

# STAINLESS INDIA

A MAGAZINE PUBLISHED BY

**Indian Stainless Steel  
Development Association**

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## Delhi can boast of new terminal T3

Delhi's new airport terminal T3 is part of the project for the modernization and upgradation of the Delhi airport awarded to Delhi International Airport Limited (DIAL), a joint venture company formed by the Bangalore-based GMR Group, Airports Authority of India (AAI), Fraport and Malaysian Airport Holdings. T3 Terminal at Delhi's Indira Gandhi International Airport is the world's eighth largest airport terminal.

Terminal 3, a state-of-the-art integrated terminal, occupies 502,000 m<sup>2</sup> (5.4 million sq ft), with a capacity to handle 34 million passengers annually. The new Terminal 3 is a two-tier building, with the bottom floor being the arrival area, and the top being the departure area. This terminal has 168 check-in counters, 30 parking bays for aircrafts, 72 immigration counters, 15 X-ray screening areas for less waiting times, duty-free shops and other features. This terminal has 78 aero bridges, the largest number for a single terminal anywhere in the world. It also has a 100-room transit hotel.

The entire terminal had been built in a record time of just 37 months against the 60-72 months taken in different airports in the world, creating a global benchmark.

Some interesting facts about the potential of stainless steel in the airports sector can be gauged by the use of stainless steel in T3. For the domestic piers of T3, the passenger terminal building (PTB) and Airport Connection Building connecting to Delhi Metro and the car parking area, stainless steel type 304 in satin finish (surface roughness *ra* value of 0.2 microns) has been used for the following installations:

- 33 Kilometers of handrails and crashguards
- 350 Security Bollards
- 5,000 Square meters of cladding

### THIS IS THE FINAL PRINT EDITION

of **STAINLESS INDIA** magazine.

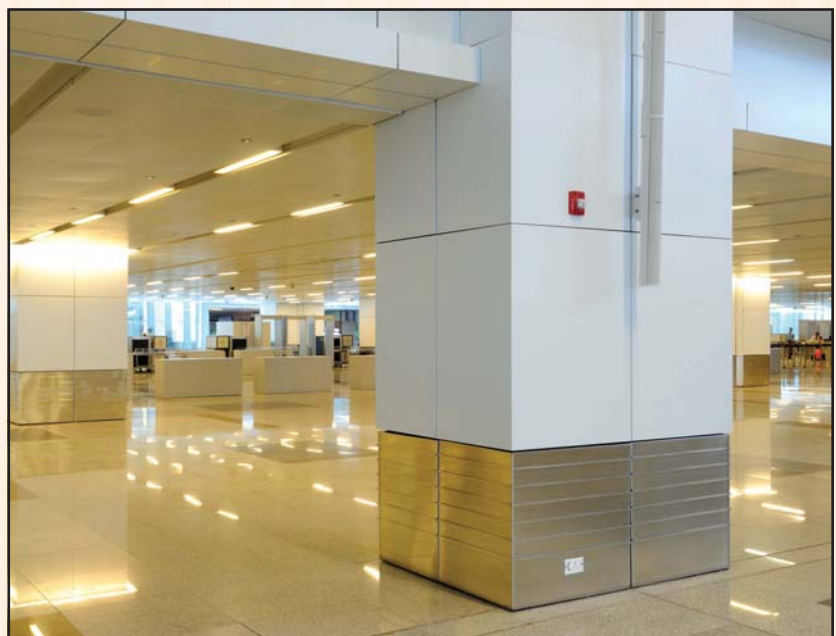
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*Departure Forecourt at the Passenger Terminal Building*



*Passenger Terminal Building's pillar clads in stainless steel*



*Parafit Railings in Passenger Terminal Building (PTB) Departure*



*Top of Ramps in the boarding area of domestic pier*



*Crash bollards at PTB Arrivals and Departure*

The EPC (Engineering, Procurement & Construction) contractor for stainless steel works in the sections of T3 mentioned above was Fabrinox, the Architectural Division of M/s Dharam Industries, a member company of ISSDA. Fabrinox designed, fabricated and installed the stainless steel items indicated.

