

Spinnerets

Enriching everyday life through precious metals!

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REFINING SERVICES | CATALYST & CHEMICALS | ELECTRICAL CONTACTS | NITRO TECHNOLOGIES | ENGINEERED PRODUCTS













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About Hindustan Platinum

Established in 1961, Hindustan Platinum is a leading manufacturer and refiner of precious metal products and services that have a wide array of industrial applications. With an impressive legacy spanning over six decades, Hindustan Platinum is a specialist when it comes to refining precious metals and manufacturing precious metal products. We also provide a full spectrum of services that range from technical advisory to metal management.

Our drive for excellence, our perseverance to serve our customers' requirements, and our unflagging effort to build a global brand have enabled us to establish a customer base in over 50 countries across 5 continents. Supporting our global footprint are two subsidiaries in United Arab Emirates (UAE) and Puerto Rico.

- Hindustan Platinum Private Limited, India

- Hindustan Platinum, DMCC, UAE

- Hindustan Platinum P.R. LLC, Puerto Rico

We serve a diverse set of industries such as Oil Refining, Petrochemical, Pharmaceutical, Chemical, Agrochemical, Flavours & Fragrance, Fine & Bulk Chemicals, Fertilizer, Sodium Nitrite/Nitrate, Industrial & Defence, Caprolactam & Cyanide, Mining, Switchgear, Home Appliances, Automobile, Glass, Jewellery, Man-made Fibre, Research and Analytical Laboratories and others.

Over the years, we have honed our in-house capabilities and supply technologically advanced products and services to our clients. Today, our team of over 950 multi-cultural and diversified professionals is dedicated to developing innovative solutions that create value for our customers. The on-going production capacity expansion at our Navi Mumbai plant will further enable us to cater to the growing demand for our products and services across the world. Our manufacturing unit's proximity to major airports and seaports is another strategic advantage that enables us to better serve our global customers.

At Hindustan Platinum, we understand the responsibility of being a manufacturer's manufacturer and are committed to delivering excellence across our portfolio of offerings. We work with our global partners for new product development as well as for process engineering and value engineering projects. Our steady investment in R&D has allowed us to continuously innovate and hone our refining and manufacturing capabilities.

World-wide, we are among a handful of companies to be listed on the London Platinum and Palladium Market's (LPPM) Good Delivery List for Platinum and Palladium and on the London Bullion Market Association's (LBMA) Good Delivery List for Silver.







Businesses We Have

1. Refining Services

At the forefront of all our activities, is refining. At Hindustan Platinum, our state-of-the-art precious metal refining facility, enables us to handle a wide variety of precious metal bearing material.

We have fine-tuned a variety of traditional and cutting-edge high-yield technologies to produce high-purity precious metals.



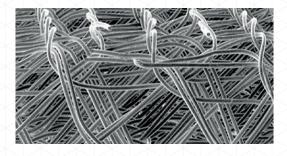
Hindustan Platinum employs stringent quality checks to ensure accurate traceability at all levels of the process. The precious metals content in scrap or spent catalysts received from industries are the main feed stock for the refinery.

Sampling and assaying are key elements of our recovery processes, whereby the precise metal content is determined for each lot of material received. The recovered metal is either returned to the customer, recycled into new products, or credited into a metal account.

In accordance with international standards, we refine and return the metal with a minimum guarantee of 99.95% purity. This can go up to up to 99.99% purity depending on the customer's requirement.

2. Nitro Technologies

Hindustan Platinum started manufacturing platinum alloy catalyst gauzes in 1963 and palladium alloy getter packs in 1985. Our knitting technology has the flexibility to manufacture each catalyst gauze individually. This allows us to offer a smart portfolio of single and multi-structural catalyst gauzes that can be modified according to the customer's desired requirements.



Hindustan Platinum also carries out destructive and non-destructive cleaning of equipment in the ammonia oxidation process downstream to recover precious metals by chemical and water-air based methods. Along with above services, Hindustan Platinum with more than six-decade experience, we also provide its plant advisor services for optimum plant efficiency.







3. Catalyst & Chemicals

We are a leading manufacturer of precious metal catalysts, owing to their activity, selectivity, and recyclability, play a pivotal role in chemical industries. Our catalysts are abundantly supplied to the API industry and its intermediaries as well as to industries like Agrochemicals, Flavours & Fragrances, and Fine & Bulk Chemicals.



