Ductile Iron Pipes and Fittings with **JSAW-LOCK Restrained Jointing System**

DN100 - DN1800

JINDAL SAW LTD.
TOTAL PIPE SOLUTIONS

JINDAL SAW LIMITED

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

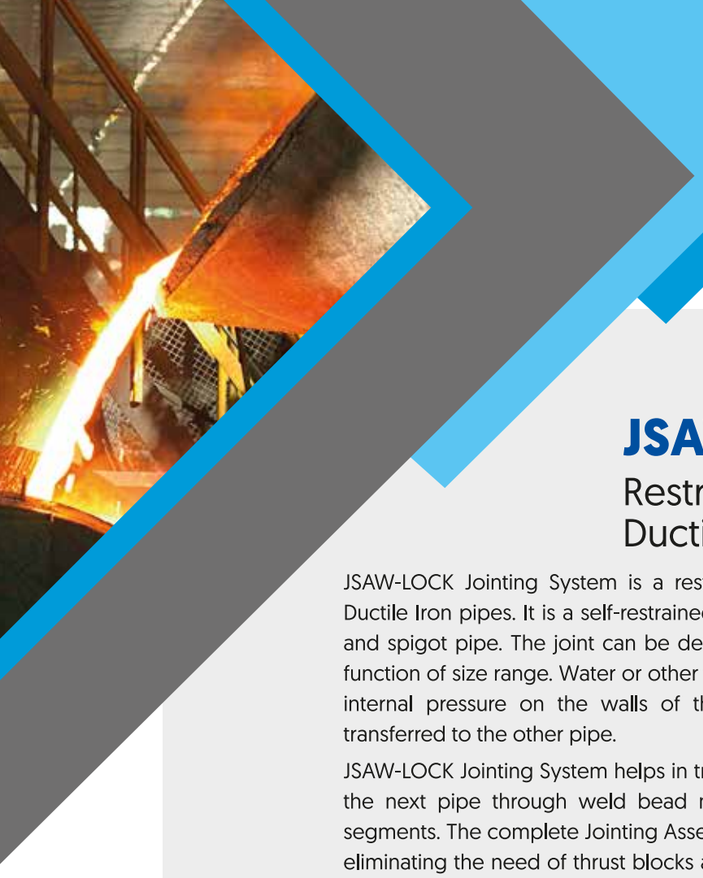
With an enviable track record of stability, trust, growth and performance for the last 30 years, Jindal SAW is now the undisputed leader in the pipe industry with manufacturing facilities in India, UAE, Europe and USA. Jindal SAW manufactures Long Seam SAW Pipes, Helical (spiral) Seam SAW Pipes, Anti-corrosion 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.

SERVICE AREA

Jindal SAW offers Ductile Iron Pipe System for the following service areas:

- Raw water and drinking water pipelines
- Sewerage and waste water pipelines
- Mining pipelines
- Floating pipelines
- Hydro-power plants penstocks
- Fire fighting water mains
- Irrigation pipelines
- Snow making pipelines



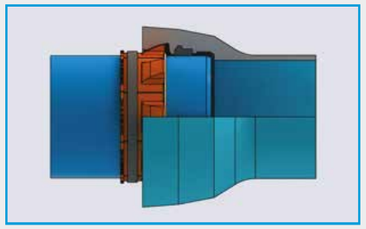
JSAW-LOCK

Restrained Joint Ductile Iron Pipeline System

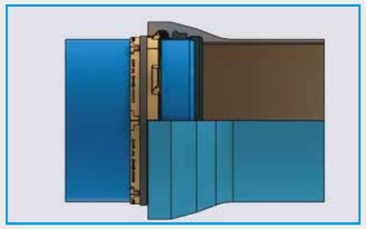
JSAW-LOCK Jointing System is a restrained semi flexible push-in-jointing of Ductile Iron pipes. It is a self-restrained, semi-flexible jointing system of socket and spigot pipe. The joint can be deflected up to the designed value as per function of size range. Water or other fluids passing through the pipe line exert internal pressure on the walls of the pipe barrel and the same force is transferred to the other pipe.

