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REVISION N <sup>o</sup> .: 19  ORIGINAL DATE ISSUED : <27-JUN-2005  LAST REVIEWED: *19-JAN-2018	<b>SAFETY DATA SHEET – COPPER CATHODE</b>  DOCUMENT N <sup>o</sup> .: <b>MAN-HDS-002</b>

**DISTRIBUTION CONTROL SHEET**

COPY N <sup>o</sup>	LOCATION	TITLE
1	Quality Offices	Document Controller
2	SHEQ	Safety & Hygiene Manager (Electronic)
3	Despatch	Process Supervisor (Electronic)
4	Plant Manager's Office	Plant Manager – Nickel (Electronic)
5	Manager – BMR Office	Manager – BMR (Electronic)
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9	Sales Admin.	Marketing Executive (Electronic)
10	Leaches - Cu Winning	Supervisor – Cu Winning (Electronic)
11	Plant Manager's office	Plant Manager – Leaches (Electronic)
12	Alice Lourens	Manager Investor Relations (for inclusion on Implats' Web Page)

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1. **PRODUCT AND COMPANY IDENTIFICATION**

**Product Name:** Copper Cathodes

**Synonyms:** ISA Copper, Copper Cathode, Copper sheet, Cathode Copper, Impala Copper, Copper Metallic.

**Use(s):** Catalyst, Alloys, Construction Materials, Wiring, Plumbing, Electrolysis.

**Supplier Details:** Impala Platinum Ltd – Refineries  
Base Metals Refinery  
P.O. Box 222  
SPRINGS  
1560  
GAUTENG  
Republic of South Africa

**\*Contact Persons:** *Laboratory Manager – Suzanne Finney Tel: +27 11 360 3478*  
[suzanne.finney@implats.co.za](mailto:suzanne.finney@implats.co.za)  
*Leaches/Cu Winning Manager – Sello Semosa Tel: +27 360 3126*  
[selilo.semosa@implats.co.za](mailto:selilo.semosa@implats.co.za)

**Emergency Contact Information:**

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

2. **HAZARDS IDENTIFICATION**

**Classification according to GHS Classification (SANS 10234):**

NOT CLASSIFIED AS A DANGEROUS GOOD

**Health hazards:**

Acute toxicity, oral Not categorised due to product form  
Respiratory sensitisation Not categorised due to product form  
Skin sensitisation Not categorised due to product form

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

**Hazard Summary:**

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

**Health hazards:** Low toxicity – irritant. Avoid dust / fume inhalation (e.g. during cutting / welding). Inhalation of fumes (e.g. if welding) may cause metal fume fever, a flu-like illness with dry throat, cough, chills, tight chest, weakness and muscular aches (symptoms last 1 – 2 days). Toxic only if swallowed, and cathodes too large to swallow.

**Environmental hazards:** No known adverse effects in aquatic environment. Ecotoxic highly unlikely in cathode form, e.g. during transportation, as in sealed containers. Ecotoxic only if reacted with acids, which dissolve the copper, and this will only occur in specially applied conditions.

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**Label Elements:**

- Hazard Pictograms:** None
- Signal Word:** Not applicable
- Health Statements:** H303 – May be harmful if swallowed – highly unlikely in product form
- Precautionary statements:**
- Prevention:** P201 – Obtain special instruction 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:** None specified
  - Disposal:** P501 – Dispose of contents/container in accordance with local/regional/national/international regulations

**Supplemental label information:** None

**Other Hazards:** Not a BPT or vPvB substance or mixture. No other acute or chronic health impact noted.

3. **COMPOSITION / INFORMATION ON INGREDIENTS**

<b>Ingredient</b>	:	Copper
<b>Formula</b>	:	Cu
<b>CAS N°.</b>	:	7440-50-8
<b>Poison Sched.</b>	:	None Allocated
<b>Conc.</b>	:	>99%
<b>ICSC#</b>	:	0240
<b>RTECS#</b>	:	GL5325000

4. **FIRST AID MEASURES**

**Eye:** Not applicable.

**Inhalation:** Not applicable. Due to product form, acute inhalation symptoms are not anticipated. When melted metal fumes may cause slight irritation.

**Skin:** Not applicable. However, sensitive individuals may develop allergic skin reactions. Seek medical attention if this occurs.

**Ingestion:** Due to product form and application, ingestion is considered highly unlikely.

5. **FIRE FIGHTING MEASURES**

**Flash Point:** Not detected

**Flammable Limits:** Not detected. Non-flammable. No fire or explosion hazard exists. May evolve toxic gases (copper oxide if heated to decomposition).

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**Auto-ignition Point:** Not detected. Non-flammable. 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.

