REVISION Nº.: 1

**BASE METAL REFINERIES**

IMPALA SPRINGS

ISSUED DATE: 21 October 2021

WORK PROCEDURE TASK **SAFETY DATA SHEET – COPPER CATHODE**

SECTION: LEACHES

DOCUMENT NO.: **SDS-002**

## DISTRIBUTION CONTROL SHEET

| Nº | LOCATION | TITLE |
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| | | |
|---|---|---|
| **Product code** | : | Not applicable |
| **Version** | : | 1 |
| **Date of issue** | : | 01/10/2021 |
| **Date of previous issue** | : | No previous validation |

## SECTION 1: Identification of the substance / mixture and of the company / undertaking

### 1.1. Product Identifier

| | | |
|---|---|---|
| **Product name** | : | Copper Cathodes |
| **Synonyms** | : | Impala Copper. Copper Metallic. Copper Sheet |
| **EC number** | : | Not applicable |
| **UK (GB) REACH Registration number** | : | Not applicable |
| **Legal Identity** | : | Not Applicable |
| **CAS number** | : | Not applicable |
| **Product code** | : | Not applicable |
| **Product type** | : | Not applicable |
| **Other means of identification** | : | Not applicable |

### 1.2. Relevant Relevant identified uses of the substance or mixture and uses advised against Specific uses

Catalyst, Alloys, Construction Materials, Wiring, Plumbing, Electrolysis.

### 1.3. Details of the supplier of the safety data sheet

| | | |
|---|---|---|
| **Supplier Name** | : | Impala Platinum Ltd – Refineries |
| **Address** | : | Base Metals Refinery<br>P.O. Box 222<br>SPRINGS<br>1560<br>GAUTENG<br>Republic of South Africa |
| **Contact Person (s)** | : | Element Coordinator – Org Langenhoven<br>Tel: +27 11 360 3176<br>E-mail: georg.langenhoven@implats.co.za |
| | : | Leaches Section Manager – Selilo Semosa<br>Tel: +27 11 360 3176<br>E-mail: Selilo.semosa@implats.co.za |

### 1.4. Emergency telephone number

For emergency information – see above for Impala Platinum contacts.
South Africa Poisons Information Centre (24 hours) 0861-555-777 (South Africa only)

## SECTION 2: Hazard Identification

### 2.1. Classification of the substance or mixture
### GHS Classification (sans 10234)

**Health Hazard:**

| | | |
|---|---|---|
| Acute toxicity, oral | H303 | May be harmful if swallowed, highly unlikely in product form |

**Physical hazards:** : Not classified for physical hazards

**Health hazards**: : Not classified for physical hazards

**Environmental hazards** : Not classified as an environmental hazard

### 2.2. Label elements

**Hazard Pictograms** : None allocated

**Signal word** : None allocated

**Hazard statements** : H303 – May be harmful if swallowed – highly unlikely in product form

**Precautionary statements**
**Prevention** : P201 – Obtain special instructions before use.
: P202 – Do not handle until all safety precautions have been read and understood.

**Response** : P308+P313 – If exposed or concerned get medical advice / attention.

**Storage** : Not applicable.

**Disposal** : P501–Dispose of contents/container in accordance with local/regional/national/international regulations.

**Supplemental label elements** : Not applicable.

## SECTION 3: Composition / Information on Ingredients

### 3.1. Substances

Ingredient : Copper
Formula : Cu
CAS Nº : 7440-50-8
Poison Sched : None Allocated
Conc. : ≥99%
RTECS Nº : GL5325000
EC No : 231-159-6
ICSN N : 0240

## SECTION 4: First aid measures

### 4.1. Description of first aid measures

**Eye contact** : Exposure considered unlikely in cathode form.

**Inhalation** : Exposure considered unlikely. Due to product form, inhalation hazard is not anticipated. When melted metal fumes may cause slight irritation.

**Skin contact** : No adverse effects are anticipated. However, sensitive individuals may allergic skin reactions. Gently flush affected area with water. Seek medical attention if this occurs develop.

**Ingestion** : Due to product form and application, ingestion is considered highly unlikely. For advice contact a Doctor or Poisonous Information Centre (24 hours) 0861 555 777 (South Africa only).

## SECTION 5: Firefighting measures

### 5.1. Fire Fighting

| | | |
|---|---|---|
| Flash Point | : | Not applicable |
| Flammable Limits | : | Not applicable |
| Auto-ignition Point | : | Not applicable |
| Fire Extinguishing Media | : | Use an extinguishing agent suitable for a surrounding fire. |
| Special Fire Fighting Procedures | : | Non-flammable. No fire or explosion hazard exists. May evolve toxic gases (copper oxide if heated to decomposition). |
| Hazardous Chemical Code | : | Non allocated |

Note: May cause fire or explosion with incompatible materials (see Reactivity section 10.2). Evacuate area and contact emergency services. Remain upwind and notify those downwind of the hazard. Wear full protective equipment, including self-contained Breathing apparatus (SCBA) when combating fire. Bund water to prevent contamination of drains.