A huge amount of effort was put into by Fabrinox for complying with overseas architects' stringent requirements. Some of these are mentioned below:

- Railings were designed as per BS 5395 British standards.
- High impact rated crash bollards and crash guards to withstand 40 Kilo Newton load.

- All Welders were qualified for fracture and load tests by third party inspection agencies.

Apart from this, Fabrinox also supplied 18 Kilometers of handrails and 2,500 square meters of cladding for installation by others elsewhere at T3.

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## Nickel Magazine

'Nickel' is a magazine devoted to nickel and its applications, published by the Nickel Institute. After 24 years of being published in print and sent free-of-charge to over 32,000 persons across the globe (including 3,500 in India), it has now gone online. Those wishing to receive this valuable magazine, please register at: [www.nickelonline.org/subscribe](http://www.nickelonline.org/subscribe) to receive email notification of future issues.

## Workshop in Ahmedabad -- STAINLESS STEEL FOR BUILDINGS



**Mr. Ramesh Gopal addressing the delegates**

The Indian Stainless Steel Development Association (ISSDA) held a hugely successful workshop in Ahmedabad on the use of stainless steel for buildings. The workshop was held on Saturday 21<sup>st</sup> August, 2010. About 350 architects, builders, interior designers, municipal and government officials responsible for enhancing the image and infrastructure of Ahmedabad, stainless steel fabricators and members of the stainless steel industry in and around Ahmedabad attended.

This event was sponsored by Raajratna Metal Industries Ltd., Fabrica of the Sunrise Group, Lancer Laser Tech Ltd., (all-based in Ahmedabad) and the Chennai based M/s Fein Power Tools India Pvt Ltd. All these companies provide products and services in stainless steel for the building and construction sector.

The objective of the seminar was to help stainless steel fabricators to ensure high quality of architectural products. For the architects and designers, it was an extremely useful exercise to know how to identify good quality stainless steel products. The presentations were also meant to help new-comers to the field of stainless steel fabrication for this sector to know how to go about setting up a manufacturing unit, including the equipment and machinery they would need. Availability of consultants for new projects was indicated to the audience.

Highly experienced personnel from the stainless steel industry across India such as Mr. Ramadas of Salem Steel Plant (SAIL), Mr. Kuldeep Singh of Jindal Architecture at Gurgaon, Mr. Kamlesh Mehta of Stallion Infrastructure, Bangalore, Mr. Rajesh of Fein Power Tools, Chennai, Mr. Nitin Shah of Fabrica, Ahmedabad, Mr. Pravin Goel of JSL Stainless Ltd., Delhi, Mr. K R Ananthanarayanan, Consultant, based in Bangalore and Mr. Ramesh Gopal of ISSDA made presentations.

The presentations comprehensively covered the complete range of activities starting from grades and grade selection criteria; architectural images spanning a variety of applications across India; a basic guide to fabrication; surface finishing techniques and requirements; the full range of stainless steel product forms available in the market for this sector; indoor plumbing in stainless steel for pure water and longevity of RCC buildings; new stainless steel products that could be introduced for capturing more market space and bigger volumes for stainless steel; and good shop floor practices for ensuring quality products.

Why did ISSDA do this programme? This is because the use of stainless steel for buildings is mainly in big cities like Delhi, Mumbai, Bangalore, Chennai etc. Not much in smaller cities like Ahmedabad. The stainless steel industry wants to

spread the use of stainless steel in buildings to a large number of cities like Ahmedabad, Chandigarh, Coimbatore, Pune, Nagpur, Aurangabad and hundreds of other tier II and tier III cities throughout India.

Why did ISSDA start with Ahmedabad for these workshops? First, Gujarat is economically most progressive state and Ahmedabad is looking forward to occupying the top slot among cities for its industry and commerce. Second, Ahmedabad is a premiere city for production and processing of stainless steel. It is therefore natural that the people, the fabricators, architects and municipal bodies in Ahmedabad would positively respond to our efforts.

Amongst a lot of people who helped, ISSDA is personally thankful to Mr. Ugamraj Hundia of M/s Real Strips Ltd. Ahmedabad, for the wholehearted support he gave from day one and who was present at the workshop. We are thankful to ISSDO for the co-operation extended to ISSDA in successfully conducting this workshop in Ahmedabad.

