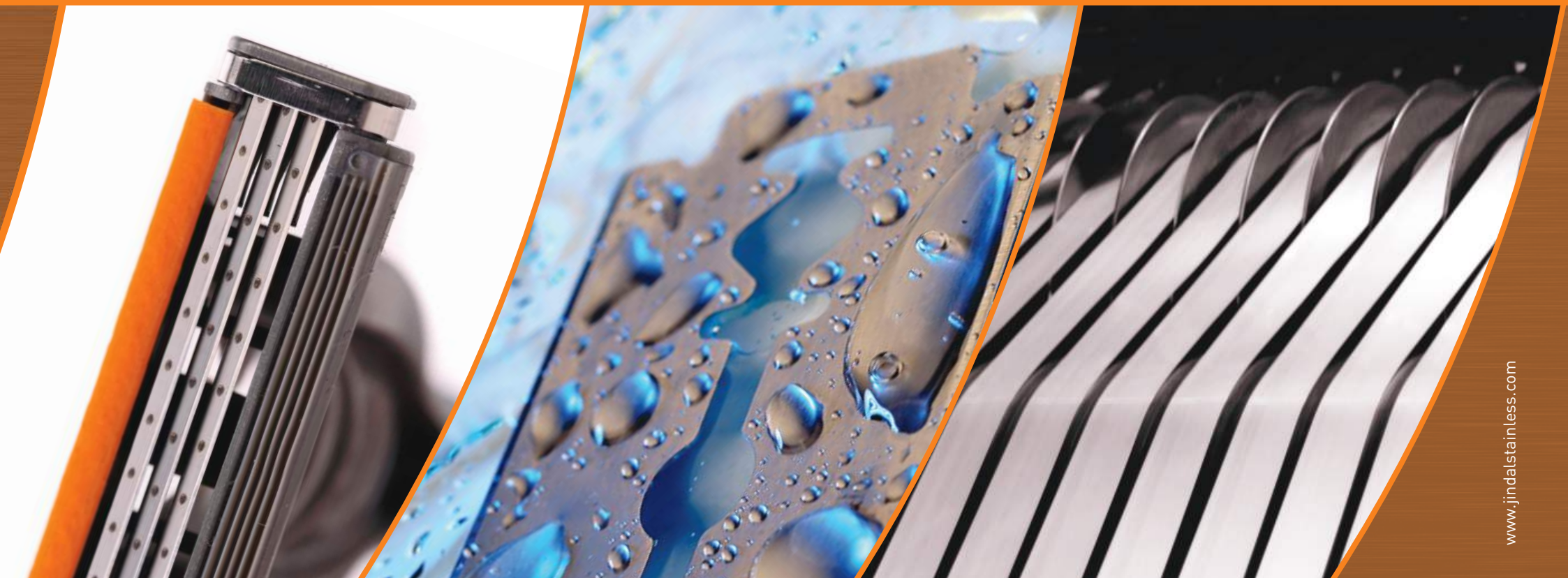


Jindal Blade Steel



**Working
together
to shape a
stainless world
We are
Jindal Stainless !!**



JINDAL STAINLESS GROUP

Founded by Shri O.P Jindal in 1970, Jindal Stainless is one of the largest stainless steel conglomerates in India and ranks amongst the top 10 stainless steel conglomerates in the world. It's not only the magnitude of our operations that determines our credibility and name, but we remain inspired by our vision for innovation and enriching lives. Jindal Stainless group has an annual crude steel capacity of 1.8 MTPA and the group has an annual turnover of Rs 14,500 crores.

Our growth has been backed by the excellence of our people, value driven business operations, customer centricity and best safety practices in the steel industry and a commitment for social responsibility.



JINDAL STAINLESS (HISAR) LTD.

The Hisar plant of the group was established in 1975 when Shri O.P Jindal, envisioned a self reliant India for meeting its stainless steel demand. Stainless steel then was no less than a luxury metal and India was completely dependent on imports to fulfil its demand which attracted duties of up to 300%. It was Shri O.P Jindal's vision and his pioneering spirit that led to the establishment of the Hisar plant, India's first stainless steel manufacturing unit.