Our experience in manufacturing catalysts, combined with our commitment to meeting the specific requirements of our customers has resulted in technologies that have been perfected into an exact science.

4. Electrical Contacts

Electrical Contacts division has a wide range of contacts for the low and medium voltage industry depending on the circuit, handling currents varying from micro amps to hundreds of amperes.

Our technical expertise coupled with our state-of-the-art manufacturing facilities in **India** and **Puerto Rico** make us the preferred

supplier-partner of silver and silver-alloyed electrical contacts for most leading businesses in the switchgear industry across the globe.

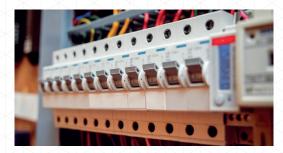
5. Engineered Products

We manufacture apparatus that is largely used in laboratories for analytical purposes.

They mainly comprise crucibles, dishes, electrodes, and tongs. These are made from Platinum and its alloy with Gold and PGMs (Platinum Group Metals). We also supply precious metal Spinnerets for man-made industry.



Along with this, Hindustan Platinum manufactures both cladded as well as uncladded platinum group metal stirrers used in the glass industry with is a pioneer in laser technology and supplies high quality bushings to the Glass Fibre Industry.







Industries We Serve

With an ambition to make a big difference to our customers' business, Hindustan Platinum serves a plethora of industries.



A Record Of Excellence

As a supplier of components that form foundational elements of our customers' products and processes, we are aware of our responsibility to adhere to the highest standards of quality. The flexibility to meet customer requirements and the ability to provide reliable products and services are the cornerstones of our business efforts.

We are aware of our commitment to our global partners and customers, our employees, our suppliers, and our environment. We are guided by the latest technologies and are constantly working on developing products that not only meet but surpass mandated quality standards and are energy efficient.

Adopting new technologies as well as continuously reviewing and improving our way of working yields benefits in terms of performance, efficiency, and safety.







Accreditations and Certifications:

Over six decades, Hindustan Platinum has grown from being a quality precious metals refiner and fabricator to a comprehensive solution provider. In our unceasing endeavour to innovate, we have invested deeply in R&D to enhance our refining, manufacturing, and analytical capabilities.

1. NABL



Our Analytical Testing Laboratory has been recognised as NABL Accredited Testing Laboratory vide Certificate Number TC-8930. This accreditation enables us to issue test certificates with ILAC MRA Mark for high-purity Platinum, Palladium, Gold and Silver.

#1 NABL - National Accreditation Board for Testing and Calibration Laboratories, is a Constituent Board of Quality Council of India. ILAC MRA Mark is registered as a worldwide mark and is owned by the International Laboratory Accreditation Cooperation (ILAC).

2. London Good Delivery

Our Navi Mumbai refinery is among a select list of refiners on the London Platinum and Palladium Market (LPPM) Good Delivery list for Platinum and Palladium and on the London Bullion Market Association (LBMA) Good Delivery list for Silver.

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Image: Production of the state of the st	Platinum Good Delivery	Palladium Good Delivery	SILVER
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3. ISO Accreditations