**All presentations are available in Ppt format in our website:**  
[www.stainlessindia.org](http://www.stainlessindia.org)

**MORE WORKSHOP PHOTOS ON  
PAGE 4 & 5**



**M Ramadas of  
M/s Salem Steel Plant(SAIL)**



**Kuldeep Singh of  
M/s Jindal Architecture**



**Nitin Shah of  
M/s Fabrica-Sunrise Group**



**Pravin Goel of  
M/s JSL Stainless Ltd**



**N C Mathur, President of ISSDA felicitating Kamalesh Mehta  
of M/s Stallion Infrastructure**



**R Rajesh of M/s Fein  
Power Tools**



**Nitin Patel of  
M/s Lancer Laser Tech, Sponsor**



**Pratik & Jignesh Shah of M/s Fabrica of  
Sunrise Group, Sponsor**



**K R Ananthanarayanan  
Consultant**



**B S Shekhawat of Viraj Profiles  
Vice President, ISSDA**



**Naresh and Ashok Sanghvi of Raajratna being felicitated,  
Sponsor**



**M. Yunus of Fein Power Tools being felicitated, Sponsor**



*Mr. N C Mathur with Mr. Ugamraj Hundia*



*A section of the audience at the workshop*

## **ISSDA Holds its 21<sup>st</sup> AGM**

The 21<sup>st</sup> AGM of ISSDA was held on September 28, 2010 in Delhi. Mr. N C Mathur, President of ISSDA, chaired the meeting.

Participants were updated on the current activities of the Association as well as the international stainless steel market scenario. The meeting approved the induction of 23 new member companies as well as the deletion from rolls of a number of companies which had repeatedly failed to pay their membership dues.

After approving Directors' Report, Adoption of Annual Accounts and Re-appointment of Auditors, the meeting discussed the necessity of incorporating changes in the Articles of Association which are more than 20 years old to bring them in line with current realities. Members were requested to submit any amendments to the suggested changes in the Articles circulated to members by October 30, 2010.

Mr. N C Mathur informed members that the year 2012 marks the 100<sup>th</sup> anniversary of the discovery of stainless steel. The International Stainless Steel Forum (ISSF) plans to have worldwide celebrations during that year starting with celebrations in China in May 2012. Programmes in India would be decided upon shortly.

Mr. N C Mathur called on members of ISSDA to prepare to be the third largest stainless steel producing country in the world in the centenary year 2012 with an output of 4 million tonnes.

### **Election of members to the Managing Committee.**

The following were elected to the Managing Committee in various categories of membership for the year 2010-2011:

#### **Primary Member Category**

Mr. N. C. Mathur, M/s JSL Stainless Ltd. Mr. B. S. Shekhawat, M/s Viraj Profiles Ltd.; Mr Anand Gupta, M/s Ambica Steels Ltd; Mr Yatinder Pal Singh Suri, M/s Outokumpu India Pvt Ltd; Mr Sanjay Khandelwal, M/s BRG Iron & Steel Ltd; Mr K R Srinivasan / A M Kulkarni, M/s Mukand Ltd; Mr Pankaj Gautam, M/s SAIL / SSP Ltd.

#### **Associate Member Category**

Mr. V. K Agarwal, M/s Bansal Wire Industries Ltd; Mr. Ajay Madan, M/s Loeser Arm India Pvt Ltd; Mr. Pratik Shah, M/s Fabrica of Sunrise Group; Mr. Arvind B. Patel, M/s Valgro India Ltd;

Mr. Anil Saxena, M/s Jindal Architecture Ltd.

Mr. Ramesh Gopal was elected to represent the Nickel Institute in the **Association Member Category**.

It was also decided to meet frequently at regular intervals and put in efforts to have an effective and functional Managing Committee which would steer the work of the Association.

Some members voiced their opinion that ISSDA should provide production and end-use data for stainless steel for India on a more frequent basis. Mr. Mathur informed members that this would be taken up in the next meeting of the Managing Committee in November 2010.

Mr N C Mathur was elected unanimously as the President of ISSDA and Mr B S Shekhawat was elected unanimously as the Vice President of ISSDA for 2010-2011.

