COLD FORMED HOLLOW SECTIONS *for* GENERAL STRUCTURAL PURPOSES

HOLLOW SECTIONS

MAIN SPECIFICATIONS

Clarification	Specification	Designation of Grade	Mechanical Properties					Chemical Composition %								Impact Properties	
			Tensile Strength N/mm²		Yield Strength Min.	Elongation Min.		C	Si	Mn	P	S	Mo	Al	CEV	Test Temperature	Min average absorbed energy for standard test piece
						CHS	RHS or SHS										
			t < 3mm	3mm ≤ t ≤ 40mm	N/mm²	%		Max	Max	Max	Max	Max	Max	Max	Max	°C	J
Cold formed welded structural hollow sections of non-alloy and fine grain steels	BS EN 10219	S235JRH	360-510	340-470	235	24		0.17	-	1.40	0.045	0.045	-	-	0.35	20	27
		S275JRH	430-580	410-560	275	20		0.20	-	1.50	0.040	0.040	-	-	0.40	20	27
		S275J0H	430-580	410-560	275	20		0.20	-	1.50	0.040	0.040	-	-	0.40	0	27
		S275J2H	430-580	410-560	275	20		0.20	-	1.50	0.035	0.035	-	-	0.40	-20	27
		S355JRH	510-680	490-630	355	20		0.22	0.55	1.60	0.040	0.040	-	-	0.45	20	27
		S355J0H	510-680	490-630	355	20		0.22	0.55	1.60	0.040	0.040	-	-	0.45	0	27
		S355J2H	510-680	490-630	355	20		0.22	0.55	1.60	0.035	0.035	-	-	0.45	-20	27
Carbon Steel Square Pipes for General Structural Purposes	JIS G 3466	STKR 400	400		245	-	23 (N1)	0.25	-	-	0.04	0.04	-	-	-	-	-
		STKR 490	490		325	-	23 (N1)	0.18	0.55	1.50	0.04	0.04	-	-	-	-	-
Carbon Steel Tubes for General	JIS G 3444	STK 290	290		-	30 (N1) 20 (N2)	-	-	-	-	0.050	0.050	-	-	-	-	-
		STK 400	400		235	23 (N1) 18 (N2)	-	0.250	-	-	0.040	0.040	-	-	-	-	-
		STK 500	500		355	15 (N1) 10 (N2)	-	0.300 to 1.00	0.300	0.350	0.040	0.040	-	-	-	-	-
		STK 540	540		390	20 (N1) 16 (N2)	-	0.230	1.500	0.550	0.040	0.040	-	-	-	-	-
Square & Rectangular Hollow Sections	ASTM A-500	Grade A	310		269	As specified in A-500 specification		0.30	-	-	0.045	0.045	-	-	-	-	-
		Grade B	400		317			0.30	-	-	0.045	0.045	-	-	-	-	-
		Grade C	427		345			0.27	-	1.35	0.035	0.035	-	-	-	-	-
		Grade D	400		250			0.30	-	-	0.045	0.045	-	-	-	-	-
Circular Hollow Section	ASTM A-500	Grade A	310		230	25		0.30	-	-	0.045	0.045	-	-	-	-	-
		Grade B	400		290	23		0.30	-	-	0.045	0.045	-	-	-	-	-
		Grade C	425		315	21		0.27	-	1.35	0.035	0.035	-	-	-	-	-
		Grade D	400		250	23		0.30	-	-	0.045	0.045	-	-	-	-	-

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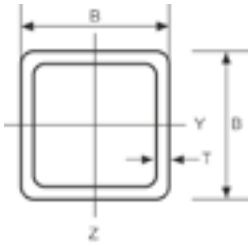
HOLLOW SECTIONS