All Businesses

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- С		i i i i i i i i i i i i i i i i i i i			Procurement, Sales and Services of following		
Certificatio	Bureau Verlias Certification Holding SAS – UK Branch certifies that the Management System of the above Organisation has been audited and fround to be in accordance with the requirements of the Management System Standard detailed below. Standard	Corporate Office	VIOS Tower, 22nd Floor, New Cuffe Parade, Off Eastern Freeway, Wadala, Mumbai - 400 037, India	businesses - Refining Services - Chemical and Catalyst - Nitro Technologies - Engineered Products - Electrical Contacts and R & D of Nitro Technologies			
	ISO 9001:2015 Scope of cartification	Refining Services Unit	C 122, TTC Industrial Area, Pawane, Navi Mumbai - 400703, India	Refining and recovery (Reclamation) of precious metals from spent catalyst / chemical from various industries (Mainly from Pharma, Petrochemical, Agro, Speciality chemicals, Mining and Jewellery etc.)			
Veritas	Refiners and manufacturers of precisous metal products made of Puthenium, Rhodium, Palladium, Silver, Indium, Platium, Oold and La alog and services for industrial applications. Refining and recovery of precisous metals from spent of various chemical and industrial applications.	Verita	Catalyst & Chemical Division	C 122, TTC Industrial Area, Pawane, Navi Mumbai - 400703, India	Develop and manufacture of Catalysts (Heterogeneous and Homogeneous). Saits and Saits Solutions of various industrial applications.		
Ve	Develop, manufacture and sake of precisure metals based heterogeneous & homogeneous catalysts, solts and their solutions for diverse chemical applications Manufacture and sake of precisus metals based engineered products mainly spinnerettes, cup, cluster holder, bushing, himbles, granules, rings, bars, set.	Ver	Precious Metal Engineered Products	C 122, TTC Industrial Area, Pawane, Navi Mumbai - 400703, India	Manufacture and Sale of precious metals based engineered products mainly spinnerettes, cups, cluster holder, bushing, thimble, granules, rings, bars etc.		
au	 Design, manufacture and supply of platinum gauzes, getter and supporting screens. Design, manufacture and sade of electrical contacts like solid & bimetal rivets, profile contacts, brazing foils, contact assemblies, wires and strips 	au	Nitro Technologies	C 122, TTC Industrial Area, Pawane, Navi Mumbai - 400703, India	Design, manufacture and supply of: 1. Platinum alloy catalyst gauzes / systems 2. Palladium alloy getter / catohment. 3. Gauzes /systems supporting / separator screens		
Bure	Original cycle start date: 06 July 2010 Exploy date of previous cycle: 16 December 2022 Recertification Audit date: 23 January 2023 Recertification cycle start date: 03 May 2023 Subject to the combunds addiafacture coversition of the Organisation's Management System.	Bure	Electrical Contact Division	C 122(C-154), TTC Industrial Area, Pawane, Navi Mumbai - 400703, India	Design, manufacture and sale of silver and silver alloy: 1) Solid and binnetal rivets 2) Profile contacts 3) Contacts on carriers 4) Wires 5) Brazing foils and wires		
29	the set fit cale is valid with it. B become to easy to be a base data is a data with the set of the	29	Signed on beh Jagdheesh N. Director - CEF Commodities, Centration to	In of BVCH SAS UK Branch HITERATION, South Asis Industry & Facilities Division y advess: So thinks of Presc Street, Londo Card Mice Rev And Street, March And Zabaness Fan, March And Print Andre Facilities The Street And Print Andre Facilities (Street And Print Andre Facilities)	ited (Certification Business) Pg 2 of 2		

We are committed to create value for our customers

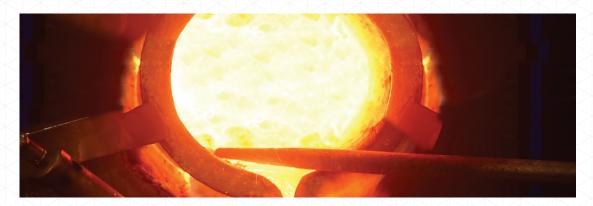






Our Precious Metal Management & Refining Services

Certain measures must be adopted to successfully manufacture high-quality precious metals-based products. At Hindustan Platinum, we understand that the production of the necessary starting material and intermediate products from the recovered materials of the spent products are an absolute necessity.



Precious Metals Refining

Hindustan Platinum operates one of the world's most modern precious metals recycling facilities. The precious metals refining provides for comprehensive refining services for catalyst and getter gauze scrap, glass wool filters, precious metals containing dust and sludge from downstream equipment of the ammonia oxidation reactor and storage tank cleaning operations.

Precious Metals Management

Hindustan Platinum has extensive experience in manufacturing precious metals products and providing related services, offering our customers the industry's most inclusive array of services for the entire precious metal lifecycle.



Whether its Gold, Silver, Platinum, or Palladium, our specialists create tailor-made solutions for our customers within the scope of customary price-hedging instruments such as outright buy and sell orders and working of limit orders.

We can provide metals in the form of bars, grains, or sponge, at most locations worldwide. We can also arrange for unallocated metal credit and loco swaps as required.