## **Succession Planning at ISSDA**

ISSDA is looking for a Senior Executive to succeed its present Executive Director. After familiarization, the candidate should be capable of taking over responsibilities as the Executive Director of ISSDA. Persons having sound technical knowledge of stainless steel properties and applications with a minimum 10-15 years' experience in the industry, capable of representing the Indian stainless steel industry at national and international levels and inspiring the government and other potential industry sectors to use stainless steel, as well as interact effectively with various layers of stainless steel industry and trade to increase volumes of stainless steel usage in India may apply to: [nissda@gmail.com](mailto:nissda@gmail.com). Very good ability to communicate at all levels (spoken & written), and enhancing the prestige of this 20-year old organization is essential.

## Stainless steel production for the first half of 2010: More than 40% increase



Preliminary figures released by the International Stainless Steel Forum (ISSF) show that stainless steel crude steel production has tremendously increased in the first half of 2010 by 44.3% compared to the same period of 2009. Total production for the first six months of 2010 was 15.6 million metric tons (mmt). All major regions showed significant higher production volumes in the first half year 2010. Remarkably, China reported a lower than average production increase.

This never seen before strong magnitude of stainless steel production growth is reflecting several facts:

1. A clear statistical basics effect after the dramatically decreased production in the first half of 2009 due to the world-wide economic crisis.
2. A much stronger and quicker than anticipated recovery of the global economy.
3. A strong re-stocking business – partially combined with speculative buying.
4. A re-filling of the mill-internal supply-chain.

In Asia, with China excluded, stainless steel production increased by 46% to 4.3 million tons. All stainless steel producing countries significantly increased production in the first half of 2010. Growth rates were between 20 and 80%. China increased the stainless steel production in the period of review by 35% to 5.5mmt.

**Table 1:Stainless and heat-resisting crude steel production (in '000 metric tonnes)**

Region	Half Yearly		+/-% Y-o-Y
	2009	2010	
Western Europe/Africa	2,888	4,304	49.0
Eastern Europe	100	163	62.9
The Americas	833	1,399	67.9
Asia	2,959	4,313	45.8
China	4,067	5,469	34.5
Total World	10,847	15,648	44.3

**Table 2: Market share of stainless steel categories (as per cent of total crude steel melting)**

Grade category	2009	2010
	Year	Half Year
CrMn steels (200 series)	11.7	11.3
CrNi steels (300 series)	60.6	58.3
Cr steels ( 400 series)	27.8	30.5

Western Europe/Africa reported a 49% increase in stainless steel production during the first six months of 2010. Total production was 4.3 million metric tonnes in this period.

The split by main stainless steel grades has seen a recovered market share of ferritic stainless steels. This clearly reflects the strong production recovery in the

global automotive industry. The market share of austenitic CrNi stainless steels has slightly decreased compared with the average of 2009 due to stronger development of the ferritics. The market share of chrome-manganese stainless steels has increased somewhat due to the better market demand in China.

**Source: International Stainless Steel Forum (ISSF)**

### DISCLAIMER

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Utmost effort is put into ensuring that there is no infringement of copyright or IPR. In spite of our best efforts, sometimes incorrect information creeps in, mainly because we have faith in those who contribute articles / images for us. Any such error, if at all, is deeply regretted. If point out, we have no qualms in admitting our error and publish an apology in an effort to appease the aggrieved party.

### V.R. SUBRAMANIAN Passes Away



V.R. Subramanian, former Executive Director, India Lead Zinc Development Association,

passed away in sleep during the early hours of 17 August 2010. Mr. Subramanian made immense contribution towards the growth of the Indian steel and non-ferrous metals sectors in general and the lead and zinc industry in particular.

Mr. Subramanian was also instrumental in establishing a branch of the Nickel Development Institute (now the Nickel Institute) in India in 1987 and played an important role in the founding of the Indian Stainless Steel Development Association (ISSDA) in 1989.

He leaves behind his wife, son and daughters. May his soul rest in peace!

## Sleek Stainless Steel Canopies at New Metro Stations in Delhi



*Gleaming stainless steel entrance canopy at the Jawaharlal Nehru Stadium metro station in Delhi*

M/s Jindal Architecture Ltd has designed, fabricated and installed the first of its kind elegant stainless steel canopy structures at the main entrances of Delhi Metro Rail Corporation (DMRC) underground stations on the new Badarpur line. The huge stainless steel canopy structures measure 17m in length; 10m in width and 4m in height.

