

**JINDAL**  
D.P. JINDAL GROUP

# SEAMLESS & ERW

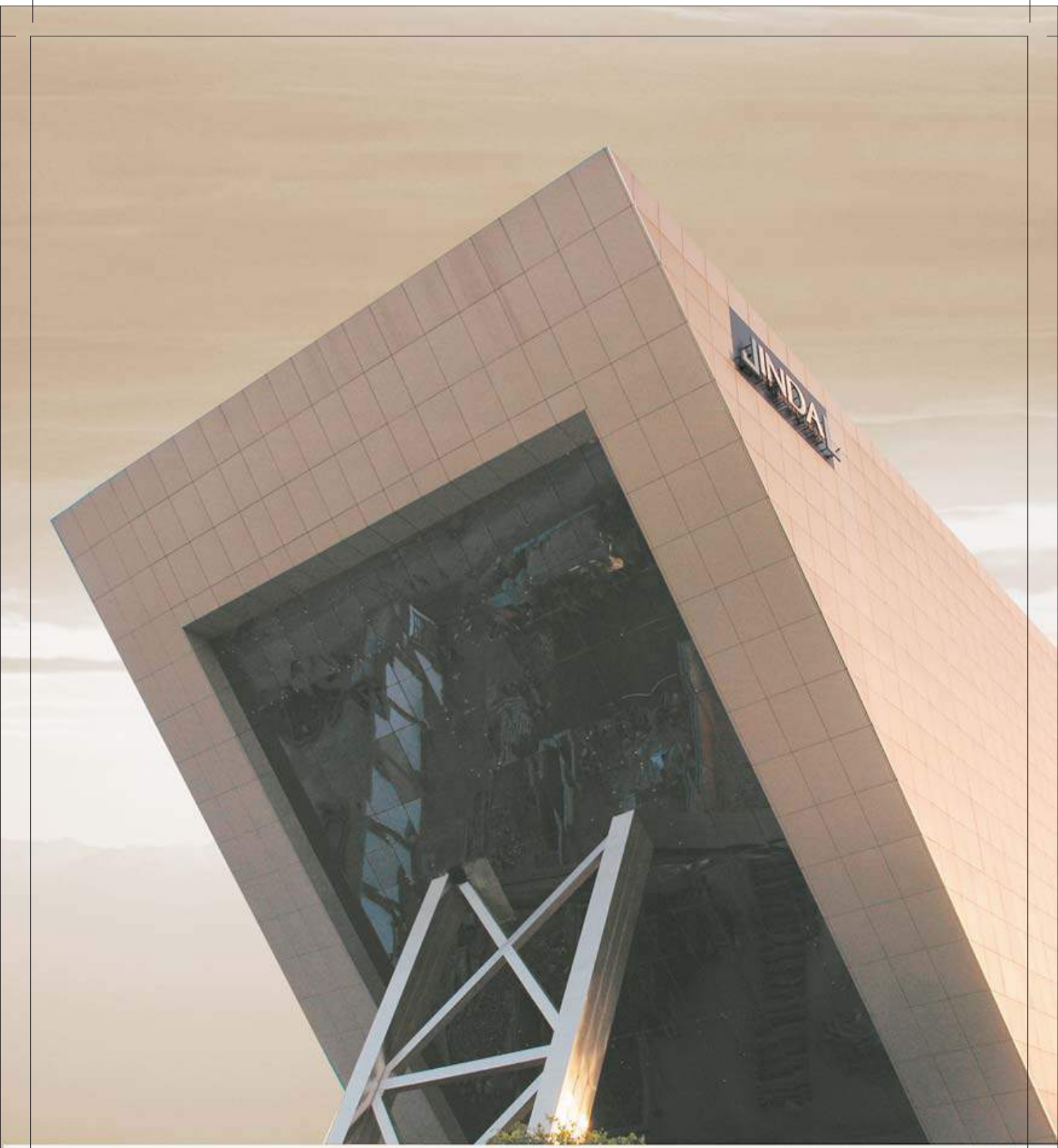
## Pipes & Tubes



**MAHARASHTRA SEAMLESS LIMITED**  
An ISO 9001:2008 Company

**JINDAL PIPES LIMITED**  
An ISO 9001:2008 Company

GROUP/PIPE/AUGUST-2013



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## Our Vision

To sustain our position as the largest manufacturer of Seamless & ERW steel pipes and tubes in India while creating value for the Indian economy and our stakeholders.

## Our Mission

Our mission is to accentuate growth in the economy and improve general quality of life. We are committed to provide products and services of high-quality and enrich the lives of people associated with us.

# D.P. Jindal Group

ERW and Seamless Pipes & Tubes



Power



Offshore Drilling



Where exceeding expectations is a tradition and gaining precocious success is an art applied to work, such culture is the identity of D.P. Jindal Group. With its strong conviction, the business conglomerate has reserved its rightful position in the market as the largest Seamless & ERW steel pipes and tubes manufacturer of the country.

D.P. Jindal Group since its very inception has pursued an unstinted path of growth despite national and international competition, reaching an annual turnover of Rs. 4000 cr. Taking its futuristic approach forward, the Group has ventured into the power sector to generate renewable energies such as wind and solar, ensuring a cleaner and greener environment.

The company has time and again pushed limits to discover and rediscover the various grades and applications of steel pipes and tubes for sectors like Oil & Gas, Hydrocarbon, Power, Agriculture, Housing, Infrastructure to name a few. The product range comprises of ERW Pipes & Tubes (Black & Galvanized) and Seamless Pipes & Tubes (Hot finished, Cold drawn and Pilgered).

The Group has a highly experienced talent team, contemporary technology, efficiency-oriented environment and state-of-the-art production capacity to help foster further growth of the organization as well as the economy of the nation.

# Jindal Pipes Limited (JPL)

Jindal Pipes Ltd. (JPL) was incorporated in 1970 with a production capacity of 3000 TPA for manufacturing of steel Pipes & Tubes. Since then, the company has brought phenomenal development in pipe manufacturing process through many innovative measures. Today, it has an annual turnover of approx. Rs. 700 Crores.

Backed by state-of-the-art technology know-how and highly motivated & skilled workforce, the company has achieved significant growth. Its production capacity has grown to 2,50,000 TPA.

JPL is now India's one of the best and largest manufacturers of ERW, Black and Galvanized Steel Pipes & Tubes in different thickness from 2.00mm to 9.50mm having an Outer Diameter (OD) ranging from 1/2" to 14" NB conforming to various national and international standards.

Recently the company has started manufacturing RHS & SHS Pipes of various sizes which are to be used for different applications i.e. Architectural and Industrial.



Our constant endeavour is to produce pipes of highest quality and sustainability. To achieve this, we stick to strict quality standards, continuous in-house evaluations and training of our workforce.

Our company has been constantly executing regular as well as customised orders for pipes to meet the requirements of sectors like Agriculture, Oil & Gas, Public Health, Housing, Irrigation, Engineering, etc.



5 MW Captive Power Plant, Ghaziabad (UP)

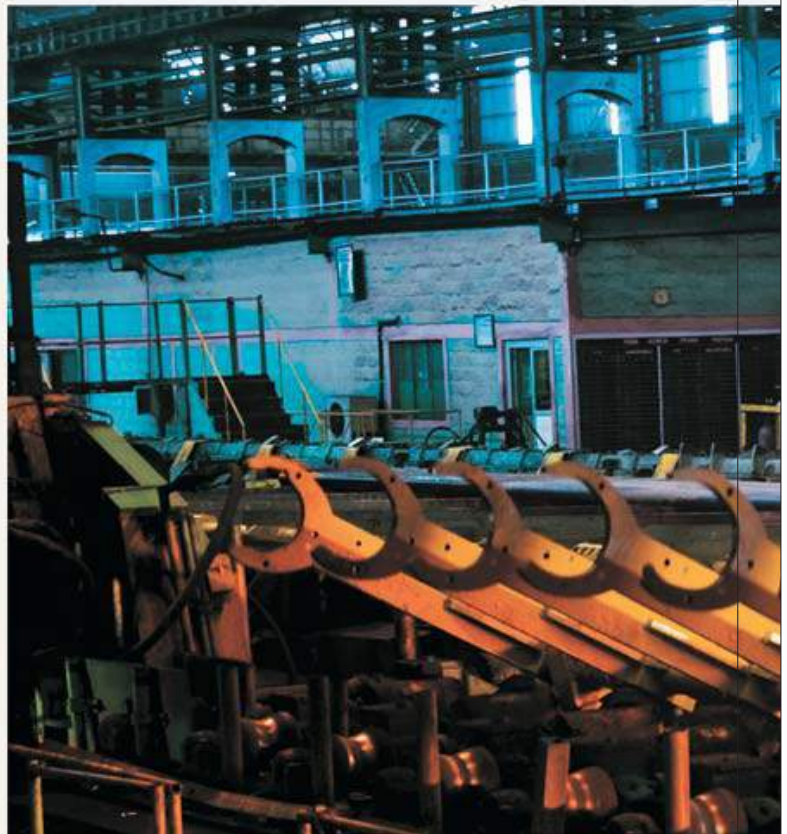
# Maharashtra Seamless Limited (MSL)

Situated at Raigad, Maharashtra, MSL's plant is equipped with the latest machinery capable of producing wide range of Seamless Pipes and Tubes both in HOT FINISHED and COLD DRAWN/ COLD PILGERED condition.

A wide product range with varied sizes and specifications caters to diverse application areas like Oil & Gas sector, Hydrocarbon industry, Boilers & Heat Exchangers, Automotive, Bearing and General Engineering industries, etc.

The company has expanded its production facilities, using PLUG MILL technology supported by World Class Reelers, to manufacture seamless pipes of larger diameter upto 20" and wall thickness upto 40mm for the first time in India.

Besides, a brand new ultra modern Coating Plant has been installed for FBE, 3LPE & 3LPP coating with capacity to cater pipes from 1" to 48" OD.





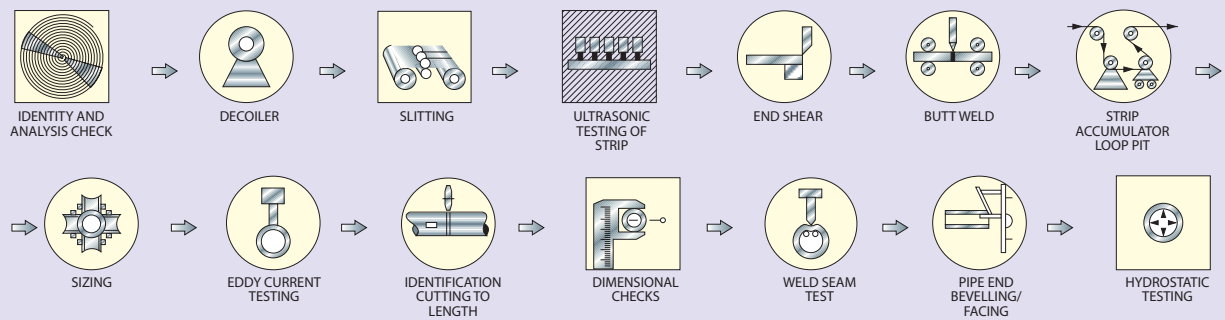
Maharashtra Seamless Limited, the flagship Company of the D.P. Jindal Group, is the largest manufacturer of Seamless Steel Pipes & Tubes in India with a production capacity of over 5,50,000 metric tons per year.



# ERW Black & Galvanized Pipes

at Ghaziabad facility: Pipes ranging from 1/2" to 14" NB and 2.00mm to 9.50mm in wall thickness.

## MANUFACTURING AND TESTING FLOW DIAGRAM ELECTRIC RESISTANCE WELDED BLACK



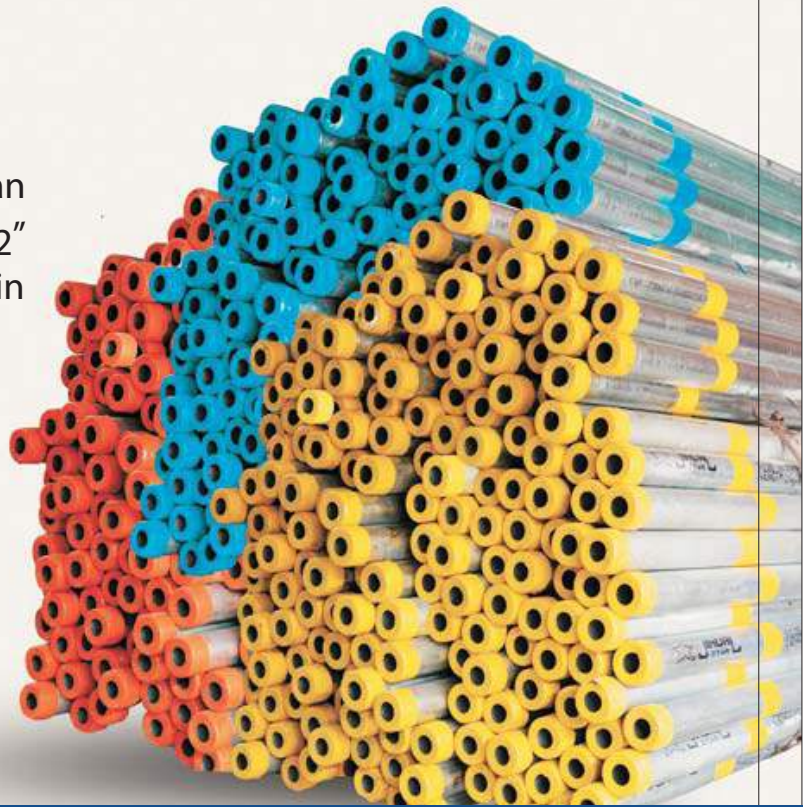
FOR BOILER TUBES

FOR GALVANIZED TUBES

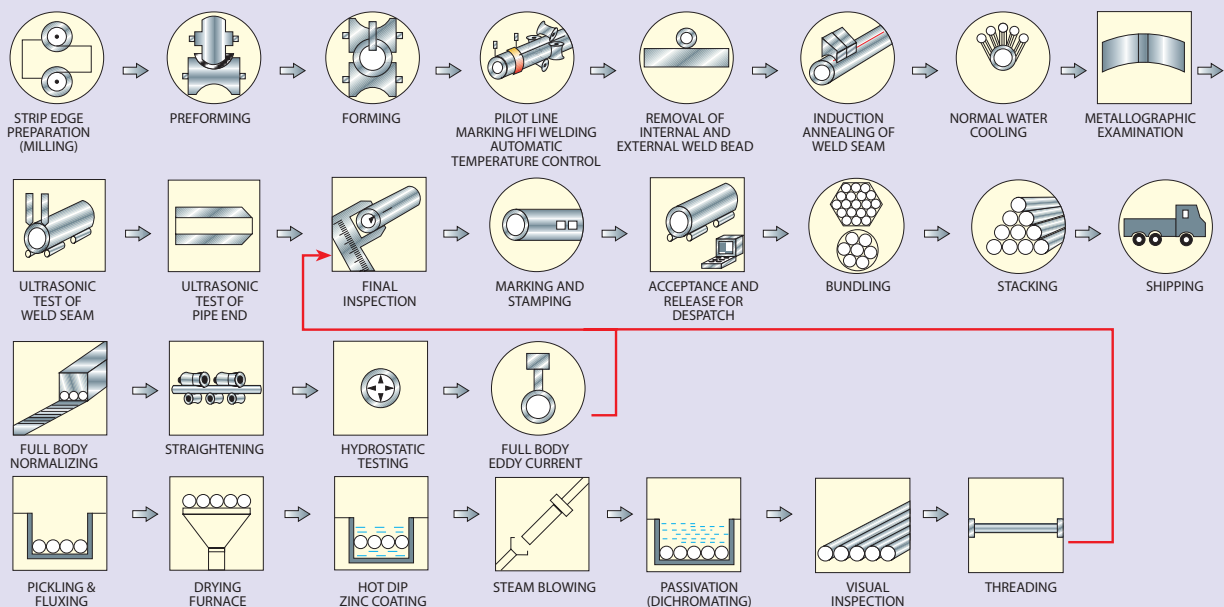
JINDAL PIPES LIMITED (JPL) has pioneered in introducing state-of-the-art technology & full-fledged R&D unit amongst the pipe manufacturers in the industry since 1970. The company is now equipped with one of the

India's best ERW pipe manufacturing facilities that can produce pipes ranging from 1/2" to 14" NB and 2mm to 9.5mm in wall thickness.

Since its inception, JPL has been serving the core development sectors in the country like - Agriculture, Oil & Gas, Refineries, Public Health, Housing, Engineering and Infrastructure.



## OF HIGH FREQUENCY INDUCTION WELDED / AND GALVANIZED PIPES/TUBES

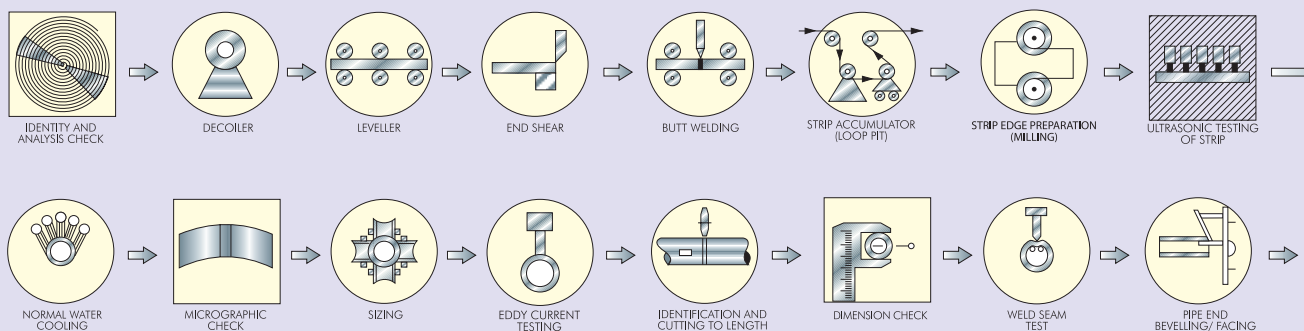


# 20" ERW Pipes

facility at Nagothane, Raigad (Maharashtra)



## MANUFACTURING AND TESTING FLOW DIAGRAM OF HIGH

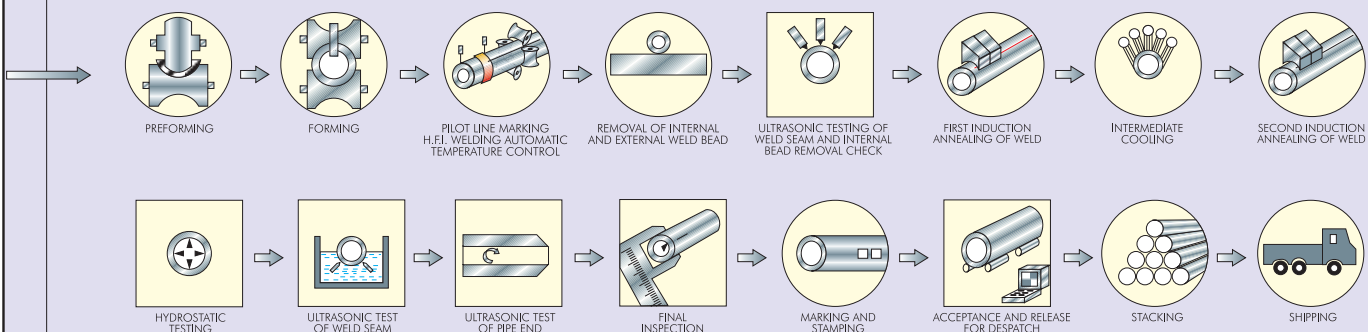


MSL has diversified into manufacturing of large diameter ERW pipes from size range 6" to 20" and wall thickness from 3.2mm to 16.00mm.

MSL's state-of-the-art ERW Plant from MANNESMANN, Germany, is India's first and par excellence ERW pipe manufacturing facility. Today, the company is one of the largest outside diameter ERW pipes manufacturers of the country.



### FREQUENCY INDUCTION WELDED/ELECTRIC RESISTANCE WELDED PIPES



## CPE Technology

# 7" Seamless Pipes & Tubes

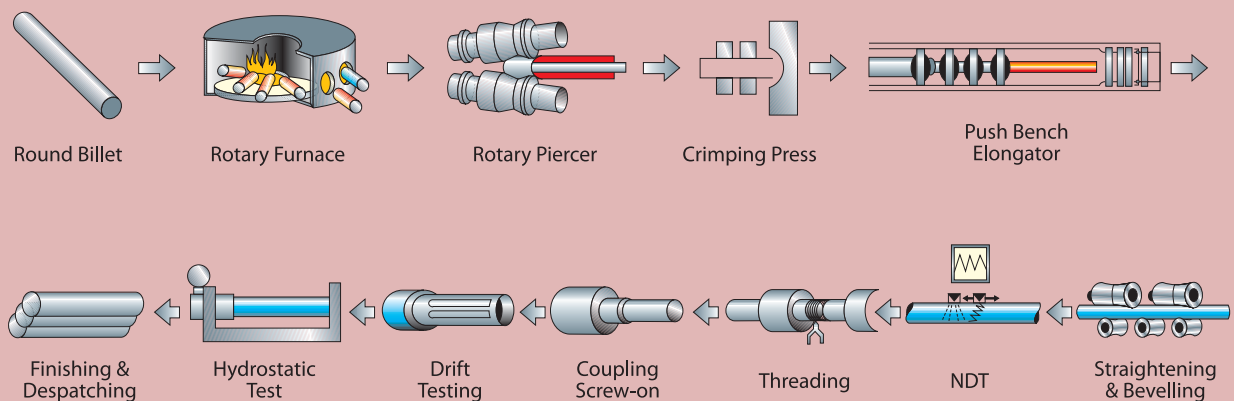
facility at Nagothane, Raigad (Maharashtra)

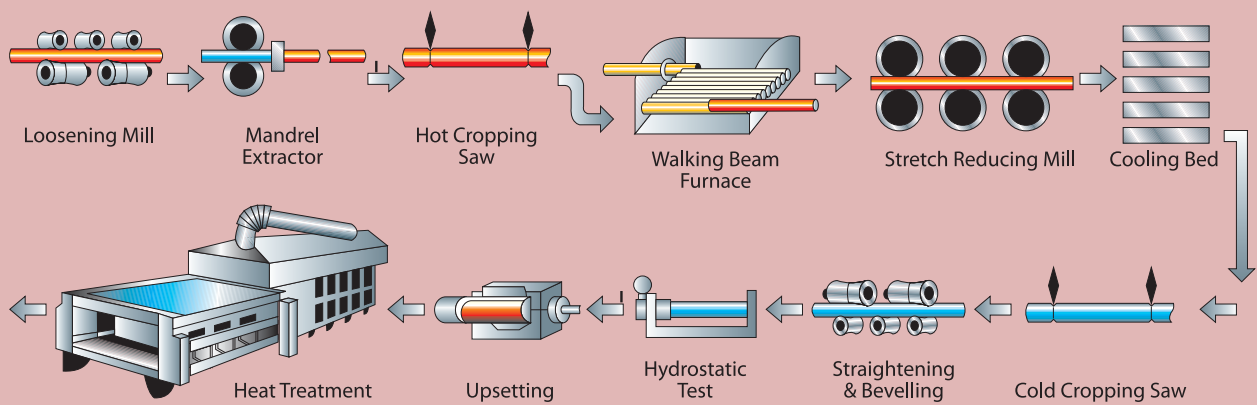
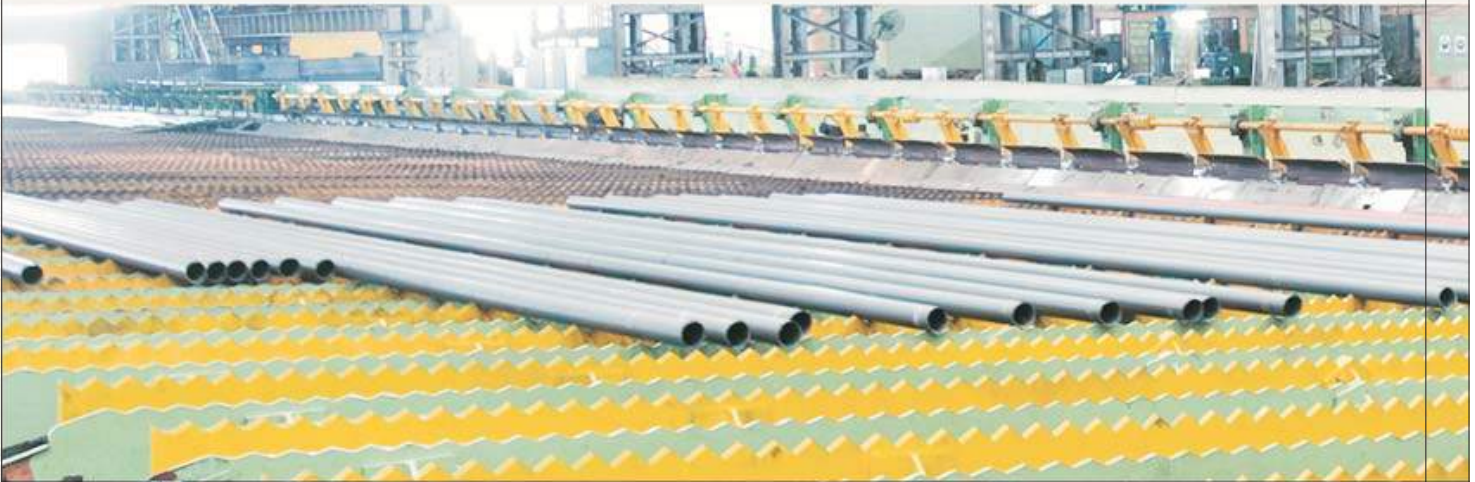
Our state-of-the-art plant uses world renowned CPE Technology acquired through technical know-how from German giant **MANNESMANN DEMAG HUTTENSTECHNIK GmbH**.

The CPE (Cross Roll Piercing and Elongation) process begins with the piercing of a hot billet on the piercer, followed by crimping and then elongation on the push-bench and finally the dimensions are controlled within specified variation on the Stretch Reducing Mill (SRM).

This process minimises longitudinal and transverse defects in pipes and tubes. It also ensures better control over wall thickness variation as compared to other manufacturing processes.

