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REVISION N°.: 9	*SAFETY DATA SHEET – COBALT POWDER	
	DOCUMENT N°.: MAN-HDS-001	

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1. **IDENTIFICATION OF THE MATERIAL AND SUPPLIER**

1.1 **Supplier Details**

Impala Platinum Ltd – Refineries

Base Metals Refinery
P.O. Box 222
SPRINGS
1560
GAUTENG
Republic of South Africa
Tel.: +27 11 360 3777
Fax.: +27 11 360 3495

Head Office

Implats
Private Bag x18
NORTHLANDS
2116
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Republic of South Africa
Tel.: +27 11 731 9000
Fax.: +27 11 731 9254

1.2 **Contact Persons**

Refineries - Manager – BMR
Head Office - Marketing Executive

1.3 **Emergency Contact Information**

For emergency information – see above for contacts

1.4 **Product Description**

Cobalt Powder

1.5 **Synonyms:** Cobalt Metal Powder, Impala Cobalt Powder, Cobalt ACGIH OSHA, Cobalt Metallic, Cobalt – 59, Kobalt (German), Super Cobalt.

1.6 **Use(s):** Process Reagent, Industrial Applications, Paint Additive, alloy manufacturer, flame spraying.

2. **HAZARDS IDENTIFICATION**

CLASSIFIED AS HAZARDOUS
NOT CLASSIFIED AS A DANGEROUS GOOD

Risk and Safety Phrases

Risk and Safety Phrases are standardised phrases allocated to Hazardous Substances. Risk phrases convey a general description of the physicochemical, environmental and health hazard of a substance. Safety phrases provide information on safe storage, handling, disposal, personal protection and first aid.

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Risk Phrases

Xn EU Symbol for harmful substances
R42/43 May cause sensitisation by inhalation and skin contact.
R53 May cause long term adverse effects in the aquatic environment

Safety Phrases

S2 Keep out of reach of children
S22 Do not breathe dust.
S24 Avoid contact with skin.
S37 Wear suitable gloves.
S61 Avoid release to the environment. Refer to special instructions / Safety data sheets

Health Hazard Summary

Moderate toxicity. Chronic exposure may result in blood, liver, kidney, lung, heart and thyroid damage and skin disease. Cobalt and cobalt compounds are classified as possibly carcinogenic to humans (IARC Group 2B). Occupational exposure has been associated with lung cancer, and with repeated exposure, scarring of the lungs (pulmonary fibrosis).

- 2.1 **Eye:** Irritant. Contact may result in lacrimation, irritation, pain, redness and conjunctivitis. Prolonged contact – corneal burns and possible permanent damage.
- 2.2 **Inhalation:** Irritant. Over exposure may result in upper respiratory and mucous membrane irritation, coughing and at high levels nausea, breathing difficulties with asthma like symptoms, with wheezing, shortness of breath and sensitisation. Chronic exposure may result in lung fibrosis, hypersensitivity and asthma. DEAFNESS: Bilateral nerve deafness has been described following chronic occupational exposure to cobalt powder or during chronic treatment of anaemia with cobalt chloride. Deafness typically resolves completely after discontinuation of exposure (Gardner, 1953; Schirmacher, 1967; Meecham & Humphrey, 1991). RHINITIS: Rhinitis has been described in diamond polishers with exposure to cobalt dust and symptoms of bronchoconstriction (Gheysens et al, 1985).
- 2.3 **Skin:** Irritant. Prolonged and repeated contact may result in skin rash, dermatitis and hypersensitivity with allergic response.
- 2.4 **Ingestion:** Low to moderate toxicity. Ingestion may result in nausea, vomiting, abdominal pain, diarrhoea, fatigue, dizziness, drowsiness and with large doses unconsciousness. Thyroid damage and heart failure may occur.

3. COMPOSITION / INFORMATION ON INGREDIENTS

3.1	Ingredient	:	Cobalt
3.2	Formula	:	Co
3.3	CAS N°.	:	7440-48-4
3.4	Poison Sched.	:	None Allocated
3.5	Conc.	:	≥99.80%
3.6	RTECS#	:	GF 8750000
3.7	EC#	:	027-001-00-9
3.7	ICSC#	:	0782

4. FIRST AID MEASURES

- 4.1 **Eye:** Flush gently with running water for minimum 15 minutes. Seek medical attention if irritation develops.

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4.2 **Inhalation:** If over exposure occurs leave exposure area immediately. If other than minor symptoms are displayed seek immediate medical attention.