**Fire Extinguishing Media:** Non-flammable.

**Special Fire Fighting Procedures:** None

**Hazchem Code:** None allocated.

## 6. ACCIDENTAL RELEASE MEASURES

**Spillage:** If spill is cathode form, collect and re-use where possible. If spilt and contaminated wear dust proof goggles, PVC / Rubber gloves, a Class P1 (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.

**Environment:** Due to product form (insoluble solid plates), 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.

Mobility	:	Not water soluble, nor absorbed by soil.
Persistence and degradability	:	Readily biodegradable.
Bio accumulative potential	:	No bio accumulation potential.

## 7. HANDLING AND STORAGE

**Packaging Material:** 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.

**Handling:** Use safe work practices to avoid eye or skin contact and inhalation. Observe good personal hygiene. Prohibit eating, drinking and smoking in contaminated areas. Wash hands before eating.

**Storage:** 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.

**Transport:** Not regulated for transport purposes.

## 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

**Ventilation:** No special precautions are normally required when handling this product. Maintain dust / fume levels below the recommended exposure standard. Avoid inhalation. Use in ventilated areas.

**Occupational Exposure Limits:**

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NIOSH IDLH (National Institute of Occupational Safety and Health's Immediately Dangerous to Life or Health) : Copper compounds – 100mg/m<sup>3</sup>

NIOSH REL (National Institute of Occupational Safety and Health's Recommended Exposure Limit for an 8 or 10 hour time-weighted average) : Copper compounds (dusts and mists) - 1mg/m<sup>3</sup>

South African OHSAct : Copper compounds – 1mg/m<sup>3</sup>

ASCC(AUS)/TLV TWA: Copper fume – 0.2mg/m<sup>3</sup>  
ACGIH 2007/ASCC(AUS) TWA : Copper dust/mist – 1mg/m<sup>3</sup>

**PPE:** Wear safety glasses, safety boots and leather gloves. Whilst this product does not present a chemical exposure hazard with normal use, personal protective equipment has been recommended to protect against the physical hazards associated with handling the product.

## 9. PHYSICAL AND CHEMICAL PROPERTIES

<b>Appearance</b>	:	Bright or reddish coloured metal, approx. 450mm high, 1050mm long and 1050mm wide
<b>Odour</b>	:	Odourless
<b>Flammability</b>	:	Non Flammable
<b>Flash Point</b>	:	Not Relevant
<b>Boiling Point</b>	:	2595°C (4703°F)
<b>Melting Point</b>	:	1083°C (1981.4°F)
<b>Exposure Standard (TWA)</b>	:	0.2 mg/m <sup>3</sup> (fume); 1 mg/m <sup>3</sup> (dust or mist)
<b>Evaporation Rate</b>	:	Not Available
<b>pH</b>	:	Not Available
<b>%Volatiles</b>	:	Not Available
<b>Specific Gravity</b>	:	8.94
<b>Vapour Pressure</b>	:	Not Relevant
<b>Solubility (water)</b>	:	Insoluble
<b>Lower Explosion Limit</b>	:	Not Relevant
<b>Upper Explosion Limit</b>	:	Not Relevant
<b>Molecular Weight</b>	:	63.546g/mole
<b>Cu concentration</b>	:	>=99.70%

## 10. STABILITY AND REACTIVITY

**Flammability:** Non flammable. May evolve toxic gases (copper oxide) when heated to decomposition.

**Reactivity:** Stable under recommended conditions of storage. Avoid heat, sparks, open flames, and other ignition sources. Incompatible with oxidising agents (e.g. magnesium chlorate), acids (e.g. nitric acid), and reacts violently with chlorine, fluorine, ethylene oxide, 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.

**Decomposition Products:** May evolve toxic gases if heated to decomposition.

## 11. TOXICOLOGICAL INFORMATION

Low toxicity. Due to product form (block), no adverse health effects are anticipated with normal use.

**Eye:** Not applicable. 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.

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**Inhalation:** Not applicable. 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.

**Skin:** Non-irritating. 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.

**Ingestion:** 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. Large doses may result in blood and liver /kidney damage. Due to product form, ingestion is considered unlikely. 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 contribution to the total daily intake of copper, 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.

**Acute Toxicity Data:**

LD50 (Interperitoneal) :	3500µg/kg (mouse)
LDLo (Subcutaneous) :	375mg/kg (rabbit)
TDLo (Ingestion) :	120µg/kg (human – gastro intestinal upset)

12. **ECOLOGICAL INFORMATION**

Due to product form (insoluble solid block), the environmental impact of this product will be negligible. Small quantities of the product may dissolve if product is in contact with acidic water, and such soluble copper compounds are highly toxic to aquatic and plant life. Insoluble copper compounds are significantly less environmentally hazardous.

