BASE METALS REFINERY

SAFETY DATA SHEET – NICKEL POWDER

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1. IDENTIFICATION OF THE MATERIAL AND SUPPLIER

1.1 Product identifier

Product Name Nickel Powder

Synonym(s) Nickel Metal Powder, 994 Nickel Powder, Impala Nickel Powder

1.2 Uses and uses advised against

Use(s) Catalyst, Printing Industry, Metal Alloys, Nickel Plating, Ceramic Manufacture, Process Chemical, Industrial Application, Steel Manufacturing.

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)
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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

CLASSIFIED AS HAZARDOUS ACCORDING TO SANS 10234

GHS Classification(s)

Acute toxicity, oral	Category 4
Respiratory sensitisation	Category 1
Skin sensitisation	Category 1
Carcinogenicity	Category 2
Specific target organ Toxicity (RE)	Category 1
Aquatic toxicity (Chronic)	Category 3

2.2 Label Elements:

Signal Word DANGER

Hazard Pictograms

Health Statement(s)

H301	Harmful if swallowed
H317	May cause an allergic skin reaction
H334	May cause allergy or asthma symptoms or breathing difficulties if inhaled
H413	May cause long lasting harmful effects to aquatic life
H351	Limited evidence of carcinogenic effect
H372	Causes damage to organs through prolonged or repeated exposure

Prevention statement(s)

P201	Obtain special instruction before use
P202	Do not handle until all safety precautions have been read and understood
P261	Avoid breathing dust/fume
P264	Wash thoroughly after handling
P270	Do not eat, drink or smoke when using this product
P272	Contaminated work clothes must not be allowed out of the workplace
P273	Avoid release to the environment
P280	Wear protective gloves, protective clothing and eye protection
P285	In case of inadequate ventilation wear respiratory protection

Response statements(s)

P330	Rinse mouth
P101 + P312	IF SWALLOWED: Call a poison centre/doctor
P302 + P352	IF ON SKIN: Wash well with plenty of soap and water
P304 + P340	IF INHALED: Remove to fresh air and keep at rest in a position comfortable for breathing
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses if present and easy to do. Continue rinsing.
P308 + P313	If exposed or concerned get medical advice/attention
P311 + P342	If experiencing respiratory symptoms call a poison centre or doctor
P321	Specific treatment is advised – see first aid instructions
P333 + P313	If skin irritation or rash occurs get medical advice/attention
P337 + P313	If eye irritation persists get medical advice/attention
P363	Wash contaminated clothing before reuse

Storage statement(s) P405 Stored locked up

Disposal statement(s) P501 Dispose of contents/container in accordance with relevant regulations

2.3 **Other Hazards**:
No information provided

3. COMPOSITION / INFORMATION ON INGREDIENTS

3.1 Substances/Mixtures

Ingredient	Nickel
Formula	Ni
CAS #	7440-02-0
Poison Sched.	None Allocated
Conc. Ni	≥99.80%
Conc. Co	<0.15%
RTECS #	QR5950000
EC #	231-111-4
ICSC #	0062
Hazchem.	None Allocated
UN #	None Allocated
D.G Class	None Allocated
PKG Group	None Allocated
EPG	None Allocated
Sub/Tert. Risk	None Allocated

4. FIRST AID MEASURES

4.1 Description of first aid measures

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

Inhalation If over exposure occurs leave exposure area immediately. If other than minor symptoms are displayed seek immediate medical attention. Apply artificial respiration if not breathing.

Skin Remove contaminated clothing and gently flush affected areas with soap and water. Seek medical attention if irritation develops. Launder clothing before reuse. Maintain good personal hygiene.

Ingestion If poisoning occurs, contact a Doctor or South Africa Poisons Information Centre (24 hours): 0861-555-777 (South Africa only). Do not induce vomiting. Seek immediate medical attention.

First Aid Facilities Eye wash and safety shower facilities should be available.

