EQUALENT INTERNATIONAL STANDARDS FOR VARIOUS INDIAN STANDARDS

Indian Standard	American Standard	British Standard	Japanese Standard	German Standard
IS 1161-1998	ASTM A500	BS 4360	JIS G3444/ 1994	DIN 2439 - 2441
	GR A /1993	BS 7613/ 1994	--	
IS-1239	ASTM A53/ 1993	BS 1387 / 1985	--	DIN 2439 - 2441
(Part 1) /2004	Elong.20% for all			
	Galv. 550Gms/m2			
IS 9295 / 1983	ASTM A-513	BS 6323 / 1982	--	--
IS 3601 / 2006	--	BS 1775	JIS G3345 / 1983	DIN 2393 / 1994
		BS 6323 / 1982		
IS 4923 / 1997	ASTM A500	BS 6363	JIS G3466 / 1982	DIN 2395
	GRA/1993			
IS 4270 / 2001	--	BS 879	--	--
IS 3589 / 2001	--	BS 5534	--	--
IS 9537 / II	--	BS 4568	--	--
IS/ISO/3183-2007	This Specification is equivalent to IS 1978 - 82 (Old Version)			

STEEL TUBES FOR ORDINARY USES IN WATER, GAS, STEAM & AIR

Conforming to IS:1239 (Part-I) 2004

Nominal Bore (N.B.)		Outside Diameter			Wall Thickness		NOMINAL WEIGHT Kg / Meters		METERS / TON	
		Minimum	Maximum							
MM	INCH	MM	MM	CLASS	MM	SWG*	P.E.	S & S	P.E.	S & S
15	(1/2")	21.00	21.40	L	2.00	14	0.95	0.96	1056	1046
		21.00	21.80	M	2.60	12	1.21	1.22	826	820
		21.00	21.80	H	3.20	10	1.44	1.45	694	690
20	(3/4")	26.40	26.90	L	2.30	13	1.38	1.39	725	719
		26.50	27.30	M	2.60	12	1.56	1.57	641	637
		26.50	27.30	H	3.20	10	1.87	1.88	535	532
25	(1")	33.20	33.80	L	2.60	12	1.98	2.00	505	500
		33.30	34.20	M	3.20	10	2.41	2.43	415	411
		33.30	34.20	H	4.00	8	2.93	2.95	341	339
32	(1 1/4")	41.90	42.50	L	2.60	12	2.54	2.57	394	389
		42.00	42.90	M	3.20	10	3.10	3.13	322	319
		42.00	42.90	H	4.00	8	3.79	3.82	264	262
40	(1 1/2")	47.80	48.40	L	2.90	11	3.23	3.27	310	306
		47.90	48.80	M	3.20	10	3.56	3.60	281	278
		47.90	48.80	H	4.00	8	4.37	4.41	229	227
50	(2")	59.60	60.20	L	2.90	11	4.08	4.15	245	241
		59.70	60.80	M	3.60	9	5.03	5.10	199	196
		59.70	60.80	H	4.50	7	6.19	6.26	161	160
65	(2 1/2")	75.20	76.00	L	3.20	10	5.71	5.83	175	171.5
		75.30	76.60	M	3.60	9	6.42	6.54	156	153
		75.30	76.60	H	4.50	7	7.93	8.05	126	124
80	(3")	87.90	88.70	L	3.20	10	6.72	6.89	149	145
		88.00	89.50	M	4.00	8	8.36	8.53	120	117
		88.00	89.50	H	4.80	6	9.90	10.10	101	99
100	(4")	113.00	113.90	L	3.60	9	9.75	10.00	102	100
		113.10	115.00	M	4.50	7	12.20	12.50	82	80
		113.10	115.00	H	5.40	5	14.50	14.80	69	67
125	(5")	138.50	140.80	M	4.80	6	15.90	16.40	63	61
		138.50	140.80	H	5.40	5	17.90	18.40	56	54
150	(6")	163.90	166.50	M	4.80	6	18.90	19.50	53	51
		163.90	166.50	H	5.40	5	21.30	21.90	47	46