JSAW-LOCK Jointing System helps in transferring the thrust forces generated to the next pipe through weld bead made on spigot of each pipe via lock segments. The complete Jointing Assembly makes the joint self-restraining thus eliminating the need of thrust blocks and facilitates trenchless laying of Ductile Iron pipe lines. Ductile Iron pipes with JSAW-LOCK Jointing System are quick to assemble and well suited to be used in seismic zones, fault crossings, liquefaction zones, connections to structures, floating pipe lines, Hydro-power plants, laying on steep slopes, fire-fighting water mains and mine dewatering pipelines without thrust blocks or external restraining requirement.

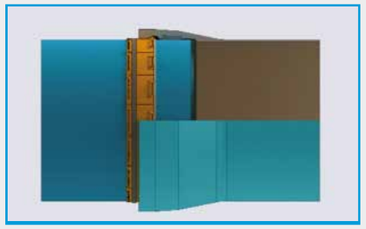
JSAW-LOCK Jointing System is available in size range from DN 100 - 1800 as per EN545/ISO 2531/ISO10804-1 with suitable range of fittings.



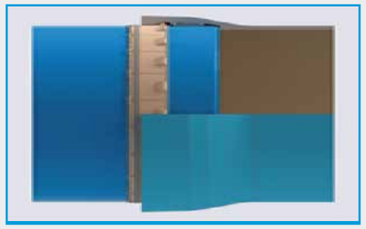
DN 100 - DN 300



DN 350 - DN 1000



DN 1100 - DN 1200



DN 1400 - DN 1800

TECHNICAL DATA

JSAW-LOCK Ductile Iron Pipe - Technical Specifications

Table 1: JSAW-LOCK Ductile Iron Pipe - Technical Specifications

Product Name	JSAW-LOCK (DI pipe with Double Socket & Spigot ends suitable for restrained semi flexible Push-on-Jointing)
Size Range	DN 100mm to DN 1800mm
Standard Length	6.0m or customized length *
Internal Linings	• Sulphate resisting cement • Blast furnace slag cement • Ordinary Portland cement • High Alumina cement • Polyurethane lining • Seal coat*
Outside Coatings	• Zinc or Zinc-Aluminium deposition of 130g/m^2 / 200g/m^2 / 400g/m^2 with finishing layer of Blue or Red Epoxy, Bitumen • Polyurethane Coating
Coating of Joint Area	Blue or Red Epoxy / Bituminous Coating
Conforming Specifications	Design : ISO 10803 Product : ISO 2531; BS EN 545 Joint : ISO 10804 PU Lining : BS EN 15655 PU Coating : BS EN 15189 Rubber Gasket : ISO 4633, BS EN 681-1