### CPE PROCESS FLOW CHART





## Plug Mill Technology

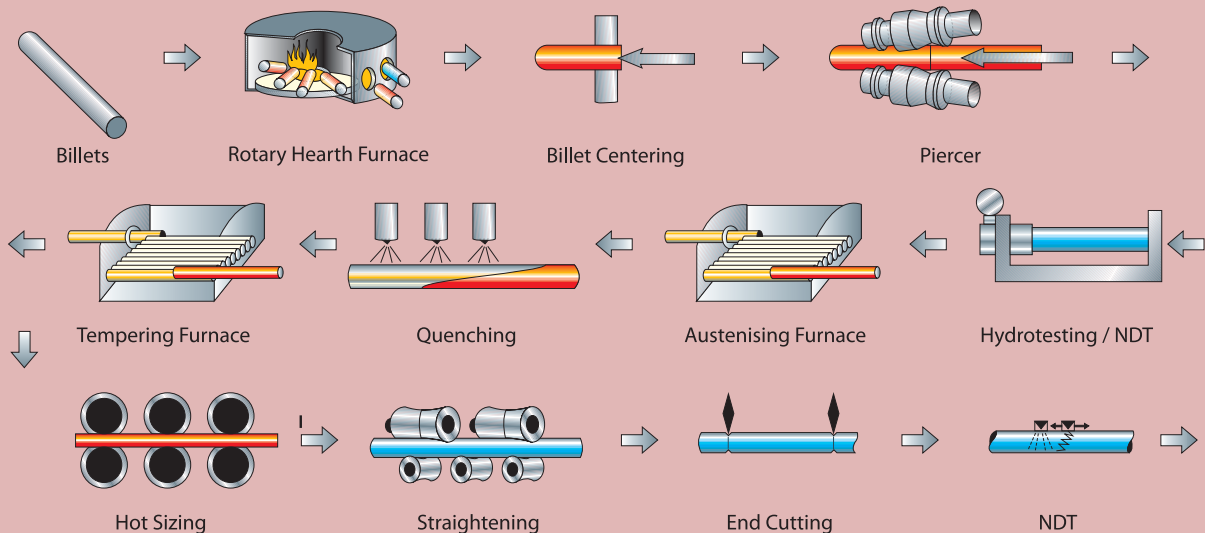
# 20" Seamless Pipes & Tubes

facility at Nagothane, Raigad (Maharashtra)

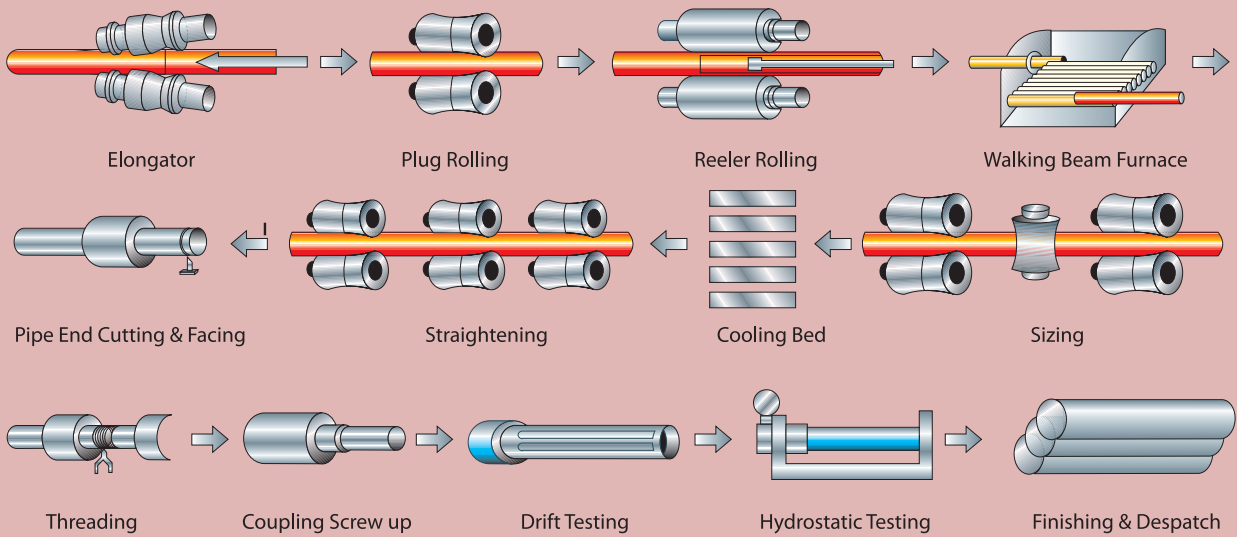
Plug Mill process is a proven process for manufacturing of higher diameter Seamless pipes by heating round billets up to the plastic stage of steel and piercing in a Cross Roll Piercer. Further elongation is achieved through a Plug Mill in which the thick wall hot hollow is rolled through a pair of Top and Bottom Rolls with a plug inside to control the ID and achieve better internal surface finish.

World Class Reelers are used to improve the wall thickness circumferentially, to achieve close tolerance on the Wall Thickness. As the OD and the ID are controlled by external and internal toolings during hot rolling in Plug Mill and Reeler, the pipe will have close tolerance, to cater to the requirements of OCTG and other applications.

### PLUG MILL PROCESS FLOW CHART







**MPM Technology**

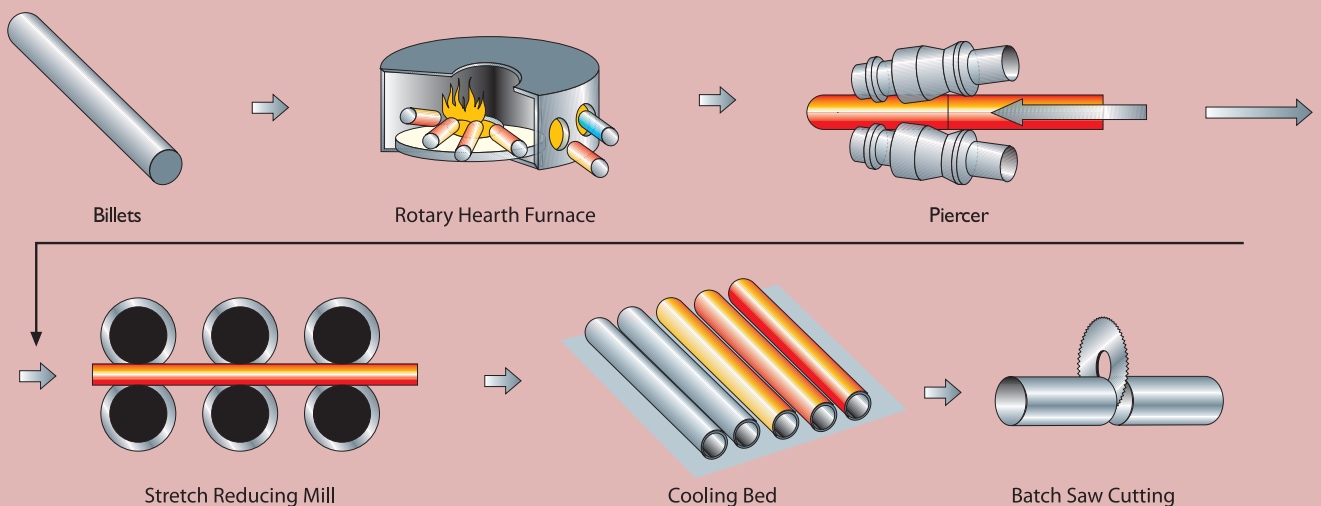
# 6" Seamless Pipes & Tubes

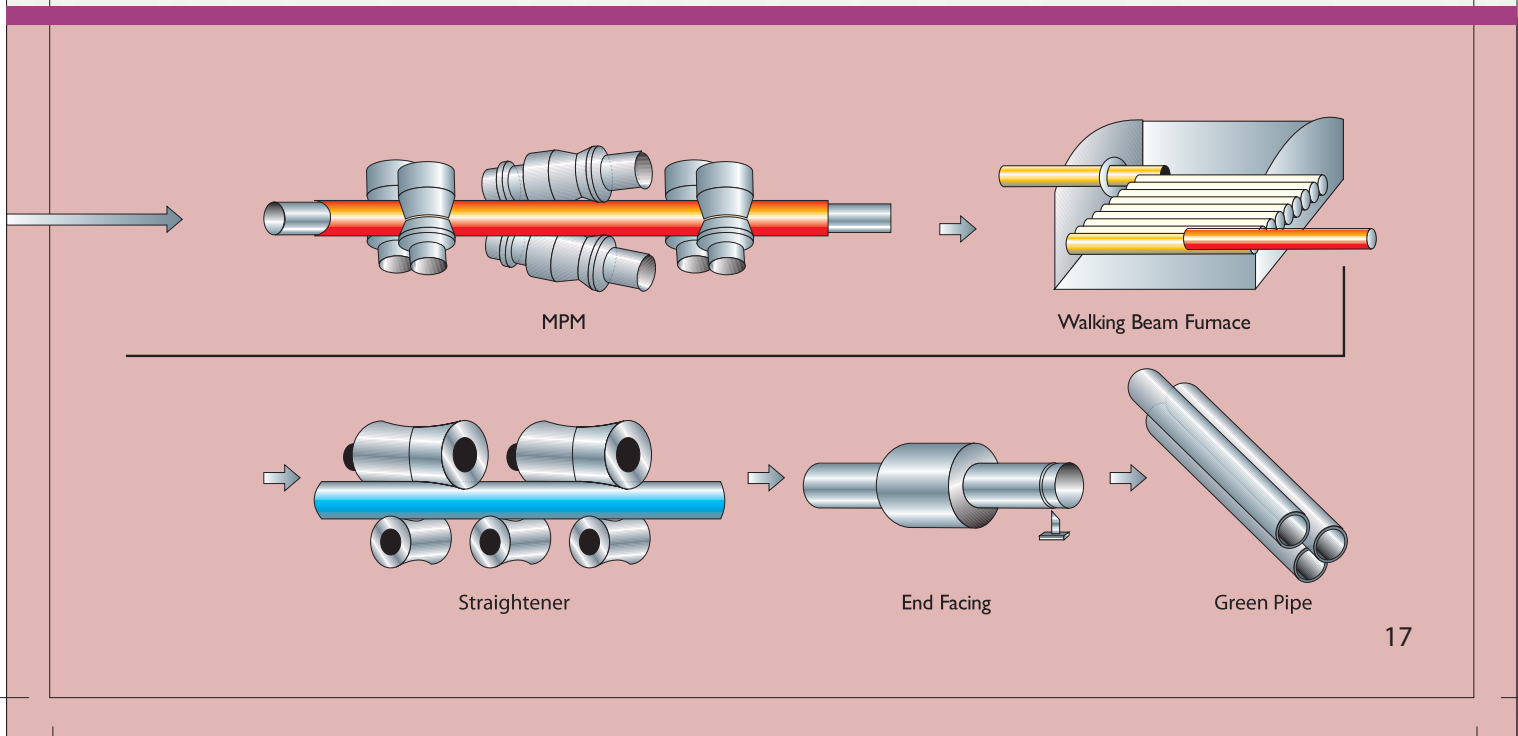
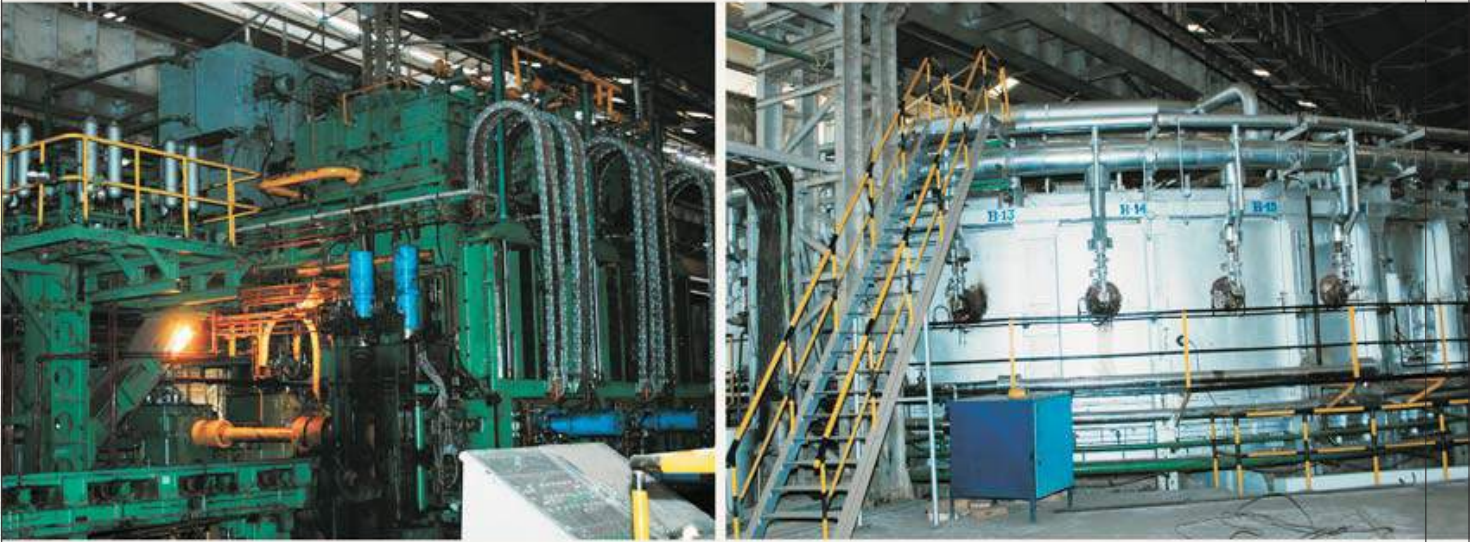
facility at Mangaon (Maharashtra)

MPM is the state-of-the-art manufacturing process for high quality Seamless Pipes and Tubes. In this process, pierced hollow is further elongated by 6 stand continuous rolling mill, where a high precision mandrel inside the hollow moves along with pipe during rolling, which ensures smooth internal surface finish of the pipe.

Each stand is equipped with Hydraulic gauge control, which ensures uniform thickness throughout the length. The deformation of hot metal is in longitudinal direction, which gives better mechanical properties. No torsional stress is induced during hot rolling, which ensures defect-free product.

## MPM PROCESS FLOW CHART





# Relentless Pursuit of Quality



Quality is the hallmark of D.P. Jindal Group. Strict adherence to the policy of "No Compromise with Quality" is demonstrated by its stringent control over procurement of raw material, process control, streamlined distribution network and fast delivery of finished products.

We are holding Quality Management System Certification of ISO 9001: 2008. Similarly, we are holding Integrated Management System Certification for

Environmental Management System ISO 14001:2004 and Occupational Health and Safety Management System OHSAS 18001:2007.

We are also certified to use API Monogram for casing, tubing and line pipes from American Petroleum Institute. Similarly, we are holding Certificate of Approval as Well Known Pipe and Tube Maker from Central Boiler Board.

Our in-house R&D activities and adherence to the stringent Quality Standards using sophisticated inspection facilities which include Hydrostatic Testing, NDT facilities viz. Electro Magnetic Inspection, Ultrasonic, MPI & Eddy Current Testing and Laboratory Inspection/ Testing facilities like Spectrometer, Metallurgical Microscope, UTM, Impact Testing and Hardness Testers etc. have helped MSL to benchmark itself, amongst the best pipe manufacturers in the world.



Our manufacturing /inspection facilities and product quality have approval from all leading International Inspection agencies such as Lloyds, DNV, BVQI, EIL, TUV, PDIL, SGS and many others, who are regularly inspecting our finished products for their esteemed clients.

SAIL, Vedanta, TATA, Aditya Birla, Adani, Mahindra, JSW, JSPL, NALCO, Coal India, Indian Railways and Ordnance factories.



Our products are in use by quality conscious sector of Indian Industry and our clientele includes customers like ONGC, OIL, IOCL, HPCL, BPCL, GAIL, Reliance, Cairn, ESSAR, BG Exploration, BHEL, NTPC, L&T, Punj Lloyd, ALSTOM, Thermax,



Our products, also, have exposure to major International markets and we enjoy a large number of satisfied customers in MIDDLE EAST, ASIA, FAR EAST and USA, including various Oil Companies Worldwide.

# CSR, Environment & Human Resources



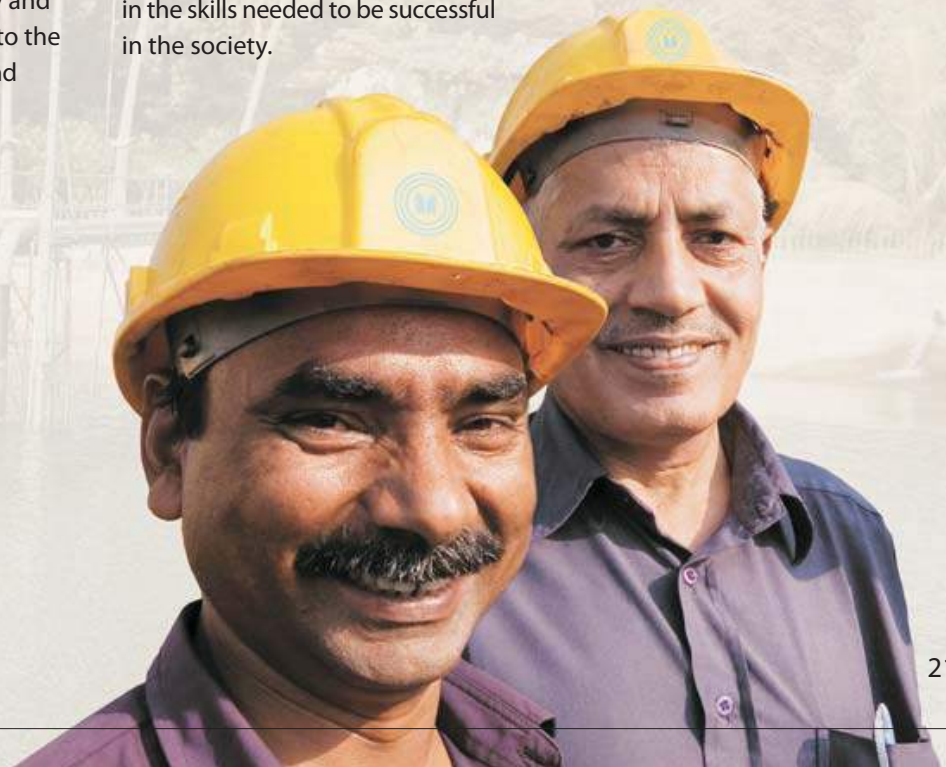


D.P. Jindal Group's strong belief in Corporate Social Responsibility is inspired through its commitment to take care of Environment, Health and Safety of its employees and neighbourhood.

A well equipped B.C. Jindal Charitable Hospital near the plant has been rendering primary and emergency health services to the employees, their families and nearby villagers.

Jindal Mount Litera Zee School near the plant is an initiative in nurturing young minds in the field of education. The curriculum includes a highly interactive skill-based programme, which uses developmentally appropriate and collaborative learning strategies to help students achieve competency in the skills needed to be successful in the society.

With our goal of becoming the leader in the industry, our aim in human resource management is at par with the industry. It is our continuous endeavour to reform our organizational structure to maintain an optimum level of human resource for better productivity and performance.



# Applications & Specifications:

## OIL & GAS SECTOR



API 5L/ ISO 3183  
 IS/ ISO 3183  
 API 5CT  
 API 5DP

## HYDROCARBON PROCESS INDUSTRY



ASTM : A-53, A-333, A-334, A-335  
 BS : 3602 (Pt-I), 3603  
 IS : 6286

## AUTOMOTIVE INDUSTRY



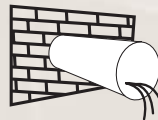
ASTM : A-519  
 SAE : 1010, 1012, 1020, 1040, 1518, 4130  
 DIN : 2391, 1629  
 BS : 980, 6323 (Pt-V)  
 IS : 3601, 3074

## BOILER, HEAT EXCHANGER, SUPER HEATER & CONDENSER



ASTM : A-106, A-178, A-179, A-192, A-209, A-210, A-213, A-214  
 BS : 3059 (Pt-I & Pt-II), EN 10216 (Pt-I & Pt-II) 3602 (Pt-1)  
 IS : 1914, 2416, 11714, 4923  
 DIN : 17175

## WATER & SEWAGE



IS : 1239 (Pt-I), 3589, IS 4270  
 BS : 1387  
 DIN : 2440, 2441

## MECHANICAL, STRUCTURAL, & GENERAL ENGINEERING



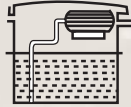
ASTM : A-500, A-501, A-519  
 DIN : 1629, 1630, 2391, 17100, 17200  
 BS : 980, 1775, 3601, 6323  
 IS : 1161, 3601, 9295

## RAILWAYS



IS : 1239 (Pt-I), 1161  
 BS : 980  
 RDSO : ETI / OHE / 11

## WATER WELL



IS : 4270  
 ASTM : A-589

## HYDRAULIC CYLINDER



SAE : 1026, 1518  
 IS : 6631  
 DIN : 1629

## BEARING INDUSTRY



SAE : 52100  
 DIN : 100 Cr6



# Certifications:



# Product Range - ERW

<b>I) Pipe Size Range</b>	21.30 - 508.00mm OD
<b>II) Galvanized Pipes</b>	21.30 - 355.60mm OD
<b>III) Boiler Tubes</b>	33.40 - 355.60mm OD
<b>IV) Oil Country Tubular Goods (OCTG)</b>	
A) Size Range:	
Line Pipes	Plain End from 88.9 - 508.0mm OD Threaded & Coupled with API Round Threads from 88.90 - 323.90mm OD
Casing	From 114.3 - 244.48mm Outside Diameter Plain End / Threaded and Coupled with STC, LTC & BTC Threads
B) Grades:	
Line Pipes (API 5L)	Upto Gr. X-70 (PSL-1 and PSL-2)
Casing & Tubing (API 5CT)	J-55 and K-55
<b>V) Sectional Pipes</b>	
Square Hollow Sections	25 x 25 to 250 x 250mm
Rectangular Sections	50 x 25 to 300 x 200mm

Nominal pipe size		DIMENSION AND WEIGHT (kg/m)																																		
		WALL THICKNESS (mm/inch)																																		
Inch	mm	2.00	2.30	2.60	2.90	3.20	3.60	4.00	4.40	4.50	4.80	5.20	5.40	5.50	5.60	6.00	6.40	7.10	7.80	7.90	8.20	8.40	8.70	9.30	9.50	9.70	10.30	10.90	11.10	11.50	11.90	12.00	12.20	12.50	12.70	
1/2	15	0.079	0.090	0.102	0.114	0.126	0.142	0.157	0.173	0.177	0.188	0.205	0.213	0.216	0.220	0.236	0.250	0.280	0.307	0.311	0.323	0.330	0.342	0.366	0.375	0.382	0.406	0.429	0.437	0.453	0.467	0.472	0.480	0.492	0.500	
3/4	20	0.947	-	1.21	-	1.44	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
1	25	1.315	33.40	1.56	1.78	1.98	2.20	2.41	2.67	2.93	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1 1/4	32	1.500	38.10	1.78	2.02	2.27	2.51	-	3.05	3.35	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1 1/2	40	1.750	44.50	-	2.39	2.69	2.98	3.26	3.63	4.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		1.950	49.00	-	2.61	2.93	3.23	3.56	3.97	4.37	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		2.000	51.00	-	2.76	3.10	3.44	3.77	4.21	4.64	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2	50	2.375	60.30	-	3.11	3.49	3.87	4.25	4.74	5.23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		2.500	63.50	-	3.53	3.90	4.33	4.76	5.32	5.87	6.41	6.55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2 1/2	65	2.875	73.00	-	-	-	5.01	5.51	6.16	6.81	7.44	7.60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3	80	3.500	88.90	-	-	-	6.15	6.72	7.57	8.36	9.17	9.37	9.95	11.12	11.31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3 1/2	90	4.000	101.60	-	-	-	-	7.76	8.70	9.63	10.55	10.80	11.46	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4	100	4.500	114.30	-	-	-	-	8.77	9.83	10.88	11.92	12.20	12.96	13.99	14.50	15.01	16.02	17.03	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		5.000	127.00	-	-	-	-	9.77	10.95	12.13	13.30	13.60	14.46	15.62	16.19	16.76	17.90	19.03	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5	125	5.500	139.70	-	-	-	-	-	12.08	-	14.68	15.00	15.90	17.90	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		5.563	141.30	-	-	-	-	-	10.90	-	13.54	-	16.16	18.10	18.74	20.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6	150	6.000	152.40	-	-	-	-	-	-	16.40	17.50	-	19.60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		6.500	165.10	-	-	-	-	-	-	17.43	17.80	18.90	-	21.30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7	175	6.625	168.30	-	-	-	-	-	-	13.03	14.62	16.21	17.78	18.18	19.35	20.91	21.69	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8	200	8.625	219.10	-	-	-	-	-	-	17.04	19.13	21.22	23.29	23.81	25.37	27.43	28.45	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9	225	9.625	244.50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10	250	10.750	273.10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12	300	12.750	323.90	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13	325	13.375	339.70	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
14	350	14.000	355.60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16	400	16.000	406.40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		16.500	419.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		16.770	426.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18	450	18.000	457.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		18.625	473.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20	500	20.000	508.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		20.866	530.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Note: Other intermediate thickness can be manufactured as agreed.

