

SQUARE HOLLOW SECTION

Product Range
12mm X 12mm to 300mm X 300mm

Thickness
1mm to 12mm



SQUARE HOLLOW SECTION (SHS) | S : 4923 : 2017/EN 10219-1 : 2006*/ASTM A-500

Dimension	Weight kg/m	Area cm ²	Moment of Inertia		Radius of Gyration		Elastic Modulus			Plastic Modulus			Torsional Constants				
			I _x cm ⁴	I _y cm ⁴	R _{xx} cm	R _{yy} cm	Z _{xx} cm ³	Z _{yy} cm ³	S _{xx} cm ³	S _{yy} cm ³	J _x cm ⁴	J _y cm ⁴	J _z cm ⁴	C _x cm ³	C _y cm ³	C _z cm ³	
12X12X1.6	0.47	0.60	0.10	0.10	0.41	0.41	0.17	0.17	0.19	0.22	0.22	0.12	0.12	0.18			
12X12X2.0	0.55	0.70	0.11	0.11	0.40	0.40	0.19	0.19	0.25	0.25	0.25	0.07	0.07	0.13			
15X15X1.6	0.62	0.79	0.23	0.23	0.54	0.54	0.31	0.31	0.39	0.39	0.32	0.32	0.32	0.38			
15X15X2.0	0.74	0.94	0.25	0.25	0.52	0.52	0.34	0.34	0.44	0.44	0.44	0.28	0.28	0.35			
15X15X2.2	0.79	1.00	0.25	0.25	0.50	0.50	0.34	0.34	0.46	0.46	0.46	0.24	0.24	0.32			
20X20X1.6	0.87	1.11	0.61	0.61	0.74	0.74	0.61	0.61	0.75	0.75	0.95	0.95	0.84	0.84			
20X20X2.0	1.05	1.34	0.69	0.69	0.72	0.72	0.69	0.69	0.88	0.88	1.01	0.90	0.90	0.90			
20X20X2.2	1.13	1.44	0.73	0.73	0.71	0.71	0.73	0.73	0.93	0.93	1.00	0.90	0.90	0.90			
20X20X2.6	1.29	1.64	0.78	0.78	0.69	0.69	0.89	0.89	1.03	1.03	1.24	1.24	1.24	1.46			
25X25X1.6	1.12	1.43	1.28	1.28	0.95	0.95	0.92	0.92	1.19	1.19	1.47	2.32	1.64	1.64			
25X25X2.0	1.37	1.74	1.48	1.48	0.92	0.92	0.91	0.91	1.26	1.26	1.57	2.40	1.70	1.70			
25X25X2.2	1.48	1.88	1.57	1.57	0.91	0.91	0.89	0.89	1.38	1.38	1.76	2.47	1.76	1.76			
25X25X2.6	1.70	2.16	1.72	1.72	0.89	0.89	0.88	0.88	1.45	1.45	1.88	2.41	1.75	1.75			
25X25X2.9	1.84	2.35	1.81	1.81	0.88	0.88	1.15	1.15	1.54	1.54	1.84	3.75	2.24	2.24			
30X30X1.6	1.37	1.75	2.51	2.51	1.15	1.15	1.13	1.13	1.82	1.82	2.21	2.21	4.35	2.59			
30X30X2.0	1.68	2.14	2.72	2.72	1.12	1.12	1.12	1.12	1.94	1.94	2.37	4.60	2.72	2.72			
30X30X2.2	1.82	2.32	2.91	2.91	1.10	1.10	1.10	1.10	2.16	2.16	2.68	4.96	2.93	2.93			
30X30X2.6	2.10	2.68	3.23	3.23	1.08	1.08	1.08	1.08	2.30	2.30	2.89	5.09	3.02	3.02			
30X30X2.9	2.30	2.93	3.44	3.44	1.08	1.08	1.08	1.08	2.34	2.34	2.96	5.11	3.03	3.03			
30X30X3.0	2.36	3.01	3.50	3.50	1.07	1.07	1.07	1.07	2.42	2.42	3.08	5.10	3.05	3.05			
30X30X3.2	2.49	3.17	3.62	3.62	1.03	1.03	1.03	1.03	2.65	2.65	3.50	5.50	4.52	4.52			
30X30X4.0	2.94	3.75	3.97	3.97	0.98	0.98	0.98	0.98	2.78	2.78	3.84	2.89	1.98	1.98			
30X30X5.0	3.42	4.36	4.16	4.16	0.92	0.92	0.92	0.92	2.75	2.75	4.01	4.01	0.69	0.76			
30X30X6.0	3.79	4.83	4.12	4.12	0.88	0.88	0.88	0.88	2.78	2.78	4.01	4.01	0.69	0.76			
32X32X1.6	1.48	1.88	2.84	2.84	1.23	1.23	1.23	1.23	1.78	1.78	2.12	2.12	4.59	2.60			
32X32X2.0	1.81	2.30	3.36	3.36	1.21	1.21	1.21	1.21	2.10	2.10	2.54	5.40	3.02	3.02			
32X32X2.2	1.96	2.50	3.60	3.60	1.20	1.20	1.20	1.20	2.25	2.25	2.74	5.74	3.19	3.19			
32X32X2.6	2.26	2.88	4.02	4.02	1.18	1.18	1.18	1.18	2.52	2.52	3.11	6.26	3.47	3.47			
32X32X2.9	2.48	3.16	4.30	4.30	1.17	1.17	1.17	1.17	2.69	2.69	3.36	6.51	3.60	3.60			
32X32X3.2	2.68	3.42	4.54	4.54	1.15	1.15	1.15	1.15	2.84	2.84	3.59	6.62	3.68	3.68			
38X38X1.6	1.77	2.26	4.92	4.92	1.48	1.48	1.48	1.48	2.59	2.59	3.06	7.95	3.82	3.82			
38X38X2.0	2.18	2.78	5.88	5.88	1.45	1.45	1.45	1.45	3.10	3.10	3.70	9.49	4.51	4.51			
38X38X2.2	2.36	3.03	6.32	6.32	1.44	1.44	1.44	1.44	3.33	3.33	4.00	10.19	4.81	4.81			
38X38X2.6	2.78	3.51	7.14	7.14	1.43	1.43	1.43	1.43	3.76	3.76	4.57	11.39	5.33	5.33			
38X38X2.9	3.03	3.86	7.68	7.68	1.41	1.41	1.41	1.41	4.05	4.05	4.97	12.10	5.65	5.65			
38X38X3.2	3.29	4.19	8.18	8.18	1.40	1.40	1.40	1.40	4.31	4.31	5.34	12.64	5.89	5.89			
38X38X3.6	3.63	4.62	8.76	8.76	1.38	1.38	1.38	1.38	4.62	4.62	5.80	13.07	6.10	6.10			
40X40X1.6	1.88	2.39	5.79	5.79	1.56	1.56	1.56	1.56	2.90	2.90	3.41	9.32	4.28	4.28			
40X40X2.0	2.31	2.94	6.94	6.94	1.54	1.54	1.54	1.54	3.47	3.47	4.13	11.20	5.07	5.07			
40X40X2.2	2.51	3.20	7.47	7.47	1.53	1.53	1.53	1.53	3.74	3.74	4.48	12.05	5.42	5.42			
40X40X2.6	2.92	3.72	8.45	8.45	1.51	1.51	1.51	1.51	4.23	4.23	5.12	13.54	6.04	6.04			
40X40X2.9	3.21	4.09	9.11	9.11	1.49	1.49	1.49	1.49	4.56	4.56	5.58	14.46	6.42	6.42			

