Hollow Section

SQURE HOLLOW SECTIONS

The use of steel tubular sections provides for strong, light and profitable structures and as a result offer a host of possibilities in terms of application (expressive capacity). The use of these products also facilitates designs with a greater aesthetic appeal.

Their main advantages are as follows :

Design

- Lighter and more diaphanous structures. Pieces of greater length with fewer joints.
- Large spans. More transparent trusses and purlins with the possibility of eliminating transversal bracing.
- More slender supports. Fewer sections, which can be reduced even more with the use of tubular sections filled with concrete.
- Economical solution. Easily executed direct joints, shorter construction times and easy maintenance, are the results of a correct design and the guarantee of a competitive delivery date and price.
- Expressive capacity. Circular, square, rectangular and elliptical sections, a range of wall thicknesses for every dimension of tubular section, absence of sharp edges,etc. These are the elements that provide innovating, wide ranging possibilities forarchitects and engineers.

Strength

- Compression. For the same centred compression load and under the same conditions tubular sections allow for the use of longer elements than possible should open sections be used. If pillars are involved, a concrete fill permits to reduce further the amount of sections used.
- Torsion. Their stiffness is the highest of all commercial steel sections. For this reason, their behaviour is unbeatable in the case of lateral bulging or warpage.
- Bending. Due to the distribution of material on two axes, their behaviour in bending in two directions, is close to that of a beam and better than that of open sections.
- Tensile. The use of welded joints throughout their extension means that the resistant section in the joints is used completely, unlike bolted joints or those with gusset plates.
- Fatigue. The wide range of mechanical applications in which we can find steel tubular sections are eloquent proof of their perfect behaviour in these conditions.
- Fluid-dynamic. Their low opposition to the thrust of fluids allows lighter sections to be used and makes them the perfect element in outdoor or underwater structures, such as posts, masts, towers, cranes, etc.

Safety

Protecting steel tubular sections by means of surface coating is easier and more economical than open sections due to the absence of cavities and the lower surface area to be covered.

Passive protection

Structures made from Tubular Sections offer higher fire resistance than open sections due to a lower surface area exposed to fire in relation to mass(lower form factor/mass). Mixed structures based on tubular sections filled with concrete, show excellent behaviour in the presence of fire because of a delay due to the higher thermal inertia.

Active protection

Filled with water, or when water flows through them due to the thermalsiphon effect, irrigated structures provide almost unlimited fire resistance. Maintenance of water circulation, with the replacement of any losses that might occur due to vaporisation, ensures that the structure is cooled in such a way that gradually the temperature stabilizes at values not very much higher than the water status change temperature and very much lower, therefore, than the critical temperature of steel. In addition to:

- Introducing longer elements in structures.
- Reducing the number of joints.
- Eliminating struts.
- Stiffeners and plate brackets, to reduce weight.
- A concrete fill increases the surface area per floor.
- Their shape facilitates maintenance and represents an economic solution.

RECTANGULAR HOLLOW SECTIONS

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Dimensions & Properties of Square Hollow Sections

SHS D x B mm	Thickness t mm	Sec Area A cm^2	Unit Wt w kg/m	Moment of Inertia		Radius of Gyration		Elastic Modulus		Torsional Constants		Outer Surface
				I_{xx} cm^4	I_{yy} cm^4	r_{xx} cm	r_{yy} cm	$z_{xx}cm^3$	$z_{yy}cm^3$	J cm^4	B cm^3	Area per m m^2
25 x 25	1.6	1.43	1.12	1.28	1.28	0.94	0.94	1.02	1.02	1.96	1.46	0.092
	2.0	1.74	1.36	1.48	1.48	0.92	0.92	1.19	1.19	2.29	1.68	0.090
	2.6	2.16	1.69	1.72	1.72	0.89	0.89	1.38	1.38	2.68	1.92	0.087
	3.2	2.53	1.98	1.89	1.89	0.86	0.86	1.51	1.51	2.96	2.07	0.084
32 x 32	2.0	2.30	1.80	3.36	3.36	1.21	1.21	2.10	2.10	5.30	3.05	0.118
	2.6	2.88	2.26	4.02	4.02	1.18	1.18	2.51	2.51	6.45	3.63	0.115
	3.2	3.42	2.69	4.54	4.54	1.15	1.15	2.84	2.84	7.41	4.07	0.112
38 x 38	2.0	2.78	2.18	5.88	5.88	1.46	1.46	3.10	3.10	9.31	4.54	0.142
	2.6	3.51	2.75	7.14	7.14	1.43	1.43	3.76	3.76	11.51	5.49	0.139
	3.2	4.19	3.29	8.18	8.18	1.40	1.40	4.30	4.30	13.45	6.28	0.136
	4.0	5.03	3.95	9.26	9.26	1.36	1.36	4.87	4.87	15.67	7.12	0.131

