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Aug'20

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Galvalume Steel for Solar Structures



JSW Steel helping india
move forward.

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Steel



Energy



Infrastructure



Cement



Sports



Foundation



Paints



Ventures

JSW Group

A \$12 billion conglomerate, with presence across India, USA, Italy, South America & Africa, the JSW Group is a part of the O.P. Jindal Group with strong footprints across core economic sectors, namely, Steel, Energy, Infrastructure, Cement, also in Ventures and Sports.

The Group is paving the way for India's development as a global superpower. JSW Steel is India's leading steel producer and among the world's most illustrious steel company. The Group is also leading in every sector that it operates in.

JSW Energy is one of the earliest private entrants into the power sector positioned strongly as a full-spectrum integrated power company with a presence across the power sector value chain. It is one of the most efficient Power Company in the country with one of the country's largest open cast mining operation by volume and one of the largest private sector Hydro Operator in India. JSW Cement creates the building blocks of India with its environment friendly products. JSW Infrastructure is contributing to the nation's development by providing world class services to clients through state-of-the-art ports, terminals, shipyards and other facilities. JSW Sports runs the Sports Excellence Program (SEP) to identify, nurture and develop Indian athletes to ensure that they bring sporting glory to the nation on the global stage. JSW Sports also runs the Bengaluru Football Club, Delhi Capitals cricket team and the Haryana Steelers kabaddi team.

JSW Paints is a greenfield venture of the JSW group backed by cutting-edge technology, automation and scale that's comparable to leading players in the Indian paints sector. The company manufactures and market both industrial coatings as well as decorative paints. In the Decorative paints segment, the company offers a complete range of only water-based paints for Interior & Exterior walls, wood & metal - various surfaces in Homes.

JSW Ventures is an early-stage, tech-focused, venture capital fund of JSW Group. JSW Ventures extends its partnership not just through capital, but through a commitment to build exceptional companies by developing growth strategies, improving financial functions, and providing access to the investor community and support from JSW Group's extensive resources.

The JSW Group is committed to creating more smiles at every step of the journey. JSW Foundation, the Group's CSR and sustainability arm, is in constant pursuit of making life better for communities with its various initiatives in the fields of health, education, livelihood and sports, along with art and culture.

JSW Group is proud to be charting a course to excellence that creates opportunities for every Indian and leads to the creation of a sustainable, dynamic and developed nation.

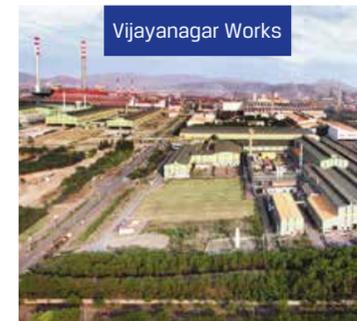


JSW Steel Ltd.

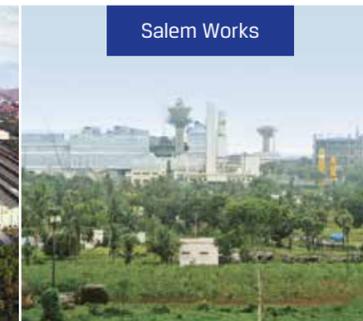
The flagship company of USD 12 billion JSW Group, JSW Steel is one of India's leading integrated steel manufacturers with a domestic capacity of 18 MTPA. It is one of the fastest growing companies in India with a footprint in over 100 countries. With state-of-the-art manufacturing facilities located in Karnataka, Tamil Nadu and Maharashtra, it is recognized for its innovation and quality.

JSW offers a wide gamut of steel products that includes Hot Rolled, Cold Rolled, Bare & Pre-painted Galvanized & Galvalume®, TMT Rebars, Wire Rods, Special Steel, Electrical Steel and Tinplate.