4.3 **Skin:** Remove contaminated clothing and gently flush affected areas with soap and water. Seek medical attention if irritation develops. Launder clothing before reuse.

4.4 **Ingestion:** If poisoning occurs, contact a Doctor or Poisons Information Centre on +27 11 642 2417 or 0800 113911 (South Africa). Do not induce vomiting. Seek immediate medical attention.

4.5 **First Aid Facilities:** Eye wash facilities should be available.

5. **FIRE FIGHTING MEASURES**

5.1 **Flammability:** Non flammable. Very fine dust (<3um) may burn when exposed to ignition sources or mixed with strong oxidising agent. May evolve toxic cobalt oxides when heated to decomposition. May evolve explosive hydrogen gas on contact with water / acid.

5.2 **Fire and Explosion:** Non flammable – potentially combustible dust. Evacuate area and contact emergency services. Toxic cobalt oxides may be evolved when heated. Remain upwind and notify those downwind of hazard. Wear full protective equipment (see spillage section 6.1 below) including Self Contained Breathing Apparatus (SCBA) when combating fire. Use waterfog to cool intact containers and nearby storage areas.

5.3 **Extinguishing:** Non flammable. Prevent contamination of drains or waterways; absorb runoff with sand or similar.

5.4 **Hazardous Chemical Code:** None allocated.

6. **ACCIDENTAL RELEASE MEASURES**

6.1 **Spillage:** If spilt (bulk), wear dust-proof goggles, PVC/rubber gloves, a Class P1 (Particulate) respirator and overalls. Collect spill and place in sealable container for disposal. Avoid generating dust. Toxic to aquatic organisms in very low concentrations. Do not flush residues to sewer. Absorb all residues.

6.2 **Environment:** AQUATIC FATE: Cobalt is absorbed to a great extent by hydrolysis or oxidate sediments. Cobalt may be taken into solution in small amounts through bacteriological activity. TERRESTRIAL FATE: The availability of cobalt is primarily regulated by pH and is usually found in soils as divalent cobalt. At low pH it is oxidised to trivalent cobalt and often found associated with iron. Adsorption of divalent cobalt on soil colloids is high between pH 6 & 7, whereas leaching and plant uptake of cobalt are enhanced by a lower pH (HSDB).

7. **HANDLING AND STORAGE**

7.1 **Packaging Material:** Packed in blue 250kg drums, loaded in 1000kg lots on a pallet, sealed with a numbered plastic seal and lead seal.

7.2 **Handling:** Before use, read the product label. Use of safe work procedures are recommended. Unsafe 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.

7.3 **Storage:** Store in cool, dry, well ventilated area, removed from oxidising agents, alkalis, acids and foodstuffs. Ensure containers are adequately labelled, protected from physical damage and sealed when not in use.

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

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8. EXPOSURE CONTROLS / PERSONAL PROTECTION

- 8.1 **Ventilation:** Do not inhale dust / powder. Use with adequate natural ventilation. Where a dust inhalation hazard exists, mechanical extraction ventilation is recommended. Maintain dust / fume levels below the recommended exposure standard.
- 8.2 **Occupational Exposure Limits:** Cobalt is legislated at 0.1mg/m³ (OHS Act South Africa), and 0.02mg/m³ by ACGIH
- 8.3 **PPE:** Wear dust-proof goggles and PVC or rubber gloves. Where heavy skin contamination is likely wear overalls. 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). Do **not** take working clothes home.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	:	Grey metallic powder
Odour	:	Odourless
Flammability	:	Non Flammable
Flash Point	:	Not Applicable
Boiling Point	:	2870 °C
Melting Point	:	1495 °C
Exposure Standard (TWA)	:	0.02 mg/m ³ (cobalt)
Evaporation Rate	:	Not Available
pH	:	Not Available
% Volatiles	:	Not Available
Specific Gravity	:	8.90
Vapour Pressure	:	Not Available
*Solubility (water)	:	Insoluble
Lower Explosion Limit	:	Not Relevant
Upper Explosion Limit :	:	Not Relevant
Molecular Weight	:	58.93
Co concentration	:	>=99.80%
Auto-ignition temperature	:	Not Available

10. STABILITY AND REACTIVITY

- 10.1 **Flammability:** Non flammable – fine particles (<3um) can combust when exposed to ignition sources or mixed with strong oxidising agents. Potentially flammable/explosive mixtures in air may form at high concentrations. May evolve EXPLOSIVE hydrogen gas on contact with water/acids. May evolve toxic cobalt oxides when heated to decomposition.
- 10.2 **Reactivity:** Incompatible violently/explosively with strong oxidising agents (e.g. peroxides ammonium nitrate, bromine tetrafluoride and nityl fluoride.) Attacked slowly by ammonia and sodium hydroxide. Incompatible with reactive metals (e.g. potassium and sodium) and with acids (e.g. hydrochloric acid). May spontaneously ignite on contact with air or acetylene in finely ground form.
- 10.3 **Decomposition Products:** May evolve toxic cobalt oxides when heated to decomposition.

