Carbon Steel Pipes for General Structural Purposes

LIGHT (AA) (MANUFACTURER STANDARD)

Nominal Size		Outside Diameter		Nominal Wall Thickness		Calculated Weight Plain Ends		
		Minimum	Maximum					
in	mm	mm	mm	in	mm	kg/m	kg/ft	lb/ft
½	15	21.0	21.4	0.063	1.6	0.739	0.225	0.496
¾	20	26.4	26.9	0.063	1.6	0.982	0.229	0.659
1	25	33.2	33.8	0.069	1.8	1.364	0.416	0.916
1¼	32	41.9	42.3	0.069	1.8	1.739	0.530	1.167
1½	40	47.8	48.4	0.069	1.8	1.994	0.608	1.339
2	50	59.6	60.2	0.069	1.8	2.503	0.763	1.680
2½	65	75.2	76.0	0.072	1.9	3.368	1.026	2.261
3	80	87.9	88.7	0.080	2.1	4.330	1.320	2.907
3½	90	101.1	102.0	0.080	2.1	5.150	1.570	3.460
4	100	112.2	113.2	0.085	2.2	5.917	1.803	3.972
5	125	138.7	140.6	0.150	4.0	12.364	3.768	8.308
6	150	164.1	166.1	0.150	4.0	15.069	4.593	10.117

Wall Thickness Tolerance= -10%

CARBON STEEL CEMENT LINING PIPES (MANUFACTURER STANDARD)

Outside Diameter	Minimum Nominal Wall Thickness	Outside Diameter		Calculated Weight Plain Ends
		Maximum	Minimum	
mm	mm	mm	mm	kg/m
177.3	3.7	179.1	175.5	17.51
	4.1	179.1	175.5	19.22
232.2	4.1	234.5	229.9	25.32

Carbon Steel Pipes for Scaffolding

JIS G 3444/88 (MANUFACTURER STANDARD)

Nominal Size	Standard Specification	Outside Diameter		Wall Thickness	Weight	Reference			
		Min	Max			Cross Sectional Area	Geometrical Moment of Inertia	Modulus of Section	Radius of Gyration of Area
mm		mm	mm	mm	kg/m	cm^2	cm^4	cm^3	cm
21.7 O/D	STK 290	21.45	21.95	1.20	0.607	0.773	0.407	0.375	0.726
				1.50	0.747	0.952	0.488	0.45	0.716
				1.60	0.793	1.010	0.513	0.473	0.713
				2.00	0.972	1.238	0.607	0.56	0.700
42.7 O/D	STK 400	42.45	42.95	2.30	2.29	2.919	5.97	2.80	1.43
				2.50	2.49	3.157	6.40	3.00	1.42
				2.80	2.76	3.510	7.02	3.29	1.41
48.6 O/D	STK 500	48.35	48.85	2.30	2.63	3.345	8.99	3.70	1.64
				2.50	2.84	3.621	9.65	3.97	1.63
				2.80	3.16	4.029	10.60	4.36	1.62
				3.20	3.58	4.564	11.80	4.86	1.61

Notes:

1) When Wall Thickness < 3.0 mm, tolerance = ±0.3 mm
2) When 3.0 mm ≤ wall thickness > 12 mm, tolerance = ±10%

Steel Pipe Piles

Standard Sizes

In JIS Specifications, the sizes and section properties of steel pipe piles are classified according to two types, as shown in Tables 1 and 2.

Generally speaking, it is most economical to use the outside diameter, the wall thickness, and the pile length best suited for specific design requirements. This is particularly true with large-diameter, heavy-wall and long-length pipe piles. In actuality, however, other factors such as the manufacturing process, production capacity, and method of transport have to be taken into account. Therefore, it is desirable that the manufacturers be consulted for individual projects.