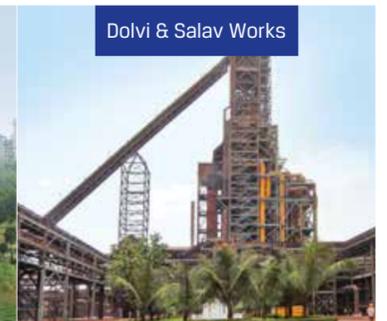
JSW Steel continues to enhance its capabilities to meet the rapidly changing global market needs. To stay on the leading edge of technical advancement, JSW has entered into technological collaboration with JFE Steel Corp, Japan to manufacture high strength and advanced high strength steel for the automobile sector. JSW Steel has also entered into a joint venture with Marubeni-Itochu Steel Inc. Tokyo, to set up a state-of-the-art steel processing centers. To strengthen its global network, The company has acquired steel manufacturing facilities at Texas & Ohio in USA & in Piomboni, Italy. Going forward, JSW Steel aims to increase the annual production to 40 million tons within a span of 10 years.



Vijayanagar Works



Salem Works



Dolvi & Salav Works



JSW Steel Coated Products Ltd.

JSW Steel Coated Products Limited is 100% subsidiary company of JSW Steel, having state-of-the-art manufacturing facilities in the state of Maharashtra.

JSW Steel Coated Products Ltd. is India's largest manufacturer and exporter of Coated Steel as well as Colour Coated Steel. The production facilities, Tarapur and Vasind Works, are located in the vicinity of major ports. The company's Kalmeshwar Works is centrally located near Nagpur to serve across regions.

JSW is an ISO 9001: 2008 Certified Organization and the first licensee producer for Galvalume® in India. The Tarapur plant is specialized in manufacturing Ultra-Thin Coated Products. The company is also a manufacturer of appliance grade colour coated products. JSW's Kalmeshwar Works is the first producer of Galvanized and Colour Coated Steel in India. JSW also has established India's first Appliance Grade Line to manufacture Pre Coated and Vinyl Coated Metal.