* Standard Wire Gauge

TOLERANCE

Thickness:

Light Tubes : + not limited
- 8%

Medium &
Heavy Tubes: + not limited
- 10%

Weight:

Single Tube : + 10%
(light series) - 8%

Single Tube : +/- 10%
(Medium & Heavy series)

For quantities per load of 10 ton Min.: +7.5%
(light series) -5.0%

For quantities per load of 10 ton Min.: +/- 7.5%
(Medium & Heavy series)

Chemical Composition

As per IS: 10748 – 2004

Physical Properties

Tensile strength : Min. 320 Mpa

Elongation % age : 20% Min. above 25 mm NB
12% Min. upto 25 mm NB

Hydro Test Pressure : 5 Mpa

HOLLOW STEEL SECTIONS FOR STRUCTURAL USE, SQUARE HOLLOW SECTION (SHS)

Conforming to IS : 4923 – 1997

SHS (DxB)*	THICKNESS	UNIT WEIGHT	
MM	MM	Kg/Meter	Meter/Ton
19 X 19	2.00	0.99	1010
	2.60	1.20	833
	2.90	1.30	769
25 X 25	2.00	1.36	735
	2.60	1.69	592
	3.20	1.98	505
32 X 32	2.60	2.26	442
	3.20	2.69	372
	4.00	3.19	313
38 X 38	2.00	2.18	459
	2.60	2.75	364
	3.20	3.29	304
	4.00	3.95	253
40 X 40	2.00	2.31	433
	2.60	2.92	342
	3.20	3.49	287
	4.00	4.20	238
49.5 X 49.5	2.60	3.69	271
	3.20	4.45	225
	4.50	5.95	168
60 X 60	2.60	4.55	220
	3.20	5.50	182
	3.50	5.96	168
	4.50	7.43	135
72 X 72	3.20	6.71	149
	4.00	8.22	122
	5.00	10.01	100

SHS (DxB)*	THICKNESS	UNIT WEIGHT	
MM	MM	Kg/Meter	Meter/Ton
80 X 80	3.20	7.51	133
	4.00	9.22	108
	5.00	11.27	89
91.5 X 91.5	3.60	9.67	103
	4.50	11.88	84
	5.40	14.01	71
100 X 100	3.60	10.64	94
	4.50	13.08	76
	6.00	16.98	59
113.5 X 113.5	4.00	13.43	74
	5.00	16.53	60
	6.00	19.53	51
125 X 125	4.00	14.87	67
	5.00	18.33	55
	6.00	21.69	46
132 X 132	4.00	15.75	63
	5.00	19.43	51
	6.00	23.01	43
150 X 150	5.00	22.26	45
	6.00	26.40	38
	7.00	30.44	33
180 X 180	5.00	26.97	37
	6.00	32.05	31
	8.00	41.91	24

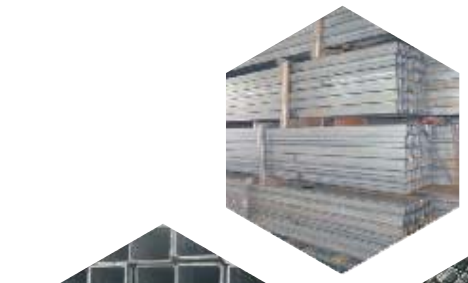
OTHER ALLOWABLE STRESS VALUES (in Mpa)

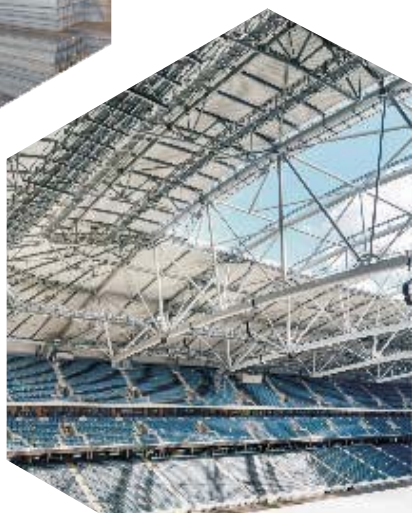
Steel Grade	Min.Yield Stress	Min. UTS
Yst 210	210	330
Yst 240	240	410
Yst 310	310	450

