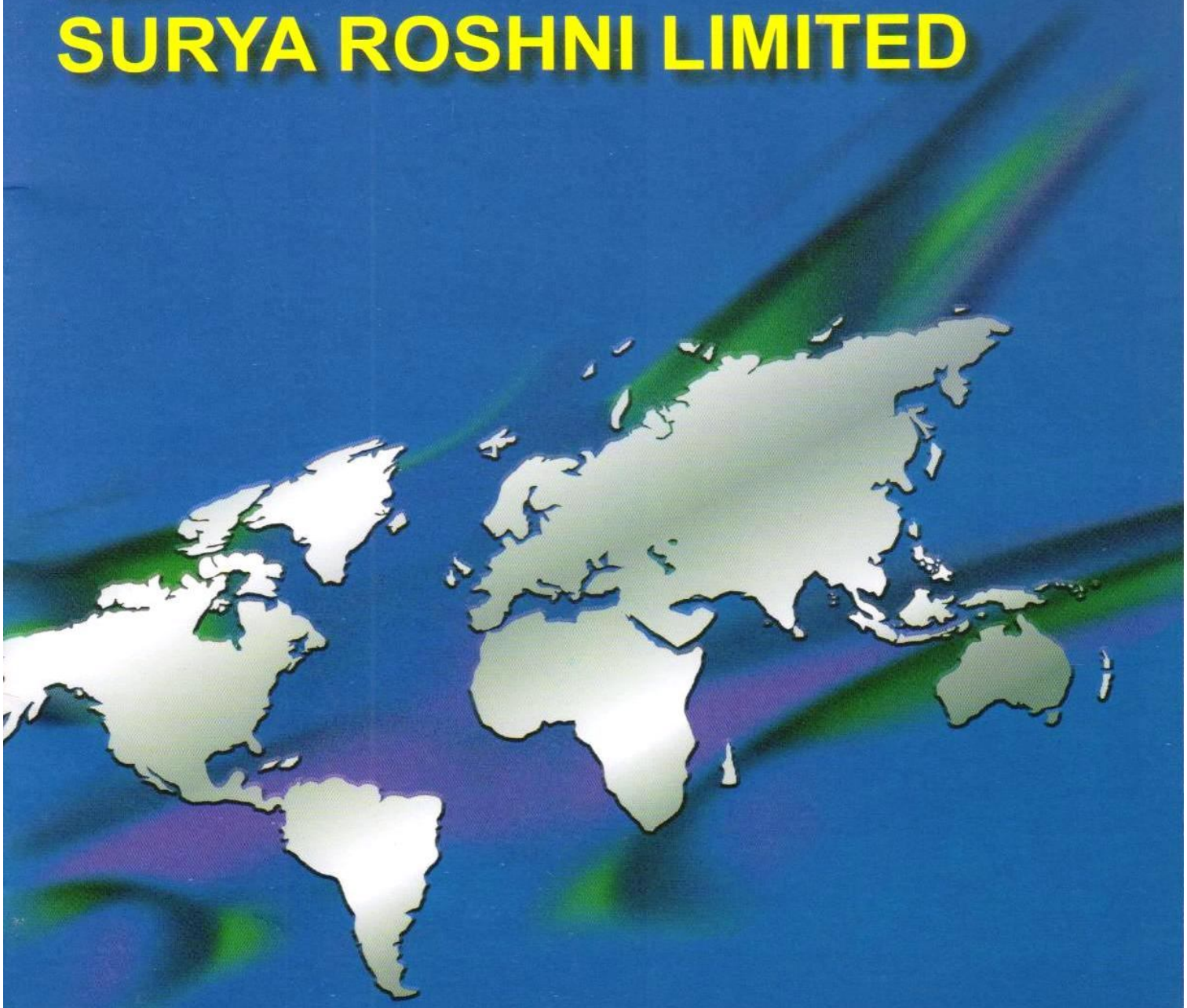
ERW STEEL PIPES
from
SURYA ROSHNI LIMITED



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$ 350 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 2,00,000 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 certified by DET NORSKE 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, Grade B, as well as 42, X 46, X 52, X 56, X 60, X 65 and X70 PSL-1, PSL-2 both.

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, BS EN 10255,
DIN EN 10255

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, IS:4923

Chemical Industries

Conveying of Chemicals.

Fire Fighting System

IS:3589, IS:1239, ASTM (A 53), ASTM A 795

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 Mechnical & 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.