*Options available only with prior arrangement

JSAW-LOCK SYSTEM

Pipe Dimensions/ Allowable Pressure/ Tractive Force Details

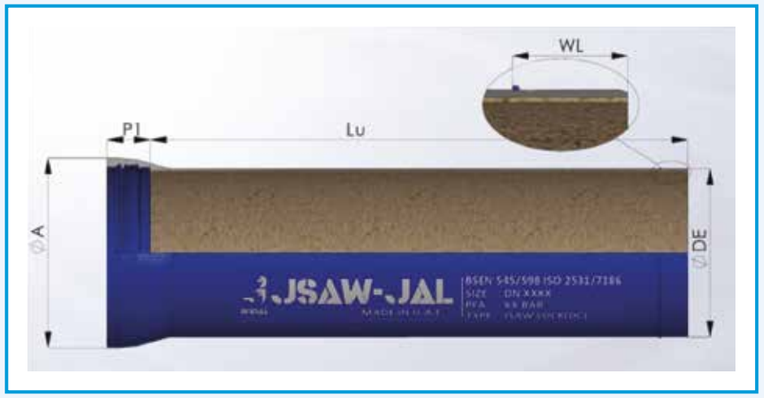


Table 2: JSAW-LOCK - Normal Pressure Application

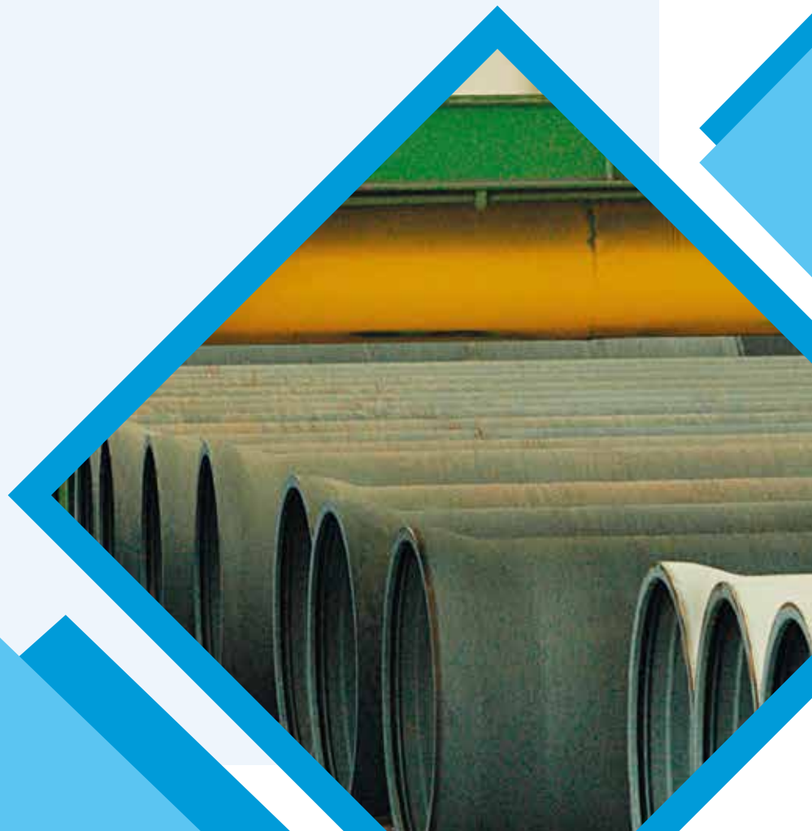
Size	PFA (Bar) *	Deflection (Degree)	Tractive Force (KN)	No. of Locks	External Diameter (DE)	Socket OD (A)	Socket Depth (P1)	Weld Distance (WL)
100	40	5	60	5	118	170	123	85
150	40	5	120	5	170	246	130	85
200	40	4	190	8	222	290	142	95
250	40	4	290	8	274	354	163	100
300	40	4	420	8	326	410	174	105
350	30	3	430	8	378	460	171	110
400	30	3	560	8	429	524	183	117
500	30	3	850	9	532	654	200	117
600	35	2	1400	10	635	766	216	122
700	27	2	1390	10	738	836	198	125
800	25	1.5	1690	10	842	950	198	125
900	25	1.5	2130	12	945	1069	206	128
1000	25	1.5	2620	12	1048	1180	229	142
1200	25	1.2	**	29***	1255	1390	324	220
1400	22	1	**	29***	1462	1624	322	230
1500	20	1	**	29***	1565	1725	326	235
1600	20	1	**	29***	1668	1840	352	245
1800	16	1	**	29***	1875	2065	348	253

*For higher or any other special PFA requirements, please contact us.
**For tractive forces please consult JSAW.
***Locks include complete kit including rubber spacer

Table 3: JSAW LOCK - High Pressure Application

Size	PFA (Bar) *	Deflection (Degree)	Tractive Force (KN)	No. of Locks	External Diameter (DE)	Socket OD	Socket Depth (P1)	Weld Distance (WL)
100	100	5	140	5	118	170	123	85
150	100	5	290	5	170	246	130	85
200	64	4	300	8	222	316	142	95
250	64	4	460	8	274	390	163	100
300	45	4	470	8	326	410	174	105
350	38	3	621	8	378	460	171	110
400	35	3	640	8	429	540	183	117
500	35	3	980	9	532	670	200	117

*For higher or any other special PFA requirements, please contact us.



ADVANTAGES

JSAW-LOCK Ductile Iron Pipe

JSAW-LOCK DI pipes are designed to connect the individual pipes into one unique piping line system without the need for welding, screwing, testing, and also without the need for thrust block. JSAW-LOCK pipes are also the most suitable option for various areas of application due to the following advantages:

- Provides a robust pipe system with simple locking mechanism.
- The pipes are designed to sustain high pressure ranging from 100 bar to 25 bar in sizes from DN 100 to DN 1800 respectively.
- It can withstand pressure surges and possible unforeseen influences over an enduring lifetime.
- The simple locking system saves a great deal of installation time.
- Polyurethane coating and lining (wherever provided) provides extraordinary high C-value, more adhesive strength, more elasticity, higher mechanical strength and high abrasive resistance.
- The deflection in the jointing system provides flexibility during operation.
- It can be used in regions with elevated earthquake or earth settlement risks.
- Very high angular deflections make these joints suitable for laying even in complicated and demanding intersections.
- Advantage of laying without anchorage or thrust blocks in conventional open trenches.

