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MAIN PRODUCTS

Our Company manufactures a wide range of quality industrial steel products which are widely accepted by the building and secondary manufacturing industries.

Classification	Specification	Page	Application
Welded Stainless Steel Mechanical / Ornamental Tubing	ASTM A554	4	Architectural application such as hand railing, gates, furniture, display stand etc.
Welded Austenitic Stainless Steel Tubes	ASTM A312	5	Usage in pharmaceutical industries, marine engineering, petrolchemical plant, oil refinery plant, pulp & paper processing line, general food processing line etc.
Austenitic Stainless Steel Butt-Welded Fittings	ASTM A403	6	For joining of industrial tubes.
Carbon Steel Tubes for Ordinary Uses, Water Piping and Structural Purposes	BS 1387 JIS G3452	7 - 8 9	For bicycles, vehicles, agricultural application, civil engineering, steel towers, furniture, mining industry, etc.
ERW Steel Tubes for Cement Lined Pipes	MS 1968/BS EN 10224	9	Industrial water, irrigation & agriculture water, sewage & drainage piping, etc.
Carbon Steel Tubes for General Structural Purposes (AA Pipes)	Manufacturer Standard	10	Ordinary uses, light structure support, etc.
Square and Rectangular Hollow Sections	ASTM A500	11 - 14	Buildings, bicycles, vehicles, machineries, lamp post, hand rails, furniture pipes, structures and all other supports, etc.

WELDED STAINLESS STEEL TUBES & FITTINGS

TYPE OF STAINLESS STEEL: CHARACTERISTICS & APPLICATIONS

Classification	Standard Designation			Characteristics	Major Applications
	JIS	ASTM & AISI	Din		
Standard Type	SUS 304	304	1.4301	Properties such as corrosion resistance, heat resistance, workability and weldability are excellent and well-balanced. Stainless steel most easy to use.	General home appliances, chemical industry, architecture and decorative uses.
(NI-Based)	SUS 304L	304L	1.4306	Excellent in grain boundary corrosion resistance and suited for work which permits no heat treatment after welding	Oil refining, chemical and nuclear power industries.
Improved Corrosion	SUS 316	316	1.4401	Better corrosion resistance than that of 304 against sea water and other media.	Chemical, pulp, photography and food processing facilities.
Resistance Type (NI-Based)	SUS 316L	316L	1.4404	Carbon content is reduced compared with 316, thereby adding grain boundary corrosion resistance to characteristics of 316.	Machinery and equipment chemical industry

CHEMICAL COMPOSITION

Standard Specification	Grades Available	Carbon (% max)	Manganese (% max)	Phosphorous (% max)	Sulphur (% max)	Silicon (% max)	Nickel (%)	Chromium (%)	Molybdenum (%)
ASTM A312	TP 304	0.080	2.00	0.045	0.030	1.00	8.00-11.00	18.00-20.00	
	TP 304L	0.035	2.00	0.045	0.030	1.00	8.00-13.00	18.00-20.00	
	TP 316	0.080	2.00	0.045	0.030	1.00	10.00-14.00	16.00-18.00	2.00-3.00
	TP 316L	0.035	2.00	0.045	0.030	1.00	10.00-14.00	16.00-18.00	2.00-3.00
ASTM A554	MT 304	0.080	2.00	0.045	0.030	1.00	8.00-11.00	18.00-20.00	
	MT 304L	0.035	2.00	0.045	0.030	1.00	8.00-13.00	18.00-20.00	
	MT 316	0.080	2.00	0.045	0.030	1.00	10.00-14.00	16.00-18.00	2.00-3.00
	MT 316L	0.035	2.00	0.045	0.030	1.00	10.00-14.00	16.00-18.00	2.00-3.00
ASTM A403	WP 304	0.080	2.00	0.045	0.030	1.00	8.00-11.00	18.00-20.00	
	WP 304L	0.035	2.00	0.045	0.030	1.00	8.00-13.00	18.00-20.00	
	WP 316	0.080	2.00	0.045	0.030	1.00	10.00-14.00	16.00-18.00	2.00-3.00
	WP 316L	0.035	2.00	0.045	0.030	1.00	10.00-14.00	16.00-18.00	2.00-3.00

MECHANICAL PROPERTIES

Standard Specification	Grades Available	Tensile Strength min (N/mm ²)	Yield Strength min (N/mm ²)	Elongation 2in or 50mm min %
ASTM A312	TP 304	515	205	35
	TP 304L	485	170	35
	TP 316	515	205	35
	TP 316L	485	170	35
ASTM A554	MT 304	515	205	35
	MT 304L	485	170	35
	MT 316	515	205	35
	MT 316L	485	170	35
ASTM A403	WP 304	515	205	35
	WP 304L	485	170	35
	WP 316	515	205	35
	WP 316L	485	170	35