Hindustan Platinum's Navi Mumbai refinery is on the London Platinum and Palladium Market (LPPM) Good Delivery list for Platinum and Palladium and on the London Bullion Market Association (LBMA) Good Delivery List for Silver. As a result, bars manufactured by us are readily accepted by bullion banks and commodity exchanges around the world.







Engineered Products, Spinnerets – Introduction

Hindustan Platinum, a pioneer in production of precious metal spinneret in India has been serving the man-made fibre industry globally for nearly a quarter of a century. In addition to the manufacturing, the company also extends its service for repairing & refabrication of old and worn-out spinnerets of the original makers or brands.

State-of-the-art Manufacturing Facility

Our manufacturing facility meets all the requirements of producing spinnerets of exact standards demanded by today's producers of man-made fibres. Our rich experience in the sophisticated process of production of spinnerets has helped us constantly in meeting the challenges created by an increasingly innovative industry striving to manufacture products with outstanding characteristics.

Hindustan Platinum has in-depth knowledge, command, and expertise in spinneret technology where precision, consistency and accuracy are constant benchmarks. Having a full in-house capacity for refining with an entire streamlined and controlled process, allows us the flexibility to work on customized designs, based on product-specific needs of the customer. When working on precious metal spinnerets, whether for a standard design or one specifically developed by our customer, we ensure that the metal or alloy used has the following characteristics:

- Extremely resistant to corrosion
- Stable enough to continuously resist deformation
- Recyclable

Our Products

We Manufacture High Precision Custom-Made Spinnerets of Global Standards

- 1. Precious Metal Spinnerets for viscose staple fiber, filament, rayon and tyre cords year
- 2. Cluster holders fitted with precious metal spinnerets for viscose staple
- 3. Tantalum filters used for viscose staple and rayon filament
- 4. Stainless Steel Cup Form & Ring Spinneret for acrylic fiber

Hindustan Platinum spinnerets are characterized by high uniformity and offer hole diameter ranging from 40 μ and above with ± 1 μ tolerance and hole L/D ratio up to 2:1 with capillary length tolerance ± 10 μ .







1. Precious Metal Spinnerets For Viscose Staple Fiber, Filament, Rayon And Tyre Cords

Gold, Platinum, and Rhodium are the basic components of alloy used for manufacturing spinnerets for wet spinning process. With fully integrated in-house manufacturing process, which starts with melting of virgin metal or used spinnerets, refining/rolling, heat treating, cup drawing from sheets etc. This process requires machines and tools of utmost precision, quality conscious and extensive know-how of advance and efficient manufacturing technique. At Hindustan Platinum, we constantly strive for innovation through technological advancement to take our precision to a higher level.

We are currently supplying spinnerets having holes as per customer requirement with hole diameter as low as 40 microns.

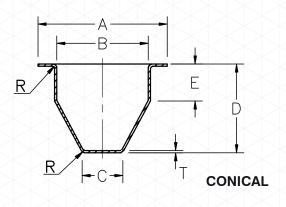
Alloy	HP - N31	HP - N51		
Composition	XXXXX			
Gold	69.5%	49.5%		
Platinum	30%	49.5%		
Rhodium	0.5%	1%		
Specific gravity (g/cm ²)	20	20.3		
Vikers hardness (kg/mm)	200-240	185-200		
Tensile strength (kg/mm²)	40-60	85		

The Principle Alloys and their Mechanical Properties we work with:

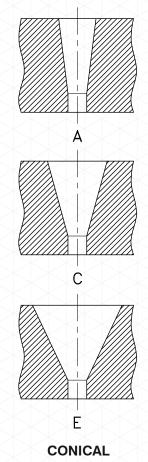
In addition to the above-mentioned principle alloys, we also manufacture spinnerets in any composition on customer request.