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			I _x cm ⁴	I _y cm ⁴	R _{xx} cm	R _{yy} cm	Z _{xx} cm ³	Z _{yy} cm ³	S _{xx} cm ³	S _{yy} cm ³	J cm ⁴	C cm ³
40X40X3.0	3.50	4.21	9.52	9.52	1.49	1.49	4.66	4.66	5.72	5.72	14.72	6.53
40X40X3.2	3.49	4.45	9.72	9.72	1.48	1.48	4.86	4.86	6.01	6.01	15.19	6.73
40X40X3.6	3.85	4.91	10.45	10.45	1.46	1.46	5.23	5.23	6.53	6.53	15.86	7.02
40X40X4.0	4.20	5.35	11.07	11.07	1.44	1.44	5.54	5.54	7.01	7.01	16.15	7.19
40X40X5.0	4.99	6.36	12.26	12.26	1.39	1.39	6.13	6.13	8.02	8.02	15.15	6.99
40X40X6.0	5.68	7.23	12.94	12.94	1.34	1.34	6.47	6.47	8.76	8.76	11.76	5.99
40X40X8.0	6.74	8.59	13.05	13.05	1.23	1.23	6.52	6.52	9.50	9.50	2.17	1.81
45X45X1.6	2.13	2.71	8.41	8.41	1.76	1.76	3.74	3.74	4.38	4.38	13.47	5.54
45X45X2.0	2.62	3.34	10.12	10.12	1.74	1.74	4.50	4.50	5.32	5.32	16.31	6.61
45X45X2.2	2.86	3.64	10.92	10.92	1.73	1.73	4.86	4.86	5.78	5.78	17.63	7.10
45X45X2.6	3.33	4.24	12.42	12.42	1.71	1.71	5.52	5.52	6.64	6.64	20.01	7.98
45X45X3.0	3.67	4.67	13.45	13.45	1.70	1.70	5.98	5.98	7.25	7.25	21.57	8.55
45X45X3.2	4.00	5.09	14.41	14.41	1.68	1.68	6.41	6.41	7.83	7.83	22.91	9.05
45X45X3.6	4.42	5.63	15.57	15.57	1.66	1.66	6.92	6.92	8.55	8.55	24.33	9.58
45X45X4.0	4.83	6.15	16.61	16.61	1.64	1.64	7.39	7.39	9.22	9.22	25.31	9.96
50X50X1.6	2.38	3.03	11.71	11.71	1.97	1.97	4.69	4.69	5.46	5.46	18.68	6.95
50X50X2.0	2.94	3.74	14.15	14.15	1.95	1.95	5.66	5.66	6.66	6.66	22.75	8.35
50X50X2.2	3.20	4.08	15.30	15.30	1.94	1.94	6.12	6.12	7.24	7.24	24.66	9.00
50X50X2.6	3.74	4.76	17.47	17.47	1.92	1.92	6.99	6.99	8.34	8.34	28.19	10.18
50X50X3.0	4.12	5.25	18.98	18.98	1.90	1.90	7.60	7.60	9.13	9.13	30.58	10.98
50X50X3.2	4.25	5.41	19.47	19.47	1.90	1.90	7.79	7.79	9.39	9.39	31.33	11.22
50X50X3.6	4.50	5.73	20.40	20.40	1.89	1.89	8.16	8.16	9.89	9.89	32.72	11.68
50X50X4.0	4.98	6.35	22.15	22.15	1.87	1.87	8.86	8.86	10.84	10.84	35.16	12.49
50X50X4.5	5.46	6.95	23.74	23.74	1.85	1.85	9.50	9.50	11.75	11.75	37.09	13.14
50X50X6.0	9.26	11.79	31.94	31.94	1.65	1.65	12.78	12.78	17.55	17.55	24.10	10.19
50X50X8.0	11.79	15.45	35.13	35.13	1.61	1.61	14.52	14.52	20.66	20.66	28.19	11.68
50X50X10.0	15.45	20.40	40.80	40.80	1.57	1.57	16.80	16.80	24.33	24.33	32.72	12.49
50X50X12.0	19.11	26.46	48.00	48.00	1.53	1.53	19.11	19.11	28.19	28.19	37.09	13.14
50X50X14.0	22.78	32.52	55.20	55.20	1.50	1.50	21.46	21.46	32.16	32.16	41.33	13.89
50X50X16.0	26.46	38.58	62.40	62.40	1.47	1.47	23.81	23.81	36.13	36.13	45.62	14.64
50X50X18.0	30.13	44.64	69.60	69.60	1.44	1.44	26.16	26.16	40.10	40.10	49.91	15.45
50X50X20.0	33.80	50.69	76.80	76.80	1.42	1.42	28.51	28.51	44.07	44.07	54.20	16.26
50X50X22.0	37.47	56.75	84.00	84.00	1.40	1.40	30.86	30.86	48.04	48.04	58.49	17.07
50X50X24.0	41.14	62.80	91.20	91.20	1.38	1.38	33.21	33.21	52.01	52.01	62.78	17.88
50X50X26.0	44.81	68.86	98.40	98.40	1.36	1.36	35.56	35.56	55.98	55.98	67.07	18.69
50X50X28.0	48.48	74.91	105.60	105.60	1.34	1.34	37.91	37.91	59.95	59.95	71.36	19.50
50X50X30.0	52.15	80.96	112.80	112.80	1.32	1.32	40.26	40.26	63.92	63.92	75.65	20.31
50X50X32.0	55.82	87.02	120.00	120.00	1.30	1.30	42.61	42.61	67.89	67.89	79.94	21.12
50X50X34.0	59.49	93.07	127.20	127.20	1.28	1.28	44.96	44.96	71.86	71.86	84.23	21.93
50X50X36.0	63.16	99.13	134.40	134.40	1.26	1.26	47.31	47.31	75.83	75.83	88.52	22.74
50X50X38.0	66.83	105.18	141.60	141.60	1.24	1.24	49.66	49.66	79.80	79.80	92.81	23.55
50X50X40.0	70.50	111.24	148.80	148.80	1.22	1.22	52.01	52.01	83.77	83.77	97.10	24.36
50X50X42.0	74.17	117.29	156.00	156.00	1.20	1.20	54.36	54.36	87.74	87.74	101.39	25.17
50X50X44.0	77.84	123.35	163.20	163.20	1.18	1.18	56.71	56.71	91.71	91.71	105.68	25.98
50X50X46.0	81.51	129.40	170.40	170.40	1.16	1.16	59.06	59.06	95.68	95.68	109.97	26.79
50X50X48.0	85.18	135.46	177.60	177.60	1.14	1.14	61.41	61.41	99.65	99.65	114.26	27.60
50X50X50.0	88.85	141.51	184.80	184.80	1.12	1.12	63.76	63.76	103.62	103.62	118.55	28.41
50X50X52.0	92.52	147.57	192.00	192.00	1.10	1.10	66.11	66.11	107.59	107.59	122.84	29.22
50X50X54.0	96.19	153.62	199.20	199.20	1.08	1.08	68.46	68.46	111.56	111.56	127.13	30.03
50X50X56.0	99.86	159.68	206.40	206.40	1.06	1.06	70.81	70.81	115.53	115.53	131.42	30.84
50X50X58.0	103.53	165.73	213.60	213.60	1.04	1.04	73.16	73.16	119.50	119.50	135.71	31.65
50X50X60.0	107.20	171.79	220.80	220.80	1.02	1.02	75.51	75.51	123.47	123.47	140.00	32.46
50X50X62.0	110.87	177.84	228.00	228.00	1.00	1.00	77.86	77.86	127.44	127.44	144.29	33.27
50X50X64.0	114.54	183.89	235.20	235.20	0.98	0.98	80.21	80.21	131.41	131.41	148.58	34.08
50X50X66.0	118.21	189.94	242.40	242.40	0.96	0.96	82.56	82.56	135.38	135.38	152.87	34.89
50X50X68.0	121.88	196.00	249.60	249.60	0.94	0.94	84.91	84.91	139.35	139.35	157.16	35.70
50X50X70.0	125.55	202.05	256.80	256.80	0.92	0.92	87.26	87.26	143.32	143.32	161.45	36.51
50X50X72.0	129.22	208.10	264.00	264.00	0.90	0.90	89.61	89.61	147.29	147.29	165.74	37.32
50X50X74.0	132.89	214.16	271.20	271.20	0.88	0.88	91.96	91.96	151.26	151.26	170.03	38.13
50X50X76.0	136.56	220.21	278.40	278.40	0.86	0.86	94.31	94.31	155.23	155.23	174.32	38.94
50X50X78.0	140.23	226.27	285.60	285.60	0.84	0.84	96.66	96.66	159.20	159.20	178.61	39.75
50X50X80.0	143.90	232.32	292.80	292.80	0.82	0.82	99.01	99.01	163.17	163.17	182.90	40.56
50X50X82.0	147.57	238.38	300.00	300.00	0.80	0.80	101.36	101.36	167.14	167.14	187.19	41.37
50X50X84.0	151.24	244.43	307.20	307.20	0.78	0.78	103.71	103.71	171.11	171.11	191.48	42.18
50X50X86.0	154.91	250.49	314.40	314.40	0.76	0.76	106.06	106.06	175.08	175.08	195.77	42.99
50X50X88.0	158.58	256.54	321.60	321.60	0.74	0.74	108.41	108.41	179.05	179.05	200.06	43.80
50X50X90.0	162.25	262.60	328.80	328.80	0.72	0.72	110.76	110.76	183.02	183.02	204.35	44.61
50X50X92.0	165.92	268.65	336.00	336.00	0.70	0.70	113.11	113.11	186.99	186.99	208.64	45.42
50X50X94.0	169.59	274.71	343.20	343.20	0.68	0.68	115.46	115.46	190.96	190.96	212.93	46.23
50X50X96.0	173.26	280.76	350.40	350.40	0.66	0.66	117.81	117.81	194.93	194.93	217.22	47.04
50X50X98.0	176.93	286.82	357.60	357.60	0.64	0.64	120.16	120.16	198.90	198.90	221.51	47.85
50X50X100.0	180.60	292.87	364.80	364.80	0.62	0.62	122.51	122.51	202.87	202.87	225.80	48.66
50X50X102.0	184.27	298.93	372.00	372.00	0.60	0.60	124.86	124.86	206.84	206.84	230.09	49.47
50X50X104.0	187.94	304.98	379.20	379.20	0.58	0.58	127.21	127.21	210.81	210.81	234.38	50.28
50X50X106.0	191.61	311.04	386.40	386.40	0.56	0.56	129.56	129.56	214.78	214.78	238.67	51.09
50X50X108.0	195.28	317.09	393.60	393.60	0.54	0.54	131.91	131.91	218.75	218.75	242.96	51.90
50X50X110.0	198.95	323.15	400.80	400.80	0.52	0.52	134.26	134.26	222.72	222.72	247.25	52.71
50X50X112.0	202.62	329.20	408.00	408.00	0.50	0.50	136.61	136.61	226.69	226.69	251.54	53.52
50X50X114.0	206.29	335.26	415.20	415.20	0.48	0.48	138.96	138.96	230.66	230.66	255.83	54.33
50X50X116.0	209.96	341.31	422.40	422.40	0.46	0.46	141.31	141.31	234.63	234.63	260.12	55.14
50X50X118.0	213.63	347.37	429.60	429.60	0.44	0.44	143.66	143.66	238.60	238.60	264.41	55.95
50X50X120.0	217.30	353.42	436.80	436.80	0.42	0.42	146.01	146.01	242.57	242.57	268.70	56.76
50X50X122.0	220.97	359.48	444.00	444.00	0.40	0.40	148.36	148.36	246.54	246.54	273.00	57.57
50X50X124.0	224.64	365.53	451.20	451.20	0.38	0.38	150.71	150.71	250.51	250.51	277.29	58.38
50X50X126.0	228.31	371.59	458.40	458.40	0.36	0.36	153.06	153.06	254.48	254.48	281.58	59.19
50X												

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Table with columns: Dimension (mm), Weight (kg/m), Area (cm2), Moment of Inertia (Ix, Iy, Ix-y), Radius of Gyration (Rxx, Ryy, Rxx-yy), Elastic Modulus (Zxx, Zyy, Zxx-yy), Plastic Modulus (Sxx, Syy, Sxx-yy), Torsional Constants (J, C), and Torional Constants (J, C).

SQUARE HOLLOW SECTION

SQUARE HOLLOW SECTION (SHS) IS : 4923 : 2017/EN 10219-1 : 2006*/ASTM A-500

Table with columns: Dimension (mm), Weight (kg/m), Area (cm2), Moment of Inertia (Ix, Iy, Ix-y), Radius of Gyration (Rxx, Ryy, Rxx-yy), Elastic Modulus (Zxx, Zyy, Zxx-yy), Plastic Modulus (Sxx, Syy, Sxx-yy), Torsional Constants (J, C), and Torional Constants (J, C).