AREAS OF APPLICATION

JSAW-LOCK Restrained Joint Piping System

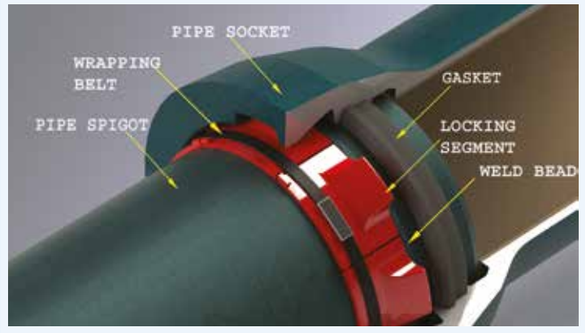
- Trenchless laying of Ductile Iron pipe lines
- Laying of Ductile Iron pipe lines without thrust blocks - for water applications
- For higher pressure applications
- Laying of pipe lines on steep slopes
- Hydro-power applications
- Mining applications such as dewatering and temporary water distributions
- Bridge pipelines
- Laying by Horizontal Directional Drilling - Trenchless application
- Snow making pipelines
- Firefighting Mains
- District Cooling/Heating pipelines
- Floating pipelines in water

JSAW-LOCK SYSTEM

Construction of the Joint

JSAW-LOCK Restrained Joint comprises of the following components:

- Pipe with Internal Double Socket Profile
- Lock Segments
- Rubber Gasket
- Wrapping Belt
- Pipe Spigot with Weld Bead



This type of Joint provides restraint against axial movement of pipe with the use of lock segments, which are restrained by the socket sloping face and weld bead. Locking segments are placed along the periphery of the pipe spigot and tightened by a wrapping belt.

Lock: Lock accessories are of Ductile Iron made with customized design and are supplied to suit the corresponding required PFA.

Wrapping Belt: For smaller diameters up to DN300 plastic ties are supplied for lock strapping after assembly. For sizes DN 350 and above, steel straps of 19mm width with strength 1900 lbs are supplied for lock strapping after assembly.

Rubber Gasket: Elastomeric gasket materials are supplied in conformance to ISO4633/BSEN681-1 with type WA (Drinking Water)/WC (Sewage Water) and are hygienically approved (WRAS/ACS/Italy). The push-on joint gaskets supplied are of Tyton or anchored profile as per JSAW socket design. The gasket material is EPDM or NBR as per application.

Rubber Spacer (DN1400 to DN1800): DCP locks from DN1400 to DN1800 are designed in such a way that, after the complete insertion and assembly of locks, lock insertion window needs to be cleared out. The space of last lock is to be filled by rubber spacer.

INSTALLATION PROCEDURE

JSAW-LOCK SYSTEM

A. Socket Preparation

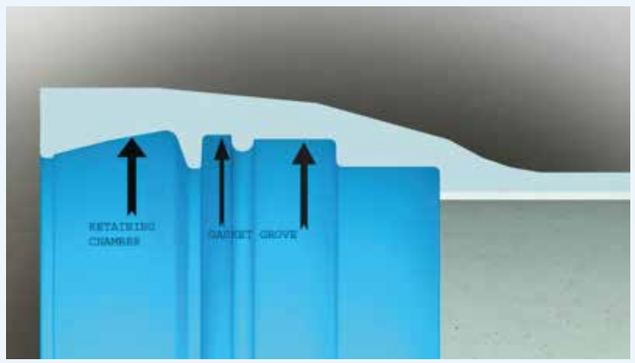
1. Positioning of Socket

Keep the insertion grooves on the top side to easily facilitate the insertion of the locks.

2. Cleaning

Clean the internal socket, such as the gasket seating groove, retaining chamber etc. as highlighted by the arrows in the image shown below. Remove all the dust and foreign particles.