WELDED STAINLESS STEEL MECHANICAL/ ORNAMENTAL TUBING

ASTM A554

Round Tube				
Size (Outside Diameter)		Weight (kg/m)		
		Nominal Wall Thickness (mm)		
in	mm	1.0	1.2	1.5
1/2	12.7	0.291	0.343	0.418
5/8	15.9	0.371	0.439	0.538
3/4	19.1	0.451	0.534	0.657
7/8	22.2	0.528	0.627	0.773
1	25.4	0.608	0.723	0.892
1 1/4	31.8	0.767	0.914	1.131
1 1/2	38.1	0.924	1.102	1.366
2	50.8	1.241	1.481	1.841
2 1/2	63.5	1.557	1.861	2.315
3	76.2	1.873	2.242	2.789
4	101.6	2.506	3.001	3.737

Square Tube				
Size (Outside Diameter)		Weight (kg/m)		
		Nominal Wall Thickness (mm)		
in	mm	1.0	1.2	1.5
1/2	12.7	0.371	0.437	0.532
3/4	19.1	0.574	0.681	0.837
1	25.4	0.773	0.920	1.136
1 1/4	31.8	0.976	1.164	1.440
1 1/2	38.1	1.176	1.403	1.740
2	50.8	1.578	1.886	2.343

Rectangular Tube				
Size (Outside Diameter)		Weight (kg/m)		
		Nominal Wall Thickness (mm)		
in	mm	1.0	1.2	1.5
1 x 1/2	25.4 x 12.7	0.572	0.679	0.834
1 1/2 x 3/4	38.1 x 19.1	0.875	1.042	1.288
1 1/2 x 1	38.1 x 25.4	0.974	1.162	1.438
2 x 1	50.8 x 25.4	1.176	1.403	1.740

WELDED AUSTENITIC STAINLESS STEEL TUBES

ASTM A312

Nominal Size	Outside Diameter	Schedule 10S			Schedule 40S		
		Nominal Wall Thickness	Weight		Nominal Wall Thickness	Weight	
			TP 304/ TP 304L	TP 316/ TP 316L		TP 304/ TP 304L	TP 316/ TP 316L
in	mm	mm	kg/m	kg/m	mm	kg/m	kg/m
1/2	21.34	2.11	1.01	1.02	2.77	1.28	1.29
3/4	26.67	2.11	1.29	1.30	2.87	1.70	1.71
1	33.40	2.77	2.11	2.13	3.38	2.53	2.54
1 1/4	42.16	2.77	2.72	2.74	3.56	3.42	3.45
1 1/2	48.26	2.77	3.14	3.16	3.68	4.09	4.11
2	60.33	2.77	3.97	4.00	3.91	5.50	5.53
2 1/2	73.03	3.05	5.32	5.35	5.16	8.72	8.78
3	88.90	3.05	6.52	6.56	5.49	11.41	11.48
4	114.30	3.05	8.45	8.51	6.03	16.24	16.34
5	141.30	3.40	11.68	11.75	6.55	21.99	22.13
6	168.28	3.40	13.96	14.05	7.11	28.54	28.73
8	219.08	3.76	20.17	20.30	8.18	42.97	43.25

PERTINENT EXCERPTS FROM ASTM A312 SPECIFICATION

Applicable Standards	Outside Diameter (mm)	Tolerance (mm)
Outside Diameter	21.34 to 48.26	-0.80, + 0.40
	60.33 to 114.30	-0.80, + 0.80
	114.30 to 219.08	-0.80, + 1.60
Wall Thickness	Not less than 12.5% of nominal wall thickness	
Length	Outside diameter : 203 mm or less Length : 7320 mm or shorter, -0.00 + 6.00 mm Other : As per mutual negotiation	

AUSTENITIC STAINLESS STEEL BUTT-WELDED FITTINGS

ASTM A403

(weight: kg/pc)

Nominal Size	90° Elbow		45° Elbow		Cap		Equal Tee	
	Long Radius		Long Radius					
in	10S	40S	10S	40S	10S	40S	10S	40S
1/2	0.060	0.075	0.030	0.038	0.032	0.040	0.090	0.120
3/4	0.060	0.075	0.030	0.037	0.040	0.050	0.120	0.160
1	0.140	0.160	0.100	0.120	0.090	0.110	0.280	0.300
1 1/4	0.240	0.260	0.140	0.170	0.110	0.140	0.450	0.490
1 1/2	0.280	0.350	0.180	0.200	0.140	0.180	0.590	0.750
2	0.460	0.660	0.310	0.400	0.190	0.240	0.800	0.960
2 1/2	0.800	1.300	0.450	0.700	0.240	0.350	1.180	1.950
3	1.200	2.150	0.650	1.100	0.400	0.700	1.550	2.800
4	2.000	4.000	1.050	1.950	0.580	1.200	2.450	4.650
5	3.420	6.480	1.710	3.240	1.000	1.800	3.450	6.540
6	5.250	9.940	2.430	4.970	1.600	2.800	5.020	10.000
8	10.000	20.100	5.010	10.100	2.500	5.400	8.910	17.900

