



A NEW CHAPTER IN OUR SUCCESS STORY

CLAD LINE PIPES



JINDAL SAW LTD.
TOTAL PIPE SOLUTIONS

THE PIONEERS WHO PROVIDE TOTAL PIPE SOLUTIONS

THIS IS HOW THE STORY BEGAN

Founded in 1952 by Sh. O.P. Jindal, a first generation entrepreneur who began an indigenous single-unit-steel plant in Hisar, Haryana.

The group today enjoys global presence with manufacturing facilities across India, USA, Europe, Middle East & Indonesia, mining concessions in Chile, Australia, Indonesia, South Africa & Mozambique with marketing offices around the world. The group is a \$15 billion conglomerate with business interest spanning steel, pipes, mining, power, industrial gases, cement and seaport facilities. The group has further diversified into petroleum, diamond, high value metals and mineral exploration.

**LEADING
PLAYER
IN THE
WORLD
FOR PIPES
& TUBES**

**TRUST.
PLAYING THE
LEAD ROLE.
JINDAL SAW**



Jindal SAW Limited was founded in the year 1984 by Mr. P.R. Jindal.

With an enviable track record of stability, trust, growth and performance for the last 30 years, Jindal SAW is now the undisputed leader in the pipe industry with manufacturing facilities in India, UAE, Europe and USA.

Jindal SAW manufactures Long Seam SAW Pipes, Helical (spiral) Seam SAW Pipes, Anti-corrosion and Concrete Weight Coatings, Hot Induction Bends, Connector Casings, Ductile Iron Pipes & Fittings, Seamless Tubes & Pipes. Jindal SAW has further diversified into mining & pellets. Our customers include world's leading oil & gas companies, government bodies heading irrigation and water resource, engineering & construction companies which undertake large EPC contracts, transportation, power generation and other industrial applications.

**INTRODUCING CLAD LINE PIPES.
ADDING A WHOLE NEW DIMENSION
TO THE PORTFOLIO**



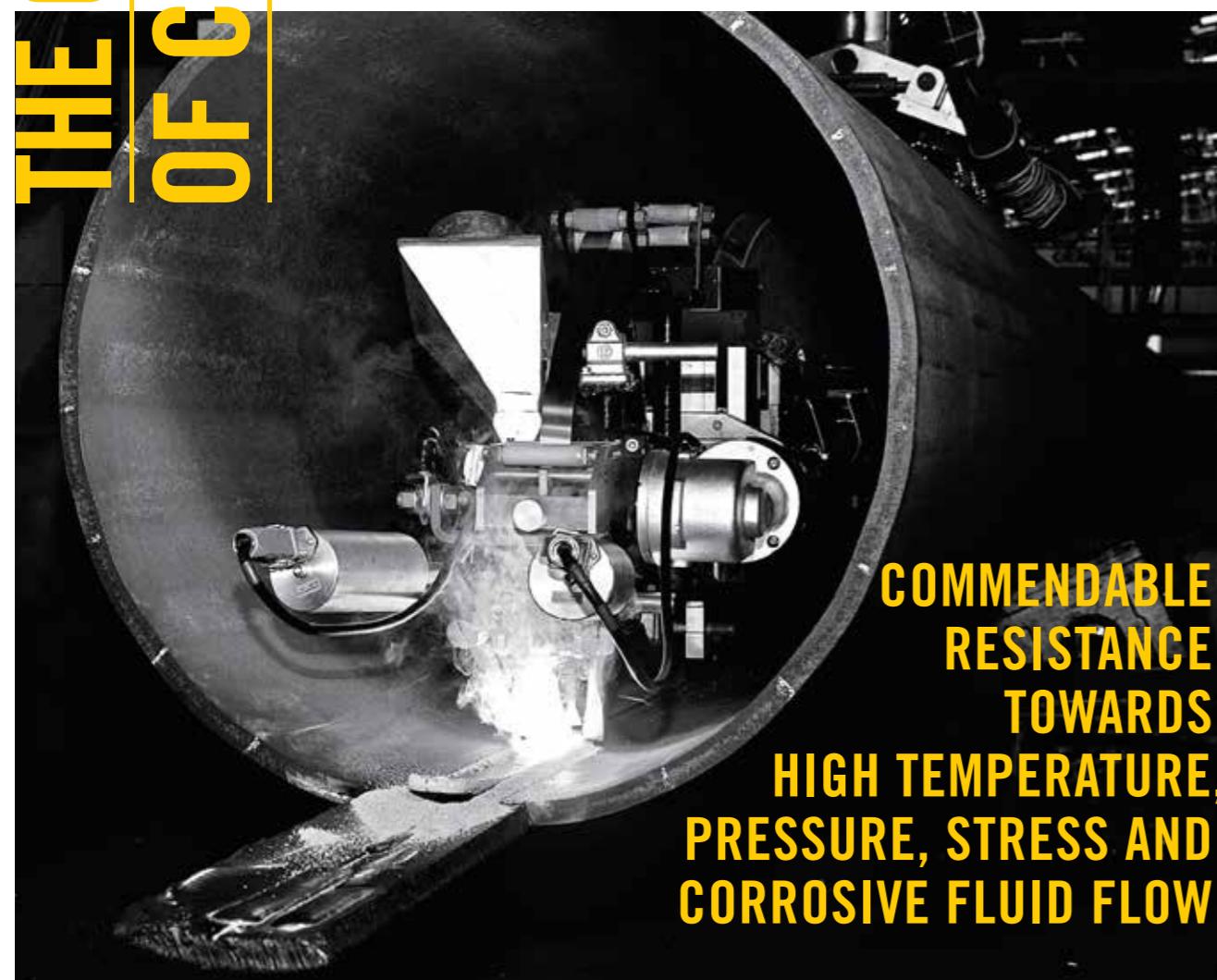
Jindal SAW Ltd. (JSW) has set up the first-ever manufacturing facility for the Welded Clad Line pipes in India. Its strategic manufacturing location in Gujarat has been well chosen to cater to domestic and global markets and is well-connected by road and to ports.

