

Page 1 of 7	BASE METALS REFINERY
Revision N ^o .: 3	HAZARD DATA SHEET – COBALT POWDER
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REVISED BY: S FINNEY/ S ENGELBRECHT	APPROVED BY: Ni OPERATIONS MANAGER – BMR



1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product Description

Cobalt Powder

1.2 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

P.O. Box 61386

MARSHALLTOWN

2107

GAUTENG

Republic of South Africa

Tel. : +27 11 481 3911

Fax. : +27 11 484 0340

Cell. : +27 82 445 2228

1.3 Contact Persons

Refineries - Senior Operations Manager Base Metals Refinery

Head Office - Senior Manager Worldwide Marketing

1.4 Emergency Contact Information

For emergency information – see above for contacts

2. COMPOSITION / INFORMATION ON INGREDIENTS

2.1 **Ingredient:** Cobalt

2.2 **Formula:** Co

2.3 **CAS N^o.:** 7440-48-4

PAGE 2 of 7	Doc No: MAN-HDS-001	BASE METALS REFINERY
REVISION: 3	HAZARD DATA SHEET – COBALT POWDER	

- 2.4 **Synonyms:** Cobalt Metal Powder
- 2.5 **Use(s):** Flame spraying, paint, alloy manufacturing, abrasives, glass manufacturing.
- 2.6 **Poison Sched.:** None Allocated
Hazchem.: None Allocated
U.N. # : None Allocated
D.G Class: None Allocated
PKG Group: None Allocated
EPG: None Allocated
Sub/Tert. Risk: None Allocated

3. **HAZARDS IDENTIFICATION**

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).

3.1 **Eye**

Irritant. Contact may result in lacrimation, irritation, pain, redness and conjunctivitis. Prolonged contact – corneal burns and possible permanent damage.

3.2 **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 anemia 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).

3.3 **Skin**

Irritant. Prolonged and repeated contact may result in skin rash, dermatitis and hypersensitivity with allergic response.

3.4 **Ingestion**

Low to moderate toxicity. Ingestion may result in nausea, vomiting, gastrointestinal irritation and diarrhoea.

PAGE 3 of 7	Doc No: MAN-HDS-001	BASE METALS REFINERY
REVISION: 3	HAZARD DATA SHEET – COBALT POWDER	

4. **FIRST AID MEASURES**

4.1 **Eye**

Flush gently with running water. Seek medical attention if irritation develops.

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 8000. Do not induce vomiting. Seek immediate medical attention.

5. **FIRE FIGHTING MEASURES**

5.1 **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 spill section 6.1 below) including Self Contained Breathing Apparatus (SCBA) when combating fire. Use waterfog to cool intact containers and nearby storage areas.

5.2 **Extinguishing**

Non flammable. Prevent contamination of drains or waterways, absorb runoff with sand or similar.

6. **ACCIDENTAL RELEASE MEASURES**

6.1 **Spillage**

If spilt (bulk), wear dust-proof goggles, PVC/rubber gloves, a Class P1 (Particulate) respirator and coveralls. 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.

PAGE 4 of 7	Doc No: MAN-HDS-001	BASE METALS REFINERY
REVISION: 3	HAZARD DATA SHEET – COBALT POWDER	

6.2 Environment

AQUATIC FATE: Cobalt is absorbed to a great extent by hydrolysate 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 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.

7.3 Transport

Not regulated for transport purposes.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

8.1 Occupational Exposure Limits

Cobalt is legislated at 0.1mg/m³ (OHS Act South Africa), and 0.02mg/m³ by ACGIH

8.2 PPE

Wear dust-proof goggles and PVC or rubber gloves. Where heavy skin contamination is likely wear coveralls. Where an inhalation risk exists, wear a Class P1 (Particulate) respirator. At high dust levels, wear a Full-Face Class P3 (Particulate) or Powered Air Purifying Respirator (PAPR).

PAGE 5 of 7	Doc No: MAN-HDS-001	BASE METALS REFINERY
REVISION: 3	HAZARD DATA SHEET – COBALT POWDER	

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	:	Grey metal 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 Applicable
pH	:	Not Applicable
% Volatiles	:	Not Applicable
Specific Gravity	:	8.90
Vapour Pressure	:	Not Applicable
Solubility	:	Insoluble
Lower Explosion Limit	:	Not Applicable
Upper Explosion Limit	:	Not Applicable
Molecular Weight	:	58.93
Co concentration	:	>=99.80%

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.

10.2 Reactivity

Incompatible violently/explosively with strong oxidising agents – ammonium nitrate, bromine tetrafluoride and nitryl fluoride. Attacked slowly by ammonia and sodium hydroxide.

10.3 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 (TLV/TWA).

PAGE 6 of 7	Doc No: MAN-HDS-001	BASE METALS REFINERY
REVISION: 3	HAZARD DATA SHEET – COBALT POWDER	

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). A case-control study of 9 workers who died due to lung cancer found 44% were working on cobalt production compared to 17% of controls (not statistically significant). In a cohort study at the same plant, an excess mortality (relative risk 4.66) was found for lung cancer among the cobalt production workers (MEDITEXT).

11.1 Health Hazards - Ingestion

Ingestion of cobalt salts has been reported to cause reproductive effects. Liver and kidney damage has been reported in humans.

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

LD50 (Ingestion): 6170mg/kg (rat)

11.2 Health Hazards - Inhalation

Over exposure to cobalt has been reported to cause respiratory sensitisation, with asthma like symptoms.

TWA: 0.02mg/m³ (as Cobalt)

11.3 Health Hazards – Eye

Irritant. Contact may result in irritation, lacrimation, pain, redness and conjunctivitis.

11.4 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).

11.5 Health Hazards – Toxicity Data

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

LDLo (Intravenous) : 100mg/kg (mouse)

LDLo (Intraperitoneal) : 100mg/kg (mouse)

12. ECOLOGICAL INFORMATION

12.1 Atmosphere

None allocated.

PAGE 7 of 7	Doc No: MAN-HDS-001	BASE METALS REFINERY
REVISION: 3	HAZARD DATA SHEET – COBALT POWDER	

12.2 **Soil**

None allocated.

12.3 **Biological**

None allocated.

13. **DISPOSAL CONSIDERATION**

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

14. **TRANSPORT INFORMATION**

Not regulated for transport purposes.

15. **REGULATORY INFORMATION**

Symbol: Xn
R-Phrases: 42/43
S-Phrases: 22-24-37
EEC No.: 231-158-0

16. **OTHER INFORMATION**

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