(weight: kg/pc)

Nominal Size	Reducing Tee		Concentric & Eccentric Reducer	
	10S	40S	10S	40S
3/4 x 1/2	0.130	0.230	0.050	0.060
1 x 1/2	0.250	0.400	0.100	0.110
1 x 3/4	0.270	0.420	0.100	0.110
1 1/4 x 1/2	0.480	0.680	0.130	0.150
1 1/4 x 3/4	0.500	0.680	0.130	0.150
1 1/4 x 1	0.520	0.680	0.140	0.160
1 1/2 x 1/2	0.600	0.910	0.165	0.210
1 1/2 x 3/4	0.640	0.970	0.175	0.220
1 1/2 x 1	0.660	0.990	0.180	0.230
1 1/2 x 1 1/4	0.680	1.020	0.190	0.250
2 x 3/4	0.620	1.470	0.260	0.360
2 x 1	0.760	1.590	0.270	0.380
2 x 1 1/4	0.780	1.630	0.280	0.390
2 x 1 1/2	0.820	1.700	0.290	0.400
2 1/2 x 1	1.130	2.270	0.420	0.630
2 1/2 x 1 1/4	1.190	2.380	0.430	0.640
2 1/2 x 1 1/2	1.240	2.490	0.440	0.650
2 1/2 x 2	1.360	2.720	0.460	0.680
3 x 1	-	-	0.510	0.850
3 x 1 1/4	1.640	2.840	0.520	0.860
3 x 1 1/2	1.660	2.840	0.530	0.880
3 x 2	1.700	2.950	0.550	0.910
3 x 2 1/2	1.770	3.060	0.560	0.940

(weight: kg/pc)

Nominal Size	Reducing Tee		Concentric & Eccentric Reducer	
	10S	40S	10S	40S
4 x 1 1/2	2.440	5.030	0.750	1.300
4 x 2	2.460	5.080	0.780	1.350
4 x 2 1/2	2.470	5.130	0.810	1.400
4 x 3	2.540	5.260	0.830	1.500
4 x 3 1/2	2.590	5.350	0.850	1.600
5 x 2	4.900	8.620	1.050	2.260
5 x 2 1/2	5.030	8.850	1.180	2.370
5 x 3	5.170	9.070	1.300	2.480
5 x 3 1/2	5.310	9.300	1.350	2.580
5 x 4	5.440	9.530	1.400	2.700
6 x 2	-	-	1.500	3.200
6 x 2 1/2	7.120	14.520	1.600	3.300
6 x 3	7.260	14.740	1.700	3.400
6 x 3 1/2	7.350	14.970	1.800	3.450
6 x 4	7.480	15.200	1.900	3.500
6 x 5	7.710	15.650	1.950	3.700
8 x 3 1/2	10.610	23.000	2.680	5.000
8 x 4	10.840	23.450	2.780	5.000
8 x 5	11.110	24.040	2.960	5.400
8 x 6	11.340	24.490	3.080	5.900