COLD FORMED SQUARE HOLLOW SECTIONS

EN10219 : Part 2

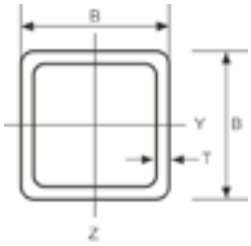


Size	Thickness	Mass	Sectional Area	Moment of Inertia	Radius of Gyration	Elastic Modulus	Plastic Modulus	Torsional Constants		Superficial area / m	Approx. length/ tonne
B x B mm	T mm	M kg/m	A cm^2	I cm^4	i cm	W_{el} cm^3	W_{pl} cm^3	I_t cm^4	C_t cm^3	A_s m^2/m	m/t
25 x 25	2.0	1.36	1.74	1.48	0.924	1.19	1.47	2.53	1.80	0.093	733
	2.5	1.64	2.09	1.69	0.899	1.35	1.71	2.97	2.07	0.091	610
30 x 30	2.0	1.68	2.14	2.72	1.13	1.81	2.21	4.54	2.75	0.113	596
	2.5	2.03	2.59	3.16	1.10	2.10	2.61	5.40	3.20	0.111	492
	3.0	2.36	3.01	3.50	1.08	2.34	2.96	6.15	3.58	0.110	423
40 x 40	2.0	2.31	2.94	6.94	1.54	3.47	4.13	11.3	5.23	0.153	434
	2.5	2.82	3.59	8.22	1.51	4.11	4.97	13.6	6.21	0.151	355
	3.0	3.30	4.21	9.32	1.49	4.66	5.72	15.8	7.07	0.150	303
	4.0	4.20	5.35	11.1	1.44	5.54	7.01	19.4	8.48	0.146	238
50 x 50	2.5	3.60	4.59	16.9	1.92	6.78	8.07	27.5	10.2	0.191	278
	3.0	4.25	5.41	19.5	1.90	7.79	9.39	32.1	11.8	0.190	236
	4.0	5.45	6.95	23.7	1.85	9.49	11.7	40.4	14.4	0.186	183
	5.0	6.56	8.36	27.0	1.80	10.8	13.7	47.5	16.6	0.183	152
60 x 60	3.0	5.19	6.61	35.1	2.31	11.7	14.0	57.1	17.7	0.230	193
	4.0	6.71	8.55	43.6	2.26	14.5	17.6	72.6	22.0	0.226	149
	5.0	8.13	10.4	50.5	2.21	16.8	20.9	86.4	25.6	0.223	123
	6.0	9.45	12.0	56.1	2.16	18.7	23.7	98.4	28.6	0.219	106
70 x 70	3.0	6.13	7.81	57.5	2.71	16.4	19.4	92.4	24.7	0.270	163
	3.5	7.06	8.99	65.1	2.69	18.6	22.2	106	28.0	0.268	142
	4.0	7.97	10.1	72.1	2.67	20.6	24.8	119	31.1	0.266	126
	5.0	9.70	12.4	84.6	2.62	24.2	29.6	142	36.7	0.263	103
	6.0	11.3	14.4	95.2	2.57	27.2	33.8	163	41.4	0.259	88.3
80 x 80	3.0	7.07	9.01	87.8	3.12	22.0	25.8	140	33.0	0.310	141
	3.5	8.16	10.4	99.8	3.10	25.0	29.5	161	37.6	0.308	123
	4.0	9.22	11.7	111	3.07	27.8	33.1	180	41.8	0.306	108
	5.0	11.3	14.4	131	3.03	32.9	39.7	218	49.7	0.303	88.7
	6.0	13.2	16.8	149	2.98	37.3	45.8	252	56.6	0.299	75.7
90 x 90	3.0	8.01	10.2	127	3.53	28.3	33.0	201	42.5	0.350	125
	3.5	9.26	11.8	145	3.51	32.2	37.9	232	48.5	0.348	108
	4.0	10.5	13.3	162	3.48	36.0	42.6	261	54.2	0.346	95.4
	5.0	12.8	16.4	193	3.43	42.9	51.4	316	64.7	0.343	77.9
	6.0	15.1	19.2	220	3.39	49.0	59.5	368	74.2	0.339	66.2
100 x 100	3.0	8.96	11.4	177	3.94	35.4	41.2	279	53.2	0.390	112
	4.0	11.7	14.9	226	3.89	45.3	53.3	362	68.1	0.386	85.2
	5.0	14.4	18.4	271	3.84	54.2	64.6	441	81.7	0.383	69.4
	6.0	17.0	21.6	311	3.79	62.3	75.1	514	94.1	0.379	58.9
	8.0	21.4	27.2	366	3.67	73.2	91.1	645	114	0.366	46.8
120 x 120	3.0	10.8	13.8	312	4.76	52.1	60.2	488	78.2	0.470	92.3
	4.0	14.2	18.1	402	4.71	67.0	78.3	637	101	0.466	70.2
	5.0	17.5	22.4	485	4.66	80.9	95.4	778	122	0.463	57.0
	6.0	20.7	26.4	562	4.61	93.7	112	913	141	0.459	48.2
	8.0	26.4	33.6	677	4.49	113	138	1163	175	0.446	37.9
	10.0	31.8	40.6	777	4.38	129	162	1376	203	0.437	31.4
140 x 140	4.0	16.8	21.3	652	5.52	93.1	108	1023	140	0.546	59.7
	5.0	20.7	26.4	791	5.48	113	132	1256	170	0.543	48.3
	6.0	24.5	31.2	920	5.43	131	155	1479	198	0.539	40.8
	8.0	31.4	40.0	1127	5.30	161	194	1901	248	0.526	31.8
	10.0	38.1	48.6	1312	5.20	187	230	2274	291	0.517	26.2