RECTANGULAR HOLLOW SECTION

Product Range
26mm X 13mm to 400mm X 200mm

Thickness
1mm to 12mm



RECTANGULAR HOLLOW SECTION (RHS) IS : 4923 : 2017/EN 10219-1 : 2006*/ASTM A-500

Dimension	Weight kg/m	Area cm ²	Moment of Inertia		Radius of Gyration		Elastic Modulus			Plastic Modulus			Torsional Constants		
			I _x cm ⁴	I _y cm ⁴	R _{xx} cm	R _{yy} cm	Z _{xx} cm ³	Z _{yy} cm ³	S _{xx} cm ³	S _{yy} cm ³	J	C			
26X13X1.6	0.85	1.08	0.83	0.27	0.88	0.50	0.64	0.74	0.42	0.84	0.51	0.63	0.66		
26X13X2.0	1.02	1.30	0.94	0.30	0.88	0.48	0.73	0.47	0.47	0.98	0.59	0.64	0.67		
30X20X1.6	1.12	1.43	1.66	0.88	1.08	0.78	1.11	0.88	1.39	1.05	1.85	1.68	1.38		
30X20X2.0	1.37	1.74	1.94	1.02	1.06	0.77	1.30	1.02	1.65	1.24	2.08	1.55	1.60		
30X20X2.2	1.48	1.88	2.05	1.08	1.04	0.76	1.37	1.08	1.76	1.32	2.15	1.60	1.60		
40X10X1.6	1.12	1.43	2.25	0.22	1.25	0.39	1.13	0.44	1.57	0.54	0.65	0.76			
40X10X2.0	1.37	1.74	2.60	0.25	1.22	0.38	1.30	0.50	1.85	0.63	0.65	0.78			
40X20X1.6	1.37	1.75	3.43	1.15	1.40	0.81	1.72	1.15	2.18	1.34	2.83	1.92	1.92		
40X20X2.0	1.68	2.14	4.05	1.34	1.38	0.79	2.03	1.34	2.61	1.60	3.25	2.19	2.19		
40X20X2.2	1.82	2.32	4.32	1.43	1.36	0.79	2.16	1.43	2.61	1.71	3.40	2.29	2.29		
40X20X2.6	2.10	2.68	4.81	1.57	1.34	0.77	2.41	1.57	3.18	1.93	3.58	2.43	2.43		
40X25X1.6	1.50	1.91	4.02	1.93	1.45	1.01	2.01	1.55	2.49	1.80	4.25	2.51	2.51		
40X25X2.0	1.84	2.34	4.77	2.28	1.43	0.99	2.39	1.85	2.99	2.16	4.99	2.91	2.91		
40X25X2.2	1.99	2.54	5.11	2.43	1.42	0.98	2.56	1.95	3.23	2.32	5.28	3.07	3.07		
40X25X2.6	2.31	2.94	5.72	2.71	1.39	0.96	2.86	2.17	3.67	2.63	5.75	3.32	3.32		
50X25X1.6	1.75	2.23	7.02	2.37	1.77	1.03	2.81	1.90	3.53	2.17	5.83	3.21	3.21		
50X25X2.0	2.15	2.74	8.38	2.81	1.75	1.01	3.36	2.25	4.26	2.62	6.90	3.76	3.76		
50X25X2.2	2.34	2.98	9.01	3.01	1.74	1.01	3.61	2.41	4.61	2.82	7.35	3.99	3.99		
50X25X2.6	2.72	3.46	10.16	3.36	1.71	0.99	4.07	2.69	5.26	3.21	8.09	4.37	4.37		
50X30X1.6	1.88	2.39	7.96	3.60	1.82	1.23	3.19	2.40	3.91	2.75	8.07	3.96	3.96		
50X30X2.0	2.31	2.94	9.54	4.29	1.80	1.21	3.82	2.86	4.74	3.33	9.65	4.67	4.67		
50X30X2.2	2.51	3.20	10.27	4.61	1.79	1.20	4.11	3.08	5.14	3.60	10.35	4.99	4.99		
50X30X2.6	2.92	3.72	11.82	5.19	1.77	1.18	4.65	3.46	5.88	4.11	11.56	5.53	5.53		
50X30X2.9	3.21	4.09	12.54	5.58	1.75	1.17	5.02	3.72	6.40	4.47	12.27	5.85	5.85		
60X40X1.6	2.38	3.03	15.22	8.16	2.24	1.64	5.08	4.08	6.12	4.64	17.10	6.63	6.63		
60X40X2.0	2.94	3.74	18.41	9.83	2.22	1.62	6.14	4.92	7.47	5.65	20.77	7.96	7.96		
60X40X2.2	3.20	4.08	19.92	10.62	2.21	1.61	6.64	5.31	8.12	6.14	22.49	8.56	8.56		
60X40X2.6	3.74	4.76	22.76	12.09	2.19	1.59	7.59	6.05	9.36	7.07	25.65	9.67	9.67		
60X40X2.9	4.12	5.25	24.74	13.11	2.17	1.58	8.25	6.56	10.25	7.73	27.76	10.41	10.41		
60X40X3.0	4.25	5.41	25.38	13.44	2.17	1.58	8.46	6.72	10.53	7.94	28.41	10.63	10.63		
60X40X3.2	4.50	5.73	26.61	14.07	2.15	1.57	8.87	7.04	11.09	8.36	29.63	11.05	11.05		
60X40X3.6	4.98	6.35	29.90	15.23	2.13	1.55	9.64	7.62	12.16	9.15	31.72	11.79	11.79		
66X33X1.6	2.36	3.00	16.85	5.74	2.37	1.38	5.11	3.48	6.34	3.92	14.01	5.94	5.94		
66X33X2.0	2.90	3.70	20.37	6.90	2.35	1.37	6.18	4.19	7.75	4.77	16.94	7.09	7.09		
66X33X2.2	3.17	4.04	22.05	7.43	2.34	1.36	6.68	4.51	8.40	5.17	18.28	7.61	7.61		
66X33X2.6	3.69	4.70	25.15	8.43	2.31	1.34	7.63	5.11	9.68	5.94	20.72	8.56	8.56		
66X33X2.9	4.07	5.19	27.33	9.12	2.29	1.33	8.29	5.53	10.59	6.49	22.31	9.17	9.17		
66X33X3.2	4.44	5.66	29.37	9.75	2.28	1.31	8.90	5.91	11.46	7.01	23.67	9.70	9.70		
75X25X1.6	2.38	3.03	19.74	3.47	2.55	1.07	5.27	2.78	6.81	3.11	9.94	4.97	4.97		
75X25X2.0	2.94	3.74	23.84	4.14	2.52	1.05	6.36	3.32	8.31	3.77	11.88	5.88	5.88		
75X25X2.2	3.20	4.08	25.77	4.44	2.51	1.04	6.88	3.56	9.02	4.08	12.75	6.28	6.28		
75X25X2.6	3.74	4.76	29.40	5.00	2.49	1.02	7.84	4.00	10.40	4.67	14.26	6.99	6.99		

RECTANGULAR HOLLOW SECTION

RECTANGULAR HOLLOW SECTION (RHS) Js : 4923 : 2017/EN 10219-1 : 2006*/ASTM A-500

Dimension	Weight	Area	Moment of Inertia		Radius of Gyration		Elastic Modulus		Plastic Modulus		Torsional Constants	
			I _x	I _y	R _{xx}	R _{yy}	Z _{xx}	Z _{yy}	S _{xx}	S _{yy}	J	C
mm	kg/m	cm ²	cm ⁴	cm ⁴	cm	cm	cm ³	cm ³	cm ³	cm ³	cm ⁴	cm ⁴
75X25X50	4.25	5.41	32.72	5.49	2.46	1.01	8.75	4.40	11.69	5.21	15.44	7.55
75X50X16	3.01	3.83	30.51	16.39	2.82	2.07	8.14	6.56	9.75	7.40	34.07	10.70
75X50X20	3.72	4.74	37.16	19.91	2.80	2.05	9.91	7.97	11.96	9.06	41.75	12.36
75X50X22	4.07	5.18	40.35	21.59	2.79	2.04	10.76	8.64	13.03	9.87	45.43	14.02
75X50X26	4.76	6.06	46.44	24.78	2.77	2.02	12.39	9.92	15.10	11.43	52.42	16.02
75X50X29	5.26	6.70	50.77	27.04	2.75	2.01	13.54	10.82	16.60	12.55	57.31	17.40
75X50X32	5.75	7.33	54.90	29.18	2.74	2.00	14.64	11.68	18.04	13.63	61.98	18.69
75X50X36	6.40	8.15	60.10	31.86	2.72	1.98	16.03	12.75	19.90	15.01	67.44	20.23
75X50X40	7.03	8.95	64.96	34.34	2.69	1.96	17.33	13.74	21.66	16.33	72.33	21.59
80X40X16	2.88	3.67	30.71	10.52	2.89	1.69	7.68	5.26	9.47	5.87	25.48	8.99
80X40X20	3.56	4.54	37.36	12.72	2.87	1.67	8.34	6.36	11.61	7.17	31.03	10.94
80X40X22	3.89	4.96	40.53	13.76	2.86	1.67	10.14	6.88	12.64	7.80	33.72	11.71
80X40X26	4.55	5.80	46.58	15.74	2.83	1.65	11.65	7.87	14.64	9.01	36.68	13.31
80X40X29	5.03	6.41	50.87	17.11	2.82	1.63	12.72	8.56	16.07	9.88	42.09	14.40
80X40X30	5.19	6.61	52.25	17.56	2.81	1.63	13.07	8.78	16.54	10.16	43.16	14.74
80X40X32	5.50	7.01	54.94	18.41	2.80	1.62	13.74	9.21	17.46	10.72	45.21	15.39
80X40X36	6.12	7.79	60.05	20.02	2.78	1.60	15.02	10.01	19.23	11.77	48.88	16.36
80X40X40	6.71	8.55	64.79	21.49	2.75	1.59	16.20	10.75	20.91	12.77	51.97	17.35
96X48X16	3.49	54.03	18.57	3.49	2.05	11.26	7.74	13.82	6.58	44.69	13.26	
96X48X20	4.32	5.50	22.59	3.47	2.03	13.76	9.42	17.00	10.52	54.83	16.09	
96X48X22	4.73	6.02	24.51	3.45	2.02	14.97	10.22	18.54	11.47	59.70	17.44	
96X48X26	5.53	7.04	28.96	3.43	2.00	17.29	11.75	21.55	13.30	69.03	19.99	
96X48X29	6.12	7.80	30.79	3.41	1.99	18.95	12.83	23.75	14.65	75.62	21.77	
96X48X32	6.70	8.54	33.28	3.40	1.97	20.55	13.87	25.85	15.91	81.83	23.43	
96X48X36	7.47	9.52	36.40	3.37	1.96	22.58	15.17	28.58	17.56	89.30	25.47	
96X48X40	8.22	10.47	39.32	3.35	1.94	24.49	16.39	31.21	19.14	96.41	27.30	
96X48X45	9.13	11.63	42.68	3.32	1.92	26.75	17.79	34.34	21.01	105.91	29.30	
100X50X16	3.63	4.63	61.29	21.08	3.64	2.13	12.26	8.44	15.04	9.33	50.65	14.45
100X50X20	4.51	5.74	74.98	25.67	3.61	2.11	15.00	10.27	18.50	11.46	62.21	17.57
100X50X22	4.93	6.28	81.59	27.87	3.60	2.11	16.32	11.15	20.19	12.50	67.79	19.05
100X50X26	5.78	7.36	94.33	32.09	3.58	2.09	18.87	12.84	23.48	14.51	78.49	21.86
100X50X29	6.40	8.15	103.48	35.09	3.56	2.07	20.70	14.04	25.88	15.96	86.08	23.84
100X50X30	6.60	8.41	106.46	36.06	3.56	2.07	21.30	14.43	26.66	16.44	88.53	24.47
100X50X32	7.01	8.95	112.29	37.95	3.55	2.06	22.46	15.18	28.20	17.37	93.28	25.70
100X50X36	7.81	9.95	123.51	41.56	3.52	2.04	24.71	16.63	31.21	19.19	102.23	27.99
100X50X40	8.60	10.95	134.14	44.95	3.50	2.03	26.83	17.98	34.10	20.93	110.37	30.06
100X50X45	9.55	12.17	146.61	48.87	3.47	2.00	29.33	19.55	37.56	23.00	119.34	32.35
100X50X50	10.49	13.36	158.19	52.45	3.44	1.98	31.64	20.98	40.84	24.95	126.87	34.28
120X60X16	4.39	5.59	107.43	37.05	4.38	2.57	17.91	12.35	21.89	13.60	88.45	21.18
120X60X20	5.45	6.94	131.92	45.33	4.36	2.56	21.99	15.11	27.00	16.75	109.10	25.89
120X60X22	5.97	7.60	143.92	49.33	4.35	2.55	23.97	16.45	29.51	18.29	119.15	28.15
120X60X26	7.00	8.92	166.92	57.05	4.33	2.53	27.82	19.02	34.41	21.30	138.66	32.50