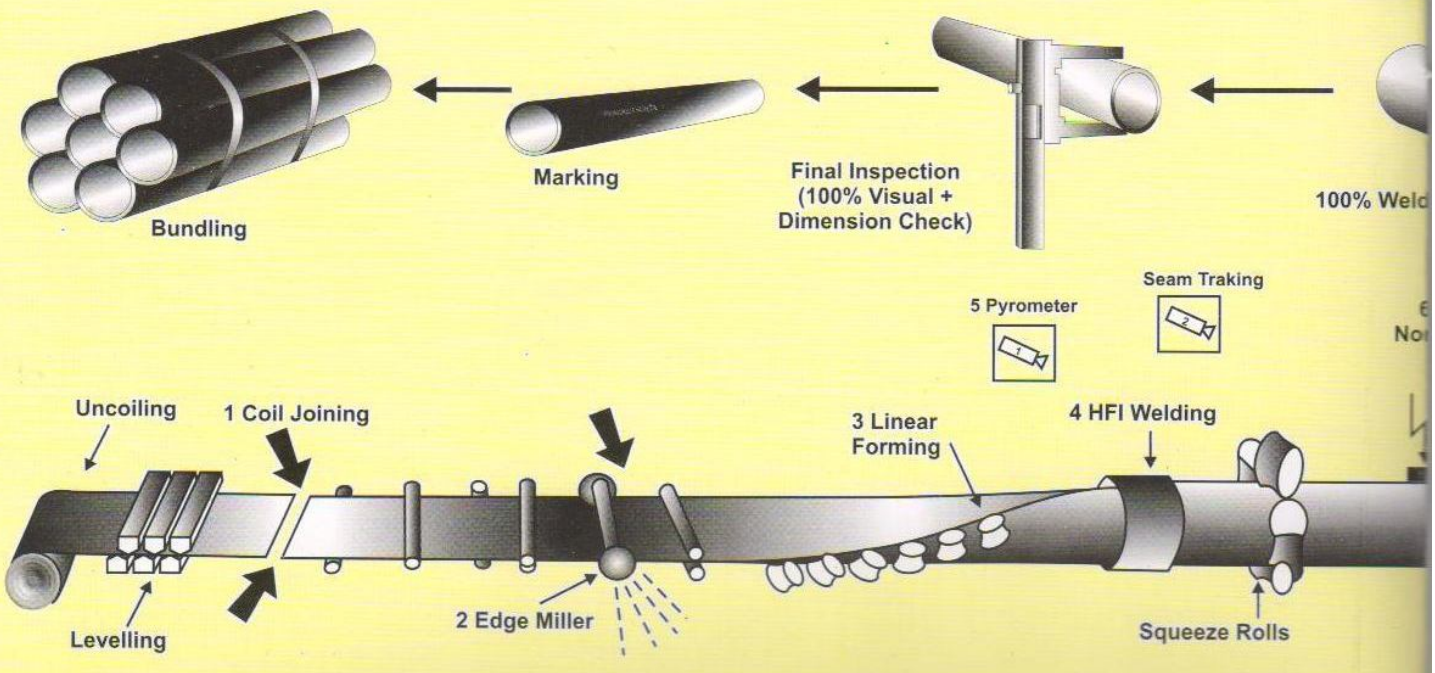
Modern Laboratory

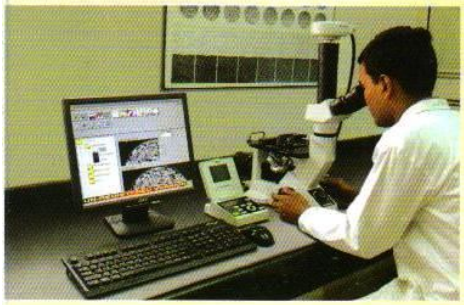
To ensure product reliability through process control, Surya has a fully equipped metallurgical laboratory with all the tools essential for comprehensive product quality testing and evaluation to withstand reactive processes. Hydro testing of pipes is undertaken to detect leaks and fissures prior to 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.