11. TOXICOLOGICAL INFORMATION

Cobalt salts have been reported to cause chromosomal damage in experimental animals. Cobalt and cobalt compounds are classified as possibly carcinogenic to humans (IARC Group 2B). Metallic cobalt is retained in and slowly absorbed from the lungs, with an estimated half-life of 5 to 15 years (HSDB).

- 11.1 **Health Hazards – Eye:** Irritant. Contact may result in irritation, lacrimation, pain, redness and conjunctivitis. Prolonged contact may cause corneal burns and possible permanent damage.

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11.2 **Health Hazards – Inhalation:** Irritant. Over exposure to cobalt has been reported to cause respiratory sensitisation, with asthma like symptoms. Over exposure may result in upper respiratory and mucous membrane irritation, coughing and, at high levels, breathing difficulties with asthma like symptoms, with wheezing and shortness of breath. Potential respiratory sensitiser.

*TLV / TWA: 0.02mg/m³ (as Cobalt) (ACGIH 2004)

11.3 **Health Hazards – Skin:** Cobalt has been reported to cause dermatitis and skin sensitisation. Chronic over exposure may result in “Cobalt itch” or “carboly-itch” (“measle like” red spotty rash).

11.4 **Health Hazards – Ingestion:** Toxic. Ingestion may result in nausea, vomiting, abdominal pain, diarrhoea, fatigue, dizziness and drowsiness, and with large doses unconsciousness. Ingestion of cobalt salts may cause reproductive effects. Thyroid damage, liver and kidney damage and heart failure may occur.

Acute Toxicity Data:

LDLo (Ingestion): 750mg/kg (rabbit)

LDLo (Ingestion): 50mg/kg (rat)

LD50 (Ingestion): 100mg/kg (rat)

11.5 **Health Hazards – Toxicity Data:** Cobalt (7440-48-4)
LD50 (ingestion): 6170mg/kg (rat)

12. ENVIRONMENT

Limited ecotoxicity data was available from this product at the time this report was prepared. Ensure appropriate measures are taken to prevent this product from entering the environment.

13. DISPOSAL CONSIDERATION

13.1 **Waste Disposal:** Collect and reuse where possible. Minimise dust generation. Contact Impala Refineries on +27 11 360 3777 for additional specific information.

13.2 **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

15.1 **AICS:** Symbol: Xn
R-Phrases: 42/43 - 53
S-Phrases: 2-22-24-3-61
EEC No.: 231-158-0

15.2 **Poison Schedule:** A poison schedule number has not been allocated to this product.

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16. OTHER INFORMATION

- 16.1 **Respirators:** In general the use of respirators should be limited and engineering controls employed to avoid exposure. If respiratory equipment must be worn ensure correct respirator selection and training is undertaken. Remember that some respirators may be extremely uncomfortable when used for long periods. The use of air powered or air supplied respirators should be considered where prolonged or repeated use is necessary.
- 16.2 **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).
- 16.3 **IARC – Group 2B – Possible Human Carcinogen:** This product contains an ingredient which has demonstrated sufficient evidence to have been classified by the International Agency for Research into Cancer (IARC) as possibly carcinogenic to humans and whose use should be strictly monitored and controlled.
- 16.4 ***Colour Rating System:** Amber. In accordance with 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 rating indicates a high hazard.
- Whist 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.
- 16.5 ***Personal Protective Equipment Guidelines:** The recommendation for protective equipment contained within this 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.
- 16.6 ***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 report which encompass all possible scenarios, it is anticipated that users will assess the risks and apply control methods where appropriate.
- 16.7 **Abbreviations:** 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# - 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.
CNS – Central Nervous System
RTECS – The Registry of Toxic Effects of Chemical Substances
ICSC – International Chemical Safety Card.
EC – Enzyme commission
EU – European Union
- 16.8 **Report Reviewed:** *17 March 2009.

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- 16.9 **Report Status:** Impala Platinum Ltd. have exercised reasonable care in the preparation of the information contained in this HDS, 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 HDS will be current at the time that the HDS is used. It is the responsibility of the Buyer/User to ensure that the most recent version of this document is available.

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