JSW has adopted state-of-the-art manufacturing techniques/processes at this facility to produce a wide size range of Clad Line Pipes with an installed capacity of 10,000 M.T. annually. The advanced and sensitive production processes ensure the highest standard of product parameters in terms of accuracy, geometry, length and surface finish.

The highly experienced and enriched team of JSW keenly focuses on providing shorter delivery lead times and on fulfilling customer demands flawlessly.

**CAPACITY OF
10,000 METRIC TONS
ANNUALLY**

THE CHARACTER SKETCH OF CLAD LINE PIPES



COMMENDABLE
RESISTANCE
TOWARDS
HIGH TEMPERATURE,
PRESSURE, STRESS AND
CORROSIVE FLUID FLOW

Clad line pipes are typically produced by cladding carbon steel substrate with stainless steel or nickel base alloy, known as Corrosion Resistant Alloy (CRA). CRAs are used to withstand corrosion situations such as high temperatures, pressures, stresses, corrosive fluid flow and to provide long term corrosion resistance to pipe line. CRA such as SS 304L, SS316L, SS 317L, UNS 8825, UNS 6625 are metallurgically bonded with low alloy steel substrate. This bi-metallic pipe provides excellent strength and toughness of alloy carbon steel along with excellent corrosion resistance of CRA. These CRA welded line pipes are commonly used in Oil & Gas refineries and process plants.

IT IS DYNAMIC, VERSATILE AND RELIABLE.

PRODUCT PORTFOLIO

WELD OVERLAY ROUTE

Line pipe size ranges from 6" to 40" internal diameter can be produced with wall thickness of up to 50mm of base metal with 2.5 to 5.0mm Clad layer. Clad layer is deposited on the inside of Carbon Steel Seamless and Welded pipes with Hot TIG process. Line pipes are supplied in single and double random length.



PIPE MILL CAPACITY CHART

Product	Grade	Diameter	Thickness*	Length / Radius
WELDOVERLAY** (HOT WIRE TIG WELDING)	Carbon Steel: All grades up to API - X-70 CRA: Stainless Steel and Ni base alloys	6" to 40"	8.00 mm to 50 mm	Random Straight Lengths Up to 12.50 meter
HOT INDUCTION BENDS		4" to 56"	8 mm to 50 mm	Bend Radius up to 10000 mm

*Thickness Includes CRA Clad Thickness from 2.5 mm/As per Customer requirement/ As per API

**Circumferential Cladding from 6" onwards can be done through Hot Wire TIG. Circumferential Cladding from 16" onwards can be done through Electro slag welding.

Note:

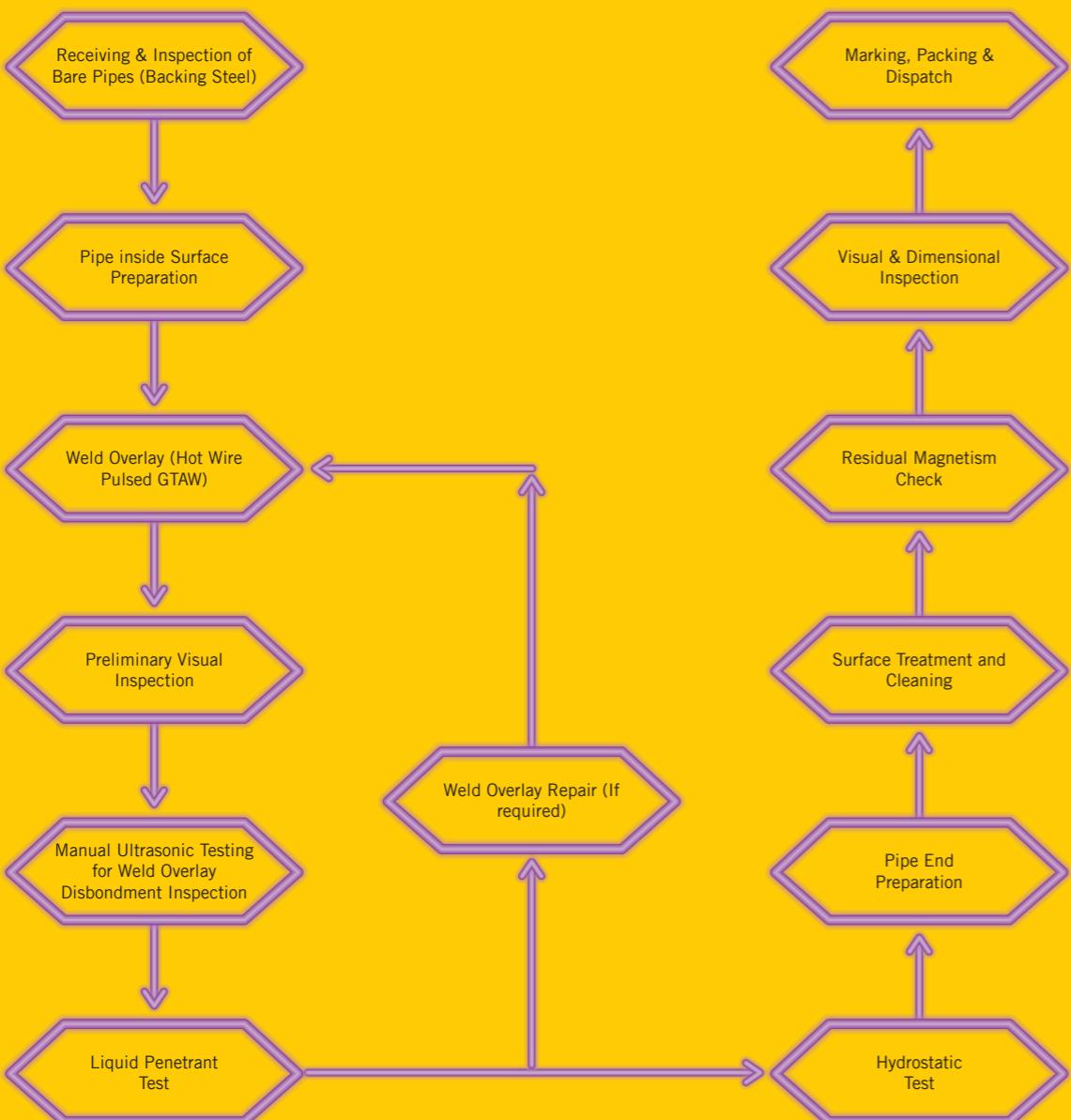
- Jindal has state of art modern fully automatic equipment for carrying out internal cladding through Hot Wire TIG from 6" to 40" internal diameter, Clad layer is deposited on the inside of Carbon steel , Seamless and Welded pipes.
- The Hot Wire TIG process uses a preheated wire that is added to the weld pool behind the tungsten.

WHAT GOES BEHIND IN MAKING CLAD LINE PIPE'S CHARACTER STRONG.

MANUFACTURING PROCESS

Clad pipes are produced by weld overlay (Hot wire TIG/ Strip cladding) of CRA material inside the carbon steel pipes. Weld overlay is being done in Circumferential direction by Automatic machine.

PROCESS FLOW CHART



INSPECTION & TESTING

Jindal SAW Ltd. Clad pipe manufacturing facility is equipped with Ultrasonic Test Equipment for disbondment inspection, Magnetic Particle inspection system, Phase-array ultrasonic inspection system, Automatic Liquid Penetrant examination system (water washable type), Video-scope for the visual inspection of pipe inside surface.

Test facility also includes Mechanical Test lab facility, Chemical Test lab facility, PMI equipments, Ferrite meter, Metallurgical lab and Corrosion test lab. A variety of tests can be conducted in-house as per the requirements of various international standards.

TESTING FACILITIES



In-house Testing Facility	
Destructive Testing	Non Destructive Testing
Tensile Test	
Guided Bend Test	Phase Array UT
Charpy Impact Test	
Microstructure Examination	Hydrostatic Test
Hardness Test	Magnetic Particle Inspection
Shear Bond Strength Test	Manual Ultrasonic Test
Chemical Analysis	Automatic Liquid Penetrant Examination
	Visual Inspection / Videoscopy
Corrosion Test	
Intergranular Corrosion Test in accordance with ASTM A 262 Practice, Type A, B & E	Positive Material Identification Test
Pitting corrosion test in accordance with ASTM A G48 Method A	Ferrite Content Check (Ferrite Meter)
Hydrogen Induced Cracking Test as per NACE TM 0284	Surface Roughness Test
Sulphide Stress Corrosion Cracking Test as per NACE TM 0177 Method A & B	Chloride Content Check

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