



## Manufacturing Process

The process utilises the latest technology and modern equipments for producing high quality ERW Pipes.

### 1. Slit Preparations

HR Coils are slitted to predetermined widths for each size of pipe and thickness. Slitted coil is uncoiled at the entry of ERW mill and the ends are sheared and welded one after another to make it single endless strip.

### 2. Forming

Slitted coils are initially formed into U shape and then into a cylindrical shape with open edges using a series of forming rolls.

### 3. Welding

The open edges are heated to the required temperature through high frequency low voltage high current and press welded by forge rolls making perfect and strong butt weld without filler materials.

### 4. Debeading

Weld flash on top and inside (if needed) is trimmed out through carbide tools.

### 5. Seam Annealing

Whenever required, welding portion and heat affected zone is put to normalising with medium frequency normaliser and then cooled down in air cooling bed.

### 6. Sizing & Cutting

After water quenching, slight reduction is applied to pipes with sizing rolls to give them desired accurate outside diameter.

Pipes are cut to required lengths by flying cut off disc/saw cutter.

### 7. Facing and Beveling

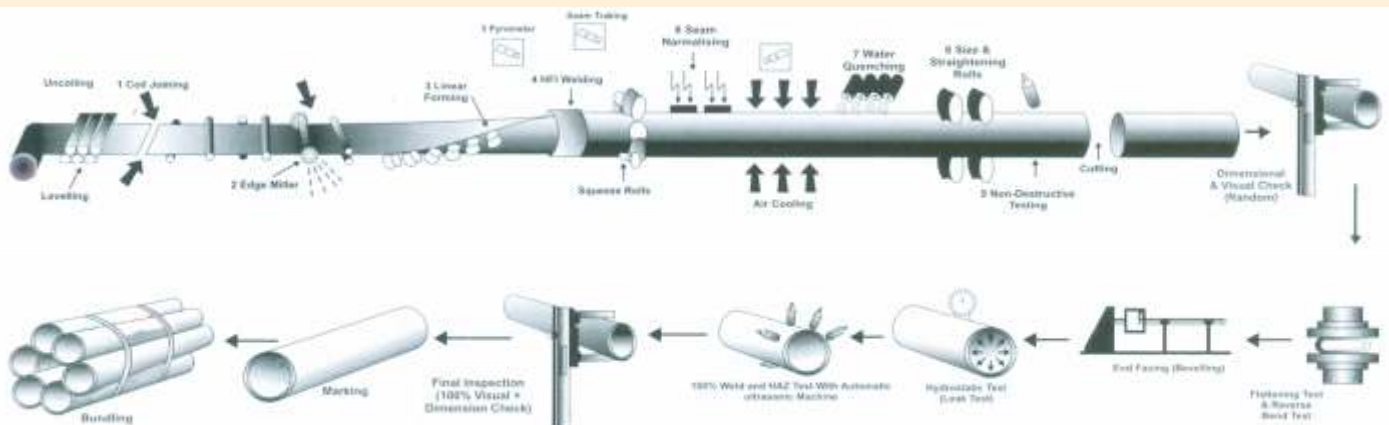
The pipe ends are faced and bevelled by the end facer.

All the processes are continuous with auto arrangements. These plain ended tubes go for further processing as per the customer need like galvanizing, threading, black varnishing etc.

### 8. Packing


Finished pipes are bundled in desired number of pieces as per customer's requirement and packed properly to ensure freshness till delivery.

## MANUFACTURING PROCESS



NAVRATAN PIPE is manufacturing the tubes of following specification

IS : 1239 (P-1) 20004	IS : 1978 / 1982	DIN 2441
IS : 3589 / 2001	BS : 1387 / 1985	JIS G-3452
IS : 4270 / 2001	BS : 1139 / EN39	ASTM : A-120
IS : 1161 / 1998	BS : 6323	ASTM : A-53
IS : 9295 / 1983	DIN 2439	ISO : 65-1981
IS : 3601 / 1984	DIN 2440	
IS : 4923 / 1497		
IS : 5504 / 1997		



**N**avratan Pipes and Profile Limited an ISO : 9001-2000 Company and Export House. Navratan Pipe incepted in year 1986 and since has become one of the leading manufacturing unit of ERW Black / Galvanized Steel Pipes conforming to various National/International specifications with a capability to manufacture customised Pipes/Structures/Poles etc. also.

Besides NAVRATAN PIPES is also manufacturing Hollow Sections, Scaffolding Tubes, Cold Rolled formed sections like 'Z' Purlin, Decksheet, LIP Channels, Guard Rail, with a production capacity of 1,00,000 Ton per annum.

NAVRATAN PIPE also exports Scaffolding Accessories, Window Section, Angles, Beams, Plates, Channels, Rolled MS Strips, Plain & Corrugated Sheets, Pipe Fittings & Valves.

NAVRATAN PIPE has the latest technology plant & machinery and testing equipments blended with vigilant quality assurance department, which ensures the best quality product.

Our products regularly inspected by various third party inspection agencies both from National/International sectors viz SGS, BUREAU VERITAS, LLOYDS, QSS, CROWN, TUV etc.

NAVRATAN PIPE is because of skilled management, a combination of Cost, Quality & Delivery.

Today NAVRATAN PIPE have strong satisfied customers both in India and in highly sensitive markets of countries like Belgium, Germany, Greece, France, Netherlands, Sweden, UK, Kenya, Dubai, Iraq, Kuwait, South Africa, Australia, New Zealand, USA etc.

