PAGE 1 of 10	**PRECIOUS METAL REFINERIES**	IMPALA SPRINGS
REVISION Nº.: 1		
ISSUED DATE: 30 October 2025	WORK PROCEDURE TASK	**SAFETY DATA SHEET – RUTHENIUM**
	SECTION:	VAULTS
	DOCUMENT Nº.:	**SDS-017**

DISTRIBUTION CONTROL SHEET

Nº	LOCATION	TITLE
1	Quality Offices	Document Controller
2	Plant Manager Office	Plant Manager - Ruthenium (Electronic)
3	Laboratory Manager's Office	Laboratory Manager (Electronic)
4	Marketing	Head of Sales (Electronic)
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Product name	:	Ruthenium Powder
Product Code	:	RU METAL
Version	:	1
Date of issue	:	30/10/2025
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	:	Ruthenium Powder
Chemical name	:	Ruthenium
Formula	:	Ru
Product type	:	Powder

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

Manufacture of Ruthenium chemicals for use in catalysts, as metal and/or in alloys for electrical contacts, sputtering targets.

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 +27(0)11 360 3777
Contact Person (s)	:	Jamie Welman Tel: +27(0) 11 360 3111 E-mail: jamie.welman@implats.co.za www.implats.co.za

1.4. Emergency telephone number

See above for Refineries contacts.
Poison Centre – Tygerberg Hospital, Belville Cape Town +27(0)21 931 6129

SECTION 2: Hazard Identification

2.1. Classification of the substance or mixture

Product name : Ruthenium Powder

Harmful – if swallowed – in contact with skin, if inhaled
This product may cause adverse health effects with high-level dust generation, inhalation or prolonged skin contact.
May form ruthenium salts on contact with acids.

2.2. Label elements

Hazard Pictograms :

Signal word : Low Toxicity Warning
Additional Labelling : Each container should be labelled
Before use : If dissolved, ensure adequate enclosure or ventilation, do not breathe mists and avoid solution contact with eyes, skin and clothing.
May cause sensitization or allergic reaction.
If melted do not breathe furnace fumes.

SECTION 3: Composition / Information on Ingredients

3.1. Substances

UVCB

Product / Ingredient name – Ruthenium

Identifiers	%	Classification	Type
Major components: Ruthenium CAS:# 7440-18-8 EINECS Number: 231-127-1	99.90-99.99		[*]

SECTION 4: First aid measures

4.1. Description of first aid measures

Eye contact : Flush gently with running water for at least 15 minutes. Seek medical attention if irritation develops.

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

Skin contact : Gently flush affected areas with soap and water. Seek medical attention if irritation develops.

Ingestion : If poisoning occurs, contact a doctor or Poisons Information Centre on +27-21-931-6129. Do not induce vomiting. Give a glass of water to drink. Seek urgent medical attention.

SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media : Does not burn

Extinguishing media not to be used : Not applicable.

5.2. Special hazards arising from the substance or mixture

Special exposure hazard : May evolve toxic fumes in fire.
Remain upwind and notify those downwind of hazard

5.3. Advice for firefighters

Special protective equipment for firefighters : Wear full protective equipment including Self Contained Breathing Apparatus (SCBA) if combating fire

Note: Unlike some finely divided Ruthenium powder supplied by other companies, the material supplied by Impala Platinum is non-flammable and therefore DOES NOT present a fire hazard.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

Personal precautions : If spilt (bulk) wear goggles and PVC or rubber gloves.
Where a dust inhalation hazard exists (i.e. when used in large quantities) wear a Class P1 (particulate) respirator.

6.2. Environmental precautions

Environmental precautions : Prevent this material from entering surface waters

6.3. Methods and material for containment and cleaning up

Solid : Sweep up and place in sealed container

Solution : Absorb spillage with moist sand or similar and place in sealed containers for reprocessing or recovery.

