

ERW STEEL PIPES

from

SURYA ROSHNI LIMITED



Trust...

...is what we build around the world
through our Steel Pipes

About Ourselves

Surya Roshni Ltd. is today a vast conglomerate with a very large ERW pipe manufacturing plant and a large cold rolling strip mill at Bahadurgarh (Haryana). It also has two large lighting units at Kashipur (UP) and Malanpur (MP), producing fluorescent tubelights, GLS lamps, CFL lamps, HPSV lamps, glass shells auto halogen lamps and various other components. The Kashipur unit is the largest FTL lighting factory in the country.

With its firm commitment to excellence in quality, its wide range of products in different specifications, constant technological upgradation and deep concern for customer satisfaction, the Company is justifiably a brand leader in both the steel pipe and lighting industries. The Company has a wide marketing network with its branches and dealer outlets spread across the length and breadth of the country.

With a turnover of over US\$ 275 million, the Company's quest for growth is never ending. Expansion and augmentation of facilities are continuous, ongoing processes, to meet growing demands. The steel pipe & CR strip divisions have been modernised to meet the stringent requirements of customers. Surya Roshni is making giant strides in its chosen areas with its tested skills, committed youth, vast experience and mature leadership.

Steel Pipe Plant

ERW pipes are extensively used in agriculture, industry and construction activities like scaffolding and casing in bore wells. They are used for conveying water, gas, crude oil and chemicals at various pressures and densities over long distances. Considering the challenging and varied applications, the pipes are produced to meet very high standards of specifications, both national and international, including that of API (American Petroleum Institute).

Having commenced three decades ago, the steel pipe division of Surya Roshni has grown in size and range to become a very large ERW pipe producer in the country producing about 160000 MT per annum, with sizes ranging from 15 mm NB to 400 mm NB, available both in galvanized and black condition.

The pipe plant situated at Bahadurgarh (Haryana) is equipped with state-of-the-art machines-slitting lines, pipe mills, galvanizing units, threading machines, finishing machines and fool-proof high pressure hydro testing machines. The plant also has sufficient handling facilities, both EOT and mobile cranes supported by pipe conveyer systems. The factory has a 100% power generation facility to guard against production loss in the event of power failure from State Electricity Board.

Quality assurance begins at the raw material stage and continues right through all the manufacturing operations, till the materials are packed for despatch. The quality assurance department is fully backed by a modern laboratory for various metallurgical and chemical tests, and a test house for testing physical properties. It has been awarded the prestigious ISO 9001 certificate by DETNORSKE VERITAS (DNV) for its quality systems.

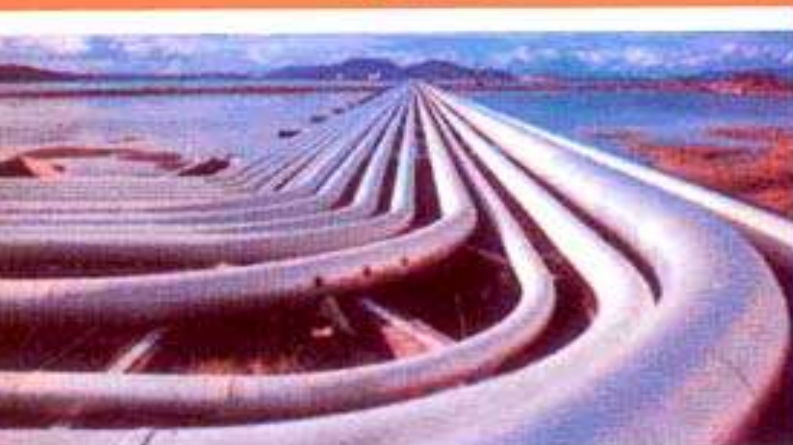
The specialty in Surya Roshni lies in its large dia pipes, with diameter ranging from 200 mm to 400 mm. It has achieved remarkable success in producing various special grades including API 5L grade A, 5L grade B as well as 5LX42, X46, X52, X56, X60 and X65.



OUR WIDE RANGE

For Different Applications

The products conform to the following National & International specifications incorporating latest amendments



Water Pipe lines

Water Mains, Sewerage Systems.
Industrial Water Lines, Plant Piping.
IS:1239, IS:3589, BS:1387, DIN 2439
DIN 2440, 2441, ASTM (A 53), JIS G 3452

Agriculture & Irrigation

Deep Tube-Wells & Casing Pipes.
IS:4270

Gas Pipe lines

Pipe Lines for Natural Gas, LPG and other Non-Toxic Gases.
API 5L (PSL 1 & PSL 2), IS:1978
JIS G 3452

Oil Pipe lines

Oil Refinery Piping, Crude Oil Piping.
Cross Country Pipe Line.
API 5L (PSL 1 & PSL 2), IS:1978

Construction Industries

Scaffolding & Structural Purposes.
IS:1161, BS:1139

Chemical Industries

Conveying of Chemicals.

Fire Fighting System

IS:3589, IS:1239, ASTM (A 53),

Power Projects

Ash Handling System, LP Piping.
API 5L, IS:3589, IS:1239

Automobile Industry

Air & Water Flow System IS:1239

Other Purposes

Supply of Exhaust Piping. (IS:1239)
Steel Tubes for Idlers & Troughed Belt Conveyers. (IS:9295)
Cold Storage Industry. (IS:1239)
LPG Cylinder Supporting Rings. (IS:1239)
Steel Tubes for Mechanical & General Engineering Purposes.
(IS:3601, BS:1775)



Manufacturing Diagram

ERW pipes are made of HR Coils. After being longitudinally slitted, the strip is progressively formed into a circular shape by passing it through a series of forming rolls.

Continuous welding is carried out by a high frequency induction welding machine, and the seam is formed by fusing the edges without filler metal. The weld bead reinforcement (inside, if needed) is removed and the welded pipes, after cooling, are cut in appropriate length after attaining its roundness and specified outer diameter.

The pipes, after straightening, are conveyed to the finishing bay for finishing, testing and inspection. Some of these pipes are subsequently galvanized and threaded.