## STEEL TUBES FOR USED IN WATER, GAS, AIR AND STEAM CONFORMING TO IS : 1239 (PART - 1) 2004 / BS : 1387 / 85

N.B. and Series	Outside Diameter		Wall Thickness		Nominal Weight Black Tubes				Nominal Weight Galvanised Tubes				Sockets	
					Plain End		Screwed & Socked		Plain End		Screwed & Socked		Minimum OD	Maximum Length
mm	Min (mm)	Max (mm)	mm	SWG	Kg/m	m/tonne	Kg/m	m/tonne	Kg/m	m/tonne	Kg/m	m/tonne	mm	mm
15L	21.0	21.4	2.00	14	0.947	1056	0.956	1046	0.947	1056	0.956	1046	27.0	37.0
M	21.0	21.8	2.60	12	1.21	826	1.22	820	1.21	826	1.22	820		
H	21.0	21.8	3.20	10	1.44	694	1.45	690	1.44	694	1.45	690		
20L	26.4	26.9	2.30	13	1.38	725	1.39	719	1.38	725	1.39	719	32.5	39.0
M	26.5	27.3	2.60	12	1.56	641	1.57	637	1.56	641	1.57	637		
H	26.5	27.3	3.20	10	1.87	535	1.88	532	1.87	535	1.88	532		
25L	33.2	33.8	2.60	12	1.98	505	2.0	500	1.98	505	2.0	500	39.5	46.0
M	33.3	34.2	3.20	10	2.41	415	2.43	412	2.41	415	2.43	412		
H	33.3	34.2	4.00	8	2.93	341	2.95	339	2.93	341	2.95	339		
32L	41.9	42.5	2.60	12	2.54	394	2.57	389	2.54	394	2.57	389	49.0	51.0
M	42.0	42.9	3.20	10	3.10	323	3.13	319	3.10	323	3.13	319		
H	42.0	42.9	4.00	8	3.79	264	3.82	262	3.79	264	3.82	262		
40L	47.8	48.4	2.90	11	3.23	310	3.27	306	3.23	310	3.27	306	56.0	51.0
M	47.9	48.8	3.20	10	3.56	281	3.60	278	3.56	281	3.60	278		
H	47.9	48.8	4.00	8	4.37	229	4.41	227	4.37	229	4.41	227		
50L	59.6	60.2	2.90	11	4.08	245	4.15	241	4.08	245	4.15	241	68.0	60.0
M	59.7	60.8	3.60	9	5.03	199	5.10	196	5.03	199	5.10	196		
H	59.7	60.8	4.50	7	6.19	162	6.26	160	6.19	162	6.26	160		
65L	75.2	76.0	3.20	10	5.71	175	5.83	172	5.71	175	5.83	172	84.0	69.0
M	75.3	76.6	3.60	9	6.42	156	6.54	153	6.42	156	6.54	153		
H	75.3	76.6	4.50	7	7.93	126	8.05	124	7.93	126	8.05	124		
80L	87.9	88.7	3.20	10	6.72	149	6.89	145	6.72	149	6.89	145	98.0	75.0
M	88.0	89.5	4.00	8	8.36	120	8.53	117	8.36	120	8.53	117		
H	88.0	89.5	4.80	6	9.90	101	10.10	99	9.90	101	10.10	99		
100L	113.0	113.9	3.60	9	9.75	103	10.0	100	9.75	103	10.0	100	124.0	87.0
M	113.1	115.0	4.50	7	12.20	82	12.50	80	12.20	82	12.50	80		
H	113.1	115.0	5.40	5	14.50	69	14.80	68	14.50	69	14.80	68		
125M	138.5	140.8	4.80	6	15.90	63	16.40	61	15.90	63	16.40	61	151.0	96.0
H	138.5	140.8	5.40	5	17.90	56	18.4	54	17.90	56	18.4	54		
150M	163.9	166.5	4.80	6	18.90	53	19.50	51	18.90	53	19.50	51	178.0	96.0
H	163.9	166.5	5.40	5	21.30	47	21.9	46	21.30	47	21.9	46		

### TOLERANCE

#### (a) Thickness

- Light tubes + Not Limited  
- 8%
- Medium and Heavy Tubes + Not Limited  
- 10%

#### (b) Weight

- Single Tube (Light Series) + 10%  
- 8%
- Single Tube (Medium and Heavy Series) +/- 10%
- For Light Series +/- 7.5%
- For Quantities per load of 10 tonnes minimum (Minimum and Heavy Series) +/- 7.5%

#### (c) Length

4 to 7 meters unless otherwise specified

#### (d) Tensile Strength

-320 mpa (min)

#### (e) % of elongation

-20% (min)





