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REVISION N <sup>o</sup> .: 22  ORIGINAL DATE ISSUED: <27-JUN-2005  LAST REVIEWED: 01-Oct-2021	<b>SAFETY DATA SHEET – COPPER CATHODE</b>  DOCUMENT N <sup>o</sup> .: <b>MAN-HDS-002</b>

**DISTRIBUTION CONTROL SHEET**

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## 1. IDENTIFICATION OF THE MATERIAL AND SUPPLIER

### 1.1 Product identifier

**Product name** Copper Cathodes

**Synonym(s)** ISA Copper, Copper Cathode, Copper sheet, Cathode Copper, Impala Copper, Copper Metallic.

### 1.2 Uses and uses advised against

**Use(s)** 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  
P.O. Box 222  
SPRINGS  
1560  
GAUTENG  
Republic of South Africa

**\*Contact Person(s)** *Element coordinator, Hazardous Chemical Substances, BMR – Org Langenhoven*  
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[selilo.semosa@implats.co.za](mailto:selilo.semosa@implats.co.za)

### 1.4 Emergency contact telephone number(s)

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

### 2.1 Classification of the substance or mixture

NOT CLASSIFIED AS A DANGEROUS GOOD ACCORDING TO SANS 10234

#### **GHS Classification(s)**

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
Aquatic toxicity	Not categorised due to product form

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

### 2.2 Label Elements:

**Hazard Pictogram(s)** None allocated

**Signal Word** None allocated

**Health Statement(s)** H303 May be harmful if swallowed – highly unlikely in product form

**Prevention statement(s)** P201 Obtain special instruction before use

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P202 Do not handle until all safety precautions have been read and understood

**Response statement(s)** P308 + P313 If exposed or concerned get medical advice/attention

**Storage statement(s)** None specified

**Disposal statement(s)** P501 Dispose of contents/container in accordance with local/regional/national/international regulations

2.3 **Other Hazards:** No other information available

### 3. COMPOSITION / INFORMATION ON INGREDIENTS

#### 3.1 **Substances/Mixtures**

<b>Ingredient</b>	Copper
<b>Formula</b>	Cu
<b>CAS#</b>	7440-50-8
<b>Poison Schedule</b>	None Allocated
<b>Conc.</b>	>99%
<b>EC#</b>	231-159-6
<b>ICSC#</b>	0240
<b>RTECS#</b>	GL5325000

### 4. FIRST AID MEASURES

#### 4.1 **Description of first aid measures**

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

**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).

**First aid facilities** No information provided.

### 5. FIRE FIGHTING MEASURES

#### 5.1 **Extinguishing Media**

Use an extinguishing agent suitable for a surrounding fire.

#### 5.2 **Special hazards arising from the substance or mixture**

Non-flammable. No fire or explosion hazard exists. May evolve toxic gases (copper oxide if heated to decomposition).

#### 5.3 **Advice for firefighters**

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.

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**5.4 Hazardous Chemical Code**

None allocated.

**6. ACCIDENTAL RELEASE MEASURES**

**6.1 Personal precautions, protective equipment and emergency procedures**

Wear PPE as detailed in section 8 of this SDS.

**6.2 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 of 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.

**6.4 References to other sections**

See sections 8 and 13 for exposure controls and disposal

**7. HANDLING AND STORAGE**

**7.1 Precautions for safe 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-2-propyne, 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.

**8. EXPOSURE CONTROLS / PERSONAL PROTECTION**

**8.1 Control parameters**

<b>Exposure Limits</b>	NIOSH IDLH	Copper compounds 100mg/m <sup>3</sup>
	NIOSH REL	Copper compounds (dusts and mists) 1mg/m <sup>3</sup>
	SA 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>

**Biological Limits** No biological limit values available for this product

**8.2 Exposure Controls**

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**Engineering controls** No special precautions are normally required when handling this product.

**PPE** 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.

<b>Eye</b>	Wear safety glasses
<b>Hand</b>	Wear leather gloves.
<b>Body</b>	Wear overalls. Do not take working clothes home.
<b>Respiratory</b>	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).

## 9. PHYSICAL AND CHEMICAL PROPERTIES

### 9.1 Information on basic 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>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>Partition Coefficient</b>	Not Available
<b>Autoignition temperature</b>	Not Available
<b>Decomposition temperature</b>	Not Available
<b>Viscosity</b>	Not Available
<b>Odour Threshold</b>	Not Available
<b>Molecular Weight</b>	63.546g/mole
<b>Cu concentration</b>	>=99.70%

9.2 Other information  
No other information available.

## 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.

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**10.5 Incompatible materials**

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.

**10.6 Hazardous decomposition products**

May evolve toxic gases if heated to decomposition.