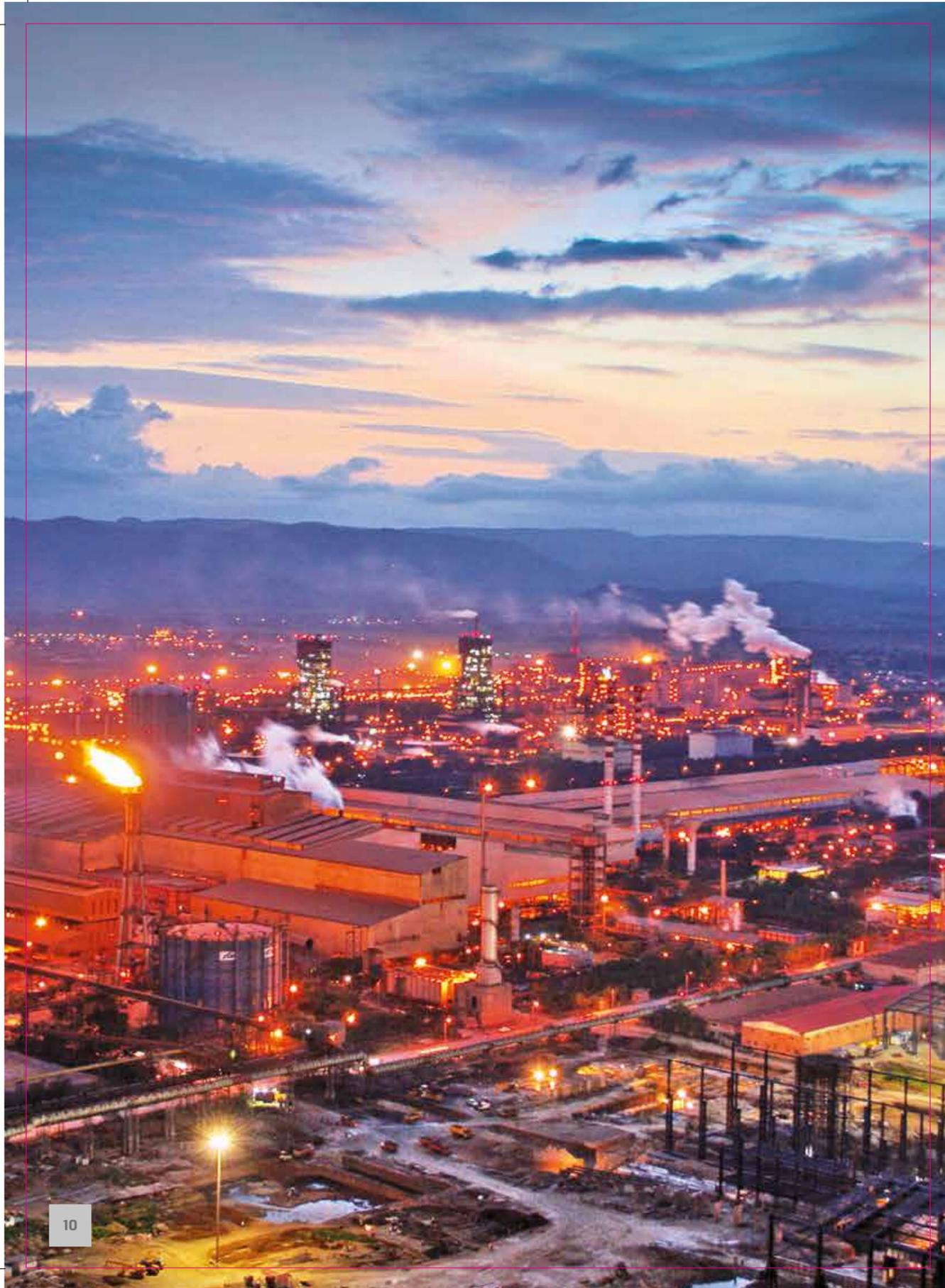
Vasind Works



Tarapur Works



Kalmeshwar Works



Steel Melting Shop

Setting Benchmarks

- First continuous annealing line in India
- Widest Cold Rolling Mill (upto 1870 mm width)
- India's largest Coated Steel producer
- First Licensee Galvalume® producer in India
- JSW Steel Salem works is the largest integrated Alloy and Special Steel plant in India
- One of the widest Hot Strip Mill in India
- India's most modern and largest Vertical Caster-300/260/220 x 2200 mm
- India's only Multi-Radii Bloom Caster operational at Salem works
- ZERO EFFLUENT discharge for greener & cleaner environment
- 1.6 million trees planted at Vijayanagar works, transforming the area into a green oasis
- India's largest Long Steel producer by installed capacity



Blast Furnace - IV



JSW Steel wins the prestigious Deming Prize for its excellence in TQM

The JSW Vijayanagar Works is the largest single location integrated steel plant in the world to be awarded the prestigious Deming Prize for excellence in Total Quality Management (TQM) presented by the Union of Japanese Scientists and Engineers (JUSE)

Award & Recognitions

Business & Operations

- Sustainability Performance in Corporate Governance & Sustainability Vision Awards, 2020
- CII prestigious National Supply Chain and Logistics Excellence (SCALE) Award, 2019
- BHEL Best Supplier Award, 2019
- CII-EXIM Bank Award, Platinum Recognition, 2019
- Gold at the International Convention on QC Circles 2019
- CII Exim Bank Awards for Business Excellence, 2018
- The 25th Steel Minister's Trophy for the best performing integrated steel plant, 2016-17
- IMC RBNQA Performance Excellence Trophy, 2016

Management

- CII 13th National Competition under the Continuous and Bulk Manufacturing Organization, 2019
- Environmental Responsibility/Stewardship award by Fastmarkets AMM, 2019
- Business Standard CEO of the Year Award, 2018
- Outstanding Business Leader of the Year CNBC-TV18, 2018
- Chief Finance Officer of the Year, 2018

Sustainability

- Worldsteel's Sustainability Champion Award, 2019
- IIM National Sustainability Award under the 'Large Integrated Steel Plants' category, 2019
- IIM National Sustainability Award under the Secondary Steel / Alloy Steel Plants category, 2019
- TERI - The Energy and Resources Institute Sustainability 4.0 Awards, 2019
- CII 19th National Award for Excellence in Energy Management, 2018
- Apex India Energy Efficiency Award, 2018
- Golden Peacock Environment Management Award, 2018
- CII - National Energy Management Award, 2017

Manufacturing Facilities



Tarapur Works

JSW's Tarapur works is largest coated steel plant in a single location specialising in manufacturing of ultra thin coated products. The plant offers coated products catering to several sectors and located about 100 kms from Mumbai. The plant produces pre-painted galvanised / galvalume, galvanised and bare galvalume steel. It has unique service center facility to meet the customised requirements of various segments. The plant has zero discharge facility having multi - effect evaporator system for effluent treatment.