RECTANGULAR HOLLOW SECTION

RECTANGULAR HOLLOW SECTION (RHS) Js : 4923 : 2017/EN 10219-1 : 2006*/ASTM A-500

Dimension	Weight	Area	Moment of Inertia		Radius of Gyration		Elastic Modulus		Plastic Modulus		Torsional Constants	
			I _x	I _y	R _{xx}	R _{yy}	Z _{xx}	Z _{yy}	S _{xx}	S _{yy}	J	C
mm	kg/m	cm ²	cm ⁴	cm ⁴	cm	cm	cm ³	cm ³	cm ³	cm ³	cm ⁴	cm ⁴
120X60X29	7.76	9.89	183.65	62.60	4.31	2.52	30.61	20.87	38.00	23.49	152.74	35.60
120X60X32	8.52	10.85	199.68	67.95	4.29	2.50	33.32	22.65	41.51	25.63	166.31	38.56
120X60X36	9.51	12.11	220.75	74.77	4.27	2.48	36.80	24.93	46.07	28.40	183.57	42.29
120X60X40	10.48	13.35	240.74	81.25	4.25	2.47	40.13	27.09	50.49	31.08	199.79	45.76
120X60X45	11.67	14.87	264.52	88.88	4.22	2.44	44.09	29.63	55.82	34.30	218.51	49.75
120X60X50	12.84	16.36	286.97	95.99	4.19	2.42	47.83	32.00	60.95	37.38	235.39	53.33
120X60X56	15.10	19.23	328.01	108.77	4.13	2.38	54.67	36.26	70.57	43.12	263.07	59.24
150X50X16	4.26	5.43	124.73	6.76	4.79	1.12	16.64	5.41	22.63	5.92	22.78	10.23
150X50X20	5.29	6.74	152.77	8.11	4.76	1.10	20.37	6.49	27.95	7.22	27.42	12.24
150X50X22	5.79	7.38	166.32	8.74	4.75	1.09	22.18	7.00	30.52	7.84	29.56	13.16
150X50X26	6.80	8.66	192.52	9.91	4.71	1.07	25.67	7.83	35.54	9.04	33.47	14.85
150X50X30	7.82	9.96	221.18	10.45	4.71	1.07	28.62	8.65	40.62	10.15	37.45	16.35
150X50X32	8.67	11.05	248.82	11.19	4.71	1.07	31.18	9.48	45.87	11.26	41.42	17.74
150X50X36	9.52	12.13	276.55	12.13	4.71	1.07	34.41	10.43	51.43	12.49	46.12	19.13
150X50X40	10.48	13.31	304.28	13.17	4.71	1.07	37.41	11.48	57.43	13.84	50.87	20.52
150X50X45	11.59	14.67	341.39	14.43	4.71	1.07	40.28	12.64	64.03	15.34	55.72	22.02
150X50X50	12.84	16.16	378.82	15.88	4.71	1.07	42.91	13.99	71.23	16.99	60.71	23.62
150X50X56	14.26	17.86	426.52	17.54	4.71	1.07	45.28	15.54	79.03	18.84	66.88	25.33
150X50X60	15.84	19.68	474.67	19.37	4.71	1.07	47.38	17.28	87.33	20.89	73.33	27.16
150X50X66	17.59	21.64	532.24	21.37	4.71	1.07	49.21	19.14	96.13	23.16	80.13	29.12
150X50X72	19.52	23.76	599.23	23.54	4.71	1.07	50.78	21.14	105.43	25.64	87.53	31.24
150X50X78	21.64	26.04	675.64	25.89	4.71	1.07	52.08	23.36	115.23	28.34	95.53	33.52
150X50X84	23.95	28.58	761.47	28.43	4.71	1.07	53.11	25.81	125.53	31.34	104.13	35.97
150X50X90	26.54	31.36	856.72	31.17	4.71	1.07	53.88	28.49	136.33	34.64	113.43	38.58
150X50X96	29.33	34.39	961.41	34.11	4.71	1.07	54.38	31.31	147.63	38.24	123.43	41.34
150X50X102	32.33	37.58	1075.64	37.26	4.71	1.07	54.61	34.28	159.43	42.14	134.43	44.24
150X50X108	35.54	40.93	1199.23	40.61	4.71	1.07	54.58	37.41	171.73	46.34	146.43	47.34
150X50X114	38.95	44.44	1332.24	44.17	4.71	1.07	54.28	40.74	184.53	50.74	159.43	50.64
150X50X120	42.56	48.11	1474.67	47.91	4.71	1.07	53.71	44.28	197.83	55.34	173.43	54.14
150X50X126	46.37	51.94	1626.52	51.84	4.71	1.07	52.88	48.01	211.63	60.14	188.43	57.84
150X50X132	50.38	55.93	1787.77	55.97	4.71	1.07	51.78	51.94	225.93	65.14	204.43	61.74
150X50X138	54.59	60.08	1958.41	60.31	4.71	1.07	50.41	56.08	241.73	70.34	221.43	65.84
150X50X144	59.00	64.39	2138.44	64.86	4.71	1.07	48.68	60.41	259.03	75.74	239.43	70.14
150X50X150	63.61	68.94	2327.87	69.61	4.71	1.07	46.58	64.96	277.83	81.34	258.43	74.64
150X50X156	68.42	73.73	2526.72	74.56	4.71	1.07	44.01	69.71	298.13	87.14	278.43	79.34
150X50X162	73.43	78.76	2735.07	79.71	4.71	1.07	41.01	74.66	319.93	93.14	299.43	84.24
150X50X168	78.64	83.94	2952.92	85.06	4.71	1.07	37.58	79.81	343.33	99.34	321.43	89.34
150X50X174	84.05	89.37	3180.27	90.61	4.71	1.07	33.71	85.16	368.33	105.74	344.43	94.64
150X50X180	89.66	95.04	3417.12	96.36	4.71	1.07	29.38	90.71	394.93	112.34	368.43	100.14
150X50X186	95.47	100.96	3673.47	102.31	4.71	1.07	24.58	96.46	423.13	119.14	393.43	105.84
150X50X192	101.48	107.13	3939.22	108.46	4.71	1.07	19.28	102.41				

RECTANGULAR HOLLOW SECTION

RECTANGULAR HOLLOW SECTION (RHS) JS : 4923 : 2017/EN 10219-1 : 2006*/ASTM A-500

Dimension	Weight	Area	Moment of Inertia		Radius of Gyration		Elastic Modulus		Plastic Modulus		Torsional Constants	
			I _x	I _y	R _{xx}	R _{yy}	Z _{xx}	Z _{yy}	S _{xx}	S _{yy}	J	C
mm	kg/m	cm ²	cm ⁴	cm ⁴	cm	cm	cm ³	cm ³	cm ³	cm ³	cm ⁴	cm ⁴
200X100X60	34.38	43.79	214.621	7191.9	700	4.05	214.65	14.584	172.779	167.45	1765.96	240.49
240X120X60	21.78	27.75	2110.72	725.35	8.72	5.11	175.90	120.90	216.01	134.01	1745.55	207.11
240X120X50	26.97	34.36	2579.67	882.47	8.66	5.07	214.98	147.08	265.58	164.45	2141.72	251.48
240X120X60	32.05	40.83	3025.91	1030.45	8.61	5.02	252.16	171.75	313.41	193.69	2517.16	292.80
240X120X60	41.91	53.39	3651.64	1299.95	8.49	4.95	320.99	216.66	403.69	248.66	3196.64	366.11
250X100X40	21.16	26.95	2091.66	502.99	8.81	4.32	167.34	100.60	210.41	110.90	1335.40	177.41
250X100X50	26.19	33.36	2555.76	639.85	8.75	4.28	204.31	121.97	258.51	135.84	1651.59	214.59
250X100X60	31.11	39.63	2992.34	709.63	8.69	4.23	239.39	141.93	304.85	159.70	1909.64	248.83
250X100X80	46.66	51.79	3600.55	888.89	8.57	4.14	304.05	177.78	392.27	204.23	2397.53	308.31
250X150X40	24.30	30.95	2666.87	1254.24	9.33	6.31	215.75	164.57	259.61	183.27	2698.49	274.12
250X150X50	30.11	38.36	3304.18	1507.95	9.23	6.27	264.34	201.06	319.76	225.48	3329.96	334.43
250X150X60	35.82	45.65	3885.56	1768.35	9.23	6.23	310.85	235.78	378.05	266.28	3924.87	391.36
250X150X80	46.94	59.79	4972.24	2250.41	9.12	6.14	397.78	300.06	489.07	343.71	5045.97	494.90
250X150X100	57.63	73.42	5960.20	2882.88	9.01	6.04	476.82	357.72	592.79	415.67	6032.07	584.33
280X100X40	23.04	29.35	2785.31	558.32	9.74	4.36	198.96	111.67	252.63	122.42	1543.27	193.54
280X100X50	28.54	36.36	3406.60	677.60	9.68	4.32	243.33	135.52	310.80	150.09	1886.92	241.68
280X100X60	33.94	43.23	3998.76	792.27	9.62	4.27	285.63	157.86	367.00	176.62	2209.32	290.67
300X150X40	27.44	34.95	4196.67	1477.46	10.96	6.44	279.78	193.00	341.98	212.47	3455.16	330.97
300X150X50	34.04	43.36	5153.13	1770.87	10.90	6.44	343.55	236.12	421.90	261.73	4261.58	404.51
300X150X60	40.53	51.63	6073.51	2079.57	10.85	6.35	404.91	277.28	499.63	309.48	5038.24	474.31
300X150X80	53.22	67.79	7807.95	2654.12	10.73	6.26	520.55	353.89	648.55	400.51	6496.60	602.47
300X150X100	65.48	83.42	9402.90	3173.71	10.62	6.17	626.93	423.17	788.86	485.67	7804.31	715.07
300X200X40	30.58	38.95	5072.88	2756.56	11.41	8.38	338.20	275.66	401.18	304.84	5889.58	447.72
300X200X50	37.96	48.36	6241.05	3360.92	11.36	8.34	416.07	336.10	495.65	376.37	6919.17	549.43
300X200X60	45.24	57.63	7370.23	3962.19	11.31	8.29	491.35	396.22	587.83	446.07	8214.59	646.87
300X200X80	59.50	75.79	9513.66	5097.04	11.20	8.20	634.25	508.71	765.35	579.99	10688.71	829.36
300X200X100	73.33	93.42	11507.24	6144.30	11.10	8.11	767.15	614.43	933.86	706.73	12983.61	994.50
300X200X120	86.77	110.53	13554.97	7107.11	10.99	8.02	890.34	710.72	1095.47	826.41	15071.27	1141.95
350X250X50	45.81	58.36	10519.88	6305.84	13.43	10.39	601.14	504.47	709.04	564.76	12375.85	814.43
350X250X60	54.66	69.63	12457.31	7456.44	13.36	10.35	711.85	596.68	842.61	670.85	14735.26	962.58
350X250X80	72.06	91.79	16170.48	9659.06	13.27	10.26	924.05	772.73	1101.65	876.27	19295.99	1243.82
350X250X100	89.03	113.42	19672.08	11723.55	13.17	10.17	1124.12	937.89	1349.92	1072.79	23627.09	1504.66
350X250X120	105.61	134.53	22966.89	13655.73	13.07	10.08	1312.40	1092.46	1587.60	1260.54	27692.08	1744.69
400X200X50	45.81	58.36	12489.82	4311.75	14.65	8.60	624.50	451.18	762.43	475.87	10289.69	739.55
400X200X60	54.66	69.63	14789.35	5091.63	14.57	8.55	759.47	509.17	905.99	562.47	12205.15	872.78
400X200X80	72.06	91.79	19195.28	6572.45	14.46	8.46	939.77	657.25	1184.31	733.39	15926.67	1124.29
400X200X100	89.03	113.42	23348.08	7950.97	14.35	8.37	1167.41	795.10	1450.98	896.73	19422.30	1355.55
400X200X120	105.61	134.53	27252.95	9230.63	14.23	8.28	1362.65	923.07	1706.13	1052.01	22662.53	1566.20
500X200X140	93.78	127.11	15060.82	7988.55	10.89	7.93	1004.06	798.86	1244.30	939.14	16924.34	1271.23
500X200X160	121.76	155.11	3091.50	10414.85	11.42	8.19	1545.76	1041.49	1949.87	1199.54	2361.632	1758.81
500X200X180	164.08	211.63	19446.79	12357.11	11.53	12.40	972.34	837.15	1142.39	940.63	2392.938	1338.20
500X200X200	84.62	107.79	25349.270	16336.49	15.33	12.31	1267.14	1089.10	1497.91	1230.55	31464.16	1738.28