Note: Min.% Elongation: 10% for GR. Yst 310, 15% for GR. Yst 240 & 20% for Yst 210

e: The sizes which are not covered in the Table can also be supplied as per customer requirement (Clause – 8.1)

* D : Depth
B : Breadth





HOLLOW STEEL SECTIONS FOR STRUCTURAL USE RECTANGULAR HOLLOW SECTION (RHS)

Conforming to IS : 4923 – 1997

RHS	THICKNESS	UNIT WEIGHT	
MM	MM	Kg/Meter	Meter/Ton
40 X 20	2.00	1.68	595
	2.60	2.10	476
	3.20	2.49	402
50 X 25	2.00	2.15	465
	2.60	2.71	369
	3.20	3.24	309
	4.00	3.88	258
60 X 40	2.60	3.73	268
	3.20	4.50	222
	4.50	6.02	166
66 X 33	2.60	3.69	271
	3.20	4.45	225
	4.50	5.95	168
75 X 25	2.60	3.73	268
	3.20	4.50	222
	4.50	6.02	166
80 X 40	2.90	5.03	199
	3.50	5.96	168
	4.50	7.43	135
96 X 48	3.20	6.71	149
	4.00	8.22	122
	5.00	10.01	100
90 X 60	3.20	7.01	143
	4.00	8.59	116
	5.00	10.48	95
100 X 50	3.20	7.01	143
	4.00	8.59	116
	5.40	11.21	89
	6.00	12.27	81
120 X 60	3.60	9.50	105
	4.50	11.67	86
	5.40	13.76	73
122 X 61	3.60	9.67	103
	4.50	11.88	84
	5.40	14.01	71
145 X 82	3.60	12.16	82
	4.50	14.99	67
	5.40	17.74	56
150 X 75	3.60	12.05	83
	4.50	14.85	67
	5.40	17.57	57
150 X 100	3.60	13.46	74
	4.50	16.62	60
	5.40	19.69	51
172 X 92	3.60	14.25	70
	4.50	17.61	57
	5.40	20.88	48
200 X 100	4.50	20.15	50
	6.00	26.40	38
	7.00	30.44	33
200 X 150	4.50	23.68	42
	6.00	31.11	32
	8.00	40.66	25

General technical specification and tolerances:	
Spec :	IS:4923:1997
Length:	6.0m +/- 0.05mm customized length ranging from 4m to 8m may be supplied
Thickness:	For all sizes: +/- 10.0%
Outer Dimensions:	1% with a Min. of 0.5mm
Corner Squareness:	90^0 +/- 2^0
Corner Radii:	Max. 3x (thickness of the section)
Weight:	on individual length : +10%, -8% on lots of 10 MT: +/- 7.5%
Straightness:	Min1:200^{th} of any length measured along the center line (mill straightened condition) unless otherwise specifically arranged
Twist Tolerance:	Max. 2mm:+:0.5mm /1m length, the measured relative vertical shift of any adjacent corner of the measured by keeping one side on flat surface.
End Finish:	Plain Ended- Mechanically sheared, mill-cut finish without further machining.
Surface Finish:	Black without any surface treatment of oiling or varnishing.
Raw Material:	Sulphur content: 0.05% max. Phosphorus content:0.05% max.