BS 1387 : 1985 LIGHT, MEDIUM, HEAVY

GENERAL INFORMATION ON BS 1387 : WELDED STEEL TUBE

DESCRIPTION	BS 1387 : 1985 welded steel tube is produced in three thickness classes - Light, Medium and Heavy - available in black finished or hot dipped galvanized finished in 6 meter uniform mill lengths.								
APPLICATIONS	For ordinary conveyance of steam, gas, air, water, etc.								
END FINISH AND END PROTECTION	Plain-end square-cut (PE) or threaded and fixed with coupling (T/C). (PE) tubes are shipped without any protection on both ends. T/C tubes are supplied screwed with taper threads to BS 21 and fitted with one taper-threaded malleable iron socket, as required under this specifications.								
IDENTIFICATION MARKING	Tubes are marked by colour bands about 50 mm wide, painted about 300 mm from each end, as follow : Light tubes-Brown Medium tubes-Blue Heavy tubes-Red								
PERTINENT EXCERPTS FROM BS 1387 : 1985 SPECIFICATION									
CHEMICAL COMPOSITION	The chemical composition of the steel, by ladle analysis, shall comply with the table below : C max. Mn max. P max. S max. 0.20% 1.20% 0.045% 0.045%								
MECHANICAL PROPERTIES	The mechanical properties at room temperature shall be given as table below : Tensile strength (N/ mm ²) : 320 to 460 Yield strength (N/ mm ²) : 195 min. Elongation on gauge length $L_0 = 5.65 \sqrt{S_0}$ (%) : 20 min.								
TOLERANCES ON DIMENSION AND MASS	Outside Diameter : As shown in table on following page. Wall Thickness : Light tubes - 8% Medium and heavy tubes - 10% Mass : The mean consignment mass for quantities of DN 150 mm and over of one size shall not deviate more than $\pm 4\%$ from the mass of consignment calculated from the mass given in table as appropriate. No single tube shall deviate by more than = 10%, - 8% from the mass given in table as appropriate.								
BEND TEST	Black tubes up to and including DN 50 mm shall be bent cold without any signs of fracture or failure, through 180 degrees round a former having a radius at the bottom of the groove equal to six times the outside diameter of the tube as given in table. Hot-dip-zinc coated tubes shall be bent cold without cracking the steel, through 90° round a former having a radius at the bottom of the groove equal to eight times the outside diameter of the tube.								
FLATTENING TEST	The flattening test applies to tubes greater than DN 50 mm. A ring not less than 40 mm in length taken from one end of each selected tube shall be flattened cold between parallel flat platens without showing either crack or flaw until the distance between the platens, measured under load, is not greater than 75% of original outside diameter of the tube, and no cracks or flaws in the metal elsewhere than in the weld shall occur until the distance between the platens is less than 60% of original diameter. The weld shall be placed at 90 degrees to the direction of flattening.								
LEAK TIGHTNESS TEST	The test shall be either a hydraulic test at a pressure of 50 bar ($50 \times 10 \text{ N/ M}^2$), or, alternatively, an eddy current test.								
HOT-DIP ZINC COATING TEST (IF REQUIRED)	After the four successive one-minute immersions in the copper-sulphate solution, the test sample shall not show any adherent red deposits of metallic copper.								
BORE TEST FOR HOT-DIP COATED TUBES	Hot-dip zinc coated tubes up to and including DN 25mm shall have a rod 230 mm in length, of the appropriate diameter specified below, passed through them and shall have a free bore. Rod diameters <table style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th style="text-align: center;"><u>Nonimal size (DN)</u></th> <th style="text-align: center;"><u>Diameter of rod (mm)</u></th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">15mm</td> <td style="text-align: center;">9.5</td> </tr> <tr> <td style="text-align: center;">20mm</td> <td style="text-align: center;">14.3</td> </tr> <tr> <td style="text-align: center;">25mm</td> <td style="text-align: center;">20.6</td> </tr> </tbody> </table>	<u>Nonimal size (DN)</u>	<u>Diameter of rod (mm)</u>	15mm	9.5	20mm	14.3	25mm	20.6
<u>Nonimal size (DN)</u>	<u>Diameter of rod (mm)</u>								
15mm	9.5								
20mm	14.3								
25mm	20.6								

CARBON STEEL TUBES FOR ORDINARY PIPING

JIS G3452 : 1997

Tolerances

Wall Thickness : + not limited
- 12.5%

Outside Diameter : as shown in table

Nominal Size		Outside Diameter		Wall Thickness		Weight (Plain End)					Test Pressure		Bundling
in	mm	in	mm	in	mm	lb/ft	lb/20ft	kg/ft	kg/m	kg/6m	Bar	Psi	Pieces
7	175	7.508	190.7	0.209	5.3	16.3	326	7.38	24.2	145.2	25	360	10
8	200	8.516	216.3	0.228	5.8	20.2	404	9.17	30.1	180.6	25	360	10
9	225	9.520	241.8	0.244	6.2	24.2	484	11.0	36.0	216.0	25	360	10
10	250	10.528	267.4	0.220	6.0	24.2	484	10.9	35.9	215.4	25	360	10
10	250	10.528	267.4	0.260	6.6	28.5	570	12.9	42.4	254.4	25	360	10
12	300	12.539	318.5	0.272	6.9	35.6	712	16.2	53.0	318.0	25	360	5
14	350	14.000	355.6	0.311	7.9	45.5	910	20.6	67.7	406.2	25	360	5
16	400	16.000	406.4	0.311	7.9	52.1	1042	23.7	77.6	465.6	25	360	5

ERW STEEL TUBES FOR CEMENT LINED PIPES

MS 1968 : 2007 / BS EN 10224 : 2002

Tolerances

Wall Thickness & Outside Diameter as shown in table :

Outside Diameter	Minimum Wall Thickness	Outside Diameter		Calculated Weight Plain Ends
		Maximum	Minimum	
mm	mm	mm	mm	kg/m
114.3	3.6	115.4	113.2	9.83
168.3	3.6	170.0	166.6	14.62
219.1	4.0	221.3	216.9	21.22
273.0	4.0	275.0	271.0	26.53
323.9	4.0	326.3	321.5	31.55
355.6	4.5	358.3	352.9	38.96

CARBON STEEL TUBES FOR GENERAL STRUCTURE PURPOSES (AA PIPES)