## ERW STEEL PIPES FOR WATER, GAS & WEWAGE AS PER IS - 3589 / 2001

Nominal Size	Outer Diameter	Thickness	Calculated Weight	
(NB) mm	(OD) mm	mm	Kg/Mtrs.	Mtrs./Ton
150	168.3	4.00	16.21	61.70
150	168.3	4.50	18.17	55.00
150	168.3	4.80	19.35	51.68
150	168.3	5.00	20.14	49.66
150	168.3	5.40	21.69	46.10
150	168.3	6.00	24.02	41.64
150	168.3	7.00	27.84	35.92
175	193.7	4.00	18.70	53.00
175	193.7	4.50	21.00	48.00
175	193.7	4.80	22.35	44.72
175	193.7	5.00	23.26	43.00
175	193.7	5.40	25.07	40.00
175	193.7	6.00	27.77	36.00
175	193.7	7.00	32.20	31.00
200	219.1	4.00	21.22	47.13
200	219.1	4.50	23.81	42.00
200	219.1	4.80	25.36	39.43
200	219.1	5.00	26.40	37.87
200	219.1	5.40	28.46	35.13
200	219.1	6.00	31.53	31.71
200	219.1	7.00	36.61	27.31
250	273.1	4.00	26.50	37.68
250	273.1	4.50	29.80	33.55
250	273.1	4.80	31.75	31.50
250	273.1	5.00	33.00	30.25
250	273.1	5.40	35.63	28.00
250	273.1	6.00	39.50	25.31
250	273.1	7.00	45.91	21.77
300	323.9	4.00	31.60	32.00
300	323.9	4.50	35.40	28.00
300	323.9	4.80	37.80	26.00
300	323.9	5.00	39.30	25.00
300	323.9	5.40	42.40	24.00
300	323.9	6.00	47.00	21.00
300	323.9	7.00	54.70	18.00
300	323.9	8.00	62.30	16.00
300	323.9	9.20	71.40	14.00
300	323.9	10.00	77.40	13.00

### TOLERANCE

Thickness : ± 10%  
 Outside Diameter : ± 0.75%  
 Length Random length 4 to 7 meters  
 unless specified otherwise  
 on request upto 12 meters

Spiral Welded Pipes from 200 mm - 1420 mm ID is being manufactured by Navratan Pipe & Profile Limited. The specification table is available at Page No.7.

## STEEL TUBES FOR WATER WELLS (CASING PIPES) CONFORMING TO IS : 4270/2001

N.B. of Pipe	Outside Diameter	Thickness	Nominal Weight Black Tubes Plain End	
			Kg/m	m/tonne
MM	MM	MM		
100	114.3	5.4	14.5	6.9
125	141.3	5.4	18.1	55
		7.1	23.5	43
150	168.3	5.4	21.6	46
		7.1	28.2	35
175	193.7	6.4	29.6	34
		8.0	36.6	27
200	219.1	6.4	36.6	30
		8.0	41.6	24
225	244.5	7.1	41.6	24
		9.0	52.3	19
250	273.1	8.0	52.3	19
		10.0	64.9	15
300	323.9	8.0	62.3	16
		10.0	77.4	13
350	355.6	9.52	81.25	12
400	406.4	9.52	93.17	11

### A. PHYSICAL PROPERTIES

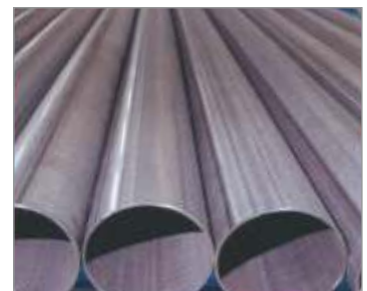
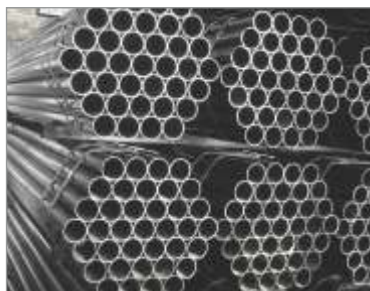
Grade	Y.S.(Min) MPa(kg/mm <sup>2</sup> )	T.S.(Min)T MPa(kg/mm <sup>2</sup> )	% age Elongation
Fe 410	235	410	15
Fe 450	275	450	13

### B. TOLERANCE

- Outside Diameter 1%
- Thickness
 

Welded Tube Upto and including 406.4 MM	+15% -12.5%
Over 406.4 MM outside Diameter	+15% -10%
- Weight
 

Single Tube	-8% +10% +10%
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**STEEL TUBES FOR STRUCTURAL PURPOSES  
CONFORMING TO IS: 1161 : 1998**