Table 1. Sizes and Section Properties of Steel Pipe Piles

Outside Diameter (mm)	Wall Thickness (mm)	Sectional Area (cm^2)	Unit Weight (kg/m)	Moment of Inertia I (cm^4)	Section Modulus Z (cm^3)	Radius of Gyration i (cm)	External Surface Area (m^2/m)
500	9	138.8	109	418×10^2	167×10	17.4	1.57
500	12	184.0	144	548×10^2	219×10	17.3	1.57
500	14	213.8	168	632×10^2	253×10	17.2	1.57
600	9	167.1	131	728×10^2	243×10	20.9	1.88
600	12	221.7	174	958×10^2	319×10	20.8	1.88
600	14	257.7	202	111×10^3	369×10	20.7	1.88
600	16	293.6	230	125×10^3	417×10	20.7	1.88
700	9	195.4	153	116×10^3	333×10	24.4	2.20
700	12	259.4	204	154×10^3	439×10	24.3	2.20
700	14	301.7	237	178×10^3	507×10	24.3	2.20
700	16	343.8	270	201×10^3	574×10	24.2	2.20

Table 2. Sizes and Section Properties of Steel Pipe Piles

Outside Diameter (mm)	Wall Thickness (mm)	Sectional Area (cm^2)	Unit Weight (kg/m)	Moment of Inertia I (cm^4)	Section Modulus Z (cm^3)	Radius of Gyration i (cm)	External Surface Area (m^2/m)
406.4	9.0	112.4	88.2	222×10^2	109×10	14.0	1.28
406.4	2.0	148.7	117	289×10^2	142×10	14.0	1.28
508.0	9.0	141.1	111	439×10^2	173×10	17.6	1.60
508.0	12.0	187.0	147	575×10^2	227×10	17.5	1.60
508.0	14.0	217.3	171	663×10^2	261×10	17.5	1.60
609.6	9.0	169.8	133	766×10^2	251×10	21.2	19.2
609.6	12.0	225.3	177	101×10^3	330×10	21.1	19.2
609.6	14.0	262.0	206	116×10^3	381×10	21.1	19.2
609.6	16.0	298.4	234	132×10^3	432×10	21.0	19.2
711.2	9.0	198.5	156	122×10^3	345×10	24.8	2.23
711.2	12.0	263.6	207	161×10^3	454×10	24.7	2.23
711.2	14.0	306.6	241	186×10^3	524×10	24.6	2.23
711.2	16.0	349.4	274	211×10^3	594×10	24.6	2.23
812.8	9.0	227.3	178	184×10^3	452×10	28.4	2.55
812.8	12.0	301.9	237	242×10^3	596×10	28.3	2.55
812.8	14.0	351.3	276	280×10^3	690×10	28.2	2.55
812.8	16.0	400.5	314	318×10^3	782×10	28.2	2.55
914.4	12.0	340.2	267	346×10^3	758×10	31.9	2.87
914.4	14.0	396.0	311	401×10^3	878×10	31.8	2.87
914.4	16.0	451.6	354	456×10^3	997×10	31.8	2.87
914.4	19.0	534.5	420	536×10^3	117×10^2	31.7	2.87
1016.0	12.0	378.5	297	477×10^3	939×10	35.5	3.19
1016.0	14.0	440.7	346	553×10^3	109×10^2	35.4	3.19
1016.0	16.0	502.7	395	628×10^3	124×10^2	35.4	3.19
1016.0	19.0	595.1	467	740×10^3	146×10^2	35.2	3.19

Formulas for Section Properties

Formulas for section properties and weights are as follows :-

Weight	$W = 0.02466t\,(D-t)$ kg/m	Radius of gyration	$i = \sqrt{I/A}$ cm
Cross sectional area of steel	$A = \pi \cdot t \cdot (D-t) \times 10^{-3}$ cm^2	Where	D = outside diameter (mm)
Moment of inertia	$I = (\pi/64)(D^4-d^4) \times 10^{-4}$ cm^4		t = wall thickness (mm)
Section modulus	$Z = (\pi/32)(D^4-d^4)/D \times 10^{-3}$ cm^3		d = inside diameter (mm)