Focus on Quality

Customer satisfaction drives Surya Roshni in everything that it does. No wonder, its commitment to the high quality of its pipes commences right from the selection of raw material and continues at every stage of manufacturing process till the finished product. Steel strips are assessed for their mechanical strength and consistency. At every subsequent stage along the manufacturing line, our engineers employ sophisticated equipment and techniques to ensure not only defect free quality of pipes, but also their optimal performance under the most adverse conditions. The inspection procedures evaluate each pipe for surface finish, perfection of weld, correct diameter, wall thickness, length and weight.

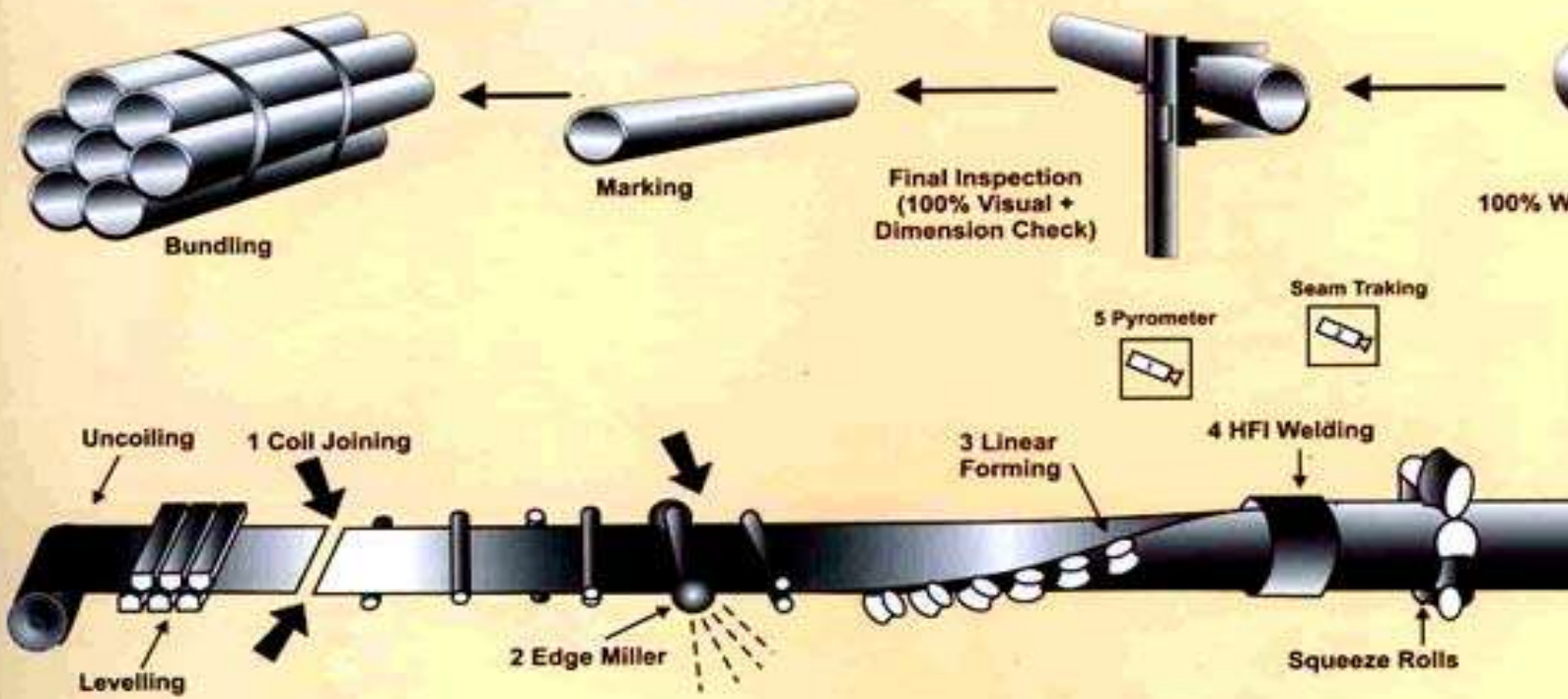
Modern Laboratory

To ensure product reliability through process control, Surya has a fully equipped metallurgical laboratory with all the tools essential for comprehensive product quality testing and evaluation to withstand reactive processes. Hydro testing of pipes is undertaken to detect leaks and fissures prior to galvanizing and threading. Destructive testing of pipes entails performance examination of the weld, as well as their tensile and compressive strength.

The constant emphasis on high quality guarantees a long, trouble-free service life to the pipes – without breakdown and without corrosion.

Testing and Quality Control Facilities

Besides the numerous quality assurance measures during the manufacturing process and at various inspection points, the following facilities are available for ensuring stringent quality standards.