4.2 Most important symptoms and effects, both acute and delayed

Symptoms and effects are generally associated with chronic exposure (i.e. lung fibrosis). May cause an allergic skin reaction. May cause allergy or asthma or breathing difficulties if inhaled.

4.3 Immediate medical attention and special treatment needed

Treat symptomatically.

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. May evolve toxic nickel oxides when heated. Very finely divided nickel metal in the fully reduced state can smoulder in the presence of oxygen or air. Fine dust may be explosive at high concentrations and/or in confined areas. Prevent contamination of drains or waterways; absorb runoff with sand or similar (**NOT** carbon dioxide or water).

5.3 Advice for firefighters

Evacuate area and contact emergency services. 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 water fog to cool intact containers and nearby storage areas.

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

Prevent product from entering drains and waterways.

6.3 Methods of cleaning up

Contain spillage, and collect and place in suitable containers for disposal. Avoid generating dust.

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

Before use, read the product label. Use safe work practices to avoid eye or skin contract and inhalation. Observe good personal hygiene. Prohibit eating, drinking and smoking in contaminated areas (e.g. if container is damaged). Wash hands before eating or smoking.

7.2 Conditions for safe storage, including any incompatibilities

Store in cool, dry, well ventilated area, removed from oxidising agents (e.g. hypochlorites), acids (sulfuric acid), heat sources and foodstuffs. Ensure containers are adequately labelled, protected from physical damage and sealed when not in use. Large storage areas should have appropriate ventilation systems.

7.3 Specific end use(s)

Packed in brown 250kg drums and loaded in 1000kg lots on a pallet. Each drum sealed with a security seal.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

8.1 Control parameters

Exposure standards	SA Legislation	Ni soluble = 0.1 mg/m^3 Ni insoluble = 0.5 mg/m^3 Ni metal = 0.5 mg/m^3
	ICSC0062	Ni soluble = 0.1 mg/m^3 Ni insoluble = 0.2 mg/m^3 Ni metal = 1.5 mg/m^3
	SWA (AUS)	Ni Metal TWA 1 mg / m^3 Ni Soluble compounds (as Ni): TWA 0.1mg / m^3
Biological Limits	No biological limit allocated for nickel	

8.2 Exposure Controls

Engineering controls 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.

PPE

Eye	Wear dust-proof goggles
Hand	Wear PVC or rubber gloves.
Body	Wear overalls. Do not take working clothes home.
Respiratory	Where an inhalation risk exists, wear a Class P2 (Particulate) respirator.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

Appearance	Grey/Silver Powder
Odour	Odourless
Flammability	Non Flammable
Flash Point	Not Relevant
Lower Explosion Limit	Not Relevant
Upper Explosion Limit	Not Relevant
Auto Ignition Temperature	Not Available
Decomposition Temperature	Not Available
Boiling Point	2730 ºC
Melting Point	1455 ºC
Evaporation Rate	Not Relevant
pH	Not Relevant
%Volatiles	Not Relevant
Vapour Density	Not Available
Specific Gravity	8.90
Vapour Pressure	Not Relevant
Solubility (water)	Insoluble
Partition Coefficient	Not Available
Viscosity	Not Relevant
Explosive Properties	Not Available
Oxidising Properties	Not Available
Odour Threshold	Not Available
Molecular Weight	58.71g/mole
Ni concentration	≥99.80%

9.2 Other information

No other information available.

10. STABILITY AND REACTIVITY

10.1 Reactivity

Carefully review all information in sections 10.2 to 10.6.

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 (fine particles, <3um, can combust when exposed to ignition sources), as well as incompatible materials (section 10.5)

10.5 Incompatible materials

May evolve flammable – explosive hydrogen gas in contact with strong acids. Incompatible with oxidising agents (e.g. hypochlorites, peroxide, ammonium nitrate) and acids (e.g. sulfuric acid, hydrochloric acid) reacts slowly with non-oxidising acids and more rapidly with oxidising acids. Also incompatible with nitrates, sulfur, selenium, Halogens, Halogen-Halogen Compounds, nitryl compounds and organic solvents. Reacts violently in powder form with titanium powder and potassium perchlorate.