Carbon Steel Pipes for Ordinary Piping

JIS G 3452 - 1968 (SGP)

Nominal Size		Outside Diameter		Thickness		Unit weight (plain end)		Test Pressure	
A	B	mm	in	mm	in	lb/ft	kg/m	kg/cm²	Psi
6	1/8	10.5	0.413	2.0	0.079	0.282	0.419	25	360
8	¼	13.8	0.543	2.3	0.090	0.438	0.652	25	360
10	3/8	17.3	0.681	2.3	0.090	0.572	0.851	25	360
15	½	21.7	0.854	2.8	0.110	0.88	1.31	25	360
20	¾	27.2	1.071	2.8	0.110	1.13	1.68	25	360
25	1	34.0	1.338	3.2	0.126	1.63	2.43	25	360
32	1¼	42.7	1.681	3.5	0.138	2.27	3.38	25	360
40	1½	48.6	1.913	3.5	0.138	2.61	3.89	25	360
50	2	60.5	2.382	3.8	0.150	3.57	5.31	25	360
65	2½	76.3	3.004	4.2	0.165	5.02	7.47	25	360
80	3	89.1	3.508	4.2	0.165	5.91	8.79	25	360
90	3½	101.6	4.000	4.2	0.165	6.79	10.1	25	360
100	4	114.3	4.500	4.5	0.177	8.2	12.2	25	360
125	5	139.8	5.504	4.5	0.177	10.1	15.0	25	360
150	6	165.2	6.504	5.0	0.197	13.3	19.8	25	360
175	7	190.7	7.508	5.3	0.209	16.3	24.2	25	360
200	8	216.3	8.516	5.8	0.228	20.2	30.1	25	360
225	9	241.8	9.520	6.2	0.244	24.2	36.0	25	360
250	10	267.4	10.528	6.6	0.260	28.5	42.4	25	360
300	12	318.5	12.539	6.9	0.272	35.6	53.0	25	360
350	14	355.6	14.00	7.9	0.311	45.5	67.7	25	360
400	16	406.4	16.00	7.9	0.311	52.1	77.6	25	360
450	18	457.2	18.00	7.9	0.311	58.7	87.5	25	360
500	20	508.0	20.00	7.9	0.311	65.4	97.4	25	360

Carbon Steel Pipes for Machine Structural Purposes

AVAILABLE IN COLD ROLLED, HOT ROLLED MATERIAL (JIS G 3445-1983-STKM 11A)

Nominal Size	Outside Diameter		Thickness											
		SWG	19				18				17			
		mm	1.0				1.2				1.4			
		in	0.039				0.047				0.065			
mm	in	mm	kg/m	kg/6m	kg/ft	lb/ft	kg/m	kg/6m	kg/ft	lb/ft	kg/m	kg/6m	kg/ft	lb/ft
12	1/2	12.7	0.289	1.734	0.088	0.194	0.340	2.040	0.104	0.229	0.390	2.34	0.119	0.262
16	5/8	15.9	0.368	2.208	0.112	0.247	0.435	2.610	0.133	0.293	0.501	3.006	0.153	0.337
19	3/4	19.1	0.447	2.682	0.136	0.300	0.530	3.180	0.162	0.357	0.611	3.666	0.186	0.410
22	7/8	22.2	0.523	3.138	0.159	0.351	0.622	3.732	0.189	0.417	0.718	4.308	0.219	0.483
25	1	25.4	0.602	3.612	0.183	0.404	0.716	4.296	0.218	0.481	0.829	4.974	0.253	0.558
28	1-1/8	28.6	0.681	4.086	0.208	0.459	0.811	4.866	0.247	0.545	0.939	5.634	0.286	0.631
32	1-1/4	31.8	0.760	4.560	0.232	0.512	0.906	5.436	0.276	0.609	1.050	6.30	0.320	0.706
35	1-3/8	34.9					1.000	6.000	0.304	0.670	1.160	6.96	0.354	0.781
38	1-1/2	38.1					1.092	6.552	0.333	0.734	1.267	7.602	0.386	0.851
41	1-5/8	41.3					1.187	7.122	0.362	0.798	1.378	8.268	0.420	0.926
44	1-3/4	44.5					1.281	7.686	0.391	0.862	1.488	8.928	0.454	1.001
47	1-7/8	47.6					1.373	8.238	0.419	0.924	1.595	9.570	0.486	1.072
50	2	50.8					1.468	8.808	0.447	0.986	1.705	10.230	0.520	1.146
54	2-1/8	54.0					1.563	9.378	0.476	1.049	1.816	10.896	0.554	1.221
57	2-1/4	57.2									1.926	11.556	0.587	1.294
60	2-3/8	60.3									2.033	12.198	0.620	1.367
65	2-1/2	63.5									2.144	12.864	0.653	1.440
80	3	76.2												