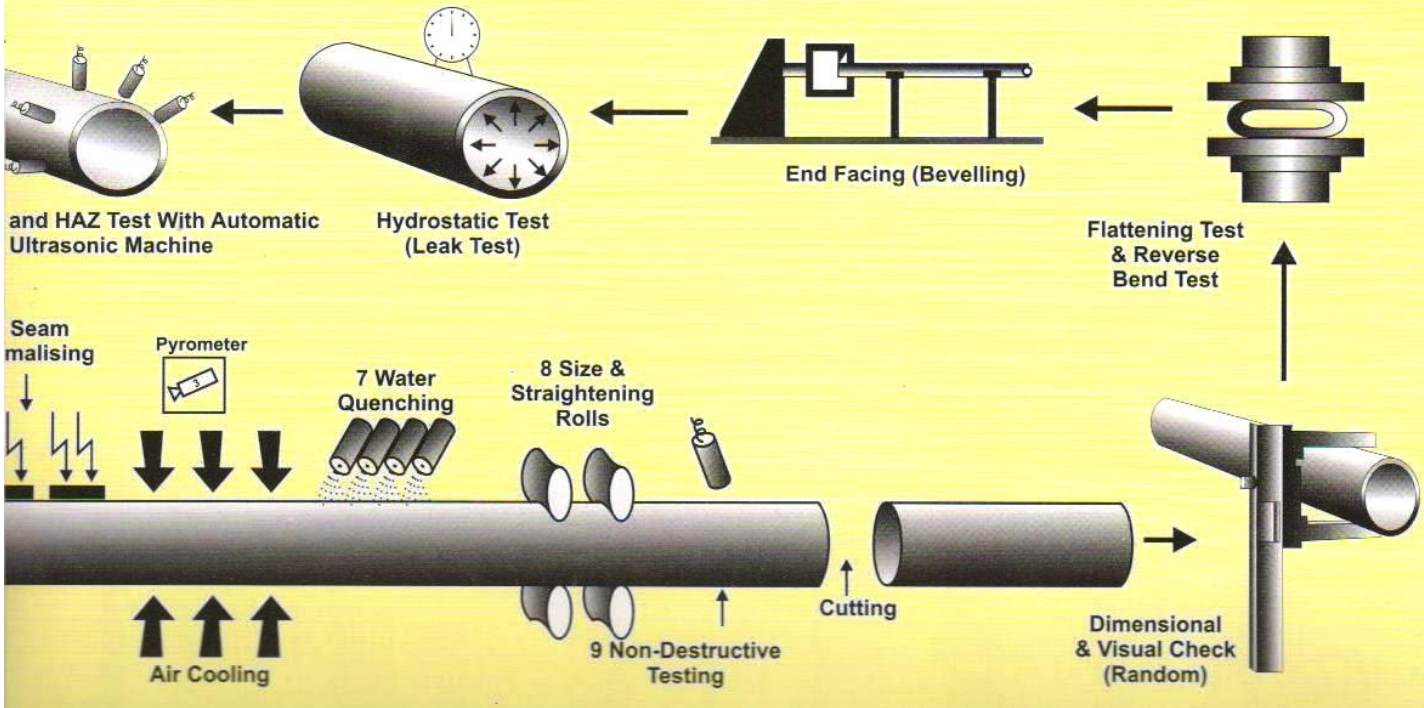




1)	Universal Testing Machines (Digital)	For material testing (mechanical properties)
2)	Eddy Current Testing Machine (NDT)	For on line flaw detection on welds
3)	Ultrasonic Testing Machine (NDT) (After hydro testing)	For checking strip laminations and flaw detection on welds on pipes in auto mode
4)	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 normalising, 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.


Certificate of Authority to use the Official API Monogram
License Number: 5L-0222
SURYA ROSHNI, LIMITED
Prakash Nagar
Bahadurgarh
Haryana, Distt. Jhajjar
India
American Petroleum Institute


DET NORSKE VERITAS
MANAGEMENT SYSTEM CERTIFICATE
SURYA ROSHNI LIMITED
(STEEL DIVISON)
ISO 9001
DEVELOPMENT, MANUFACTURE & SUPPLY OF MILD STEEL ERW PIPES/TUBES (BLACK & GALVANISED) AND COLD ROLLED STEEL STRIPS

UL LISTED

Yet another confirmation to our competence

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

Surya Enter Spiral Weld Pipes Segment

BHUJ PLANT

Surya Roshni has set up, **in a record time of 8 months from the date of signing MOU with Gujarat**, a modern large Spiral Weld manufacturing plant in Gujarat situated in an area of about 100 acres at Anjar (Kutch). The Plant will produce spiral weld pipes in the range from 18" to 100", with maximum wall thickness of 1" (25.4mm) conforming to API/ASTM specifications upto API5L, Gr.X80. It will produce its full capacity of 2, 00,000 MT shortly. ERW Pipes in the range of 1" to 8" in various specifications will also be produced at the Bhuj plant. All the machines for manufacturing of Spiral Weld Pipes are imported from reputed manufacturers from Germany , Malasyia & U.K. to name a few

The estimated turnover from this plant is around Rs. 2000 Crores. which would generate employment to about 2000 persons in the locality.

Applications

Oil & Gas
- Offshore and Onshore Pipelines.
- Submarine Pipelines

Structural
- Piling pile foundation for high rise buildings Bridges Piras
- Well casing

Water
- Distribution and Transmission lines for Irrigation system.
- Portable drinking water requirements

Industrial
- Mining Pipe
- Dredging Pipes and Pontoons Cooling Water Lines

Third Party Inspection 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
IS : 4923

Export of Steel Pipes

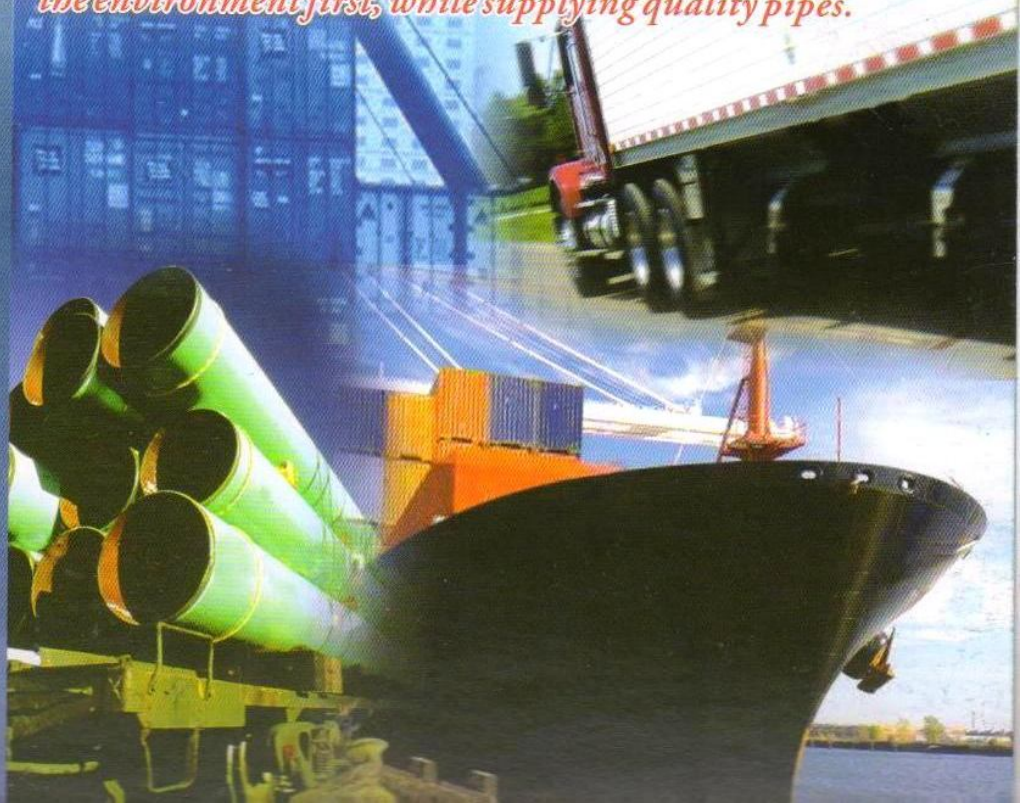
New Horizons

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



TECHNICAL DATA OF PIPES CONFORMING TO API 5L -2008 (44th edition)