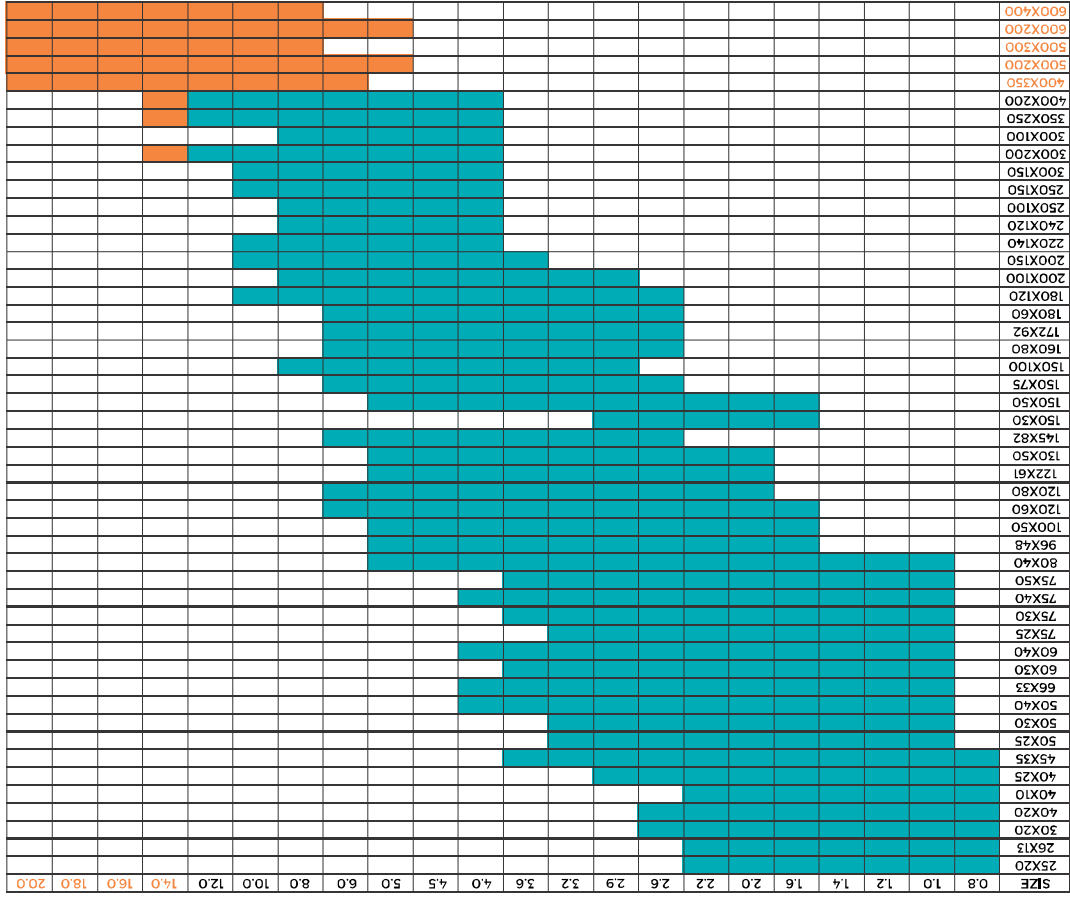
■ UPCOMING SIZES

RECTANGULAR HOLLOW SECTION

RECTANGULAR HOLLOW SECTION (RHS) JS : 4923 : 2017/EN 10219-1 : 2006*/ASTM A-500

Dimension	Weight	Area	Moment of Inertia		Radius of Gyration		Elastic Modulus		Plastic Modulus		Torsional Constants	
			I _x	I _y	R _{xx}	R _{yy}	Z _{xx}	Z _{yy}	S _{xx}	S _{yy}	J	C
mm	kg/m	cm ²	cm ⁴	cm ⁴	cm	cm	cm ³	cm ³	cm ³	cm ³	cm ⁴	cm ⁴
400X300X100	104.73	133.42	30954.74	19920.57	15.23	12.22	1547.74	1328.04	1840.98	1513.86	36709.68	2114.80
400X300X120	124.45	158.53	36288.45	23314.01	15.13	12.15	1814.43	1554.27	2171.75	1784.67	45625.84	2467.39
400X300X140	143.74	183.11	41349.30	26521.47	15.03	12.03	2067.47	1768.10	2490.27	2045.10	52172.04	2795.60
400X300X160	162.63	207.17	46142.73	29547.33	14.92	11.94	2307.14	1969.93	2796.72	2295.29	58508.01	3088.98
400X300X180	181.10	230.70	50674.11	32396.29	14.82	11.85	2533.71	2159.76	3091.21	2535.33	63594.05	3377.06
400X300X200	199.15	253.70	54946.80	35072.75	14.72	11.76	2747.44	2338.19	3375.85	2765.36	69191.33	3628.36
500X200X60	64.08	81.63	25690.13	6221.07	17.74	8.73	1027.61	622.11	1284.16	678.87	16353.70	1093.63
500X200X80	84.62	107.79	35466.50	8047.87	17.62	8.64	1358.66	804.79	1683.27	887.19	21566.48	1419.28
500X200X100	104.73	133.42	40960.16	9757.63	17.50	8.55	1634.41	975.77	2068.10	1086.73	26105.40	1716.72
500X200X120	124.45	158.53	47877.48	11354.15	17.38	8.46	1915.10	1135.42	2438.78	1277.61	30538.24	1990.64
500X200X140	143.74	183.11	54524.82	12841.14	17.26	8.37	2181.00	1284.12	2795.43	1459.94	34633.43	2240.67
500X200X160	162.63	207.17	60908.49	14222.30	17.13	8.29	2432.34	1422.23	3138.16	1633.85	38360.40	2466.45
500X200X180	181.10	230.70	66734.75	15501.28	17.01	8.20	2689.39	1550.13	3467.09	1799.45	41889.87	2687.57
500X200X200	199.15	253.70	72309.80	16681.66	16.88	8.11	2892.40	1668.17	3783.35	1956.86	44934.65	2843.65
500X300X60	120.43	153.42	52866.82	24127.24	18.56	12.54	2114.68	1608.49	2588.10	1805.86	55167.59	2975.40
500X300X120	143.29	182.33	62169.00	28293.53	18.46	12.45	2486.76	1888.24	3024.38	2130.27	62797.85	3130.85
500X300X140	165.72	211.11	71063.12	32251.70	18.35	12.36	2842.53	2150.12	3475.83	2445.50	71991.13	3589.92
500X300X160	187.75	239.17	79553.80	36006.64	18.24	12.27	3182.24	2400.45	3912.56	2749.69	80703.46	3999.20
500X300X180	209.36	266.70	87653.65	39663.17	18.13	12.18	3506.15	2637.55	4354.69	3042.93	88881.60	4351.25
500X300X200	230.55	293.70	95363.14	42926.09	18.02	12.09	3814.53	2861.74	4742.35	3325.36	96133.06	4647.62
600X200X60	75.10	93.63	40672.54	7350.51	20.84	8.86	1355.76	735.06	1722.32	795.27	20598.47	1324.40
600X200X80	97.18	123.79	53127.31	9320.28	20.72	8.77	1770.92	932.23	2262.23	1040.79	26928.52	1714.30
600X200X100	120.43	153.42	65043.47	11564.30	20.59	8.68	2168.12	1156.43	2785.23	1276.73	32954.16	2077.94
600X200X120	143.29	182.33	76428.61	13477.67	20.46	8.59	2547.63	1347.77	3291.44	1503.21	38583.25	2415.16
600X200X140	165.72	211.11	87290.27	15267.43	20.33	8.50	2909.68	1526.75	3780.99	1720.34	43840.48	2725.67
600X200X160	187.75	239.17	97365.94	16937.61	20.20	8.42	3254.54	1693.77	4254.00	1928.25	48677.53	3009.14
600X200X180	209.36	266.70	107473.08	18492.16	20.07	8.33	3582.44	1849.22	4710.57	2127.05	53063.38	3265.24
600X200X200	230.55	293.70	116809.10	19935.00	19.94	8.24	3893.64	1993.50	5150.84	2318.66	56969.59	3465.63
600X300X60	109.74	139.79	67146.73	23159.31	21.92	12.87	2238.33	1543.96	2735.83	1699.75	55292.51	2647.72
600X300X120	136.13	173.42	82450.14	28333.90	21.80	12.78	2748.34	1888.93	3375.23			

RHS (Rectangular Hollow Section) Sizes



TENSILE PROPERTIES OF STEEL TUBES FOR STRUCTURAL PURPOSE IS 116:2014, TABLE 2, (Clauses 3.1 and 11.2)

S. No.	Grade	Tensile Strength		Yield Strength	Elongation on Gauge Length	
		Min	MPa		5.65√s ₀	Min
1	YST 210	350	210	210	20	20
2	YST 240	410	240	240	17	15
3	YST 310	450	310	310	14	10
4	YST 355	490	355	355	10	10

TENSILE PROPERTIES OF STEEL TUBES SECTIONS IS 4923:2017, TABLE 4, (Clauses 19.2)

S. No.	Grade	Tensile Strength		Yield Strength	Elongation	
		Min	MPa		Min	Percent
1	YST 210	330	210	210	20	20
2	YST 240	410	240	240	15	15
3	YST 310	450	310	310	10	10
4	YST 355	490	355	355	10	10

CHEMICAL & MECHANICAL PROPERTIES IS 2062:2011 (Clauses 5, 8.1, 8.2, 10.3, 10.3.1, 11.3.1, 12.2)

Grade Designation	Ladle Analysis, Percent, Max					Carbon Equivalent (CE), Max	Tensile Strength R _m , Min MPa	Yield Stress	Percentage Elongation A _{min} at Gauge Length L=5.65
	C	Mn	S	P	Si				
E 250	0.22	1.50	0.045	0.045	0.40	0.41	410	250	23
E 300	0.20	1.50	0.045	0.045	0.45	0.44	440	300	22
E 350	0.20	1.55	0.045	0.045	0.45	0.47	490	350	22
E 410	0.20	1.60	0.045	0.045	0.45	0.50	540	410	20

CHEMICAL COMPOSITION & MECHANICAL PROPERTIES IS 10748:2004 Table 1 & 3 (Clauses 7.1, 7.2, 8.3 & 9.2.4)

Grade	Ladle Analysis, Percent, Max					Carbon Equivalent (CE), Max	Tensile Strength		Yield Stress	Percentage Elongation, min at Gauge Length 5.65√s ₀
	C	Mn	S	P	Si		Min, MPa	Max, MPa		
1	0.10	0.50	0.040	0.040	-	-	290	170	30	
2	0.12	0.60	0.040	0.040	-	-	330	210	28	
3	0.16	1.20	0.040	0.040						