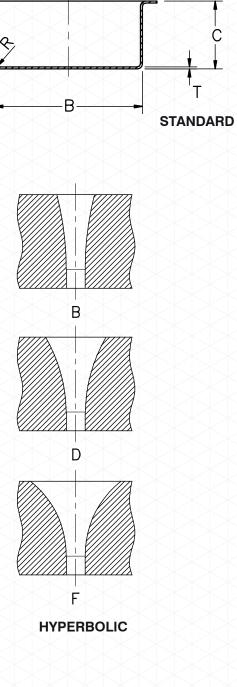






Typical Hole Profile





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Manufacturing Tolerance Parameter

Description	Parameter			
Minimum capillary diameter	40 <i>µ</i>			
Number of holes	As per requirement			
Capillary diameter tolerance	±1μ			
Capillary length tolerance	±10 µ			
L/D ratio	As per requirement			



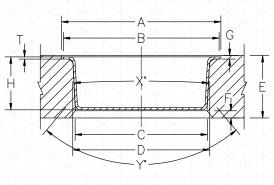


2. Cluster Holders

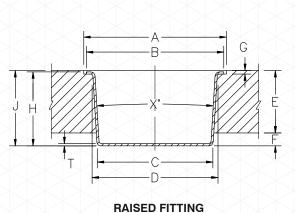
We supply special steel alloy Cluster Holders fitted with precious metal spinnerets for Viscose Staple Fibre used in wet spinning process. This tremendously saves the customer's investments into precious metals. Another advantage is easy replacement of individual eyes/ thimbles instead of the entire spinnerets.



Typical Assembly



SUNKEN FITTING







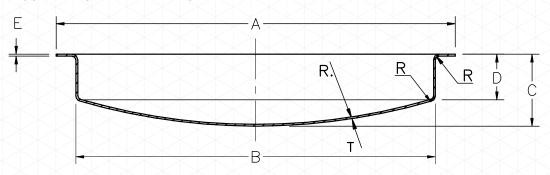


3. Tantalum Spinnerets For Wet Spinning

Tantalum is extremely resistant to corrosion and has superior hardness and workability. Hence, making it highly suitable for manufacturing spinnerets for certain wet spinning processes. The inherent properties of tantalum also give the spinnerets a longer operating life. They are used for production of acrylic fiber.



Typical Spinneret Shape



4. Stainless Steel Ring Type Spinnerets

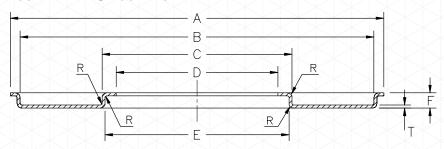
These Spinnerets for acrylic Staple Fibre is used in dry spinning process. These can have upto 2800 holes with 50 microns hole diameter to produce acrylic staple fiber using the dry spinning process. Each spinneret, manufactured as per customer's requirement, is within tolerances as tight as half a micron in diameter.







Typical Ring Type Spinneret



The market offers a wide range of steels suitable for manufacturing of spinnerets. The largely used materials are listed with their suitable SS grade, their composition, analysis, and mechanical properties.

AISI	304	316	316 Ti	329	430	431	630	
DIN	1.4031	1.4401	1.4571	-<>	1.4016	1.4057	1.4542	X
ANALYSIS:	\bigcirc			\rightarrow		\square	\times	\mathbb{N}
С	0.08 max	0.08 max	0.08 max	0.06 max	0.12 max	0.20 max	0.07 max	0.05 max
Cr	18-20	16-18	16-18	25	16-18	15-17	15.5-17.5	14-16
Ni	8-10.5	10.14	10.14	5	-	1.25-2.50	3-5	5-7
Мо	-	2-3	2-3	1.5	-	- /		0.5-1
Cu	-		-		- <	-	3.5	1.25-1.75
Ti			5 x C min	->>		·	\times	
Cb/Ta	-	-	-	\rightarrow	-	-	5 x C min	8 x C min
MECHANICAL PROPERTIES:								
Density	7.9	7.95	7.95	7.8	7.7	7.7	7.75	7.75
Yield strength Hg/mm ²	20	21	23	50	27.5	60	80-130	65-130
Tensile strength Hg/mm²	50-60	50-65	50-65	70	50-65	80-140	86-140	99-130
Elongation (min) %	50	40	40	30	20	14	14-22	14-24
Reduction (min) %	60	50	50	55	60	45	52-66	48-66
Impact (min) kgm	8.60	8.60	8.60	8	-	3.0	2.2-13.8	2.5-9.7
Hardness HB solution annealed	130-180	130-180	130-190	200-220	130-170	250-275* [26-28 AC]	270-290* [28-30 RC]	270-290* [28-30 AC]
	100 100	130-180	130-190	\sim	130-170	450 [48BC]	450 [48RC]	450 [48AC
Hardness (max) HB	130-160	130-160	130-190		100-170			430 [40AC

Chart of Most Used Materials





Service of Used and Worn Out Spinnerets Employees' Health and Safety

In addition to manufacturing, Hindustan Platinum repairs and refabricates old and worn out spinnerets, regardless of the original maker.