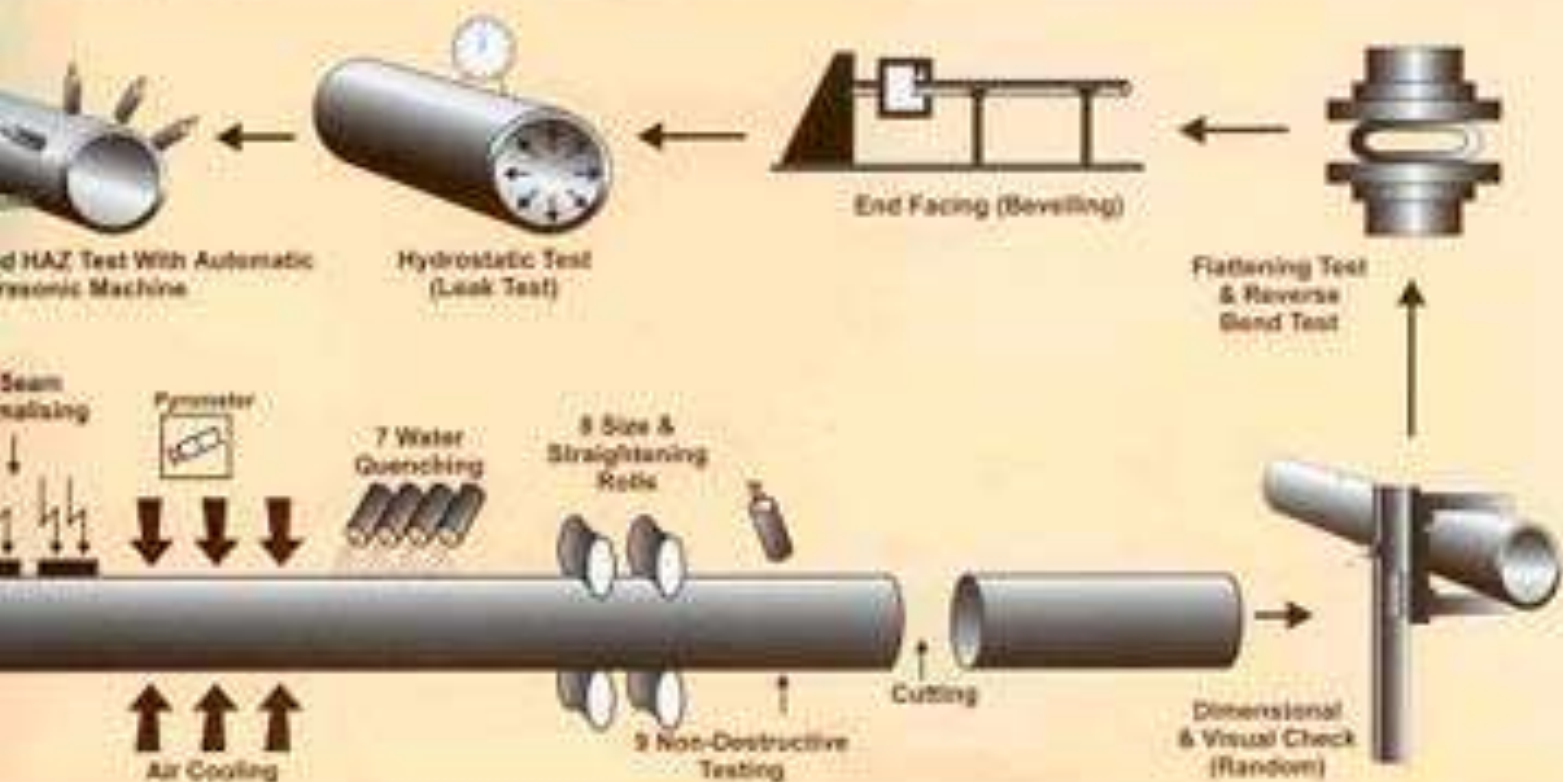




1) Universal Testing Machines (Digital)	For material testing (mechanical properties)
2) Eddy Current Testing Machine (NDT)	For on line flaw detection on welds
3) Ultrasonic Testing Machine (NDT) (After hydro testing)	For checking strip serrations and flaw detection on welds on pipes in auto mode
4) Metallurgical Microscope	For checking and evaluating the grain structure of material, heat affected and weld zones
5) Vickers Micro Hardness Tester (Digital)	For checking micro & macro hardness on weld, heat affected zone and base metal
6) Digital Ultrasonic Thickness Gauge	For checking thickness of pipes
7) Mandrels and Fixtures	Reverse bend test
8) Impact Test Machine (Charpy v notch)	For checking energy absorption test on materials
9) Bending Machine	For pipe bend test
10) Drop weight tear test	For evaluating the shear areas of material

Apart from the above important testing machines, we have temperature recorders for seam remelting, auto pressure recording for hydraulic test pressure and many other sophisticated measuring instruments.

The trained and committed work force ensures high quality of pipes made to various national and international standards, including the demanding API specifications. The quality control system which is audited from time to time and has been approved by API Surveyors.



TESTIMONY TO OUR CAPABILITY

- API 5L specifications intend to provide guidelines for the manufacture of pipes suitable for conveying gas & oil in both the oil & natural gas industries.
- It is the most prestigious and stringent specification widely adopted around the globe for cross-country pipelines meant for the movement of oil & natural gas at a very high pressure.
- Even the flow of LPG for domestic usage relies on API 5L standards indicating the requirement of the state-of-the-art technology to produce these pipes.
- API 5L is the barometer of the quality orientation of the pipe-industry because of the use of API 5L pipes in most stringent applications where a minute deviation in quality could lead to hazards.



Yet another confirmation to our competence

The Steel division of Surya Roshni Limited has been awarded the prestigious ISO-9001-2000 Certificate by DET NORSKE VERITAS (DNV), certifying that the quality system of the Company at Bahadurgrh has been found to conform to the quality standards of ISO-9001-2000. This Certificate is valid for the manufacture and supply of ERW steel tubes (Black & Galvanised) and CR Strips. This accreditation by the International Agency is added confirmation to the competence of the Company to deliver quality products.



Agencies who inspect / assess our products / work on behalf of our clients

The following Inspection Agencies work on behalf our various clients like IOCL, ONGC, Reliance GAIL, Oil India, HPCL, BPCL and NTPC.

- LLOYD's Register of Industrial Service
- Engineers India Limited
- Bureau Veritas
- Projects & Development India Limited (PDIL)
- SGS India Limited
- Mecon
- TUV
- ABSIV
- GLIS

and many other reputed national and international agencies.



Bureau of Indian Standards

Bureau of Indian Standards has given us the BIS Certification Marks licence to use the standard mark on steel pipes for the following specifications.

IS : 1161
IS : 1239
IS : 1978
IS : 3589

IS : 3601
(168.3 mm to 219.1 mm OD)

IS : 4270 and
IS : 9295

Export of Steel Pipes New Horizons

Surya Roshni, with its wide range of pipes for different applications, is one of the leading manufacturers with a strong presence in the Indian market. Now it is steadily building a place for itself in the International Market and is presently exporting its pipes to various countries, viz. USA, UK, Germany, Italy, Belgium, UAE, Oman Qatar, Bahrain, Kuwait, Sri Lanka, Bangladesh, Myanmar, Ethiopia, Mozambique, Ghana, Malta, and a few others.