N.B. and Series	Outside Diameter	Thick-ness	Nominal Weight Black Tubes Plain End		Calculated Nominal Weight Galvanized Tubes Plain End	
			Kg/m	m/tonne	Kg/m	m/tonne
15L	21.3	2.0	0.947	1058	1.00	1003
M		2.6	1.21	826	1.26	794
H		3.2	1.44	694	1.49	671
20L	26.9	2.3	1.38	725	1.43	699
M		2.6	1.56	641	1.61	621
H		3.2	1.87	535	1.92	521
25L	33.7	2.6	1.98	505	2.03	493
M		3.2	2.41	415	2.46	407
H		4.0	2.93	341	2.98	336
32L	42.4	2.6	2.54	394	2.62	382
M		3.2	3.10	323	3.18	314
H		4.0	3.79	264	3.87	258
40L	48.3	2.9	3.23	310	3.34	299
M		3.2	3.56	281	3.67	272
H		4.0	4.37	229	4.48	223
50L	60.3	2.9	4.08	245	4.20	238
M		3.6	5.03	199	5.15	194
H		4.5	6.19	162	6.31	158
65L	76.1	3.2	5.71	175	5.86	171
M		3.6	6.42	156	6.57	152
H		4.5	7.93	126	8.10	123
80L	88.9	3.2	6.72	149	6.90	145
M		4.0	8.36	120	8.54	117
H		4.8	9.90	101	10.08	99
90L	101.6	3.6	8.70	115	8.97	111
M		4.0	9.63	144	7.20	139
H		4.8	11.50	87	11.77	85
100L	114.3	3.6	9.75	103	9.97	100
M		4.5	12.20	82	12.42	81
H		5.4	14.50	69	14.72	68
110L	127.0	4.5	13.60	74	13.90	72
M		4.8	14.50	69	14.80	68
H		5.4	16.20	62	14.80	61
125 L	139.7	4.5	15.00	67	15.25	66
M		4.8	15.90	63	16.15	62
H		5.4	17.90	56	18.15	55
135 L	152.4	4.5	16.40	61	16.78	60
M		4.8	17.50	57	17.88	56
H		5.4	19.60	51	19.98	55
150 L	165.1	4.5	17.80	56	18.20	55
M		4.8	18.90	52	19.80	51
H		5.4	21.30	47	21.70	46
150 L	168.3	4.5	18.2	55	18.66	54
M		4.8	19.4	52	19.88	50
H1		5.4	21.7	46	22.24	45
H2		6.3	25.2	40	41.00	24
175 L	193.7	4.8	22.40	45	22.94	44
M		5.4	25.10	40	25.64	39
H		5.9	27.30	37	27.84	36
200 L	219.1	4.8	25.40	39	25.95	39
M		5.6	29.50	34	30.05	33
H		5.9	31.00	32	31.55	32
225 H	244.5	5.9	34.70	29	35.36	28
250 H	273.0	5.9	38.90	26	39.68	25
300 H	323.9	6.3	49.30	20	50.28	20
350 H	355.6	8.0	68.60	15	69.58	14



**A. TENSILE PROPERTIES**

GRADE	Y.S. (Min) Mpa (Kg/mm <sup>2</sup> )	T.S. (Min) Mpa (Kg/mm <sup>2</sup> )	% age elong- ation
YST-210	210 (21.42)	330 (33.66)	20
YST-240	240 (24.48)	410 (41.82)	17
YST-310	310 (31.62)	450 (45.9)	8

Note : For tube size upto and including 25 min NB elongation of 12% shall be permissible.

**B. TOLERANCES**

(i) Outside diameter upto including 48.3 mm + 0.4mm - 0.8mm Over 48.3mm +/- 1%

**C. THICKNESS**

For all Sizes + Not Limited  
Welded Tubes - 10%

**D. WEIGHT**

Single Tube (Light Class) -8%  
+10%

For Medium & Heavy Class +/- 10%

10 Tonne Light +/- 5%

Medium & Heavy +/- 7.5%

## STEEL TUBES FOR LINE PIPES USED IN OIL PETROLEUM INDUSTRIES CONFORMING TO IS : 1978

NB (mm)	OD (mm)	Wall Thickness (mm)	Plain End Weight (Kg/m)	Test Pressure (Min)	
				Grade Yst 210 STD 100Kpa	Grade Yst 240 STD 100Kpa
80	88.90	3.20	6.76	89	104
		3.60	7.57	101	117
		4.00	8.37	112	130
		4.40	9.17	123	143
		4.80	9.95	134	156
		5.50	11.31	154	172
90	101.60	3.60	8.70	88	102
		4.00	9.63	98	114
		4.40	10.55	108	125
		4.80	11.46	117	137
		5.70	13.48	139	162
		6.40	15.02	156	182
100	114.30	3.60	9.83	78	91
		4.00	10.88	87	101
		4.80	12.96	104	121
		5.20	13.99	113	132
		5.60	15.01	122	142
		6.00	16.02	130	152
125	141.30	3.20	10.90	56	65
		4.00	13.54	70	82
		4.80	16.16	84	98
		5.60	18.74	98	115
		6.60	21.92	116	135
		7.10	23.50	125	145
150	168.30	3.60	14.62	53	62
		4.00	16.21	59	76
		4.80	19.35	71	81
		5.20	20.91	77	89
		5.60	22.47	83	96
		6.40	25.55	94	110
7.10	28.22	105	122		

NB (mm)	OD (mm)	Wall Thickness (mm)	Plain End Weight (Kg/m)	Test Pressure (Min)	
				Grade Yst 210 STD 100Kpa	Grade Yst 240 STD 100Kpa
200	219.00	4.80	25.37	54	63
		5.60	29.48	63	74
		6.40	33.57	73	84
		7.00	36.61	79	92
		7.00	36.61	79	92
250	273.10	4.80	31.76	44	51
		5.60	36.94	51	59
		6.40	42.09	58	68
		7.10	46.57	65	75
		7.80	51.03	71	83
		8.70	56.72	79	92
300	323.90	4.80	37.77	37	43
		5.60	43.96	43	50
		6.40	50.11	49	57
		7.10	55.47	54	63
		7.90	61.56	61	71
		8.40	65.35	64	75
350	355.60	4.80	41.52	34	39
		5.20	44.93	36	42
		6.40	55.11	45	52
		7.10	61.02	50	58
		7.90	67.74	55	64
		8.70	74.42	61	71
400	406.40	4.80	47.54	29	34
		5.20	51.45	32	37
		5.60	55.35	34	40
		6.50	63.13	39	46
		7.10	69.91	43	51
		7.90	77.63	48	56
400	406.40	8.70	85.32	53	62
		9.50	92.98	58	68

(A) Outside Diameter - The outside diameter tolerances shall be as follows

Pipe Body	Tolerance
For Size	
48.3 mm and less	+0.40 mm -0.80 mm
60.3 mm and above	+/- 1%