Weighing approximately 6000kg each, these canopies are completely modular in design and were prefabricated at the plant and assembled at site. In total, 12 such canopies are installed at the following DMRC stations.

1. Jawaharlal Nehru Stadium Station (5 Entrances)
2. Jungpura Station (3 entrances)
3. Khan Market Station (4 Entrances)

The canopy consists of 219 mm diameter stainless steel pipes with profiled stainless steel sheets, pipes and Box sections for the roof structure. The roof



*A different design of canopy at Hauz Khas metro station*

covering is of multiwall polycarbonate sheets. All stainless steel components are in type 304 with satin finish. The trendy stainless steel canopies not only add beauty to the entrances but will also provide shelter and protection from rain and sunlight.

*Fabricator :*

M/s Jindal Architecture Ltd.  
Plot No 64, 2<sup>nd</sup> Floor, Udyog Vihar,  
Phase-IV, Gurgaon, Haryana -122 016  
Tel: 0124-4127700  
Fax: 0124-4127777  
Website: [www.jindalarc.in](http://www.jindalarc.in)

## Welcoming New Member

Viega was formed in Germany 100 years ago. The company has undergone continuous development and exhibited healthy growth rates. During all these years, Viega has been consistently open to new challenges and always in the forefront of innovation and new technology. Viega has had a huge impact on the installation technology market and employs more than 2500 people. The company is the world leader in thin-walled plumbing technology for indoor plumbing.

The Sanpress Inox products range from 15mm-108mm diameter and can be used for a variety of applications like drinking water, rain water, fire-fighting water installation, compressed air installation, agriculture and other industry applications.

It can withstand a maximum temperature of 110 degree Celsius and a pressure of maximum 16 Bar working pressure. The **black EPDM** (Ethylene Propylene diene rubber) can withstand up to 110 degree Celsius and **NBR** (Acrylonitrile/Butadiene Rubber) is used only for cold water such as chilled water or earth laid services pipes. The **HNBR** (Hydrogenated Nitrile) is used in gas installation and **FKM** (Fluoroelastomer) is used where the temperature is higher i.e in solar thermal systems with pipe collectors.



## TECHNICAL DATA (SS 316)

The Sanpress Inox –and Sanpress Inox XL-XL stainless steel pipes are thin-walled and corrosion resistant stainless steel pipes, Material No.1.4401 (X5 CrNiMo 17-12-2), with 2.3% Mo (Molybdenum) is for increased durability.

Dia and wall thickness mm	Flow rate Litre/min	Wt per mt of pipe Kg/m
15 x 1.0	0.13	0.35
18 x 1.0	0.20	0.43
22 x 1.2	0.30	0.65
28 x 1.2	0.51	0.84
35 x 1.5	0.80	1.26
42 x 1.5	1.19	1.52
54 x 1.5	2.04	1.97
64 x 2.0	2.83	3.04
76.1 x 2.0	4.08	3.70
88.9 x 2.0	5.66	4.34
108 x 2.0	8.49	5.30

### The advantages of Sanpress Inox products are as follows:

- Press connectors and pipes made of stainless steel AISI 316 (DIN 1.4401)
- Only stainless steel system with the SC-contour
- Double pressing, cylinder pipe guide, EPDM sealing element
- An economical one-man fitting process using Viega press connection tools.
- Fast installation with maximum added value
- Ideal for repair work - dripping water causes no problem
- No fire risk when renovating building
- No gas or oxygen cylinder required
- Clean appearance of installation
- No burning of insulation and no need for re-installation.
- Small bending radii.
- Clean appearance of installation

### Some of the prominent projects undertaken by them are as follows:

- MMTC-PAMP India Pvt Ltd, New Delhi
- P.D. Patil's (Industrialist) bungalow, Mumbai
- Baba Kalyani's bungalow, Mumbai
- SOMA DEVELOPERS –Director's Bungalow, Bangalore



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## Welcoming New Member

## JINDAL STAINLESS STEELWAY LTD.

### Emergence of Stainless Steel Service Centers

The Steel Service Centre Industry in India is fast developing as an inseparable connect between the primary steel producers & its end users.