STEEL TUBES FOR PETROLEUM & NATURAL GAS INDUSTRIES FOR PIPE LINE

Confirming to IS : 3183 - 2007

Nominal Size NB		Outside Diameter D	Thickness	Weight	Test Pressure (MPA)	
MM	INCH	MM	MM	Kg/Mtr.	L-210	L-245
15	(1/2")	21.30	2.80	1.28	17.00	17.00
20	(3/4")	26.70	2.90	1.70	17.00	17.00
			3.90	2.19	17.00	17.00
25	(1")	33.40	3.40	2.52	17.00	17.00
			4.50	3.21	17.00	17.00
32	(1^1/4")	42.20	3.60	3.43	17.00	17.00
40	(1^1/2")	48.30	3.70	4.07	17.00	17.00
50	(2")	60.30	2.10	3.01	9.20	10.20
			2.80	3.97	only L-175	
			3.20	4.51	only L-175	
			3.60	5.03	only L-175	
			3.90	5.42	16.20	17.00
			4.40	6.07	17.00	17.00
			4.80	6.57	17.00	17.00
			5.50	7.43	17.00	17.00
65	(2^1/2")	73.00	2.10	3.67	7.20	8.90
			2.80	4.85	only L-175	
			3.20	5.51	only L-175	
			3.60	6.16	only L-175	
			4.00	6.81	13.80	15.10
			4.40	7.44	15.20	17.00
			4.80	8.07	16.30	17.00
			5.20	8.69	17.00	17.00
			5.50	9.16	17.00	17.00
80	(3")	88.90	2.10	4.50	6.00	6.90
			2.80	5.95	only L-175	
			3.20	6.76	9.10	10.50
			3.60	7.57	only L-175	
			4.00	8.37	11.30	13.20
			4.40	9.17	12.50	14.60
			4.80	9.95	13.60	15.90
			5.50	11.31	15.60	17.00

Nominal Size NB		Outside Diameter D	Thickness	Weight	Test Pressure (Mpa)	
MM	INCH	MM	MM	Kg/Mtr.	L-210	L-245
100	(4")	114.30	2.10	5.81	4.60	5.30
			2.80	7.70	6.10	7.10
			3.20	8.77	7.00	8.10
			3.60	9.83	7.80	9.10
			4.00	10.88	8.70	10.10
			4.40	11.92	9.60	11.10
			4.80	12.96	10.40	12.10
			5.20	13.99	11.30	13.20
			5.60	15.01	12.20	14.20
125	(5")	141.30	2.10	7.21	3.70	4.30
			3.20	10.90	5.60	6.50
			4.00	13.94	7.00	8.20
			4.80	16.16	8.40	9.80
			5.60	18.74	9.80	11.50
150	(6")	168.30	2.10	8.61	3.10	3.90
			2.80	11.43	4.10	4.80
			3.20	13.03	4.70	5.50
			3.60	14.62	5.30	6.20
			4.00	16.21	6.50	7.40
			4.40	17.78	7.10	8.10
			4.80	19.35	7.70	8.90
			5.20	20.91	8.30	9.60
			5.60	22.47	9.40	11.00
200	(8")	219.10	4.80	25.37	5.52	8.06
			5.60	29.48	6.44	9.40
			6.40	33.57	7.36	10.75
			7.00	36.61	8.05	11.76
			7.90	41.14	9.09	13.27
			8.20	42.65	9.43	13.77

TOLERANCES

OUTSIDE DIAMETER:

Less than 60.3mm	+0.4mm
	-0.8mm
More than 60.3mm	+/-0.0075D

Thickness:

Less than 5.00mm	+/-0.5mm
5.00mm to 15mm	+/-0.1T

Weight:

Gd 175'175P'A-25	+10%
	-5%
Gd 210,45	+10%
	-3.5%
Lot Size	+/-1.75%

Height of inside Beed: Max. 1.5mm
Angle of Bevel: 30° + 5° – 0°

Straightness: 0.2% of length

CHEMICAL COMPOSITION

Grade	C%	Mn%	S%	P%
L-245	0.26 Max	1.20 Max	0.03 Max	0.03 Max
L-210	0.22 Max	0.90 Max	0.03 Max	0.03 Max
L-175	0.21 Max	0.60 Max	0.03 Max	0.03 Max

Bend Test:

Angle Of Bend: -180°
Radious of Bend: -6D

Flattening Test:

Distance between plates: -50% of OD(For Weld)
Non Destructive Test: 33% of OD(For metal)

Referance Hole:-1/8”

PHYSICAL PROPERTIES

Grade	YST(Min.)	TS(Min.)
L-175	175 Mpa	310Mpa
L-210	210 Mpa	335 Mpa
L-245	245 Mpa	415 Mpa

Elongation %age: A' = Ao2/U0.9XC
C' = 1940 Xc Cross Section Area

STEEL TUBE FOR STRUCTURAL PURPOSE

Confirming to IS : 1161 - 1998

Nominal Size NB		Outside Diameter D		Thickness T		Nominal Weight Black Tubes Plain End	
MM	INCH	MM	CLASS	MM	SWG	Kg/Meter	Meter/Ton
15	(1/2")	21.30	L	2.00	14	0.947	1056
			M	2.60	12	1.210	826
			H	3.20	10	1.440	694
20	(3/4")	26.90	L	2.30	13	1.380	725
			M	2.60	12	1.560	641
			H	3.20	10	1.870	535
25	(1")	33.70	L	2.60	12	1.980	505
			M	3.20	10	2.410	415
			H	4.00	08	2.930	341
32	(1 1/4")	42.40	L	2.60	12	2.540	394
			M	3.20	10	3.100	322
			H	4.00	08	3.790	264
40	(1 1/2")	48.30	L	2.90	11	3.230	310
			M	3.20	10	3.560	281
			H	4.00	08	4.370	229
50	(2")	60.30	L	2.90	11	4.080	245
			M	3.60	09	5.030	199
			H	4.50	07	6.190	162
65	(2 1/2")	76.10	L	3.20	10	5.710	175
			M	3.60	09	6.420	156
			H	4.50	07	7.930	126
80	(3")	88.90	L	3.20	10	6.720	149
			M	4.00	08	8.360	120
			H	4.80	06	9.990	101
100	(4")	114.30	L	3.60	09	9.750	102
			M	4.50	07	12.200	82
			H	5.40	05	14.500	70
110		127.00	L	4.50	07	13.600	74
			M	4.80	06	14.500	69
			H	5.40	05	16.200	62
125	(5")	139.70	L	4.50	07	15.000	66.5
			M	4.80	06	15.900	63
			H	5.40	05	17.900	56
135		152.40	L	4.50	07	16.400	61
			M	4.80	06	17.500	57
			H	5.40	05	19.600	51
150	(6")	165.10	L	4.50	07	17.800	56
			M	4.80	05	18.900	53
			H	5.40	05	21.300	47
150	(6")	168.30	L	4.50	07	18.200	55
			M	4.80	06	19.400	51.5
			H1	5.40	05	21.700	46
			H2	6.30	03	25.200	40
175	(7")	193.70	L	4.80	06	22.400	45
			M	5.40	05	25.100	40
			H	5.90	04	27.300	37
200	(8")	219.10	L	4.80	06	25.400	39
			M	5.60	05	29.500	34
			H	5.90	04	31.000	32

Chemical Properties

C	0.12% Max
Mn	0.60% Max
P	0.04% Max
S	0.04% Max
Si	0.08% Max

Physical Properties

Grade	YS (Min.) Mpa	TS (Min.) Mpa	% age (Min.) Elong.
YST-210	210	330	20
YST-240	240	410	17

Note: For tubes upto size 25mm NB including Elongation of 12% shall be permissible.

Weight

Single tubes (light series)	+10% -8%
Single tubes (medium & heavy series)	+/- 10%

Weight Truck Load

For lot of 10 Ton Min.