Kalmeshwar Works

JSW Steel Kalmeshwar works is centrally located 30 kms from Nagpur to cater the requirements from all regions. It has galvanising capabilities to produce higher thickness and higher coating. The Strict adherence to standards of excellence in quality has lead to attain many world renowned certification to kalmeshwar works. JSW Kalmeshwar works is first coated steel manufacturing facility in India. It produces galvanised, Galvalume, pre-painted galvanised / galvalume steel.

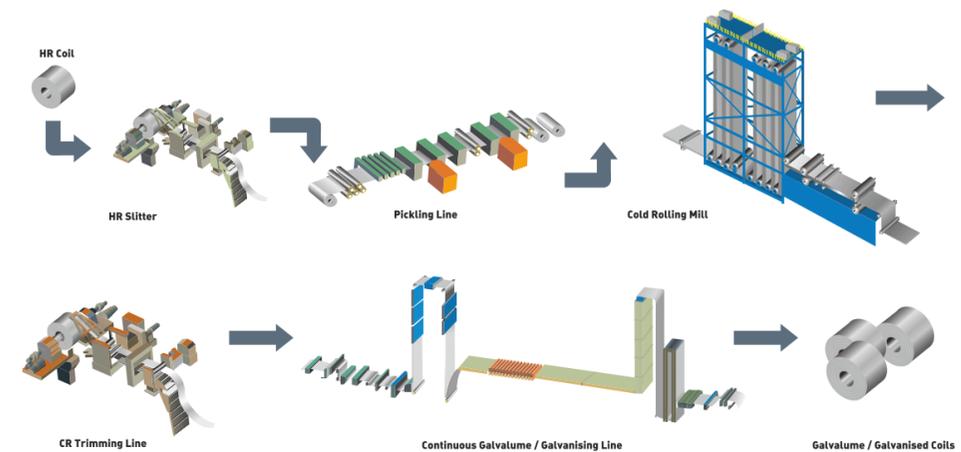
Vasind Works

Vasind works is located 70 kms from Mumbai. It is a full fledged complex with cold rolling, galvanising and colour coating facilities. Vasind works has India's first appliance grade colour coating line, the grades of this line are approved by major white good manufacturers. It sources HR steel from Dolvi & Vijayanagar works to manufacture value added steel products.

Manufacturing Process

Galvalume® steel composition, which combines the galvanic corrosion resistance of zinc with the barrier corrosion resistance of aluminium, this product was discovered by Bethlehem Steel Corporation after an extensive research program. The coating's unique microstructure embeds zinc rich areas within an aluminium rich matrix which, while allowing zinc to provide galvanic protection, restricts its dissolution.

Galvalume® steel can be used for roofs of all types and pitches, and can be employed for walls. It is recommended for any new building where a cost-effective maintenance for roofing system is required. Excellent resistance to corrosion and good heat reflectivity make Galvalume® steel the preferred choice for farm building, roofing, and siding applications. The appearance can be further enhanced with the use of pre-painted Galvalume® sheet.