(B) Wall Thickness - The Tolerances on the wall thickness of line pipes shall be as follows:

Type	For	Tolerance
Welded Pipes	73.0 mm and smaller	+20.0% -12.5%
	88.9 mm O.D. & Larger	+18.0% -12.5%

(C) Weight-The tolerance shall be as follows:

Grade Yst-210 and Yst-240	+10.0% / -3.5%
Grade Yst-170	+10.0% -5.0%
Spical Plain end pipes-All Grades	+10.0% -5.0%
Car loads lots For min 18000 Kg:	
Grade Yst 210 & Yst 240	-1.75% -2.5%



## HOLLOW STEEL SECTIONS FOR STRUCTURAL USE AS PER IS : 4923 : 1997

### SQUARE HOLLOW SECTIONS (SHS)

Section SHS (mm)	Depth D (mm)	Width B (mm)	Thickness T (mm)	Width W (mm)	Mts./Tonne
16x16	16.00	16.00	1.80	0.83	1204
	16.00	16.00	2.40	1.07	935
19x19	19.00	19.00	1.80	0.99	1010
	19.00	19.00	2.40	1.29	775
25x25	25.00	25.00	2.60	1.69	592
	25.00	25.00	3.20	1.98	505
30x30	30.00	30.00	2.60	2.10	476
	30.00	30.00	3.20	2.49	402
	30.00	30.00	4.00	2.94	340
40x40	40.00	40.00	2.60	2.92	342
	40.00	40.00	3.20	3.49	287
	40.00	40.00	3.60	3.85	260
	40.00	40.00	4.00	4.20	238
50x50	50.00	50.00	2.90	4.35	230
	50.00	50.00	3.20	4.77	210
70x70	70.00	70.00	3.20	6.71	149
	70.00	70.00	4.00	8.22	122
	70.00	70.00	4.80	9.66	104
80x80	80.00	80.00	3.60	9.38	107
	80.00	80.00	4.50	11.52	87
	80.00	80.00	4.90	12.44	80
100x100	100.00	100.00	3.60	9.67	103
	100.00	100.00	4.50	11.88	84
	100.00	100.00	5.40	14.01	71
120x120	120.00	120.00	4.80	15.92	63
	120.00	120.00	5.40	17.74	56
132x132	132.00	132.00	4.80	18.71	53
	132.00	132.00	5.40	20.88	48
150x150	150.00	150.00	5.00	22.26	45

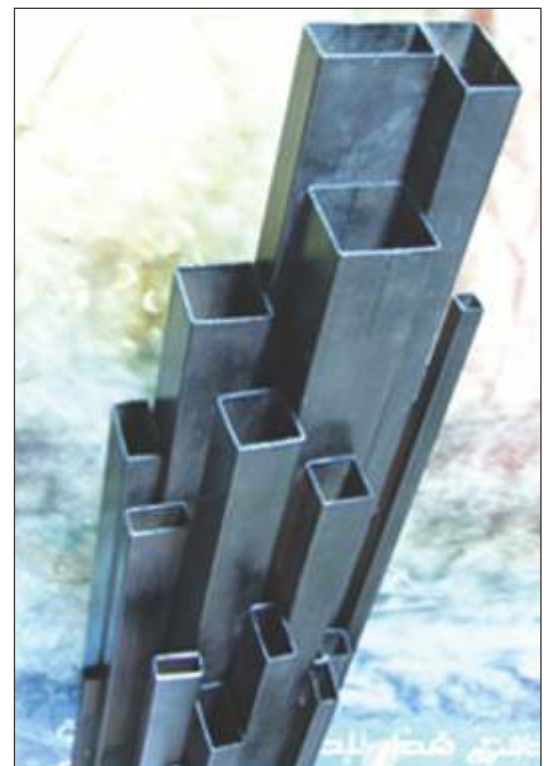
### RECTANGULAR HOLLOW SECTIONS (RHS)

Section SHS (mm)	Depth D (mm)	Width B (mm)	Thickness T (mm)	Width W (mm)	Mts./Tonne
30X20	30.00	20.00	2.00	1.47	680
40X20	40.00	20.00	2.00	1.78	562
50X25	50.00	25.00	2.90	2.98	336
	50.00	25.00	3.20	3.24	309
60X40	60.00	40.00	2.90	4.12	243
66x33	66.00	33.00	2.90	4.07	246
	66.00	33.00	3.60	4.93	203
	66.00	33.00	4.50	5.95	168
70x30	70.00	30.00	2.90	4.12	243
	70.00	30.00	3.20	4.50	222
	70.00	30.00	4.00	5.45	183
80x40	80.00	40.00	2.90	5.03	199
	80.00	40.00	3.20	5.50	182
	80.00	40.00	4.00	6.71	149
96x48	96.00	48.00	3.20	6.71	149
	96.00	48.00	4.00	8.22	122
	96.00	48.00	4.80	9.66	104
122x61	122.00	61.00	3.60	9.67	103
	122.00	61.00	4.50	11.88	84
	122.00	61.00	5.40	14.01	71
145x82	145.00	82.00	4.80	15.92	63
	145.00	82.00	5.40	17.74	56
172x92	172.00	92.00	4.80	18.71	53
	172.00	92.00	5.40	20.88	48

Grade	T.S. (min) Mpa	Y.S. (min) Mpa	Elongation	
			25.4mm & under	Over 25.4mm
YST-210	330	210	12	20
YST-240	410	240	10	15
YST-310	450	310	8	10