Since its inception, Jindal Stainless (Hisar) Limited has integrated its operations on a strategy of both, backward and forward integration, starting from melting, casting, hot rolling to cold rolling and other value additions. Today, our Hisar plant is a fully integrated Stainless Steel plant with a capacity of 8,00,000 tpa. It is also the world's largest producer of Stainless Steel strips for razor blades and India's largest producer of coin blanks, serving the needs of India and International mints. Our Specialty product division caters to the high end precision and specialty stainless steel requirements of reputed Indian and International customers. The product range includes Slabs & Blooms, Hot Rolled Coils, Strips, Plates, Coin Blanks, Precision Strips and Cold Rolled Coils.

Going forward, the company plans to continue its focus on development of new value added stainless steel grades, process improvements and customer satisfaction through developing customised products matching their specific requirements. Simultaneously, continuous measures are being undertaken to reduce cost in different production processes.



JINDAL STAINLESS LIMITED

Jindal Stainless Limited is one of the largest integrated manufacturers of stainless steel in India with a capacity of 1 million tons per annum. A leader and a name synonymous with 'Enterprise', 'Excellence' and 'Success', company's ethos mirrors most characteristics similar to the metal it produces; akin to stainless steel Jindal Stainless Limited is innovative and versatile in its thought process; strong and unrelenting in its operations.

The company is focussing on strengthening Internal Process & Systems and Customer Serviceability. Further, special plans are being made for market development of niche grades and expanding the portfolio of high value products of steel. The state-of-the-art unit of Jindal Stainless is located in the eastern part of India in the state of Odisha. The plant in Odisha also has Ferro Alloy's manufacturing facilities with world class technology and equipments sourced from Siemens VAI, SMS Siemag and Andritz Sundwig and a production capacity of up to 250,000 tons per annum. The complex, equipped with captive power generation facility, is eventually scalable up to 3.2 million tons per annum of stainless steel production.

JINDAL STAINLESS CORPORATE MANAGEMENT SERVICES PVT. LTD. (JSCMS)

Jindal Stainless Corporate Management Services Pvt. Ltd. works as an internal consultant and provides necessary back-end support services to the Jindal Stainless Group Companies. As an advisory company, JSCMS functions closely with Directors, Business Heads and other Functional Heads of Jindal Stainless Group Companies to support them drive seamless flow of business operations. JSCMS acts as a catalyst to achieve business excellence and helps in creating value for Jindal Stainless Group Companies by introducing best practices and regulating processes.

The company focuses on creating value by providing synergy within the group companies, working on a prime repository of global best practices and frameworks with the help of a talented team.





SPECIAL PRODUCT DIVISION

CAPACITY TO PRODUCE 30,000 MT OF HIGHLY SPECIALISED GRADES OF COLD ROLLED PRECISION STRIPS WHICH INCLUDE AUSTENITIC, FERRITIC AND MARTENSITIC STAINLESS STEEL.

Special product Division (SPD) at JSL Hisar have state of the art precision rolling and slitting equipments to produce stainless steel precision strips down to minimum thickness of 0.05mm in maximum width of 450mm. In addition, SPD also have an independent line for production of cold rolled **Razor Blade Strips** to minimum thickness of 0.074 mm, in 5.74mm width specially for Single Edge Blades and 0.09/0.10 mm thick strips for Double edge Blades.

This division focuses on the production of customized products through various specialized processing equipment, primarily for annealing, rolling and finishing. There is an option of using either a Bell annealing or a Bright annealing or even Horizontal annealing depending on the grade and finish of stainless steel being produced. Fully Automatic 4-Hi mills and Sendzimir mills are equipped with automatic gauge control system & are used for making ultra thin gauges with close thickness tolerances. To impart various finishes in the final product the complex has Strip Grinding Line, Skin Pass Mill and Tension Leveler. The finish coils from different processes are finally passed through the Precision slitters to attain precise dimensions as per customer's requirement.

The division houses a sophisticated vertical Bright Annealing (BA) line equipped with highly advanced features to achieve the desired mechanical properties along with a flat strip and bright surface. The line also has an online degreasing unit to ensure good surface cleanliness.