## SECTION 6: Accidental release measures

### 6.1. Personal precautions, protective equipment and emergency procedures

**Personal precautions** : Wear PPE as detailed in section 8 of this SDS.

### 6.2. Environmental precautions

**Environmental precautions** : Due to product form (insoluble in water), the environmental impact of this product will be negligible. Small amounts of the product may dissolve if product is in contact with acidic water, and soluble copper compounds are highly toxic to aquatic and plant life. Insoluble copper compounds are significantly less environmentally hazardous. Prevent product from entering drains and waterways.

### 6.3 Methods and material for containment and cleaning up

If spill in cathode form, collect and re-use where possible. If spilt and contaminated wear dust proof goggles, PVC / Rubber gloves, a Class PI (Particulate) respirator and

overalls. Collect the spill and place in sealable containers for re-use where possible or for disposal. Avoid generating dust. Toxic to aquatic organisms in very low concentrations. Do not flush residues to sewer. Absorb all residues.

## SECTION 7: Handling and Storage

### 7.1. Precautions for safe handling

**Protective measures / Packing material/ Handling** : Use of safe work procedures are recommended, to avoid eye or skin contact and inhalation. Observe good personal hygiene. Prohibit eating, drinking and smoking in contaminated areas. Wash hands before eating.

### 7.2. Conditions for safe storage, including any incompatibilities

Store in a cool, dry, well-ventilated area, removed from oxidising agents, strong acids, (e.g. Nitric acid) chlorine, fluorine, ethylene oxide, acetylene, hydrogen sulfide and foodstuffs. Ensure containers are adequately labelled, protected from physical damage and sealed when not in use. Also store away from alkalis, phosphorus, 1-bromo-2propyne, sulfur, chlorates, ammonium nitrate, bromates, iodates, potassium oxide, sodium azide and lead azide.

### 7.3. Specific end use(s)

Packed in bale weights slightly in excess of 2000kg. Each bale is mounted on a pallet. The copper is secured to the pallet by means of two metal strips which pass through the pallet and encompass the copper.

## SECTION 8: Exposure controls / personal protection

### 8.1. Control parameters

***Occupational Exposure Limit:***

| | **Exposure limit values** |
|---|---|
| NIOSH IDLH | Copper compounds 100mg/m$^3$ |
| NIOSH REL | Copper compounds (dusts and mists) 1mg/m$^3$ |
| SA OHSAct | Copper compounds 1mg/m$^3$ |
| ASCC(AUS)/TLV TWA | Copper fume 0.2mg/m3 |
| ACGIH 2007/ASCC(AUS) TWA | Copper dust/mist 1mg/m3 |

### 8.2. Exposure controls

**Respiratory protection** : Where an inhalation risk exists, wear a Class P2 (Particulate) respirator. At high dust levels, wear a Full-Face Class P3 (Particulate) or Powered Air Purifying Respirator (PAPR).

**Hand protection** : Wear leather gloves.

**Eye protection** : Wear safety glasses

**Skin protection** : Wear overalls. Do not take working clothes home.

## SECTION 9: Physical and chemical properties

The conditions of measurement of all properties are at standard temperature and pressure unless otherwise indicated.

### 9.1. Information on basic physical and chemical properties

| | | |
|---|---|---|
| **Appearance** | : | Bright or reddish coloured metal, approx. 450mm high, 1050mm long and 1050mm wide |
| **Odour** | : | Odourless |
| **Flammability (Solid, gs)** | : | Non-Flammable |
| **Flash Point** | : | Not relevant |
| **Lower Explosion Limit** | : | Not relevant |
| **Upper Explosion Limit** | : | Not relevant |
| **Auto Ignition Temperature** | : | Not relevant |
| **Boiling Point** | : | 2595oC (4703ºF) |
| **Melting Point** | : | 1083oC (1981.4ºF) |
| **Evaporation Rate** | : | Not relevant |
| **pH** | : | Not relevant |
| **%Volatiles** | : | Not relevant |
| **Specific Gravity** | : | 8.94 |
| **Vapour Pressure** | : | Not relevant |
| **Solubility (water)** | : | Insoluble |
| **Molecular Weight** | : | 63.546g/mole |
| **Cu concentration** | : | ≥99.70% |

## SECTION 10: Stability and reactivity

### 10.1. Reactivity

Stable under recommended conditions of storage.

### 10.2. Chemical stability

Stable under recommended conditions of storage.

### 10.3. Possibility of hazardous reactions

No reactions expected, except if exposed to incompatible materials – see section 10.5

### 10.4. Conditions to avoid

Avoid heat, sparks, open flames, and other ignition sources.