#### B. TOLERANCE

- Outside Diameter ± 0.5 mm
- Thickness ± 10%
- Weight -8%  
(i) Single Pipe -8% + 10%  
(ii) On lots of 10 Tonne ± 7.5%





Size	Outside Diameter		Wall Thickness		Mass of Plain and Pipe		Standard Test Pressure								
							Gr.A	Gr.B	Gr.X42	Gr.X46	Gr.X52	Gr.X56	Gr.X60	Gr.X65	Gr.X70
	mm	inch	mm	inch	Kg/Mtr.	lb/Ft.	MPa	MPa	MPa	MPa	MPa	MPa	MPa	MPa	MPa
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	15.30	16.4	17.6	19.0	20.7
			4.0	0.156	9.63	6.41	9.8	11.4	13.7	15.0	17.0	18.2	19.6	20.7	0.5
			4.4	0.172	10.55	7.04	10.8	12.5	15.1	16.5	18.7	20.1	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	20.7
4½	114.3	4.500	5.7	0.226	13.48	9.12	13.9	16.2	19.5	20.7	20.7	20.7	20.7	20.7	20.7
			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	20.7	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	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	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	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	20.7
5⅞	141.3	5.563	6.4	0.250	17.03	11.36	13.9	16.2	19.5	20.7	20.7	20.7	20.7	20.7	20.7
			7.1	0.280	18.77	12.59	15.7	18.3	20.7	20.7	20.7	20.7	20.7	20.7	20.7
			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	20.7	20.7
6⅝	168.3	6.625	6.6	0.258	21.92	14.63	11.6	13.5	16.3	17.8	20.1	20.7	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	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	20.7
			5.2	0.203	20.91	13.94	7.7	8.9	13.4	14.7	16.6	17.9	19.2	20.7	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	20.7
			6.4	0.250	25.55	17.04	9.4	11.0	16.6	18.1	20.7	20.7	20.7	20.7	20.7
			7.1	0.280	28.22	18.99	10.5	12.2	18.4	20.1	20.7	20.7	20.7	20.7	20.7
			8⅝	219.1	8.625	7.9	0.312	31.25	21.06	11.7	13.6	20.4	20.7	20.7	20.7
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	20.7
7.0	0.277	36.61				24.72	7.9	9.2	13.9	15.2	17.2	18.5	19.8	20.7	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	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	20.7
10¾	273.1	10.750	8.7	0.344	45.14	30.45	9.9	11.5	17.3	18.9	20.7	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	20.7
			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	20.7
12¾	323	12.750	7.8	0.307	51.03	34.27	7.1	8.3	14.1	15.4	17.4	18.7	20.1	20.7	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	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	20.7
			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			

## SPIRAL WELDED PIPE



## SPIRAL WELDED PIPE PLANT

# SPIRAL WELDED PIPES

## CONFORMING TO API 5L-2008 (SPIRAL PIPE)

Nominal O.D. mm	Length m	Wall Thickness mm	Theoretic Weight kg/m	Pipe Weight kg	Test Pressure MPa	Nominal O.D. mm	Length m	Wall Thickness mm	Theoretic Weight kg/m	Pipe Weight kg	Test Pressure MPa						
219	12	6	32.02	384.24	7.7	630	12	6	92.83	1114.00	2.7						
		7	37.10	445.17	9.0			7	108.05	1296.59	3.1						
		8	42.13	505.54	10.3			8	123.22	1478.59	3.6						
273	12	6	40.01	480.09	6.2			9	138.33	1660.00	4.0						
		7	46.42	557.04	7.2			10	153.40	1840.82	4.5						
		8	52.78	633.39	8.3			11	168.42	2021.04	4.9						
325	12	6	47.70	572.43	5.2			12	183.39	2200.68	5.4	720	12	6	106.15	1273.80	2.4
		7	55.40	664.76	6.1			7	123.59	1483.03	2.7						
		8	63.04	756.50	6.9			8	140.97	1691.66	3.1						
		9	70.64	847.65	7.8			9	158.31	1899.71	3.5						
377	12	6	55.40	664.76	4.5			10	175.60	2107.16	3.9			11	192.84	2314.02	4.3
		7	64.37	772.48	5.2			12	210.02	2520.29	4.7			820	12	7	140.85
		8	73.30	879.61	6.0	8	160.70	1928.41	2.8								
		9	82.18	986.16	6.7	9	180.50	2166.05	3.1								
10	91.01	1092.10	7.5	10	200.26	2403.10	3.4										
426	12	6	62.65	751.76	4.0	11	219.96	2639.55	3.8	12	239.62					2875.42	4.1
		7	72.83	873.99	4.6	920	12	8	180.43	2165.16	2.5						
		8	82.97	995.62	5.3			9	202.70	2432.40	2.8						
		9	93.06	1116.66	6.0			10	224.92	2699.04	3.1						
		10	103.09	1237.10	6.6			11	247.09	2965.08	3.4						
		11	113.08	1356.96	7.3			12	269.21	3230.54	3.7						
12	123.02	1476.22	7.9	1020	12			8	200.16	2401.91	2.2						
478	12	6	70.34					844.10	3.5	9	224.90	2698.74	2.5				
		7	81.81					981.71	4.1	10	249.58	2994.97	2.8				
		8	93.23					1118.73	4.7	11	274.22	3290.62	3.0				
		9	104.60					1255.15	5.3	12	298.81	3585.67	3.3				
		10	115.92					1390.99	5.9	1220	12	9	269.28	3231.36	2.1		
		11	127.19	1526.23	6.5			10	298.90			3586.80	2.3				
12	138.41	1660.89	7.1	11	328.47	3941.64	2.5										
529	12	6	77.89	934.65	3.2	12	357.99	4295.88	2.8								
		7	90.61	1087.36	3.7	1420	12	9	313.68			3764.16	1.8				
		8	103.29	1239.47	4.3			10	348.23			4178.76	2.0				
		9	115.92	1390.99	4.8			11	382.73	4592.76	2.2						
		10	128.49	1541.92	5.3			12	417.18	5006.16	2.4						
		11	141.02	1692.26	5.9												
12	153.50	1842.00	6.4														