Specially for precision strips, a tension leveling unit is available to get table top flatness without affecting the quality of strip surface. An online flatness measurement helps produce strips with a flatness of the level of low "I" units.


The final slitting comprises precision slitters that can slit strips in highly precise widths as per the requirement of any of customer to different segments.





THE DEVELOPMENT OF RAZOR BLADE STEEL

Jindal Stainless is a major producer of stainless razor blade steel in the world catering to a major portion of the globe. It has achieved consistent progress in quality over the years with respect to dimensional and metallurgical properties of steel. The microstructure of our strips is designed to optimize / facilitate hardening, sharpening and honing operations at the customers end and to develop the ideal characteristics for the intended end applications. These are achieved with stringent quality checks utilizing modern and sophisticated testing equipment such as the metallurgical microscope with advanced image analyzer, digital micro-hardness tester, microprocessor controlled tensile testing machine and scanning electron microscope. Persistent R & D activity has helped the product attain international standards. Flexibility to customize the product to match each individual customer's requirement sets us apart.



Jindal Stainless Limited is international in all respects. Behind our products and services lie the massive resources of one of the great metal producers. A clear focus on customer needs, coupled with cross market expertise, a wide product range and up-to-the-minute technology ensures that innovative solutions are provided.

JINDAL BLADE STEEL (JBS)

JBS STRIPS OF MINIMUM 0.074MM IN THICKNESS AND MINIMUM 5.74MM IN WIDTH SPECIALLY FOR SINGLE EDGE RAZOR BLADE APPLICATION, WHEREAS STRIPS WITH THICKNESS OF 0.09/0.1MM IN AND WIDTH RANGING FROM 13.8MM TO 22.2MM SPECIALLY FOR DOUBLE EDGE RAZOR BLADE APPLICATION, ARE PRODUCED AND SUPPLIED TO THE LEADING INDIAN AND INTERNATIONAL RAZOR BLADE MANUFACTURERS.

THE PRODUCTION PROCESS FOR JBS STRIPS

THE STRENGTH OF JSL LIES IN HAVING A FULLY
INTEGRATED OPERATION AT HISAR.

The production of Blade steel strips begins with state of the art melt and casting shops where melting of ferrous scrap and ferro-alloys in the UHP Electric Arc Furnace, followed by secondary refining in AOD/ VOD units. The liquid steel thus obtained, is cast into ingots/blooms. These ingots/blooms are subjected to stringent quality checks and then hot rolled in the Tandem Strip Mill comprising reheating furnace, roughing stand and multiple finishing stand with down coilers.





The Hot Rolled Coils are transferred to the Special product division where the hot rolled coils continuously go through the processes like spheroidising annealing (bell annealing), shot-blasting, pickling and cold rolling to achieve desired thickness. The coils are further cold rolled in multiple stages to ultra thin thickness and precise widths as per customer's requirement.

SPD have an exclusive cold rolling mill setup for blade steel coils. The facilities for production of these strips are equipped with Bell Annealing and Continuous Bright Annealing lines to ensure uniform distribution of fine secondary carbides and to ensure metallurgical properties in the material as per international standards/customers specification. The as rolled finish products in JBS grade are as per end application ranging from 0.074mm to 0.10mm in thickness and 5mm to 24mm in width, covering the Single as well as Double Edge blade requirements.



GOOD
HOUSEKEEPING
PROMOTES
SAFETY

JSL
JINDAL STEEL

888

DTR

D.T.R

PROCESS FLOW – HISAR (FOR JBS)

STEEL MAKING

The state of art Melt & Casting shops have an installed capacity of 800,000 metric tons per annum. These facilities comprise :

- Ultra high power – Electric Arc Furnace – 2 nos. x 45 MT
- AOD (Argon Oxygen Decarburisation) Convertors – 2 nos. x 50 MT
- VOD (Vaccum Oxygen Decarburisation) Converters – 1 no – 50 MT
- Ingot Teeming bay with multiple ingot casting
- Bloom caster – 1 no – Size > 200 x 200 mm

HOT ROLLING

Hot rolling comprises Tandem Strip Mill with a total capacity of 264,000 MT per annum.