Although spinnerets formed of platinum and gold alloy are comparatively durable, it may be maintained over prolonged usage. However, it is important to eliminate replacement of new spinnerets as much as possible. Even spinnerets manufactured from the metals which are acknowledged as the most suitable, at times become unfit for use, due to defects developed after prolonged use. The pressure required to force the viscous cellulosic solution through the minute hole in the base of respective spinnerets causes the bent, otherwise distorted. Furthermore, incrustations formed around the edges of the orifices decreases the respective diameters thereof and in many instances the orifices become completely closed. Closing of certain of the orifices results in the production of a fiber, which varies from the initially formed fiber. Hence, making it necessary to remove and replace such clogged or partially clogged spinnerets.



Our Commitments

Employees' Health and Safety

At Hindustan Platinum, managing health, safety, and enterprise risk is a core responsibility.

As a Member of the British Safety Council, Hindustan Platinum has pledged to keeping people safe and healthy at work. We have always strived to integrate health, safety, and risk management in our corporate strategies, business practices, workplace culture, and employee behaviour. We see adherence to health and safety norms as a leading indicator of our overall business and operational performance







Responsible. Sustainable

Hindustan Platinum is more than just a business. It is a socially responsible business committed to positively impacting the environment and community. We believe that the world belongs to every living being. It is our duty to protect and nourish it for future generations.

One of the key elements of our Mission statement is "Protecting the environment and community by striving for zero waste". We have pledged to implement sustainable business practices by embracing clean energy

We consistently work towards developing and adopting solutions that are better for our planet. Over time, our constant efforts have brought us closer to our goals of becoming energy-positive and achieving zero-waste across our business units. Through investments in wind farms and solar parks, we generate more energy than we consume. In addition to meeting strict environmental regulations our R&D team strives endlessly to improve processes, with a particular focus on increasing water and energy conservation.

Our commitment to clean energy and zero waste can be seen in our fully integrated effluent treatment plant, root zone system, rainwater harvesting facility, organic waste converter as well as stringent air-quality control and waste liquid neutralization processes.

We are dedicated to the social wellbeing of the community, especially the development of weaker and under privileged sections of the society. Various initiatives by Hindustan Platinum and its associate foundation – Choksi Charity Foundation focus on health care and sanitization, education, women's empowerment, building facilities for senior citizens, environmental sustainability, promotion and protection of art & culture, sports, rural development, and disaster relief.





Hindustan Platinum

Industries We Serve Products We Make

Electroplating industry	Precious metal salts and solutions				
Fertiliser, industrial & defense explosives,	Platinum/Rhodium catalyst				
Caprolactam and cyanide manufacturers gauzes	Palladium alloy catchment gauzes				
Glass fiber and glass wool industries	Platinum/Rhodium alloy bushings Spinner baskets				
Glass and optical glass industries	Platinum/Rhodium alloy stirrers Thimbles, orifice rings, liners, etc				
Man-made fiber industries	Precious metal spinnerets cluster spinnerets Tantalum filters Stainless steel spinnerets				
Pharmaceutical and chemical industries	Precious metal salts supported and unsupported catalysts				
Research and analytical laboratories	Platinum laboratory apparatus				
Steel and glass industries	Platinum and Platinum/Rhodium Thermocouple wires Throwaway tips				
Switchgear, control gear, automobile, spacecraft, elevator and home appliance industries	Electrical contacts				
Oil refineries, petrochemical industry and all other industries	Recovery and refining of precious metals from industrial scrap				
Jewellery Industry	Supplier of Pt 950 granules in composition of Palladium, Cobalt, Copper, Ruthenium, Iridium etc. Supplier of Pt 950 Chain in roll, Pt 950 Blanks/Rings and other Pt 950 allied products for jewellery industries.				



Hindustan Platinum Pvt. Ltd.

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HP/EP/SPN/V2/092023