### TOLERANCES :-

#### 1) Outside diameter of Body & Ends :

Specified OD (mm)	Body Tolerance	Ends Tolerance (mm)	Out-of-roundness tolerances (mm)	
≥88.9 to ≥168.3	±0.0075 D	-0.40, +1.60	Pipe except the end	Pipe end
>168. to ≥610	±0.0075 D but max. of 3.20mm	+0.005 D, but max. of ± 1.6 mm	0.020 D	0.015 D

#### 2) Thickness

#### 3) Mass:

≤5.0 mm = ±0.5 mm +10%, -3½% of  
 >5.0 to >15.0 = ±0.1t standard weight  
 (where t - wall thickness)

### 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 $Af=1940 A^{0.2} / U^{0.9}$ (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 $Af=1940 A^{0.2} / U^{0.9}$ (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**

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	0.30	0.30	0.15	0.43	0.25
Grade X65M	0.12	1.60	0.025	0.015	0.45		≥ 0.15		0.50	0.30	0.30	0.15	0.43	0.25
Grade X70M	0.12	1.70	0.025	0.015	0.45		≥ 0.15		0.50	0.30	0.30	0.15	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 Ultrasonic 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 of 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
		inch	mm		inch	mm	Kg/Mtr	ib/ft	Grade A	Grade B	
									MPa	MPa	
½	15	0.0840	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	5.94	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	-



## CONFORMING TO API 5L-2008 (44th edition)

NPS Designator	DN Designator	Outside Diameter		Schedule No	Wall Thickness		Mass of Plain end Pipe		Test Pressure		Pieces/ Bundle
		inch	mm		inch	mm	Kg/Mtr	ib/ft	Grade A	Grade B	
									MPa	MPa	
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	11.3	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	-

### TOLERANCE

Outside Diameters	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 pipe 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

	Carbon	Manganese	Phosphorus	Sulphur	Copper	Nickel	Chromium	Molybdenum	Venadium
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

$$Cu + Ni + Cr + Mb \geq 1\%$$

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.



CONFORMING TO API 5L-2008 (44th edition)

## TECHNICAL DATA OF PIPES CONFORMING TO BS:1387

Nominal Bore		Outside Diameter		Thickness	Weight of Black Pipe		Pcs Per bundle	
		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	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
	1¼	32	42.5	41.900	2.6	2.540	2.570	61
	1½	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
	2½	65	76.0	75.000	3.2	5.710	5.830	27
	3	80	88.7	87.900	3.2	6.720	6.890	24
MEDIUM	4	100	113.9	113.000	3.6	9.750	10.000	16
	½	15	21.7	21.000	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
	1¼	32	42.9	42.100	3.2	3.100	3.130	51
	1½	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
	2½	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
HEAVY	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
	½	15	21.7	21.000	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
	1¼	32	42.9	42.100	4.0	3.800	3.830	44
	1½	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
	2½	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	

### TOLERANCE

Outside Diameters as per above table

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

### THICKNESS

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

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 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

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

## SUITABLE FOR SCREWING CONFORMING TO ISO : 65

DN	Designation of Thread	Outside Diameter <sup>1)</sup> D mm	Thickness (T) and masses per unit length (M) according the series											
			Heavy Series			Medium Series			Light Series 1			Light Series 2		
			T mm	Plain end M kg/m	Screwed Scoketed M kg/m	T mm	Plain end M kg/m	Screwed Scoketed M kg/m	T mm	Plain end M kg/m	Screwed Scoketed M kg/m	T mm	Plain end M kg/m	Screwed Scoketed M kg/m
15	½	21.3	3.2	1.44	1.45	2.6	1.21	1.22	2.3	1.09	1.09	2.0	0.947	0.956
20	¾	26.9	3.2	1.87	1.88	2.6	1.56	1.57	2.3	1.39	1.40	2.3	1.38	1.39
25	1	33.7	4.0	2.93	2.95	3.2	2.41	2.43	2.9	2.20	2.22	2.6	1.98	2.00
32	1¼	42.4	4.0	3.97	3.82	3.2	3.10	3.13	2.9	2.82	2.85	2.6	2.54	2.57
40	1½	48.3	4.0	4.37	4.41	3.2	3.56	3.60	2.9	3.24	3.28	2.9	3.23	3.27
50	2	60.3	4.5	6.19	6.26	3.6	5.03	5.10	3.2	4.49	4.56	2.9	4.08	4.15
65	2½	76.1	4.5	7.93	8.05	3.6	6.42	6.54	3.2	5.73	5.85	3.2	5.71	5.83
80	3	88.9	5.0	10.3	10.5	4.0	8.36	8.53	3.6	7.55	7.72	3.2	6.72	6.89
100	4	114.3	5.4	14.5	14.8	4.5	12.2	12.5	4.0	10.8	11.1	3.6	9.75	10.0
125	5	139.7	5.4	17.9	18.4	5.0	16.6	17.1	-	-	-	-	-	-
150	6	165.12	5.4	21.3	21.9	5.0	19.8	20.4	-	-	-	-	-	-