The quest for entering new markets is continuing and with this aim in mind, the Company is participating in various industrial exhibitions being held abroad. Efforts are on to make a foray in countries, viz. Australia, Canada, Singapore, Malaysia, Iraq, Yemen, Eritrea, Kenya, Nigeria, Tanzania, Uganda, and a few others.

Thanks to our ISO 9001 accreditation and the license from American Petroleum Institute for using its API monogram, our products find ready acceptance for its quality.

For over 30 years we've been putting health, safety and the environment first, while supplying quality pipes.



TECHNICAL DATA OF PIPES CONFORMING TO API 5L -2004

Size	Outside Diameter		Wall Thickness		Mass of Plain end Pipe		Standard Test Pressure							
	mm	Inch	mm	Inch	Kg/Mtr	lb/ft	Grade A Mpa	Grade B Mpa	Grade X42 Mpa	Grade X46 Mpa	Grade X52 Mpa	Grade X56 Mpa	Grade X60 Mpa	Grade X65 Mpa
3 1/2	88.9	3.500	2.1	0.083	4.50	3.03	5.9	6.8	8.2	9.0	10.2	10.9	11.7	12.7
			2.8	0.109	5.95	3.95	7.8	9.1	11.0	12.0	13.6	14.6	15.6	16.9
			3.2	0.125	6.76	4.51	8.9	10.4	12.5	13.7	15.5	16.7	17.9	19.4
			3.6	0.141	7.57	5.06	10.1	11.7	14.1	15.4	17.4	18.8	20.1	20.7
			4.0	0.156	8.37	5.58	11.2	13.0	15.7	17.1	19.4	20.7	20.7	20.7
			4.4	0.172	9.17	6.12	12.3	14.3	17.2	18.8	20.7	20.7	20.7	20.7
			4.8	0.188	9.95	6.66	13.4	15.6	18.8	20.5	20.7	20.7	20.7	20.7
			5.5	0.216	11.31	7.58	15.4	17.2	20.7	20.7	20.7	20.7	20.7	20.7
4	101.6	4.000	2.1	0.083	5.15	3.48	5.1	6.0	7.2	7.9	8.9	9.6	10.3	11.1
			2.8	0.109	6.82	4.53	6.8	8.0	9.6	10.5	11.9	12.8	13.7	14.8
			3.2	0.125	7.76	5.18	7.8	9.1	11.0	12.0	13.6	14.6	15.6	16.9
			3.6	0.141	8.70	5.82	8.8	10.2	12.3	13.5	15.3	16.4	17.6	19.0
			4.0	0.156	9.63	6.41	9.8	11.4	13.7	15.0	17.0	18.2	19.6	20.7
			4.4	0.172	10.55	7.04	10.8	12.5	15.1	16.5	18.7	20.1	20.7	20.7
			4.8	0.188	11.46	7.66	11.7	13.7	16.4	18.0	20.4	20.7	20.7	20.7
			5.7	0.226	13.48	9.12	13.9	16.2	19.5	20.7	20.7	20.7	20.7	20.7
4 1/2	114.3	4.500	2.1	0.083	5.81	3.92	4.6	5.3	6.4	7.0	7.9	8.5	9.1	9.9
			3.2	0.125	8.77	5.85	7.0	8.1	9.7	10.6	12.1	13.0	13.9	15.1
			3.6	0.141	9.83	6.57	7.8	9.1	11.0	12.0	13.6	14.6	15.6	16.9
			4.0	0.156	10.88	7.24	8.7	10.1	12.2	13.3	15.1	16.2	17.4	18.8
			4.4	0.172	11.92	7.96	9.6	11.1	13.4	14.6	16.6	17.8	19.1	20.7
			4.8	0.188	12.96	8.67	10.4	12.1	14.6	16.0	18.1	19.5	20.7	20.7
			5.2	0.203	13.99	9.32	11.3	13.2	15.8	17.3	19.6	20.7	20.7	20.7
			5.6	0.219	15.01	10.02	12.2	14.2	17.0	18.6	20.7	20.7	20.7	20.7
			6.0	0.237	16.02	10.80	13.0	15.2	18.3	20.0	20.7	20.7	20.7	20.7
			6.4	0.25	17.03	11.36	13.9	16.2	19.5	20.7	20.7	20.7	20.7	20.7
5 1/2	141.3	5.563	2.1	0.083	7.21	4.86	3.7	4.3	5.2	5.7	6.4	6.9	7.4	8.0
			3.2	0.125	10.9	7.27	5.6	6.5	7.9	8.6	9.8	10.5	11.3	12.2
			4.0	0.156	13.54	9.02	7.0	8.2	9.9	10.8	12.2	13.1	14.1	15.2
			4.8	0.188	16.16	10.80	8.4	9.8	11.8	12.9	14.6	15.7	16.9	18.3
			5.6	0.219	18.74	12.51	9.8	11.5	13.8	15.1	17.1	18.4	19.7	20.7
			6.6	0.258	21.92	14.63	11.6	13.5	16.3	17.8	20.1	20.7	20.7	20.7
			2.1	0.083	8.61	5.80	3.1	3.6	5.4	5.9	6.7	7.2	7.7	8.4
			2.8	0.109	11.43	7.59	4.1	4.8	7.2	7.9	9.0	9.6	10.3	11.2
3.2	0.125	13.03	8.69	4.7	5.5	8.3	9.0	10.2	11.0	11.8	12.8			
3.6	0.141	14.82	9.77	5.3	6.2	9.3	10.2	11.5	12.4	13.3	14.4			
4.0	0.156	16.21	10.79	5.9	6.9	10.3	11.3	12.8	13.8	14.8	16.0			
4.4	0.172	17.78	11.87	6.5	7.6	11.4	12.4	14.1	15.1	16.2	17.6			
4.8	0.188	19.35	12.94	7.1	8.2	12.4	13.6	15.4	16.5	17.7	19.2			
5.2	0.203	20.91	13.94	7.7	8.9	13.4	14.7	16.6	17.9	19.2	20.7			
5.6	0.219	22.47	15.00	8.3	9.6	14.5	15.8	17.9	19.3	20.7	20.7			
6.4	0.25	25.55	17.04	9.4	11.0	16.5	18.1	20.5	20.7	20.7	20.7			
7.1	0.28	28.22	18.99	10.5	12.2	18.4	20.1	20.7	20.7	20.7	20.7			
7.9	0.312	31.25	21.06	11.7	13.6	20.4	20.7	20.7	20.7	20.7	20.7			
8.7	0.344	34.24	23.10	12.8	14.9	20.7	20.7	20.7	20.7	20.7	20.7			
8 1/2	219.1	8.625	3.2	0.125	17.04	11.36	3.6	4.2	6.4	6.9	7.9	8.5	9.1	9.8
			4.0	0.156	21.22	14.12	4.5	5.3	7.9	8.7	9.8	10.6	11.3	12.3
			4.8	0.188	25.37	16.96	5.4	6.3	9.5	10.4	11.8	12.7	13.6	14.7
			5.2	0.203	27.43	18.28	5.9	6.9	10.3	11.3	12.8	13.7	14.7	15.9
			5.6	0.219	29.48	19.68	6.3	7.4	11.1	12.2	13.8	14.8	15.9	17.2
			6.4	0.250	33.57	22.38	7.3	8.4	12.7	13.9	15.7	16.9	18.1	19.6
			7.0	0.277	36.61	24.72	7.9	9.2	13.9	15.2	17.2	18.5	19.8	20.7
			7.9	0.312	41.14	27.73	9.0	10.4	15.7	17.1	19.4	20.7	20.7	20.7
			8.2	0.322	42.65	28.58	9.3	10.8	16.3	17.8	20.2	20.7	20.7	20.7
			8.7	0.344	45.14	30.45	9.9	11.5	17.3	18.9	20.7	20.7	20.7	20.7
			9.5	0.375	49.10	33.07	10.8	12.5	18.9	20.6	20.7	20.7	20.7	20.7
			10 1/2	273.1	10.750	4.0	0.156	26.54	17.67	3.6	4.2	7.2	7.9	8.9
4.8	0.188	31.76				21.23	4.4	5.1	8.7	9.5	10.7	11.5	12.4	13.4
5.2	0.203	34.35				22.89	4.7	5.5	9.4	10.3	11.6	12.5	13.4	14.5
5.6	0.219	36.94				24.65	5.1	5.9	10.1	11.1	12.5	13.5	14.4	15.6
6.4	0.250	42.09				28.06	5.8	6.8	11.6	12.6	14.3	15.4	16.5	17.8
7.1	0.279	46.57				31.23	6.5	7.5	12.8	14.0	15.9	17.1	18.3	19.8
7.8	0.307	51.03				34.27	7.1	8.3	14.1	15.4	17.4	18.7	20.1	20.7
8.7	0.344	56.72				38.27	7.9	9.2	15.7	17.2	19.4	20.7	20.7	20.7
9.3	0.365	60.50				40.52	8.5	9.8	16.8	18.4	20.7	20.7	20.7	20.7
11.1	0.438	71.72				48.28	10.1	11.8	20.0	20.7	20.7	20.7	20.7	20.7
12 1/2	323.9	12.750	4.4	0.172	34.67	23.13	3.4	3.9	6.7	7.3	8.3	8.9	9.6	10.3
			4.8	0.188	37.77	25.25	3.7	4.3	7.3	8.0	9.0	9.7	10.4	11.3
			5.2	0.203	40.87	27.23	4.0	4.6	7.9	8.7	9.8	10.5	11.3	12.2
			5.6	0.219	43.96	29.34	4.3	5.0	8.5	9.3	10.6	11.3	12.2	13.2
			6.4	0.250	50.11	33.41	4.9	5.7	9.7	10.6	12.1	13.0	13.9	15.0