Size	Outside Diameter		Wall Thickness		Mass of Plain end Pipe		Standard Test Pressure								
							Gr.A	Gr.B	Gr.X42	GrX46	GrX52	GrX56	GrX60	Gr.X65	Gr.X70
	mm	inch	mm	inch	Kg/Mtr.	Lb/Ft.	MPa	MPa	MPa	MPa	MPa	MPa	MPa	MPa	MPa
3½	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	13.8
			2.8	0.109	5.95	3.95	7.8	9.1	11.0	12.0	13.6	14.6	15.6	15.6	18.3
			3.2	0.125	6.76	4.51	8.9	10.4	12.5	13.7	15.5	16.7	17.9	17.9	20.5
			3.6	0.141	7.57	5.06	10.1	11.7	14.1	15.4	17.4	18.8	20.1	20.1	20.5
			4.0	0.156	8.37	5.58	11.2	13.0	15.7	17.1	19.4	20.5	20.5	20.5	20.5
			4.4	0.172	9.17	6.12	12.3	14.3	17.2	18.8	20.5	20.5	20.5	20.5	20.5
			4.8	0.188	9.95	6.66	13.4	15.6	18.8	20.5	20.5	20.5	20.5	20.5	20.5
			5.5	0.216	11.31	7.58	15.4	17.2	20.5	20.5	20.5	20.5	20.5	20.5	20.5
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	12.0
			2.8	0.109	6.82	4.53	6.8	8.0	9.6	10.5	11.9	12.8	13.7	14.8	16.0
			3.2	0.125	7.76	5.18	7.8	9.1	11.0	12.0	13.6	14.6	15.6	16.9	18.3
			3.6	0.141	8.70	5.82	8.8	10.2	12.3	13.5	15.3	16.4	17.6	19.0	20.5
			4.0	0.156	9.63	6.41	9.8	11.4	13.7	15.0	17.0	18.2	19.6	20.5	20.5
			4.4	0.172	10.55	7.04	10.8	12.5	15.1	16.5	18.7	20.1	20.5	20.5	20.5
			4.8	0.188	11.46	7.66	11.7	13.7	16.4	18.0	20.4	20.5	20.5	20.5	20.5
			5.7	0.226	13.48	9.12	13.9	16.2	19.5	20.5	20.5	20.5	20.5	20.5	20.5
4½	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	10.7
			3.2	0.125	8.77	5.85	7.0	8.1	9.7	10.6	12.1	13.0	13.9	15.1	16.3
			3.6	0.141	9.83	6.57	7.8	9.1	11.0	12.0	13.6	14.6	15.6	16.9	18.3
			4.0	0.156	10.88	7.24	8.7	10.1	12.2	13.3	15.1	16.2	17.4	18.8	20.4
			4.4	0.172	11.92	7.96	9.6	11.1	13.4	14.6	16.6	17.8	19.1	20.5	20.5
			4.8	0.188	12.96	8.67	10.4	12.1	14.6	16.0	18.1	19.5	20.5	20.5	20.5
			5.2	0.203	13.99	9.32	11.3	13.2	15.8	17.3	19.6	20.5	20.5	20.5	20.5
			5.6	0.219	15.01	10.02	12.2	14.2	17.0	18.6	20.5	20.5	20.5	20.5	20.5
			6.0	0.237	16.02	10.80	13.0	15.2	18.3	20.0	20.5	20.5	20.5	20.5	20.5
			6.4	0.250	17.03	11.36	13.9	16.2	19.5	20.5	20.5	20.5	20.5	20.5	20.5
			7.1	0.280	18.77	12.59	15.7	18.3	20.5	20.5	20.5	20.5	20.5	20.5	20.5
5⅝	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	8.7
			3.2	0.125	10.9	7.27	5.6	6.5	7.9	8.6	9.8	10.5	11.3	12.2	13.2
			4.0	0.156	13.54	9.02	7.0	8.2	9.9	10.8	12.2	13.1	14.1	15.2	16.5
			4.8	0.188	16.16	10.80	8.4	9.8	11.8	12.9	14.6	15.7	16.9	18.3	19.8
			5.6	0.219	18.74	12.51	9.8	11.5	13.8	15.1	17.1	18.4	19.7	20.5	20.5
			6.6	0.258	21.92	14.63	11.6	13.5	16.3	17.8	20.1	20.5	20.5	20.5	20.5
6⅝	168.3	6.625	2.1	0.083	8.61	5.80	3.1	3.6	5.4	5.9	6.7	7.2	7.7	8.4	9.08
			2.8	0.109	11.43	7.59	4.1	4.8	7.2	7.9	9.0	9.6	10.3	11.2	12.1
			3.2	0.125	13.03	8.69	4.7	5.5	8.3	9.0	10.2	11.0	11.8	12.8	13.8
			3.6	0.141	14.62	9.77	5.3	6.2	9.3	10.2	11.5	12.4	13.3	14.4	15.6
			4.0	0.156	16.21	10.79	5.9	6.9	10.3	11.3	12.8	13.8	14.8	16.0	17.3
			4.4	0.172	17.78	11.87	6.5	7.6	11.4	12.4	14.1	15.1	16.2	17.6	19.0
			4.8	0.188	19.35	12.94	7.1	8.2	12.4	13.6	15.4	16.5	17.7	19.2	20.5
			5.2	0.203	20.91	13.94	7.7	8.9	13.4	14.7	16.6	17.9	19.2	20.5	20.5
			5.6	0.219	22.47	15.00	8.3	9.6	14.5	15.8	17.9	19.3	20.5	20.5	20.5
			6.4	0.250	25.55	17.04	9.4	11.0	16.5	18.1	20.5	20.5	20.5	20.5	20.5
			7.1	0.280	28.22	18.99	10.5	12.2	18.4	20.1	20.5	20.5	20.5	20.5	20.5
			7.9	0.312	31.25	21.06	11.7	13.6	20.4	20.5	20.5	20.5	20.5	20.5	20.5
			8.7	0.344	34.24	23.10	12.8	14.9	20.5	20.5	20.5	20.5	20.5	20.5	20.5
8⅝	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	10.6
			4.0	0.156	21.22	14.12	4.5	5.3	7.9	8.7	9.8	10.6	11.3	12.3	13.3
			4.8	0.188	25.37	16.96	5.4	6.3	9.5	10.4	11.8	12.7	13.6	14.7	15.9
			5.2	0.203	27.43	18.28	5.9	6.9	10.3	11.3	12.8	13.7	14.7	15.9	17.3
			5.6	0.219	29.48	19.68	6.3	7.4	11.1	12.2	13.8	14.8	15.9	17.2	18.6
			6.4	0.250	33.57	22.38	7.3	8.4	12.7	13.9	15.7	16.9	18.1	19.6	20.5
			7.0	0.277	36.61	24.72	7.9	9.2	13.9	15.2	17.2	18.5	19.8	20.5	20.5
			7.9	0.312	41.14	27.73	9.0	10.4	15.7	17.1	19.4	20.5	20.5	20.5	20.5
			8.2	0.322	42.65	28.58	9.3	10.8	16.3	17.8	20.2	20.5	20.5	20.5	20.5
			8.7	0.344	45.14	30.45	9.9	11.5	17.3	18.9	20.5	20.5	20.5	20.5	20.5
			9.5	0.375	49.10	33.07	10.8	12.5	18.9	20.6	20.5	20.5	20.5	20.5	20.5
10¾	273.1	10.750	4.0	0.156	26.54	17.67	3.6	4.2	7.2	7.9	8.9	9.6	10.3	11.2	12.1
			4.8	0.188	31.76	21.23	4.4	5.1	8.7	9.5	10.7	11.5	12.4	13.4	14.5
			5.2	0.203	34.35	22.89	4.7	5.5	9.4	10.3	11.6	12.5	13.4	14.5	15.7
			5.6	0.219	36.94	24.65	5.1	5.9	10.1	11.1	12.5	13.5	14.4	15.6	16.9
			6.4	0.250	42.09	28.06	5.8	6.8	11.6	12.6	14.3	15.4	16.5	17.8	19.3
			7.1	0.279	46.57	31.23	6.5	7.5	12.8	14.0	15.9	17.1	18.3	19.8	20.5
			7.8	0.307	51.03	34.27	7.1	8.3	14.1	15.4	17.4	18.7	20.1	20.5	20.5
			8.7	0.344	56.72	38.27	7.9	9.2	15.7	17.2	19.4	20.5	20.5	20.5	20.5
			9.3	0.365	60.50	40.52	8.5	9.8	16.8	18.4	20.5	20.5	20.5	20.5	20.5
			11.1	0.438	71.72	48.28	10.1	11.8	20.0	20.5	20.5	20.5	20.5	20.5	20.5