Carbon Steel Pipes for Machine Structural Purposes

AVAILABLE IN COLD ROLLED, HOT ROLLED MATERIAL (JIS G 3445-1983-STKM 11A)

Nominal Size	Outside Diameter		Thickness											
			SWG	16				15				14			
			mm	1.6				1.8				2.0			
			in	0.063				0.071				0.079			
mm	in	mm		kg/m	kg/6m	kg/ft	lb/ft	kg/m	kg/6m	kg/ft	lb/ft	kg/m	kg/6m	kg/ft	lb/ft
12	1/2	12.7		0.438	2.628	0.134	0.296	0.484	2.904	0.148	0.326	0.528	3.168	0.161	0.355
16	5/8	15.9		0.564	3.384	0.172	0.379	0.626	3.756	0.191	0.421	0.686	4.116	0.209	0.461
19	3/4	19.1		0.691	4.146	0.211	0.465	0.768	4.608	0.234	0.516	0.844	5.064	0.257	0.567
22	7/8	22.2		0.813	4.878	0.248	0.547	0.906	5.436	0.276	0.609	0.996	5.976	0.304	0.670
25	1	25.4		0.939	5.634	0.286	0.631	1.048	6.288	0.319	0.703	1.154	6.924	0.352	0.776
28	1-1/8	28.6		1.066	6.396	0.325	0.717	1.190	7.140	0.363	0.80	1.312	7.872	0.400	0.882
32	1-1/4	31.8		1.192	7.152	0.363	0.800	1.332	7.992	0.406	0.895	1.470	8.820	0.448	0.988
35	1-3/8	34.9		1.318	7.908	0.402	0.886	1.469	8.814	0.448	0.988	1.623	9.738	0..495	1.091
38	1-1/2	38.1		1.440	8.640	0.439	0.968	1.612	9.672	0.491	1.083	1.781	10.686	0.543	1.197
41	1-5/8	41.3		1.567	9.402	0.478	1.054	1.754	10.524	0.534	1.177	1.938	11.628	0.591	1.303
44	1-3/4	44.5		1.693	10.158	0.516	1.138	1.896	11.376	0.578	1.274	2.096	12.576	0.639	1.409
47	1-7/8	47.6		1.815	10.890	0.553	1.219	2.033	12.198	0.620	1.367	2.249	13.494	0.686	1.512
50	2	50.8		1.942	11.652	0.592	1.305	2.175	13.050	0.663	1.462	2.407	14.442	0.734	1.618
54	2-1/8	54.0		2.068	12.408	0.630	1.389	2.317	13.902	0.706	1.557	2.565	15.390	0.782	1.724
57	2-1/4	57.2		2.194	13.164	0.669	1.475	2.459	14.754	0.750	1.654	2.723	16.338	0.830	1.830
60	2-3/8	60.3		2.316	13.896	0.706	1.557	2.597	15.582	0.792	1.746	2.876	17.256	0.877	1.934
65	2-1/2	63.5		2.443	14.658	0.745	1.642	2.739	16.434	0.835	1.841	3.033	18.198	0.925	2.039
80	3	76.2		2.944	17.644	0.897	1.978	3.303	19.818	1.007	2.220	3.660	21.960	1.116	2.460