40 x 40	2.6	3.72	2.92	8.45	8.45	1.51	1.51	4.22	4.22	13.63	6.20	0.147
	2.9	4.09	3.21	9.11	9.11	1.49	1.49	4.56	4.56	14.85	6.68	0.145
	3.2	4.45	3.49	9.72	9.72	1.48	1.48	4.86	4.86	16.00	7.12	0.144
	4.0	5.35	4.20	11.07	11.07	1.44	1.44	5.54	5.54	18.75	8.12	0.139
50 x 5	2.6	4.76	3.74	17.47	17.47	1.92	1.92	6.99	6.99	28.53	10.37	0.187
	2.9	5.25	4.12	18.99	18.99	1.90	1.90	7.60	7.60	31.15	11.23	0.185
	3.6	6.35	4.98	22.15	22.15	1.87	1.87	8.86	8.86	36.58	12.98	0.181
	4.5	7.67	6.02	25.50	25.50	1.82	1.82	10.20	10.20	41.99	14.68	0.177
60 x 60	2.6	5.80	4.55	31.33	31.33	2.33	2.33	10.44	10.44	50.08	15.52	0.227
	2.9	6.41	5.03	34.21	34.21	2.31	2.31	11.40	11.40	56.12	16.95	0.225
	3.2	7.01	5.50	36.94	36.94	2.30	2.30	12.31	12.31	60.02	18.31	0.224
	4.0	8.55	6.71	43.55	43.55	2.26	2.26	14.52	14.52	72.41	21.62	0.219
	4.8	10.01	7.85	49.22	49.22	2.22	2.22	16.41	16.41	83.86	24.51	0.215
72 x 72	3.2	8.54	6.71	66.32	66.32	2.79	2.79	18.42	18.42	106.81	27.47	0.272
	4.0	10.47	8.22	79.03	79.03	2.75	2.75	21.95	21.95	129.85	32.78	0.267
	4.8	12.31	9.66	90.31	90.31	2.71	2.71	25.09	25.09	151.55	37.55	0.263
80 x 80	3.2	9.57	7.51	92.71	92.71	3.11	3.11	23.18	23.18	148.55	34.60	0.304
	4.0	11.75	9.22	111.04	111.04	3.07	3.07	27.76	27.76	181.22	41.49	0.299
	4.8	13.85	10.87	127.58	127.58	3.04	3.04	31.89	31.89	212.26	47.77	0.295
91.5 x 91.5	3.6	12.32	9.67	156.49	156.49	3.56	3.56	34.21	34.21	251.17	51.14	0.347
	4.5	15.14	11.88	187.57	187.57	3.52	3.52	41.00	41.00	306.78	61.40	0.343
	5.4	17.85	14.01	215.68	215.68	3.48	3.48	47.14	47.14	359.76	70.77	0.338
113.5 x 113.5	4.8	20.28	15.92	393.30	393.30	4.40	4.40	69.30	69.30	637.45	103.89	0.429
	5.4	22.60	17.74	432.58	432.58	4.38	4.38	76.23	76.23	708.69	114.41	0.426

132 x 132	4.8	23.83	18.71	634.39	634.39	5.16	5.16	96.12	96.12	1018.30	144.11	0.503
	5.4	26.59	20.88	700.11	700.11	5.13	5.13	106.08	106.08	1134.25	159.18	0.500
	4.0	22.95	18.01	807.82	807.82	5.93	5.93	107.71	107.71	1273.46	161.38	0.579
	5.0	28.36	22.26	982.12	982.12	5.89	5.89	130.95	130.95	1569.09	196.38	0.574
150x150	6.0	33.63	26.40	1145.91	1145.91	5.84	5.84	152.79	152.79	1856.18	229.44	0.569
	7.0	38.78	30.44	1299.44	1299.44	5.79	5.79	173.26	173.26	2134.99	260.65	0.564
	8.0	43.79	34.38	1443.00	1443.00	5.74	5.74	192.40	192.40	2405.78	290.12	0.559
	4.0	27.75	21.78	1421.74	1421.74	7.16	7.16	157.97	157.97	2224.31	236.76	0.699
	5.0	34.36	26.97	1736.87	1736.87	7.11	7.11	192.99	192.99	2747.93	289.40	0.694
180 x 180	6.0	40.83	32.05	2036.52	2036.52	7.06	7.06	226.28	226.28	3259.23	339.65	0.689
	7.0	47.18	37.03	2321.04	2321.04	7.01	7.01	257.89	257.89	3758.53	387.59	0.684
	8.0	53.39	41.91	2590.73	2590.73	6.97	6.97	287.86	287.86	4246.16	433.32	0.679
	4.0	34.15	26.61	2639.14	2639.14	8.79	8.79	239.92	239.92	4099.49	359.65	0.859
	5.0	42.36	33.25	3238.02	3238.02	8.74	8.74	294.37	294.37	5076.22	441.43	0.854
220 x 220	6.0	50.43	39.59	3813.36	3813.36	8.70	8.70	346.67	346.67	6034.53	520.18	0.849
	7.0	58.38	45.83	4365.55	4365.55	8.65	8.65	396.67	396.67	6974.82	596.00	0.844
	8.0	66.19	51.96	4894.99	4894.99	8.60	8.60	445.00	445.00	7897.48	668.99	0.839
	4.0	38.95	30.57	3907.30	3907.30	10.02	10.02	312.58	312.58	6045.40	468.61	0.979
	5.0	48.36	37.96	4805.01	4805.01	9.97	9.97	384.40	384.40	7494.83	576.44	0.974
250 x 250	6.0	57.63	45.24	5672.00	5672.00	9.92	9.92	453.76	453.76	8920.44	680.77	0.969
	7.0	66.78	52.42	6508.73	6508.73	9.87	9.87	520.70	520.70	10322.70	781.69	0.964
	8.0	75.79	59.50	7315.65	7315.65	9.82	9.82	582.25	582.25	11702.07	879.31	0.959