Light Series	+/- 5%
medium & heavy series	+/- 7.5%

Tolerance

Outside diameter:

upto and including 48.3mm	+ 0.4mm - 0.8mm
Over 48.3mm	+/- 1%

Thickness

+ Not Limited - 10%

SPECIFICATIONS OF STEEL TUBES FOR WATER AND SEWAGE

Conforming to IS : 3589 - 2001

Nominal N.B. Size		OutsideDiameter	Wall Thickness	Calculated Weight	
MM	INCH	MM	MM	Kg/m	Mtr/Tonne
150	(6”)	168.30	2.60	10.60	94.30
		168.30	3.20	12.00	83.30
		168.30	4.00	16.21	61.70
		168.30	5.00	20.14	49.66
		168.30	6.00	24.01	41.64
		168.30	7.00	27.84	35.91
175	(7”)	193.70	4.00	18.71	53.44
		193.70	5.00	23.27	42.97
		193.70	6.00	27.77	36.01
		193.70	7.00	32.23	31.03
200	(8”)	219.10	2.60	13.88	72.00
		219.10	3.60	19.13	52.27
		219.10	4.00	21.22	47.13
		219.10	5.00	26.40	37.88
		219.10	5.40	28.46	35.14
		219.10	6.00	31.53	31.72
		219.10	7.00	36.61	27.31

TOLERANCES

Outside Diameter:	+/- 0.75% of OD
Thickness:	+/- 10%
Ovality:	Shall not exceed 1% of the specified diameter
Bead Height:	The maximum height of the weld bead on the internal surface of the pipes shall not exceed 60% of nominal wall thickness
Straightness:	Shall not deviate from the straightness by more than 0.2% of total length
Length:	Single random length of 4 to 7 meter
Weight:	+/- 7.5% on Truck Load

PHYSICAL PROPERTIES

Grade	Yield Stress	Tensile Strength	%elongation
	Mpa(Min)	Mpa(Min)	(Min)
Fe-330	195	330	20
Fe-410	235	410	18
Fe-450	275	450	15

: The sizes which are not covered in the Table can also be supplied as per customer requirement (Clause – 11.1)

ERW STEEL TUBES FOR WATER WELLS

Conforming to IS : 4270 - 2001 PLAIN END CASING PIPES

N.B. Size	Outside Diameter	Wall Thickness	Nominal Weight	
mm	mm	mm	Kg/m	Mtr/Ton
100	114.30	5.00	13.48	74
125	141.30	5.00	16.80	59
150	168.30	5.00	20.13	50
175	193.70	5.40	25.10	40
200	219.10	5.40	28.46	35

TOLERANCES

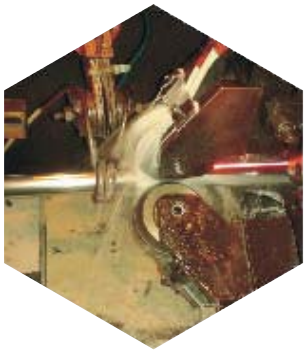
Outside diameter of pipe: +/- 1.0%

Thickness: + 15%
Up to 406.4mm OD - 12.5%

Weight: + 10%
Single Tube - 8%

Length: 4 to 7 mtrs
unless otherwise specified

* Higher wall thickness than specified may be supplied as per requirement of the customer



PHYSICAL PROPERTIES

Grade	Y.S. (Min.) Mpa (N/mm2)	T.S.(Min.) Mpa (N/mm2)	%age Min. Elongation on 5.65/So=GI
Fe 410	235	410	15%

STEEL TUBES FOR IDLERS FOR BELT CONVEYORS

Conforming to IS : 9295 - 1983

Outside Diameter	Thickness	Weight	
mm	mm	Kg / Mtr.	Mtr. / Ton
63.50	3.65	5.39	185.53
63.50	4.50	6.55	152.67
76.10	3.65	6.52	153.37
76.10	4.50	7.95	125.78
88.90	4.05	8.47	118.06
88.90	4.85	10.05	99.48
88.90	6.30	12.83	77.93
101.60	4.05	9.74	102.64
101.60	4.85	11.57	86.42
101.60	6.30	14.81	67.52
114.30	4.50	12.19	82.00
114.30	5.40	14.50	68.96
114.30	6.30	16.78	59.60
139.70	4.50	15.00	66.65
139.70	4.85	16.13	62.00
139.70	5.40	17.89	55.90
139.70	6.30	20.73	48.25
165.10	4.50	17.80	56.18
165.10	4.85	19.17	52.18
165.10	5.40	21.27	47.02
165.10	6.30	24.67	40.53
219.10	5.40	28.50	35.09
219.10	6.30	33.06	30.26
219.10	7.10	37.12	26.95