(W.T. For ERW Boiler Tubes)

ERW Pipes and Boiler Tubes (JPL Ghaziabad facility)

ERW Pipes (MSL Nagothane facility)

ERW Pipes (MSL Nagothane facility)

**BLACK & GALVANIZED**

**ERW STEEL TUBES CONFORMING TO IS:1239(Pt-I) EQUIVALENT TO BS:1387 & STRUCTURAL TUBES CONFORMING TO IS:1161**

SERIES			LIGHT					MEDIUM					HEAVY				
NOMINAL BORE		O.D.	OUTSIDE DIA.		W.T.	WEIGHT		OUTSIDE DIA.		W.T.	WEIGHT		OUTSIDE DIA.		W.T.	WEIGHT	
INCH	mm	mm	MIN. (mm)	MAX. (mm)	mm	P/E Kg/m	S/S Kg/m	MIN. (mm)	MAX. (mm)	mm	P/E Kg/m	S/S Kg/m	MIN. (mm)	MAX. (mm)	mm	P/E Kg/m	S/S Kg/m
1/2	15	21.3	21.0	21.4	2.0	0.947	0.956	21.0	21.8	2.6	1.21	1.22	21.0	21.8	3.2	1.44	1.45
3/4	20	26.9	26.4	26.9	2.3	1.38	1.39	26.5	27.3	2.6	1.56	1.57	26.5	27.3	3.2	1.87	1.88
1	25	33.7	33.2	33.8	2.6	1.98	2.00	33.3	34.2	3.2	2.41	2.43	33.3	34.2	4.0	2.93	2.95
1 1/4	32	42.2	41.9	42.5	2.6	2.54	2.57	42.0	42.9	3.2	3.10	3.13	42.0	42.9	4.0	3.79	3.82
1 1/2	40	48.3	47.8	48.4	2.9	3.23	3.27	47.9	48.8	3.2	3.56	3.60	47.9	48.8	4.0	4.37	4.41
2	50	60.3	59.6	60.2	2.9	4.08	4.15	59.7	60.8	3.6	5.03	5.10	59.7	60.8	4.5	6.19	6.26
2 1/2	65	76.1	75.2	76.0	3.2	5.71	5.83	75.3	76.6	3.6	6.42	6.54	75.3	76.6	4.5	7.93	8.05
3	80	88.9	87.9	88.7	3.2	6.72	6.89	88.0	89.5	4.0	8.36	8.53	88.0	89.5	4.8	9.90	10.10
4	100	114.3	113.0	113.9	3.6	9.75	10.00	113.1	115.0	4.5	12.20	12.50	113.1	115.0	5.4	14.50	14.80
5	125	139.7	-	-	4.5	15.00	-	138.5	140.8	4.8	15.90	16.40	138.5	140.8	5.4	17.90	18.40
6	150	165.1	-	-	4.5	17.80	-	163.9	166.5	4.8	18.90	19.50	163.9	166.5	5.4	21.30	21.90
6	150	165.1	-	-	-	-	-	-	-	-	-	-	-	-	H2-5.9	23.20	-
6	150	165.1	-	-	-	-	-	-	-	-	-	-	-	-	H3-6.3	24.70	-
6	150	165.1	-	-	-	-	-	-	-	-	-	-	-	-	H4-8	31.00	-
6	150	168.3	-	-	4.5	18.20	-	-	-	4.8	19.40	-	-	-	H1-5.4	21.70	-
6	150	168.3	-	-	-	-	-	-	-	-	-	-	-	-	H2-6.3	25.20	-
6	150	168.3	-	-	-	-	-	-	-	-	-	-	-	-	H3-8	31.60	-
6	150	168.3	-	-	-	-	-	-	-	-	-	-	-	-	H4-10	39.00	-
7	175	193.7	-	-	4.8	22.40	-	-	-	5.4	25.10	-	-	-	5.9	27.30	-
7	175	193.7	-	-	-	-	-	-	-	-	-	-	-	-	H2-6.3	29.10	-
7	175	193.7	-	-	-	-	-	-	-	-	-	-	-	-	H3-8	36.60	-
7	175	193.7	-	-	-	-	-	-	-	-	-	-	-	-	H4-10	45.30	-
7	175	193.7	-	-	-	-	-	-	-	-	-	-	-	-	H5-12	53.80	-
8	200	219.1	-	-	4.8	25.40	-	-	-	5.6	29.50	-	-	-	5.9	31.00	-
8	200	219.1	-	-	-	-	-	-	-	-	-	-	-	-	H2-8	41.60	-
8	200	219.1	-	-	-	-	-	-	-	-	-	-	-	-	H3-10	51.60	-
8	200	219.1	-	-	-	-	-	-	-	-	-	-	-	-	H4-12	61.30	-
10	250	273.0	-	-	-	-	-	-	-	-	-	-	-	-	5.9	38.90	-
10	250	273.0	-	-	-	-	-	-	-	-	-	-	-	-	H2-8	52.30	-
10	250	273.0	-	-	-	-	-	-	-	-	-	-	-	-	H3-10	64.90	-
10	250	273.0	-	-	-	-	-	-	-	-	-	-	-	-	H4-12	77.20	-
12	300	323.9	-	-	-	-	-	-	-	-	-	-	-	-	6.3	49.30	-
12	300	323.9	-	-	-	-	-	-	-	-	-	-	-	-	H2-8	62.30	-
12	300	323.9	-	-	-	-	-	-	-	-	-	-	-	-	H3-10	77.40	-
12	300	323.9	-	-	-	-	-	-	-	-	-	-	-	-	H4-12	92.30	-
14	350	355.6	-	-	-	-	-	-	-	-	-	-	-	-	8.0	68.60	-
14	350	355.6	-	-	-	-	-	-	-	-	-	-	-	-	H2-10	85.20	-
14	350	355.6	-	-	-	-	-	-	-	-	-	-	-	-	H3-12	102.00	-

NOTE: (I) IS:1239 & BS:1387 cover sizes upto 100mm NB all series and 125 & 150mm NB medium & heavy series, plain end and screwed & socketed ends.  
 (II) IS:1161 covers all sizes plain end only.  
 (III) IS:1161 O.D. tolerance will be as per dimension tolerance clause. Above table min./max. O.D. applicable for IS:1239 only.  
 (IV) Hydro Test Pressure - 5 MPa (IS:1161 hydro test not required.)

**ERW PIPES FOR WATER & SEWAGE CONFORMING TO IS:3589 & WATER WELL CASING CONFORMING TO IS:4270**

SIZE		CONVENTIONAL MASS PER UNIT LENGTH (Kg/m)																								
NB	OD	WALL THICKNESS (mm)																								
		3.20	3.60	4.00	4.30	4.65	4.85	5.00	5.20	5.40	5.60	6.00	6.35	6.40	7.00	7.10	8.00	9.50	10.00	10.30	10.50	11.10	11.50	12.00	12.50	12.70
mm	mm	3.20	3.60	4.00	4.30	4.65	4.85	5.00	5.20	5.40	5.60	6.00	6.35	6.40	7.00	7.10	8.00	9.50	10.00	10.30	10.50	11.10	11.50	12.00	12.50	12.70
100	114.30	-	-	-	-	-	-	13.48	-	14.50	-	16.02	-	-	-	-	-	-	-	-	-	-	-	-	-	-
125	141.30	-	-	-	-	-	-	16.81	-	18.10	-	20.02	-	-	-	-	-	-	-	-	-	-	-	-	-	-
150	168.30	13.03	14.62	16.21	17.39	18.77	19.55	20.13	20.91	21.69	-	24.01	25.36	25.55	27.84	28.22	-	-	-	-	-	-	-	-	-	-
175	193.70	-	16.88	18.71	20.08	21.68	22.59	23.27	24.17	25.07	-	27.77	29.34	29.56	32.23	32.67	36.63	-	-	-	-	-	-	-	-	-
200	219.10	-	19.13	21.22	22.78	24.59	25.62	26.40	27.43	28.46	29.48	31.53	33.31	33.57	36.61	37.12	41.65	49.10	51.56	53.03	54.01	56.94	58.87	61.29	63.68	64.64
225.0	244.50	-	-	23.72	25.47	27.50	28.66	29.53	30.69	31.84	32.99	35.29	37.29	37.58	41.00	41.57	46.66	55.05	57.83	59.49	60.59	63.89	66.08	68.80	71.51	72.60
250	273.10	-	23.93	26.54	28.50	30.78	32.08	33.06	34.35	35.65	36.94	39.52	41.77	42.09	45.93	46.57	52.30	61.75	64.88	66.75	68.00	71.72	74.19	77.26	80.33	81.55
300	323.90	-	-	31.55	33.89	36.61	38.16	39.32	40.87	42.41	43.96	47.04	49.73	50.11	54.70	55.47	62.32	73.65	77.41	79.65	81.15	85.62	88.59	92.30	95.99	97.46
350	355.60	-	-	34.68	37.25	40.24	41.95	43.23	44.93	46.63	48.33	51.73	54.69	55.11	60.18	61.02	68.57	81.08	85.22	87.71	89.36	94.30	97.58	101.68	105.76	107.39
400	406.40	-	-	-	-	46.07	48.03	49.49	51.45	53.40	55.35	59.24	62.64	63.13	68.94	69.91	78.60	92.98	97.75	100.61	102.51	108.20	111.99	116.71	121.42	123.30
450	457.00	-	-	-	-	51.87	54.08	55.73	57.94	60.14	62.34	66.73	70.57	71.12	77.68	78.77	88.58	104.84	110.23	113.46	115.61	122.05	126.34	131.68	137.02	139.15
500	508.00	-	-	-	-	57.72	60.18	62.02	64.48	66.93	69.38	74.28	78.55	79.16	86.48	87.70	98.64	116.78	122.81	126.41	128.82	136.01	140.80	146.78	152.74	155.12

NOTE: (I) IS:4270 covers Pipe size 100mm to 500mm NB & IS:3589 covers Pipe size 168.30mm O.D. to 508.00mm O.D.  
 (II) IS:4270 covers wall thickness upto 12 mm.  
 (III) Other thickness may be supplied as per agreement.  
 (IV) Max. Hydro Test Pressure IS:3589 - 5 MPa, IS:4270 - 7 MPa.

## ERW BOILER, SUPER HEATER, HEAT EXCHANGER, CONDENSER & AIR HEATER TUBES & PIPES

Outside Diameter mm	Conforming to BS 3059 (Pt-I & II), ASTM A-178, A-214, A-333, IS:1914 (Pt-IV), IS:2416 (Pt-IV), IS:11714 (Pt-III)																									
	2.03	2.34	2.64	2.95	3.25	3.38	3.56	3.66	3.68	3.91	4.06	4.50	5.16	5.49	5.74	6.02	6.35	6.55	7.04	7.11	7.80	7.92	8.18	8.38	9.27	9.52
33.4/33.7	1.59	1.81	2.02	2.24	2.44	2.53	-	2.71	-	-	2.97	3.24	-	-	-	-	-	-	-	-	-	-	-	-	-	-
38.0	1.80	2.06	2.30	2.55	2.79	-	-	3.10	-	-	3.40	3.72	-	-	-	-	-	-	-	-	-	-	-	-	-	-
42.2/42.4	-	2.31	2.59	2.87	3.14	-	3.41	3.50	-	-	3.84	4.21	-	-	-	-	-	-	-	-	-	-	-	-	-	-
44.5	-	2.43	2.73	3.02	3.31	-	-	3.69	-	-	4.05	4.44	-	-	-	-	-	-	-	-	-	-	-	-	-	-
48.3	-	2.65	2.97	3.30	3.61	-	-	4.03	4.05	-	4.43	4.86	-	-	-	-	-	-	-	-	-	-	-	-	-	-
50.8	-	2.80	3.14	3.48	3.81	-	-	4.25	-	-	4.68	5.14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
57.2	-	-	3.55	3.95	4.32	-	-	4.83	-	-	5.32	5.85	-	-	-	-	-	-	-	-	-	-	-	-	-	-
60.3	-	-	3.75	4.17	4.57	-	-	5.11	-	5.44	5.63	6.19	-	-	-	-	-	-	-	-	-	-	-	-	-	-
63.5	-	-	3.96	4.40	4.83	-	-	5.40	-	-	5.95	6.55	-	-	-	-	-	-	-	-	-	-	-	-	-	-
73.0	-	-	-	-	-	-	-	-	-	-	-	-	8.63	-	-	-	-	-	-	-	-	-	-	-	-	-
76.1	-	-	-	5.32	5.84	-	-	6.54	-	-	7.21	7.95	-	-	-	-	-	-	-	-	-	-	-	-	-	-
88.9	-	-	-	-	6.86	-	-	7.69	-	-	8.49	9.37	-	11.29	-	-	-	-	-	-	-	-	-	-	-	-
101.6	-	-	-	-	-	-	-	8.84	-	-	9.77	10.78	-	-	13.57	-	-	-	-	-	-	-	-	-	-	-
114.3	-	-	-	-	-	-	-	-	-	-	11.04	12.18	-	-	-	16.07	-	-	-	-	-	-	-	-	-	-
127.0	-	-	-	-	-	-	-	-	-	-	-	13.59	-	-	-	-	-	-	-	-	-	-	-	-	-	-
141.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	21.77	-	-	-	-	-	-	-	-
168.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	28.26	-	-	-	-	-	-
219.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	33.31	-	36.81	-	-	-	-	42.55	-	-
273.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	41.75	-	-	-	51.01	-	-	-	60.29	-
323.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	49.71	-	-	-	-	-	-	65.18	-	73.78
355.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	54.69	-	-	-	-	-	67.90	-	-	81.25

Note :Hydrostatic Test / NDT Test, as per specification requirements.

# Weld-On Connectors- **ERW**

MSL, now offers weldable Box and Pin Multi Start Thread Connectors, suitable to be girth welded with ERW Pipes as per Specification API 5L. Weld-On Connectors are designed for Offshore and Onshore applications, where environmental conditions call for fast connector make-up combined with superior performance.

MSL uses Leopard Connectors which combine the advantages of a preloaded thread-type connector with the rapid make up, desired for offshore operations.

The Leopard Connectors have high cone angle and is available in twin on four start thread. When stabbed, the box swallows approximately 90% of the pin length. The stabbing guide prevents cross-threading. Full make-up is achieved in less than half a turn with a four start thread and less than one turn for a two start thread.

#### **Leopard Connectors have following features:**

- Multi Start Threads for fast make-up
- Low torque make-up with rig tongs less than one turn make-up
- Integral 4 point anti-rotation provision
- Suitable for piling
- Reversible and reusable
- Visual indication of make-up
- Preloaded for fatigue

#### **Weld-On Connectors are available as per following details:**

Specification	: API 5L
Grade	: Gr. B through Gr. X-70
Pipe Size	: Upto 508.00mm (20")
Wall Thickness	: 15.87mm (max.)

# Product Range - Seamless

- I) Hot Finished Pipes and Tubes  
Carbon & Alloy Steel:  
Outside Diameter (OD) 26mm - 508.0mm  
Wall Thickness (WT) 2.8mm - 40mm
- II) Cold Pilgered / Cold Drawn Tubes  
Carbon & Alloy Steel:  
Outside Diameter (OD) 10mm - 101mm  
Wall Thickness (WT) 1mm - 10mm
- III) OIL Country Tubular Goods (OCTG)
  - A) Size Range
    - Line Pipes - Plain End Upto 20" (508 mm) Outside Diameter  
- Threaded and Coupled with API Line  
Pipe threads upto 12" (323.9 mm) Outside Diameter
    - Casing Upto 13<sup>3</sup>/<sub>8</sub>" (339.72 mm) Outside Diameter Plain End / Threaded and Coupled with STC, LTC & BTC Threads
    - Tubing NUE / EUE upto 4<sup>1</sup>/<sub>2</sub>" Outside Diameter Plain End or Threaded & Coupled with API Round Threads
    - Drill Pipes
      - Internal Upset (IU) 3<sup>1</sup>/<sub>2</sub>" to 4<sup>1</sup>/<sub>2</sub>"
      - External Upset (EU) 2<sup>7</sup>/<sub>8</sub>" to 4<sup>1</sup>/<sub>2</sub>"
      - Internal - External Upset (IEU) 4<sup>1</sup>/<sub>2</sub>" to 5"
  - B) Grades
    - Line Pipes (API - 5L) All Grades upto X-70 / X-70Q
    - Casing & Tubing (API 5CT)

Yield Strength (ksi)	40	55	65	80	90	95	110	125
Group 1	H 40	J 55 K 55		N 80				
Group 2			M 65	L 80	C 90	R 95 T 95	C 110	
Group 3							P 110	
Group 4								Q125

- Proprietary Grades  
High Collapse Casing MAHA HC L80  
MAHA HC P110
- Drill Pipes (API 5DP) Gr. E, X,G,S
- Sour Service NACE (MR - 0175)

# ASTM SCHEDULED SIZES

DIMENSION AND WEIGHT															
Nominal Pipe Size mm/inch	OD mm	SCHEDULE WALL THICKNESS (mm) / WEIGHT (kg/m)													
		Sch 5	Sch 10	Sch 20	Sch 30	STD	Sch 40	XS	Sch 60	Sch 80	Sch 100	Sch 120	Sch 140	Sch 160	XXS
6	10.3	-	1.24	-	-	1.73	1.73	2.41	-	2.41	-	-	-	-	-
1/8		-	0.28	-	-	0.37	0.37	0.47	-	0.47	-	-	-	-	-
8	13.7	-	1.65	-	-	2.24	2.24	3.02	-	3.02	-	-	-	-	-
1/4		-	0.49	-	-	0.63	0.63	0.80	-	0.80	-	-	-	-	-
10	17.1	-	1.65	-	-	2.31	2.31	3.20	-	3.20	-	-	-	-	-
3/8		-	0.63	-	-	0.84	0.84	1.10	-	1.10	-	-	-	-	-
15	21.3	1.65	2.11	-	-	2.77	2.77	3.73	-	3.73	-	-	-	4.78	7.47
1/2		0.80	1.00	-	-	1.27	1.27	1.62	-	1.62	-	-	-	1.95	2.55
20	26.7	1.65	2.11	-	-	2.87	2.87	3.91	-	3.91	-	-	-	5.56	7.82
3/4		1.03	1.28	-	-	1.69	1.69	2.20	-	2.20	-	-	-	2.90	3.64
25	33.4	1.65	2.77	-	-	3.38	3.38	4.55	-	4.55	-	-	-	6.35	9.09
1		1.29	2.09	-	-	2.50	2.50	3.24	-	3.24	-	-	-	4.24	5.45
32	42.2	1.65	2.77	-	-	3.56	3.56	4.85	-	4.85	-	-	-	6.35	9.70
1 1/4		1.65	2.69	-	-	3.39	3.39	4.47	-	4.47	-	-	-	5.61	7.77
40	48.3	1.65	2.77	-	-	3.68	3.68	5.08	-	5.08	-	-	-	7.14	10.15
1 1/2		1.90	3.11	-	-	4.05	4.05	5.41	-	5.41	-	-	-	7.25	9.55
50	60.3	1.65	2.77	-	-	3.91	3.91	5.54	-	5.54	-	-	-	8.74	11.07
2		2.39	3.93	-	-	5.44	5.44	7.48	-	7.48	-	-	-	11.11	13.44
65	73.0	2.11	3.05	-	-	5.16	5.16	7.01	-	7.01	-	-	-	9.53	14.02
2 1/2		3.69	5.26	-	-	8.63	8.63	11.41	-	11.41	-	-	-	14.92	20.39
80	88.9	2.11	3.05	-	-	5.49	5.49	7.62	-	7.62	-	-	-	11.13	15.24
3		4.52	6.46	-	-	11.29	11.29	15.27	-	15.27	-	-	-	21.35	27.68
90	101.6	2.11	3.05	-	-	5.74	5.74	8.08	-	8.08	-	-	-	-	-
3 1/2		5.18	7.41	-	-	13.57	13.57	18.64	-	18.64	-	-	-	-	-
100	114.3	2.11	3.05	-	-	6.02	6.02	8.56	-	8.56	-	11.13	-	13.49	17.12
4		5.84	8.37	-	-	16.08	16.08	22.32	-	22.32	-	28.32	-	33.54	41.03
125	141.3	2.77	3.40	-	-	6.55	6.55	9.53	-	9.53	-	12.70	-	15.88	19.05
5		9.46	11.56	-	-	21.77	21.77	30.97	-	30.97	-	40.28	-	49.12	57.43
150	168.30	2.77	3.40	-	-	7.11	7.11	10.97	-	10.97	-	14.27	-	18.26	21.95
6		11.31	13.83	-	-	28.26	28.26	42.56	-	42.56	-	54.21	-	67.57	79.22
200	219.10	-	-	6.35	7.04	8.18	8.18	12.70	10.31	12.70	15.09	18.26	20.62	23.01	22.23
8		-	-	33.32	36.82	42.55	42.55	64.64	53.09	64.64	75.92	90.44	100.93	111.27	107.93
250	273.00	3.40	4.19	6.35	7.80	9.27	9.27	12.70	12.70	15.09	18.26	21.44	25.40	28.58	25.40
10		22.61	27.78	41.76	51.01	60.29	60.29	81.53	81.53	95.98	114.71	133.01	155.10	172.27	155.10
300	323.80	-	-	-	8.38	9.53	10.31	12.70	14.27	17.48	21.44	25.40	28.58	33.32	25.40
12		-	-	-	65.19	73.86	79.71	97.44	108.93	132.05	159.87	186.92	208.08	238.69	186.92
350	355.60	-	-	-	9.53	9.53	11.13	12.70	15.09	19.05	23.83	27.79	31.75	35.71	-
14		-	-	-	81.33	81.33	94.55	107.40	126.72	158.11	194.98	224.66	253.58	281.72	-
400	406.40	-	-	-	9.53	9.53	12.70	12.70	16.66	21.44	-	-	-	-	-
16		-	-	-	93.27	93.27	123.31	123.31	160.12	203.54	-	-	-	-	-
450	457.00	-	-	9.53	11.13	9.53	14.27	12.70	19.05	23.83	-	-	-	-	-
18		-	-	105.17	122.38	105.17	155.81	139.16	205.75	254.57	-	-	-	-	-
500	508.00	-	-	9.53	12.70	9.53	15.09	12.70	20.62	26.19	-	-	-	-	-
20		-	-	117.15	155.13	117.15	183.43	155.13	247.84	311.19	-	-	-	-	-

NOTE : Special sizes made to order.



# BOILER AND HEAT-EXCHANGER TUBES

Outside Diameter		Wall Thickness																
		16 swg	15 swg	14 swg	13 swg	12 swg	11 swg	10 swg	9 swg	8 swg	7 swg	6 swg	5 swg	4 swg	1/4"	5/16"	3/8"	1/2"
		1.63 mm	1.83 mm	2.03 mm	2.34 mm	2.64 mm	2.95 mm	3.25 mm	3.66 mm	4.06 mm	4.47 mm	4.88 mm	5.39 mm	5.89 mm	6.35 mm	7.94 mm	9.53 mm	12.7 mm
In	mm	Weight with nominal thk (kg/mtr)																
		Weight with minimum thk (kg/mtr)																
0.75	19.05	0.70	0.78	0.85	0.96	1.07	1.17	1.27										
		0.74	0.82	0.89	1.01	1.12	1.23	1.33										
1.00	25.40	0.96	1.06	1.17	1.33	1.48	1.63	1.78										
		1.00	1.12	1.23	1.40	1.56	1.71	1.86										
1.25	31.75				1.70	1.90	2.10	2.28	2.54	2.77								
					1.78	1.99	2.20	2.40	2.66	2.91								
1.50	38.10							2.79	3.11	3.41	3.71	4.00	4.35	4.68	4.97			
								3.07	3.42	3.75	4.08	4.40	4.57	4.91	5.22			
1.75	44.45							3.30	3.68	4.04	4.41	4.76	5.19	5.60	5.97			
								3.63	4.05	4.45	4.85	5.24	5.71	5.88	6.26			
2.00	50.80							3.81	4.25	4.68	5.11	5.53	6.04	6.52	6.96			
								4.19	4.68	5.15	5.62	6.08	6.64	7.18	7.66			
2.25	57.15							4.32	4.83	5.32	5.81	6.29	6.88	7.45	7.96	9.64		
								4.75	5.31	5.85	6.39	6.92	7.57	8.19	8.75	10.60		
2.50	63.50							4.83	5.40	5.95	6.51	7.05	7.72	8.37	8.95	10.88	12.68	
								5.31	5.94	6.55	7.16	7.76	8.50	9.21	9.84	11.97	13.95	
2.75	69.85							5.34	5.97	6.59	7.21	7.82	8.57	9.29	9.94	12.12	14.18	
								5.87	6.57	7.25	7.93	8.60	9.43	10.22	10.94	13.34	15.59	
3.00	76.20							5.85	6.55	7.22	7.91	8.58	9.41	10.21	10.94	13.37	15.67	
								6.43	7.20	7.95	8.70	9.44	10.35	11.23	12.03	14.70	17.24	
3.25	82.55							6.36	7.12	7.86	8.61	9.35	10.26	11.14	11.93	14.61	17.16	
								6.99	7.83	8.64	9.47	10.28	11.28	12.25	13.13	16.07	18.88	
3.50	88.90							6.86	7.69	8.49	9.31	10.11	11.10	12.06	12.93	15.85	18.65	
								7.55	8.46	9.34	10.24	11.12	12.21	13.26	14.22	17.44	20.52	
3.75	95.25									9.13	10.01	10.88	11.94	12.98	13.92	17.10	20.15	
										10.04	11.01	11.96	13.14	14.28	15.31	18.81	22.16	
4.00	101.60									9.77	10.71	11.64	12.79	13.90	14.92	18.34	21.64	
										10.74	11.78	12.80	14.07	15.29	16.41	20.17	23.80	
4.25	107.95									10.40	11.41	12.40	13.63	14.82	15.91	19.58	23.13	29.83
										11.44	12.55	13.64	15.00	16.31	17.50	21.54	25.44	32.82
4.50	114.30									11.04	12.11	13.17	14.48	15.75	16.91	20.83	24.62	31.82
										12.14	13.32	14.49	15.92	17.32	18.60	22.91	27.09	35.00
4.75	120.65									11.67	12.81	13.93	15.32	16.67	17.90	22.07	26.12	33.81
										12.84	14.09	15.33	16.85	18.34	19.69	24.28	28.73	37.19
5.00	127.00									12.31	13.51	14.70	16.17	17.59	18.89	23.31	27.61	35.80
										13.54	14.86	16.17	17.78	19.35	20.78	25.64	30.37	39.38
5.25	133.35									12.95	14.21	15.46	17.01	18.51	19.89	24.56	29.10	37.79
										14.24	15.63	17.01	18.71	20.37	21.88	27.01	32.01	41.57
5.50	139.70												17.85	19.44	20.88	25.80	30.59	39.78
													19.64	21.38	22.97	28.38	33.65	43.75
6.00	152.40												19.54	21.28	22.87	28.29	33.58	43.75
													21.50	23.41	25.16	31.12	36.94	48.13
6.50	165.10												21.23	23.13	24.86	30.77	36.56	47.73
													23.35	25.44	27.35	33.85	40.22	52.51

NOTE : Special sizes made to orders.