12¾	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	11.2
			4.8	0.188	37.77	25.25	3.7	4.3	7.3	8.0	9.0	9.7	10.4	11.3	12.2
			5.2	0.203	40.87	27.23	4.0	4.6	7.9	8.7	9.8	10.5	11.3	12.2	13.2
			5.6	0.219	43.96	29.34	4.3	5.0	8.5	9.3	10.6	11.3	12.2	13.2	14.3
			6.4	0.250	50.11	33.41	4.9	5.7	9.7	10.6	12.1	13.0	13.9	15.0	16.3
			7.1	0.281	55.47	37.46	5.4	6.3	10.8	11.8	13.4	14.4	15.4	16.7	18.1
			7.9	0.312	61.56	41.48	6.1	7.1	12.0	13.1	14.9	16.0	17.2	18.6	20.1
			8.4	0.330	65.35	43.81	6.4	7.5	12.8	14.0	15.8	17.0	18.3	19.8	20.5
			8.7	0.344	67.62	45.62	6.7	7.8	13.2	14.5	16.4	17.6	18.9	20.5	20.5
			9.5	0.375	73.65	49.61	7.3	8.5	14.5	15.8	17.9	19.2	20.6	20.5	20.5
			10.3	0.406	79.65	53.57	7.9	9.2	15.7	17.1	19.4	20.5	20.5	20.5	20.5
			11.1	0.438	85.62	57.65	8.5	9.9	16.9	18.5	20.5	20.5	20.5	20.5	20.5
14	355.6	14.000	4.8	0.188	41.52	27.76	3.4	3.9	6.7	7.3	8.2	8.9	9.5	10.3	11.1
			5.2	0.203	44.93	29.94	3.6	4.2	7.2	7.9	8.9	9.6	10.3	11.1	12.0
			5.3	0.210	45.78	30.96	3.7	4.3	7.3	8.0	9.1	9.8	10.5	11.4	12.3
			5.6	0.219	48.33	32.26	3.9	4.6	7.8	8.5	9.6	10.3	11.1	12.0	13.0
			6.4	0.250	55.11	36.75	4.5	5.2	8.9	9.7	11.0	11.8	12.7	13.7	14.8
			7.1	0.281	61.02	41.21	5.0	5.8	9.8	10.8	12.2	13.1	14.1	15.2	16.5
			7.9	0.312	67.74	45.65	5.5	6.4	11.0	12.0	13.6	14.6	15.6	16.9	18.3
			8.7	0.344	74.42	50.22	6.1	7.1	12.1	13.2	14.9	16.1	17.2	18.6	20.2
			9.5	0.375	81.08	54.62	6.6	7.7	13.2	14.4	16.3	17.5	18.8	20.3	20.5
			10.3	0.406	87.71	59.00	7.2	8.4	14.3	15.6	17.7	19.0	20.4	20.5	20.5
			11.1	0.438	94.30	63.50	7.8	9.0	15.4	16.8	19.1	20.5	20.5	20.5	20.5
16	406.4	16.000	4.8	0.188	47.54	31.78	2.9	3.4	5.8	6.4	7.2	7.8	8.3	9.0	9.7
			5.2	0.203	51.45	34.28	3.2	3.7	6.3	6.9	7.8	8.4	9.0	9.7	10.6
			5.6	0.219	55.35	36.95	3.4	4.0	6.8	7.4	8.4	9.0	9.7	10.5	11.4
			6.4	0.250	63.13	42.09	3.9	4.6	7.8	8.5	9.6	10.3	11.1	12.0	13.0
			7.1	0.281	69.91	47.22	4.3	5.1	8.6	9.4	10.7	11.5	12.3	13.3	14.0
			7.9	0.312	77.63	52.32	4.8	5.6	9.6	10.5	11.9	12.8	13.7	14.8	16.0
			8.7	0.344	85.32	57.57	5.3	6.2	10.6	11.5	13.1	14.0	15.1	16.3	17.7
			9.5	0.375	92.98	62.64	5.8	6.8	11.5	12.6	14.3	15.3	16.5	17.8	19.3
			10.3	0.406	100.61	67.68	6.3	7.3	12.5	13.7	15.5	16.6	17.8	19.3	20.5
			11.1	0.438	108.20	72.86	6.8	7.9	13.5	14.7	16.7	17.9	19.2	20.5	20.5