HOLLOW SECTIONS

COLD FORMED SQUARE HOLLOW SECTIONS

EN10219:Part 2



Size	Thickness	Mass	Sectional Area	Moment of Inertia	Radius of Gyration	Elastic Modulus	Plastic Modulus	Torsional Constants		Superficial area / m	Approx. length/ tonne
B x B mm	T mm	M kg/m	A cm^2	I cm^4	i cm	W_{el} cm^3	W_{pl} cm^3	I_t cm^4	C_t cm^3	A_s m^2/m	m/t
150 x 150	4.0	18.0	22.9	808	5.93	108	125	1265	162	0.586	55.5
	5.0	22.3	28.4	982	5.89	131	153	1554	197	0.583	44.9
	6.0	26.4	33.6	1146	5.84	153	180	1833	230	0.579	37.9
	8.0	33.9	43.2	1412	5.71	188	226	2364	289	0.566	29.5
	10.0	41.3	52.6	1653	5.61	220	269	2839	341	0.557	24.2
160 x 160	4.0	19.3	24.5	987	6.34	123	143	1541	185	0.626	51.9
	5.0	23.8	30.4	1202	6.29	150	175	1896	226	0.623	42.0
	6.0	28.3	36.0	1405	6.25	176	206	2239	264	0.619	35.4
	8.0	36.5	46.4	1741	6.12	218	260	2897	334	0.606	27.4
	10.0	44.4	56.6	2048	6.02	256	311	3490	395	0.597	22.5
180 x 180	5.0	27.0	34.4	1737	7.11	193	224	2724	290	0.703	37.1
	6.0	32.1	40.8	2037	7.06	226	264	3223	340	0.699	31.2
	6.3	33.3	42.4	2096	7.03	233	273	3383	354	0.693	30.0
	8.0	41.5	52.8	2546	6.94	283	336	4189	432	0.686	24.1
	10.0	50.7	64.6	3017	6.84	335	404	5074	515	0.677	19.7
	12.0	58.5	74.5	3322	6.68	369	454	5865	584	0.658	17.1
	12.5	60.5	77.0	3406	6.65	378	467	6050	600	0.656	16.5
200 x 200	5.0	30.1	38.4	2410	7.93	241	279	3763	362	0.783	33.2
	6.0	35.8	45.6	2833	7.88	283	330	4459	426	0.779	27.9
	6.3	37.2	47.4	2922	7.85	292	341	4682	444	0.773	26.8
	8.0	46.5	59.2	3566	7.76	357	421	5815	544	0.766	21.5
	10.0	57.0	72.6	4251	7.65	425	508	7072	651	0.757	17.6
	12.0	66.0	84.1	4730	7.50	473	576	8230	743	0.738	15.2
	12.5	68.3	87.0	4859	7.47	486	594	8502	765	0.736	14.6
250 x 250	6.0	45.2	57.6	5672	9.92	454	524	8843	681	0.979	22.1
	6.3	47.1	60.0	5873	9.89	470	544	9290	711	0.973	21.2
	8.0	59.1	75.2	7229	9.80	578	676	11598	878	0.966	16.9
	10.0	72.7	92.6	8707	9.70	697	822	14197	1062	0.957	13.8
	12.0	84.8	108	9859	9.55	789	944	16691	1226	0.938	11.8
	12.5	88.0	112	10161	9.52	813	975	17283	1266	0.936	11.4
300 x 300	6.0	54.7	69.6	9964	12.0	664	764	15434	997	1.18	18.3
	6.3	57.0	72.6	10342	11.9	689	795	16218	1042	1.17	17.5
	8.0	71.6	91.2	12801	11.8	853	991	20312	1293	1.17	14.0
	10.0	88.4	113	15519	11.7	1035	1211	24966	1572	1.16	11.3
	12.0	104	132	17767	11.6	1184	1402	29514	1829	1.14	9.65
	12.5	108	137	18348	11.6	1223	1451	30601	1892	1.14	9.30
350 x 350	6.0	64.1	81.6	16008	14.0	915	1049	24683	1372	1.38	15.6
	6.3	66.9	85.2	16645	14.0	951	1093	25939	1436	1.37	14.9
	8.0	84.2	107	20681	13.9	1182	1366	32557	1787	1.37	11.9
	10.0	104	133	25189	13.8	1439	1675	40127	2182	1.36	9.61
	12.0	123	156	29054	13.6	1660	1949	47598	2552	1.34	8.16
	12.5	127	162	30045	13.6	1717	2020	49393	2642	1.34	7.86
400 x 400	6.0	73.5	93.6	24104	16.0	1205	1379	37039	1808	1.58	13.6
	6.3	76.8	97.8	25096	16.0	1255	1438	38925	1892	1.57	13.0
	8.0	96.7	123	31269	15.9	1563	1800	48934	2362	1.57	10.3
	10.0	120	153	38216	15.8	1911	2214	60431	2892	1.56	8.35
	12.0	141	180	44319	15.7	2216	2587	71843	3395	1.54	7.07
	12.5	147	187	45877	15.7	2294	2683	74598	3518	1.54	6.81

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HOLLOW SECTIONS

COLD FORMED RECTANGULAR HOLLOW SECTIONS

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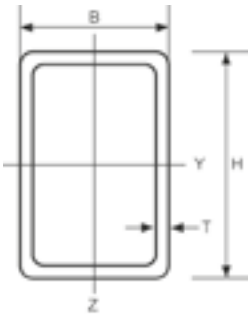
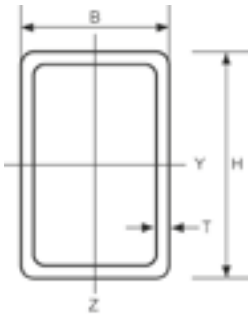