MANUFACTURER STANDARD

Tolerances

Wall Thickness : +/- 10%

Outside Diameter : as shown in table

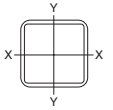
Nominal Size		Outside Diameter				Wall Thickness		Calculated Weight Plain Ends			Bundling
		Maximum		Minimum							
in	mm	in	mm	in	mm	in	mm	kg/m	kg/ft	lb/ft	Pieces
1/2	15	0.84	21.4	0.83	21.0	0.063	1.6	0.773	0.236	0.520	127
3/4	20	1.06	26.9	1.04	26.4	0.063	1.6	0.990	0.302	0.666	127
1	25	1.33	33.8	1.31	33.2	0.071	1.8	1.405	0.428	0.944	127
1 1/4	32	1.67	42.5	1.65	41.9	0.071	1.8	1.791	0.546	1.270	61
1 1/2	40	1.90	48.4	1.88	47.8	0.071	1.8	2.053	0.626	1.204	61
2	50	2.30	60.2	2.35	59.6	0.071	1.8	2.579	0.786	1.733	61
2 1/2	65	2.99	76.0	2.96	75.2	0.071	1.8	3.276	0.999	2.202	37
3	80	3.49	88.7	3.46	87.9	0.071	1.8	3.840	1.170	2.579	19
3 1/2	90	3.98	102.0	3.95	100.3	0.083	2.1	5.106	1.556	3.430	19
4	100	4.48	113.9	4.45	113.0	0.083	2.1	5.764	1.757	3.874	19
5	125	5.53	140.6	5.46	138.7	0.157	4.0	13.400	4.080	8.990	10
6	150	6.54	166.1	6.46	164.1	0.157	4.0	15.900	4.850	10.700	10

SQUARE & RECTANGULAR HOLLOW SECTIONS

ASTM A500 SPECIFICATION

SURFACE FINISH	The products are supplied in unpickled and oiled condition. Primer or varnish undercoat finish is available upon request.		
STANDARD MILL LENGTH	Square & Rectangular Tubes are supplied in 6 meter length. Special length can be arranged upon request.		
	PERTINENT EXCERPTS FROM ASTM A500 SPECIFICATION		
CHEMICAL COMPOSITION (Heat Analysis)	C <u>max(%)</u>	S <u>max(%)</u>	P <u>max(%)</u>
Grade A	0.26	0.05	0.04
Grade B	0.26	0.05	0.04
MECHANICAL PROPERTIES	Tensile Strength <u>(N/mm²)</u>	Yield Strength <u>(N/mm²)</u>	Elongation <u>(%)</u>
Grade A	310 (min)	269 (min)	25 (min)
Grade B	400 (min)	317 (min)	23 (min)
TOLERANCES IN OUTSIDE DIAMETER	<u>Largest Outside Dimension in (mm)</u>		<u>Tolerances, plus & minus, in (mm)</u>
	2 1/2 (63.5) and under		: 0.020 (0.50)
	Over 2 1/2 to 3 1/2 (63.5 to 88.9), incl.		: 0.025 (0.64)
	Over 3 1/2 to 5 1/2 (88.9 to 139.7), incl.		: 0.030 (0.76)
	Over 5 1/2 (139.7)		: 1%
TOLERANCES IN WALL THICKNESS	Plus and minus 10% of nominal thickness, exclusive of weld area.		
TOLERANCES IN LENGTH	Plus 2 inches on standard length.		
TOLERANCES IN STRAIGHTNESS	1/8 in x $\frac{\text{Total Length(ft)}}{5}$		
SQUARENESS OF SIDES	Adjacent sides of tube may deviate from 90 degrees by plus or minus 2 degrees.		
RADIUS OF CORNERS	The radius of any outside corner of the section shall not exceed 3 times the specified wall thickness.		
TOLERANCES IN TWIST	Largest Outside Dimension <u>in (mm)</u>	Maximum Twist in 3ft <u>in (mm)</u>	
	1 1/2 (38.1) and under	0.050 (1.27)	
	Over 1 1/2 to 2 1/2 (38.1 to 63.5), incl.	0.062 (1.57)	
	Over 2 1/2 to 4 (63.5 to 101.6), incl.	0.075 (1.90)	
	Over 4 to 6 (101.6 to 152.4), incl.	0.087 (2.20)	
	Over 6 to 8 (152.4 to 203.2), incl.	0.100 (2.54)	
	Over 8 (203.2)	0.112 (2.84)	