Tools to be used: Paint brush, Bent Screwdriver, Scrapper or Trowel



3. Inserting the Gasket

The gasket groove should be lubricated with an accurate dose of lubricant. For this purpose, carefully lay a thin film of lubricant (supplied with the pipes by the manufacturer), over the sealing groove surface as shown with a pale yellow colour in the image below.

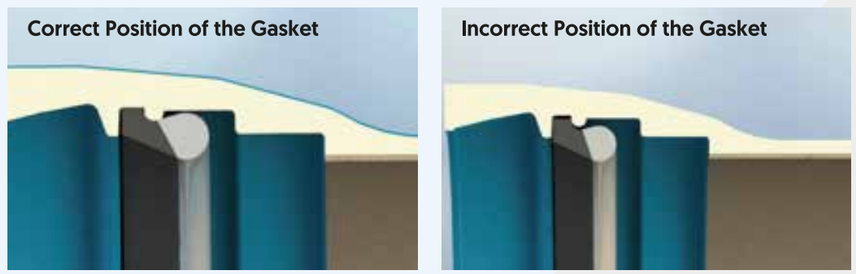
Note: Do not put any lubricant in the gasket retaining groove (the narrow groove).

Clean the gasket and bend it in a loop as to form a heart shape. Insert the lower part in the retaining chamber of the gasket groove first, then release the loop to allow the heart shape part to spread out into the gasket seating groove. Fit the gasket into the socket so that the hard-rubber claw on the outside engages in the groove in the socket. Then press the loop flat.

Section views of the gasket looping and seating inside the groove

If you encounter any difficulties in the gasket fixing procedure, even after following the previous steps, then try making two or more loops as shown in the image below. This will facilitate the fixing of the gasket within the retaining groove.

Ram the gasket with hand or wooden mallet softly to fix the gasket in the groove properly



4. Lubrication

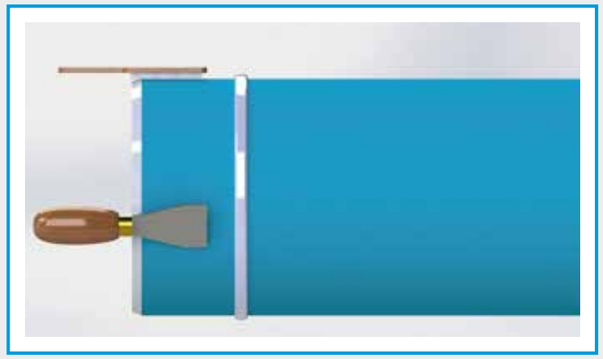
After proper seating of the gasket, apply a thin layer of lubricant on the top face of the gasket as shown in image.

B. Preparation of Spigot

1. Cleaning

Clean the surface of spigot end with soft wire brush/paint brush. Remove all the dust, foreign particles, any fouling and excess paint (Paint humps, bubbles or pimples)

Tools to be used: Paint brush, wire brush with soft wires, Scrubber, trowel etc.



2. Lubrication

Put a thin layer of lubricant on the spigot end of the pipe with weld bead, particularly at the bevel area just before assembly.

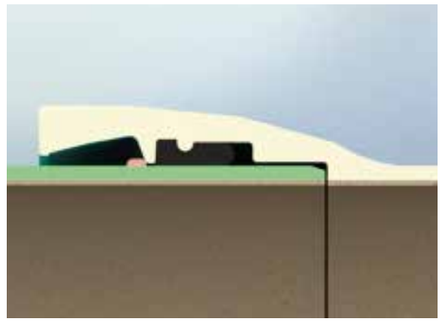
3. Assembly of the Joint

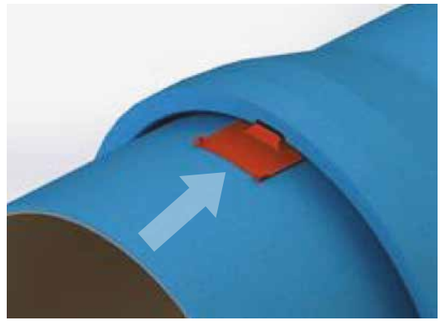
After applying lubricant on spigot end, pull or push it in with suitable tools (Chain blocks, Jacks and other hydraulic Pushers) until it is fully home in the socket. The pipes must not be at an angular deflection when being pulled in and while the lock segments are being fitted.