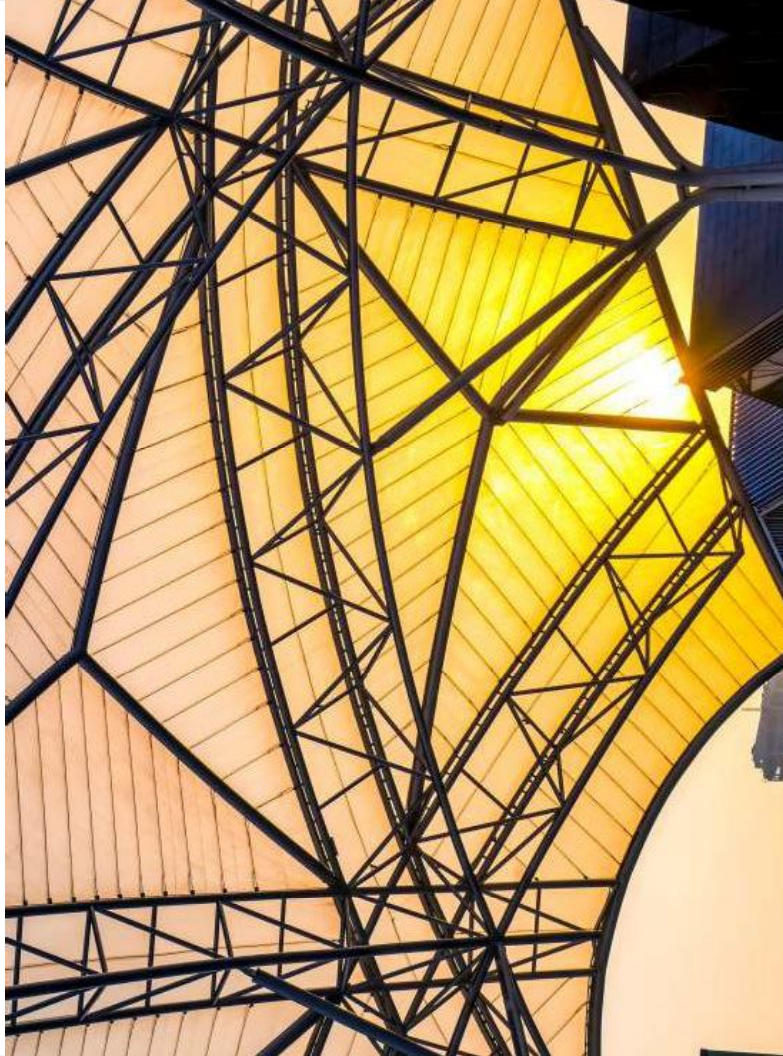
CIRCULAR HOLLOW SECTION

Product Range

21.3mm to 355.6mm

Thickness

1mm to 10mm



CIRCULAR HOLLOW SECTION FOR STRUCTURAL PURPOSES CONFORMING TO IS:1161 : 2014

Outside Diameter	Thickness	Mass	Area of Cross Section	Internal Volume	Moment of Inertia	Elastic Modulus	Plastic Modulus	Radius of Gyration	Square of Radius of Gyration	Torsional Constant
mm	mm	kg/m	cm ²	cm ³ /m	cm ⁴	cm ²	cm ³	cm	cm ²	cm ⁴
21.30	1.60	0.76	0.99	257	0.46	0.45	0.62	0.70	0.49	0.91
21.30	1.80	0.87	1.10	246	0.33	0.50	0.63	0.69	0.48	0.99
21.30	2.00	0.95	1.21	235	0.57	0.54	0.75	0.69	0.47	1.07
21.30	2.30	1.08	1.37	219	0.63	0.59	0.83	0.68	0.46	1.16
21.30	2.60	1.20	1.53	204	0.68	0.64	0.92	0.67	0.45	1.26
21.30	2.90	1.32	1.68	189	0.73	0.68	0.99	0.66	0.43	1.37
26.90	1.60	1.00	1.27	441	1.02	0.76	1.03	0.90	0.80	1.52
26.90	1.80	1.11	1.42	426	1.12	0.84	1.14	0.89	0.79	1.67
26.90	2.00	1.23	1.56	412	1.22	0.91	1.24	0.88	0.78	1.81
26.90	2.30	1.40	1.78	391	1.36	1.01	1.40	0.87	0.76	2.02
26.90	2.60	1.56	1.96	370	1.48	1.10	1.54	0.86	0.75	2.20
26.90	2.90	1.72	2.19	350	1.60	1.19	1.68	0.85	0.73	2.38
33.70	1.60	1.27	1.61	731	2.08	1.24	1.65	1.14	1.29	2.47
33.70	1.80	1.42	1.80	712	2.30	1.37	1.83	1.13	1.28	2.73
33.70	2.00	1.56	1.99	693	2.51	1.49	2.01	1.12	1.26	2.98
33.70	2.30	1.78	2.27	665	2.81	1.67	2.27	1.11	1.24	3.34
33.70	2.60	1.99	2.54	638	3.09	1.84	2.52	1.10	1.22	3.67
33.70	2.90	2.20	2.81	611	3.36	1.99	2.76	1.09	1.20	3.98
33.70	3.20	2.41	3.07	585	3.60	2.14	2.99	1.08	1.18	4.28
33.70	3.60	2.67	3.40	552	3.91	2.32	3.28	1.07	1.15	4.64
38.10	3.00	2.60	3.31	809	5.13	2.69	3.71	1.25	1.55	5.39
38.10	4.00	3.36	4.29	712	6.31	3.31	4.67	1.21	1.47	6.63
38.10	5.00	4.08	5.20	620	7.28	3.82	5.52	1.18	1.40	7.65
38.10	6.00	4.75	6.05	535	8.07	4.23	6.25	1.15	1.33	8.47
38.10	8.00	5.94	7.56	384	9.17	4.82	7.42	1.10	1.21	9.63
42.40	1.60	1.61	2.05	1207	4.27	2.02	2.66	1.44	2.08	4.03
42.40	1.80	1.80	2.30	1192	4.74	2.24	2.97	1.44	2.06	4.47
42.40	2.00	1.99	2.54	1158	5.19	2.45	3.27	1.43	2.05	4.90
42.40	2.30	2.27	2.90	1122	5.84	2.76	3.70	1.42	2.02	5.51
42.40	2.60	2.55	3.25	1087	6.46	3.05	4.12	1.41	1.99	6.10
42.40	2.90	2.83	3.60	1052	7.06	3.33	4.53	1.40	1.96	6.66
42.40	3.20	3.09	3.94	1018	7.62	3.59	4.93	1.39	1.93	7.19
42.40	3.60	3.45	4.39	973	8.33	3.93	5.44	1.38	1.90	7.86
48.30	1.60	1.84	2.35	1598	6.41	2.65	3.49	1.65	2.73	5.31
48.30	1.80	2.06	2.63	1569	7.12	2.95	3.89	1.65	2.71	5.89
48.30	2.00	2.28	2.91	1541	7.81	3.25	4.29	1.64	2.68	6.47
48.30	2.30	2.61	3.32	1500	8.81	3.65	4.87	1.63	2.65	7.30
48.30	2.60	2.93	3.73	1459	9.78	4.05	5.44	1.62	2.62	8.10
48.30	2.90	3.25	4.14	1419	10.70	4.43	5.99	1.61	2.59	8.86
48.30	3.00	3.35	4.27	1405	11.00	4.55	6.17	1.61	2.58	9.11
48.30	3.20	3.56	4.53	1379	11.59	4.80	6.52	1.60	2.56	9.59
48.30	3.60	3.97	5.06	1327	12.71	5.26	7.21	1.59	2.51	10.52
48.30	4.00	4.37	5.57	1276	13.77	5.70	7.87	1.57	2.47	11.40
48.30	4.50	4.86	6.19	1213	15.01	6.21	8.66	1.56	2.42	12.43
48.30	5.00	5.34	6.80	1152	16.15	6.69	9.42	1.54	2.37	13.38
48.30	6.00	6.26	7.97	1055	18.19	7.53	10.81	1.51	2.28	15.07
48.30	8.00	7.95	10.13	819	21.37	8.85	13.16	1.45	2.11	17.70

CIRCULAR HOLLOW SECTION FOR STRUCTURAL PURPOSES CONFORMING TO IS:1161 : 2014

Outside Diameter	Thickness	Mass	Area of Section	Internal Volume	Moment of Inertia	Elastic Modulus	Plastic Modulus	Radius of Gyration	Square of Radius of Gyration	Torsional Constant
mm	mm	kg/m	cm ²	cm ³ /m	cm ⁴	cm ³	cm ³	cm	cm ²	cm ⁴
6030	1.60	232	295	2561	1272	422	551	2.06	4.31	8.44
6030	2.00	288	366	2489	1558	517	680	2.06	4.25	10.34
6030	2.30	329	419	2457	1765	585	774	2.05	4.21	11.71
6030	2.60	370	471	2394	1965	652	866	2.04	4.17	13.04
6030	2.90	411	523	2333	2159	716	956	2.03	4.13	14.32
6030	3.00	424	540	2316	2222	737	986	2.03	4.12	14.74
6030	3.20	451	574	2282	2347	776	1044	2.02	4.09	15.57
6030	3.60	503	641	2215	2587	858	1159	2.01	4.03	17.16
6030	4.00	555	707	2148	2817	934	1270	2.00	3.98	18.69
6030	4.50	619	789	2067	3090	1025	1404	1.98	3.92	20.50
6030	5.00	682	869	1967	3348	1110	1533	1.96	3.85	22.31
6030	6.00	804	1024	1832	3818	1266	1776	1.93	3.73	25.33
6030	8.00	1032	1314	1541	4599	1525	2205	1.87	3.50	30.51
7610	2.00	366	466	4083	3198	840	1098	2.62	6.87	1681
7610	2.20	419	533	4015	3634	955	1253	2.61	6.81	1910
7610	2.60	471	600	3948	4659	1067	1405	2.60	6.76	2134
7610	2.90	524	667	3882	4474	1176	1553	2.59	6.71	2352
7610	3.20	575	733	3816	4878	1282	1702	2.58	6.66	2564
7610	3.60	644	820	3728	5401	1419	1894	2.57	6.59	2839
7610	4.00	711	906	3642	5906	1552	2081	2.55	6.52	3104
7610	4.50	795	1012	3536	6512	1711	2310	2.54	6.43	3423
7610	5.00	877	1117	3422	7092	1864	2532	2.52	6.35	3728
7610	6.00	1037	1321	3227	8176	2149	2956	2.49	6.19	4287
7610	8.00	1344	1712	2837	10059	2644	3727	2.42	5.88	5297
7610	9.00	1490	1897	2651	10870	2857	4076	2.39	5.73	5713
8830	2.00	429	546	5661	5157	1160	1511	3.07	9.44	23.20
8830	2.20	491	626	5581	5870	1321	1725	3.06	9.38	2641
8830	2.60	553	705	5502	6568	1478	1937	3.05	9.32	2955
8830	2.90	615	784	5424	7252	1631	2146	3.04	9.26	3265
8830	3.20	676	862	5346	7921	1782	2351	3.03	9.19	3564
8830	3.60	757	965	5242	8790	1977	2621	3.02	9.11	3955
8830	4.00	838	1067	5140	9634	2167	2885	3.00	9.03	4335
8830	4.50	937	1193	5014	10654	2397	3206	2.99	8.93	4794
8830	5.00	1035	1318	4889	11637	2618	3524	2.97	8.83	5236
8830	6.00	1227	1563	4645	13494	3036	4131	2.94	8.64	6072
8830	8.00	1596	2033	4174	16797	3779	5253	2.87	8.26	7538
8830	9.00	1774	2259	3948	18257	4107	5770	2.84	8.08	8214
8830	10.00	1946	2479	3723	19588	4409	6259	2.81	7.91	8818
10160	2.00	491	626	7482	7763	1528	1984	3.52	12.41	30.56
10160	2.30	563	718	7390	8848	1742	2268	3.51	12.33	34.84
10160	2.60	635	809	7299	9914	1952	2549	3.50	12.26	39.03
10160	2.90	706	899	7208	10959	2157	2826	3.49	12.19	43.15
10160	3.20	777	989	7118	11985	2359	3100	3.48	12.12	47.19
10160	3.60	870	1108	6999	13324	2623	3459	3.47	12.02	52.46
10160	4.00	963	1226	6881	14628	2880	3812	3.45	11.93	57.59
10160	4.50	1078	1373	6755	16213	3192	4246	3.44	11.81	63.65
10160	5.00	1191	1517	6590	17747	3493	4670	3.42	11.70	69.67