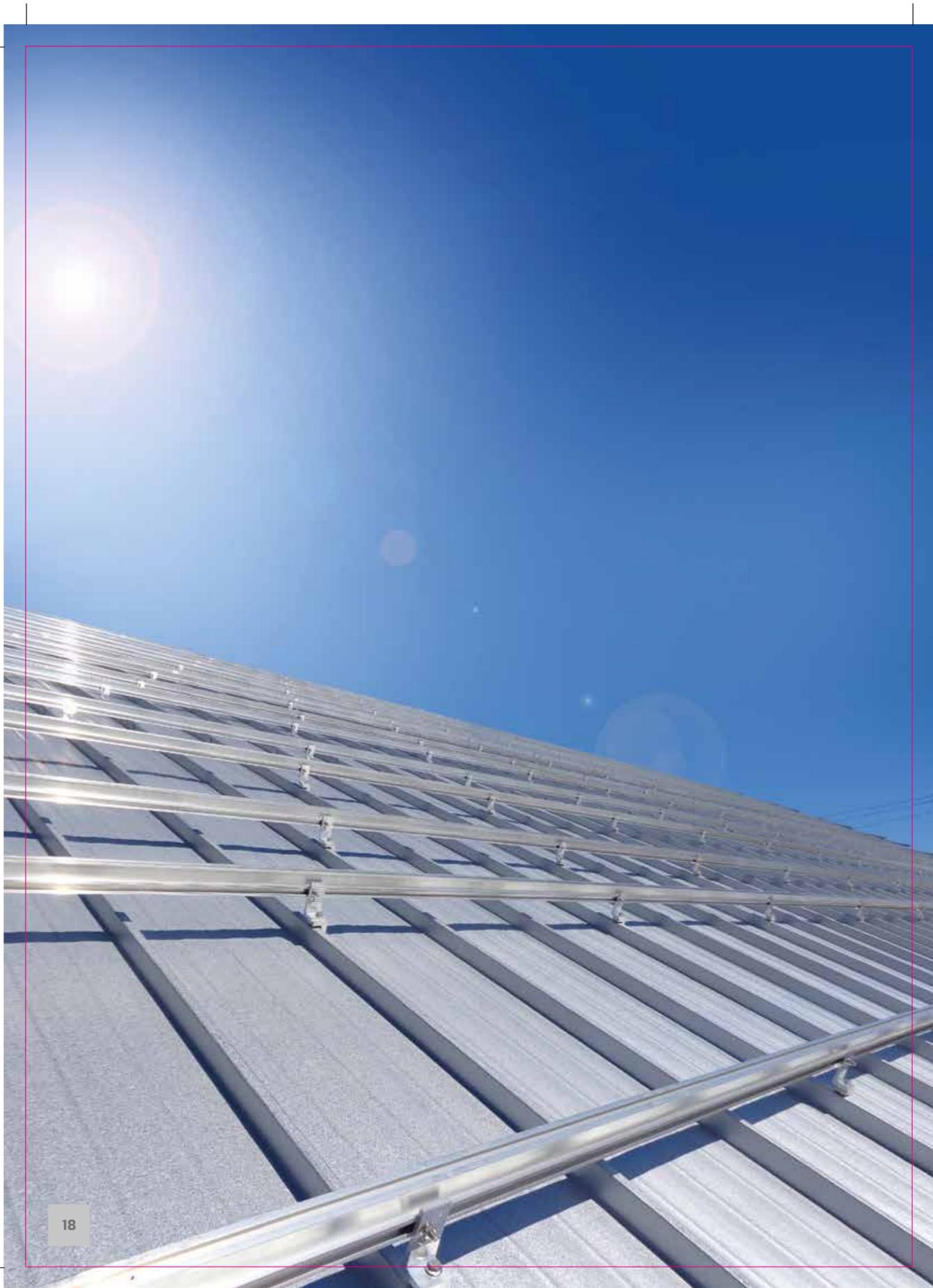
JSW Galvos

Complete Solution for Solar Structures

JSW is the first Indian company to produce Galvalume® coated steel - the coated product renowned for its excellent corrosion resistance and heat reflectivity - under a technology licence from BIEC International Inc. USA.

The technology licence qualifies JSW Steel to continually access the latest product innovations and process refinements through BIEC and the ZAC Association of which the company is a member. This ensures that JSW Steel's product will meet the highest international standards. The alloy coated product nominally contains 55% aluminum, 43.5% zinc and 1.5% silicon by weight. Applied by the hot-dipping process, the product is ideal for applications requiring superior corrosion resistance and heat reflectivity, typically required for building construction, appliances, agricultural equipment and several non-exposed automotive components. The product's shiny spangled appearance is attractive and can be used without painting. Word 'GALVOS', symbolizes a synergy of high quality, high durability & high corrosive resistant steel and the power of Sun. With thicknesses ranging from 0.7 mm to 3 mm and Yield Strength from 350 to 550 mpa, JSW GALVOS is designed to meet the complete requirements of Solar Structures (Purlin, Rafter, Bracers etc).





