

# STAINLESS STEEL FOR SUGAR INDUSTRY

PURITY & RELIABILITY

## 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.

### HARNESS THE POWER OF A LEADER

"Innovation in production process and product development plays a key role in sustaining our leadership position"







## 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 LTD.

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.







## GRADE PROPERTIES & APPLICATION

Grade / Type	Properties	Applications
J4	<ul style="list-style-type: none"> <li>• High strength to weight ratio</li> <li>• Excellent formability &amp; wear resistance</li> <li>• Excellent weldability and good corrosion resistance than mild steel</li> </ul>	<ul style="list-style-type: none"> <li>• Cane Conveyor: Side Plates, Chain Links, Pin, Bushes and Rollers</li> <li>• Milling, Donnelly chutes</li> <li>• Rake elevators, plates, juice trays</li> <li>• Juice/Syrup tanks and Hoppers</li> </ul>
J204 Cu	<ul style="list-style-type: none"> <li>• High strength to weight ratio</li> <li>• Excellent formability and wear resistance</li> <li>• Good weldability and corrosion resistance</li> </ul>	<ul style="list-style-type: none"> <li>• Milling: Juice trays / Gutters</li> <li>• Sulphur statio</li> <li>• Tubes: Juice Heaters, Evaporators, Pans and Condensers</li> <li>• Crystallizers and Centrifugals</li> </ul>
JS LAUS	<ul style="list-style-type: none"> <li>• High yield strength as compared to Cr-Ni stainless steel</li> <li>• Excellent formability &amp; Weldability</li> <li>• Has good corrosion resistance/resistance to SO<sub>2</sub> environment during processing of mixed juice and syrup</li> </ul>	<ul style="list-style-type: none"> <li>• Juice tanks and Pipe Lines</li> <li>• Trough &amp; screw Conveyor</li> <li>• Condensers and crystallizers</li> </ul>
J304/304L	<ul style="list-style-type: none"> <li>• Good Corrosion and Oxidation resistance</li> <li>• Superior weldability, ductility and toughness</li> </ul>	<ul style="list-style-type: none"> <li>• Sulphidation and clarification segment including boiling house</li> <li>• Vacuum filter, condenser &amp; syrup tank</li> </ul>
J316/316L	<ul style="list-style-type: none"> <li>• Superior resistance to Corrosion at many aggressive environments</li> <li>• Superior resistance to pitting and crevice corrosion</li> <li>• Higher strength and better creep resistance at higher temperature</li> <li>• Good weldability, ductility and fabricability</li> </ul>	<ul style="list-style-type: none"> <li>• Raw cane handling at carriers, cane knives and Condensers</li> <li>• Filtration, clarifiers and crystallizers</li> <li>• Diffusers and mills</li> <li>• Centrifugals, sugar bins and filling</li> </ul>
J409 M	<ul style="list-style-type: none"> <li>• Resistance to corrosion / abrasion</li> <li>• Good formability and weldability</li> <li>• Excellent performance at elevated temperature</li> </ul>	<ul style="list-style-type: none"> <li>• Diffusers and mills</li> <li>• Centrifugals ,sugar bins and fillings</li> <li>• Clarifiers and crystallizers</li> <li>• Filtration and condensers</li> <li>• For dry and semi-dry handling</li> </ul>
J439	<ul style="list-style-type: none"> <li>• Good resistance to inter-granular/pitting corrosion</li> <li>• Fully Ferritic microstructure</li> <li>• Very good weldability and ductility</li> </ul>	<ul style="list-style-type: none"> <li>• Sugarcane juice ducts and heaters</li> <li>• Evaporators and boiling pans</li> <li>• Crystallization units and dryers</li> </ul>



## WHY STAINLESS STEEL

Low/Negligible Corrosion	:	Stainless steel offers excellent corrosion resistance to corrosive media found in sugar industry.
High Strength/weight Ratio	:	Due to high yield strength, it is possible to reduce the material thickness (and weight) by 20 - 30% without change in structural strength.
Easy Fabrication	:	Excellent mechanical properties, formability and weldability make stainless steel ideal material for fabrication.
Abrasion Resistance	:	High abrasion resistance reduces wear during conveyor operations & increases the life cycle of equipments.
Heat Transfer	:	Efficient heat transfer solves the problem of scaling which reduces downtime for cleaning and wear of stainless steel tubes.
Superior Hygiene	:	Hygienic properties of Stainless Steel make it suitable for applications in industry like sugar, dairy, brewery, distillery & pharmaceutical, etc. Maintains organoleptic characteristics (color, flavor, taste) of sugar crystals.
Chemical Inertia	:	No metal transfer, no reaction with sugar and no change in sugar color.
Biological Inertia	:	Makes bacteria colony growth more difficult on the stainless steel surface
Low Maintenance	:	No protective paint/coating required. Smooth surface allows easy cleaning.
Lower Operating Cost	:	Stainless steel considerably brings down the breakdown incidence which results in lower cost of operations.
Lifecycle Cost	:	Stainless steel results in 30-40% savings over the lifetime of the equipment.
Safety	:	Stainless steel enhances the overall safety of the entire plant due to reduction in accidents/ leakages.







## CHEMICAL PROPERTIES & MECHANICAL PROPERTIES

Grade	%C (Max)	% Mn (Max)	%P (Max)	%S (Max)	%Si (Max)	%Cr	%Ni	%Mo	N PPM (Max)	Others	UTS (MPa Min)	YS (MPa Min)	Elong % (Min)	Hardness RB (Max)
J4	0.10	8.5-10	0.08	0.01	0.75	15-16	1-2	-	2000	Cu = 1.5-2	650	325	40	100
J204 Cu	0.10	6.5-9	0.06	0.01	0.75	16-17.5	1.5-3.5	-	1000-2000	Cu = 2-4	620	310	40	100
JSL AUS	0.08	6-8	0.07	0.01	0.75	16-18	4-6	-	1000	Cu = 1.5-2	550	205	40	95
J 304	0.07	2.00	0.045	0.03	0.75	17.5-19.5	8-10.5	-	1000	-	515	205	40	92
J 304 L	0.03	2.00	0.045	0.03	0.75	17.5-19.5	8-12	-	1000	-	485	170	40	92
J 316	0.08	2.00	0.045	0.03	0.75	16-18	10-14	2-3	1000	-	515	205	40	95
J 316 L	0.03	2.00	0.045	0.03	0.75	16-18	10-14	2-3	1000	-	485	170	40	95
J 409 M	0.03	0.8-1.5	0.03	0.03	1.00	10.8-12.5	1.50	-	300	Ti=0.75 max	450	275	20	90
J 439	0.03	1.00	0.04	0.03	1.00	17-19	0.50	-	300	Ti= 0.2+ 4 x (C+N) min, 1.1 max Al = 0.15 max	415	205	22	89



### COMPARISON OF BRASS VS STAINLESS STEEL TUBE

Factor	Brass	Stainless Steel
Strength	Low	High
Heat Transfer	Good	Good
Scaling	High	Low
Maintenance Cost (periodic)	High Frequency	Low Frequency
Material Cost	High	Low
Residual (scrap) Value	High	Low
Total Life	Low	High

### COMPARISON OF LIFE CYCLE COST OF STAINLESS STEEL V/S MILD STEEL

Factor	Mild Steel	Stainless Steel
Material Price	Low	High
Weight Of Material Used	High	Low
Fabrication And Installation	Low	Marginally High
Maintenance Cost (periodic)	High	Low
Replacement Frequency	High	Low
Cost Of Lost Production	High	Low
Residual (scrap) Value	Low	High





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