Till few years ago, around 90 – 95% of Steel in India was distributed to end users by either the producing mills directly or by the trading sector comprising of big

& small distributors or stockists. The materials were generally supplied in their mother form, as produced, to be further processed by end users through local stand-alone processors, to make them usable for end applications.

But in the last few years, there has been a marked change in steel producers'

approach towards reaching out to its end consumers. Today, most of them have forged alliances with international companies in the steel servicing business to bring ready-to-use processed steel directly to their customers' doorsteps.

\*\*\*\*\*

**Jindal Stainless Limited** was the first to envision this big service opportunity in the stainless steel arena. The idea to set up a string of service centres across India & outside to provide customized stainless steel, in exact quantities & on exact time, was put on the table sometime in early 2004 & the moment it was spelt out, it found widespread acceptance among all, across the organization.

Soon after, Jindal Stainless Limited embarked on its journey, to bring customer - centric service solutions. JSL formed a strategic joint venture with Steelway Inox Market Group, in early 2004 to form a new organization - **Jindal Stainless Steelway Limited**.

Jindal Stainless Steelway Ltd. is the largest stainless steel service center in India which services customers with different grades of stainless steel in tailor-made forms, on just-in-time basis.

The company's state-of-the-art plants are operational in Gurgaon (Haryana), Mumbai (Maharashtra) & Chennai (Tamil Nadu) with another one coming up in Baroda (Gujarat). The company also has a warehouse facility in Kolkata (W.Bengal) to cater to the North-East market of India. The strategic location of all the service centers is essential in catering the scattered stainless steel requirement of India. Apart from this, the company also has a series of satellite marketing office in all major cities of India.



Gurgaon Plant



Mumbai Plant



Chennai Plant

**Facilities Installed:** The company is equipped with the latest technologically advanced Slitting, Cut-to-Length & Surface Polishing Lines (No.4, Scotch Brite, Mirror Finish, Anti Fingerprint Finish & Embossing) from the best international equipments suppliers Like FIMI & IMEAS of Italy and DAHEWA of Korea.



CUT TO LENGTH LINE



SLITTING LINE



SCOTCH BRITE POLISHING LINE



NARROW CTL LINE



GORE BAR (FLAT BAR LINE)

*For details of services available, Please contact JSSL MARKETING TEAM:*

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**For more details:**  
**SUHNER India Pvt. Ltd., 235 U2, Bommasandra Industrial Area, Bangalore - 560 099**  
**Ph: 080 27831108, Fax: 080 27831109, E-mail: [abrasive.in@suhner.com](mailto:abrasive.in@suhner.com),**  
**Website: [www.suhner.com](http://www.suhner.com)**

## Welcoming New Member



Jindal Architecture Ltd.

**ARC** - Jindal Architecture Limited is an ISO 9001:2008 & ISO 3834-2 certified company, subsidiary of JSL Stainless Limited, a stainless steel major of India under the flagship of Jindal Group having an annual turnover of USD 12 billion.

JAL has taken the initiative to promote stainless steel products and technology solutions to cater to the emerging market of Stainless Steel for Architecture, Building, Construction (ABC) & Railways in India.

JAL specializes in complete design, fabrication and installation of high quality stainless steel architectural metal-works with an in-house design team comprising of architects, product designers and engineers to provide the clients with a flexible and creative approach in achieving spectacular and unique design solutions. The manufacturing unit is located at Gurgaon, equipped with state-of-the-art CNC (computer numerical control) machineries commissioned in March 2004 for fabrication and machining of specialty components in stainless steel. The fabrication unit is set up on a plot area of 350000 sq ft.

Innovative products with value added applications in the household, corporate, industrial, hospitality, OEM (metro) & Railway segments are constantly being evolved. The division is fully geared to meet any of the specialized job requirements including all types of column, wall and roof cladding, handrails (customized/off-the-shelf), false ceiling, atriums (integrated and free standing), canopies, space frames, skylights, spider glazing, structural glazing, door and window frames, fences and boundary walls, wide range of street furniture, school/cafeteria furniture, lighting, signage's, Kiosk, Modular Toilets, Components for Railway and Metro coaches, Stainless Steel Modular Kitchens and so forth.

