

Copper

Section 1. Identification of the Substance and Company

1.1 Product Identification:

Product Name: Copper Cathode

Synonyms: Electrowon Copper Cathode

EC No: 231-159-6

CAS No: 7440-50-8

1.2 Uses

Identified Uses:

- Production of copper fire-refined ingots, and unwrought shape
- Production of copper particulates and powder
- Production of alloys in which copper is the main constituent as well as where it is minor alloying element
- Production of copper powder containing preparations
- Production of copper containing articles
- Production of article made from copper and copper containing particulates
- Use as an intermediate in the production of other copper containing substances
- Use as brazing paste
- Use as catalyst
- Used in articles
- Use as spray coating agent
- Use of article made from copper and copper containing particulates

Uses Advised Against:

None advised against

1.3 Company Identification

Manufactured by:

In Canada:

Vale Canada limited
Ontario Operations
Sudbury, ON
Canada P0M 1N0

Vale Newfoundland and Labrador
Long Harbour Processing Plant
Long Harbour, NL
Canada A0B 2J0

Distributed by:

Vale Canada Limited
200 Bay St., Royal Bank Plaza
Suite 1600, South Tower, PO Box 70
Toronto, ON
Canada, M5J 2K2
Email: msds@vale.com

Imported by:

In North & South America:

Vale Americas Inc.
140 E. Ridgewood Avenue
Suite 415, South Tower
Paramus, NJ 07652
U.S.A.

In Asia (Except India, & Pakistan):

Vale Base Metals Asia Pacific PTE. LTD.
One Temasek Avenue #39-01
Millenia Tower
Singapore, 039192

In Europe, Middle East, Africa, India, & Pakistan:

Vale International SA
Route de Pallatex 29
1162 Saint-Prex
Switzerland

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

for Europe call CHEMTREC: +(44) 870 8200418

Section 2. Hazards Identification

2.1 Classification of the Substance:

Not classified

2.2: Label elements

Product identifier: Copper
CAS #: 7440-500-8

Section 3. Composition

Substance

Mixture

Hazardous Ingredients	Typical Composition	C.A.S. Number	EINECS/EC Label No.
Copper Metal (Cu)	99.99%	7440-50-8	231-159-6

Section 4. First Aid Measures

Ingestion: No specific first aid required.

Inhalation: No specific first aid required.

Skin: Remove contaminated clothing, and wash affected areas thoroughly with water. If skin irritation or rash occurs: Get medical advice/attention. Show label if possible.

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

<i>Most important symptoms & affects, both acute/delayed</i>	No important symptoms and affects
<i>Indication of immediate medical attention and special treatment needed</i>	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 oxidize to metal oxides if exposed to high temperatures within a fire. Keep containers cool with water spray.
<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>	Avoid generation of dusty atmospheres. Do not inhale dusts. Contaminated work clothing should not be allowed out of the workplace. Use personal protective equipment as required. Wash hands, and face thoroughly after handling.
<i>Environmental Protection measures:</i>	No specific measures needed.
<i>Procedures for cleaning/absorption:</i>	Pick up and replace in original container. 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. Wear appropriate nationally approved respirators if handling is likely to cause the concentration limits of airborne copper to exceed the locally prescribed exposure limits. Wear suitable protective clothing and gloves. 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:

Copper Metal (Cu) – CAS 7440-50-8	
	Exposure Limit (mg/m ³)
TLV ^{1,2}	1.0

DNEL's

	Unit	DNEL
Inhalation		
Acute local	mg Cu/m ³	No hazard identified
Long-term local	mg Cu/m ³	No hazard identified
Systemic effects - Acute	mg Cu/m ³	20

8.1.2 Environmental Limits:

PNEC's

Compartment	Unit	PNEC
Freshwater	µg Cu/L	7.8
Sediment (freshwater)	mg Cu/kg	87
Marine water	µg Cu/L	5.2
Sediment (marine water)	mg Cu/kg	676
Agricultural soil	mg Cu/kg	65

8.2.1 Occupational exposure controls:

As supplied, this product does not pose a health hazard by inhalation. 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 copper levels as low as possible. Avoid repeated skin contact.