TECHNICAL DATA OF PIPES CONFORMING TO API 5L -2004

Size	Outside Diameter		Wall Thickness		Mass of Plain end Pipe		Standard Test Pressure							
							Grade A	Grade B	Grade X42	Grade X46	Grade X52	Grade X56	Grade X60	Grade X65
							Mpa	Mpa	Mpa	Mpa	Mpa	Mpa	Mpa	Mpa
12 1/2	323.9		7.1	0.281	55.47	37.46	5.4	6.3	10.8	11.8	13.4	14.4	15.4	16.7
			7.9	0.312	61.56	41.46	6.1	7.1	12.0	13.1	14.9	16.0	17.2	18.6
			8.4	0.330	65.35	43.81	6.4	7.5	12.8	14.0	15.8	17.0	18.3	19.8
			8.7	0.344	67.62	45.62	6.7	7.8	13.2	14.5	16.4	17.6	18.9	20.5
			9.5	0.375	73.85	49.61	7.3	8.5	14.5	15.8	17.9	19.2	20.6	20.7
			10.3	0.406	79.65	53.57	7.9	9.2	15.7	17.1	19.4	20.7	20.7	20.7
			11.1	0.438	85.62	57.65	8.5	9.9	16.9	18.5	20.7	20.7	20.7	20.7
			14	355.6	14.000	4.8	0.188	41.52	27.76	3.4	3.9	6.7	7.3	8.2
5.2	0.203	44.93				29.94	3.6	4.2	7.2	7.9	8.9	9.6	10.3	11.1
5.3	0.21	45.78				30.96	3.7	4.3	7.3	8.0	9.1	9.8	10.5	11.4
5.8	0.219	48.33				32.26	3.9	4.6	7.8	8.5	9.6	10.3	11.1	12.0
6.4	0.25	55.11				36.75	4.5	5.2	8.9	9.7	11.0	11.8	12.7	13.7
7.1	0.281	61.02				41.21	5.0	5.8	9.8	10.8	12.2	13.1	14.1	15.2
7.9	0.312	67.74				45.85	5.5	6.4	11.0	12.0	13.6	14.6	15.6	16.9
8.7	0.344	74.42				50.22	6.1	7.1	12.1	13.2	14.9	16.1	17.2	18.6
9.5	0.375	81.08				54.62	6.6	7.7	13.2	14.4	16.3	17.5	18.8	20.3
10.3	0.406	87.71				59.00	7.2	8.4	14.3	15.6	17.7	19.0	20.4	20.7
11.1	0.438	94.30				63.50	7.8	9.0	15.4	16.8	19.1	20.5	20.7	20.7
16	406.4	16.000				4.8	0.188	47.54	31.78	2.9	3.4	5.8	6.4	7.2
			5.2	0.203	51.45	34.28	3.2	3.7	6.3	6.9	7.8	8.4	9.0	9.7
			5.6	0.219	55.35	36.95	3.4	4.0	6.8	7.4	8.4	9.0	9.7	10.5
			6.4	0.25	63.13	42.09	3.9	4.6	7.8	8.5	9.6	10.3	11.1	12.0
			7.1	0.281	69.91	47.22	4.3	5.1	8.6	9.4	10.7	11.5	12.3	13.3
			7.9	0.312	77.63	52.32	4.8	5.6	9.6	10.5	11.9	12.8	13.7	14.8
			8.7	0.344	85.32	57.57	5.3	6.2	10.6	11.5	13.1	14.0	15.1	16.3
			9.5	0.375	92.98	62.84	5.8	6.8	11.5	12.6	14.3	15.3	16.5	17.8
			10.3	0.406	100.61	67.68	6.3	7.3	12.5	13.7	15.5	16.6	17.8	19.3
			11.1	0.438	108.20	72.86	6.8	7.9	13.5	14.7	16.7	17.9	19.2	20.7