**11. TOXICOLOGICAL INFORMATION**

**11.1 Information on toxicological effects**

**Acute Toxicity** Due to product form (cathode sheet), no adverse health effects are anticipated with normal use.

LD50 (Interperitoneal)	3500µg/kg (mouse)
LDLo (Subcutaneous)	375mg/kg (rabbit)
TDLo (Ingestion)	20µg/kg (human – gastro intestinal upset)

**Skin** 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.

**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.

**Mutagenicity** No evidence of mutagenic effects.

**Carcinogenicity** No evidence of carcinogenic 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 - RE** 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. 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

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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.

**12. ECOLOGICAL INFORMATION**

**12.1 Toxicity**

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.

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.

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,
LC50 (rainbow trout)	29.2µg/L at pH6,
EC50 (green alga)	85 µg/L for 4 days (cell volume bioassay), EC50 (alga, saltwater) = 5 µg/L for 72 hrs (growth rate bioassay)

**12.2 Persistence and degradability**

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.

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**12.3 Bio accumulative potential**

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.

**12.4 Mobility in soil**

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.

**12.5 Results of PBT and vPvB assessment**

No information available.

**12.6 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.

**13. DISPOSAL CONSIDERATION**

**13.1 Waste treatment methods**

**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 for additional specific information (see section 1.3)

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

**14. TRANSPORT INFORMATION**

NOT CLASSIFIED AS A DANGEROUS GOOD BY THE CRITERIA OF THE ADG, IMDG OR IATA

	<b>Land Transport (ADG)</b>	<b>Sea Transport (IMDG/IMO)</b>	<b>Air Transport (IATA/ICAO)</b>
<b>14.1 <u>UN #</u></b>	None Allocated	None Allocated	None Allocated
<b>14.2 <u>UN proper shipping name</u></b>	None Allocated	None Allocated	None Allocated
<b>14.3 <u>Transport hazard class</u></b>			
<b>D.G Class</b>	None Allocated	None Allocated	None Allocated
<b>Subsidiary risk(s)</b>	None Allocated	None Allocated	None Allocated
<b>14.4 <u>Packing Group</u></b>	None Allocated	None Allocated	None Allocated
<b>14.5 <u>Environmental hazards</u></b>	None Allocated	None Allocated	None Allocated
<b>14.6 <u>Special precautions for user</u></b>			
<b>Hazchem code</b>	None Allocated	None Allocated	None Allocated

**15. REGULATORY INFORMATION**

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

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<b>Poison schedule</b>	Classified as a Schedule 6 poison using the criteria in SUSMP.
<b>Classifications</b>	None allocated
<b>Risk phrases</b>	None allocated
<b>Safety phrases</b>	S36/37/39 Wear suitable protective clothing, gloves, eye protection
<b>Regulatory information</b>	SANS 10228:2012 SA National Standard – The identification and classification of dangerous goods for transportation by road and rail modes  GHS of Classification and Labelling of Chemicals ST/SG/AC.10/3-/Rev.6  Regulation (EC) No. 1907/2006 of the European Parliament and the Council of December 2006

**15.2 Chemical safety assessment**  
No other information available

**16. OTHER INFORMATION**  
**Additional 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).

**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.

**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.

**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.

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As a general guideline a Green colour rating indicates a low hazard, and Amber colour rating indicates a moderate hazard and a Red colour 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.

<b>Abbreviations</b>	ADG	European agreement on the International carriage of dangerous goods by road
	CAS#	Chemical Abstract Service number – used to uniquely identify chemical compounds.
	CNS	Central nervous system
	EC#	Enzyme commission
	EU	European Union
	GHS	Global Harmonised System of Classification and Labelling of Chemicals
	IARC	International Agency for Research on Cancer.
	IATA	International Air Transport Association
	ICAO	International Civil Aviation Organisation
	ICSC#	International Chemical Safety Card.
	IMDG	Inter Modal transport of Dangerous goods
	IMO	International Maritime Organisation
	M	Moles per litre, a unit of concentration.
	mg/m <sup>3</sup>	Milligrams per cubic metre.
	NIOSH IDLH	National Institute of Occupational Safety and Health's Immediately Dangerous to Life or Health
	NIOSH REL	National Institute of Occupational Safety and Health's Recommended Exposure Limit for an 8 or 10 hour time-weighted average
	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.
	ppm	Parts Per Million.
	RTECS#	The Registry of Toxic Effects of Chemical Substances
	SA OHSAct	South African Occupational Health & Safety Act
	STEL	Short Term Exposure Limit
	STOT-RE	Specific Target Organ Toxicity – repeated exposure
	STOT-SE	Specific Target Organ Toxicity – single exposure
	SUSMP	Standard for the Uniform Scheduling of Medicines & Poisons
	SWA	Safe Work Australia
	TLV	Threshold Limit Value
	TWA/ES	Time Weighted Average of Exposure Standard.

**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.

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