The following size is also available upon request:

Nominal Size	Outside Diameter		Thickness				
			mm	1.60			
			in	0.063			
mm	in	mm		kg/m	kg/6m	kg/ft	lb/ft
36	1.417	36		1.357	8.144	0.414	0.912

Carbon Steel Pipes for General Structural Purposes

JIS G 3444-1988-STK 290
JIS G 3444-1988-STK 400
JIS G 3444-1988-STK 500
JIS G 3444-1988-STK 540

Outside Diameter	Wall Thickness	Calculated Weight	Cross-Sectional Area	Geometrical Moment of Inertia	Modulus of Section	Radius of Gyration of Area
mm	mm	kg/mm	cm^2	cm^4	cm^3	cm
21.7	2.0	0.972	1.238	0.607	0.56	0.70
27.2	2.0	1.24	1.583	1.26	0.93	0.89
	2.3	1.41	1.799	1.41	1.03	0.88
34.0	2.3	1.80	2.291	2.89	1.70	1.12
42.7	2.3	2.29	2.919	5.97	2.80	1.43
	2.5	2.49	3.157	6.40	3.00	1.42
	2.8	2.76	3.510	7.02	3.29	1.41
48.6	2.3	2.63	3.345	8.99	3.70	1.64
	2.5	2.84	3.621	9.65	3.97	1.63
	2.8	3.16	4.029	10.6	4.36	1.62
	3.2	3.58	4.564	11.8	4.86	1.61
60.5	2.3	3.30	4.205	17.8	5.90	2.06
	3.2	4.52	5.760	23.7	7.84	2.03
	4.0	5.57	7.100	28.5	9.41	2.00
76.3	2.8	5.08	6.465	43.7	11.5	2.60
	3.2	5.77	7.349	49.2	12.9	2.59
	4.0	7.13	9.085	59.5	15.6	2.56
89.1	2.8	5.96	7.591	70.7	15.9	3.05
	3.2	6.78	8.636	79.8	17.9	3.04
	4.0	8.39	10.69	97.0	21.8	3.01
101.6	3.2	7.76	9.892	120	23.6	3.48
	4.0	9.63	12.26	146	28.8	3.45
	5.0	11.90	15.17	177	34.9	3.42
114.3	3.2	8.77	11.17	172	30.2	3.93
	3.6	9.83	12.52	192	33.6	3.92
	4.5	12.20	15.52	234	41.0	3.89
	5.6	15.00	19.12	283	49.6	3.85
139.8	3.6	12.10	15.40	357	51.1	4.82
	4.0	13.40	17.07	394	56.3	4.80
	4.5	15.00	19.13	438	62.7	4.79
	6.0	19.80	25.22	566	80.9	4.74
165.2	4.5	17.80	22.72	734	88.9	5.68
	5.0	19.80	25.16	808	97.8	5.67
	6.0	23.60	30.01	952	115	5.63
	7.0	27.30	34.79	1,090	132	5.60
190.7	4.5	20.70	26.32	1,140	120	6.59
	5.0	22.90	29.17	1,260	132	6.57
	6.0	27.30	34.82	1,490	156	6.53
	7.0	31.70	40.40	1,710	179	6.50
216.3	4.5	23.50	29.94	1,680	155	7.49
	6.0	31.10	39.64	2,190	203	7.44
	7.0	36.10	46.03	2,520	233	7.40

Applicable Tolerances:
- Thickness: Under 3 mm ± 0.3 mm; 3 mm and over to 8 mm ± 10%
- Outside Diameter: Under 50 mm ± 0.25 mm; 50 mm or over ± 0.5%

BRITISH STANDARD STEEL TUBES FOR SCAFFOLDING (BS 1139: SECTION 1.1: 1990)