Jindal Architectural Limited works as a catalyst amongst designers, architects, fabricators and other professionals to

### Entrance Sculptural Gateway at JPL Township, Raigarh



**33m high gateway, India's tallest Architectural marvel in stainless steel, weighing approximately 20 metric tons. It is an excellent example of application of stainless steel as a structural material.**

provide a range of technical support services for stainless steel applications in Architectural, Building & Construction works.

Our range of services includes:

- Consultations and assistance to Clients, Architects and Designers during design phases of a project.
- Evolving an innovative range of products using stainless steel for value addition in Architectural and Interior applications.
- In-house working on quantity estimates, cost estimates, activity planning, delivery schedules and installation methodologies.
- Preparation of details and shop drawings.

- Fabrication and material assembly through the employment of state-of-the-art manufacturing, processing, welding and tooling technology.
- Installation and erection, site supervision and management, commissioning and handing over.

#### **Corporate office:-**

#### **Jindal Architecture Ltd.**

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## Matt Finish, Satin Finish – Know from the experts

*This article has been contributed by Fein Power Tools India Pvt Ltd, an associate member of ISSDA*

Stainless steels are a family of steels with a unique set of properties. Protected by a passive layer of chromium oxide film at the surface which is formed by reaction of the chromium in the stainless steel and oxygen in the atmosphere, they require no added surface protection against corrosion.

It is important for surface finishers to understand that during the process of applying a specific surface finish, **THEY SHOULD NOT ENGAGE IN ACTIVITIES** that would destroy the passivity of the surface. In other words, if you employ rough and tough activity with a stainless steel surface (as you would tend to do with carbon steel), you would destroy the corrosion resistance (read: passivity of the surface film) and the job in question would inexplicably start showing signs of corrosion in service.

This article attempts to help you achieve the specific surface finish – either Matt or Satin – while retaining the passivity of the surface and give your clients decades of stainless service.

The number of finishing processes for getting the desired finish can be minimized by selecting, as a starting point, the closest mill finish to the desired result. To achieve a consistent surface quality, it is advisable to agree to a polishing specification which must include a surface roughness value Ra and inspection. It is in the best interests of the fabricator and the specifier (architect/designer) that each one keeps a small sample of the agreed finish.

Satin finish is a smooth reflective finish. This finish is obtained by the use of finer grit belts and non-woven brushes which gives a clean cut finish with a maximum surface roughness of Ra = 0.4 microns.

Matt finish is less reflective than Satin. This finish is obtained by the use of brushes and grinding media with slightly

coarser grains, giving a finish in which unidirectional texture can be clearly seen. The Ra value should be specified as not greater than 0.7 microns.

To start the finishing process, the rough mill finish on the product must undergo metal removal to make the surface uniform. For this purpose, different equipments are available. For instance, variable speed angle grinders and a range of easy-to-change abrasive can be used with them. It is advisable to start with coarse removal of 40-60 grit and move down in steps to finer belts and wheels to say 120 grit before you begin final process of applying the finish you need. Please note that it is very important to keep the speed down to avoid excessive heating of surface. Damage caused by excessive heating can be difficult to repair and lead to excessive wear of the abrasive.



*Angle Grinder*



*Set of wheels and belts for grinding (Metal removal)*

High speed grinding does not speed up your productivity. On the contrary, it is positively more expensive for you both in terms of time and money.

### Applying Final Finishes:



*Wheels for applying Matt/Satin Finishes*

Before applying any of these final finishes, please make sure that the last grinding operation was by 120 grit grinding medium. First apply Matt finish, which is the rougher of the two finishes. The Blue and Green wheels in the image above are for this purpose. They give you a surface roughness value of less than 0.7 microns.

For obtaining a satin finish, use the brown coloured non-woven wheel and obtain the desired finish. **CAUTION: DO NOT SKIP THE MATT FINISH STAGE. IF YOU DIRECTLY APPLY THE SATIN FINISH WHEEL, YOU WILL LAND UP SPENDING MORE TIME AND MONEY.** If you skip the step, the finish quality will not be uniform or desirable.

If you follow the above guidelines, you would get an excellent uniform and consistent finish and the product would provide corrosion free service for decades.

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