The Tandem Strip Mill comprises reheating furnace, roughing stand and multiple finishing stand with down coilers.

End product with minimum thickness of 3 mm with width ranging from 240 mm to 380 mm is the raw material the production of JBS strips in Speciality Product Division.

COLD ROLLING IN SPD – JBS STRIPS

Speciality Product Division has a capacity of 30,000 MT per annum of precision cold rolled strips.

The facilities with modern equipment comprise :

- Sendzimir mill /4Hi mills with automatic gauge control system
- Continuous Shot Blasting & Pickling line
- Spheroidized Annealing lines from Ebner
- Bright Annealing line from Ebner
- Precision Slitting lines from Nobag
- Precision Slitting lines from Burghardt + Schmidt
- Strip Grinding lines

JINDAL BLADE STEEL SPECIFICATIONS

This Cold Rolled martensitic stainless steel strip is specially manufactured to meet the requirement for the manufacturing of Single Edge and Double Edge Blades.

CHEMICAL COMPOSITION, TYPICAL (in weight %)

GRADE	C	Mn	P(max)	S(max)	Cr	Si
JBS	0.67	0.65	0.025	0.020	13.0	0.40

MICRO STRUCTURE : Cold rolled stainless steel with evenly distributed fine spheroidized chromium carbide in the ferrite matrix.

PRIMARY CARBIDES : No detrimental primary carbide shall be present in micro structure.

SECONDARY CARBIDES : Min 50 per 100 sq μ at 1000 x magnification

NON-METALLIC INCLUSIONS : Steel shall be free from any harmful non metallic inclusions.

MATERIAL SPECIFICATIONS

MECHANICAL PROPERTIES :

- ▶ Ultimate tensile strength : 1080 +/- 100 N/mm².
- ▶ Hardness: 280-350 HV.

STRIP DIMENSIONS FOR DOUBLE EDGE RAZOR BLADE APPLICATION

- ▶ Thickness and tolerances :

Thickness range (mm)	Tolerances (mm)
0.090 to 0.100	+/- 0.005

STRIP DIMENSIONS FOR SINGLE EDGE RAZOR BLADE APPLICATION

Thickness range (mm)	Tolerances (mm)
0.074 to 0.076	+/- 0.005

- ▶ Maximum transverse variation of thickness: 0.005 mm.
- ▶ Width: Between 5 mm to 24 mm, as per customer's specific requirement with tolerance ± 0.025 mm.

SURFACE

- ▶ Surface finish: Semi Matt Finish with max Ra-0.125 μm .

SLIT EDGE

- ▶ Ripple free slit edge with maximum Burr height of 0.005 mm.

**Can be customized to individual requirements.*



STRAIGHTNESS :

Strip width (mm)	Maximum allowed deviation in straightness (mm)	
	In 1.2 meter length	In 2.5 meter length
5.74 to < 8 mm	5.0	12.0
8 to < 20 mm	4.0	9.0
20 to 22.40 mm	3.0	6.0

DELIVERY CONDITIONS :