Size	Thick-ness	Mass	Sec-tional Area	Moment of Inertia		Radius of Gyration		Elastic Modulus		Plastic Modulus		Torsional Constants		Superfi-cial area / m	Approx. length/ tonne
H x B mm	T mm	M kg/m	A cm^2	I_{yy} cm^4	I_{zz} cm^4	i_{yy} cm	i_{zz} cm	$W_{el,yy}$ cm^3	$W_{el,zz}$ cm^3	$W_{pl,yy}$ cm^3	$W_{pl,zz}$ cm^3	I_t cm^4	C_t cm^3	A_s m^2/m	m/t
50 x 25	2.0	2.15	2.74	8.38	2.81	1.75	1.01	3.35	2.25	4.26	2.62	7.06	3.92	0.143	465
	2.5	2.62	3.34	9.89	3.28	1.72	0.991	3.95	2.62	5.11	3.12	8.43	4.60	0.141	382
	3.0	3.07	3.91	11.2	3.67	1.69	0.969	4.47	2.93	5.86	3.56	9.64	5.18	0.140	326
50 x 30	2.0	2.31	2.94	9.54	4.29	1.80	1.21	3.81	2.86	4.74	3.33	9.77	4.84	0.153	434
	2.5	2.82	3.59	11.3	5.05	1.77	1.19	4.52	3.37	5.70	3.98	11.7	5.72	0.151	355
	3.0	3.30	4.21	12.8	5.70	1.75	1.16	5.13	3.80	6.57	4.58	13.5	6.49	0.150	303
	4.0	4.20	5.35	15.3	6.69	1.69	1.12	6.10	4.46	8.05	5.58	16.5	7.71	0.146	238
60 x 40	2.5	3.60	4.59	22.1	11.7	2.19	1.60	7.36	5.87	9.06	6.84	25.1	9.72	0.191	278
	3.0	4.25	5.41	25.4	13.4	2.17	1.58	8.46	6.72	10.5	7.94	29.3	11.2	0.190	236
	4.0	5.45	6.95	31.0	16.3	2.11	1.53	10.3	8.14	13.2	9.89	36.7	13.7	0.186	183
	5.0	6.56	8.36	35.3	18.4	2.06	1.48	11.8	9.21	15.4	11.5	42.8	15.6	0.183	152
70 x 40	3.0	4.72	6.01	37.3	15.5	2.49	1.61	10.7	7.75	13.4	9.05	36.5	13.2	0.210	212
	4.0	6.08	7.75	46.0	18.9	2.44	1.56	13.1	9.44	16.8	11.3	45.8	16.2	0.206	164
	5.0	7.34	9.36	52.9	21.5	2.38	1.52	15.1	10.8	19.8	13.3	53.8	18.7	0.203	136
70 x 50	3.0	5.19	6.61	44.1	26.1	2.58	1.99	12.6	10.4	15.4	12.2	53.6	17.1	0.230	193
	4.0	6.71	8.55	54.7	32.2	2.53	1.94	15.6	12.9	19.5	15.4	68.1	21.2	0.226	149
	5.0	8.13	10.4	63.5	37.2	2.48	1.90	18.1	14.9	23.1	18.2	80.8	24.6	0.223	123
80 x 40	3.0	5.19	6.61	52.3	17.6	2.81	1.63	13.1	8.78	16.5	10.2	43.9	15.3	0.230	193
	4.0	6.71	8.55	64.8	21.5	2.75	1.59	16.2	10.7	20.9	12.8	55.2	18.8	0.226	149
	5.0	8.13	10.4	75.1	24.6	2.69	1.54	18.8	12.3	24.7	15.0	65.0	21.7	0.223	123
80 x 50	3.0	5.66	7.21	61.1	29.4	2.91	2.02	15.3	11.8	18.8	13.6	65.0	19.7	0.250	177
	4.0	7.34	9.35	76.4	36.5	2.86	1.98	19.1	14.6	24.0	17.2	82.7	24.6	0.246	136
	5.0	8.91	11.4	89.2	42.3	2.80	1.93	22.3	16.9	28.5	20.5	98.4	28.7	0.243	112
80 x 60	3.0	6.13	7.81	70.0	44.9	3.00	2.40	17.5	15.0	21.2	17.4	88.3	24.1	0.270	163
	3.5	7.06	8.99	79.3	50.7	2.97	2.37	19.8	16.9	24.1	19.8	101	27.3	0.268	142
	4.0	7.97	10.1	87.9	56.1	2.94	2.35	22.0	18.7	27.0	22.1	113	30.3	0.266	126
	5.0	9.70	12.4	103	65.7	2.89	2.31	25.8	21.9	32.2	26.4	136	35.7	0.263	103
90 x 50	3.0	6.13	7.81	81.9	32.7	3.24	2.05	18.2	13.1	22.6	15.0	76.7	22.4	0.270	163
	4.0	7.97	10.1	103	40.7	3.18	2.00	22.8	16.3	28.8	19.1	97.7	28.0	0.266	126
	5.0	9.70	12.4	121	47.4	3.12	1.96	26.8	18.9	34.4	22.7	116	32.7	0.263	103
100 x 40	3.0	6.13	7.81	92.3	21.7	3.44	1.67	18.5	10.8	23.7	12.4	59.0	19.4	0.270	163
	4.0	7.97	10.1	116	26.7	3.38	1.62	23.1	13.3	30.3	15.7	74.5	24.0	0.266	126
	5.0	9.70	12.4	136	30.8	3.31	1.58	27.1	15.4	36.1	18.5	87.9	27.9	0.263	103
100 x 50	3.0	6.60	8.41	106	36.1	3.56	2.07	21.3	14.4	26.7	16.4	88.6	25.0	0.290	152
	4.0	8.59	10.9	134	44.9	3.50	2.03	26.8	18.0	34.1	20.9	113	31.3	0.286	116
	5.0	10.5	13.4	158	52.5	3.44	1.98	31.6	21.0	40.8	25.0	135	36.8	0.283	95.4
	6.0	12.3	15.6	179	58.7	3.38	1.94	35.8	23.5	46.9	28.5	154	41.4	0.279	81.5
100 x 60	3.0	7.07	9.01	121	54.6	3.66	2.46	24.1	18.2	29.6	20.8	122	30.6	0.310	141
	3.5	8.16	10.4	137	61.9	3.63	2.44	27.4	20.6	33.8	23.8	139	34.8	0.308	123
	4.0	9.22	11.7	153	68.7	3.60	2.42	30.5	22.9	37.9	26.6	156	38.7	0.306	108
	5.0	11.3	14.4	181	80.8	3.55	2.37	36.2	26.9	45.6	31.9	188	45.8	0.303	88.7
	6.0	13.2	16.8	205	91.2	3.49	2.33	41.1	30.4	52.5	36.6	216	51.9	0.299	75.7
100 x 80	3.0	8.01	10.2	149	106	3.82	3.22	29.8	26.4	35.4	30.4	196	41.9	0.350	125
	4.0	10.5	13.3	189	134	3.77	3.17	37.9	33.5	45.6	39.2	254	53.4	0.346	95.4
	5.0	12.8	16.4	226	160	3.72	3.12	45.2	39.9	55.1	47.2	308	63.7	0.343	77.9
	6.0	15.1	19.2	258	182	3.67	3.08	51.7	45.5	63.8	54.7	357	73.0	0.339	66.2