# OCTG: API LINE PIPES

Dimensions, Weights and Test Pressures for Sizes 0.840" through 20" (SI Units)															
Size	Specified Outside Diameter	Specified Wall Thickness	Plain-end Weight per Unit Length	Calculated Inside Diameter	Minimum Test Pressure (kPa x 100)										Type
	D	t	Wpe	d	Grade	Grade	Grade	Grade	Grade	Grade	Grade	Grade	Grade	Grade	
	(mm)	(mm)	(Kg/m)	(mm)	A25	A	B	X-42	X-46	X-52	X-56	X-60	X-65	X-70	
0.840	21.3	2.8	1.28	15.7	48	48	48	-	-	-	-	-	-	-	S
0.840	21.3	3.7	1.61	13.9	59	59	59	-	-	-	-	-	-	-	S
1.050	26.7	2.9	1.70	20.9	48	48	48	-	-	-	-	-	-	-	S
1.050	26.7	3.9	2.19	18.9	59	59	59	-	-	-	-	-	-	-	S
1.315	33.4	3.4	2.52	26.6	48	48	48	-	-	-	-	-	-	-	S
1.315	33.4	4.5	3.21	24.4	59	59	59	-	-	-	-	-	-	-	S
1.660	42.2	3.6	3.43	35.0	69	83	90	-	-	-	-	-	-	-	S
1.660	42.2	4.9	4.51	32.4	90	124	131	-	-	-	-	-	-	-	S
1.900	48.3	3.7	4.07	40.9	69	83	90	-	-	-	-	-	-	-	S
1.900	48.3	5.1	5.43	38.1	90	124	131	-	-	-	-	-	-	-	S
<b>2 3/8"</b>	60.3	3.6	5.03	53.1	69	150	170	205	205	205	205	205	205	205	S
	60.3	3.9	5.42	52.5	69	163	170	205	205	205	205	205	205	205	S
	60.3	4.4	6.07	51.5	76	170	170	205	205	205	205	205	205	205	S
	60.3	4.8	6.57	50.7	83	170	170	205	205	205	205	205	205	205	S
	60.3	5.5	7.43	49.3	90	170	170	205	205	205	205	205	205	205	S
	60.3	6.4	8.51	47.5	96	170	170	205	205	205	205	205	205	205	S
	60.3	7.1	9.31	46.1	96	170	170	205	205	205	205	205	205	205	S
<b>2 7/8"</b>	73.0	4.0	6.81	65.0	69	138	161	191	205	205	205	205	205	205	S
	73.0	4.4	7.44	64.2	69	152	170	205	205	205	205	205	205	205	S
	73.0	4.8	8.07	63.4	69	166	170	205	205	205	205	205	205	205	S
	73.0	5.2	8.69	62.6	69	170	170	205	205	205	205	205	205	205	S
	73.0	5.5	9.16	62.0	76	170	170	205	205	205	205	205	205	205	S
	73.0	6.4	10.51	60.2	83	170	170	205	205	205	205	205	205	205	S
	73.0	7.0	11.39	59.0	90	170	170	205	205	205	205	205	205	205	S
<b>3 1/2"</b>	88.9	3.2	6.76	82.5	69	91	106	125	138	156	168	179	194	205	E
	88.9	3.6	7.57	81.7	69	102	119	141	156	175	190	201	205	205	E
	88.9	4.0	8.37	80.9	69	113	132	157	173	194	205	205	205	205	S/E
	88.9	4.4	9.17	80.1	69	125	146	172	190	205	205	205	205	205	S/E
	88.9	4.8	9.95	79.3	69	136	159	188	205	205	205	205	205	205	S/E
	88.9	5.5	11.31	77.9	69	156	170	205	205	205	205	205	205	205	S/E
	88.9	6.4	13.02	76.1	-	170	170	205	205	205	205	205	205	205	S
	88.9	7.1	14.32	74.7	-	170	170	205	205	205	205	205	205	205	S
	88.9	7.6	15.24	73.7	90	170	170	205	205	205	205	205	205	205	S
<b>4"</b>	101.6	3.2	7.76	95.2	-	79	93	110	121	136	147	157	170	183	E
	101.6	3.6	8.70	94.4	55	89	104	123	136	153	166	177	191	205	E
	101.6	4.0	9.63	93.6	-	99	116	137	151	170	184	196	205	205	S/E
	101.6	4.4	10.55	92.8	69	109	127	151	166	187	203	205	205	205	S/E
	101.6	4.8	11.46	92.0	83	119	139	164	181	204	205	205	205	205	S/E

S:Seamless  S/E   
 E:ERW

# OCTG: API LINE PIPES

Dimensions, Weights and Test Pressures for Sizes 0.840" through 20" (SI Units)															
Size	Specified Outside Diameter	Specified Wall Thickness	Plain-end Weight per Unit Length	Calculated Inside Diameter	Minimum Test Pressure (kPa x 100)										Type
	D	t	Wpe	d	Grade	Grade	Grade	Grade	Grade	Grade	Grade	Grade	Grade	Grade	
	(mm)	(mm)	(Kg/m)	(mm)	A25	A	B	X-42	X-46	X-52	X-56	X-60	X-65	X-70	
	101.6	5.7	13.48	90.2	83	141	165	195	205	205	205	205	205	205	S/E
	101.6	6.4	15.02	88.8	-	159	185	205	205	205	205	205	205	205	S/E
	101.6	7.1	16.55	87.4	-	176	190	205	205	205	205	205	205	205	S
	101.6	8.1	18.68	85.4	117	190	190	205	205	205	205	205	205	205	S
<b>4 1/2"</b>	114.3	3.2	8.77	107.9	55	71	82	97	108	121	131	139	151	163	E
	114.3	3.6	9.83	107.1	-	79	93	110	121	136	147	157	170	183	E
	114.3	4.0	10.88	106.3	69	88	103	122	134	151	164	174	189	204	S/E
	114.3	4.4	11.92	105.5	-	97	113	134	148	166	180	192	205	205	S/E
	114.3	4.8	12.96	104.7	83	106	123	146	161	181	197	205	205	205	S/E
	114.3	5.2	13.99	103.9	-	115	134	158	175	197	205	205	205	205	S/E
	114.3	5.6	15.01	103.1	83	123	144	170	188	205	205	205	205	205	S/E
	114.3	6.0	16.02	102.3	83	132	154	183	202	205	205	205	205	205	S/E
	114.3	6.4	17.03	101.5	-	141	165	195	205	205	205	205	205	205	S/E
	114.3	7.1	18.77	100.1	-	157	183	205	205	205	205	205	205	205	S
	114.3	7.9	20.73	98.5	-	174	190	205	205	205	205	205	205	205	S
	114.3	8.6	22.42	97.1	117	190	190	205	205	205	205	205	205	205	S
	114.3	11.1	28.25	92.1	-	190	190	205	205	205	205	205	205	205	S
	114.3	13.5	33.56	87.3	-	190	190	205	205	205	205	205	205	205	S
	114.3	17.1	40.99	80.1	-	190	190	205	205	205	205	205	205	205	S
<b>5 9/16"</b>	141.3	3.2	10.90	134.9	46	57	67	79	87	98	106	113	122	132	E
	141.3	4.0	13.54	133.3	58	71	83	99	109	122	132	141	153	165	E
	141.3	4.8	16.16	131.7	70	86	100	118	130	147	159	169	183	198	E
	141.3	5.6	18.74	130.1	81	100	117	138	152	171	185	197	205	205	S/E
	141.3	6.6	21.92	128.1	83	118	137	163	179	202	205	205	205	205	S/E
	141.3	7.1	23.50	127.1	105	127	148	175	193	205	205	205	205	205	S
	141.3	7.9	25.99	125.5	116	141	164	195	205	205	205	205	205	205	S
	141.3	8.7	28.45	123.9	128	155	181	205	205	205	205	205	205	205	S
	141.3	9.5	30.88	122.3	139	169	190	205	205	205	205	205	205	205	S
	141.3	12.7	40.28	115.9	186	190	190	205	205	205	205	205	205	205	S
	141.3	15.9	49.17	109.5	193	190	190	205	205	205	205	205	205	205	S
<b>6 5/8"</b>	168.3	3.2	13.03	161.9	-	48	56	83	91	103	111	118	128	138	E
	168.3	3.6	14.62	161.1	-	54	63	93	103	116	125	133	144	156	E
	168.3	4.0	16.21	160.3	-	60	70	103	114	128	139	148	160	173	E
	168.3	4.4	17.78	159.5	-	66	77	114	125	141	153	163	176	190	E
	168.3	4.8	19.35	158.7	-	72	84	124	137	154	167	178	193	205	E
	168.3	5.2	20.91	157.9	-	78	91	134	148	167	181	192	205	205	S/E
	168.3	5.6	22.47	157.1	-	84	98	145	160	180	195	205	205	205	S/E

S:Seamless  S/E   
 E:ERW

# OCTG: API LINE PIPES

Dimensions, Weights and Test Pressures for Sizes 0.840" through 20" (SI Units)															
Size	Specified Outside Diameter	Specified Wall Thickness	Plain-end Weight per Unit Length	Calculated Inside Diameter	Minimum Test Pressure (kPa x 100)										Type
	D	t	Wpe	d	Grade	Grade	Grade	Grade	Grade	Grade	Grade	Grade	Grade	Grade	
	(mm)	(mm)	(Kg/m)	(mm)	A25	A	B	X-42	X-46	X-52	X-56	X-60	X-65	X-70	
	168.3	6.4	25.55	155.5	-	96	112	165	183	205	205	205	205	205	S/E
	168.3	7.1	28.22	154.1	-	106	124	184	202	205	205	205	205	205	S/E
	168.3	7.9	31.25	152.5	-	118	138	204	205	205	205	205	205	205	S
	168.3	8.7	34.24	150.9	-	130	152	205	205	205	205	205	205	205	S
	168.3	9.5	37.20	149.3	-	142	166	205	205	205	205	205	205	205	S
	168.3	11.0	42.67	146.3	-	165	190	205	205	205	205	205	205	205	S
	168.3	12.7	48.73	142.9	-	190	190	205	205	205	205	205	205	205	S
	168.3	14.3	54.31	139.7	-	190	190	205	205	205	205	205	205	205	S
	168.3	15.9	59.76	136.5	-	190	190	205	205	205	205	205	205	205	S
	168.3	18.3	67.69	131.7	-	190	190	205	205	205	205	205	205	205	S
	168.3	19.1	70.27	130.1	-	190	190	205	205	205	205	205	205	205	S
<b>8 5/8"</b>	219.1	4.0	21.22	211.1	-	46	54	79	88	99	107	114	123	133	E
	219.1	4.8	25.37	209.5	-	55	64	95	105	118	128	136	148	159	E
	219.1	5.2	27.43	208.7	-	60	70	103	114	128	139	148	160	173	E
	219.1	5.6	29.48	207.9	-	64	75	111	123	138	150	159	173	186	E
	219.1	6.4	33.57	206.3	-	74	86	127	140	158	171	182	197	205	S/E
	219.1	7.0	36.61	205.1	-	81	94	139	153	173	187	199	205	205	S/E
	219.1	7.9	41.14	203.3	-	91	106	157	173	195	205	205	205	205	S/E
	219.1	8.2	42.65	202.7	-	94	110	163	180	202	205	205	205	205	S/E
	219.1	8.7	45.14	201.7	-	100	117	173	191	205	205	205	205	205	S/E
	219.1	9.5	49.10	200.1	-	109	127	189	205	205	205	205	205	205	S/E
	219.1	11.1	56.94	196.9	-	128	149	205	205	205	205	205	205	205	S/E
	219.1	12.7	64.64	193.7	-	146	170	205	205	205	205	205	205	205	S/E
	219.1	14.3	72.22	190.5	-	164	190	205	205	205	205	205	205	205	S
	219.1	15.9	79.67	187.3	-	183	190	205	205	205	205	205	205	205	S
	219.1	18.3	90.62	182.5	-	190	190	205	205	205	205	205	205	205	S
	219.1	19.1	94.20	180.9	-	190	190	205	205	205	205	205	205	205	S
	219.1	20.6	100.84	177.9	-	190	190	205	205	205	205	205	205	205	S
	219.1	22.2	107.79	174.7	-	190	190	205	205	205	205	205	205	205	S
	219.1	25.4	121.33	168.3	-	190	190	205	205	205	205	205	205	205	S
<b>10 3/4"</b>	273.1	4.0	26.54	265.1	-	37	43	72	80	90	97	103	112	121	E
	273.1	4.8	31.76	263.5	-	44	52	87	96	108	117	124	134	145	E
	273.1	5.2	34.35	262.7	-	48	56	94	104	117	126	134	146	157	E
	273.1	5.6	36.94	261.9	-	52	60	101	112	125	136	145	157	169	E
	273.1	6.4	42.09	260.3	-	59	69	116	127	143	155	165	179	193	E
	273.1	7.1	46.57	258.9	-	66	76	128	141	159	172	183	199	205	S/E

S:Seamless  S/E   
 E:ERW

# OCTG: API LINE PIPES

Dimensions, Weights and Test Pressures for Sizes 0.840" through 20" (SI Units)																	
Size	Specified Outside Diameter	Specified Wall Thickness	Plain-end Weight per Unit Length	Calculated Inside Diameter	Minimum Test Pressure (kPa x 100)										Type		
					D	t	Wpe	d	Grade	Grade	Grade	Grade	Grade	Grade		Grade	Grade
					(mm)	(mm)	(Kg/m)	(mm)	A25	A	B	X-42	X-46	X-52		X-56	X-60
	273.1	7.8	51.03	257.5	-	72	84	141	155	175	189	201	205	205	S/E		
	273.1	8.7	56.72	255.7	-	80	94	157	173	195	205	205	205	205	S/E		
	273.1	9.3	60.50	254.5	-	86	100	168	185	205	205	205	205	205	S/E		
	273.1	11.1	71.72	250.9	-	102	119	200	205	205	205	205	205	205	S/E		
	273.1	12.7	81.55	247.7	-	117	137	205	205	205	205	205	205	205	S/E		
	273.1	14.3	91.26	244.5	-	132	154	205	205	205	205	205	205	205	S		
	273.1	15.9	100.85	241.3	-	147	171	205	205	205	205	205	205	205	S		
	273.1	18.3	114.99	236.5	-	169	190	205	205	205	205	205	205	205	S		
	273.1	20.6	128.27	231.9	-	190	190	205	205	205	205	205	205	205	S		
	273.1	22.2	137.36	228.7	-	190	190	205	205	205	205	205	205	205	S		
	273.1	23.8	146.32	225.5	-	190	190	205	205	205	205	205	205	205	S		
	273.1	25.4	155.15	222.3	-	190	190	205	205	205	205	205	205	205	S		
	273.1	31.8	189.22	209.5	-	190	190	205	205	205	205	205	205	205	S		
<b>12 3/4"</b>	323.9	4.4	34.67	315.1	-	34	40	67	74	83	90	96	104	112	E		
	323.9	4.8	37.77	314.3	-	37	44	73	81	91	98	105	113	122	E		
	323.9	5.2	40.87	313.5	-	40	47	79	87	98	106	113	123	132	E		
	323.9	5.6	43.96	312.7	-	44	51	85	94	106	115	122	132	143	E		
	323.9	6.4	50.11	311.1	-	50	58	97	107	121	131	139	151	163	E		
	323.9	7.1	55.47	309.7	-	55	64	108	119	134	145	155	168	181	S/E		
	323.9	7.9	61.56	308.1	-	61	72	120	133	149	162	172	187	201	S/E		
	323.9	8.4	65.35	307.1	-	65	76	128	141	159	172	183	198	205	S/E		
	323.9	8.7	67.62	306.5	-	68	79	132	146	164	178	189	205	205	S/E		
	323.9	9.5	73.65	304.9	-	74	86	145	160	179	194	205	205	205	S/E		
	323.9	10.3	79.65	303.3	-	80	93	157	173	195	205	205	205	205	S/E		
	323.9	11.1	85.62	301.7	-	86	101	169	186	205	205	205	205	205	S/E		
	323.9	12.7	97.46	298.5	-	99	115	193	205	205	205	205	205	205	S/E		
	323.9	14.3	109.18	295.3	-	111	130	205	205	205	205	205	205	205	S		
	323.9	15.9	120.76	292.1	-	124	144	205	205	205	205	205	205	205	S		
	323.9	17.5	132.23	288.9	-	136	159	205	205	205	205	205	205	205	S		
	323.9	19.1	143.56	285.7	-	149	173	205	205	205	205	205	205	205	S		
	323.9	20.6	154.08	282.7	-	160	187	205	205	205	205	205	205	205	S		
	323.9	22.2	165.17	279.5	-	173	190	205	205	205	205	205	205	205	S		
	323.9	23.8	176.13	276.3	-	185	190	205	205	205	205	205	205	205	S		
	323.9	25.4	186.97	273.1	-	190	190	205	205	205	205	205	205	205	S		
	323.9	27.0	197.68	269.9	-	190	190	205	205	205	205	205	205	205	S		
	323.9	28.6	208.27	266.7	-	190	190	205	205	205	205	205	205	205	S		
	323.9	31.8	229.06	260.3	-	190	190	205	205	205	205	205	205	205	S		

S:Seamless  S/E   
 E:ERW

# OCTG: API LINE PIPES

Dimensions, Weights and Test Pressures for Sizes 0.840" through 20" (SI Units)															
Size	Specified Outside Diameter	Specified Wall Thickness	Plain-end Weight per Unit Length	Calculated Inside Diameter	Minimum Test Pressure (kPa x 100)										Type
	D	t	Wpe	d	Grade	Grade	Grade	Grade	Grade	Grade	Grade	Grade	Grade	Grade	
	(mm)	(mm)	(Kg/m)	(mm)	A25	A	B	X-42	X-46	X-52	X-56	X-60	X-65	X-70	
14"	355.6	4.8	41.52	346.0	-	34	40	67	73	83	89	95	103	111	E
	355.6	5.2	44.93	345.2	-	37	43	72	80	89	97	103	112	121	E
	355.6	5.3	45.78	345.0	-	38	44	74	81	91	99	105	114	123	E
	355.6	5.6	48.33	344.4	-	40	46	78	86	96	104	111	121	130	E
	355.6	6.4	55.11	342.8	-	45	53	89	98	110	119	127	138	148	E
	355.6	7.1	61.02	341.4	-	50	59	98	109	122	132	141	153	165	E
	355.6	7.9	67.74	339.8	-	56	65	110	121	136	147	156	170	183	E
	355.6	8.7	74.42	338.2	-	62	72	121	133	150	162	173	187	202	E
	355.6	9.5	81.08	336.6	-	67	79	132	145	163	177	188	204	205	S/E
	355.6	10.3	87.71	335.0	-	73	85	143	158	177	192	204	205	205	S/E
	355.6	11.1	94.30	333.4	-	79	92	154	170	191	205	205	205	205	S/E
	355.6	11.9	100.86	331.8	-	84	98	165	182	205	205	205	205	205	S/E
	355.6	12.7	107.39	330.2	-	90	105	176	194	205	205	205	205	205	S/E
	355.6	14.3	120.36	327.0	-	101	118	198	205	205	205	205	205	205	S
	355.6	15.9	133.19	323.8	-	113	131	205	205	205	205	205	205	205	S
	355.6	17.5	145.91	320.6	-	124	145	205	205	205	205	205	205	205	S
	355.6	19.1	158.49	317.4	-	135	158	205	205	205	205	205	205	205	S
	355.6	20.6	170.18	314.4	-	146	170	205	205	205	205	205	205	205	S
	355.6	22.2	182.52	311.2	-	157	184	205	205	205	205	205	205	205	S
	355.6	23.8	194.74	308.0	-	169	190	205	205	205	205	205	205	205	S
355.6	25.4	206.83	304.8	-	180	190	205	205	205	205	205	205	205	S	
355.6	27.0	218.79	301.6	-	190	190	205	205	205	205	205	205	205	S	
355.6	28.6	230.63	298.4	-	190	190	205	205	205	205	205	205	205	S	
355.6	31.8	253.92	292.0	-	190	190	205	205	205	205	205	205	205	S	
16"	406.4	4.8	47.54	396.8	-	30	35	58	64	72	78	83	90	97	E
	406.4	5.2	51.45	396.0	-	32	38	63	70	78	85	90	98	106	E
	406.4	5.6	55.35	395.2	-	35	41	68	75	84	91	97	105	114	E
	406.4	6.4	63.13	393.6	-	40	46	78	86	96	104	111	120	130	E
	406.4	7.1	69.91	392.2	-	44	51	86	95	107	116	123	134	144	E
	406.4	7.9	77.63	390.6	-	49	57	96	106	119	129	137	149	160	E
	406.4	8.7	85.32	389.0	-	54	63	106	117	131	142	151	164	177	E
	406.4	9.5	92.99	387.4	-	59	69	115	127	143	155	165	179	193	S/E
	406.4	10.3	100.61	385.8	-	64	75	125	138	155	168	179	194	205	E
	406.4	11.1	108.20	384.2	-	69	80	135	149	167	181	193	205	205	E
406.4	11.9	115.77	382.6	-	74	86	144	159	179	194	205	205	205	E	
406.4	12.7	123.31	381.0	-	79	92	154	170	191	205	205	205	205	S/E	

S:Seamless  S/E   
 E:ERW

# OCTG: API LINE PIPES

Dimensions, Weights and Test Pressures for Sizes 0.840" through 20" (SI Units)															
Size	Specified Outside Diameter	Specified Wall Thickness	Plain-end Weight per Unit Length	Calculated Inside Diameter	Minimum Test Pressure (kPa x 100)										Type
	D	t	Wpe	d	Grade	Grade	Grade	Grade	Grade	Grade	Grade	Grade	Grade	Grade	
	(mm)	(mm)	(Kg/m)	(mm)	A25	A	B	X-42	X-46	X-52	X-56	X-60	X-65	X-70	
18"	406.4	21.4	203.19	363.6	-	133	155	205	205	322	205	205	205	205	S
	457.0	4.8	53.53	447.4	-	27	31	52	57	64	70	74	80	87	E
	457.0	5.6	62.34	445.8	-	31	36	60	67	75	81	87	94	101	E
	457.0	6.4	71.12	444.2	-	35	41	69	76	85	93	99	107	116	E
	457.0	7.1	78.77	442.8	-	39	46	77	85	95	103	110	119	128	E
	457.0	7.9	87.49	441.2	-	44	51	85	94	106	115	122	132	143	E
	457.0	8.7	96.18	439.6	-	48	56	94	104	117	126	134	146	157	E
	457.0	9.5	104.84	438.0	-	52	61	102	113	127	138	147	159	171	S/E
	457.0	10.3	113.46	436.4	-	57	66	111	123	138	149	159	172	186	E
	457.0	11.1	122.06	434.8	-	61	71	120	132	149	161	171	186	200	S/E
	457.0	11.9	130.62	433.2	-	66	77	128	142	159	173	184	199	205	E
	457.0	12.7	139.16	431.6	-	70	82	137	151	170	184	196	205	205	S/E
	457.0	14.3	156.12	428.4	-	79	92	154	170	192	205	205	205	205	S
	457.0	19.1	206.27	418.8	-	105	123	205	205	205	205	205	205	205	S
457.0	23.8	254.26	409.4	-	131	153	205	205	205	205	205	205	205	S	
20"	508.0	5.6	69.38	496.8	-	28	32	58	64	71	77	82	89	96	E
	508.0	6.4	79.16	495.2	-	32	37	66	73	81	88	94	102	110	E
	508.0	7.1	87.70	493.8	-	35	41	73	81	91	98	104	113	122	E
	508.0	7.9	97.43	492.2	-	39	46	81	90	101	109	116	126	136	E
	508.0	8.7	107.12	490.6	-	43	50	89	99	111	120	128	139	150	E
	508.0	9.5	116.79	489.0	-	47	55	92	102	114	124	132	143	154	S/E
	508.0	10.3	126.41	487.4	-	51	60	106	117	131	142	152	164	177	E
	508.0	11.1	136.01	485.8	-	55	64	114	126	142	153	163	177	191	E
	508.0	11.9	145.58	484.2	-	59	69	122	135	152	164	175	190	205	E
	508.0	12.7	155.13	482.6	-	63	74	123	136	153	166	176	191	205	S/E
	508.0	15.1	183.55	477.8	-	75	87	147	162	182	197	205	205	205	S
	508.0	20.6	247.61	466.8	-	102	119	200	205	205	205	205	205	205	S
	508.0	26.2	311.31	455.6	-	130	152	205	205	205	205	205	205	205	S

S:Seamless  S/E   
 E:ERW

# OCTG: API TUBING

DIMENSIONS, WEIGHTS AND END FINISH																
Outside Diameter		Nominal Weights				Wall Thickness		Coupling OD		Thread Type		Type of End Finish				Type
		Non Upset T&C		External Upset T&C				NUE	EUE	API Round		Grade				
In.	mm.	lb/ft.	kg/mtr	lb/ft.	kg/mtr	In.	mm.			mm.	mm.	TPI	TPI	H-40 J-55	N-80 Type-1,Q	L-80 C-90 R-95 T-95
1.900	48.26	2.40	3.57	-	-	0.125	3.18	-	-	-	-	P	-	-	-	S
1.900	48.26	2.75	4.09	2.90	4.32	0.145	3.68	55.88	63.50	10	10	PNU	PNU	PNU	-	S
1.900	48.26	3.65	5.43	3.73	5.55	0.200	5.08	-	63.50	-	10	PU	PU	PU	PU	S
1.900	48.26	4.42	6.58	-	-	0.250	6.35	-	-	-	-	-	-	P	-	S
1.900	48.26	5.15	7.66	-	-	0.300	7.62	-	-	-	-	-	-	P	-	S
2.063	52.40	3.24	4.82	-	-	0.156	3.96	-	-	-	-	P	P	P	-	S
2.063	52.40	4.50	6.70	-	-	0.225	5.72	-	-	-	-	P	P	P	P	S
2 3/8	60.32	4.00	5.95	-	-	0.167	4.24	73.02	-	10	-	PN	PN	PN	-	S
2 3/8	60.32	4.60	6.85	4.70	6.99	0.190	4.83	73.02	77.80	10	8	PNU	PNU	PNU	PNU	S
2 3/8	60.32	5.80	8.63	5.95	8.85	0.254	6.45	73.02	77.80	10	8	-	PNU	PNU	PNU	S
2 3/8	60.32	6.60	9.82	-	-	0.295	7.49	-	-	-	-	-	-	P	-	S
2 3/8	60.32	7.35	10.94	7.45	11.09	0.336	8.53	-	77.80	-	8	-	-	PU	-	S
2 7/8	73.02	6.40	9.52	6.50	9.67	0.217	5.51	88.90	93.17	10	8	PNU	PNU	PNU	PNU	S/E*
2 7/8	73.02	7.80	11.61	7.90	11.76	0.276	7.01	88.90	93.17	10	8	-	PNU	PNU	PNU	S
2 7/8	73.02	8.60	12.80	8.70	12.95	0.308	7.82	88.90	93.17	10	8	-	PNU	PNU	PNU	S
2 7/8	73.02	9.35	13.91	9.45	14.06	0.340	8.64	-	93.17	-	8	-	-	PU	-	S
2 7/8	73.02	10.50	15.63	-	-	0.392	9.96	-	-	-	-	-	-	P	-	S
2 7/8	73.02	11.50	17.11	-	-	0.440	11.18	-	-	-	-	-	-	P	-	S
3 1/2	88.90	7.70	11.46	-	-	0.216	5.49	107.95	-	10	-	PN	PN	PN	-	S/E*
3 1/2	88.90	9.20	13.69	9.30	13.84	0.254	6.45	107.95	114.30	10	8	PNU	PNU	PNU	PNU	S
3 1/2	88.90	10.20	15.18	-	-	0.289	7.34	107.95	-	10	-	PN	PN	PN	-	S
3 1/2	88.90	12.70	18.90	12.95	19.27	0.375	9.52	107.95	114.30	10	8	-	PNU	PNU	PNU	S
3 1/2	88.90	14.30	21.28	-	-	0.430	10.92	-	-	-	-	-	-	P	-	S
3 1/2	88.90	15.50	23.07	-	-	0.476	12.09	-	-	-	-	-	-	P	-	S
3 1/2	88.90	17.00	25.30	-	-	0.530	13.46	-	-	-	-	-	-	P	-	S
4	101.60	9.50	14.14	-	-	0.226	5.74	120.65	-	8	-	PN	PN	PN	-	S/E*
4	101.60	10.70	15.92	11.00	16.37	0.262	6.65	-	127.00	-	8	PU	PU	PU	-	S
4	101.60	13.20	19.64	-	-	0.330	8.38	-	-	-	-	-	-	P	-	S
4	101.60	16.10	23.96	-	-	0.415	10.54	-	-	-	-	-	-	P	-	S
4	101.60	18.90	28.13	-	-	0.500	12.70	-	-	-	-	-	-	P	-	S
4	101.60	22.20	33.04	-	-	0.610	15.49	-	-	-	-	-	-	P	-	S
4 1/2	114.30	12.60	18.75	12.75	18.97	0.271	6.88	132.08	141.30	8	8	PNU	PNU	PNU	-	S/E*
4 1/2	114.30	15.20	22.62	-	-	0.337	8.56	-	-	-	-	-	-	P	-	S
4 1/2	114.30	17.00	25.30	-	-	0.380	9.65	-	-	-	-	-	-	P	-	S
4 1/2	114.30	18.90	28.13	-	-	0.430	10.92	-	-	-	-	-	-	P	-	S
4 1/2	114.30	21.50	32.00	-	-	0.500	12.70	-	-	-	-	-	-	P	-	S
4 1/2	114.30	23.70	35.27	-	-	0.560	14.22	-	-	-	-	-	-	P	-	S
4 1/2	114.30	26.10	38.84	-	-	0.630	16.00	-	-	-	-	-	-	P	-	S