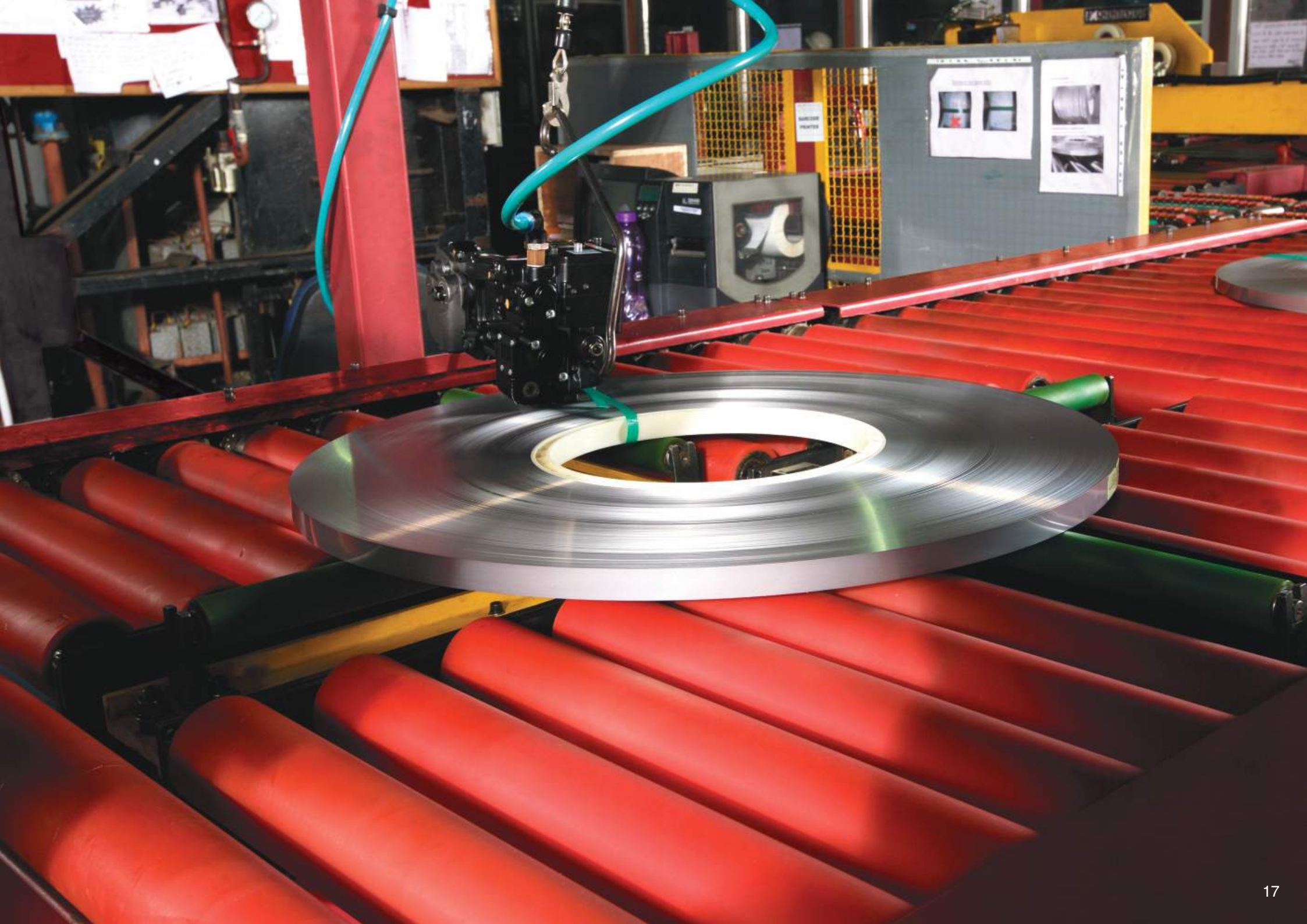
- ▶ Razor blade strip is wound into a pancake.
- ▶ Coils, on plastic cores, with an inner diameter of 280 ± 2 mm.
- ▶ Max Coil Outer Diameter can be 850mm.
- ▶ Two or Three Equidistant PVC strapping is done through the eye of the coil, to ease handling.

RUST PROTECTION :

- ▶ A thin layer of anti-corrosion oil is applied.

TEST CERTIFICATE

Test certificates are issued giving the details of coil no., heat no., composition, size and mechanical properties along with a packing list.





PACKAGING

JSL have adopted a packaging standard that ensures a 'safe & sound' arrival of the products at customer's workplace. JSL's packaging standard has won approvals from many of our customers. Yet flexible packaging process allows incorporation of customers' new and specific requirement, if any.

MARKING

Labels on each coils show information about the material like grade, coil no, slit no. and heat no, size and net weight.

MASTER SAMPLE

Master samples are packed in separate boxes and marked "MS" (if required).

A STATE OF THE ART ROBOTIC PACKAGING FACILITY HELPS IN DELIVERING A CONSISTENT DAMAGE FREE QUALITY PRODUCT OVER AND OVER AGAIN.