Tolerances

Outside Diameter	Pipe Body	+/- 0.75%	
	Pipe Ends	Pipe size ≤ 10.750"	+ 1.6 mm, - 0.4 mm
		Pipe Size > 10.750" & ≤ 20"	+ 2.4 mm, - 0.8 mm
Thickness	+ 15 %, - 12.5%	Weight	+ 10 % , - 3.5 %

Mechanical Properties

PSL 1	Grade A	Grade B	Grade X42	Grade X46	Grade X52	Grade X56	Grade X60
Yield Strength (Min)	207 MPa	241 MPa	290 MPa	317 MPa	359 MPa	386 MPa	414 MPa
Tensile Strength(Min)	331 MPa	414 MPa	414 MPa	434 MPa	455 MPa	490 MPa	517 MPa
Elongation	As per API 5L						
PSL 2	Grade B	Grade X42	Grade X46	Grade X52	Grade X56	Grade X60	Grade X65
	MPa	MPa	MPa	MPa	MPa	MPa	MPa
Yield Strength (Min)	241-448	290-496	317-524	359-531	386-544	414-565	448-600
Tensile Strength(Min)	414-758	414-758	434-758	455-758	490-758	517-758	531-758
Elongation	As per API 5L						

Chemical Properties

PSL-1	Composition, Max, %						
	Carbon	Manganese	Phosphorus	Sulphur	Titanium	V + Nb	V + Nb + Ti
Grade A	0.22	0.9	0.03	0.03	-	-	-
Grade B	0.26	1.2	0.03	0.03	0.04	0.03	0.15
Grade X42	0.26	1.3	0.03	0.03	0.04	-	0.15
Grade X46	0.26	1.4	0.03	0.03	0.04	-	0.15
Grade X52	0.26	1.4	0.03	0.03	0.04	-	0.15
Grade X56	0.26	1.4	0.03	0.03	0.04	-	0.15
Grade X60	0.26	1.4	0.03	0.03	0.04	-	0.15

PSL-2	Composition, Max, %					
	Carbon	Manganese	Phosphorus	Sulphur	Titanium	V + Nb + Ti
Grade B	0.22	1.20	0.025	0.015	0.04	0.15
Grade X42	0.22	1.30	0.025	0.015	0.04	0.15
Grade X46	0.22	1.40	0.025	0.015	0.04	0.15
Grade X52	0.22	1.40	0.025	0.015	0.04	0.15
Grade X56	0.22	1.40	0.025	0.015	0.04	0.15
Grade X60	0.22	1.40	0.025	0.015	0.04	0.15
Grade X65	0.22	1.45	0.025	0.015	0.06	0.15

TECHNICAL DATA OF PIPES CONFORMING TO ASTM A-53 GR. A & B SCH. 40

NPS Designator	DN Designator	Outside Diameter		Wall Thickness		Mass of Plain end Pipe		Test Pressure	
		mm	inch	mm	inch	Kg/Mtr	lb/ft	Grade A Mpa	Grade B Mpa
½	15	21.3	0.840	2.77	0.109	1.27	0.85	4.8	4.8
¾	20	26.7	1.050	2.87	0.113	1.89	1.13	4.8	4.8
1	25	33.4	1.315	3.38	0.130	2.5	1.68	4.8	4.8
1½	32	42.2	1.660	3.56	0.14	3.39	2.27	8.3	9
1¾	40	48.3	1.900	3.68	0.145	4.05	2.73	8.3	8.3
2	50	60.3	2.375	3.91	0.154	5.44	3.68	15.9	17.2
2½	65	73	2.875	5.16	0.203	8.63	5.8	17.2	17.2
3	80	88.9	3.500	5.49	0.12	11.29	4.61	15.3	17.2
3½	90	101.6	4.000	5.74	0.125	13.57	5.18	14	16.3
4	100	114.3	4.500	6.02	0.125	16.07	5.85	13.1	15.2
5	125	141.3	5.563	6.55	0.15	21.77	9.02	11.5	13.4
6	150	168.3	6.625	7.11	0.188	28.26	12.94	10.5	12.3
8	200	219.1	8.625	8.18	0.188	42.55	16.96	9.2	10.8
10	250	273	10.750	9.27	0.188	60.29	21.23	8.4	9.9
12	300	323.8	12.750	10.31	0.203	79.7	27.23	7.9	9.2
14	350	355.8	14.000	11.13	0.21	94.55	30.96	7.8	9
16	400	406.4	16.000	12.7	0.219	123.3	36.95	7.7	9

TECHNICAL DATA OF PIPES CONFORMING TO ASTM A-53 GR. A & B SCH. 30/STD.