PPE

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

Eye protection: None

Hand & Skin Protection: Wear suitable protective clothing and gloves, which should be selected specifically for the working place, depending on concentration and quantity of the hazardous material (overalls and leather/rubber gloves). Wash skin thoroughly after handling and before eating, drinking or smoking. Change contaminated clothing frequently.

Launder clothing and gloves as needed. Use of skin-protective barrier cream advised.

Section 9. Physical and Chemical Properties

Odourless, reddish metal slab

Physical state at 20°C and 101.3 kPa	solid
Melting / freezing point	1083°C
Boiling point	2595°C
Decomposition temperature	Not applicable
Relative density	Not applicable
Vapour pressure	Not applicable
Vapour density	Not applicable
Surface tension	Not applicable
Water solubility	Not applicable
pH	Not applicable
Evaporation rate	Not applicable
Partition coefficient n-octanol/water (log	Not applicable
Flash point	Not applicable
Flammability	Non-flammable
Explosive properties	Non-explosive
Self-ignition temperature	Autoflammability is not applicable to massive copper metal
Oxidising properties	Non-oxidising
Granulometry	Not applicable
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>	Avoid contact with heat and strong acids

Incompatible materials

Strong acids

Hazardous Decomposition Product(s)

Not applicable

Section 11. Toxicological Information³

Copper

Acute Toxicity:

a) *Oral:* Adverse effect observed - LD₅₀ RAT 300 mg/kg bw

b) *Inhalation:* Adverse effect observed – LC₅₀ RAT 2000mg/kg bw

c) *Dermal:* No adverse effect observed

Corrosivity/Irritation:

a) *Respiratory Tract:* None

b) *Skin:* No adverse effect observed copper is not a skin irritant.

c) *Eyes:* No adverse effect observed, slightly irritating but not classified. Mechanical irritation may be expected.

Sensitization:

a) *Respiratory tract:* No information available

b) *Skin:* No adverse effect copper is not a skin sensitizer

c) *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.

Chronic toxicity:

a) *Oral:* No information available

b) *Inhalation:* No information available

c) *Dermal:* No information available

Mutagenicity /

Reproductive toxicity: No adverse effects observed

Carcinogenicity: Not classified as a carcinogen

Section 12. Ecological Information

Toxicity: Not classified as hazardous to the aquatic environment.

Persistence and Degradability: The PBT and vPvB criteria of Annex XIII to the Regulation does not apply to inorganic substances, such as copper metal. The methods for determining the biological degradability are not applicable to inorganic substances

Bioaccumulative Potential: Copper does not tend to bioaccumulate or biomagnify in aquatic or terrestrial systems.

Mobility in soil: The substance is essentially insoluble in water.

Results of PBT and vPvB assessment: Not classified as PBT or vPvB.

Other adverse effects: None anticipated.

Section 13. Disposal Considerations

Waste treatment methods: Recover or recycle if possible. Dispose of contents in accordance with local, state or national legislation.

Additional Information: 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	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.

MARPOL 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:

REACH Registration #'s:

Not registered by Vale Canada

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

Not Classified

Canada:

WHMIS 2015 Classification:

Not Classified

All components are listed on the Canadian Domestic Substances List (DSL)

Section 16. Other Information

Indications of change:

1.0 – Original document

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
- LR Lead Registrant
- MMAD Mass Median Aerodynamic Diameter
- NIOSH National Institute of Occupational Safety and Health
- OEL Occupational Exposure Limits
- OR Only Representative
- OSHA Occupational Safety and Health Administration

PBT	PBT: Persistent, Bioaccumulative and Toxic
PNEC	Predicted No Effect Concentration
STEL	Short Term Exposure Limit
STOT	Specific Target Organ Toxicity
TLV-TWA	Threshold Limit Value – Time Weighted Average
vPvB	very Persistent and very Bioaccumulative
WEL	Workplace Exposure Limit (UK HSE EH40)

Safety Data Sheet prepared by:
Vale Canada Limited
200 Bay St., Royal Bank Plaza
Suite 1600, South Tower, PO Box 70
Toronto, ON
Canada, M5J 2K2
msds@vale.com

SDS available online at <http://www.vale.com/canada/en/business/mining/nickel/pages/default.aspx>

Note:
Vale Canada believes that the information in this Safety Data Sheet is accurate. However, Vale Canada 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. Maximum Exposure Limit of the Health and Safety Executive in the U.K. in EH40/2005.
3. 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.