HOLLOW SECTIONS

COLD FORMED RECTANGULAR HOLLOW SECTIONS

EN10219:Part 2



Size	Thick-ness	Mass	Sec-tional Area	Moment of Inertia		Radius of Gyration		Elastic Modulus		Plastic Modulus		Torsional Constants		Superfi-cial area / m	Approx. length/ tonne
H x B mm	T mm	M kg/m	A cm^2	I_{yy} cm^4	I_{zz} cm^4	i_{yy} cm	i_{zz} cm	$W_{el,yy}$ cm^3	$W_{el,zz}$ cm^3	$W_{pl,yy}$ cm^3	$W_{pl,zz}$ cm^3	I_t cm^4	C_t cm^3	A_s m^2/m	m/t
120 x 40	3.0	7.07	9.01	148	25.8	4.05	1.69	24.7	12.9	32.2	14.6	74.6	23.5	0.310	141
	4.0	9.22	11.7	187	31.9	3.99	1.65	31.1	15.9	41.2	18.5	94.2	29.2	0.306	108
	5.0	11.3	14.4	221	36.9	3.92	1.60	36.8	18.5	49.4	22.0	111	34.1	0.303	88.7
120 x 60	3.0	8.01	10.2	189	64.4	4.30	2.51	31.5	21.5	39.2	24.2	156	37.1	0.350	125
	3.5	9.26	11.8	216	73.1	4.28	2.49	35.9	24.4	44.9	27.7	179	42.2	0.348	108
	4.0	10.5	13.3	241	81.2	4.25	2.47	40.1	27.1	50.5	31.1	201	47.0	0.346	95.4
	5.0	12.8	16.4	287	96.0	4.19	2.42	47.8	32.0	60.9	37.4	242	55.8	0.343	77.9
	6.0	15.1	19.2	328	109	4.13	2.38	54.7	36.3	70.6	43.1	280	63.6	0.339	66.2
120 x 80	3.0	8.96	11.4	230	123	4.49	3.29	38.4	30.9	46.2	35.0	255	50.8	0.390	112
	4.0	11.7	14.9	295	157	4.44	3.24	49.1	39.3	59.8	45.2	331	64.9	0.386	85.2
	5.0	14.4	18.4	353	188	4.39	3.20	58.9	46.9	72.4	54.7	402	77.8	0.383	69.4
	6.0	17.0	21.6	406	215	4.33	3.15	67.7	53.8	84.3	63.5	469	89.4	0.379	58.9
	8.0	21.4	27.2	476	252	4.18	3.04	79.3	62.9	102	76.9	584	108	0.366	46.8
140 x 80	3.0	9.90	12.6	334	141	5.15	3.35	47.8	35.3	58.2	39.6	317	59.7	0.430	101
	4.0	13.0	16.5	430	180	5.10	3.30	61.4	45.1	75.5	51.3	412	76.5	0.426	77.0
	5.0	16.0	20.4	517	216	5.04	3.26	73.9	54.0	91.8	62.2	501	91.8	0.423	62.6
	6.0	18.9	24.0	597	248	4.98	3.21	85.3	62.0	107	72.4	584	106	0.419	53.0
	8.0	23.9	30.4	708	293	4.82	3.10	101	73.3	131	88.4	731	129	0.406	41.8
	10.0	28.7	36.6	804	330	4.69	3.01	115	82.6	152	103	851	147	0.397	34.8
150 x 100	3.0	11.3	14.4	461	248	5.65	4.15	61.4	49.5	73.5	55.8	507	81.4	0.490	88.4
	4.0	14.9	18.9	595	319	5.60	4.10	79.3	63.7	95.7	72.5	662	105	0.486	67.2
	5.0	18.3	23.4	719	384	5.55	4.05	95.9	76.8	117	88.3	809	127	0.483	54.5
	6.0	21.7	27.6	835	444	5.50	4.01	111	88.8	137	103	948	147	0.479	46.1
	8.0	27.7	35.2	1008	536	5.35	3.90	134	107	169	128	1206	182	0.466	36.1
	10.0	33.4	42.6	1162	614	5.22	3.80	155	123	199	150	1426	211	0.457	29.9
160 x 80	3.0	10.8	13.8	464	159	5.80	3.39	58.0	39.8	71.4	44.3	380	68.6	0.470	92.3
	4.0	14.2	18.1	598	204	5.74	3.35	74.7	50.9	92.9	57.4	494	88.0	0.466	70.2
	5.0	17.5	22.4	722	244	5.68	3.30	90.2	61.0	113	69.7	601	106	0.463	57.0
	6.0	20.7	26.4	836	281	5.62	3.26	105	70.2	132	81.3	702	122	0.459	48.2
	8.0	26.4	33.6	1001	335	5.46	3.16	125	83.7	163	100	882	150	0.446	37.9
	10.0	31.8	40.6	1146	380	5.32	3.06	143	95.0	191	117	1031	172	0.437	31.4
180 x 80	3.0	11.8	15.0	621	177	6.43	3.43	69.0	44.2	85.8	48.9	445	77.5	0.510	84.9
	4.0	15.5	19.7	802	227	6.37	3.39	89.1	56.7	112	63.5	578	99.6	0.506	64.5
	5.0	19.1	24.4	971	272	6.31	3.34	108	68.1	137	77.2	704	120	0.503	52.3
	6.0	22.6	28.8	1128	314	6.25	3.30	125	78.5	160	90.2	823	139	0.499	44.2
	8.0	28.9	36.8	1362	377	6.08	3.20	151	94.1	198	111	1036	170	0.486	34.6
	10.0	35.0	44.6	1570	429	5.94	3.10	174	107	234	131	1214	196	0.477	28.6
180 x 100	4.0	16.8	21.3	926	374	6.59	4.18	103	74.8	126	84.0	854	127	0.546	59.7
	5.0	20.7	26.4	1124	452	6.53	4.14	125	90.4	154	103	1045	154	0.543	48.3
	6.0	24.5	31.2	1310	524	6.48	4.10	146	105	181	120	1227	179	0.539	40.8
	8.0	31.4	40.0	1598	637	6.32	3.99	178	127	226	150	1565	222	0.526	31.8
	10.0	38.1	48.6	1859	736	6.19	3.89	207	147	268	177	1859	260	0.517	26.2
200 x 100	4.0	18.0	22.9	1200	411	7.23	4.23	120	82.2	148	91.7	985	142	0.586	55.5
	5.0	22.3	28.4	1459	497	7.17	4.19	146	99.4	181	112	1206	172	0.583	44.9
	6.0	26.4	33.6	1703	577	7.12	4.14	170	115	213	132	1417	200	0.579	37.9
	8.0	33.9	43.2	2091	705	6.95	4.04	209	141	267	165	1811	250	0.566	29.5
	10.0	41.3	52.6	2444	818	6.82	3.94	244	164	318	195	2154	292	0.557	24.2