NPS Designator	DN Designator	Outside Diameter		Wall Thickness		Mass of Plain end Pipe		Test Pressure	
		mm	inch	mm	inch	Kg/Mtr	lb/ft	Grade A Mpa	Grade B Mpa
14"	Std	14.000	355.8	0.375	9.52	81.25	54.62	6.8	7.7
16"	Std	16.000	406.4	0.375	9.52	93.17	62.64	5.8	6.8

Tolerances

Outside Diameter	Pipe Size upto & including DN 40	± 0.4 mm
	Pipe size DN 50 or larger	± 1%
Thickness	- 12.5% (max)	
Weight	± 10%	

Testing

Online NDT	For pipes over DN 50 Weld seam of each pipe shall be tested by Eddy Current Test
Bend Test	For pipes upto & including DN 50 Bending angle: 90° Bending radius: 12 times to the OD of Tube (no crack in body & weld)
Flattening	For pipes over DN 50 1. Flatten upto 2/3 of OD for ductility of weld 2. Flatten upto 1/3 of OD for ductility of steel 3. Full Flattening for testing of lamination

Mechanical Properties

	Grade A	Grade B
Yield Strength	205 Mpa (Min)	240 Mpa (Min)
Tensile Strength	330 Mpa (Min)	415 Mpa (Min)
Elongation	As per ASTM A-53	

Chemical Properties

Composition, Max. %

	Carbon	Manganese	Phosphorus	Sulphur	Copper	Nickel	Chromium	Molybdenum	Vanadium
Grade A	0.25	0.95	0.05	0.045	0.5	0.4	0.4	0.15	0.08
Grade B	0.3	1.2	0.05	0.045	0.5	0.4	0.4	0.15	0.08

Cu + Ni + Cr + Mo + V ≤ 3%

Galvanizing

Minimum	0.490 Kg/Sq Mtr
Average	0.550 Kg/Sq Mtr

TECHNICAL DATA OF PIPES CONFORMING TO BS:1387

	Nominal Bore		Outside Diameter		Thickness	Weight of Black Pipe	
			Max	Min		(Kg/Mtr.)	
	Inch	MM	MM	MM	mm	Plain end	screwed & socketed
Light	½	15	21.4	21.000	2.0	0.947	0.956
	¾	20	26.9	26.400	2.3	1.380	1.390
	1	25	33.8	33.200	2.6	1.980	2.000
	1 ¼	32	42.5	41.900	2.6	2.540	2.570
	1 ½	40	48.4	47.800	2.9	3.230	3.270
	2	50	60.2	59.600	2.9	4.080	4.150
	2 ½	65	76.0	75.200	3.2	5.710	5.830
	3	80	88.7	87.900	3.2	6.720	6.890
Medium	4	100	113.9	113.000	3.6	9.750	10.000
	½	15	21.7	21.100	2.6	1.210	1.220
	¾	20	27.2	26.600	2.6	1.560	1.570
	1	25	34.2	33.400	3.2	2.410	2.430
	1 ¼	32	42.9	42.100	3.2	3.100	3.130
	1 ½	40	48.8	48.000	3.2	3.570	3.610
	2	50	60.8	59.800	3.6	5.030	5.100
	2 ½	65	76.6	75.400	3.6	6.430	6.550
	3	80	89.5	88.100	4.0	8.370	8.540
	4	100	114.9	113.300	4.5	12.200	12.500
Heavy	5	125	140.6	138.700	5.0	16.600	17.100
	6	150	166.1	164.100	5.0	19.700	20.300
	½	15	21.7	21.100	3.2	1.440	1.450
	¾	20	27.2	26.600	3.2	1.870	1.880
	1	25	34.2	33.400	4.0	2.940	2.960
	1 ¼	32	42.9	42.100	4.0	3.800	3.830
	1 ½	40	48.8	48.000	4.0	4.380	4.420
	2	50	60.8	59.800	4.5	6.190	6.260
	2 ½	65	76.6	75.400	4.5	7.930	8.050
	3	80	89.5	88.100	5.0	10.300	10.500
4	100	114.9	113.300	5.4	14.500	14.800	
5	125	140.6	138.700	5.4	17.900	18.400	
6	150	166.1	164.100	5.4	21.300	21.900	

Tolerances

Outside Diameter as per above table

Thickness	Light	Medium	Heavy
	- 8%	- 10%	- 10%

Weight - 8% & + 10% (for single tube)

Mechanical Properties		Chemical Properties	
Yield Strength	195 N/sq mm (Minimum)	Carbon	0.20 % Max
Tensile Strength	320 to 460 N/sq mm	Manganese	1.20 % Max
% Elongation	20 % Min	Phosphorous	0.045 % Max
		Sulphur	0.045 % Max

Bend Test For tubes upto & including 2"

Black Tube	Bending angle	180°
	Bending radius	6 times to the OD of Tube
	Weld Position	3 O'clock

Galvanized Tubes	Bending angle	90°
	Bending radius	8 times to the OD of Tube
	Weld Position	3 O'clock

Flattening Test For Tubes above 2"

1. Flatten upto 75% of tube dia for weld test (Weld at 3 O'clock position)
2. Flatten upto 60% of tube dia for raw material test