Technical Specification

Reference Standard	Grade	Yield Strength (Mpa), Minimum	Tensile Strength (Mpa)	% Elongation	Thickness	Width (mm) - Mill edge, Tolerance -0/+5 mm	Slit Width	AZ Coating (GSM)
			Minimum	Minimum	mm		Tolerance -0/+0.5 mm	
ASTM A792	Grade 50 Class -2	340	NA	12	0.70 TO 2.20 mm	1250 Max	As per customer Requirement	AZ150 / AZ200
	Grade 50 Class -1	340	450	12	0.70 TO 2.00 mm	1250 Max	As per customer Requirement	AZ150 / AZ200
	Grade 50 Class -4	340	410	12	0.70 TO 2.20 mm	1250 Max	As per customer Requirement	AZ150 / AZ200
	Grade 80 Class -1	550	570	NA	0.70 TO 1.60 mm	1250 Max	As per customer Requirement	AZ150
IS 15961	YS 300	300	340	20	0.70 TO 2.20 mm	1250 Max	As per customer Requirement	AZ150 / AZ200
	YS 350	350	420	15	0.70 TO 2.00 mm	1250 Max	As per customer Requirement	AZ150 / AZ200
	YS 550	550	550	NA	0.70 TO 1.60 mm	1250 Max	As per customer Requirement	AZ150

Class 1 - Min YS 340mpa and TS 450mpa
 Class 2 - Min YS 340mpa and TS not defined



JSW Galvos Applications

suitable for all parts of Module Mounting Structure

Parts of MMSg	Current weight in the structure (%)	Thickness of HDG (mm)	Thickness of GI (mm)	Thickness from GI (mm)
Column post	14%	2-3	Not Used	1.8-2.2
Rafters	14%	2-2.5	1.6-2	1.3-1.5
Purlins	65%	2-2.5	1-1.5	0.8-1.2
Bracings	5%	2-2.5	1.6-2	1.3-1.5
Connection chips	2%	Thickness is 4 - 5 mm so HR material is forged and used		

Case study for a 1 MW project - JSW Galvos is better choice in any aspect

Parameters	Description	HDG	GI	JSW Galvos
Projects where material is preferred	-	Ground mounted Rooftop Tracking structures	Ground mounted	Ground mounted Rooftop Tracking structures
Per MW requirement	Lower usage is preferred	45 T	45 T	36 T
Thickness of material	Lower thickness preferred	2 to 3 mm	1.5 to 2 mm	0.8 to 1.2 mm
Thickness of coating	Lower thickness preferred	80 to 160 microns	80 microns	40 microns
Strength	Higher strength preferred	345 Mpa	345 Mpa	550 Mpa
Life of material	Higher life expected	15 years (with Galvanizing)	15 years	25 years
Location constraint	-	Cannot be used near sea shores		None
Overall material cost in the project	Lower cost preferred	High	High	High

Now, JSW GALVOS can be used in Concrete and C4 Corrosive Environment!



Replaces the need for Hot Dip Galvanizing

JSW GALVOS can be used in Challenging (alkaline) environments in conjunction with Epoxy/PU Layer

Types of Challenges in environment for GALVOS in nature

Concrete

Zinc and Aluminum can be affected by alkaline such as CONCRETE with a pH greater than 9

Corrosive environment

Salt water destroys the protective oxide layer of Aluminum and Zinc, increasing its vulnerability while making it chemically active

Effective Epoxy / PU protection layer on JSW GALVOS for challenging environments and long lasting life

Acting as a physical barrier between aggressive environment and base substrate

Inherent anti corrosive properties

Extremely hard and resistant to friction

Particularly resistant to diluted acids, alkalis, petroleum products, to some solvents, water, sea water

Prevent oxidation of substrate and thereby corrosion

Usually Solar companies apply one of the following two methods to fix their tables on which solar modules are fixed :

1 They already create a 1 meter deep hole and the Galvanized / Galvalum coated leg of the Steel table is placed in the hole and is filled with gravel.

2 The uncoated Table legs are placed in a bigger hole in ground ~ 1 meter deep and an RCC is created by applying a cement based aggregate.

If left as such, the chlorides/sulphur based compounds in moist soil can attack the Galvanized/galvalum coated steel legs and spoil them in **case (1)**. In **case (2)**, chlorides and sulphur based compounds can reach the embedded steel leg thru concrete cover and attack it causing severe corrosion.

Following two approaches have to be used in each case to enhance the life of the embedded structure (Steel Table) in the earth w.r.t. its corrosion stability

For **method (1)**, simply apply a 100 micron Epoxy or MIO-Epoxy on the galvanized Galvalume steel leg before inserting into the hole in the ground.