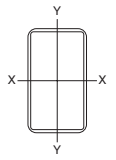
SQUARE HOLLOW SECTIONS



ASTM A500 / MANUFACTURER STANDARD

Nominal Size		Wall Thickness		Unit Weight				Area of Metal	Moment of Inertia I	Section Modulus Z	Radius of Gyration r	Bundling
in	mm	in	mm	lb/ft	kg/ft	kg/m	kg/6m	in ²	in ⁴	in ³	in	Pieces
1/2 x 1/2	12.7 x 12.7	0.039	1.0	0.240	0.109	0.357	2.142	0.070	0.002	0.009	0.188	225
		0.047	1.2	0.272	0.123	0.404	2.424	0.082	0.002	0.010	0.180	225
		0.063	1.6	0.364	0.165	0.541	3.246	0.102	0.003	0.012	0.173	225
5/8 x 5/8	15.9 x 15.9	0.039	1.0	0.306	0.139	0.456	2.736	0.090	0.005	0.016	0.239	225
		0.047	1.2	0.353	0.160	0.525	3.150	0.106	0.005	0.018	0.231	225
		0.063	1.6	0.472	0.214	0.702	4.212	0.134	0.006	0.021	0.223	225
3/4 x 3/4	19.1 x 19.1	0.039	1.0	0.373	0.169	0.555	3.330	0.110	0.009	0.024	0.290	225
		0.047	1.2	0.434	0.197	0.646	3.876	0.140	0.011	0.030	0.288	225
		0.063	1.6	0.580	0.263	0.863	5.178	0.186	0.014	0.037	0.282	225
1 x 1	25.4 x 25.4	0.039	1.0	0.505	0.229	0.752	4.512	0.149	0.022	0.045	0.392	100
		0.047	1.2	0.593	0.269	0.883	5.296	0.173	0.026	0.051	0.385	100
		0.063	1.6	0.770	0.350	1.150	6.900	0.226	0.032	0.064	0.376	100
		0.091	2.3	1.050	0.470	1.540	9.240	0.308	-	-	-	100
		0.120	3.0	1.296	0.588	1.929	11.574	0.385	0.047	0.094	0.350	100
1 1/4 x 1 1/4	31.8 x 31.8	0.047	1.2	0.754	0.342	1.122	6.733	0.220	0.052	0.084	0.487	100
		0.063	1.6	0.983	0.446	1.463	8.778	0.290	0.066	0.106	0.479	100
		0.091	2.3	1.357	0.616	2.020	12.120	-	-	-	-	100
		0.120	3.0	1.698	0.770	2.527	15.162	0.505	0.103	0.165	0.452	100
1 1/2 x 1 1/2	38.1 x 38.1	0.047	1.2	0.915	0.415	1.362	8.172	0.288	0.093	0.124	0.590	100
		0.063	1.6	1.200	0.544	1.785	10.710	0.384	0.120	0.159	0.581	100
		0.091	2.3	1.666	0.756	2.480	14.880	-	-	-	-	100
		0.120	3.0	2.100	0.953	3.125	18.750	0.626	0.192	0.260	0.554	100
2 x 2	50.8 x 50.8	0.063	1.6	1.626	0.738	2.424	14.544	0.480	0.300	0.300	0.786	49
		0.091	2.3	2.282	1.035	3.396	20.377	0.689	0.410	0.410	0.777	49
		0.120	3.0	2.904	1.317	4.322	25.932	0.870	0.494	0.494	0.756	49
		0.125	3.2	3.060	1.390	4.560	27.360	0.893	0.508	0.508	0.756	49
		0.156	4.0	3.700	1.680	5.510	33.060	1.088	0.589	0.589	0.740	49
2 1/2 x 2 1/2	63.5 x 63.5	0.091	2.3	2.898	1.315	4.313	25.878	0.860	0.820	0.656	0.976	25
		0.120	3.0	3.708	1.682	5.518	33.111	1.110	1.020	0.820	0.961	25
		0.125	3.2	3.910	1.770	5.810	34.860	1.150	1.053	0.840	0.958	25
		0.156	4.0	4.760	2.160	7.090	42.540	1.400	1.241	0.993	0.942	25
3 x 3	76.2 x 76.2	0.091	2.3	3.515	1.594	5.231	31.387	1.030	1.440	0.960	1.190	20
		0.120	3.0	4.511	2.046	6.714	40.281	1.346	1.830	1.220	1.170	20
		0.125	3.2	4.790	2.173	7.129	42.772	1.400	1.890	1.260	1.163	20
		0.156	4.0	5.820	2.640	8.660	51.960	1.711	2.251	1.500	1.147	20
4 x 4	101.6 x 101.6	0.120	3.0	6.210	2.810	9.230	55.380	1.830	4.530	2.270	1.580	20
		0.125	3.2	6.505	2.951	9.681	58.086	1.902	4.700	2.344	1.572	20
		0.156	4.0	7.950	3.600	11.810	70.900	2.340	5.660	2.830	1.556	20
		0.177	4.5	8.945	4.057	13.312	79.874	2.630	6.280	3.140	1.550	20
		0.236	6.0	11.614	5.268	17.285	103.708	3.390	7.800	3.910	1.520	20
5 x 5	127.0 x 127.0	0.156	4.0	10.100	4.570	15.000	90.000	2.961	11.430	4.571	1.965	9
		0.177	4.5	11.356	5.151	16.901	101.403	3.330	12.700	5.080	1.970	9
		0.236	6.0	14.830	6.727	22.070	132.424	4.340	16.000	6.420	1.920	9
6 x 6	152.4 x 152.4	0.156	4.0	12.200	5.530	18.140	108.840	3.583	20.200	6.730	2.400	9
		0.177	4.5	13.768	6.245	20.490	122.940	4.040	22.500	7.500	2.360	9
		0.236	6.0	18.045	8.185	26.856	161.130	5.280	28.700	9.580	2.330	9