\* Available only in J-55

S:Seamless  S/E   
 E:ERW



# OCTG: API CASING

DIMENSIONS, WEIGHTS AND END FINISH																				
Outside Diameter		Normal Weight T&C		Normal Weight Plain-end		Wall Thickness		TYPE OF FINISH GRADE								COUPLING OD	THREAD TYPES TPI		TYPE	
In.	mm	lb/ft.	Kg/mtr	lb/ft.	Kg/mtr	Inch	mm	H-40	J-55 K-55	M 65	L-80 R-95	N-80 Type-1,Q	C-90 T-95	C-110	P-110	Q-125	mm	STC LTC	BTC	S / E
4 1/2	114.30	9.50	14.14	9.42	14.02	0.205	5.21	PS	PS	PS	-	-	-	-	-	-	127.00	8	-	S
4 1/2	114.30	10.50	15.63	10.24	15.24	0.224	5.69	-	PSB	PSB	-	-	-	-	-	-	127.00	8	5	S
4 1/2	114.30	11.60	17.26	11.36	16.91	0.250	6.35	-	PSLB	PLB	PLB	PLB	PLB	P	PLB	-	127.00	8	5	S
4 1/2	114.30	13.50	20.09	13.06	19.44	0.290	7.37	-	-	PLB	PLB	PLB	PLB	P	PLB	-	127.00	8	5	S
4 1/2	114.30	15.10	22.47	15.00	22.32	0.337	8.56	-	-	-	-	-	-	-	PLB	PLB	127.00	8	5	S
5	127.00	11.50	17.11	11.25	16.74	0.220	5.59	-	PS	PS	-	-	-	-	-	-	141.30	8	-	S
5	127.00	13.00	19.35	12.85	19.12	0.253	6.43	-	PSLB	PSLB	-	-	-	-	-	-	141.30	8	5	S
5	127.00	15.00	22.32	14.89	22.16	0.296	7.52	-	PSLB	PLB	PLB	PLB	PLB	P	PLB	-	141.30	8	5	S
5	127.00	18.00	26.79	17.94	26.70	0.362	9.19	-	-	PLB	PLB	PLB	PLB	P	PLB	PLB	141.30	8	5	S
5	127.00	21.40	31.85	21.32	31.73	0.437	11.10	-	-	PLB	PLB	PLB	PLB	P	PLB	PLB	141.30	8	5	S
5	127.00	23.20	34.53	23.11	34.39	0.478	12.14	-	-	-	PLB	PLB	PLB	P	PLB	PLB	141.30	8	5	S
5	127.00	24.10	35.87	24.05	35.80	0.500	12.70	-	-	-	PLB	PLB	PLB	P	PLB	PLB	141.30	8	5	S
5 1/2	139.70	14.00	20.84	13.72	20.41	0.244	6.20	PS	PS	PS	-	-	-	-	-	-	153.67	8	-	S
5 1/2	139.70	15.50	23.07	15.35	22.85	0.275	6.98	-	PSLB	PSLB	-	-	-	-	-	-	153.67	8	5	S
5 1/2	139.70	17.00	25.30	16.88	25.13	0.304	7.72	-	PSLB	PLB	PLB	PLB	PLB	P	PLB	-	153.67	8	5	S
5 1/2	139.70	20.00	29.76	19.83	29.52	0.361	9.17	-	-	PLB	PLB	PLB	PLB	P	PLB	-	153.67	8	5	S
5 1/2	139.70	23.00	34.23	22.56	33.57	0.415	10.54	-	-	PLB	PLB	PLB	PLB	P	PLB	PLB	153.67	8	5	S
5 1/2	139.70	26.80	39.88	26.73	39.78	0.500	12.70	-	-	-	-	-	P	P	-	-	-	-	-	S
5 1/2	139.70	29.70	44.20	29.66	44.14	0.562	14.27	-	-	-	-	-	P	P	-	-	-	-	-	S
5 1/2	139.70	32.60	48.52	32.58	48.49	0.625	15.88	-	-	-	-	-	P	P	-	-	-	-	-	S
6 5/8	168.28	20.00	29.76	19.52	29.06	0.288	7.32	PS	PSLB	PSLB	-	-	-	-	-	-	187.71	8	5	S/E*
6 5/8	168.28	24.00	35.72	23.61	35.13	0.352	8.94	-	PSLB	PLB	PLB	PLB	PLB	P	PLB	-	187.71	8	5	S/E*
6 5/8	168.28	28.00	41.67	27.67	41.18	0.417	10.59	-	-	PLB	PLB	PLB	PLB	P	PLB	-	187.71	8	5	S/E*
6 5/8	168.28	32.00	47.62	31.22	46.46	0.475	12.06	-	-	-	PLB	PLB	PLB	P	PLB	PLB	187.71	8	5	S/E*
7	177.80	20.00	29.76	19.57	29.12	0.272	6.91	PS	PS	PS	-	-	-	-	-	-	200.03	8	-	S/E*
7	177.80	23.00	34.23	22.64	33.70	0.317	8.05	-	PSLB	PLB	PLB	PLB	PLB	-	-	-	200.03	8	5	S/E*
7	177.80	26.00	38.69	25.68	38.21	0.362	9.19	-	PSLB	PLB	PLB	PLB	PLB	P	PLB	-	200.03	8	5	S/E*
7	177.80	29.00	43.16	28.75	42.78	0.408	10.36	-	-	PLB	PLB	PLB	PLB	P	PLB	-	200.03	8	5	S/E*
7	177.80	32.00	47.62	31.72	47.20	0.453	11.51	-	-	PLB	PLB	PLB	PLB	P	PLB	-	200.03	8	5	S/E*
7	177.80	35.00	52.09	34.62	51.52	0.498	12.65	-	-	-	PLB	PLB	PLB	P	PLB	PLB	200.03	8	5	S/E*
7	177.80	38.00	56.55	37.30	55.52	0.540	13.72	-	-	-	PLB	PLB	PLB	P	PLB	PLB	200.03	8	5	S
7 5/8	193.68	24.00	35.72	23.49	34.96	0.300	7.62	PS	-	-	-	-	-	-	-	-	215.90	8	-	S
7 5/8	193.68	26.40	39.29	25.59	38.08	0.328	8.33	-	PSLB	PSLB	PLB	PLB	PLB	P	-	-	215.90	8	5	S
7 5/8	193.68	29.70	44.20	29.05	43.24	0.375	9.52	-	-	PLB	PLB	PLB	PLB	P	PLB	-	215.90	8	5	S
7 5/8	193.68	33.70	50.15	33.07	49.22	0.430	10.92	-	-	PLB	PLB	PLB	PLB	P	PLB	-	215.90	8	5	S
7 5/8	193.68	39.00	58.04	38.09	56.68	0.500	12.70	-	-	-	PLB	PLB	PLB	P	PLB	PLB	215.90	8	5	S
7 5/8	193.68	42.80	63.70	42.43	63.14	0.562	14.27	-	-	-	PLB	PLB	PLB	P	PLB	PLB	215.90	8	5	S
7 5/8	193.68	45.30	67.42	44.71	66.54	0.595	15.11	-	-	-	PLB	PLB	PLB	P	PLB	PLB	215.90	8	5	S
7 5/8	193.68	47.10	70.10	46.79	69.63	0.625	15.88	-	-	-	PLB	PLB	PLB	P	PLB	PLB	215.90	8	5	S
7 3/4	196.85	46.10	68.61	45.51	67.72	0.595	15.11	-	-	-	-	P	P	P	P	P	-	-	-	S
8 5/8	219.08	24.00	35.72	23.61	35.14	0.264	6.71	-	PS	PS	-	-	-	-	-	-	244.48	8	-	S/E*
8 5/8	219.08	28.00	41.67	27.04	40.24	0.304	7.72	PS	-	PS	-	-	-	-	-	-	244.48	8	-	S/E*
8 5/8	219.08	32.00	47.62	31.13	46.33	0.352	8.94	PS	PSLB	PSLB	-	-	-	-	-	-	244.48	8	5	S/E*

\* Available only in J-55 & K-55

# OCTG: API CASING

DIMENSIONS, WEIGHTS AND END FINISH																				
Outside Diameter		Normal Weight T&C		Normal Weight Plain-end		Wall Thickness		TYPE OF FINISH GRADE								COUPLING OD	THREAD TYPES TPI		TYPE	
In.	mm	lb/ft.	Kg/mtr	lb/ft.	Kg/mtr	Inch	mm	H-40	J-55 K-55	M 65	L-80 R-95	N-80 Type-1,Q	C-90 T-95	C-110	P-110	Q-125	mm	STC LTC	BTC	S / E
85/8	219.08	36.00	53.58	35.17	52.35	0.400	10.16	-	PSLB	PSLB	PLB	PLB	PLB	P	-	-	244.48	8	5	S/E*
85/8	219.08	40.00	59.53	39.33	58.53	0.450	11.43	-	-	PLB	PLB	PLB	PLB	P	PLB	-	244.48	8	5	S/E*
85/8	219.08	44.00	65.48	43.43	64.64	0.500	12.70	-	-	-	PLB	PLB	PLB	P	PLB	-	244.48	8	5	S/E*
85/8	219.08	49.00	72.92	48.05	71.51	0.557	14.15a	-	-	-	PLB	PLB	PLB	P	PLB	PLB	244.48	8	5	S
95/8	244.48	32.30	48.07	31.05	46.20	0.312	7.92	PS	-	-	-	-	-	-	-	-	269.88	8	-	S/E*
95/8	244.48	36.00	53.58	34.89	51.93	0.352	8.94	PS	PSLB	PSLB	-	-	-	-	-	-	269.88	8	5	S/E*
95/8	244.48	40.00	59.53	38.97	57.99	0.395	10.03	-	PSLB	PSLB	PLB	PLB	PLB	P	-	-	269.88	8	5	S/E*
95/8	244.48	43.50	64.74	42.74	63.61	0.435	11.05	-	-	PLB	PLB	PLB	PLB	P	PLB	-	269.88	8	5	S/E*
95/8	244.48	47.00	69.95	46.19	68.75	0.472	11.99	-	-	PLB	PLB	PLB	PLB	P	PLB	PLB	269.88	8	5	S/E*
95/8	244.48	53.50	79.62	52.90	78.72	0.545	13.84	-	-	-	PLB	PLB	PLB	P	PLB	PLB	269.88	8	5	S
95/8	244.48	58.40	86.91	57.43	85.47	0.595	15.11	-	-	-	PLB	PLB	PLB	P	PLB	PLB	269.88	8	5	S
103/4	273.05	32.75	48.74	31.25	46.50	0.279	7.09	PS	-	-	-	-	-	-	-	-	298.45	8	-	S/E*
103/4	273.05	40.50	60.27	38.92	57.91	0.350	8.89	PS	PSB	PSB	-	-	-	-	-	-	298.45	8	5	S/E*
103/4	273.05	45.50	67.71	44.26	65.87	0.400	10.16	-	PSB	PSB	-	-	-	-	-	-	298.45	8	5	S/E*
103/4	273.05	51.00	75.90	49.55	73.75	0.450	11.43	-	PSB	PSB	PSB	PSB	PSB	P	PSB	-	298.45	8	5	S/E*
103/4	273.05	55.50	82.60	54.26	80.75	0.495	12.57	-	-	PSB	PSB	PSB	PSB	P	PSB	-	298.45	8	5	S/E*
103/4	273.05	60.70	90.33	59.45	88.47	0.545	13.84	-	-	-	-	-	PSB	P	PSB	PSB	298.45	8	5	S
103/4	273.05	65.70	97.78	64.59	96.12	0.595	15.11	-	-	-	-	-	PSB	P	PSB	PSB	298.45	8	5	S
113/4	298.45	42.00	62.51	40.65	60.50	0.333	8.46	PS	-	-	-	-	-	-	-	-	323.85	8	-	S
113/4	298.45	47.00	69.95	45.63	67.90	0.375	9.53	-	PSB	PSB	-	-	-	-	-	-	323.85	8	5	S
113/4	298.45	54.00	80.36	52.63	78.32	0.435	11.05	-	PSB	PSB	-	-	-	-	-	-	323.85	8	5	S
113/4	298.45	60.00	89.29	58.87	87.61	0.489	12.42	-	PSB	PSB	PSB	PSB	PSB	P	PSB	PSB	323.85	8	5	S
113/4	298.45	65.00	96.73	64.02	95.27	0.534	13.56	-	-	-	P	P	P	P	P	P	-	-	-	S
113/4	298.45	71.00	105.66	69.48	103.40	0.582	14.78	-	-	-	P	P	P	P	P	P	-	-	-	S
133/8	339.72	48.00	71.43	46.01	68.48	0.330	8.38	PS	-	-	-	-	-	-	-	-	365.12	8	-	S/E*
133/8	339.72	54.50	81.11	52.78	78.55	0.380	9.65	-	PSB	PSB	-	-	-	-	-	-	365.12	8	5	S/E*
133/8	339.72	61.00	90.78	59.50	88.55	0.430	10.92	-	PSB	PSB	-	-	-	-	-	-	365.12	8	5	S/E*
133/8	339.72	68.00	101.20	66.16	98.46	0.480	12.19	-	PSB	PSB	PSB	PSB	PSB	P	PSB	-	365.12	8	5	S/E*
133/8	339.72	72.00	107.15	70.70	105.21	0.514	13.06	-	-	-	PSB	PSB	PSB	P	PSB	PSB	365.12	8	5	S

\* Available only in J-55 & K-55

S:Seamless  S/E

E:ERW

# Pup Joints, Coupling and Coupling Stock

## Pup Joints

Pup Joints of Tubing (EUE / NUE) and Casing are available in length of 2 feet, 3 feet, 4 feet, 6 feet, 8 feet, 10 feet etc.

## Coupling Stock

Coupling Stocks for all sizes of Casing and Tubing are available in the length of 3.0 to 12.0 mtrs.

Dimensions of the Coupling Stock and Couplings

### I) CASING ROUND - THREAD COUPLING DIMENSIONS :

Size Outside Diameter	Major Diameter mm	Coupling				
		Outside mm	Minimum Length		Weight	
			Short mm	Long mm	Short kg	Long kg
Inch	mm	mm	Short mm	Long mm	Short kg	Long kg
4 1/2	114.30	127.00	158.75	177.80	3.62	4.15
5	127.00	141.30	165.10	196.85	4.66	5.75
5 1/2	139.70	153.67	171.45	203.20	5.23	6.42
6 5/8	168.28	187.71	184.15	222.25	9.12	11.34
7	177.80	200.03	184.15	228.60	8.39	10.83
7 5/8	193.70	215.90	190.50	234.95	12.30	15.63
8 5/8	219.08	244.48	196.85	254.00	16.23	21.67
9 5/8	244.48	269.88	196.85	266.70	18.03	25.45
10 3/4	273.05	298.45	203.20	-	20.78	-
11 3/4	298.45	323.85	203.20	-	22.64	-
13 3/8	339.72	365.12	203.20	-	25.66	-

**Note :**

- i) The size designation for the coupling is the same as the size designation for the pipe on which the coupling is used.
- ii) API Group 1, 2 and 3 - Tolerance on Coupling outside diameter,  $\pm 1\%$  but not greater than  $\pm 3.18\text{mm}$ .
- iii) API Group 4 - Tolerance on Coupling outside diameter,  $\pm 1\%$  but not greater than  $+3.18\text{mm}$ ,  $-1.59\text{mm}$ .

**II) BUTTRESS THREAD CASING COUPLING DIMENSIONS:**

Size	Major Diameter	Coupling			
		Outside Diameter	Minimum Length	Weight	
				Regular kg	Sp. Clearance kg
Inch	mm	mm	mm	kg	kg
4 1/2	114.30	127.00	225.42	4.55	3.48
5	127.00	141.30	231.78	5.85	4.00
5 1/2	139.70	153.67	234.95	6.36	4.47
6 5/8	168.28	187.71	244.48	11.01	5.65
7	177.80	200.03	254.00	10.54	6.28
7 5/8	193.68	215.90	263.52	15.82	9.29
8 5/8	219.08	244.48	269.88	20.86	10.80
9 5/8	244.48	269.88	269.88	23.16	12.02
10 3/4	273.05	298.45	269.88	25.74	13.39
11 3/4	298.45	323.85	269.88	28.03	-
13 3/8	339.72	365.12	269.88	31.77	-

**Note :**

- i) The size designation for the coupling is the same as the size designation for the pipe on which the coupling is used.
- ii) API Group 1, 2 and 3 - Tolerance on Coupling outside diameter,  $\pm 1\%$  but not greater than  $\pm 3.18\text{mm}$ .
- iii) API Group 4 - Tolerance on Coupling outside diameter,  $\pm 1\%$  but not greater than  $+3.18\text{mm}$ ,  $- 1.59\text{mm}$ .

**III) NON UPSET TUBING COUPLING DIMENSIONS :**

Size	Major Diameter	Coupling		
		Outside Diameter	Minimum Length	Weight
				kg
Inch	mm	mm	mm	kg
2 3/8	60.32	73.02	107.95	1.28
2 7/8	73.02	88.90	130.18	2.34
3 1/2	88.90	107.95	142.88	3.71
4	101.60	120.65	146.05	4.35
4 1/2	114.30	132.08	155.58	4.89

- i) The size designation for the coupling is the same as the size designation for the pipe on which the coupling is used.
- ii) Tolerance on coupling outside diameter,  $\pm 1\%$ .

**IV) EXTERNAL UPSET TUBING COUPLING DIMENSIONS :**

Size	Outside Diameter	Coupling				
		Outside Diameter		Minimum Length	Weight	
		Regular	Special Clearance		Regular	Special Clearance
Inch	mm	mm	mm	mm	Kg	Kg
2 3/8	60.32	77.80	73.91	123.82	1.55	1.07
2 7/8	73.02	93.17	87.88	133.35	2.40	1.55
3 1/2	88.90	114.30	106.17	146.05	4.10	2.38
4	101.60	127.00	-	152.40	4.82	-
4 1/2	114.30	141.30	-	158.75	6.05	-

- i) The size designation for the coupling is the same as the size designation for the pipe on which the coupling is used.
- ii) Tolerance on Coupling outside diameter (Regular)  $\pm 1\%$
- iii) Tolerance on Coupling outside diameter (Special Clearance)  $\pm 0.38\text{ mm}$ .

# DRILL PIPES

Drill Pipes are Seamless Steel Tubulars with Weld-On Tool Joints that are used to connect a drill rig's surface equipment with its drilling equipment at the bottom of a well. Drill Pipes are manufactured to withstand severe internal and external pressure, distortion, bending and vibration. Every weld is monitored, tested and recorded.



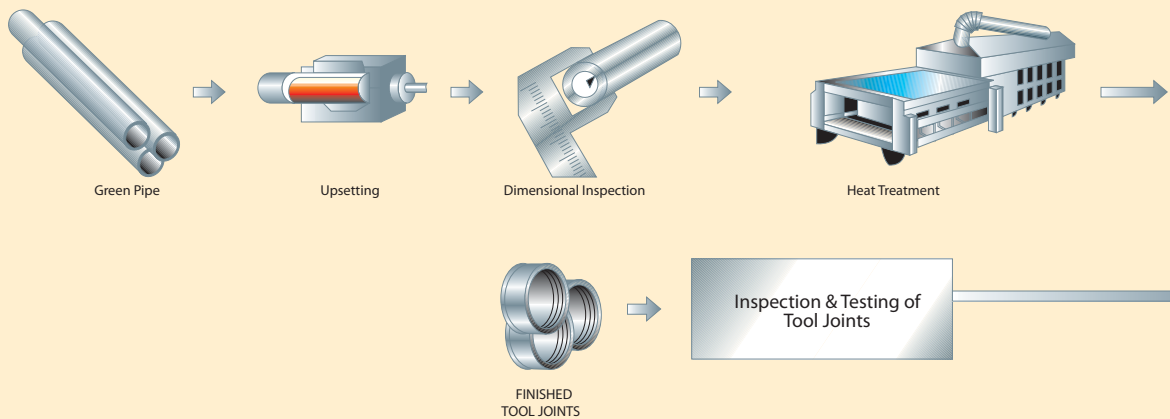
# Upset Drill Pipes with Weld-On Tool Joints

## Dimensions and Weights :

### I) Grade E

Size (inch)	Nominal Weight		OD		WT		Tool Joint
	(lb / ft)	kg/mtr	inch	mm	inch	mm	
<b>Internal Upset (IU)</b>							
4	14.00	20.84	4.00	101.60	0.330	8.38	NC 40
4 1/2	13.75	20.46	4.50	114.30	0.271	6.88	NC 46
<b>External Upset (EU)</b>							
2 3/8	6.65	9.90	2.375	60.32	0.280	7.11	NC 26
2 7/8	10.40	15.48	2.875	73.02	0.362	9.19	NC 31
3 1/2	9.50	14.14	3.500	88.90	0.254	6.45	NC 38
3 1/2	13.30	19.79	3.500	88.90	0.368	9.35	NC 38
3 1/2	15.50	23.07	3.500	88.90	0.449	11.40	NC 38
4	14.00	20.84	4.000	101.60	0.330	8.38	NC 46
4 1/2	13.75	20.46	4.500	114.30	0.271	6.88	NC 50
4 1/2	16.60	24.70	4.500	114.30	0.337	8.56	NC 50
4 1/2	20.00	29.76	4.500	114.30	0.430	10.92	NC 50
<b>Internal - External Upset (IEU)</b>							
4 1/2	16.60	24.70	4.500	114.30	0.337	8.56	NC 46
4 1/2	20.00	29.76	4.500	114.30	0.430	10.92	NC 46
5	19.50	29.04	5.000	127.00	0.362	9.19	NC 50, 5 1/2 FH
5	25.60	38.10	5.000	127.00	0.500	12.70	NC 50, 5 1/2 FH
5 1/2	21.90	32.59	5.500	139.70	0.361	9.17	5 1/2 FH
	24.70	36.76	5.500	139.70	0.415	10.54	5 1/2 FH
6 5/8	25.20	37.50	6.625	168.28	0.330	8.38	6 5/8 FH
	27.70	41.22	6.625	168.28	0.362	9.19	6 5/8 FH

## DRILL PIPE PROCESS FLOW CHART



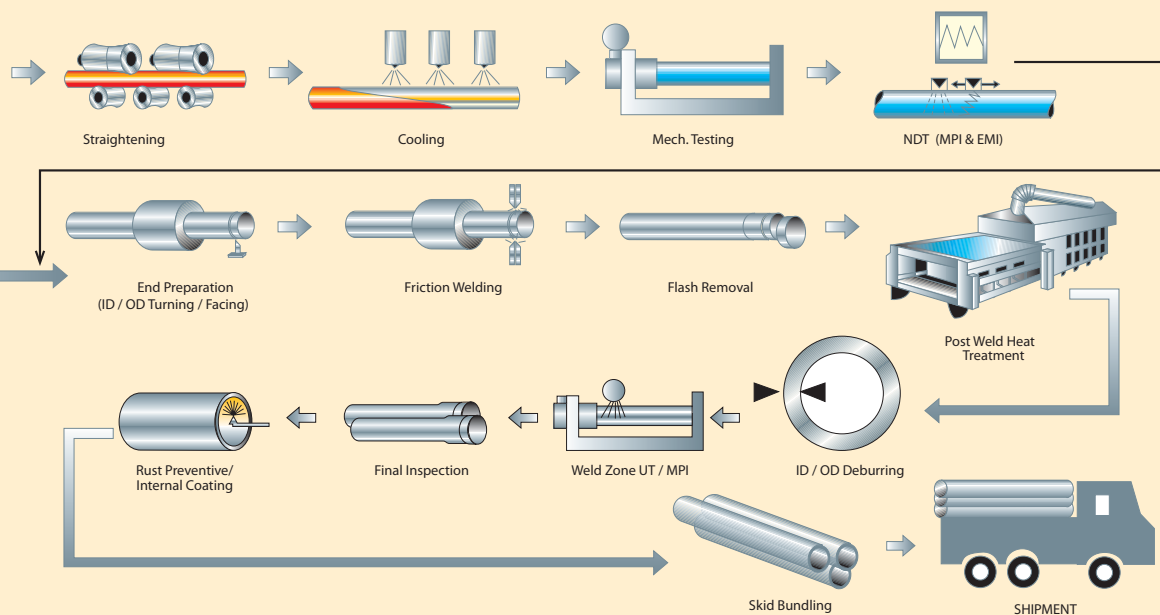
# Upset Drill Pipes with Weld-On Tool Joints

## II) Grade X, G, S

Size (inch)	Nominal Weight		OD		WT		Tool Joint
	(lb / ft)	kg/mtr	inch	mm	inch	mm	
<b>Internal Upset (IU)</b>							
3 1/2	13.30	19.79	3.50	88.90	0.368	9.35	-
4	14.00	20.84	4.00	101.60	0.330	8.38	NC 40
<b>External Upset (EU)</b>							
2 3/8	6.65	9.90	2.375	60.32	0.280	7.11	NC 26
2 7/8	10.40	15.48	2.875	73.02	0.362	9.19	NC 31
3 1/2	13.30	19.79	3.500	88.90	0.368	9.35	NC 38
3 1/2	15.50	23.07	3.500	88.90	0.449	11.40	NC 38 / NC 40
4	14.00	20.84	4.000	101.60	0.330	8.38	NC 46
4 1/2	16.60	24.70	4.500	114.30	0.337	8.56	NC 50
4 1/2	20.00	29.76	4.500	114.30	0.430	10.92	NC 50
<b>Internal - External Upset (IEU)</b>							
4 1/2	16.60	24.70	4.500	114.30	0.337	8.56	NC 46
4 1/2	20.00	29.76	4.500	114.30	0.430	10.92	NC 46
5	19.50	29.02	5.000	127.00	0.362	9.19	NC 50, 5 1/2 FH
5	25.60	38.10	5.000	127.00	0.500	12.70	NC 50, 5 1/2 FH
5 1/2	21.90	32.59	5.500	139.70	0.361	9.17	5 1/2 FH
5 1/2	24.70	36.76	5.500	139.70	0.415	10.54	5 1/2 FH
6 5/8	25.20	37.50	6.625	168.28	0.330	8.38	6 5/8 FH
6 5/8	27.70	41.22	6.625	168.28	0.362	9.19	6 5/8 FH

### CHEMICAL COMPOSITION & MECHANICAL PROPERTIES

Grade	Chemical Composition (%)		Mechanical Properties		
	P Max	S Max	Yield Strength (MPa)		Tensile Strength (Mpa)
			Min	Max	Min
E	0.03	0.02	517	724	689
X	0.02	0.015	655	862	724
G	0.02	0.015	724	931	793
S	0.02	0.015	931	1138	1000



# Tenaris Hydril Premium Connections

for demanding environment

Tenaris Hydril offers outstanding premium connection design and technology. The comprehensive range of high-performance products has been designed to meet the requirements of the most challenging applications.