Leak Tightness Test 100% Hydrotesting at 50 bar or online eddy current testing

- Galvanizing Test**
1. Bore test (for tubes upto 1")
 2. Copper Sulphate Test

Threading As per BS-21-1985

TECHNICAL DATA OF PIPES CONFORMING TO DIN:2440

Nominal Size	Outside Diameter		Wall Thickness	Mass of Tube		Pipe Thread		Sockets	
				Plain End	Socketed	Thread diameter	No of thread in 25.4 mm	Min. Outside Diameter (mm)	Min. Length (mm)
DN	Min(mm)	Max(mm)	mm	Kg/m	Kg/m				
15	21.0	21.8	2.65	1.22	1.23	20.955	14	26.4	34
20	26.5	27.3	2.65	1.58	1.59	26.441	14	31.8	36
25	33.3	34.2	3.25	2.44	2.46	33.249	11	39.5	43
32	42.0	42.9	3.25	3.14	3.17	41.910	11	48.3	48
40	47.9	48.8	3.25	3.61	3.65	47.803	11	54.5	48
50	59.7	60.8	3.65	5.10	5.17	59.614	11	66.3	56
65	75.3	76.6	3.65	6.51	6.63	75.184	11	82.0	65
80	88.0	89.5	4.05	8.47	8.64	87.884	11	95.0	71
100	113.1	115.0	4.50	12.10	12.40	113.030	11	122.0	83
125	138.5	140.8	4.85	16.20	16.70	138.430	11	147.0	92
150	163.9	166.5	4.85	19.20	19.80	163.830	11	174.0	92

TECHNICAL DATA OF PIPES CONFORMING TO DIN:2441

Nominal Size	Outside Diameter		Wall Thickness	Mass of Tube		Pipe Thread		Sockets	
				Plain End	Socketed	Thread diameter	No of thread in 25.4 mm	Min. Outside Diameter (mm)	Min. Length (mm)
DN	Min(mm)	Max(mm)	mm	Kg/m	Kg/m				
15	21.0	21.8	3.25	1.45	1.46	20.955	14	26.4	34
20	26.5	27.3	3.25	1.90	1.91	26.441	14	31.8	36
25	33.3	34.2	4.05	2.97	2.99	33.249	11	39.5	43
32	42.0	42.9	4.05	3.84	3.87	41.910	11	48.3	48
40	47.9	48.8	4.05	4.43	4.47	47.803	11	54.5	48
50	59.7	60.8	4.50	6.17	6.24	59.614	11	66.3	56
65	75.3	76.6	4.50	7.90	8.02	75.184	11	82.0	65
80	88.0	89.5	4.85	10.10	10.30	87.884	11	95.0	71
100	113.1	115.0	5.40	14.40	14.70	113.030	11	122.0	83
125	138.5	140.8	5.40	17.80	18.30	138.430	11	147.0	92
150	163.9	166.5	5.40	21.20	21.80	163.830	11	174.0	92

Tolerances

Outside Diameter As per above table
 Wall Thickness - 12.5%

Weight	Single Tube	For lot of 10 Tons
	+/- 10%	+/- 7.5%

Testing

Leak Tightness Test 100% Hydrostatic testing at 50 bar or Online Eddy Current testing

Bend Test	For tubes upto & including DN 25	For tubes above DN 25 & up to DN 50
	Bending angle 90°	Bending angle 90°
	Bending radius 3 times to the OD of Tube	Bending radius 3.5 times to the OD of Tube
	Weld Position 12 O'clock & 3 O'clock	Weld Position 12 O'clock & 3 O'clock

Flattening Test For tubes DN 65 & above
 Flatten upto 2/3 of tube dia without crack in weld; Weld position - 12'0 clock & 3'0 clock.

Galvanizing Zinc Coating = 400 g/sq m (Minimum)
 Zinc layer thickness = 56 microns

Mechanical properties

Yield Strength 185 N/sq.mm (Minimum)
 Tensile Strength 310 to 540 N/sq.mm for wall thickness less than 3 mm
 290 to 510 N/sq.mm for wall thickness ≥ 3 mm

% Elongation	Thickness	≥ 2 & < 3 mm	≥ 3 & ≤ 40 mm
	% Elong	14	18

Raw Material :- As per ST 33.2 conforming to DIN 17100.

TECHNICAL DATA OF PIPES CONFORMING TO ISO:65-1981 (E)

DN	OD	Light series 1					Light series 2				
		Outside Diameter		Wall Thickness (mm)	Mass Plain End (Kg/mtr)	Mass Screwed & Socketed (Kg/mtr)	Outside Diameter		Wall Thickness (mm)	Mass Plain End (Kg/mtr)	Mass Screwed & Socketed (Kg/mtr)
		Min(mm)	Max(mm)				Min(mm)	Max(mm)			
15	21.30	21.00	21.70	2.30	1.08	1.09	21.00	21.40	2.00	0.947	0.956
20	26.90	26.40	27.10	2.30	1.39	1.40	26.40	26.90	2.30	1.380	1.390
25	33.70	33.20	34.00	2.90	2.20	2.22	33.20	33.80	2.60	1.980	2.000
32	42.40	41.90	42.70	2.90	2.82	2.85	41.90	42.50	2.60	2.540	2.570
40	48.30	47.80	48.60	2.90	3.24	3.28	47.80	48.40	2.90	3.230	3.270
50	60.30	59.60	60.70	3.20	4.49	4.56	59.60	60.20	2.90	4.080	4.150
65	76.10	75.20	76.30	3.20	5.73	5.85	75.20	76.00	3.20	5.710	5.830
80	88.90	87.90	89.40	3.60	7.55	7.72	87.90	88.70	3.20	6.720	6.890
100	114.30	113.00	114.90	4.00	10.80	11.10	113.00	113.90	3.60	9.750	10.000

Tolerances

Outside Diameter as per above table

Thickness	Light series 1		Light series 2	
	+ not limited	-12.5 %	+ not limited	- 8%

Weight

	Light series 1		Light series 2	
	Single Tube	10 tonn Load	Single Tube	10 tonn Load
	+/- 10%	+/-7.5 %	+ 10% -8%	+/- 5%

Mechanical Properties

Tensile Strength 320 to 520 N/sq mm

% Elongation 15 % Min

Chemical Properties

Phosphorous 0.06 % Max

Sulphur 0.06 % Max

Leak Tightness Test

100% Hydro testing at a pressure of 50 bar or online eddy current testing



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