TOLERANCES

Outside Diameter: +/- 0.8%

Thickness: +/- 10%

Weight

Single Tube: +/- 10%

For quantities per load
Of 10 Ton Min.: +/- 7.5%

Ovality

Below 168.3mm OD: (0.5MM)

168.3mm OD & above: (1.0MM)

Eccentricity 5% of wall thickness

PHYSICAL PROPERTIES

Grade	Y.S. (Min.) Mpa	T.S.(Min.) Mpa	%age Elongation
ERW-210	210	330	20
ERW-240	240	410	18
ERW-310	310	450	15

CARBON STEEL TUBES FOR MECHANICAL & GENERAL ENGINEERING

Conforming to IS: 3601 - 2006

Outside Diameter	Thickness	Mass	Area of cross Section	Moment of Inertia	Modules of Sections	Radius of Gyration
mm	mm	Kg/m	cm 4	cm4	cm3	cm
21.30	1.80	0.866	1.10	0.53	0.50	0.69
	2.00	0.952	1.21	0.57	0.54	0.69
	2.60	1.20	1.53	0.68	0.64	0.67
	3.20	1.43	1.82	0.77	0.72	0.65
26.90	1.80	1.11	1.42	1.12	0.83	0.89
	2.00	1.23	1.56	1.22	0.91	0.88
	2.30	1.40	1.78	1.36	1.01	0.87
	2.60	1.56	1.98	1.48	1.10	0.86
	3.20	1.87	2.38	1.70	1.27	0.85
33.70	2.00	1.56	1.99	2.51	1.49	1.12
	2.30	1.78	2.27	2.81	1.67	1.11
	2.60	1.99	2.54	3.09	1.84	1.10
	3.20	2.41	3.07	3.60	2.14	1.08
	4.00	2.93	3.73	4.19	2.49	1.06
42.40	2.30	2.27	2.90	5.85	2.76	1.42
	2.60	2.55	3.25	6.46	3.05	1.41
	3.20	3.09	3.94	7.62	3.59	1.39
	3.60	3.44	4.39	8.33	3.93	1.38
	4.00	3.79	4.83	8.90	4.24	1.36
48.30	2.30	2.61	3.32	8.80	3.64	1.63
	2.60	2.93	3.73	9.77	4.05	1.62
	2.90	3.25	4.14	10.70	4.43	1.61
	3.20	3.56	4.53	11.59	4.80	1.60
	3.60	3.97	5.05	12.69	5.25	1.59
	4.00	4.37	5.57	13.77	5.70	1.57
60.30	2.30	3.29	4.19	17.65	5.85	2.05
	2.60	3.70	4.71	19.64	6.51	2.04
	2.90	4.11	5.23	21.59	7.16	2.03
	3.20	4.51	5.74	23.47	7.78	2.02
	3.60	5.03	6.41	25.87	8.58	2.01
	4.00	5.55	7.07	28.15	9.34	2.00
	4.50	6.19	7.89	30.90	10.20	1.98
76.10	2.60	5.24	6.00	40.57	10.66	2.60
	2.90	5.75	6.67	44.74	11.76	2.59
	3.20	6.44	7.33	48.78	12.80	2.58
	3.60	7.11	8.20	54.01	14.20	2.57
	4.50	7.95	10.10	65.12	17.10	2.54
	5.00	8.77	11.16	70.87	18.63	2.52
88.90	2.90	6.15	7.83	72.47	16.30	3.04
	3.20	6.76	8.62	79.21	17.80	3.03
	4.00	8.38	10.70	96.34	21.70	3.00
	5.00	10.30	13.20	116.40	26.20	2.97
	5.40	11.10	14.00	123.80	27.80	2.97
	5.60	11.50	14.65	127.64	28.72	2.95
101.60	3.60	8.70	11.10	133.20	26.20	3.47
	4.00	9.63	12.30	146.20	28.80	3.45
	5.00	11.90	15.20	177.50	34.90	3.42