Tenaris Hydril 3SB premium connections are available in Threaded & Coupled configurations with metal-to-metal seal.





## Premium Connections

### Main Structural Differences :

The premium connections have 3 main features which separate them from the API connections :

- Presence of shoulder,
- Presence of metal seal
- And a different thread form.

These premium connections are used when there are following requirements:

- High performance in combined loads
- High torsional strengths
- Metal-to-Metal sealing
- High galling resistance & controlled stress levels
- Tight clearance situations

### Quality & Manufacturing

Tenaris Hydril Premium Connections are manufactured to same quality standards under the Quality Management System that Tenaris uses throughout its global manufacturing system.

By manufacturing Premium Connections, as part of an Integrated process of pipe manufacturing of D.P. Jindal Group, we assure highest quality products.

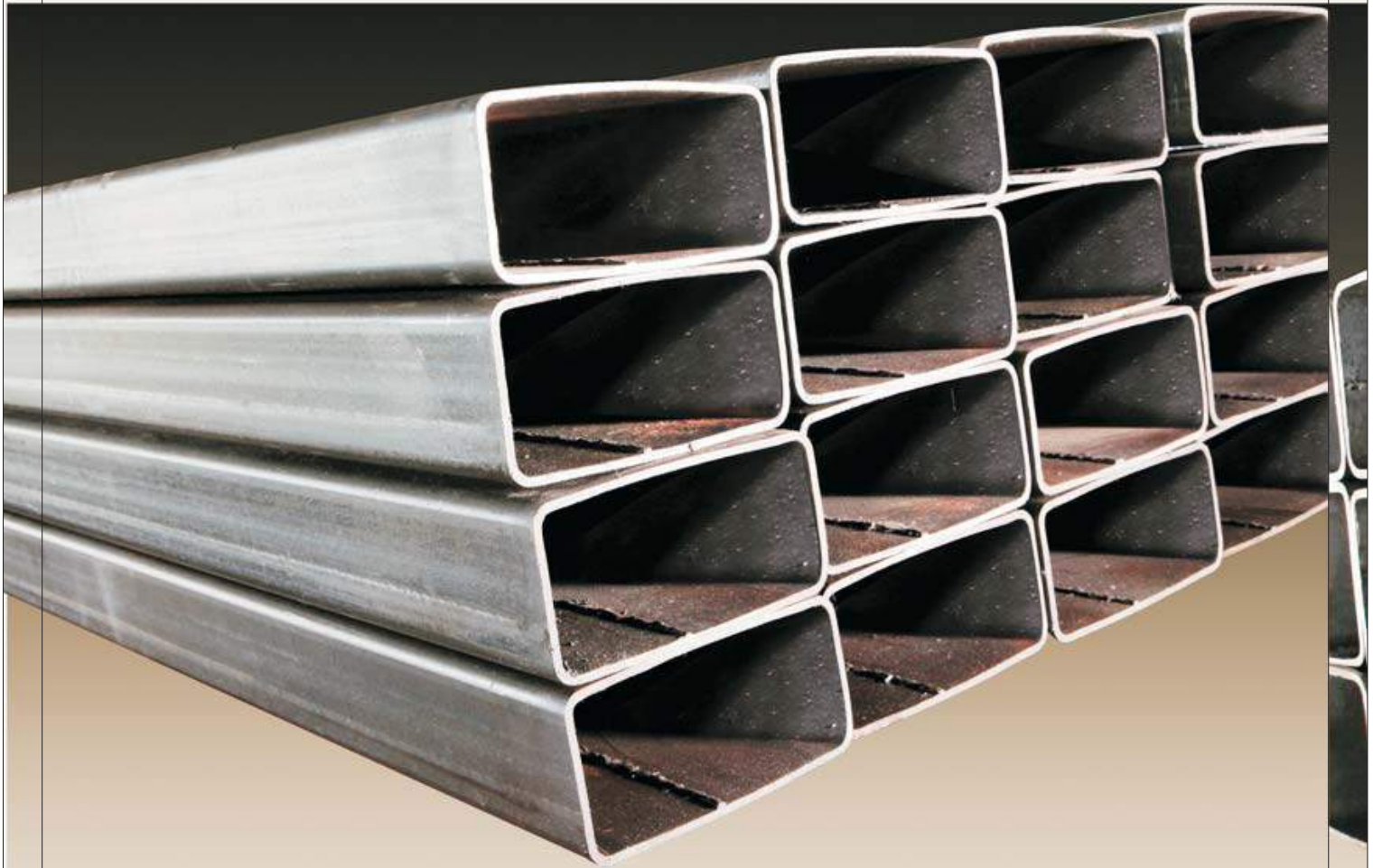
We are well equipped to adopt and execute change in required specifications and other unexpected conditions in less turnaround time, while maintaining the highest quality standards expected by the industry.

#### APPLICATIONS GUIDE :

SIZES (IN INCHES)	INTERMEDIATE CASING	PRODUCTION CASING, TUBING
2 7/8 inch to 13 3/8 inch TSH 3SB	Threaded & Coupled TSH 3SB	Threaded & Coupled



# Square & Rectangular Hollow Sections



## Applications :

### **Architectural**

Shopping Malls  
Canopies / Atriums  
Glass Curtains  
Wall Frames  
Partition Frames  
Space Frames  
Guard Rails & Staircases

### **Industrial**

Industrial Sheds, Trusses  
Columns and Purlins  
Material Storage Racks  
Mine Roof Support Systems  
(Cogs, Props)  
Pallets, Pipe Racks, Conveyors  
Gantries, Trestles, Drilling Rigs

### **Infrastructural**

Airport Terminal Buildings  
Bridges, Bus Stands  
Signage Supporting Structures  
Pedestrian Walkovers (Footbridge)  
Sports Galleries  
Railways Platform/  
Foot Overbridges

### **General Engineering**

Automobile Chassis  
Green House Structures  
Truck and Bus Body Members  
Hoarding Structures  
Amusement Park & Playground  
Equipments  
Exhibition Stalls, Scaffoldings, Furnitures

## Technical Specifications and Dimensional Tolerances

### STEEL SECTIONS CONFORMING TO IS:4923

We can also supply sections as per ASTM A 500 specification.

**Square pipe : Hf SHS** (Hot formed square hollow section)  
(manufacture processes : Seamless & ERW)

#### Specification: (Indian Standards: Hollow steel section for structural use)

IS 4923 : 1997 YSt 210
IS 4923 : 1997 YSt 240
IS 4923 : 1997 YSt 310

#### Chemical Composition

Sulphur = 0.050 % max.
Phosphorus = 0.050 % max.

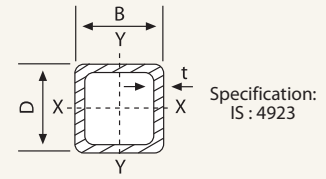
#### Tensile Properties of Hot formed section:

Grade	Tensile strength (MPa) min	Yield strength (MPa) min	Elongation (%) Min
Yst 210	330	210	20
Yst 240	410	240	15
Yst 310	450	310	10

#### Dimensional Tolerances

		Seamless	ERW
A	Thickness	±17.5%, -12.5%	+/-10%
B	Outside Dimension	+/-1% length of side to be measured with a minimum of +/-0.50 mm.	+/-1% length of side to be measured with a minimum of +/-0.50 mm.
C	Weight 1. On individual lengths 2. On lots of 10 tonnes	+10%, -8% ±7.5%	+10%, -8% +/-7.5%
D	Squareness of corner	90° ± 2°	90° ± 2°
E	Radii of corner	3t max Where t is the thickness of section	3t max Where t is the thickness of section
F	Length 1. Exact Length 2. Random Length	±6mm As per agreement Between Manufacturer & Purchaser	±6mm As per agreement Between Manufacturer & Purchaser
G	End Finish	Plain End - Mill cut finish	Plain End - Mill cut finish

# Square Hollow Sections



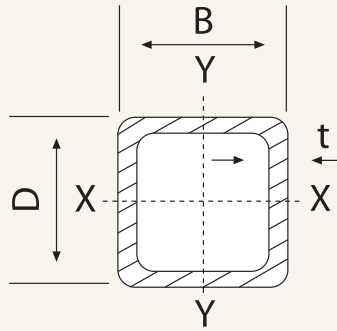
**ERW**

SHS B X D mm	Thick-ness mm	Sec Area A cm <sup>2</sup>	Unit W kg/m	Moment of Inertia		Radius of Gyration		Elastic Modulus		Torsional Constants		Outer Surface
				I <sub>xx</sub> cm <sup>4</sup>	I <sub>yy</sub> cm <sup>4</sup>	r <sub>xx</sub> cm	r <sub>yy</sub> cm	Z <sub>xx</sub> cm <sup>3</sup>	Z <sub>yy</sub> cm <sup>3</sup>	J cm <sup>4</sup>	B cm <sup>3</sup>	Area Per mm <sup>2</sup>
25 x 25	2.00	1.74	1.36	1.48	1.48	0.92	0.92	1.19	1.19	2.29	1.68	0.090
	2.60	2.16	1.69	1.72	1.72	0.89	0.89	1.38	1.38	2.68	1.92	0.087
	3.20	2.53	1.98	1.89	1.89	0.86	0.86	1.51	1.51	2.96	2.07	0.084
32 x 32	2.00	2.30	1.80	3.36	3.36	1.21	1.21	2.10	2.10	5.30	3.05	0.118
	2.60	2.88	2.26	4.02	4.02	1.18	1.18	2.51	2.51	6.45	3.63	0.115
	3.20	3.42	2.69	4.54	4.54	1.15	1.15	2.84	2.84	7.41	4.07	0.112
38 x 38	2.60	3.51	2.75	7.14	7.14	1.43	1.43	3.76	3.76	11.51	5.49	0.139
	3.20	4.19	3.29	8.18	8.18	1.40	1.40	4.30	4.30	13.45	6.28	0.136
	4.00	5.03	3.95	9.26	9.26	1.36	1.36	4.87	4.87	15.67	7.12	0.131
40 x 40	2.60	3.72	2.92	8.45	8.45	1.51	1.51	4.22	4.22	13.63	6.20	0.147
	3.20	4.45	3.49	9.72	9.72	1.48	1.48	4.86	4.86	16.00	7.12	0.144
	4.00	5.35	4.20	11.07	11.07	1.44	1.44	5.54	5.54	18.75	8.12	0.139
50 x 50	2.60	4.76	3.74	17.47	17.47	1.92	1.92	6.99	6.99	28.53	10.37	0.187
	2.90	5.25	4.12	18.99	18.99	1.90	1.90	7.60	7.60	31.15	11.23	0.185
	3.60	6.35	4.98	22.15	22.15	1.87	1.87	8.86	8.86	36.58	12.98	0.181
	4.50	7.67	6.02	25.50	25.50	1.82	1.82	10.20	10.20	41.99	14.68	0.177
60 x 60	2.60	5.80	4.55	31.33	31.33	2.33	2.33	10.44	10.44	50.08	15.52	0.227
	3.20	7.01	5.50	36.94	36.94	2.30	2.30	12.31	12.31	60.02	18.31	0.224
	4.00	8.55	6.71	43.55	43.55	2.26	2.26	14.52	14.52	72.41	21.62	0.219
	4.80	10.01	7.85	49.22	49.22	2.22	2.22	16.41	16.41	83.86	24.51	0.215
72 x 72	3.20	8.54	6.71	66.32	66.32	2.79	2.79	18.42	18.42	106.81	27.47	0.272
	4.00	10.47	8.22	79.03	79.03	2.75	2.75	21.95	21.95	129.85	32.78	0.267
	4.80	12.31	9.66	90.31	90.31	2.71	2.71	25.09	25.09	151.55	37.55	0.263
80 x 80	3.20	9.57	7.51	92.71	92.71	3.11	3.11	23.18	23.18	148.55	34.60	0.304
	4.00	11.75	9.22	111.04	111.04	3.07	3.07	27.76	27.76	181.22	41.49	0.299
	4.80	13.85	10.87	127.58	127.58	3.04	3.04	31.89	31.89	212.26	47.77	0.295
91.5 x 91.5	3.60	12.32	9.67	156.49	156.49	3.56	3.56	34.21	34.21	251.17	51.14	0.347
	4.50	15.14	11.88	187.57	187.57	3.52	3.52	41.00	41.00	306.78	61.40	0.343
	5.40	17.85	14.01	215.68	215.68	3.48	3.48	47.14	47.14	359.76	70.77	0.338
100 x 100	4.00	14.95	11.73	226.35	226.35	3.89	3.89	45.27	45.27	364.75	67.50	0.379
	5.00	18.36	14.41	271.10	271.10	3.84	3.84	54.22	54.22	441.84	80.54	0.374
	6.00	21.63	16.98	311.47	311.47	3.79	3.79	62.29	62.29	511.80	92.06	0.369
113.5 x 113.5	4.80	20.28	15.92	393.30	393.30	4.40	4.40	69.30	69.30	637.45	103.89	0.429
	5.40	22.60	17.74	432.58	432.58	4.38	4.38	76.23	76.23	708.69	114.41	0.426
132 x 132	4.80	23.83	18.71	634.39	634.39	5.16	5.16	96.12	96.12	1018.30	144.11	0.503
	5.40	26.60	20.88	700.11	700.11	5.13	5.13	106.08	106.08	1134.24	159.18	0.500
150 x 150	4.00	22.95	18.01	807.82	807.82	5.93	5.93	107.71	107.71	1273.46	161.38	0.579
	5.00	28.36	22.26	982.12	982.12	5.89	5.89	130.95	130.95	1569.09	196.38	0.574
	6.00	33.63	26.40	1145.91	1145.91	5.84	5.84	152.79	152.79	1856.18	229.44	0.569
	8.00	43.79	34.38	1443.00	1443.00	5.74	5.74	192.40	192.40	2405.78	290.12	0.559
180 x 180	4.00	27.75	21.78	1421.74	1421.74	7.16	7.16	157.97	157.97	2224.31	236.76	0.699
	5.00	34.36	26.97	1736.87	1736.87	7.11	7.11	192.99	192.99	2747.93	289.40	0.694
	6.00	40.83	32.05	2036.52	2036.52	7.06	7.06	226.28	226.28	3259.23	339.65	0.689
	8.00	53.39	41.91	2590.73	2590.73	6.97	6.97	287.86	287.86	4246.16	433.32	0.679
220 x 220	6.00	50.43	39.59	3813.36	3813.36	8.70	8.70	346.67	346.67	6034.53	520.18	0.849
	8.00	66.19	51.96	4894.99	4894.99	8.60	8.60	445.00	445.00	7897.48	668.99	0.839
	10.00	81.43	63.92	5887.19	5887.19	8.50	8.50	535.20	535.20	9549.15	796.48	0.829
	12.00	96.14	75.47	6793.08	6793.08	8.41	8.41	617.55	617.55	11116.96	915.37	0.818
250 x 250	6.00	57.63	45.24	5672.00	5672.00	9.92	9.92	453.76	453.96	8920.44	680.77	0.969
	8.00	75.79	59.50	7315.65	7315.65	9.82	9.82	585.25	585.25	11702.07	879.31	0.959
	10.00	93.43	73.34	8842.29	8842.29	9.73	9.73	707.38	707.38	14248.15	1054.68	0.949
	12.00	110.54	86.77	10254.78	10254.78	9.63	9.63	820.38	820.38	16678.37	1219.59	0.938

**SEAMLESS**

SHS B X D mm	Thick-ness mm	Sec Area A cm <sup>2</sup>	Unit W kg/m	Moment of Inertia		Radius of Gyration		Elastic Modulus		Plastic Modulus	
				I <sub>xx</sub> cm <sup>4</sup>	I <sub>yy</sub> cm <sup>4</sup>	r <sub>xx</sub> cm	r <sub>yy</sub> cm	Z <sub>xx</sub> cm <sup>3</sup>	Z <sub>yy</sub> cm <sup>3</sup>	s <sub>xx</sub> cm <sup>3</sup>	s <sub>yy</sub> cm <sup>3</sup>
250 x 250	9.00	66.677	52.342	3986.760	3986.760	7.733	7.722	398.676	398.676	472.379	472.379
	10.00	73.429	57.642	4335.132	4335.132	7.684	7.684	433.513	433.513	516.765	516.765
	11.00	80.049	62.839	4665.953	4665.952	7.635	7.635	466.595	466.595	559.586	559.586
	12.00	86.538	67.932	4981.208	4981.208	7.587	7.587	498.121	498.121	600.855	600.855

# Product Range

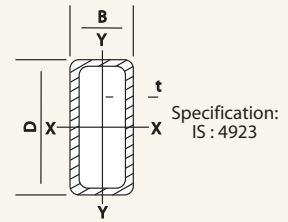


Specification:  
IS : 4923

Product Range: Square Hollow Sections (SHS)

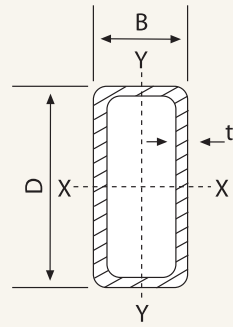
		Thickness (mm) = t																	
Section Size	B	D	2.0	2.6	2.9	3.2	3.6	4.0	4.5	4.8	5.0	5.4	6.0	8.0	9.0	10.0	11.0	12.0	
	25	25																	
	32	32																	
	38	38																	
	40	40																	
	50	50																	
	60	60																	
	72	72																	
	80	80																	
	91.5	91.5																	
	100	100																	
	113.5	113.5																	
	132	132																	
	150	150																	
	180	180																	
	200	200																	
	220	220																	
	250	250																	

# Rectangular Hollow Sections



RHS D X B mm	Thickness mm	Sec Area A cm <sup>2</sup>	Unit W kg/m	Moment of Inertia		Radius of Gyration		Elastic Modulus		Torsional Constants		Outer Surface
				I <sub>xx</sub> cm <sup>4</sup>	I <sub>yy</sub> cm <sup>4</sup>	r <sub>xx</sub> cm	r <sub>yy</sub> cm	Z <sub>xx</sub> cm <sup>3</sup>	Z <sub>yy</sub> cm <sup>3</sup>	J cm <sup>4</sup>	B cm <sup>3</sup>	Area Per mm <sup>2</sup>
50 x 25	2.00	2.74	2.15	8.38	2.81	1.75	1.01	3.35	2.25	6.79	3.79	0.142
	2.60	3.46	2.71	10.16	3.36	1.71	0.99	4.06	2.69	8.27	4.53	0.137
	3.20	4.13	3.24	11.63	3.80	1.68	0.96	4.65	3.04	9.52	5.12	0.134
	4.00	4.95	3.88	13.13	4.23	1.63	0.92	5.25	3.38	10.86	5.69	0.129
60 x 40	2.60	4.76	3.73	22.76	12.09	2.19	1.59	7.59	6.05	25.59	9.83	0.187
	2.90	5.25	4.12	24.74	13.11	2.17	1.58	8.25	6.56	28.02	10.66	0.185
	3.60	6.35	4.98	28.90	15.23	2.13	1.55	9.63	7.62	33.30	12.41	0.181
	4.50	7.67	6.02	33.31	17.44	2.08	1.51	11.10	8.72	39.34	14.29	0.177
66 x 33	2.60	4.70	3.69	25.15	8.43	2.31	1.34	7.62	5.11	20.75	8.71	0.185
	2.90	5.19	4.07	27.33	9.12	2.29	1.33	8.28	5.53	22.65	9.43	0.183
	3.60	6.28	4.93	31.87	10.52	2.25	1.29	9.66	6.37	26.71	10.90	0.179
	4.50	7.58	5.95	36.64	11.93	2.20	1.25	11.10	7.23	31.21	12.43	0.175
80 x 40	2.60	5.80	4.55	46.58	15.74	2.84	1.65	11.65	7.87	38.50	13.46	0.227
	3.20	7.01	5.50	54.94	18.41	2.80	1.62	13.74	9.21	45.83	15.78	0.224
	4.00	8.55	6.71	64.79	21.49	2.75	1.59	16.20	10.74	54.77	18.49	0.219
	4.80	10.01	7.85	73.22	24.03	2.71	1.55	18.30	12.02	62.81	20.79	0.215
96 x 48	3.20	8.54	6.71	98.61	33.28	3.40	1.97	20.54	13.87	82.13	23.82	0.272
	4.00	10.47	8.22	117.54	39.32	3.35	1.94	24.49	16.38	99.11	28.24	0.267
	4.80	12.31	9.66	134.35	44.55	3.30	1.90	27.99	18.56	114.80	32.14	0.263
122 x 61	3.60	12.32	9.67	232.61	78.83	4.34	2.53	38.13	25.84	193.91	44.50	0.347
	4.50	15.14	11.88	278.94	93.78	4.29	2.49	45.73	30.75	235.39	53.13	0.343
	5.40	17.85	14.01	320.83	107.03	4.24	2.45	52.60	35.09	274.29	60.89	0.338
145 x 82	4.80	20.28	15.92	555.16	228.50	5.23	3.36	76.57	55.73	534.27	94.45	0.429
	5.40	22.60	17.74	610.85	250.59	5.20	3.33	84.26	61.12	592.70	103.81	0.426
172 x 92	4.80	23.83	18.71	917.13	346.91	6.20	3.82	106.64	75.41	826.04	128.85	0.503
	5.40	26.59	20.88	1012.47	381.74	6.17	3.79	117.73	82.99	918.10	142.04	0.500
200 x 100	4.00	22.95	18.01	1199.71	410.78	7.23	4.23	119.97	82.16	991.47	141.46	0.579
	5.00	28.36	22.26	1459.25	496.94	7.17	4.19	145.93	99.39	1216.96	171.53	0.574
	6.00	33.63	26.40	1703.31	576.91	7.12	4.14	170.33	115.38	1434.03	199.68	0.569
	8.00	43.79	34.38	2146.21	719.19	7.00	4.05	214.62	143.84	1843.86	250.68	0.559
220 x 140	4.00	27.75	21.78	1892.62	947.66	8.26	5.84	172.06	135.38	2004.80	223.74	0.699
	5.00	34.36	26.97	2313.45	1155.23	8.21	5.80	210.31	165.04	2468.51	272.71	0.694
	6.00	40.83	32.05	2714.10	1351.70	8.15	5.75	246.74	193.10	2914.71	318.93	0.689
	8.00	53.39	41.91	3456.31	1712.25	8.05	5.66	314.21	244.61	3720.10	378.40	0.679
240 x 120	4.00	27.75	21.78	2110.72	725.35	8.72	5.11	175.89	120.89	1736.39	208.03	0.699
	5.00	34.36	26.97	2579.67	882.47	8.67	5.07	214.97	147.08	2138.48	253.55	0.694
	6.00	40.83	32.05	3025.91	1030.45	8.61	5.02	252.16	171.74	2528.39	296.7	0.689
	8.00	53.39	41.91	3851.84	1299.95	8.49	4.93	320.99	216.66	3272.9	376.29	0.679
260 x 180	6.00	50.43	39.59	4855.87	2763.43	9.81	7.40	373.53	307.05	5619.50	501.06	0.849
	8.00	66.19	51.96	6238.69	3538.10	9.71	7.31	479.90	393.12	6821.23	620.13	0.839
	10.00	81.43	63.92	7509.51	4244.26	9.60	7.22	577.65	471.58	8972.14	760.42	0.834
12.00	96.14	75.47	8672.42	4884.94	9.50	7.13	667.11	542.77	10150.39	875.12	0.829	
300 x 150	6.00	51.63	40.53	6073.51	2079.57	10.85	6.35	404.90	277.28	5034.64	478.20	0.869
	8.00	67.79	53.22	7808.95	2654.12	10.73	6.26	520.53	353.88	6559.05	612.64	0.859
	10.00	83.43	65.49	9403.90	3173.71	10.62	6.17	626.93	423.16	8011.67	736.01	0.848
	12.00	98.54	77.35	10866.10	3641.00	10.50	6.08	724.41	485.48	9110.72	829.98	0.838
300 x 200	6.00	57.65	45.24	7370.23	3962.19	11.31	8.29	491.34	396.22	8186.02	650.85	0.969
	8.00	75.79	59.50	9513.66	5097.04	11.20	8.20	634.24	509.70	10722.83	839.54	0.959
	10.00	93.43	73.34	11507.24	6144.30	11.10	8.11	767.15	614.43	13169.70	1015.43	0.948
	12.00	110.54	86.77	13355.84	7107.43	10.99	8.02	890.39	710.43	15215.03	1160.24	0.938

# Product Range



Specification:  
IS : 4923

## Product Range: Rectangular Hollow Sections (RHS)

		Thickness (mm) = t															
Section Size	D	B	2.0	2.6	2.9	3.2	3.6	4.0	4.5	4.8	5.0	5.4	6.0	8.0	10.0	12.0	
	50	25															
	60	40															
	66	33															
	80	40															
	96	48															
	122	61															
	145	82															
	172	92															
	200	100															
	220	140															
	240	120															
	260	180															
	300	150															
	300	200															

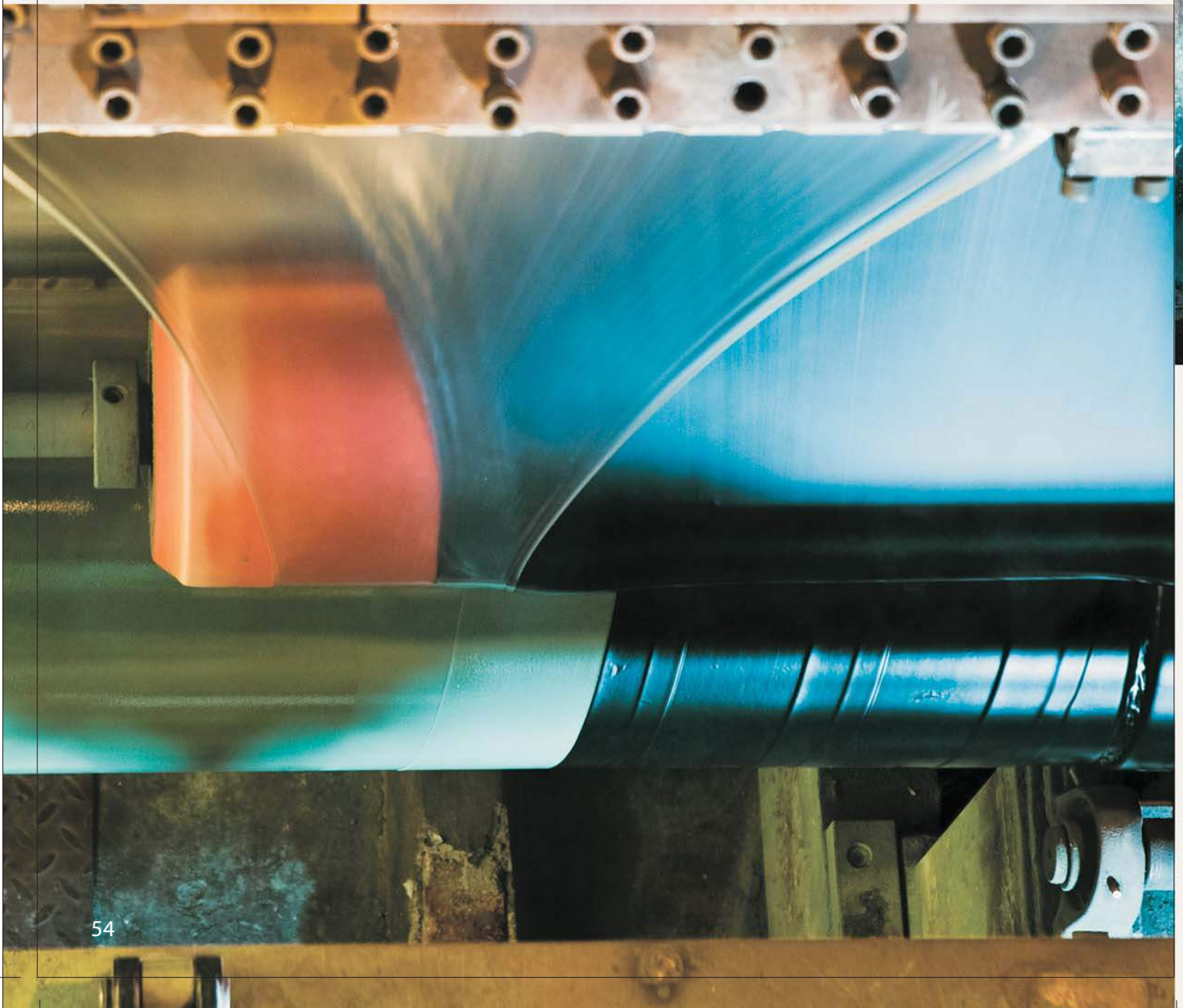
# Pipe Coating Facility

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## 3L PE/PP, FBE, DFBE and Internal Coating (Liquid Epoxy)

3 LPE / 3 LPP Coating is anti-corrosive coating of 3 layers of epoxy, adhesive and PE / PP respectively on pipes, as per following details

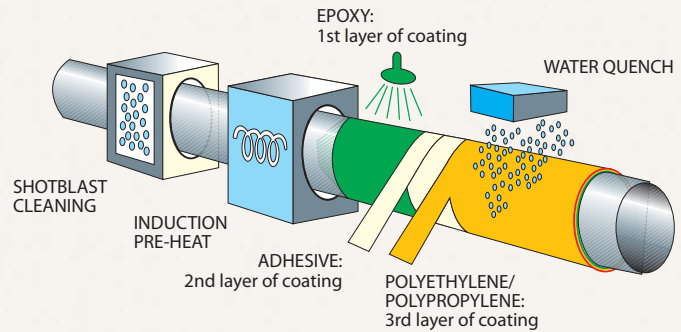
- 1st Layer is of Epoxy coating which acts as Anti-Corrosive Layer.
- 2nd Layer is of Adhesive coating which acts as Tie layer between Epoxy and PE/PP.
- 3rd Layer is of Polyethylene / Polypropylene coating which provides mechanical strength to the coating.