Tolerances :-

1) Outside diameter of Body & Ends :

Specified OD (mm)	Body Tolerance	Ends Tolerance (mm)	Out-of-roundness tolerances (mm)	
			Pipe except the end	Pipe end
≥88.9 to ≤168.3	±0.0075 D	-0.40, +1.60	0.020 D	0.015 D
>168.3 to ≤610	±0.0075 D but max. of ±3.20 mm	±0.005 D, but max. of ±1.6 mm		

2) Thickness :

≤5.0 mm = ±0.5 mm

>5.0 to <15.0 = ±0.1t

(where t = wall thickness)

3) Mass :

+10%, -3½% of standard weight

Mechanical properties :

PSL 1	Gr.A	Gr.B	Gr.X42	Gr.X46	Gr.X52	Gr.X56	Gr.X60	Gr.X65	Gr.X70
Yield strength MPa (min.)	210	245	290	320	360	390	415	450	485
Tensile strength MPa (min.)	335	415	415	435	460	490	520	535	570
Elongation (% Min.)	Min. elong. Shall be determined by $A_f=1940\ A^{0.2}/U^{0.9}$ (Where A=Area of test specimen, U=Min. specified tensile strength)								

PSL 2	Gr.A	Gr.B	Gr.X42	Gr.X46	Gr.X52	Gr.X56	Gr.X60	Gr.X65	Gr.X70
Yield strength MPa (min.)	-	245-450e	290-495	320-525	360-530	390-545	415-565	450-600	485-635
Tensile strength MPa (min.)	-	415-760	415-760	435-760	460-760	490-760	520-760	535-760	570-760
Elongation (% Min.)	Min. elong. Shall be determined by $A_f=1940\ A^{0.2}/U^{0.9}$ (Where A=Area of test specimen, U=Min. specified tensile strength)								
Ratio (YS/TS) Max.	0.93								

e = For pipe with D<219.1 mm, the maximum yield strength shall be≤ 495 MPa

Chemical Properties

composition (Max.%) :