ANN YAK SIONG HARDWARE SDN BHD
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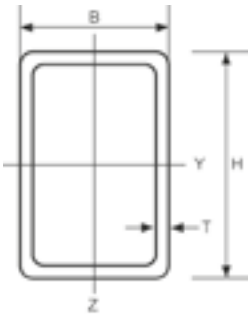
HOLLOW SECTIONS

COLD FORMED RECTANGULAR HOLLOW SECTIONS

EN10219:Part 2

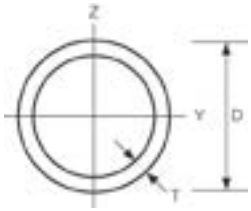


Size	Thick-ness	Mass	Sec-tional Area	Moment of Inertia		Radius of Gyration		Elastic Modulus		Plastic Modulus		Torsional Constants		Superfi-cial area / m	Approx. length/ tonne
H x B mm	T mm	M kg/m	A cm^2	I_{yy} cm^4	I_{zz} cm^4	i_{yy} cm	i_{zz} cm	$W_{el,yy}$ cm^3	$W_{el,zz}$ cm^3	$W_{pl,yy}$ cm^3	$W_{pl,zz}$ cm^3	I_t cm^4	C_t cm^3	A_s m^2/m	m/t
200 x 120	4.0	19.3	24.5	1353	618	7.43	5.02	135	103	164	115	1345	172	0.626	51.9
	5.0	23.8	30.4	1649	750	7.37	4.97	165	125	201	141	1652	210	0.623	42.0
	6.0	28.3	36.0	1929	874	7.32	4.93	193	146	237	166	1947	245	0.619	35.4
	8.0	36.5	46.4	2386	1079	7.17	4.82	239	180	298	209	2507	308	0.606	27.4
	10.0	44.4	56.6	2806	1262	7.04	4.72	281	210	356	250	3007	364	0.597	22.5
200 x 150	4.0	21.2	26.9	1584	1021	7.67	6.16	158	136	187	154	1942	219	0.686	47.3
	5.0	26.2	33.4	1935	1245	7.62	6.11	193	166	230	189	2391	267	0.683	38.2
	6.0	31.1	39.6	2268	1457	7.56	6.06	227	194	271	223	2826	313	0.679	32.1
	8.0	40.2	51.2	2829	1816	7.43	5.95	283	242	344	283	3665	396	0.666	24.9
	10.0	49.1	62.6	3348	2143	7.31	5.85	335	286	413	339	4428	471	0.657	20.4
250 x 150	5.0	30.1	38.4	3304	1508	9.28	6.27	264	201	320	225	3285	337	0.783	33.2
	6.0	35.8	45.6	3886	1768	9.23	6.23	311	236	378	266	3886	396	0.779	27.9
	6.3	37.2	47.4	4001	1825	9.18	6.20	320	243	391	276	4078	412	0.773	26.8
	8.0	46.5	59.2	4886	2219	9.08	6.12	391	296	482	340	5050	504	0.766	21.5
	10.0	57.0	72.6	5825	2634	8.96	6.02	466	351	582	409	6121	602	0.757	17.6
	12.0	66.0	84.1	6458	2925	8.77	5.90	517	390	658	463	7088	684	0.738	15.2
	12.5	68.3	87.0	6633	3002	8.73	5.87	531	400	678	477	7315	704	0.736	14.6
300 x 100	6.0	35.8	45.6	4777	842	10.2	4.30	318	168	411	188	2403	306	0.779	27.9
	8.0	46.5	59.2	5978	1045	10.0	4.20	399	209	523	238	3080	385	0.766	21.5
	10.0	57.0	72.6	7106	1224	9.90	4.11	474	245	631	285	3681	455	0.757	17.6
300 x 200	6.0	45.2	57.6	7370	3962	11.3	8.29	491	396	588	446	8115	651	0.979	22.1
	6.3	47.1	60.0	7624	4104	11.3	8.27	508	410	610	463	8524	680	0.973	21.2
	8.0	59.1	75.2	9389	5042	11.2	8.19	626	504	757	574	10627	838	0.966	16.9
	10.0	72.7	92.6	11313	6058	11.1	8.09	754	606	921	698	12987	1012	0.957	13.8
	12.0	84.8	108	12788	6854	10.9	7.96	853	685	1056	801	15236	1167	0.938	11.8
	12.5	88.0	112	13179	7060	10.8	7.94	879	706	1091	828	15768	1204	0.936	11.4
400 x 200	6.0	54.7	69.6	14789	5092	14.6	8.55	739	509	906	562	12069	877	1.18	18.3
	6.3	57.0	72.6	15330	5286	14.5	8.53	766	529	942	585	12673	916	1.17	17.5
	8.0	71.6	91.2	18974	6517	14.4	8.45	949	652	1173	728	15820	1133	1.17	14.0
	10.0	88.4	113	23003	7864	14.3	8.36	1150	786	1434	888	19368	1373	1.16	11.3
	12.0	104	132	26248	8977	14.1	8.24	1312	898	1656	1027	22782	1591	1.14	9.65
	12.5	108	137	27100	9260	14.1	8.22	1355	926	1714	1062	23594	1644	1.14	9.30
450 x 250	6.0	64.1	81.6	22724	9245	16.7	10.6	1010	740	1221	817	20687	1253	1.38	15.6
	6.3	66.9	85.2	23606	9615	16.6	10.6	1049	769	1271	851	21730	1310	1.37	14.9
	8.0	84.2	107	29335	11916	16.5	10.5	1304	953	1588	1063	27222	1628	1.37	11.9
	10.0	104	133	35737	14470	16.4	10.4	1588	1158	1948	1302	33473	1983	1.36	9.61
	12.0	123	156	41137	16662	16.2	10.3	1828	1333	2264	1515	39591	2314	1.34	8.16
	12.5	127	162	42536	17219	16.2	10.3	1890	1377	2346	1569	41057	2394	1.34	7.86
500 x 300	6.0	73.5	93.6	33012	15151	18.8	12.7	1320	1010	1581	1117	32420	1688	1.58	13.6
	6.3	76.8	97.8	34346	15777	18.7	12.7	1374	1052	1647	1165	34062	1766	1.57	13.0
	8.0	96.7	123	42805	19624	18.6	12.6	1712	1308	2063	1458	42767	2202	1.57	10.3
	10.0	120	153	52328	23933	18.5	12.5	2093	1596	2537	1791	52736	2693	1.56	8.35
	12.0	141	180	60603	27726	18.3	12.4	2424	1848	2962	2093	62581	3156	1.54	7.07
	12.5	147	187	62731	28687	18.3	12.4	2509	1912	3071	2169	64954	3269	1.54	6.81