JSL have fully automatic robotic packaging facility to pack slits of coil weights ranging from 20kgs to 100Kgs, with capacity to pack 1200 slits/day. Both, Bare and VCI wrap type of packaging (as per individual customer's requirement) is possible through this machine. It can pack slits with width ranging from 5mm to 30mm.

The coils are wound on plastic sleeves, and properly packed in steel/wooden boxes with a centre support core and silica gel desiccant.

Packaging features :

- ▶ Coils stacked with eyes vertical on wooden pallet.
- ▶ Use of VCI coated board spacers to prevent coil edge from damage.
- ▶ Cardboard core in the inside diameter.
- ▶ Cover with VCI polythene bag for protection from moisture.





QUALITY AND R&D

HALLMARK OF OUR SUCCESS

QUALITY ASSURANCE AND QUALITY CONTROL

THE MARKET DRIVEN JSL CULTURE ENSURES THAT INNOVATION IS CUSTOMER FOCUSED.

Quality Assurance and Quality Control at Jindal Stainless starts with understanding the customer's requirements, developing/supplying high quality products as per customer's requirement and constantly monitored till the customer is satisfied with the delivery of products and services. The finished products are thoroughly inspected and tested. Modern and sophisticated testing equipment helps in assuring a product of the desired quality to customers.

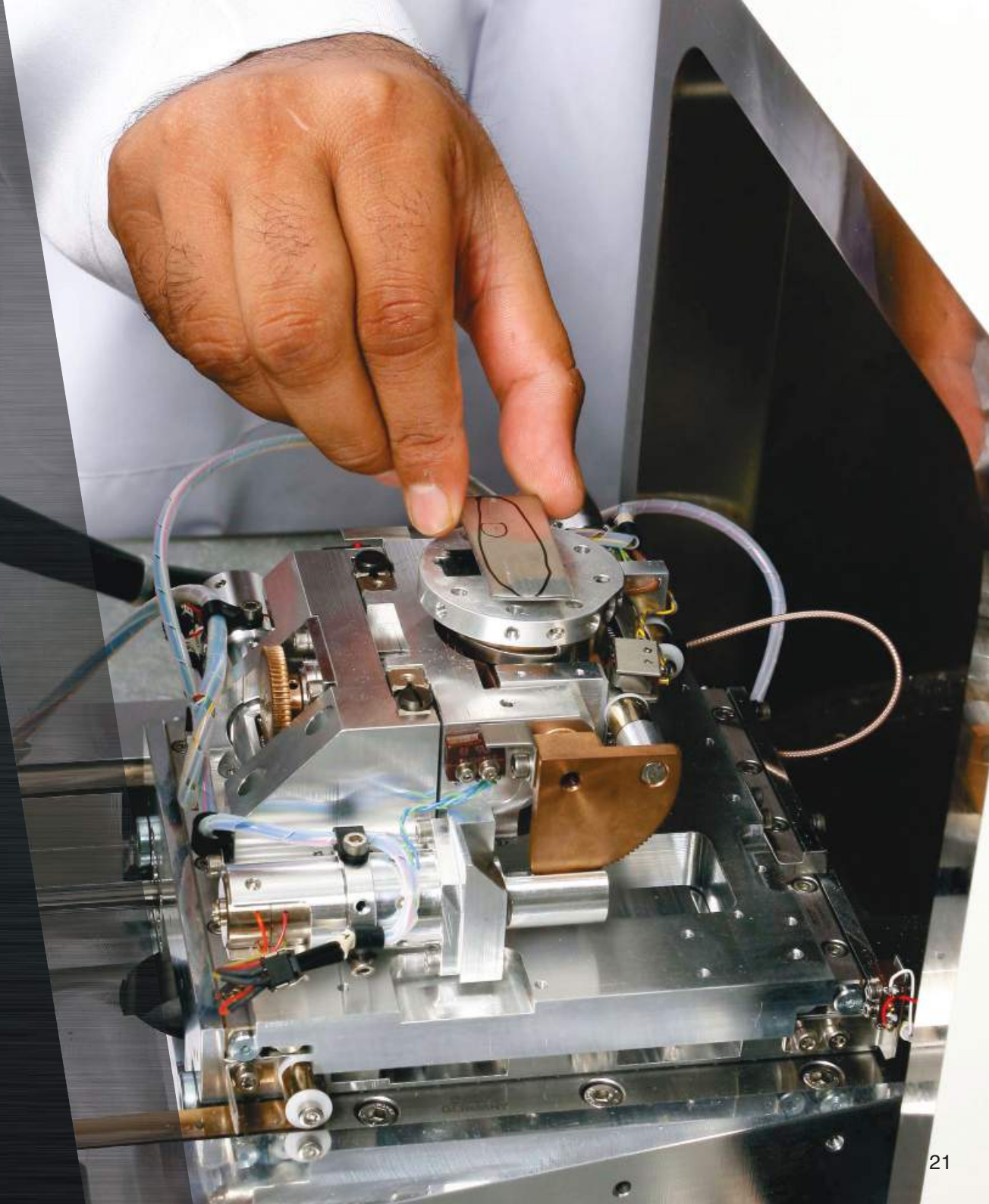
Behind our products and services lie the massive resources of one of the great metal producers. A clear focus on customer needs coupled with cross market expertise, a wide product range and up to the minute technology ensures that innovative solutions are provided.