For **method (2)** concrete cover can be coated with a 150 - 200 micron epoxy or MIO-Epoxy layer before adding soil around the RCC embedded leg.

This modification will ensure 25 year life of the embedded legs of steel from any damage due to corrosion.





The JSW Galvos Promise



Branded BGL with Liner Marking of JSW GALVOS

- The assurance of the genuineness of the product



Close & customized Tolerances

- Flexibility in product tolerances, within the capability of the plant
- Customized product in line with the design requirements of the structures



Prioritized Order Scheduling

- Timely supply of all parts.
- Fast-tracked orders
- Priority over other orders in line with project timelines



Rush order support

- Sudden project requirements support
- Agile and time bound project delivery



Customized Supply Schedules

- Manufacturing customized product thickness and proportions (ranging from 0.8 to 2mm)
- Customized supply schedules



In-House NABL Certified Testing

- Fully equipped plants with NABL certified testing equipment,
- Ensuring high degree of accuracy



10 Years Warranty

- Premium 10 year Warranty
- Assurance of the long life of product

Storage & Handling Guidelines

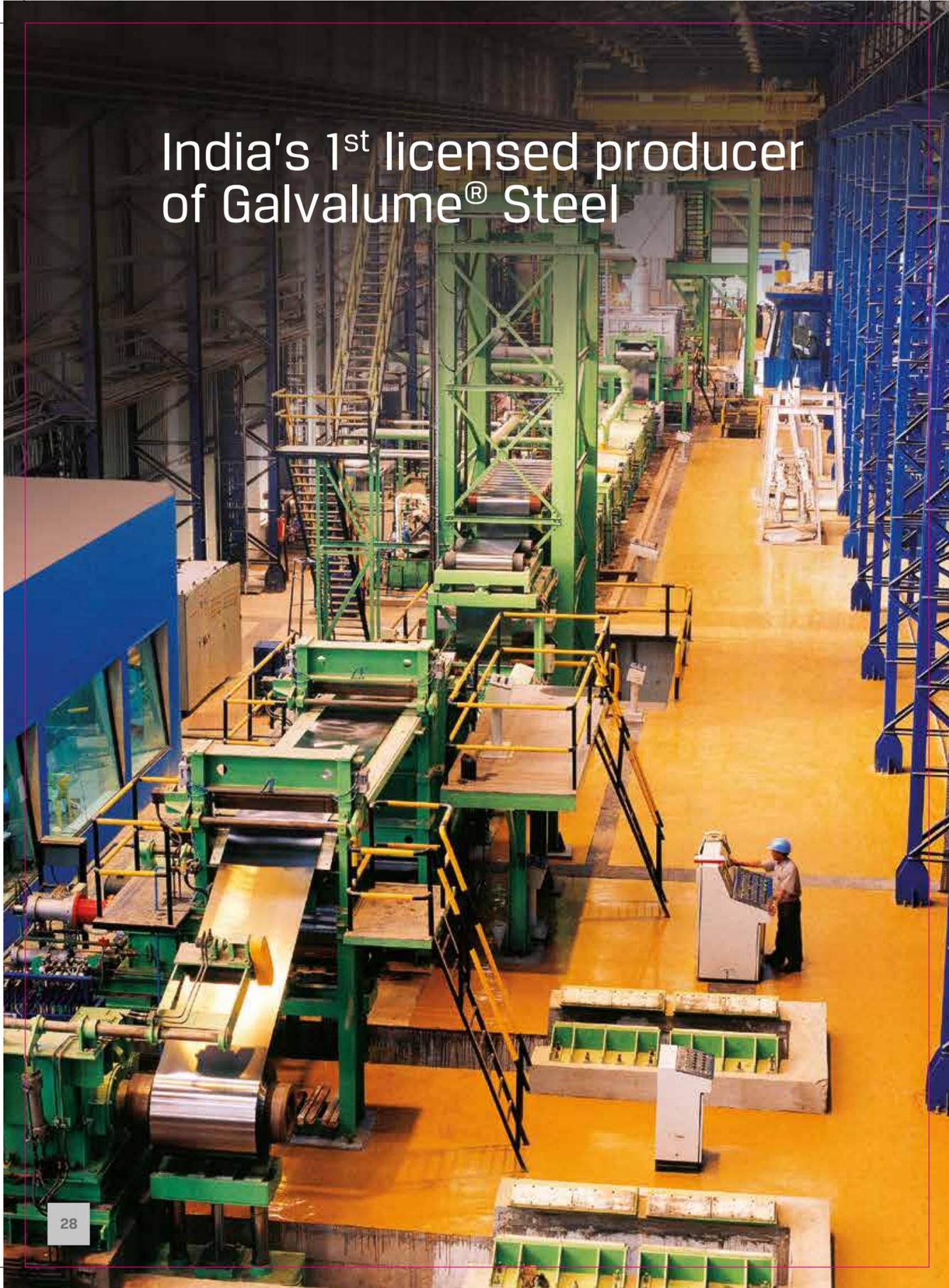
- Coil handling with 'C' hook padded with woolen felt
- The floor should be flat & clean
- Always keep the material in a dry, shaded and good ventilated area, avoid mud, water, rain etc.
- If not required for immediate use, provide cover to protect the material
- If sheets, coils or formed parts become wet during storage, it should be separated without delay & surface moisture removed with clean cloth. The steel sheets, coils or formed parts then should be stacked so that air circulation completes the drying process
- Do not use tight fitting plastic-type covering as packets/coils covers, while they may provide protection from heavy downpours, they will retard necessary ventilation and trap heat and moisture & may accelerate metal corrosion
- Under no circumstances should the material be stored near or come in contact with salt water, corrosive chemicals, ash or fumes generated or released inside the building or nearby plants, foundries, plating works, kilns, fertilizer and wet or green lumber
- Material to be kept slightly above the ground by using wooden rubber plank
- Do not slide sheet, coils and formed parts on rough surface or over each other
- It is recommended to apply zinc spray on the slit edges and punched hole area of JSW Galvos