CIRCULAR HOLLOW SECTIONS

Major Application of Structural Tubes :

Our wide range of steel scaffolding pipes are of superior quality which meet the international standard and guidelines. The pipes are made from high quality Hot Rolled Coils, making it highly erosion resistance. They are available in various specifications. The scaffolding pipes are used in the construction or repair of buildings for supporting the structure.Thick steel scaffolding pipes are used to support heavy platforms, which hold heavy loads & withstand movements. Generally made of hot dipped galvanized steel, so as to offer long term corrosion resistance, even Black pipes are used depending upon the usage conditions.

Other Application of Structural Steel Tubes :

- Casing
- Columns
- Fence
- Handrails
- Load Bearing Structure
- Piling
- Posts
- Poles
- Railings
- Scaffolding
- Sign poles
- Skywalks
- Towers

IS : 1161-1998/BS 1139/1775

N.B. and Series		Stip Width	Outside Diameter	Thickness	Nominal Weight Black Tubes Plain End		Calculated Nominal Weight Galvanised Tubes Plain End	
mm		mm	Max.	mm	Kg/m	M/Ton	Kg/m	M/Ton
15	L M H	64 63 61	21.3	2.0 2.6 3.2	0.947 1.210 1.440	1056 826 694	1.00 1.26 1.49	1003 794 671
20	L M H	81 80 78	26.9	2.3 2.6 3.2	1.380 1.560 1.870	724 641 534	1.43 1.61 1.92	699 621 521
25	L M H	101 99 98	33.7	2.6 3.2 4.0	1.980 2.410 2.930	505 415 341	2.03 2.46 2.98	493 407 336
32	L M H	128 127 126	42.4	2.6 3.2 4.0	2.540 3.100 3.790	393 322 264	2.62 3.18 3.87	382 314 258
40	L M H	147 146 145	48.3	2.9 3.2 4.0	3.230 3.560 4.370	309 281 229	3.34 3.67 4.48	299 272 223
50	L M H	184 182 180	60.3	2.9 3.6 4.5	4.080 5.030 6.190	245 199 161	4.20 5.15 6.31	238 194 158
65	L M H	234 233 231	76.1	3.2 3.6 4.5	5.710 60420 7.930	175 155 126	5.86 6.57 8.10	171 152 123
80	L M H	274 272 271	88.9	3.2 4.0 4.8	6.720 8.360 9.900	149 119 101	6.90 8.54 10.08	145 117 99
100	L M H	354 352 349	114.3	3.6 4.5 5.4	9.750 12.200 14.500	102 82 69	9.97 12.42 14.72	100 81 68
125	M H	433 432	139.7	4.8 5.4	15.900 17.900	63 56	16.15 18.15	62 55
150	M H	513 512	165.1	4.8 5.4	18.900 21.300	53 47	19.80 21.70	51 46
150	L M H		168.3	4.50 4.85 5.40 6.30	18.1 19.6 21.7 25.3	55 51 46 40	18.50 20.00 22.10 25.7	54 50 45 39
175	L M H		193.7	4.85 5.40 5.90	22.60 25.00 27.30	44 40 37	23.13 25.53 27.83	43 39 36
200	L M H		219.1	4.85 5.60 5.90	25.7 29.4 31.0	39 34 32	26.24 29.94 31.54	38 33 32
250	H		273.0	5.90	38.8	26	39.56	25
300	H		323.9	6.3	49.5	20	50.40	20
350	H		355.6	8.00	68.6	14.50	69.58	14

A. PHYSICAL PROPERTIES			
Grade	Y.S. (min.)	T.S. (min)	%age
	Mpa (Kg/mm^2)	Mpa (Kg/mm^2)	Elongation
YST-210	210 (21.42)	330 (33.66)	20
YST-240	240 (24.48)	410 (41.82)	17

B. STANDARD TOLERANCE		
1	**Outside Diameter**	
	Upto & including 48.3 mm	+0.4mm
		-0.8mm
	Over 48.3 mm	+1%
		-1%
2	**Thickness**	+Not Limited -10%
3	**Weight**	
	Singl Tube (Light)	+10%
		-8%
	Single Tube (Midium & Heavy)	±10%
	10 Tonne Lots (Light)	+5%
	10 Tonne Lots (Midium & Heavy)	±7.5%