# Advantages of Coated Pipes:

The coat begins on Bare Pipe with surface preparation by abrasive blast cleaning, phosphoric acid treatment, chromate treatment prior to the application of coat followed by electrostatic fusion bonded epoxy layer as primer, adhesive as tie layer, followed by high density Polyethylene/ Polypropylene layer as top coat.



- Strong protective layer
- Long term chemical and mechanical resistance
- High mechanical impact strength and penetration resistance
- Increases life span of pipes more than 25 years
- Economy in the long term due to less repairing/ re-working

## Applications & Specifications:

- \* 3 LPE Coating (DIN 30670) for service temperature upto +80°C
- \* 3 LPP Coating (DIN 30678) for service temperature upto +110°C
- \* Single layer FBE Coating (Canadian CAN/CSA Z245-06/ NACE RP 0394) for service temperature upto +80°C
- \* Dual layer FBE Coating (Canadian CAN/CSA Z245-06/ NACE RP 0394) for service temperature upto +80°C
- \* Internal Flow coating (API RP 5L2/ISO 15741) for service temperature upto + 80°C
- \* Internal Solvent free epoxy (AWWA C 210/NF - French Specification & BS British Specification) for service temperature upto + 80°C



SPECIFICATIONS **Coating**

1) **Pipe Size Range for 3 LPE / 3LPP Coating**

A	Outer Dia	32.0 - 1250.00mm
B	Wall Thickness	Upto 25mm for all OD
C	Length	6 - 14 meters

2) **3 LPE / PP Coating Thickness (Layerwise)**

Sr No.	Layer	Coating Thickness
1	Epoxy Coating	150 - 300 microns
2	Adhesive Coating	200 - 400 microns
3	Polyethylene / Polypropylene	1.55 - 3.35mm
4	Total Thickness	1.80 - 3.70mm

3) **Pipe Size Range for Single Layer FBE Coating**

A	Outer Dia	32.0 - 1250.00mm
B	Wall Thickness	Upto 25mm for all OD
C	Length	6 - 14 meters

4) **Single Layer FBE Thickness**

Sr No.	Layer	Coating Thickness
1	FBE Thickness	400 - 500 microns

5) **Pipe Size Range for Dual FBE Coating**

A	Outer Dia	114.30 - 1250.00mm
B	Wall Thickness	Upto 25mm
C	Length	6 - 14 meters

6) **Dual FBE Thickness**

Sr No.	Layer	Coating Thickness
1	FBE Thickness (Anti-corrosive Layer)	400 - 500 microns
2	ARO Thickness (Hard Coat Layer)	400 - 500 microns
3	Total Thickness	800 - 1000 microns

7) **Pipe Size Range for Internal Coating**

A	Outer Dia	168.30 - 559.00mm
B	Wall Thickness	Upto 25mm
C	Length	6 - 14 meters

8) **Internal Coating Thickness**

A) Sr No.	Layer	Coating Thickness
1	Internal Flow Coating for flow improvement	60 - 100 microns
B) Sr No.	Layer	Coating Thickness
1	Internal Solvent free epoxy for corrosion protection	400 - 500 microns

# Pipe Fittings

MSL offers pipe fittings to cater to the Engineering and Petrochemical Industry requirements of high quality IBR Pipe Fittings.



## Product Range

The product range includes Seamless Carbon Steel and Alloy Steel, as per following details:

Products	Size
Elbows	1/2" NB to 14" NB
Reducers	1" NB to 14" NB
Tees	1" NB to 14" NB
Cups	1/2" NB to 14" NB
Stub Ends	1/2" NB to 14" NB
Flanges	1/2" NB to 14" NB
Socket Weld	Upto 2" NB
Nipples	Upto 4" NB
Couplings	Upto 4" NB

## Material Specifications

ASTM A 234 WPB WPC WP-1 WP12 WP11 WP22 WP5 WP9 WP91 and WPR  
 ASTM A 403 WP321 321H 304 304L 316 316L 347 and 347H  
 ASTM A 420 WPL-6 WPL-9 WPL-3 and WPL-8



**API CASING & TUBING**

**CHEMICAL COMPOSITION & MECHANICAL PROPERTIES**

Specification	Group Grade Type	Chemical Composition (%)												Mechanical Properties						Hardness (max.)	Hydrostatic Test Pressure								
		C		Mn		Mo		Cr		Ni		Cu		P		S		Si				Yield Strength		Tensile Strength		% Elongation			
		Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max			Min	Max	Min	Max	Min	Max	HRC	HBW
API 5CT	1 E&S H-40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	40,000	276	80,000	552	60,000	414	-	-	$P = 2(f \times YS \times t) / D$ P = Hydrostatic Test Pressure in MPa (PSI) f = Factor - 0.6 for Gr. H-40, J-55 and K-55 larger than 9 5/8", 0.8 for all other Grades and sizes. YS = Specified Min. Yield Strength in MPa (PSI) D = Specified Outside diameter in mm (inch) t = Specified W.T. in mm (inch)
	E&S J-55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	55,000	379	80,000	552	75,000	517	-	-	
	E&S K-55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	55,000	379	80,000	552	95,000	655	-	-	
	E&S N-80	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	80,000	552	110,000	758	100,000	689	-	-	
	E&S N-80 Q	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	80,000	552	110,000	758	100,000	689	-	-	
2 S	S R-95	-	0.45	-	1.90	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	95,000	655	110,000	758	105,000	724	22	235	
	S M-65	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	65,000	448	85,000	586	85,000	586	23	241	
	S L-80	-	0.43	-	1.90	-	-	-	-	-	0.25	0.35	-	-	-	-	-	-	-	-	80,000	552	95,000	655	95,000	655	23	241	
	S L-80 9Cr	-	0.15	0.30	0.60	1.10	1.10	8.00	10.00	0.50	0.25	0.25	0.25	0.020	0.010	1.00	80,000	552	95,000	655	80,000	552	95,000	655	95,000	655	23	241	
	S L-80 13 Cr	0.15	0.22	0.25	1.00	-	-	12.00	14.00	0.50	0.25	0.25	0.25	0.020	0.010	1.00	80,000	552	95,000	655	80,000	552	95,000	655	95,000	655	23	241	
	S C-90	-	0.35	-	1.20	0.25	0.85	-	1.50	0.99	-	-	-	0.020	0.010	-	90,000	621	105,000	724	90,000	621	105,000	724	100,000	689	25.4	255	
	S T-95	-	0.35	-	1.20	0.25	0.85	0.40	1.50	0.99	-	-	-	0.020	0.010	-	95,000	655	110,000	758	95,000	655	110,000	758	105,000	724	25.4	255	
	S C-110	-	0.35	-	1.20	0.25	1.00	0.40	1.50	0.99	-	-	-	0.020	0.005	-	110,000	758	120,000	828	110,000	758	120,000	828	115,000	793	30	286	
	3 S P-110	-	-	-	-	-	-	-	-	-	-	-	-	0.030 a	0.030 a	-	110,000	758	140,000	965	110,000	758	140,000	965	125,000	862	-	-	
	4 S Q-125	-	0.35	-	1.35	-	0.85	-	1.50	0.99	-	-	-	0.020	0.010	-	125,000	862	150,000	1034	125,000	862	150,000	1034	135,000	931	b	-	

a - for ERW Gr. P-110, the Phosphorus content shall be 0.020% max. and Sulphur content 0.010% max.

b - No hardness limits are specified but the maximum variation is restricted as a manufacturing control.

N.L. - No Limit

E - ERW (Electric Resistance Welded);

S - Seamless

**Note:** Charpy - V - Notch - Absorbed energy requirements for various grades are as per formulas given in API Specification 5CT.

## CHEMICAL COMPOSITION &amp; MECHANICAL PROPERTIES

## ASTM

Specification	Type	Grade	Chemical Composition (%)											Mechanical Properties				% Elongation (G.L. 50mm) e (min)	Hydrostatic Test Pressure	Hardness (Max)				
			C		Mn		P	S	Si	Cr		Mo	Cu		NI	V	Yield Strength				Tensile Strength			
			Min	Max	Min	Max	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max			
ASTM A-53	E&S	A	-	0.25	-	0.95	0.050	0.045	-	-	0.40	-	0.15	0.40	0.40	0.08	0.08	30,000	205	48,000	330	P= 2.5 t/D or 2800 PSI (19.3 MPa) for size > 3.5" OD P= 2.5 t/D or 2500 PSI (17.2 MPa) for size ≤ 3.5" OD S= 0.60 times minimum specified YS PSI (MPa)		
		B	-	0.30	-	1.20	0.050	0.045	-	-	0.40	-	0.15	0.40	0.40	0.08	0.08	35,000	240	60,000	415			
ASTM A-106	S	A	-	0.25	0.27	0.93	0.035	0.035	0.10	-	0.40	-	0.15	0.40	0.40	0.08	0.08	30,000	205	48,000	330	P = 2.5 t/D or 2800 PSI (19.0 MPa) for pipe size > 3.5" O.D P = 2.5 t/D or 2500 PSI (17.0 MPa) for pipe size ≤ 3.5" O.D S = 0.60 times SMYS PSI (MPa)		
		B	-	0.30	0.29	1.06	0.035	0.035	0.10	-	0.40	-	0.15	0.40	0.40	0.08	0.08	35,000	240	60,000	415			
		C	-	0.35	0.29	1.06	0.035	0.035	0.10	-	0.40	-	0.15	0.40	0.40	0.08	0.08	40,000	275	70,000	485			
ASTM A 178	E	A	0.06	0.18	0.27	0.63	0.035	0.035	-	-	-	-	-	-	-	-	-	26,000	180	47,000	325	P = 32000 t/D (Inch-Pound Unit) P = 2200.6 t/D (S.I Unit)		
		C	-	0.35	-	0.80	0.035	0.035	-	-	-	-	-	-	-	-	-	37,000	255	60,000	415			
		D	-	0.27	1.00	1.50	0.030	0.015	0.10	-	-	-	-	-	-	-	-	40,000	275	70,000	485			
ASTM A179	S	-	0.06	0.18	0.27	0.63	0.035	0.035	-	-	-	-	-	-	-	-	-	26,000	180	47,000	325		72 HRB	
		S	0.06	0.18	0.27	0.63	0.035	0.035	-	0.25	-	-	-	-	-	-	-	26,000	180	47,000	325		77 HRB < 5.10 mm WT 137 HB > 5.10 mm WT	
ASTM A209	S	T 1	0.10	0.20	0.30	0.80	0.025	0.025	0.10	0.50	-	0.44	0.65	-	-	-	-	30,000	205	55,000	380		80 HRB WT < 5.10 mm 146 BHN WT ≥ 5.10 mm	
		T 1a	0.15	0.25	0.30	0.80	0.025	0.025	0.10	0.50	-	0.44	0.65	-	-	-	-	32,000	220	60,000	415		81 HRB WT < 5.10 mm 153 BHN WT ≥ 5.10 mm	
		T 1b	-	0.14	0.30	0.80	0.025	0.025	0.10	0.50	-	0.44	0.65	-	-	-	-	28,000	195	53,000	365		77 HRB WT < 5.10 mm 137 BHN WT ≥ 5.10 mm	

## CHEMICAL COMPOSITION & MECHANICAL PROPERTIES

## ASTM

Specification	Type	Grade	Chemical Composition (%)														Mechanical Properties				Hydrostatic Test Pressure	Hardness (Max)**									
			C		Mn		P		S		Si		Cr		Mo		Cu		Ni				V		N		Nb/Cb		Yield Strength Min	Tensile Strength Min	% Elongation (G.L. 50mm) e (min)
			Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	PSI	Mpa				
ASTM A 210	S	A-1	-	0.27	-	0.93	0.035	0.035	0.10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	37,000	255	60,000	415	P = 32000 t/D (Inch-Pound Unit) P = 220.6 t/D (S.I Unit)	79 HRB / 143 BHN 89 HRB / 179 BHN
		C	-	0.35	0.29	1.06	0.035	0.035	0.10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	40,000	275	70,000	485		
ASTM A 213 / A 335	S	P-1	0.10	0.20	0.30	0.80	0.025	0.025	0.10	0.50	-	-	0.44	0.65	-	-	-	-	-	-	-	-	-	-	-	30,000	205	55,000	380	For A 213 P = 32000 t/D (Inch-Pound Unit) P = 220.6 t/D (S.I Unit)	85 HRB / 163 HB / 170 HV
		# P-2 / T-2	0.10	0.20	0.30	0.61	0.025	0.025	0.10	0.30	0.50	0.81	0.44	0.65	-	-	-	-	-	-	-	-	-	-	-	30,000	205	60,000	415	-do-	
		P-5 / T-5	-	0.15	0.30	0.60	0.025	0.025	-	0.50	4.00	6.00	0.45	0.65	-	-	-	-	-	-	-	-	-	-	-	30,000	205	60,000	415	-do-	
		P-11 / T-11	0.05	0.15	0.30	0.60	0.025	0.025	0.50	1.00	1.50	1.50	0.44	0.65	-	-	-	-	-	-	-	-	-	-	-	30,000	205	60,000	415	-do-	
		P-12 / T-12	0.05	0.15	0.30	0.61	0.025	0.025	-	0.50	0.80	1.25	0.44	0.65	-	-	-	-	-	-	-	-	-	-	-	32,000	220	60,000	415	-do-	
		P-22 / T-22	0.05	0.15	0.30	0.60	0.025	0.025	-	0.50	1.90	2.60	0.87	1.13	-	-	-	-	-	-	-	-	-	-	-	30,000	205	60,000	415	-do-	
		P-91 / T-91	0.08*	0.12*	0.30	0.60	0.020	0.010	0.20	0.50	8.00	9.50	0.85	1.05	-	-	-	-	-	0.40	0.03	0.07	0.18 to 0.25	-	-	-	60,000	415	85,000	585	91 HRB min./ 90 HRB min. 25 HRC (max.)
ASTM A-214	E	-	0.18	0.27	0.63	0.035	0.035	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	72 HRB		
ASTM A 333	E & S	1	-	0.30	0.40	1.06	0.025	0.025	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	30,000	205	55,000	380	P = 2 S t/D where S = 60% of SMYS	Impact 18 J (Min.)	
		6	-	0.30	0.29	1.06	0.025	0.025	0.10	-	0.30	-	0.12	0.40	0.08	-	-	-	-	-	-	-	-	-	35,000	240	60,000	415		18 J (Min.)	
ASTM A 334	E & S	1	-	0.30	0.40	1.06	0.025	0.025	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	30,000	205	55,000	380	P = 32000 t/D (Inch-Pound Unit) P = 220.6 t/D (S.I Unit)	Impact 18 J (Min.)	
		6	-	0.30	0.29	1.06	0.025	0.025	0.10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	35,000	240	60,000	415		18 J (Min.)	

\* C% for Grade T-91 = 0.07 to 0.14%

\*\* Hardness values are not applicable for Grades P-1 to P-22

# Tensile Strength of Grade P-2 = 380MPa / 55000PSI

## CHEMICAL COMPOSITION & MECHANICAL PROPERTIES

## ASTM

Specification	Type	Grade	Chemical Composition (%)														Mechanical Properties						Hydrostatic Test Pressure	Hardness (Max)						
			C		Mn		P	S	Si		Cr		Mo	Cu		Ni	V		Yield Strength	Tensile Strength	% Elongation (G.L. 50mm) e (min)									
			Min	Max	Min	Max	Max	Max	Min	Max	Min	Max	Max	Min	Max	Min	Max	Min				Max			Min	Max				
ASTM	S	SAE 1010	0.08	0.13	0.30	0.60	0.040	0.050	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
A-519		SAE 1018	0.15	0.20	0.60	0.90	0.040	0.050	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
		SAE 1026	0.22	0.28	0.60	0.90	0.040	0.050	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
		SAE 1035	0.32	0.38	0.60	0.90	0.040	0.050	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
		SAE 1040	0.37	0.44	0.60	0.90	0.040	0.050	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
		SAE 1518	0.15	0.21	1.10	1.40	0.040	0.050	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
		SAE 1541	0.36	0.44	1.35	1.65	0.040	0.050	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
		SAE 4130	0.28	0.33	0.40	0.60	0.040	0.040	0.15	0.35	0.80	1.10	0.15	0.25	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
		SAE 52100	0.93	1.05	0.25	0.45	0.025	0.015	0.15	0.35	1.35	1.60	-	0.10	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
ASTM	E & S Butt Welded		-	-	-	-	0.050	0.060	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
A-589		Gr. A	-	-	-	-	0.050	0.060	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
		Gr. B	-	-	-	-	0.050	0.060	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
																		30,000	205	48,000	330			As per table of specification						
																		30,000	205	48,000	330									
																		35,000	240	60,000	415									

Not Specified

$e = 625000 A^{0.2} U^{0.9}$

P - Hydrostatic Test Pressure (Bar)    D - Specified Outside Diameter (mm)    t - Specified Wall Thickness (mm)  
A - Cross Sectional Area (inch<sup>2</sup> / mm<sup>2</sup>)    U - Specified Tensile Strength (PSI / MPa)  
E - ERW (Electric Resistance Welded)    S - Seamless    SMYS - Specified Min. yield Strength.



# CHEMICAL COMPOSITION & MECHANICAL PROPERTIES

IS

Specifi- cation	Grade	Chemical Composition (%)												Mechanical Properties						Hydrostatic Test Pressure	Remarks		
		C		Mn		P	S	Si	Cr		Mo	Cu	Ni	V	C.E.	Yield Strength		Tensile Strength				% Elongation (min)	
		Min	Max	Min	Max	Max	Max	Min	Max	Min	Max	Max	Max	Max	Min	Max	Min	Max					
IS:1161	E & S	-	0.12	-	0.60	0.040	-	-	-	-	-	-	-	-	-	30,500	210	48,000	330	-	20	N.A.	1) % El upto 25mm NB for all grades = 12 min. 2) Flattening distance between plates for Weld = 75%, 85%, 85% and for Parent 60%, 75%, 75% for Grades YST-210, 240 and 310 respectively.
IS:1239	E & S	-	0.20	-	1.30	0.040	0.040	-	-	-	-	-	-	-	-	-	46,500	320	-	-	12 upto 25 mm NB 20 above 25 mm NB G.L. = 5.65 √Area	5 Mpa	
IS:1914	S	0.08	0.25	0.35	1.40	0.050	0.050	0.35	-	-	-	-	-	-	-	35,200	242	64,000	440	84,000	580	P = 2 S t/D (Max), 7 MPa (min.) S = Stress 40% of S.M.T.S	
IS:320	E	0.08	0.25	0.35	1.40	0.050	0.050	0.35	-	-	-	-	-	-	-	25,500	176	46,500	320	70,000	480		
IS:360	E	0.08	0.25	0.35	1.40	0.050	0.050	0.35	-	-	-	-	-	-	-	28,500	198	52,000	360	72,500	500		
IS:2416	S	0.08	0.25	0.35	1.40	0.050	0.050	0.35	-	-	-	-	-	-	-	29,000	201	58,000	402	72,500	500	P = 2 S t/D (Max), 7 MPa (min.) S = Stress 40% S.M.T.S	
IS:310	E	0.08	0.25	0.35	1.40	0.050	0.050	0.35	-	-	-	-	-	-	-	22,000	152	44,000	304	58,000	402		
IS:360	E	0.08	0.25	0.35	1.40	0.050	0.050	0.35	-	-	-	-	-	-	-	26,000	177	51,000	353	65,500	451		
IS:3589	E & S	-	0.16	-	1.20	0.040	0.040	-	-	-	-	-	-	-	-	28,000	195	22,000	330	-	-	Flattening Test - no opening shall occur in weld until the distance between two plates less than 5 Mpa	
IS:410	E	-	0.20	-	1.30	0.040	0.040	-	-	-	-	-	-	-	-	34,000	235	59,500	410	-	-	S = Stress (60% of min. SMYS)	
IS:450	E	-	0.25	-	1.20	0.040	0.040	-	-	-	-	-	-	-	-	40,000	275	65,000	450	-	-		
IS:3601	S	-	-	-	-	0.060	0.060	-	-	-	-	-	-	-	-	45,000	310	78,000	540	-	-		
IS:4270	E & S	-	-	-	-	0.040	0.040	-	-	-	-	-	-	-	-	34,000	235	59,500	410	-	-	P = 280 t/D for Fe 410 P = 350 t/D for Fe 450 Max Pressure applied shall be 7 MPa	
IS:11714	S	0.06	0.18	0.27	0.63	0.048	0.058	-	-	-	-	-	-	-	-	26,000	179	47,000	324	-	-		
IS:9295	E	-	-	-	-	0.06	0.06	-	-	-	-	-	-	-	-	30,500	210	48,000	330	-	-	1. Drift test = minimum increase in OD after expansion shall be 2.5% 2. Flattening distance between plates for weld = 75% and for parent = 60%	
IS:240	E	-	-	-	-	0.06	0.06	-	-	-	-	-	-	-	-	35,000	240	59,500	410	-	-		
IS:310	E	-	-	-	-	0.06	0.06	-	-	-	-	-	-	-	-	45,000	310	65,000	450	-	-		

P: Hydrostatic Test Pressure (MPa) D: Specified Outside Diameter (mm) SMTS: Specified Min. Tensile Strength  
E: ERW (Electric Resistance Welded) S: Seamless S: Specified Min. yield Strength t: Specified Wall Thickness (mm)



## CHEMICAL COMPOSITION & MECHANICAL PROPERTIES

DIN

Specification	Type	Grade	Chemical Composition (%)														Mechanical Properties						Hydrostatic Test Pressure	Impact		
			C		Mn		P	S		Si	Cr		Mo		Cu	Ni	V	Yield Strength		Tensile Strength		% Elongation (min)				
			Min	Max	Min	Max	Max	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Long			Trans	
DIN 1629	S	St-37.0	-	0.17	-	-	0.040	0.040	-	-	-	-	-	-	-	-	-	235 for WT upto 16 mm 225 for WT 16 - 40 mm	350	480	25	23	50 Bar			
		St-44.0	-	0.21	-	0.040	0.040	-	-	-	-	-	-	-	-	-	-	275 for WT upto 16 mm 265 for WT 16 - 40 mm	420	550	21	19				
		St-52.0	-	0.22	-	0.040	0.035	-	-	-	-	-	-	-	-	-	-	355 for WT upto 16 mm 345 for WT 16 - 40 mm	500	650	21	19				
DIN 1630	S	St-37.4	-	0.17	0.35	-	0.040	0.040	-	0.35	-	-	-	-	-	-	-	235 for WT upto 16 mm 225 for WT 16 - 40 mm	350	480	25	23	80 bar	Longitudinal: 43 Joules Transverse: 27 Joules		
		St-44.4	-	0.20	0.40	-	0.040	0.040	-	0.35	-	-	-	-	-	-	-	275 for WT upto 16 mm 265 for WT 16 - 40 mm	420	550	21	19				
		St-52.4	-	0.22	-	0.040	0.035	-	0.55	-	-	-	-	-	-	-	-	355 for WT upto 16 mm 345 for WT 16 - 40 mm	500	650	21	19				
DIN 2391	S	St-30.5I	-	0.10	-	0.55	0.025	0.025	-	0.30	-	-	-	-	-	-	-	NBK: 215 GBK: -	NBK: 290 GBK: 280	NBK: 420	NBK: 30 GBK: 30	23	23	Not Specified		
		St-30.AL	-	0.10	-	0.55	0.025	0.025	-	0.05	-	-	-	-	-	-	-	NBK: 215 GBK: -	NBK: 290 GBK: 280	NBK: 420	NBK: 30 GBK: 30	19	19			
		St-35	-	0.17	0.40	-	0.025	0.025	-	0.35	-	-	-	-	-	-	-	NBK: 340 GBK: 315	NBK: 470	NBK: 25 GBK: 25	21	21				
		St-45	-	0.21	0.40	-	0.025	0.025	-	0.35	-	-	-	-	-	-	-	NBK: 255 GBK: -	NBK: 570	NBK: 21 GBK: 21	20	20				
		St-52	-	0.22	-	1.60	0.025	0.025	-	0.55	-	-	-	-	-	-	-	-	NBK: 355 GBK: -	NBK: 630	NBK: 22 GBK: 22	20	20			
DIN 17175	S	St-35.8	-	0.17	0.40	0.80	0.040	0.040	0.10	0.35	-	-	-	-	-	-	-	235 for WT ≤ 16 mm 225 for WT > 16 to 40 mm	360	480	25	23	80 bar	Transverse: 34 Joules Transverse: 27 Joules Transverse: 34 Joules Transverse: 34 Joules		
		St-45.8	-	0.21	0.40	1.20	0.040	0.040	0.10	0.35	-	-	-	-	-	-	-	255 for WT ≤ 16 mm 245 for WT > 16 to 40 mm	410	530	21	19				
		13 Cr. Mo44	0.10	0.18	0.40	0.70	0.035	0.035	0.10	0.35	0.70	1.10	0.45	0.65	-	-	-	290 for WT > 10 mm 305 for WT ≤ 10 mm	440	590	22	20				
		15 Mo.3	0.12	0.20	0.40	0.80	0.035	0.035	0.10	0.35	-	0.25	0.35	-	-	-	-	270 for WT > 10 mm 285 for WT ≤ 10 mm	450	600	22	20				