Outside Diameter	Wall Thickness	Calculated Weight	Cross-Sectional Area	Second Moment of Inertia	Section Modulus	Radius of Gyration of Area	Plastic Modulus
mm	mm	kg/m	cm^2	cm^4	cm^3	cm	cm^3
48.30	4.00	4.37	5.57	13.80	5.70	1.57	7.87

Applicable Tolerances : Thickness ± 10%
Outside Diameter ± 0.50 mm

BRITISH STANDARD GALVANIZED STEEL CONDUIT (BS 31-1940 CLASS B SCREWED)

Nominal Size		Outside Diameter				Thickness				Calculated Weight with Coupler			No. of Threads	Length of Threads			
		Nominal		Minimum		Nominal		Minimum						Maximum		Minimum	
in	mm	in	mm	in	mm	in	mm	in	mm	kg/m	kg/ft	lb/ft	per inch	in	mm	in	mm
¾	19	0.75	19.05	0.7387	18.76	0.064	1.63	1.52	0.060	0.713	0.217	0.479	16	0.5625	14.3	0.500	12.7
1	25	1.00	25.40	0.9887	25.11	0.064	1.63	1.52	0.060	0.972	0.296	0.653	16	0.6875	17.5	0.625	15.9
1¼	32	1.25	31.75	1.2387	31.46	0.064	1.63	1.52	0.060	1.240	0.376	0.830	16	0.7500	19.1	0.6875	17.5
1½	38	1.50	38.10	1.4880	37.80	0.072	1.83	1.73	0.068	1.680	0.511	1.130	14	0.8125	20.6	0.750	19.1
2	50	2.00	50.80	1.9880	50.50	0.080	2.03	1.93	0.076	2.510	0.765	1.690	14	0.9375	23.8	0.875	22.2

Standard Length 3.81 m (12 ft. 6 in) without coupler

Features:
* Made of hot-dip galvanized steel strip with extra-smooth surface and highly-adherent zinc coating by the unique tube-making process. The weld zone coating restored in-line
* Inside weld bead controlled to a minimum for easier wire pulling
* Screwed on both ends to BS 31 and fitted with a zinc-coated coupler on one end
* Packed in bare bundles, but the unsocketed ends protected with plastic caps
* Easier to cut, thread, bend and pull. Dimensionally accurate. Uniform quality in every respect.

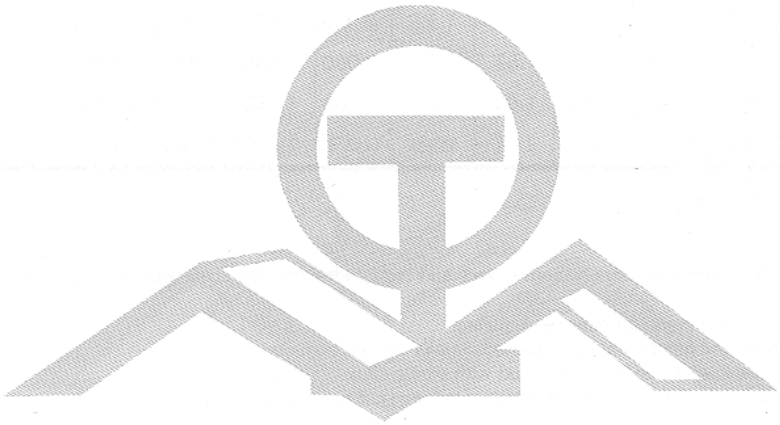
EARTH PIPE - MANUFACTURER STANDARD

Nominal Size		Outside Diameter	Wall Thickness	Weight		
in	mm	mm	mm	kg/m	kg/ft	lb/ft
2	50	60.33	1.60	2.318	0.707	1.559

Standard Length: 4.78 m (16 ft.)

WINDOW PIPE - MANUFACTURER STANDARD

Nominal Size		Outside Diameter	Wall Thickness	Weight		
in	mm	mm	mm	kg/m	kg/ft	lb/ft
0.625	16	15.90	1.20	0.435	0.133	0.293



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