PSL 1	Carbon	Manganese	Phosphorus	Sulphur	Niobium +Vanadium	Niobium +Vanadium+Titanium
Grade A	0.22	0.90	0.03	0.03	-	-
Grade B	0.26	1.20	0.03	0.03	≤ 0.06	≤ 0.15
Grade X42	0.26	1.30	0.03	0.03	-	≤ 0.15
Grade X46	0.26	1.40	0.03	0.03	-	≤ 0.15
Grade X52	0.26	1.40	0.03	0.03	-	≤ 0.15
Grade X56	0.26	1.40	0.03	0.03	-	≤ 0.15
Grade X60	0.26	1.40	0.03	0.03	-	≤ 0.15
Grade X65	0.26	1.45	0.03	0.03	-	≤ 0.15
Grade X70	0.26	1.65	0.03	0.03	-	≤ 0.15

PSL 2	C	Mn	P	S	Si	V	Nb	Ti	Cu	Ni	Cr	Mo	CE (IIW)	CE (PCM)
Grade BM	0.22	1.20	0.025	0.015	0.45	0.05	0.05	0.04	0.50	0.30	0.30	0.15	0.43	0.25
Grade X42M	0.22	1.30	0.025	0.015	0.45	0.05	0.05	0.04	0.50	0.30	0.30	0.15	0.43	0.25
Grade X46M	0.22	1.30	0.025	0.015	0.45	0.05	0.05	0.04	0.50	0.30	0.30	0.15	0.43	0.25
Grade X52M	0.22	1.40	0.025	0.015	0.45	⩽ 0.15			0.50	0.30	0.30	0.15	0.43	0.25
Grade X56M	0.22	1.40	0.025	0.015	0.45	⩽ 0.15			0.50	0.30	0.30	0.15	0.43	0.25
Grade X60M	0.12	1.60	0.025	0.015	0.45	⩽ 0.15			0.50	0.50	0.50	0.50	0.43	0.25
Grade X65M	0.12	1.60	0.025	0.015	0.45	⩽ 0.15			0.50	0.50	0.50	0.50	0.43	0.25
Grade X70M	0.12	1.70	0.025	0.015	0.45	⩽ 0.15			0.50	0.50	0.50	0.50	0.43	0.25

Destructive & Non-Destructive Testing

Hydrostatic Testing 100% of pipe shall be tested at a pressure specified in above table

NDT

PSL-1 Weld seam of each pipe shall be tested by online Eddy Current Test

PSL-2 Steel skelp and weld seam shall be tested by Ultrasoinc Test (after hydrotest)

Flattening For pipes over size 2.875"
1. Flatten upto 1/2 of OD (no crack in weld) 2. Flatten upto 1/3 of OD (no cracks or breaks other than in weld)
3. Full Flattening (no Lamination or burnt metal)

Reverse Bend Test as per API 5L or Customer Specification to determine strength of weld

Metallography Micro Structure and Micro Hardness (HV10) test are carried out

Impact Testing For PSL-2 Pipes only (at 0°C) Min value for one sample = 22 J, Min Avg.value of 3 samples = 27 J

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

NPS Designator	DN Designator	Outside Diameter		Schedule No	Wall Thickness		Mass of Plain end Pipe		Test Pressure		Pieces/ Bundle
									Grade A	Grade B	
		Inch	mm		inch	mm	Kg/Mtr	lb/ft	MPa	MPa	
½	15	0.840	21.3	40	0.109	2.77	1.27	0.85	4.8	4.8	120
¾	20	1.050	26.7	40	0.113	2.87	1.69	1.13	4.8	4.8	84
1	25	1.315	33.4	40	0.133	3.38	2.50	1.68	4.8	4.8	60
1¼	32	1.660	42.2	40	0.140	3.56	3.39	2.27	8.3	9	42
1½	40	1.900	48.3	40	0.145	3.68	4.05	2.72	8.3	9	36
2	50	2.375	60.3	40	0.154	3.91	5.44	3.66	15.9	17.2	26
2½	65	2.875	73.0	40	0.203	5.16	8.63	5.80	17.2	17.2	18
3	80	3.500	88.9	40	0.216	5.49	11.29	7.58	15.3	17.2	14
3½	90	4.000	101.6	40	0.226	5.74	13.57	9.12	14.0	16.3	12
4	100	4.500	114.3	40	0.237	6.02	16.07	10.80	13.1	15.2	10
5	125	5.563	141.3	40	0.258	6.55	21.77	14.63	11.5	13.4	7
6	150	6.625	168.3	40	0.280	7.11	28.26	18.99	10.5	12.3	7
8	200	8.625	219.1	40	0.322	8.18	42.55	28.58	9.2	10.8	—
10	250	10.750	273.0	20	0.250	6.35	41.75	28.06	5.8	6.8	—
10	250	10.750	273.0	40	0.365	9.27	60.29	40.52	8.4	9.9	—
12	300	12.750	323.8	20	0.250	6.35	49.71	33.41	4.9	5.7	—
12	300	12.750	323.8	30	0.330	8.38	65.18	43.81	6.4	7.5	—
12	300	12.750	323.8	STD	0.375	9.52	73.78	49.61	7.3	8.5	—
12	300	12.750	323.8	40	0.406	10.31	79.70	53.57	7.9	9.2	—
14	350	14.000	355.6	10	0.250	6.35	54.69	36.75	4.4	5.2	—
14	350	14.000	355.6	STD	0.375	9.52	81.25	54.62	6.6	7.7	—
14	350	14.000	355.6	40	0.438	11.13	94.55	63.50	7.8	9	—
16	400	16.000	406.4	10	0.250	6.35	62.64	42.09	3.9	4.5	—
16	400	16.000	406.4	STD	0.375	9.52	93.17	62.64	5.8	6.8	—
16	400	16.000	406.4	40	0.500	12.70	123.30	82.85	7.7	9	—

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 NPS 2 (DN 50) or larger 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	0.30	1.2	0.05	0.045	0.5	0.4	0.4	0.15	0.08

Cu + Ni + Cr + Mb + V ⩽1%

Galvanizing **(As per ASTM A-90)**

Minimum 0.490 Kg/Mtr (70 microns approx)

Average 0.550 Kg/Mtr (79 microns approx)

Marking: Online stenciling as per this standard & as per customer requirements.