Packaging

JSW offers effective packaging as per your requirements and in compliance with international norms. Emphasis is placed to ensure durability, prevention of any damage during transportation and better storage.



India's 1st licensed producer of Galvalume[®] Steel



Clientele

Utility Scale Project Developers

SB Energy

SOLAR DIRECT

GRT

ReNew POWER

Fortum

TATA TATA POWER SOLAR

Gamesa

Greenko

Solar EPC Providers

STERLING & WILSON

susten
By Mahindra

LARSEN & TOUBRO

TATA TATA INTERNATIONAL LIMITED

WAAREE
One with the Sun

BELECTRIC



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 Tel: 080-42448888

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 Harrington Road, Chetpet, Chennai - 600 031
 Tel: 044-28297420, 28297422

COIMBATORE
 T. V. Swamy Road (West), Coimbatore - 641 002
 Tel: 0422-2541870

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 A-2, Shaheed Jeet Singh Marg,
 Qutub Institutional Area, New Delhi - 110016
 Tel: 011-48178600 | Fax: 011-48178699

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 Piyush Global I Building
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 Main Mathura Road, NH-2, YMCA Chowk, NIT
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 Ghaziabad - 201 009
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 Kanpur - 208 001
 Tel: 0512-3271907

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 Road, Chalikkavattom Junction, Vytilla P.O.,
 Kochi - 682 019
 Tel: 0484-4026392/4063294

KOLKATA
 Godrej Waterside, 10th floor, Tower - 1, Unit No. 1003,
 Block - DP, Plot - 5, Sector V, Salt Lake City, Kolkata - 700 091,
 Tel: 033-40002020 | Fax: 033-40002021

LUDHIANA
 109, Modelgram, Near Kochar Market, Opp. Malwa
 School, Ludhiana - 141 002
 Tel: 0161-6578944, 6450816

MUMBAI
 Grande Palladium, 6th Floor, 175,
 CST Road, Kalina, Santacruz (East),
 Mumbai - 400 098
 Tel: 022-61871000

NAGPUR
 Poonam Plaza, Palm Road, Civil Lines, Nagpur-440 001
 Tel: 0712- 2520333

PATNA
 1, Tilak Nagar East, Behind Patna Diesel, Kankarbagh, Patna - 800 020
 Tel: 08002230517

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 Shivajinagar, Wakdevadi, Pune - 411005
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