Outside Diameter	Thickness	Mass	Area of cross Section	Moment of Inertia	Modules of Sections	Radius of Gyration
mm	mm	Kg/m	cm4	cm4	cm3	cm
	3.20	8.77	11.16	172.33	30.15	3.93
	3.60	9.83	12.50	192.00	33.60	3.92
114.30	4.50	12.20	15.50	234.30	41.00	3.89
	5.40	14.50	18.50	274.50	48.00	3.86
	6.30	16.80	21.20	315.00	55.10	3.83
	3.60	12.10	15.38	356.36	51.02	4.81
	4.00	13.40	17.04	392.57	56.20	4.80
	4.50	15.00	19.10	437.20	62.60	4.78
	5.00	16.60	21.20	480.50	68.80	4.77
139.70	5.40	17.90	22.80	514.50	73.70	4.75
	6.30	20.70	26.30	591.00	84.70	4.73
	4.50	16.40	20.90	572.20	75.10	5.23
	5.00	18.20	23.20	629.50	82.60	5.21
152.40	5.40	19.60	24.90	674.50	88.50	5.20
	4.50	17.80	22.70	732.60	88.70	5.68
	5.00	19.70	25.10	806.60	97.70	5.66
	5.40	21.20	27.10	864.70	105.00	5.65
165.10	6.30	24.80	31.40	992.00	120.00	5.63
	4.00	16.20	20.64	696.87	82.81	5.81
	4.50	18.20	23.20	777.20	98.40	5.79
	5.00	20.10	25.70	855.80	102.00	5.78
	5.40	21.70	27.60	917.70	109.00	5.76
	6.30	25.20	32.10	1053.00	125.00	5.73
168.30	7.10	28.20	35.94	1169.66	139.00	5.70
	8.00	31.60	39.70	1288.00	153.00	5.69
	5.00	23.30	29.60	1320.00	136.00	6.67
	5.40	25.10	31.90	1417.00	146.00	6.66
193.70	5.90	27.30	34.80	1536.00	159.00	6.64
	6.30	29.10	37.00	1600.00	165.00	6.60
	8.00	36.60	46.30	2004.00	207.00	6.57
	4.50	23.80	30.32	1746.18	159.40	7.59
	5.00	26.40	33.60	1928.00	176.00	7.57
219.10	5.60	29.50	37.60	2142.00	195.00	7.56
	6.30	33.10	42.00	2404.00	219.00	7.54
	8.00	41.60	52.00	1940.00	268.00	7.52

PHYSICAL PROPERTIES

Grade	Y.S.(Min.) (Mpa)	T.S.(Min) (Mpa)	% age Elongation (Min.)	
			As Welded (less than or equal to 33.7 mm OD)	As Welded (more than or equal to 33.7 mm OD)
WT160	160	310	15	22
WT210	210	330	12	20
WT240	240	410	10	15

TOLERANCE

Outside Diameter upto 25.40 mm	± 0.15 mm
Outside Diameter upto & including 51 mm	± 0.18 mm
Over 51 mm to 76.10 mm	± 0.25 mm
Above 76.10 to 88.90 mm	± 0.31 mm
Above 88.90 to 101.60 mm	± 0.36 mm
Above 101.60 to 114.3mm	± 0.43 mm
Above 114.30 to 152.40 mm	± 0.58 mm
Above 152.40 to 168.30 mm	± 0.65 mm
Above 168.30	± 0.75 mm

Note: 1) Any OD & Thickness not covered in this table may be supplied as per customer requirement (Clause No. -10)

2) The Tolerance of thickness excluding the weld shall be ± 10 %