TECHNICAL DATA OF PIPES CONFORMING TO BS:1387

	Nominal Bore		Outside Diameter		Thickness	Weight of Black Pipe (Kg/Mtr.)		Pcs Per
	Inch	MM	Max MM	Min MM	MM	Plain end	screwed & socketed	Bundle
Light	½	15	21.4	21.000	2.0	0.947	0.956	160
	¾	20	26.9	26.400	2.3	1.380	1.390	110
	1	25	33.8	33.200	2.6	1.980	2.000	80
	1 ¼	32	42.5	41.900	2.6	2.540	2.570	61
	1 ½	40	48.4	47.800	2.9	3.230	3.270	51
	2	50	60.2	59.600	2.9	4.080	4.150	37
	2 ½	65	76.0	75.200	3.2	5.710	5.830	27
	3	80	88.7	87.900	3.2	6.720	6.890	24
	4	100	113.9	113.000	3.6	9.750	10.000	16
Medium	½	15	21.7	21.100	2.6	1.210	1.220	130
	¾	20	27.2	26.600	2.6	1.560	1.570	100
	1	25	34.2	33.400	3.2	2.410	2.430	65
	1 ¼	32	42.9	42.100	3.2	3.100	3.130	51
	1 ½	40	48.8	48.000	3.2	3.570	3.610	44
	2	50	60.8	59.800	3.6	5.030	5.100	30
	2 ½	65	76.6	75.400	3.6	6.430	6.550	24
	3	80	89.5	88.100	4.0	8.370	8.540	19
	4	100	114.9	113.300	4.5	12.200	12.500	14
	5	125	140.6	138.700	5.0	16.600	17.100	10
	6	150	166.1	164.100	5.0	19.700	20.300	7
Heavy	½	15	21.7	21.100	3.2	1.440	1.450	110
	¾	20	27.2	26.600	3.2	1.870	1.880	80
	1	25	34.2	33.400	4.0	2.940	2.960	55
	1 ¼	32	42.9	42.100	4.0	3.800	3.830	44
	1 ½	40	48.8	48.000	4.0	4.380	4.420	37
	2	50	60.8	59.800	4.5	6.190	6.260	27
	2 ½	65	76.6	75.400	4.5	7.930	8.050	20
	3	80	89.5	88.100	5.0	10.300	10.500	16
	4	100	114.9	113.300	5.4	14.500	14.800	12
	5	125	140.6	138.700	5.4	17.900	18.400	10
	6	150	166.1	164.100	5.4	21.300	21.900	7

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 Black Tube

For tubes upto & including 2"

Bending angle 180°

Bending radius 6 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

Galvanizing Test

1. Free Bore test (for tubes upto 1")
2. Copper Sulphate Test

Galvanized Tubes

Bending angle 90°

Bending radius 8 times to the OD of Tube

Weld Position 3 O'clock

Leak Tightness Test

100% Hydrotesting at 50 bar or online eddy current testing

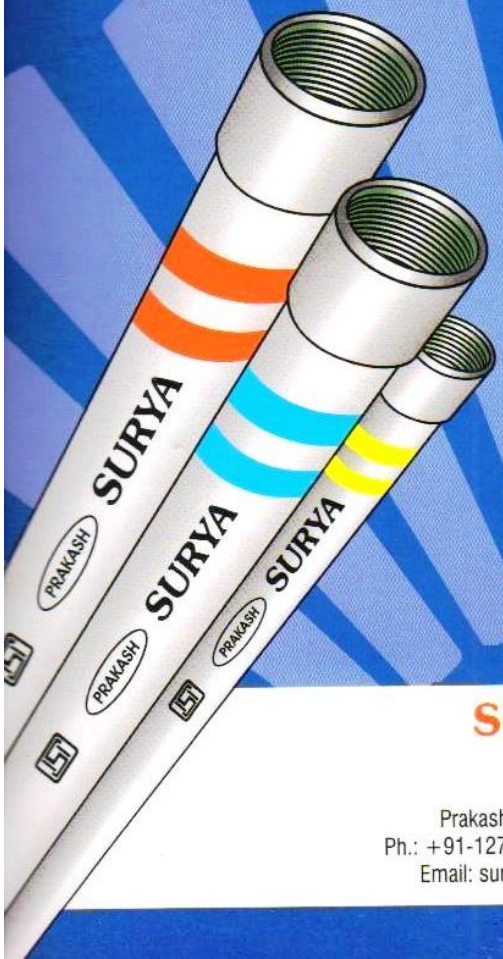
Threading

As per BS-21-1985

PRAKASH

SURYA

STEEL TUBES & PIPES



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