GBK - Annealed NBK - Normalised S - Seamless E - ERW (Electric Resistance Welded)

## TOLERANCE ON OUTSIDE DIAMETER, WALL THICKNESS, WEIGHT AND LENGTH OF PIPE

SPECIFICATION	OUTSIDE DIAMETER		WALL THICKNESS	WEIGHT	LENGTH						
	PIPE BODY	PIPE ENDS (PLAIN END)			NOMINAL	AVG (MIN)	MINIMUM	MAXIMUM	ft.	Mtr	ft.
API 5L / ISO 3183 & ISO 3183	< 2 3/8" (60.3 mm) : +0.40mm, - 0.80mm ≥ 2 3/8" (60.3mm) ≤ 24" (610mm) : ±0.0075 D but max. of ± 3.20 mm for welded pipe	< 2 3/8" (60.3 mm) : +0.40mm, -0.80mm ≥ 2 3/8" (60.3mm) ≤ 65/8" (168.3 mm) : ±1.60mm, -0.40mm > 65/8" (168.3mm) ≤ 24" (610 mm) : ±0.005 D (but max. of ± 1.60 mm)	<b>Seamless :</b> ≤ 4.0 mm WT : +0.6 mm, -0.5 mm > 4.0 mm WT to < 25.0 mm WT : +0.15%, -0.125t > 25.0 mm WT : +3.7mm or +0.1t (whichever is greater) -3.0 mm or 0.1t (whichever is greater) <b>ERW</b> ≤ 5.0 mm WT : ±0.5 mm > 5.0 mm WT to < 15.0 mm WT : ±0.1t ≥ 15.0 mm WT : ±1.5 mm	Single Length of Pipe : +10%, -3.5% Carloads ≥ 20 Ton : -1.75% Special Plain End Pipe : +10%, -5%	20 40	17.5 35.0	5.33 10.67	9 14	22.5 45.0	6.86 13.72	
API 5CT	< 4.1/2" (114.3 mm) OD : ± 0.031" (0.79mm) ≥ 4 1/2" (114.3 mm) OD : +1% D, -0.5% D	N.A	+ Not Limited -12.5%	Single Length : +6.5%, -3.50% Carloads > 40,000 lbs (18,144 kg) : -1.75% Carloads < 40,000 lbs (18,144 kg) : -3.5%	CASING TUBING	Range-1 16 - 25 (4.88- 7.62)	Range-2 25 - 34 (7.62 - 10.36)	Range-2 25 - 34 (7.62 - 10.36)	Range-3 34 - 48 (feet) (10.36 - 14.63) (mtr)		
IS:1239 Pt-I BS:1387	As per Table of relevant specification	N.A	Light : + not limited, - 8%, Medium & Heavy : + not limited, 10% Note : For IS:1239 Seamless Pipes, Tol. Shall be - 12.5%, + not limited	Carload 10 MT Light : +7.5%, -5%, 10 MT, Med. & Heavy : ±7.5% Single Tube Light : +10%, - 8%, Med & Heavy : ±10%	-	6	-	-	4	-	7
IS: 3589	Upto 508 mm O.D. : <b>Welded</b> : ± 0.75% <b>Seamless</b> : ± 1.0%	N.A	<b>Welded</b> : ±10% <b>Seamless</b> : ± 20%, -12.5%,	Carload 10 MT & above : ±7.5%	Single Random Length - 4 to 7 mtr. Double Random Length - 7 to 14 mtr.						
IS: 4270	114.30 mm - 508.0 mm OD : ± 1.0%	N.A	<b>Welded</b> - Upto 406.4 mm O.D. : +15%, -12.5% Above 406.4 mm O.D. : +15%, -10% <b>Seamless</b> : +20%, -12.5%	+ 10%, -8%	-	6	-	-	4	-	7
IS: 1161	Upto 48.3mm O.D. : +0.40 mm, -0.80 mm Over 48.3mm : ± 1.0%	N.A	<b>Welded</b> : + not limited, - 10%, <b>Seamless</b> : + Not Limited, - 12.5%	Carload 10MT Light : ±5% 10 MT, Med. & Heavy : ±7.5% Single Tube Light : +10%, - 8% Med & Heavy : ±10%	Tolerance - Exact Length as agreed / random 4 to 7 mtrs.						
IS:9295	± 0.8%	N.A	±10%	Single Length : ±10% Carload per 10 tonnes : ±7.5%	Tolerance - Exact length : +6mm, -0						
IS:1914 Pt-2,3&4	Welded & CFS : + 0, -1% HFS : ≤ 63 mm O.D. : +0.40 mm, - 0.80 mm HFS : > 63 mm O.D. : ±1.0%	N.A	<b>Welded &amp; CFS</b> : +10%, -5% <b>HFS</b> ≤ 63mm O.D. : + 17.5%, -7.5% <b>HFS</b> > 63 mm O.D. : + 15%, -5%	N.A	Tolerance Upto 9 Mtr, + 3 mm, -0 Above 9 mtr, + 6 mm, -0 Single Random length- 4 to 7 mtr. Double Random length- 7 to 14 mtr.						

## TOLERANCE ON OUTSIDE DIAMETER, WALL THICKNESS, WEIGHT AND LENGTH OF PIPE

SPECIFICAT- ION	OUTSIDE DIAMETER		WALL THICKNESS	WEIGHT	LENGTH						
	PIPE BODY	PIPE ENDS (PLAIN END)			NOMINAL ft.	Mtr	AVG (MIN) ft.	Mtr	MINIMUM ft.	Mtr	MAXIMUM ft.
IS:2416 Pt-II,III & IV	<b>Welded</b> : ± 0.75% (±0.30mm min) <b>HFS</b> : ≤ 63mm O.D.: +0.40 mm, -0.80 mm <b>HFS</b> : > 63mm O.D. : ±1.0%	N.A	<b>Welded</b> : +10%, -5% <b>HFS</b> : +17.5%, -7.5% , <b>CFS</b> : +10%, -5%	N.A	Tolerance Upto 9 Mtr, + 3 mm, - 0 Above 9 mtr, + 6 mm, - 0						
IS:11714 Pt-2&3	As per Table of relevant specification	N.A	<b>Welded</b> : ±18%, -0 <b>Seamless</b> : As per table of relevant specification	+10%, -0	Tolerance -Below 50 mm O.D. : + 3.2 mm, - 0 50 mm O.D. & above : + 4.8 mm, - 0						
BS:3059 Pt I	<b>Welded</b> : ± 0.75% (±0.30 mm min) <b>HFS</b> : ± 1% (± 0.50 mm min ) <b>CFS</b> : ± 0.5% (± 0.10 mm. Min)	N.A	<b>Welded</b> : Upto 3.25 mm WT, ± 10% Over 3.25 mm WT, ± 7.5% <b>HFS</b> : ± 12.5% <b>CFS</b> : ± 7.5%	N.A	Tolerance -Upto 6Mtr: + 6 mm, - 0 Above 6 mtr, 1.5 mm will increase for every 3 mtrs increase of length (12 mm max.)						
BS:3059 Pt II	± 0.75% (± 0.30 mm min) - Class 2	N.A	± 10% (excluding weld area) - Class 2	N.A							
BS:6323 Pt V	As per Table of relevant specification	N.A	Less than 3 mm WT : ± 10% 3 mm WT & above : ± 8%	N.A	Tolerance Upto 0.5 mtr : + 2 mm, - 0 above 0.5 to 2.0 mtr. : +3 mm, - 0 above 2.0 to 5.0 mtr. : + 5 mm, - 0 above 5.0 to 7.0 mtr. : + 10 mm, - 0 above 7.0 mtr. : as agreed						
BS:EN 10216-1	For D ≤ 219.1 mm: ± 1% or ± 0.5 mm whichever is greater  For D < 219.1 mm: ± 1% or ± 0.5 mm whichever is greater	NA	For a T/D ratio ≤ 0.025 >0.025 ≤ 0.050 >0.050 ≤ 0.10 >0.10 ± 12.5% or ± 0.4 mm, whichever is greater	According to ENV 10220	Tolerance on Exact Length L ≤ 6000 mm : + 10mm, -0 6000 < L ≤ 12000 mm : + 15 mm, -0 L > 12000 mm : + by agreement, -0						
BS:EN 10216-2	HFS For D ≤ 219.1 mm: ± 1% or ± 0.5 mm whichever is greater  For D < 219.1 mm: ± 1% or ± 0.5 mm whichever is greater  CFS ± 0.5% or ± 0.3 mm, whichever is greater	NA	HFS For a T/D ratio ≤ 0.025 >0.025 ≤ 0.050 >0.050 ≤ 0.10 >0.10 ± 12.5% or ± 0.4 mm, whichever is greater  ± 20% ± 15% ± 12.5% ± 10%  CFS ± 10% or 0.2 mm, whichever is greater	According to ENV 10220	Tolerance on Exact Length L ≤ 6000 mm : + 10mm, -0 6000 < L ≤ 12000 mm : + 15 mm, -0 L > 12000 mm : + by agreement, -0						

E= ERW S= Seamless HFS= Hot Finished Seamless CFS = Cold Finished Seamless D = Outside Diameter T/WT = Wall Thickness L= Length

**TOLERANCE ON OUTSIDE DIAMETER, WALL THICKNESS, WEIGHT AND LENGTH OF PIPE**

SPECIFICATION	TYPE	OUTSIDE DIAMETER		PIPE ENDS (PLAIN END)	WALL THICKNESS	WEIGHT	LENGTH					
		PIPE BODY					NOMINAL	AVG (MIN)	MINIMUM	MAXIMUM		
ASTM A-53	E & S	1-1/2" NPS & under : ± 0.40 mm : ± 1.0%	2" NPS and over	N.A	At any point: - 12.5% (max)	±10%	ft.	Mtr	ft.	Mtr	ft.	Mtr
ASTM A106	S	1/8" to 1-1/2" : ± 0.40 mm, : ± 0.80 mm Over 1-1/2" to 4" : ± 1.60 mm, -0.80 mm Over 4" to 8" : ± 2.40 mm, -0.80 mm Over 8" to 18" : ± 3.20 mm, -0.80 mm Over 18" to 26"		N.A	At any point: - 12.5% (max)	Single Length of Pipe + 10%, - 3.5%	20	6	16	4.88	22	6.71
ASTM A-179	S	<b>Hot Finished Seamless Tubes</b> 4" (101.6mm & under) : ± 0.40 mm, - 0.80 mm Over 4" to 7 1/2" including : ± 0.40 mm, - 1.20 mm (101.6 to 190.5 mm)		N.A	<b>HFS Tubes</b> O.D. ≤ 101.06 mm & WT < 2.40 mm : + 40%, - 0 WT 2.40 to 3.80 mm incl. : + 35%, - 0 WT 3.80 mm to 4.60 mm incl. : + 33%, - 0 WT > 4.60 mm : + 28%, - 0 <b>Welded and cold finished Seamless tubes</b> < 1" (25.4 mm) : ± 0.10 mm 1" (25.4 mm) to 1-1/2" (38.1mm) incl. : ± 0.15 mm > 1-1/2" (38.1mm) to 2" (50.8mm) excl. : ± 0.20 mm 2" (50.8 mm) to 2-1/2" (63.5 mm) incl. : ± 0.25 mm 2-1/2" (63.5mm) to 3" (76.2mm) excl. : ± 0.30 mm 3" (76.2 mm) to 4" (101.6 mm) incl. : ± 0.38 mm > 4" (101.6 mm) to 7-1/2" (190.5 mm) incl. : ± 0.38 mm, - 0.64 mm > 7-1/2" (190.5mm) to 9" (228.6 mm) incl. : ± 0.38 mm, - 1.14 mm	<b>HFS :</b> + 16%, - 0	<b>Exact Length Tolerance :</b> <b>H.F.S. Tubes :</b> + 5mm, - 0					
ASTM A-192	S	Over 7 1/2" to 9" (190.50 to 228.60 mm)					<b>Welded &amp; C.F.S Tubes :</b> Specified Length : + 6 mm, - 0					
ASTM A-209	S						<b>Welded</b> : + 10%, - 0 <b>CFS Tubes :</b> ≤ 1-1/2" O.D. : + 12%, - 0 > 1-1/2" O.D. : + 13%, - 0					
ASTM A-210	S						<b>Welded Tubes (for all sizes)</b> : +18%, - 0 <b>CFS Tubes :</b> ≤ 1.1/2" O.D. : +20%, - 0 > 1.1/2" O.D. : +22%, - 0					
ASTM A-213	S						<b>Single pipe NPS 12 &amp; under</b> : + 10%, - 3.5% <b>Single pipe over NPS 12</b> : + 10%, - 5%					
ASTM A-178	E						<b>Not specified</b>					
ASTM A-214	E						<b>Outside Diameter Wall Thickness</b> Upto 76.19 mm : ± 12.5% ± 10% 76.2 - 152.37 mm : ± 10% ± 7.5% 152.4 - 273.05 mm : ± 10% ± 10%					
ASTM A-334	E & S	1/8" to 1-1/2" : ± 0.40 mm, - 0.80 mm Over 1-1/2" to 4" : ± 0.79 mm Over 4" to 8" incl. : ± 1.59 mm, - 0.79 mm Over 8" to 12" : ± 2.38 mm, - 0.79 mm Over 12" : ± 1.0% of O.D.			At any point : - 12.5% (max.)		20	6	16	4.88	22	6.71
ASTM A-335	S	1/8" to 1-1/2" : ± 0.40 mm, - 0.80 mm Over 1-1/2" to 4" : ± 0.79 mm Over 4" to 8" incl. : ± 1.59 mm, - 0.79 mm Over 8" to 12" : ± 2.38 mm, - 0.79 mm Over 12" : ± 1.0% of O.D.			1/8" to 2 1/2" incl. for all T/D ratio : +20%, -12.5% > 2 1/2" for T/D ≤ 5% : +22.5%, -12.5% > 2 1/2" for T/D > 5% : +15%, -12.5%		40	12	35	10.67	22	6.71
ASTM A-333	E & S	1/8" to 1-1/2" incl. : ± 0.40 mm, - 0.80 mm Over 1-1/2" to 4" incl. : ± 0.80 mm Over 4" to 8" incl. : ± 1.60 mm, - 0.80 mm Over 8" to 18" incl. : ± 2.40 mm, - 0.80 mm Over 18" to 26" incl. : ± 3.20 mm, - 0.80 mm					<b>Specified Length : + 6 mm, - 0</b>					
ASTM A - 519	S	Upto 76.17 mm : ± 0.51 mm 76.20 - 114.27 mm : ± 0.64 mm 114.30 - 152.37 mm : ± 0.79 mm 152.40 - 190.47 mm : ± 0.94 mm 190.50 - 228.57 mm : ± 1.14 mm 228.6 - 273.05 mm : ± 1.27 mm		Not Specified	<b>Outside Diameter Wall Thickness</b> < 15% of OD ≥ 15% of OD Upto 76.19 mm : ± 12.5% ± 10% 76.2 - 152.37 mm : ± 10% ± 7.5% 152.4 - 273.05 mm : ± 10% ± 10%		<b>Pipe Length</b> < 1.20 mtr : + 1.6 mm, - 0 > 50.8 - 101.6 mm : + 2.4 mm, - 0 > 101.6 mm : + 3.2 mm, - 0 1.20 - 3.0 mtr : + 2.4 mm, - 0 > 50.8 mm : + 3.2 mm, - 0 3.0 - 7.3 mtr : All Sizes > 7.30 mtr : All Sizes Tolerance : + 4.8 mm, - 0 for each 3.0 mtr. above 7.3 mtr. but max 12.7 mm					

## TOLERANCE ON OUTSIDE DIAMETER, WALL THICKNESS, WEIGHT AND LENGTH OF PIPE

SPECIFICATION	OUTSIDE DIAMETER		WALL THICKNESS	WEIGHT	LENGTH			
	PIPE BODY	PIPE ENDS (PLAIN END)			NOMINAL	AVG (MIN)	MINIMUM	MAXIMUM
TYPE					ft.	Mtr	ft.	Mtr
ASTM A-589	For NPS 1 1/2" & under; variation should not be more than 0.40 mm ± 1% of OD	Not Specified	At any point: - 12.5% (max)	± 5%				
RDSO ETI/OHE/11(5/89)	33.7mm O.D. : + 0.30mm, - 0.1mm 38.0 mm O.D. : + 0.32mm, - 0.2mm 49.0 mm O.D. : + 0.32mm, - 0.2mm	28.4 (Std. ID) & 27.70 (Min ID) 29.9 (Std. ID) & 29.58 (Min ID) 40.9 (Std. ID) & 40.58 (Min ID)	- 0.31 mm, + not limited - 0.35 mm, + not limited - 0.35 mm, + not limited	N.A				
DIN 1629 and DIN 1630	≤ 100 mm OD : ± 1% of OD (0.5 mm max) > 100 mm OD : ± 1% of OD	≤ 100 mm OD : ± 0.40 mm > 100 mm OD : ± 0.5 mm ≤ 200 mm : ± 0.5% > 200 mm OD : ± 0.6%	OD ≤ 130 mm : WT ≤ 2.0 mm : +15%, -10% WT > 2.0 mm ≤ 4.0 mm : + 12.5%, -10% WT > 4.0 mm : ± 9% OD > 130 mm ≤ 320 mm : WT ≤ 0.05 D : + 17.5%, - 12.5% WT > 0.05 D ≤ 0.11 D : ± 12.5% WT > 0.11 D : ± 10.0% OD > 320 mm < 660 mm : WT ≤ 0.05 D : + 20%, - 15% WT > 0.05 D ≤ 0.09 D : + 15%, - 12.5% WT > 0.09 D : + 12.5%, - 10%	Single Length of Pipe : +1.2%, -8% For Car load not less than 10 ton : +10%, -5%	Specified length : ± 500 mm Exact Length : Upto 6 Mtr : + 10 mm, - 0 6 - 12 mtrs : + 15 mm, - 0 Above 12 mtr : As agreed			
DIN 2391	As per Table of relevant specification	Not specified	± 10%	Not specified				
DIN 17175	OD ≤ 100 mm : ± 0.75% (± 0.5 mm min) OD > 100 mm ≤ 320 mm : ± 0.9% OD > 320 mm : ± 1.0%	OD ≥ 45mm < 100 : ± 0.40mm OD > 100mm ≤ 200 mm : ± 0.5% OD > 200mm : ± 0.6%	OD ≤ 130 mm : WT ≤ 2.0 mm : + 15%, -10% WT > 2.0 mm ≤ 4.0 mm : + 12.5%, -10% WT > 4.0 mm : ± 9% OD > 130 mm ≤ 320 mm : WT ≤ 0.05 D : + 17.5%, - 12.5% WT > 0.05 D ≤ 0.11 D : ± 12.5% WT > 0.11 D : ± 10.0% OD ≤ 320 mm ≤ 660 mm : WT ≤ 0.05 D : + 22.5%, - 12.5% WT > 0.05 D ≤ 0.09 D : + 15%, - 12.5% WT > 0.09 D : + 12.5%, - 10%	Single Length of Tube : +10%, -8% For Car load of min. 10 tons : + 10%, -5%	Random length : 4 - 7 mtrs. Exact Length : Upto 500 mm : + 2mm, - 0 500 - 2000 mm : + 3mm, - 0 Above 2000 - 5000 mm : + 5mm, - 0 Above 5000 - 7000 mm : + 10mm, - 0 Above 7000 mm : As agreed			

E=ERW S= Seamless HFS= Hot Finished Seamless CFS= Cold Finished Seamless D/OD= Outside Diameter T/WT = Wall Thickness

## Conversion Tables & Formulas

### Conversion Tables

Pressure		Energy	
1 Atmosphere	= 14.7 PSI	1 Foot - Pound (Ft-Lb)	= 1.3558 Joules for Impact Energy
1 Atmosphere	= 1.033 kg/cm <sup>2</sup>	1 Joules	= 0.736 foot - pound
1 Bar	= 100000 N/mtr <sup>2</sup> or 100 KPa	1 Foot - Pound	= 4.448222 Newton
1 Bar	= 0.1 N/mm <sup>2</sup>	1 Foot - Pound	= 0.1383 kg - mtr
1 Bar	= 1.02 kg/cm <sup>2</sup>	1 Foot - Pound	= 1.3558 Newton Meter (for Torque)
1 Bar	= 14.504 PSI	1 Horse Power	= 746 Watt
1 kg/cm <sup>2</sup>	= 0.9804 Bar	1 Watt	= 0.00134 Horse Power
1 kg/cm <sup>2</sup>	= 14.22 PSI	<b>Length</b>	
1 Kg/mm <sup>2</sup>	= 9.81 MPa	1 Kilometer	= 1000 meter
1 PSI	= 0.0703 kg/cm <sup>2</sup>	1 Meter	= 100 centimeter
1 PSI	= 0.0689 Bar	1 Meter	= 1000 mm
1 PSI	= 6.895 KPa	1 Meter	= 3.28 foot
1 PSI	= 0.006895 MPa	1 Foot	= 0.3048 meter
1 MPa	= 145.032 PSI	1 Foot	= 304.8 mm
1 MPa	= 10.1992 kg/cm <sup>2</sup>	1 Foot	= 12 inch
1 MPa	= 9.9992 Bar	1 Inch	= 25.4 mm
1 MPa	= 1000 KPa	1 mm	= 0.0394 inch
1 MPa	= 1 N/mm <sup>2</sup>	1 Thou	= 0.001 inch
1 MPa	= 0.102 kg/mm <sup>2</sup>	1 Micron	= 0.001 mm
1 KPa	= 0.145032 PSI	1 Yard	= 0.9144 meter
1 KPa	= 0.001 MPA	1 Meter	= 1.0936 yard
1 KPa	= 0.01 Bar	1 Yard	= 3 feet
1 N/mm <sup>2</sup>	= 10 Bar	1 Mile	= 5280 feet
1 N/mm <sup>2</sup>	= 10.2 kg/cm <sup>2</sup>	1 Mile	= 1760 yard
1 N/mm <sup>2</sup>	= 145.032 PSI	<b>Area</b>	
1 N/mm <sup>2</sup>	= 1 MPa	1 Square Yard	= 0.8361274 Square meter
1 N/mm <sup>2</sup>	= 0.102 kg/mm <sup>2</sup>	1 Square Yard	= 9 Square feet
1 Ton/inch <sup>2</sup>	= 1.575 kg/mm <sup>2</sup>	1 Square Inch	= 645.16 Square millimeter
<b>Weight</b>		1 Square Feet	= 0.0929 Square meter
1 kg.	= 2.205 pounds (Lb)	1 Acre	= 4840 Square yard
1 Pound	= 0.45359 kg.	1 Square Mile	= 640 Acres
1 Pound	= 16 ounces	<b>Temperature</b>	
1 Pound/foot	= 1.48822 kg/mtr	i) C	= 5 (F-32) / 9
1 kg/mtr	= 0.6714 pound/foot	ii) F	= 32 + 9 C / 5
1 kg	= 9.81 Newton	iii) C / 5	= (F - 32) / 9
1 Newton	= 0.102 kg	C = Temperature in deg. Celsius F = Temperature in deg. Fahrenheit	



## Formulas

### 1 Carbon Equivalent (Ref. API 5L)

a) When the Carbon Content is  $\leq 0.12\%$

$$CE_{pcm} = C + \frac{Si}{30} + \frac{Mn}{20} + \frac{Cu}{20} + \frac{Ni}{60} + \frac{Cr}{20} + \frac{Mo}{15} + \frac{V}{10} + 5B$$

b) When the Carbon content is  $> 0.12\%$

$$CE_{IW} = C + \frac{Mn}{6} + \frac{(Cr + Mo + V)}{5} + \frac{(Ni + Cu)}{15}$$

### 2 Test Pressure (Ref. API 5C3)

a) Hydrostatic Test Pressure

Hydrostatic test pressure for plain - end pipe, extreme - line casing and integral - joint tubing are calculated by using the following formula

$$P = \frac{2St}{D}$$

b) Internal Yield (Burst) Pressure

$$P_i = 0.875 (2 \times Y_p \times t / D)$$

Where;

P = Hydrostatic test pressure in PSI

P<sub>i</sub> = Min. internal yield pressure in PSI

S = Fiber stress corresponding to the percent of specified yield strength

t = Specified wall thickness in inches

D = Specified outside diameter in inches

Y<sub>p</sub> = Specified min. yield strength in PSI

### 3 Weight for Plain End Pipes (Ref. API 5L/ASTM)

The plain end linear mass in SI Units is calculated by using the following formula

$$W_{pe} = 0.02466 (D - t) t$$

Where;

W<sub>pe</sub> is the plain end linear mass, expressed in kg/Mtr and rounded to nearest 0.01 kg/Mtr

D is the specified outside diameter, expressed in millimetres

t is the specified wall thickness, expressed in millimetres

### 4 Weight for Full Length Pipes

$$WL = (W_{pe} \times L) + ew$$

Where;

WL = Calculated weight of full length pipe (kg.)

W<sub>pe</sub> is the plain end linear mass, expressed in Kg/Mtr and rounded to nearest 0.01 kg/Mtr

L = Length of Pipe (mtr)

ew = Weight gain or loss due to end finish (kg)

Note : For Plain End Pipe ew = 0

### 5 Weight of Billet

$$\text{Weight of Billet (Kg/Mtr)} : 0.0061654 \times (\text{Dia. mm})^2$$

### 6 Standard Drift Size (Ref. API 5CT)

Product	Drift Mandrel Size(Min.)	
	Length (mm)	Diameter (mm)
<b>Casing</b>		
< 9 5/8	152	d - 3.18
≥ 9 5/8 to ≤ 13 3/8	305	d - 3.97
> 13 3/8	305	d - 4.76
<b>Tubing</b>		
≤ 2 7/8	1067	d - 2.38
> 2 7/8	1067	d - 3.18

Where; d - is inside diameter expressed in millimetres.

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