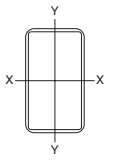
RECTANGULAR HOLLOW SECTIONS



ASTM A500 / MANUFACTURER STANDARD

Nominal Size		Wall Thickness		Unit Weight				Area of Metal	Moment of Inertia in ⁴		Section Modulus in ³		Radius of Gyration in		Bundling
in	mm	in	mm	lb/ft	kg/ft	kg/m	kg/6m	in ²	I _{xx}	I _{yy}	Z _{xx}	Z _{yy}	r _{xx}	r _{yy}	Pieces
1 x 1/2	25.4 x 12.7	0.039	1.0	0.373	0.169	0.555	3.330	0.110	0.014	0.004	0.027	0.018	0.355	0.204	72
		0.047	1.2	0.448	0.203	0.670	4.020	0.131	0.015	0.005	0.031	0.020	0.344	0.198	72
		0.063	1.6	0.580	0.263	0.863	5.178	0.167	0.018	0.006	0.037	0.024	0.335	0.191	72
1 1/2 x 3/4	38.1 x 19.1	0.039	1.0	0.577	0.261	0.858	5.148	0.170	0.499	0.017	0.066	0.045	0.542	0.314	72
		0.047	1.2	0.682	0.309	1.014	6.084	0.201	0.056	0.020	0.075	0.053	0.528	0.313	72
		0.063	1.6	0.900	0.408	1.340	8.040	0.265	0.076	0.025	0.102	0.066	0.520	0.307	72
2 x 1	50.8 x 25.4	0.039	1.0	0.770	0.349	1.150	6.900	0.227	0.120	0.041	0.120	0.082	0.727	0.424	72
		0.047	1.2	0.915	0.415	1.362	8.172	0.288	0.144	0.049	0.144	0.097	0.726	0.422	72
		0.063	1.6	1.200	0.544	1.785	10.710	0.384	0.187	0.062	0.187	0.125	0.720	0.415	72
		0.091	2.3	1.666	0.756	2.480	14.880	0.505	0.257	0.083	0.257	0.167	0.713	0.407	72
		0.120	3.0	2.100	0.953	3.125	18.752	0.626	0.285	0.093	0.285	0.187	0.680	0.390	72
2 1/2 x 1 1/2	63.5 x 38.1	0.063	1.6	1.626	0.738	2.424	14.544	0.480	0.416	0.189	0.333	0.252	0.920	0.620	50
		0.091	2.3	2.282	1.035	3.396	20.377	0.692	0.550	0.248	0.439	0.331	0.912	0.611	50
		0.120	3.0	2.904	1.317	4.322	25.932	0.870	0.685	0.306	0.548	0.409	0.889	0.595	50
3 x 1 1/2	76.2 x 38.1	0.063	1.6	1.860	0.820	2.700	16.221	0.527	0.600	0.209	0.400	0.279	1.070	0.630	50
		0.075	1.9	2.166	0.982	3.224	19.341	0.629	0.720	0.246	0.480	0.328	1.060	0.623	50
		0.091	2.3	2.590	1.175	3.855	23.127	0.762	0.860	0.293	0.573	0.391	1.060	0.620	50
		0.120	3.0	3.306	1.500	4.920	29.521	0.985	1.086	0.364	0.724	0.485	1.050	0.607	50
3 x 2	76.2 x 50.8	0.075	1.9	2.421	1.098	3.603	21.618	0.714	0.880	0.486	0.587	0.486	1.120	0.825	25
		0.091	2.3	2.898	1.315	4.313	25.878	0.863	1.060	0.578	0.707	0.578	1.110	0.818	25
		0.120	3.0	3.708	1.682	5.518	33.111	1.110	1.330	0.707	0.886	0.707	1.097	0.800	25
		0.125	3.2	3.910	1.770	5.810	34.860	1.150	1.372	0.730	0.915	0.730	1.094	0.797	25
		0.156	4.0	4.760	2.160	7.090	42.540	1.400	1.620	0.860	1.080	0.860	1.080	0.782	25
4 x 2	101.6 x 50.8	0.075	1.9	2.930	1.329	4.361	26.163	0.850	1.770	0.612	0.885	0.612	1.440	0.848	20
		0.091	2.3	3.515	1.594	5.231	31.387	1.030	2.140	0.732	1.070	0.732	1.440	0.843	20
		0.120	3.0	4.511	2.046	6.714	40.281	1.346	2.720	0.920	1.360	0.919	1.421	0.830	20
		0.125	3.2	4.790	2.173	7.129	42.772	1.400	2.810	0.950	1.405	0.950	1.420	0.824	20
		0.156	4.0	5.820	2.640	8.660	51.960	1.711	3.350	1.121	1.674	1.121	1.400	0.809	20
		0.177	4.5	6.520	2.950	9.700	58.191	1.920	3.640	1.230	1.840	1.230	1.390	0.803	20
		0.236	6.0	8.560	3.870	12.780	76.678	2.520	4.750	1.540	2.380	1.540	1.370	0.781	20
4 x 3	101.6 x 76.2	0.120	3.0	5.390	2.440	8.020	48.120	1.590	3.630	2.330	1.810	1.550	1.510	1.210	20
		0.125	3.2	5.647	2.561	8.404	50.424	1.651	3.750	2.406	1.874	1.604	1.508	1.209	20
		0.156	4.0	6.880	3.120	10.240	61.420	2.024	4.520	2.900	2.260	1.930	1.500	1.196	20
		0.177	4.5	8.945	4.057	13.312	79.874	2.630	8.630	3.900	3.450	2.600	1.810	1.190	20
		0.236	6.0	10.006	4.539	14.891	89.348	2.940	6.280	3.960	3.140	2.640	1.463	1.160	20