10.6 Hazardous decomposition products

Will evolve toxic metal oxides when heated to decomposition.

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute Toxicity No reliable data available for nickel. LD50 (Ingestion) for rat is expected to be >9 000mg/kg

Skin Slightly corrosive – irritant. Repeated contact may result in irritation, dermatitis with severe itching and possible sensitisation. A skin sensitiser. “Nickel itch” may begin with a burning and itching sensation, followed by redness and blister. Once acquired, nickel sensitivity usually persists. Nickel and its compounds can be absorbed through the skin, but not in amounts sufficient to cause intoxication. Individuals with pre-existing lung or skin sensitivities/diseases are advised to avoid exposure.

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

Mutagenicity Insufficient data available to classify as a mutagen.

Carcinogenicity Nickel metal is allocated a GHS Classification of “Category 2 - Suspected Carcinogen”. Nickel, metallic and alloys are classified as possibly carcinogenic to humans) IARC Group 2B). These classifications are based on the lack of human evidence of carcinogenicity, but the presence of positive results for tumour induction in animals after injection or intratracheal instillation. An animal inhalation study was negative for carcinogenicity (Oller et al. 2008).

Reproductive Insufficient data available to classify as a reproductive or development toxin.

STOT – SE No relevant or reliable studies available. Ingestion may result in gastric irritation, ulceration and burns to the mouth and throat with nausea, vomiting and abdominal pain. Nickel is poorly absorbed through the stomach.

STOT - RE Over exposure to dust may result in respiratory mucous membrane irritation and sensitisation. Early inhalation symptoms include nausea, giddiness, weakness, and non-productive cough, followed by breathing difficulties, pulmonary oedema and interstitial fibrosis. Half-life in the body: 667 days. Chronic exposure to nickel compounds may result in increased incidence of asthma and decreased pulmonary function.

Nickel salts have been shown to cause an increased incidence of asthma and bronchitis, decreased pulmonary function.

Nickel is poorly absorbed through the gastrointestinal tract, which accounts for its low toxicity via this route. Large doses, 1-3 mg/kg of nickel compounds have been reported to cause intestinal disorders, convulsions & asphyxia in dogs. Heart, brain, liver and kidney damage reported in animals.

Aspiration Not relevant.

Sensitisation Sufficient data from human studies exists to warrant classification of nickel as a dermal sensitiser via skin contact. The data availability is insufficient for classification of metallic nickel as a respiratory sensitiser.

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Limited eco-toxicity data was available for this product at the time this report was prepared. Metallic nickel may be harmful to aquatic life with long lasting effects – Aquatic toxicity classification relates to particle sizes less than 1mm diameter (equivalent spherical diameter).

12.2 Persistence and degradability

Not applicable for inorganic substances.

12.3 Bio accumulative potential

No information available.

12.4 Mobility in soil

Nickel mobility in soil is dependent on many parameters, including pH, and naturally occurring silica and hydrous oxides of iron and manganese. Mobility of nickel is controlled by various sorbents which scavenge it from solution. In pristine environments, hydrous oxides of iron and manganese control its mobility via sorption and co-precipitation. In polluted environments, the most abundant organic material will keep nickel soluble. Nickel is one of the most mobile heavy elements in aquatic environments and can persist indefinitely in natural waters. It is toxic to plants at 50-200ppm. Avoid acid dissolution of the nickel metal.

12.5 Results of PBT and vPvB assessment

No information available.

12.6 Other adverse effects

Nickel and nickel compounds are currently being researched at an International level for eco-toxicity and ecological effects, including bioavailability, partitioning partitioning properties and mobility of the various chemical forms of nickel.