### Tolerance

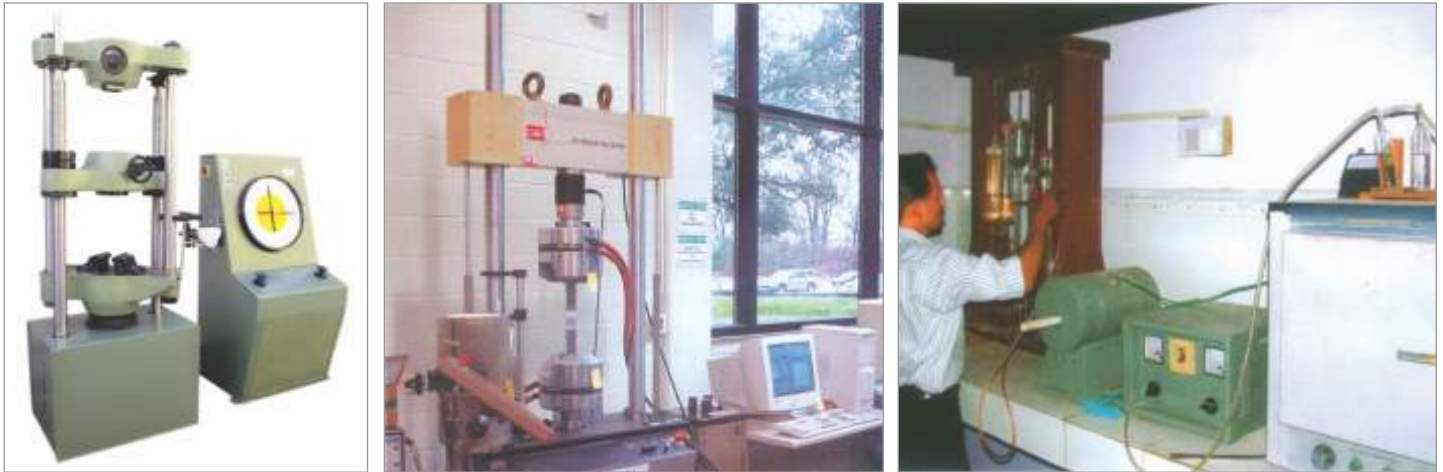
Outer Diameter as per above table Thickness

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%

## QUALITY LAB



### our wide range

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. Profile Projector	11. Magnetic Particle inspection yoke from magnaflux
12. Polishing m/c for micro & macro sample preparatin.	13. Dead Weight Pressure Gauge Tester.
14. Digital Thermometer. 15. Bevel Protector (.8mm/2.4mm)	

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 ensure 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.

### APPROVED BY

- Power Gnd Corporation of India Ltd.
- NTPC
- BHEL
- Electricity Board

### PRODUCTS

- All Angular Tubular Structures/Towers.
- Transmission Line Towers.
- Sub Station Structures from 11 Kv. to 765 Kv.
- Telecom Towers



## our wide range

### FOR DIFFERENT APPLICATIONS

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

#### WATERPIPELINES

Water Mains, Sewage 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 PIPELINES

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

#### OIL PIPELINES

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

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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)  
Steel Tubes for Mechanical & General Engineering Purposes.  
(IS:3601, BS:1775)

## MANUFACTURING DIAGRAM

NAVRATAN 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 day for finishing, testing and inspection. Some of these pipes are subsequently galvanized and threaded.

## APPLICATIONS

- Automobiles & Bus Body Building
- Furniture Industry
- Construction Industry
- Boiler Heat Exchange and Many More
- Engineering Structural Use
- Hand Pumps
- Pipe for Conveyor Belts
- Water Supply & Sewage
- Power Plant
- Wind Mills
- Chemical Industry
- Sugar Industry
- Oil & Gas Industry
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- IS : 1161-1998         STEEL TUBES FOR STRUCTURAL PURPOSE & ELECTRIC POLES
- IS : 3589-2001         STEEL TUBES FOR WATER & SEWAGE
- IS : 9295-1983         STEEL TUBES FOR USE OF IDLERS FOR BELT CONVEYORS
- IS : 4270-2001         STEEL TUBES FOR USE OF WATER WELLS PLAIN END CASING PIPES
- IS : 4923-1997         STEEL TUBES FOR USE OF HOLLOW SECTIONS FOR STRUCTURAL USE
- IS : 1978-1982         STEEL TUBES FOR USE IN TRANSPORTATION OF OIL, GAS & PETROLEUM PRODUCTS
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**Navratan**   
Pipe and Profile Limited

*Office :* Navratan Tower 10, Community Center, 3rd Floor, Mayapuri Industrial Area Phase-I, New Delhi-110064 (INDIA)  
Tel. : + 91-11-47285555 (20 Lines) Fax : + 91-11-45585059, 47285501

*Branch Office :* PEB Division, C2/7, Main Road, Janak Puri, New Delhi-110058  
Tel. : +91-11-25556438, 25556453, 25552171 E-mail : sales@navratangroup.com Website : www.navratanpipes.com

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