### 10.5. Incompatible materials

Incompatible with oxidising agents (e.g. magnesium chlorate), acids (e.g. nitric acid), and reacts violently with chlorine, fluorine, ethylene oxie, acetylene and hydrogen sulfide.
Also incompatible with aluminium, phosphorus, 1-bromo-2-propyne, chlorates, ammonium nitrates, bromates, potassium oxide, sulfur, sodium azide and lead azide.

### 10.6. Hazardous decomposition products

May evolve toxic gases if heated to decomposition.

## SECTION 11: Toxicological information

### 11.1. Information on toxicological effects

**Eye**: : Not classified as an eye irritant.

| | | |
|---|---|---|
| | : | Exposure is considered highly unlikely due to product form. |
| | : | Exposure may result in laceration, irritation, pain and redness. |
| | : | Product form greatly reduces the risk of eye injuries. |
| | : | Flush gently with running water. Seek medical attention if irritation develops. |
| | : | Exposure may result in eye irritation, lachrymation, burning sensation and conjunctivitis. |
| **Acute Toxicity:** | : | Due to product form (cathode sheet), no adverse health effects are anticipated with normal use. |
| | : | LD50 (Interperitoneal) 3500µg/kg (mouse)<br>LDLo (Subcutaneaous) 375mg/kg (rabbit)<br>TDLo (Ingestion) 20µg/kg (human – gastrointestinal upset) |
| **Skin Irritation**: | : | Not classified as skin irritant. Exposure is considered highly unlikely due to product form. |
| | : | Allergic contact dermatitis has been reported, although rare. |
| | : | Remove contaminated clothing and gently flush affected area with water. Seek medical attention if irritation develops |
| | : | Launder clothing before re-use.<br>Respiratory or Skin Sensitization |
| **Mutagenicity:** | : | No evidence of mutagenic effects. |
| **Carcinogenicity:** | : | No evidence of mutagenic effects. |
| **Reproductive** | : | Insufficient data available to classify as a reproductive toxin. |
| **STOT – SE** | : | Not classified as causing organ damage from single exposure. |
| | : | Due to product form, ingestion is considered highly unlikely. |
| | : | Low to moderate toxicity from dust / fumes. |
| | : | Ingestion may result in nausea, vomiting, abdominal pain and diarrhoea. |
| **STOT – SE** | : | Not classified as causing organ damage from repeated exposure. |
| | : | Due to product form, ingestion is considered highly unlikely. |
| | : | Large doses may result in blood and liver /kidney damage. |
| | : | If poisoning occurs, contact a Doctor of the South Africa Poisons Information Centre (24 hours): 0861-555-777 (South Africa only). |
| | : | Do not induce vomiting without first seeking medical advice. For healthy, non-occupationally-exposed humans the major route of exposure to copper is oral. |
| | : | The mean daily dietary intake of copper in adults |

ranges between 0.9 and 2.2 mg. In some cases, Drinking water may make a substantial additional particularly in households where corrosive waters have stood in copper pipes.

: All other intakes of copper (inhalation and dermal) are insignificant in comparison to the oral route. Copper is mainly absorbed through the gastrointestinal tract. From 20% to 60% of the dietary copper is absorbed, with the rest being excreted through the faeces. The major soluble salts (copper(II) sulfate, copper(II) chloride) are generally more toxic than the less soluble salts (copper(II) hydroxide, copper (II) oxide). The range between deficiency and toxicity of copper is wide for mammals, although it is narrow for bacteria and fungi. Copper is highly toxic to aquatic organisms. Among mammals, ruminants are more susceptible to copper toxicity than are monogastric animals. Young calves, whose rumen are not fully developed, are more susceptible to copper toxicity than are older ruminants. Among monogastrics, guinea pigs, and rabbits are especially susceptible.

**Aspiration:** : Not applicable for solids. Exposure is considered highly unlikely due to product form. Toxic fume if heated. Exposure to dust / fume generated may cause irritation of the nose and throat with ulceration / perforation of the nasal septum. Inhalation of fumes (if welding) may result in metal fume fever. Product form greatly reduces the risk of inhalation. If over exposure occurs, leave exposure area immediately if other minor symptoms are displayed, seek immediate medical attention.

**Sensitisation:** Not classified as causing skin or respiratory sensitisation. Allergic dermatitis has been reported in humans.