RESEARCH AND DEVELOPMENT

CONTINUOUS UP-GRADATION OF QUALITY, PROCESSES, AND SERVICES THROUGH PRODUCT INNOVATION TO DEVELOP NEW PRODUCTS AT COMPETITIVE COSTS HAS BEEN A CORNERSTONE OF OUR PHILOSOPHY.

The R&D division plays a pivotal role in retaining and consolidating company's leadership position in the Stainless Steel industry. This is achieved through Cross-fertilisation of knowledge between production, quality control and commercial units in order to maintain global standards has been the guiding principle of the R&D function.

The R & D center at Hisar is focusing on development and enhancement of new and existing products of the company. Modified 200 series grades have been evolved to meet low cost alternates of 304 (austenitic stainless steel). Continuous efforts are made by R & D team to reduce the cost of production and improve on the existing grades.



CERTIFICATIONS

ISO 9001:2008 certification of JSL is a testimony to our commitment to consistent quality. In addition, Hisar operations are also certified for AD 2000-Merkblatt W0 and PED 97/23/EC to enable us becoming a preferred and certified supplier of Stainless Steel Flat HR & CR products for Pressure Vessel, Processing & Allied Industries. ISO 14001:2004 and BS OHSAS 18001:2007 Systems Certification of the plant assure our commitment towards the environment and for providing a safe workplace for our employees. For ensuring quality at every step, the production processes are constantly monitored and controlled ensuring that the finished products are as per customer's requirements.

TESTING FACILITIES

In order to deliver assured quality, all input material including raw material is inspected and tested before use. The Quality Control Laboratories are well equipped with modern equipment such as Scanning Electron Microscope, Optical Emission Spectrometers, X-Ray Fluorescence Analyzer, Leco-Analyzers, Corrosion Testing facilities, UT testing facility, Image Analyzer, Surface energy measurement device and many more like hardness testers and Tensile testing machines.

The R&D division plays a pivotal role in retaining and consolidating Jindal's leadership position in the stainless steel.

In addition to the above, the R&D division closely interacts with reputed national and international laboratories / scientific institutions / Universities to avail expert services and knowledge for critical investigations.



An ISO 9001:2008, PED 97/23/EC, AD W0, ISO 14001:2004 and BS OHSAS 18001:2007.

**JINDAL BLADE STEEL (JBS)
OFFERS THE FOLLOWING ADVANTAGES:**

- ▶ Excellent metallurgical properties
- ▶ Close tolerances
- ▶ Smooth surface, extra accuracy on flatness and straightness
- ▶ Good blanking properties
- ▶ Good hardening properties
- ▶ Good grinding and honing properties, facilitating the manufacture of high quality edges
- ▶ Good corrosion resistance (hardened and tempered condition)

**CONSISTENT MATERIAL PROPERTIES FROM COIL TO COIL, FROM
DELIVERY TO DELIVERY.**

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