13. DISPOSAL CONSIDERATION

13.1 Waste treatment methods

Waste Disposal Collect and reuse where possible. Minimise dust generation. Contact Impala Refineries personnel for additional 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

		Land Transport (ADG)	Sea Transport (IMDG/IMO)	Air Transport (IATA/ICAO)
14.1	**UN #**	None Allocated	None Allocated	None Allocated
14.2	**UN proper shipping name**	None Allocated	None Allocated	None Allocated
14.3	**Transport hazard class**			
	D.G Class	None Allocated	None Allocated	None Allocated
	Subsidiary risk(s)	None Allocated	None Allocated	None Allocated

14.4	**Packing Group**	None Allocated	None Allocated	None Allocated
14.5	**Environmental hazards**	None Allocated	None Allocated	None Allocated
14.6	**Special precautions for user** **Hazchem code**	None Allocated	None Allocated	None Allocated

Other information ''Under US DOT only, DG 9, UN 3077 applies to nickel powders if they are < 100 micron in particle size, and if they are packaged in quantities greater than 100 pounds (0.05 metric tonne)''.

15. REGULATORY INFORMATION

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

Poison schedule A poison schedule number has not been allocated to this product, using the criteria in SUSMP.

Classifications	N	Dangerous for the environment.
	T	Toxic
	Xi	Irritant
Risk phrases	R40	Limited evidence of carcinogenic effect
	R43	May cause sensitisation by skin contact
	R48/23	Toxic. Danger of serious damage to health by prolonged exposure through inhalation
	R49	May cause cancer by inhalation
		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
	S26	In case of contact with eyes rinse immediately in running water, and seek medical advice
	S36/37/39	Wear suitable protective clothing, gloves, eye protection
	S45	In case of accident or if you feel unwell, seek medical advice (show label where possible).
	S61	Avoid release to the environment. Refer to the specific instructions in the SDS.

Regulatory information SA Hazardous Substances Act 15/1973

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

NICKEL EXPOSURE 1: NIOSH-USA recommended that workers exposed to Nickel and inorganic nickel compounds should have an initial medical exam covering.

1. Comprehensive medical and work history with emphasis on skin conditions, allergies, upper and lower respiratory tract illnesses and smoking.

2. Complete physical exam with emphasis on upper respiratory tract and skin.

3. Specific clinical tests such as X-ray, pulmonary function and indicated sputum cytology and urine nickel analysis.

NICKEL: Reported and potential adverse health effects associated with occupational exposure to Nickel metal and inorganic compounds include; an increased risk of nasal, lung and possibly laryngeal cancer in nickel refinery workers; increased risk of gastric cancer; increased risk of sarcoma (cancer arising from connective tissue); severe irritation of the upper respiratory tract; pulmonary irritation and fibrosis; pneumoconiosis; bronchial asthma; increased susceptibility to respiratory infections; and dermatitis.

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.

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. Additional technical information is available by calling +27 11 3603478 or +27 11 3603317.

COLOUR RATING SYSTEM: Amber. 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.

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.

Abbreviations

ACGIH	American Conference of Governmental Industrial Hygienists.
mg/m3	Milligrams per cubic metre.
AUS	Australia
CAS #	Chemical Abstract Service number – used to uniquely identify chemical compounds.
CNS	Central Nervous System.
EC No.	European Commission Number
EMS	Emergency Schedules (Emergency procedures for ships carrying dangerous goods.
EU	European Union
GHS	Globally Harmonised System
IARC	International Agency for Research on Cancer.
**IATA*	*International Air Traffic Association*
**ICAO*	*International Civil Aviation Organisation*
ICSC	International Chemical Safety Card.
**IMDG*	*Inter Modal transport of Dangerous Goods*
**IMO*	*International Maritime Organisation*
LC50	lethal Concentration, 50%/ Median Lethal Concentration.
LD50	Lethal Dose, 50% / Median Lethal Dose.
M	Moles per litre, a unit of concentration.
OEL	Occupational Exposure Limit.
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.
**PPE*	*Personal Protective Equipment*
ppm	Parts Per Million.
RTECS	The Registry of Toxic Effects of Chemical Substances.
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 and Poisons
SWA	Safe Work Australia
TLV	Threshold Limit Value
TWA/ES	Time Weighted Average of Exposure Standard.

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