HOLLOW SECTIONS

COLD FORMED CIRCULAR HOLLOW SECTIONS

EN10219:Part 2



Outside Diameter	Thickness	Mass	Sectional Area	Moment of Inertia	Radius of Gyration	Elastic Modulus	Plastic Modulus	Torsional Constants		Superficial area / m	Approx. length/ tonne
D mm	T mm	M kg/m	A cm^2	I cm^4	i cm	W_{el} cm^3	W_{pl} cm^3	I_t cm^4	C_t cm^3	A_s m^2/m	m/t
33.7	3.0	2.27	2.89	3.44	1.09	2.04	2.84	6.88	4.08	0.106	440
42.4	3.0	2.91	3.71	7.25	1.40	3.42	4.67	14.5	6.84	0.133	343
48.3	3.0	3.35	4.27	11.0	1.61	4.55	6.17	22.0	9.11	0.152	298
	4.0	4.37	5.57	13.8	1.57	5.70	7.87	27.5	11.4	0.152	229
60.3	3.0	4.24	5.40	22.2	2.03	7.37	9.86	44.4	14.7	0.189	236
	4.0	5.55	7.07	28.2	2.00	9.34	12.7	56.3	18.7	0.189	180
76.1	3.0	5.41	6.89	46.1	2.59	12.1	16.0	92.2	24.2	0.239	185
	4.0	7.11	9.06	59.1	2.55	15.5	20.8	118	31.0	0.239	141
88.9	3.0	6.36	8.10	74.8	3.04	16.8	22.1	150	33.6	0.279	157
	3.5	7.37	9.39	85.7	3.02	19.3	25.5	171	38.6	0.279	136
	4.0	8.38	10.7	96.3	3.00	21.7	28.9	193	43.3	0.279	119
	5.0	10.3	13.2	116	2.97	26.2	35.2	233	52.4	0.279	96.7
	6.0	12.27	15.63	134.9	2.94	30.4	41.3	267	60.7	0.279	81.5
114.3	3.0	8.23	10.5	163	3.94	28.4	37.2	325	56.9	0.359	121
	3.5	9.56	12.2	187	3.92	32.7	43.0	374	65.5	0.359	105
	4.0	10.9	13.9	211	3.90	36.9	48.7	422	73.9	0.359	91.9
	5.0	13.5	17.2	257	3.87	45.0	59.8	514	89.9	0.359	74.2
	6.0	16.0	20.4	300	3.83	52.5	70.4	600	105	0.359	62.4
139.7	3.0	10.1	12.9	301	4.83	43.1	56.1	602	86.2	0.439	98.9
	4.0	13.4	17.1	393	4.80	56.2	73.7	786	112	0.439	74.7
	5.0	16.6	21.2	481	4.77	68.8	90.8	961	138	0.439	60.2
	6.0	19.8	25.2	564	4.73	80.8	107	1129	162	0.439	50.5
	8.0	26.0	33.1	720	4.66	103	139	1441	206	0.439	38.5
	10.0	32.0	40.7	862	4.60	123	169	1724	247	0.439	31.3
168.3	4.0	16.2	20.6	697	5.81	82.8	108	1394	166	0.529	61.7
	4.5	18.2	23.2	777	5.79	92.4	121	1554	185	0.529	55.0
	5.0	20.1	25.7	856	5.78	102	133	1712	203	0.529	49.7
	6.0	24.0	30.6	1009	5.74	120	158	2017	240	0.529	41.6
	8.0	31.6	40.3	1297	5.67	154	206	2595	308	0.529	31.6
	10.0	39.0	49.7	1564	5.61	186	251	3128	372	0.529	25.6
	12.5	48.0	61.2	1868	5.53	222	304	3737	444	0.529	20.8
193.7	4.0	18.7	23.8	1073	6.71	111	144	2146	222	0.609	53.4
	4.5	21.0	26.7	1198	6.69	124	161	2395	247	0.609	47.6
	5.0	23.3	29.6	1320	6.67	136	178	2640	273	0.609	43.0
	6.0	27.8	35.4	1560	6.64	161	211	3119	322	0.609	36.0
	8.0	36.6	46.7	2016	6.57	208	276	4031	416	0.609	27.3
	10.0	45.3	57.7	2442	6.50	252	338	4883	504	0.609	22.1
	12.5	55.9	71.2	2934	6.42	303	411	5869	606	0.609	17.9
219.1	4.5	23.8	30.3	1747	7.59	159	207	3494	319	0.688	42.0
	5.0	26.4	33.6	1928	7.57	176	229	3856	352	0.688	37.9
	6.0	31.5	40.2	2282	7.54	208	273	4564	417	0.688	31.7
	8.0	41.6	53.1	2960	7.47	270	357	5919	540	0.688	24.0
	10.0	51.6	65.7	3598	7.40	328	438	7197	657	0.688	19.4
	12.0	61.3	78.1	4200	7.33	383	515	8400	767	0.688	16.3
	12.5	63.7	81.1	4345	7.32	397	534	8689	793	0.688	15.7
	16.0	80.1	102	5297	7.20	483	661	10593	967	0.688	12.5