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Outside Diameter	Thickness	Mass	Area of Section	Internal Volume	Moment of Inertia	Elastic Modulus	Plastic Modulus	Radius of Gyration	Square of Radius of Gyration	Torsional Constant
mm	mm	kg/m	cm ²	cm ³ /m	cm ⁴	cm ³	cm ³	cm	cm ²	cm ⁴
11430	2.00	554	706	9555	11127	1947	2523	3.97	15.77	38.94
11430	2.30	635	809	9452	12695	2221	2886	3.96	15.69	44.43
11430	2.60	716	912	9348	14237	2491	3245	3.95	15.60	49.82
11430	2.90	797	1015	9246	15755	2757	3600	3.94	15.52	55.13
11430	3.20	877	1117	9144	17247	3018	3951	3.93	15.44	60.36
11430	3.60	983	1252	9009	19198	3359	4413	3.92	15.33	67.19
11430	4.00	1088	1386	8875	21107	3693	4869	3.90	15.23	73.86
11430	4.50	1219	1552	8709	23432	4100	5428	3.89	15.10	82.00
11430	5.00	1348	1717	8544	25692	4496	5977	3.87	14.96	89.91
11430	6.00	1603	2041	8219	30021	5253	7045	3.83	14.71	105.06
12700	2.00	617	785	11882	15344	2416	3125	4.42	19.54	48.33
12700	2.60	798	1016	11682	19665	3097	4024	4.40	19.35	61.94
12700	2.90	888	1131	11557	21778	3430	4467	4.39	19.26	68.59
12700	3.00	918	1169	11499	22475	3539	4614	4.39	19.23	70.79
12700	3.20	977	1245	11423	23860	3757	4906	4.38	19.17	75.15
12700	3.60	1096	1396	11272	26587	4187	5483	4.36	19.05	83.74
12700	4.00	1214	1546	11122	29261	4608	6054	4.35	18.93	92.16
12700	4.50	1360	1732	10936	32519	5123	6756	4.33	18.78	102.45
12700	5.00	1505	1916	10751	35714	5624	7446	4.32	18.64	112.48
12700	6.00	1791	2281	10587	41844	6590	8792	4.28	18.35	131.79
13970	2.60	879	1120	14208	26321	3768	4888	4.85	23.50	75.36
13970	2.90	979	1246	14082	29163	4176	5428	4.84	23.40	83.52
13970	3.20	1077	1372	13956	31978	4578	5963	4.83	23.30	91.56
13970	3.60	1209	1539	13789	35605	5106	6670	4.81	23.17	102.12
13970	4.00	1339	1705	13623	39286	5624	7368	4.80	23.04	112.49
13970	4.50	1501	1911	13417	43720	6259	8229	4.78	22.87	123.18
13970	5.00	1661	2116	13212	48054	6880	9076	4.77	22.71	137.59
13970	6.00	1979	2520	12808	56426	8078	10733	4.75	22.59	161.56
16510	2.60	1042	1327	20081	45823	5309	6866	5.75	33.02	106.17
16510	2.90	1160	1478	19931	49613	5809	7630	5.74	32.90	117.78
16510	3.20	1278	1628	19781	53348	6463	8389	5.73	32.78	129.25
16510	3.60	1434	1827	19582	59579	7217	9591	5.71	32.62	144.35
16510	4.00	1589	2024	19384	65716	7961	10383	5.70	32.46	159.22
16510	4.50	1785	2270	19138	73257	8874	11610	5.68	32.27	177.49
16510	5.00	1975	2515	18894	80654	9770	12820	5.66	32.07	195.41
16510	6.00	2355	2999	18409	95025	11511	15195	5.63	31.69	230.22
16510	8.00	3100	3948	17460	14734	14734	19761	5.56	30.93	295.88
16830	2.60	1063	1353	20893	46463	5521	7139	5.86	34.33	110.43
16830	2.90	1183	1507	20739	51546	6126	7934	5.85	34.21	122.51
16830	3.20	1303	1660	20587	56574	6723	8724	5.84	34.09	134.46
16830	3.60	1463	1863	20384	63190	7509	9767	5.82	33.92	150.18
16830	4.00	1621	2065	20182	69709	8284	10800	5.81	33.76	165.68
16830	4.50	1818	2316	19931	77722	9236	12077	5.79	33.56	184.72
16830	5.00	2014	2565	19681	85585	10170	13338	5.78	33.36	203.41
16830	6.00	2402	3059	19187	100869	11957	15812	5.74	32.97	239.74

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mm	mm	kg/m	cm ²	cm ³ /m	cm ⁴	cm ³	cm ³	cm	cm ²	cm ⁴
16830	800	31.63	4029	18218	129727	154.16	20574	5.67	32.20	30832
19370	260	12.26	15.61	27907	71268	75.59	94.96	6.76	45.66	14717
19370	290	13.65	17.58	27750	79121	81.69	105.58	6.75	45.52	163.59
19370	320	15.04	19.15	27583	86900	89.75	116.14	6.74	45.38	179.45
19370	350	16.68	21.50	27318	97155	100.31	130.11	6.72	45.19	200.63
19370	400	18.72	23.64	27084	110779	110.77	143.97	6.71	45.00	221.54
19370	450	21.00	26.75	26793	119752	123.65	161.12	6.69	44.77	247.29
19370	500	23.27	29.64	26504	132023	136.52	178.08	6.67	44.54	272.63
19370	600	27.78	35.38	25950	155972	161.05	211.46	6.64	44.08	322.09
19370	800	36.64	46.67	24801	201554	208.11	276.05	6.57	43.19	416.22
21910	260	13.88	17.68	35934	103626	94.59	121.87	7.65	58.60	188.19
21910	290	15.47	19.70	35733	115107	105.07	135.56	7.64	58.44	210.15
21910	320	17.04	21.70	35532	126492	115.47	149.17	7.63	58.28	230.95
21910	350	19.14	24.37	35266	141522	129.19	167.20	7.62	58.07	256.37
21910	400	21.22	27.03	35000	156384	142.75	185.09	7.61	57.86	285.50
21910	500	26.41	33.63	34340	192804	176.00	229.24	7.57	57.33	351.99
21910	600	31.54	40.17	33686	228195	208.30	272.54	7.54	56.81	416.60
21910	800	41.66	55.06	32397	295963	270.16	356.68	7.47	54.78	540.33
21910	1000	51.58	65.69	31134	359844	328.47	437.56	7.40	54.78	656.95
24450	400	23.73	30.22	43929	218567	178.79	231.38	8.50	72.32	357.57
24450	500	29.54	37.62	43189	269838	220.74	286.84	8.47	71.75	441.49
24450	600	35.30	44.96	42456	319853	261.64	341.37	8.43	71.15	523.28
24450	800	46.67	59.44	41007	416045	340.32	447.63	8.37	70.00	680.65
24450	1000	57.84	73.67	39594	507315	414.98	550.24	8.30	68.86	823.96
27300	500	35.05	42.10	54325	376081	276.98	359.16	9.48	89.81	553.97
27300	600	39.52	50.33	55802	448708	328.72	427.81	9.44	89.16	657.45
27300	800	52.29	66.60	51875	62870	428.70	561.97	9.37	87.86	857.39
27300	1000	64.87	82.62	50273	715409	524.11	692.02	9.31	86.59	1048.22
27300	1200	77.25	96.39	48695	839614	615.10	818.05	9.24	85.33	1230.20
32390	500	39.33	50.09	77388	636942	393.30	508.53	11.28	127.15	796.59
32390	600	47.05	59.92	76405	757247	467.58	606.43	11.24	126.57	935.16
32390	800	62.34	79.39	74458	991008	611.92	798.51	11.17	124.82	1223.84
32390	1000	77.45	98.61	72556	1215834	750.75	965.67	11.10	123.29	1501.49
32390	1200	92.32	117.58	70639	1431956	884.20	1167.96	11.04	121.78	1768.39
35560	600	51.74	65.90	92725	1007055	566.40	733.39	12.36	152.82	1132.80
35560	800	68.59	87.36	90579	1320137	742.48	966.78	12.29	151.11	1484.97
35560	1000	85.25	108.57	88457	1622350	912.46	1194.75	12.22	149.42	1824.92
35560	1200	101.70	129.53	86361	1913947	1076.46	1417.31	12.16	147.76	2152.92
37700	600	54.91	69.93	104635	1203501	638.46	825.92	13.12	172.10	1276.92
37700	800	72.81	92.74	102354	1579185	837.76	1089.46	13.05	170.28	1675.55
37700	1000	90.52	115.30	100098	1942587	1050.56	1347.22	12.98	168.49	2061.10
37700	1200	108.04	137.60	97868	2293976	1216.96	1599.28	12.91	166.71	2433.93
40640	600	59.26	75.47	122170	1512833	744.50	961.99	14.16	200.45	1489.01
40640	800	78.62	100.13	119704	1987389	978.05	1269.95	14.09	198.48	1956.09
40640	1000	97.78	124.53	117264	24475.81	1204.52	1571.66	14.02	196.54	2409.04
40640	1200	116.74	148.69	114849	28937.01	1424.07	1867.19	13.95	194.62	2848.13

A - Thickness		Tolerance		B- Weight		Tolerance		Length Tolerance	
1. Light Tubes	+ not limited -8%	1. Single Tube (Light Series)	+10% -8%	1. Weight	±10%	1. Tolerance	±10%	1. Length	Unless otherwise
2. Medium & Heavy Tubes	+ not limited -10%	2. Single Tube (Medium & Heavy Series)	+7.5% - 5%	2. Single Tube (Medium & Heavy Series)	±10%	2. Single Tube (Medium & Heavy Series)	±10%	2. Single Tube (Medium & Heavy Series)	Specified 4 to 7 mtrs.
		3. For quantities per load of 10 tonnes		3. For quantities per load of 10 tonnes		3. For quantities per load of 10 tonnes		3. For quantities per load of 10 tonnes	Can also be supplied in
		minimum (Light Series)		minimum (Light Series)		minimum (Light Series)		minimum (Light Series)	FK Lengths ±5cm.
		4. For quantities per load of 10 tonnes		4. For quantities per load of 10 tonnes		4. For quantities per load of 10 tonnes		4. For quantities per load of 10 tonnes	
		minimum (Medium and Heavy Series)		minimum (Medium and Heavy Series)		minimum (Medium and Heavy Series)		minimum (Medium and Heavy Series)	

UPCOMING SIZES

CHS (Circular Hollow Section) Sizes

SIZE	21.3	26.9	33.7	42.4	48.3	60.3	76.1	88.9	101.6	114.3	127.0	139.7	152.4	165.1	168.3	193.7	219.1	244.5	273.0	323.9	353.6	377.0	406.4	
1.6																								
1.8																								
2.0																								
2.3																								
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5.0																								
5.5																								
6.0																								
8.0																								
10.0																								
12.0																								



IRO SKYWALK, PWD, NEW DELHI

TUBULAR CONNECTION

WELDED AND BOLTED CONNECTION

Beams and columns are usually connected on site by bolting. In the case of an RHS beam connection to an I-section column, a welded extended end-plate to the RHS beam permits the use of a conventional bolted connection to the column flange or web (see Figure 1 a). The bolts may be countersunk into the thick end-plate if the connection is important visually. A number of typical simple connections using cleats welded to an RHS column are shown in Figures 1 b to c. Figure 1(b) shows a fin plate welded to the face of the column and the supporting bracket can be detailed to be visually interesting. Figure 1(c) shows the use of channels welded at the tips of their flanges.