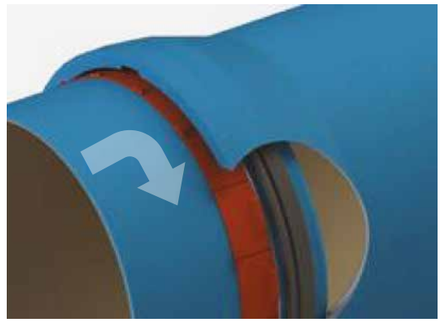
Insert the lock segments one by one through the window provided in the socket face and distribute them along the circumference of the pipe, working alternately left and right.

Then move all the segments around in one direction until the last segment can be inserted through the openings in the end-face of the socket and can be moved to a position where it provides secure locking.

Only a small part of the humps on the last locking segment should be visible through the opening at the end-face of the socket. Should segments jam, they should be moved to their intended position by gentle taps with a hammer while moving the pipe as it hangs on the sling.

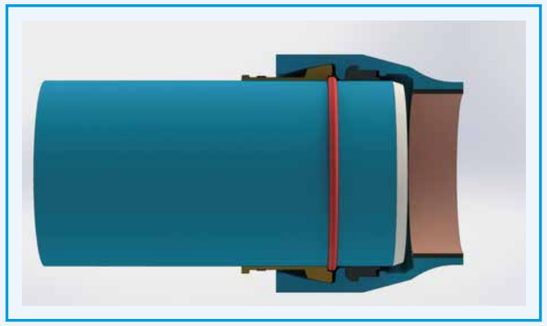






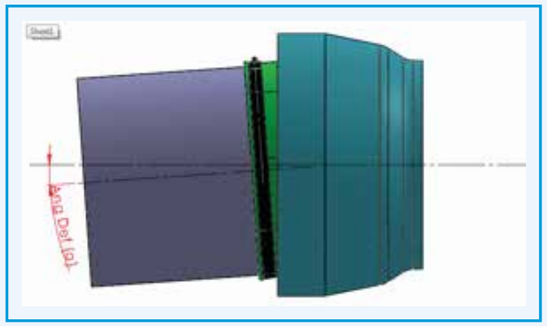
4. Locking

Pull back all the locking segments in the outward direction until they are in contact and pressed against the slope of the retaining chamber. Then wrap the clamping strap around the outside periphery of the segments as shown in the image. Tighten the clamping strap only sufficiently far enough to still allow the locking segments to be moved. Now line up the locking segments. They should be resting against the barrel of the pipe over their full area and should not be overlapping. Then tighten the clamping strap until the locking Segments are bearing firmly against the pipe around the whole of its circumference. It should now no longer be possible to move the locking segments. By pulling on it axially (e.g. by means of a locking clamp), pull the pipe out of the joint until the welded bead comes to rest against the segments. When the pipe is in an un-deflected state, the locking segments should all be approximately the same longitudinal distance away fom the end-face of the socket.



5. Angular Deflection

Once the joint is fully assembled, pull the spigot outwards to maximum and set the required/suitable angular deflection. The maximum deflection possible is mentioned in Table 3.



6. Disassembly

Push the pipe into the socket along its axis until it is in abutment and remove the locking segments through the opening in the socket end-face.

- LSAW PIPES
- HSAW PIPES
- DUCTILE IRON PIPES & FITTINGS
- CS / AS / SS PIPES & TUBES
- PELLETS
- ANTI-CORROSION COATINGS
- CONCRETE WEIGHT COATINGS
- HOT INDUCTION BENDS
- CONNECTOR CASINGS
- CLAD PIPES

JINDAL SAW LTD.

TOTAL PIPE SOLUTIONS

INDIA (Corporate Office)
Jindal SAW Ltd.
Jindal Centre, 12, Bhikaiji Cama Place,
New Delhi - 110 066, INDIA
Email: di.marketing@jindalsaw.com
Website: www.jindalsaw.com

UAE
Jindal SAW Gulf LLC
P.O Box: 132595, Plot No. 11 NR 28,
ICAD-III, Musaffah, Abu Dhabi, UAE
Tel: + 971 52 9800047
Email: di.marketing@jindalsaw.com
Website: www.jindalsaw.com

ITALY
Jindal SAW Italia S.P.A
Via K. L. Von Bruck, 32, 34144, Trieste, Italy
Tel: + 39 348 8019214
Email: i.capriello@JS-italia.com