SECTION 7: Handling and Storage

7.1. Precautions for safe handling

Protective measures : Avoid inhalation of dust or fumes.
Avoid contact with skin or eyes
Use local ventilation which is adequate to limit exposure to levels not exceeding occupational exposure limits.
Activities generating dust should be avoided.

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7.2. Conditions for safe storage, including any incompatibilities

Store in tightly sealed containers in a cool, dry and well-ventilated area removed from oxidizing agents, acids and foodstuffs.

Ensure containers are adequately labeled, protected from physical damage and sealed when not in use.

Check regularly for leaks or spills.

SECTION 8: Exposure controls / personal protection

8.1. Control parameters

Occupational exposure limits – Ruthenium

Exposure limit values
Occupational Exposure Limit: (ACGIH, edition 2008)

Occupational exposure limits – Inhalable particles

Exposure limit values
(TLV-TWA): 10mg/m^3

Occupational exposure limits – Respirable particles) based on "particulates not otherwise classified"

Exposure limit values
3mg/m^3

8.2. Exposure controls

Individual protection measures

Personal Hygiene measures : Practice good housekeeping and personal hygiene procedures.
No eating, drinking or smoking in work area.
Wash hands thoroughly before eating, drinking or smoking.
Avoid ingestion, inhalation and skin and eye contact.
Medical examinations, monitoring, record keeping and hygiene facilities are recommended.

Eye / face protection : Wear dust-proof goggles

Skin protection : Safety shoes, overalls or similar full-body work clothes should be worn and laundered daily. This protective clothing should not be word at home.

Hand protection : Wear suitable gloves (PVC or rubber)

Respiratory protection : Use an appropriate and approved respirator for toxic dust or fume if airborne concentration is likely to exceed the occupational exposure limits.

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	:	Pale Grey
Odour	:	Odourless
Melting point/melting range	:	2334°C; 4233°F
Initial boiling point and boiling range	:	4150°C; 7502°F
Flammability (solid, gas)	:	Non-flammable
Flash point	:	Not applicable
pH	:	Not applicable
Solubility	:	hydrosolubility: insoluble in water Liposolubility (solvent-oil) insoluble in solvent oil
Partition coefficient: n- octanol/water	:	Not applicable
Relative density	:	2.1 – 2.8 (variable)
Vapour density	:	Unknown
Explosive properties	:	Not applicable
Oxidising properties	:	Not applicable
Autoflammability	:	Not applicable

SECTION 10: Stability and reactivity

10.1. Reactivity

No specific data.

10.2. Chemical stability

The material is stable under normal circumstances.

10.3. Possibility of hazardous reactions

No specific data.

10.4. Conditions to avoid

Exposure to high temperatures (>1000°C), generation of dust.

10.5. Incompatible materials

Avoid contact with acids or strong oxidizing agents.

10.6. Hazardous decomposition products

Ruthenium tetroxide formed with strong oxidizing agents.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity – Ruthenium Powder

Result	Species	Dose	Exposure
Irritation of the gastro-intestinal tract		Non-toxic	Ingestion

Acute toxicity – Ruthenium Salts

Result	Species	Dose	Exposure
May be more toxic			Ingestion

Irritation / Corrosion

Product / Ingredient name	Result	Species	Score	Exposure	Observation
Dust/Powder	Irritation due to mechanical action			Prolonged and repeated exposure	Possible sensitizer

Product / Ingredient name	Result	Species	Score	Exposure	Observation
Ruthenium Salts	Irritation and skin sensitization				

Conclusion / Summary

Skin : Low irritant

Eyes : Exposure may result in eye irritation, lachrymation, burning sensation and conjunctivitis and possible corneal burn with prolonged contact.

Respiratory : Non-irritant: Ruthenium metal is unlikely to cause irritation except as a dust.
Ruthenium Salts are irritating to eyes, skin and mucous membranes and may cause sensitization.
Ruthenium tetroxide can cause severe eye damage.