## SECTION 12:Ecological information

### 13.1. Toxicity

| Result | Species | Exposure |
|---|---|---|
| LC50 250µg/L & 123µg/L | fathead minnow | 96 hours & 28 days |
| LC50 > 2 600µg/ | Asiatic clam | 96 hours |
| LC50 286µg/L | coho salmon | 48 hours |
| LC50 29.2µg/L | rainbow trout | pH6 |
| EC50 85 µg/L | green alga | 4 days (cell volume bioassay)<br>72 hrs (growth rate bioassay) |

## 13.2. Persistence and degradability

**Conclusion / summary** : Copper is a natural element and is, therefore, by definition, not degradable. As an essential nutrient, copper is homeostatically regulated by aquatic organisms and does not pose a concern for bioaccumulation or secondary poisoning in aquatic food chains. There is no evidence that supports the existence of biotransformation processes for copper compounds which would have a significant bearing on the fate of copper in aquatic environments.

## 13.3. Bioaccumulate potential

**Conclusion / summary** : Not expected to bio-concentrate or bio-Accumulate. Chemical processing or extended exposure to the environment can result in the release of copper in a bio-available form.

## 13.4. Mobility in soil

**Mobility** : Copper in its cathode sheet form is essentially immobile in the environment. Copper occurs in numerous minerals such as cuprite, tenorite, malachite, azurite, etc. Copper +2 compounds which are known to be appreciably soluble include chlorides, nitrates, and sulfates; insoluble compounds include oxides, hydroxides, carbonates and sulfides. Hydrolysis and precipitation reactions dominate the chemistry of copper compounds in most natural aqueous systems. Soluble copper compounds sorb strongly to suspended particles. The presence of complexing organic ligands can stabilise dissolved copper compounds in fresh water systems and prevent copper sorption onto solids. Most insoluble and soluble copper compounds are associated with solids, have low mobility in soil, and are not expected to volatilize from water or moist soil surfaces.

## Other adverse effects

Due to the product form (insoluble in water cathode sheets), the environmental impact of this product will be negligible. Transformation-dissolution testing has confirmed that negligible concentrations are released from the copper cathode in contact with water..

## SECTION 13:Disposal considerations

### 13.1. Waste treatment methods

**Product Methods of disposal** : Disposer must comply with state and local laws.
: Return bulk cathodes to the supplier. For small amounts of contaminated copper, cover with moist sand, vermiculite or similar to avoid dust hazard. Contact Impala Refineries for additional specific information (see section 1.3)

**Legislation:** : Dispose of in accordance with relevant local legislation.

## SECTION 14:Transport information

### 14.1. UN number

| ADR/RID | ADN | IMDG | IATA |
|---|---|---|---|
| N/A | N/A | N/A | N/A |

**Not classified as a dangerous good**
**Not regulated for Transport Purposes**

Packing: Not applicable
IMDG-Code: Not applicable
ICAO / IATA: Not applicable
RID / ADR: Not applicable

## SECTION 15:Regulatory information

### 15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

**United States**: CERCLA Sections: 102a/103 (40 CFR 302.4); Nor regulated
**Canada**: WHMIS Classification: D2B (tox material)
**EU/EC Classification**: XN (Harmful), not classified in Annex I of Directive 67/548/EEC (will change with implementation of GHS/REACH).

### 15.2 Chemical Safety Assessment

**Regulation**
EC no. 1907/2006 of the European Parliament and the Council of December 2006.

## SECTION 16:Other information

**Abbreviations and acronyms :**

**mg/m³** : : milligrams per cubic metre
**ppm:** : parts per million
**TWA/ES:** : Time Weighted Average of Exposure Standard
**pH:** : Relates to hydrogen ion concentration – this value will relate to a scale of 0-14, where 0 is highly acidic and 14 is highly alkaline.
**CAS Nº:** : Chemical Abstract Service number – used to uniquely identify chemical compounds.

**M:** : Moles per litre, a unit of concentration.
**IARC**: : International Agency for Research on Cancer.
**RTECS**: : The Registry of Toxic Effects of Chemical Substances.
**ICSC:** : International Chemical Safety Card.
**EC No:** : European Commission Number
**EU:** : European Union
**AUS:** : Australia
**Health Effect from Exposure**: : It should be noted that the effects from exposure to this will depend on sever factors including:
: Frequency and duration of use
: Quantity used
: Effectiveness of control measures
: Protective equipment used and method of application.
: Given that it is impractical to prepare a Chem Alert report which encompasses all possible scenarios, it is anticipated that users will assess the risks and apply control methods where appropriate.

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## Hazzard information References:

RTECS: Registry of toxic effects of Chemical Substances, NIOSH, edition January 1999
Sax's Dangerous Properties of Industrial Material (8th edition), R J Lewis Sr.
Material Safety Data Sheet: Platinum Standard solution National Institute of Standards and Technology (USA) August 2006
Screening of Platinum Group Metals; Pt, Rh, Pd SWECO VIAK Screening Report 2007: 2 (For Swedish Environmental Protection Agency).
ECOTOX database, http://cfpub.epa.gov/ecotox
ENVIRONMENTAL HEALTH CRITERIA 125 Platinum WHO:
http://www.inchem.org/documents/ehc/ehc/ehc125.htm

## Report Status:

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