni, Fe) ₉ S ₈	1-5	53809-86-2

Section 4. First Aid Measures

Ingestion: Get immediate medical attention

Inhalation: For respiratory tract irritation, remove to fresh air. If symptoms persist, seek medical care.

Skin: For skin irritation, flush with plenty of water. For skin rashes, seek medical attention.

Eyes: Irrigate eyeball thoroughly with water for at least 10 minutes. If discomfort persists seek medical attention.

Most important symptoms and affects, both acute and delayed
 Skin contact: Rash
 Eye contact: Redness

Indication of immediate medical attention and special treatment needed
 No special requirements

Section 5. Fire Fighting Measures

<i>Suitable extinguishing media:</i>	Any, type to be selected according to materials stored in the immediate neighbourhood.
<i>Special risks:</i>	Non-flammable. May evolve toxic sulphur containing gases if involved in a fire. Extinguish surrounding fires with appropriate methods.
<i>Special protective equipment for fire fighting:</i>	None needed. Wear protective equipment if required for other materials within the immediate vicinity.

Section 6. Accidental Release Measures

<i>Person related precautionary measures:</i>	Wear waterproof gloves and suitable protective clothing. Avoid generation of dusty atmospheres. Do not inhale dusts. Wear appropriate nationally approved respirators if collection and disposal of spills is likely to cause the concentration limits of airborne nickel to exceed the locally prescribed exposure limits.
<i>Environmental Protection measures:</i>	Do not allow spills to enter watercourses. Dispose of spills in accordance with local regulations.
<i>Procedures for cleaning/absorption:</i>	Collect spills by sweeping or vacuuming with the vacuum exhaust passing through a high efficiency particulate arresting (HEPA) filter if exhaust is discharged into the work place. Copper-containing material is normally collected to recover copper values.

Section 7. Handling and Storage

<i>Precautions for Safe Handling:</i>	Prevent the generation of inhalable dusts e.g. by the use of suitable ventilation. Do not inhale dust. Keep in a moist condition and if possible avoid drying and minimize dust generation. Wear appropriate protective clothing including waterproof gloves and nationally approved respirators. Contaminated work clothing should not be allowed out of the workplace.
<i>Conditions for Safe Storage:</i>	Keep in the container supplied, and keep container closed when not in use. Local regulations should be followed regarding the storage of this product.

Section 8. Exposure Controls / Personal Protection

8.1.1 Exposure Limits:

	ACGIH TLV-TWA ¹
Chalcopyrite, CuFeS ₂	1 mg/m ₃ as Cu
Pentlandite (Ni, Fe)gS ₈	0.2mg/m ₃ as Ni*
Pyrrhotite Fe _{n-1} Sn	Not available

*-as inhalation fraction

DNEL's

	Unit	DNEL
Inhalation		
Acute local	mgCu/m ³	1.0
Long-term local	mgCu/m ³	1.0

8.1.2 Environmental limits

PNEC's

Compartment	Unit	PNEC
Freshwater	µg Cu/L	7.8
Marine	µg Cu/L	5.2

8.2.1 Occupational exposure controls:

Do not inhale dust. Mechanical extraction ventilation may be required if user operations change it to other physical or chemical forms, whether as end products, intermediates or fugitive emissions, which are inhalable. Maintain airborne nickel levels as low as possible. Avoid repeated skin contact.

PPE

Respiratory protection: If required, use an approved respirator with particulate filters.

Eye protection: Avoid eye contact. Wear goggles or face shield.

Hand & Skin Protection: Avoid skin contact. Wear suitable protective clothing and waterproof gloves. Wash skin thoroughly after handling and before eating, drinking or smoking. Launder clothing and gloves as needed. Use of skin-protective barrier cream advised.

Section 9. Physical and Chemical Properties

Odourless, greyish, slurry or moist powder.

Physical state at 20°C and 101.3 kPa	solid
Melting / freezing point	Not available
Boiling point	Not available
Decomposition temperature	Not available
Relative density	Not available
Vapour pressure	Not applicable
Vapour density	Not applicable
Surface tension	Not applicable
Water solubility	Insoluble

pH	11.5-12.0
Evaporation rate	Not applicable
Partition coefficient n-octanol/water (log value)	Not applicable
Flash point	Not applicable
Flammability	Non-flammable
Explosive properties	Not applicable
Self-ignition temperature	Not available
Decomposition temperature	Not available
Oxidising properties	Non-oxidising
Granulometry	The 80% passing size of fresh Copper Concentrate is expected to be 30µm based on pilot plant results (range from 15 to 50µm). Copper Concentrate is expected to age and oxidize during storage and shipping forming agglomerates and lumps
Bulk Density	Not available
Stability in organic solvents and identity of relevant degradation products	Not applicable
Dissociation constant	Not applicable
Viscosity	Not applicable

Section 10. Stability and Reactivity

<i>Reactivity</i>	Stable under normal conditions.
<i>Chemical stability</i>	Stable under normal conditions.
<i>Possibility of hazardous reactions</i>	Stable under normal conditions.
<i>Conditions to avoid</i>	Heat, ignition sources
<i>Incompatible materials</i>	Many sulphides react violently and explosively with powerful oxidizers, evolving SO ₂
<i>Hazardous Decomposition Product(s)</i>	At high temperatures toxic sulphur containing gases may be evolved.