RECTANGULAR HOLLOW SECTIONS (CONT'D)



ASTM A500 / MANUFACTURER STANDARD

Nominal Size		Wall Thickness		Unit Weight				Area of Metal	Moment of Inertia in ⁴		Section Modulus in ³		Radius of Gyration in		Bundling
in	mm	in	mm	lb/ft	kg/ft	kg/m	kg/6m	in ²	I _{xx}	I _{yy}	Z _{xx}	Z _{yy}	r _{xx}	r _{yy}	Pieces
5 x 2	127.0 x 50.8	0.120	3.0	5.390	2.440	8.020	48.120	1.590	4.790	1.140	1.920	1.140	1.740	0.846	20
		0.125	3.2	5.647	2.561	8.404	50.424	1.651	4.960	1.174	1.983	1.174	1.735	0.844	20
		0.156	4.0	6.880	3.120	10.240	61.420	2.024	5.960	1.400	2.383	1.400	1.716	0.830	20
		0.177	4.5	7.739	3.510	11.518	69.105	2.270	6.570	1.520	2.630	1.520	1.700	0.820	20
		0.236	6.0	10.006	4.539	14.891	89.348	2.940	8.390	1.850	3.350	1.850	1.690	0.793	20
5 x 3	127.0 x 76.2	0.120	3.0	6.210	2.810	9.230	55.380	1.830	6.220	2.830	2.490	1.890	1.850	1.250	20
		0.125	3.2	6.505	2.951	9.681	58.086	1.902	6.431	2.923	2.572	1.950	1.841	1.241	20
		0.156	4.0	7.950	3.600	11.810	70.900	2.340	7.765	3.514	3.106	2.342	1.823	1.226	20
		0.177	4.5	8.945	4.057	13.312	79.874	2.630	8.630	3.900	3.450	2.600	1.810	1.220	20
		0.236	6.0	11.614	5.268	17.285	103.708	3.470	11.200	4.980	4.480	3.320	1.790	1.190	20
6 x 2	152.4 x 50.8	0.120	3.0	6.210	2.810	9.230	55.380	1.830	7.640	1.350	2.550	1.350	2.050	0.859	15
		0.125	3.2	6.505	2.951	9.681	58.086	1.902	7.920	1.394	2.640	1.394	2.043	0.857	15
		0.156	4.0	7.950	3.600	11.810	70.900	2.340	9.561	1.661	3.190	1.662	2.023	0.843	15
		0.177	4.5	8.945	4.057	13.312	79.874	2.630	10.500	1.820	3.500	1.820	2.010	0.838	15
		0.236	6.0	11.614	5.268	17.285	103.708	3.470	13.100	2.210	4.360	2.210	1.960	0.818	15
6 x 3	152.4 x 76.2	0.125	3.2	7.320	3.320	10.893	65.357	2.130	10.060	3.440	3.354	2.300	2.165	1.266	15
		0.156	4.0	9.020	4.090	13.424	80.544	2.652	12.200	4.145	4.070	2.763	2.146	1.251	15
		0.177	4.5	10.150	4.604	15.106	90.634	2.980	13.600	4.600	4.530	3.070	2.130	1.240	15
		0.236	6.0	13.222	5.997	19.678	118.066	3.870	17.000	5.720	5.670	3.870	2.100	1.220	15
6 x 4	152.4 x 101.6	0.156	4.0	10.100	4.570	15.000	90.000	2.961	14.860	7.962	4.960	3.981	2.241	1.640	12
		0.177	4.5	11.356	5.151	16.901	101.403	3.330	16.500	8.870	5.500	4.440	2.230	1.630	12
		0.236	6.0	14.830	6.727	22.070	132.424	4.340	21.000	11.100	7.000	5.550	2.200	1.600	12
8 x 4	203.2 x 101.6	0.156	4.0	12.200	5.530	18.140	108.840	3.583	30.000	10.270	7.500	5.134	2.900	1.700	12
		0.177	4.5	13.768	6.245	20.490	122.940	4.040	32.000	10.900	8.120	5.550	2.890	1.690	12
		0.236	6.0	18.045	8.185	26.856	161.130	5.210	40.800	13.900	10.400	7.020	2.820	1.660	12