Sensitisation

Conclusion / Summary

Skin : Low irritant

Eyes : Can causes serious eye damage

Respiratory : Not classified

Mutagenicity – Ruthenium Salts

The effects of Ruthenium salts have not been fully investigated

Conclusion / summary : Not classified

Carcinogenicity

Conclusion / summary : Non-carcinogenic: Ruthenium salts are listed as a non-carcinogenic in (all U.S.)

: in the National Toxicity Program (NTP) Report on Carcinogens

: in the International Agency for Research on Cancer (IARC) monographs

: by the Occupational Safety and Health Administration (OSHA)

Water-soluble Ruthenium compounds have caused tumours in laboratory animals

Reproductive toxicity – Ruthenium Salts / Rhodium Chloride

Maternal toxicity	Fertility	Developmental toxin	Species	Dose	Exposure
Positive		Not fully investigated	Laboratory Animals	Oral	-

Conclusion / summary : **Rhodium chloride** has caused mutations in bacteria and tumours in laboratory animals. However, the effects have not been fully investigated.

: Pregnant women should avoid contact with **Ruthenium Salts.**

Teratogenicity

Specific Target Organ Toxicity : **Single Exposure**
Ruthenium Salts may cause possible damage to the respiratory tract, GI tract, skin, eyes, teeth and immune system. However, the effects have not been fully investigated.

: **Repeated Exposure**
Ruthenium Salts may cause possible damage to the respiratory tract, GI tract, skin, eyes, teeth and immune system. However, the effects have not been fully investigated.

Aspiration hazard
Low irritant:

Information on likely routes of exposure : **Inhalation**

Potential acute health effects
Inhalation : Inhalation of dust may result in upper respiratory tract irritation
Ruthenium metal poses a low hazard but Ruthenium **salts** are potential irritants and sensitizers.

SECTION 12:Ecological information

12.1 Toxicity
Due to the very low solubility of Ruthenium powder it does not directly pose any ecological threat. However, if converted to soluble Ruthenium salts it may have the following effects.
Ruthenium Salts

12.2 Persistence and degradability
Conclusion / summary : Hazard of Ruthenium persistency in the environment

12.3 Bioaccumulate potential
Conclusion/summary : Hazard of Ruthenium accumulation
Biomagnification : Potential hazard of Ruthenium Magnification
Biodegradability : No information available

12.4 Mobility in soil

Soil organisms	:	Not available
Mobility	:	Not available
Aquatic organisms	:	**Potentially toxic to aquatic organisms** May cause long terms adverse effects in the aquatic environment
Plants and terrestrial animals	:	unknown; no information available

12.5 Other adverse effects

Ozone depletion potential	:	Does not contain ozone depleting Substances
Photochemical ozone creation potential	:	Not applicable
Global warming potential	:	Not applicable
Effects on waste water treatment plants	:	Unknown, no information available

The environmental effects of Ruthenium and its compounds have not been fully evaluated.

SECTION 13:Disposal considerations

13.1. Waste treatment methods

Product Methods of disposal : Disposer must comply with state and local laws
This material can be metallurgically recycled by Impala Platinum, South Africa, which is pre-authorized facility for the environmentally sound recovery of metals

SECTION 14:Transport information

14.1. UN number

Not Applicable

14.2. UN proper shipping name

ADR/RID	ICAO	IMDG	IATA
Not applicable	Not applicable	Not applicable	Not applicable

14.3. Transport hazard

Not regulated for transport purposes

14.4. Packing

In plastic bottles sealed in tins which in turn are sealed in boxes

SECTION 15:Regulatory information

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

United States:	CERCLA Sections 102 a/103 (40 CFR 302.4) Not regulated
Canada:	WHMIS Classification D2B (toxic material)
EU/EC Classification:	X_n (Harmful); not classified in Annex I of Directive 67/548/EEC (will change with implementation of GHS/REACH)

SECTION 16:Other information

16.1 Hazard Information References

RTECS: Registry of toxic effects of Chemica Substances, NIOSH, edition January 1999
Sax's Dangerous Properties of Industrial Materials (8th edition), RJ Lewis Sr.

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

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