Section 11. Toxicological Information²

As a mixture the toxicological properties of this product are unknown. The toxicology of the reported ingredients are summarized below.

Chalcopyrite:

Significant information specific to chalcopyrite was not found in the literature information supplied is based on copper.

Pre-existing conditions:

Wilson's disease can occur in certain individuals with a rare inherited metabolic disorder characterized by retention of excessive amounts of copper in the liver, brain, kidneys and corneas. These deposits eventually lead to tissue necrosis and fibrosis, causing a variety of clinical effects, especially liver (i.e. hepatic) disease and neurologic changes. Wilson's disease is progressive and, if left untreated, leads to fatal liver (i.e. hepatic) failure.

Pyrrhotite:

An extensive literature search revealed no toxicological or health hazard information specific to this material

Pentlandite:

Acute Toxicity:

a) *Oral:* Not available

b) *Inhalation:* Not available

c) *Dermal:* Not available

Corrosivity/Irritation:

a) *Respiratory Tract:* No classification

b) *Skin:* No classification

c) *Eyes:* No classification

Sensitization:

a) *Respiratory tract:* No information available

b) *Skin:* Nickel metal is a well-known skin sensitizer. Direct and prolonged skin contact with metallic nickel may induce nickel allergy and elicit nickel allergic skin reactions in those people already sensitized to nickel, so called nickel allergic contact dermatitis.

c) *Preexisting conditions:*

Individuals known to be allergic to nickel should avoid contact with nickel whenever possible to reduce the likelihood of nickel allergic contact dermatitis reactions (skin rashes). Repeated contact may result in persistent chronic palmar/hand dermatitis in a smaller number of individuals, despite efforts to reduce or avoid nickel exposure.

Chronic toxicity:

a) *Oral:* No information available

b) *Inhalation:* The International Agency for Research on Cancer (IARC) concluded there was insufficient evidence that nickel compounds are carcinogenic to humans. Intratracheal instillation of pentlandite (>98% pure) in hamsters did not produce a significant increase in lung tumours. The pentlandite remained in the lung

nine times longer than the positive control Ni₃S₂), which also did not produce a significant increase in lung tumours.

c) *Dermal*: No information available.

Section 12. Ecological Information

<i>Toxicity</i>	N/A
<i>Persistence and degradability</i>	Aquatic Acute 2. Toxic to aquatic life
<i>Results of PBT and vPvB assessment</i>	Not classified as PBT or vPvB.
<i>Other adverse effects</i>	None anticipated.

Section 13. Disposal Considerations

<i>Waste treatment methods</i>	Recover or recycle if possible. Dispose of contents in accordance with local, state or national legislation.
<i>Additional Information</i>	No information available.

Section 14. Transport Information

International Maritime Dangerous Goods Code	Not Regulated
International Civil Aviation Organization Technical Instructions for the Carriage of Dangerous Goods by Air	Not Regulated
U.S. Dept. of Transportation Regulations	Not Regulated
Canadian Transportation of Dangerous Goods Act	Not Regulated
European Agreement Concerning the International Carriage of Dangerous Goods by Road	Not Regulated

MAROL Annex V:

Under the 7 Criteria contained within the MARPOL Annex V, this material is classified as:

	Harmful to the Marine Environment (HME)
X	Not Harmful to the Marine Environment (non-HME)

Section 15. Regulatory Information

Europe:

Classification according to Part 3 of Annex VI of EU Regulations No.1272/2008

Not classified

Canada:
WHMIS 2015 classification
Not classified

Section 16. Other Information

Indications of Change:

1. Original document.
- 1.1 Update addresses

The following acronyms may be found in this document:

ACGIH	American Conference of Governmental Industrial Hygienists
DNEL	Derived No Effect Level
LTEL	Long Term Exposure Limit
OEL	Occupational Exposure Limits
OSHA	Occupational Safety and Health Administration
PBT	PBT: Persistent, Bioaccumulative and Toxic
PNEC	Predicted No Effect Concentration
STEL	Short Term Exposure Limit
TLV-TWA	Threshold Limit Value – Time Weighted Average
vPvB	very Persistent and very Bioaccumulative
WEL	Workplace Exposure Limit (UK HSE EH40)

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Note:

Vale Canada believes that the information in this Safety Data Sheet is accurate. However, Vale Europe Limited makes no express or implied warranty as to the accuracy of such information and expressly disclaims any liability resulting from reliance on such information.

1. Threshold Limit Values of the American Conference of Governmental Industrial Hygienists. 2016
2. Describes possible health hazards of the product supplied. If user operations change it to other chemical forms, whether as end products, intermediates or fugitive emissions, the possible health hazards of such forms must be determined by the user.