**ATMOSPHERE**

Windblown dust accounts for approximately 65% of the overall nonanthropogenic sources of copper emission to the atmosphere. On a global basis, the atmospheric copper flux from anthropogenic sources is approximately three times higher than its flux from natural sources. Non-ferrous metal production is the largest contributor of atmospheric copper flux in the United States. Copper compounds, released into the ambient atmosphere from industrial activities such as primary metal refining, are expected to exist in the particulate phase. In the particulate phase, copper compounds may be removed from the air by wet and dry deposition.

**SOIL/WATER**

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

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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. 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.

**BIOLOGICAL**

As an essential nutrient, copper is strongly bioaccumulated by all plants and animals. However, copper compounds do not biomagnify in higher trophic levels. Copper is an essential nutrient in humans; and dietary intake is the primary source of exposure to copper compounds for most people.

**Aquatic toxicity:**

LC50 (fathead minnow) : 250µg/L for 96 hrs and 123µg/L for 28 days,  
 LC50 (Asiatic clam) : > 2 600µg/L for 96 hrs,  
 LC50 (coho salmon) : 286µg/L for 96 hrs,

EC50 (green alga) : 85 µg/L for 4 days (cell volume bioassay),  
 EC50 (alga, saltwater) = 5 µg/L for 72 hrs (growth rate bioassay)

13. **DISPOSAL CONSIDERATION**

**Waste Disposal:** 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 on +27 11 360 3478 for additional specific information

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

14. **TRANSPORT INFORMATION**

**Transport** : Not classified as a Dangerous Good.  
**Hazchem.** : None Allocated  
**U.N. #** : None Allocated  
**D.G. Class** : None Allocated  
**PKG Group** : None Allocated  
**EPG** : None Allocated  
**Sub/Tert. Risk** : None Allocated

15. **REGULATORY INFORMATION**

None allocated.

16. **OTHER INFORMATION**

**Exposure Standards – Time Weighted Averages:** Exposure standards are established on the premise of an 8 hour work period of normal intensity, under normal climatic conditions and where a 16 hour break between shifts exists to enable the body to eliminate absorbed contaminants. In the following circumstances, exposure standards must be reduced; strenuous work conditions; hot, humid climates; high altitude conditions; extended shifts (which increase the exposure period and shorten the period of recuperation).



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**Colour Rating System:** Green. Chem Alert reports are assigned a colour rating of Green, Amber or Red for the purpose of providing users with a quick and easy means of determining the hazardous nature of a product. Safe handling recommendations are provided in all Chem Alert reports so as to clearly identify how users can control the hazards and thereby reduce the risk (or likelihood) of adverse effects. As a general guideline a Green colour rating indicates a low hazard, and Amber colour rating indicates a moderate hazard and a Red colour indicates rating indicates a high hazard.

Whilst all due care has been taken in the preparation of the Colour Rating System, it is intended as a guide only and does not provide any warranty in relation to the accuracy of the Colour Rating System. As far as is lawfully possible, Impala accepts no liability or responsibility whatsoever for the actions or omissions of any person in reliance on the Colour Rating System.

**Personal Protective Equipment Guidelines:** The recommendation for protective equipment contained within this Chem Alert report is provided as a guide only. Factors such as method of application, working environment, quantity used, product concentration and the availability of engineering controls should be considered before final selection of personal protective equipment is made. Information provided by Risk Management Technologies is summarised for ease of use. Additional technical information is available by calling +61 89 322 1711.

**Health Effects from Exposure:** It should be noted that the effects from exposure to this will depend on several 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.

**Abbreviations:**

mg/m<sup>3</sup> – 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# - 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.

CNS – Central nervous system

**Report Status:** Impala Platinum Ltd. have exercised reasonable care in the preparation of the information contained in this SDS, however, it assumes no responsibility or liability to the accuracy and suitability of such information, for application to the Buyer's intended purposes or consequences of its use. As regulatory standards and guideline recommendations are revised from time to time, Impala gives no assurance that the information contained in this SDS will be current at the time that the SDS is used. It is the responsibility of the Buyer/User to ensure that the most recent version of this document is available.

The data in this SDS relates only to the specific material designated herein and does not relate to use in combination with other materials and in any process. Impala assumes no responsibility for any physical or chemical changes, which the Buyer/User may make to the material designated in this SDS. Since use of this SDS information and the opinions and conditions of the use of the product are not within the control of Impala Platinum Ltd., the Buyer/User is obligated to determine the conditions of safe use of the product