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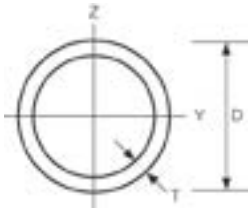
HOLLOW SECTIONS

COLD FORMED CIRCULAR HOLLOW SECTIONS

EN10219:Part 2



Outside Diameter	Thickness	Mass	Sectional Area	Moment of Inertia	Radius of Gyration	Elastic Modulus	Plastic Modulus	Torsional Constants		Superficial area / m	Approx. length/ tonne
D mm	T mm	M kg/m	A cm^2	I cm^4	i cm	W_{el} cm^3	W_{pl} cm^3	I_t cm^4	C_t cm^3	A_s m^2/m	m/t
244.5	5.0	29.5	37.6	2699	8.47	221	287	5397	441	0.768	33.9
	6.0	35.3	45.0	3199	8.43	262	341	6397	523	0.768	28.3
	8.0	46.7	59.4	4160	8.37	340	448	8321	681	0.768	21.4
	10.0	57.8	73.7	5073	8.30	415	550	10146	830	0.768	17.3
	12.0	68.8	87.8	5938	8.23	486	649	11877	972	0.768	14.5
	12.5	71.5	91.1	6147	8.21	503	673	12295	1006	0.768	14.0
	16.0	90.2	115	7533	8.10	616	837	15066	1232	0.768	11.1
273.0	4.0	26.5	33.8	3058	9.51	224	289	6116	448	0.858	37.7
	4.5	29.8	38.0	3422	9.49	251	324	6843	501	0.858	33.6
	5.0	33.0	42.1	3781	9.48	277	359	7562	554	0.858	30.3
	6.0	39.5	50.3	4487	9.44	329	428	8974	657	0.858	25.3
	8.0	52.3	66.6	5852	9.37	429	562	11703	857	0.858	19.1
	10.0	64.9	82.6	7154	9.31	524	692	14308	1048	0.858	15.4
	12.0	77.2	98.4	8396	9.24	615	818	16792	1230	0.858	12.9
	12.5	80.3	102	8697	9.22	637	849	17395	1274	0.858	12.5
	16.0	101	129	10707	9.10	784	1058	21414	1569	0.858	9.86
323.9	5.0	39.3	50.1	6369	11.3	393	509	12739	787	1.02	25.4
	6.0	47.0	59.9	7572	11.2	468	606	15145	935	1.02	21.3
	8.0	62.3	79.4	9910	11.2	612	799	19820	1224	1.02	16.0
	10.0	77.4	98.6	12158	11.1	751	986	24317	1501	1.02	12.9
	12.0	92.3	118	14320	11.0	884	1168	28639	1768	1.02	10.8
	12.5	96.0	122	14847	11.0	917	1213	29693	1833	1.02	10.4
	16.0	121	155	18390	10.9	1136	1518	36780	2271	1.02	8.23
355.6	5.0	43.2	55.1	8464	12.4	476	615	16927	952	1.12	23.1
	6.0	51.7	65.9	10071	12.4	566	733	20141	1133	1.12	19.3
	8.0	68.6	87.4	13201	12.3	742	967	26403	1485	1.12	14.6
	10.0	85.2	109	16223	12.2	912	1195	32447	1825	1.12	11.7
	12.0	102	130	19139	12.2	1076	1417	38279	2153	1.12	9.83
	12.5	106	135	19852	12.1	1117	1472	39704	2233	1.12	9.45
	16.0	134	171	24663	12.0	1387	1847	49326	2774	1.12	7.46
406.4	6.0	59.2	75.5	15128	14.2	745	962	30257	1489	1.28	16.9
	8.0	78.6	100	19874	14.1	978	1270	39748	1956	1.28	12.7
	10.0	97.8	125	24476	14.0	1205	1572	48952	2409	1.28	10.2
	12.0	117	149	28937	14.0	1424	1867	57874	2848	1.28	8.57
	12.5	121	155	30031	13.9	1478	1940	60061	2956	1.28	8.24
	16.0	154	196	37449	13.8	1843	2440	74898	3686	1.28	6.49
457.0	6.0	66.7	85.0	21618	15.9	946	1220	43236	1892	1.44	15.0
	8.0	88.6	113	28446	15.9	1245	1613	56893	2490	1.44	11.3
	10.0	110	140	35091	15.8	1536	1998	70183	3071	1.44	9.07
	12.0	132	168	41556	15.7	1819	2377	83113	3637	1.44	7.59
	12.5	137	175	43145	15.7	1888	2470	86290	3776	1.44	7.30
	16.0	174	222	53959	15.6	2361	3113	107919	4723	1.44	5.75
508.0	6.0	74.3	94.6	29812	17.7	1174	1512	59623	2347	1.60	13.5
	8.0	98.6	126	39280	17.7	1546	2000	78560	3093	1.60	10.1
	10.0	123	156	48520	17.6	1910	2480	97040	3820	1.60	8.14
	12.0	147	187	57536	17.5	2265	2953	115072	4530	1.60	6.81
	12.5	153	195	59755	17.5	2353	3070	119511	4705	1.60	6.55
	16.0	194	247	74909	17.4	2949	3874	149818	5898	1.60	5.15