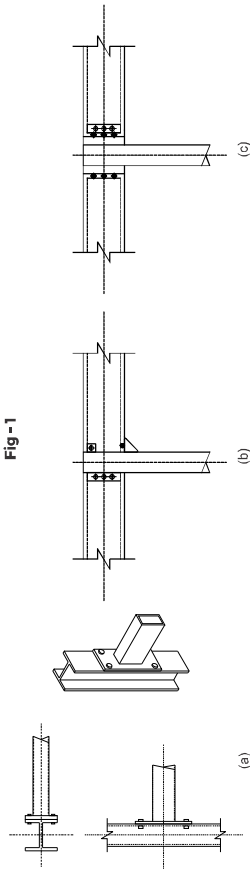


Fig - 1

Connection of RHS beam to I-section column

Conventional cleats welded to an RHS column

C-sections welded to an RHS column to facilitate the use of a bolted connection

VIERENDEEL TRUSSES

are relatively inefficient at resisting high shear-forces because of the lack of diagonal bracing and, therefore, it is necessary to use thicker or larger chord members than in triangulated trusses. Ideally, the chord and vertical members should be the same external size. If not, stiffening elements are generally inserted to increase the local bending resistance of the connections. Figure 2 shows various ways in which nominally pinned connections can be strengthened in Vierendeel trusses.

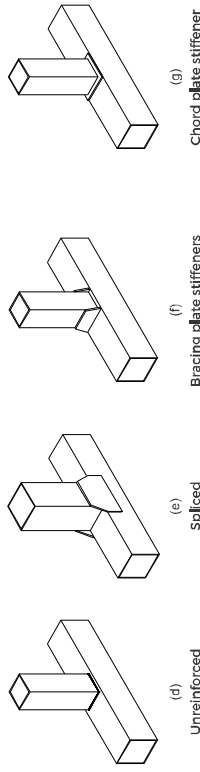


Fig - 2

Various ways in which normally pinned connection can be strengthened Fig - 2 (a) (b) (c)

REINFORCEMENT OF CONNECTIONS

For maximum resistance of the members, it is usually more efficient to select larger tubular sections with thin walls. However, when designing the connections, it is more advantageous to use chord members that are thicker and smaller in section (provided that they are not smaller than the bracing members). Therefore, a compromise is necessary for equal design and fabrication efficiency. In some cases, connections may have to be strengthened locally to resist the applied forces. It is not possible to increase the member size or thickness. This can be achieved by welding flanges to the chord face (see Figure 3(a)). It should also be noted that overlaps will also increase the connection resistance, especially for RHS members. When a third member is required at the intersection, an 'M' piece can also be used (see Figure 3(b)).

Other non-standard stiffened K connections can be used to increase the load capacity of the connection, as illustrated in Figure 3(c&d).

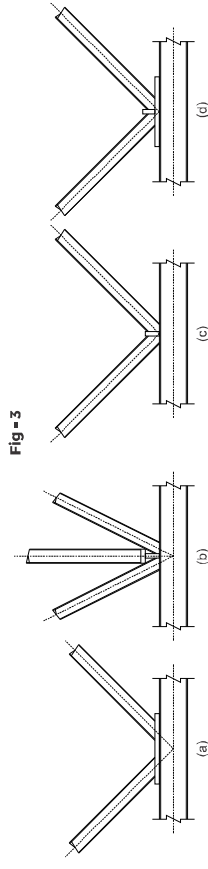


Fig - 3

COLUMN BASES

Bases to tubular columns take two basic forms: pinned and rigid (or moment-resisting). The details employed reflect the transfer of forces and moments. A genuine pinned connection can be achieved by a single pin from a projecting plate, as shown in Figure 4.

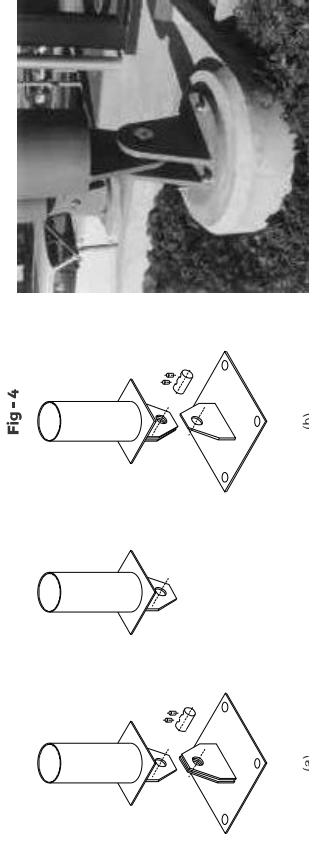


Fig - 4

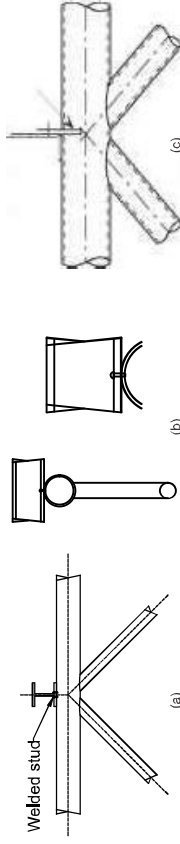
Some examples of tubular connections with pinned ends

WELDED FINNS

Fins or brackets may be welded to the side of CHS or SHS/RHS sections to provide direct attachment of secondary members such as purlins (see Figure 5). Connections of this type require careful design because of the possible local distortion of the walls of larger hollow sections. Alternatively, welded threaded studs with extended washers may be used to attach the purlins to the section.

The attachment of tension-ties or rod-bracing members requires similar details. High local forces from ties may also be transferred by 'patch-type' connections, which may be profiled around the circular section so that weld forces are transferred smoothly to the walls of the section. Multiple welded fin connections have been used successfully on a number of major projects, such as at the Cologne Airport bases at the Cologne Airport terminal, as shown in Figure 5(d).

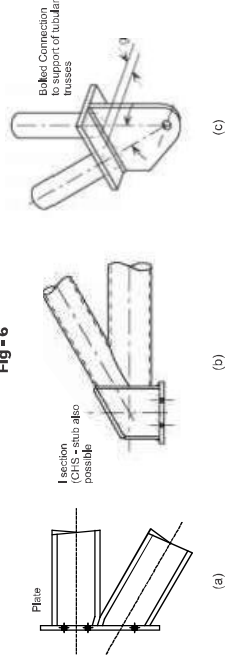
Fig - 5



5(d)

Bolted connections are desirable for site assembly, and large welded sub-assemblies that are preabricated and bolted together on site at suitable locations. The practical aspects of installation should be considered in the design process. For example, Figure 6 shows

Fig - 6



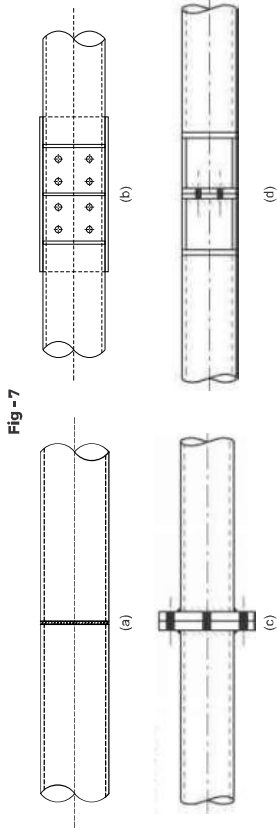
(c)

(b)

(a)

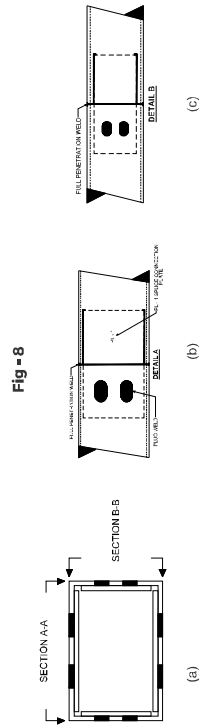
TUBULAR SPLICE CONNECTION

FLANGE PLATES (Figure -7) are simple to make but are not aesthetically pleasing. They are suitable for compression but are less efficient for tension because of bending in the end plate, requiring thicker plates and more bolts. Fillet welding around the section could cause distortion of thin flange plates.



Moment-resisting connection is achieved by a welded end-plate with four or more bolts. The thickness of the end plate depends on the moment to be transferred.

SPLICE CONNECTION WITH PLUG WELDING



Interesting details can be created using cast iron or cast steel nodes in a pinned connection

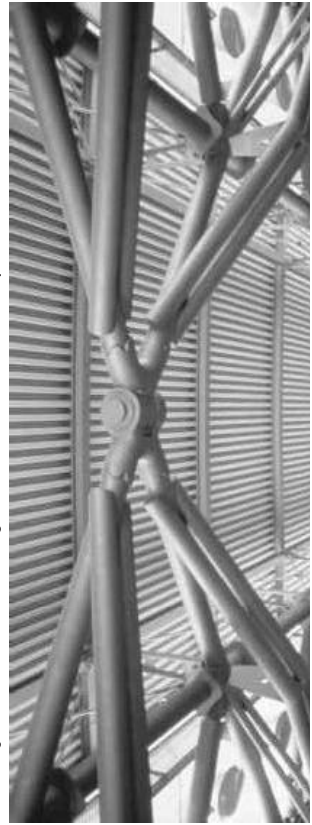


Fig - 9

TUBULAR TRUSS

Connections in trusses and lattice construction Figure -10 Two-dimensional trusses

Tubular sections are commonly used in long-span trusses for reasons of aesthetics and structural efficiency. Generally, CHS members are used for both the chords and bracing members, and a typical welded connection is illustrated in Figure - 10 However, the top and bottom chords may use RHS rather than CHS members in order to facilitate

Fig - 10



The connection with the roof or floor slab and other cross-members

For the connection of tubular trusses to RHS columns, typical bolted details are shown in Figure 11. High shear forces may require the use of more bolts than shown. The sharing of load between the upper and lower chords in the connection depends on the presence of a vertical bracing member at the end of the truss. In the detail of Figure 11(a), the upper connection will resist all of the applied shear force. In Figure 11(b), the upper and lower parts of the connections may be assumed to resist equal shear force.

Fig - 11

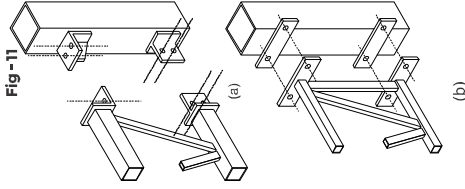


Fig - 12

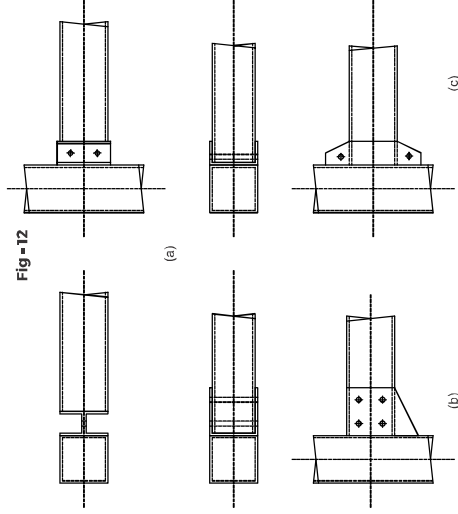


Figure 11(a&b) - Truss to SHS/RHS column connection

Figure 12 shows other typical connections of an RHS beam to an RHS column. For lightly loaded connections, the T-section shown in Figure 12(a) may be replaced with a fin plate. Where through bolting is used (as in Figure 12(b) and Figure 12(c)), spacer tubes

Typical connection of an RHS beam to an RHS column a,b&c