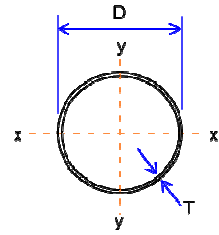
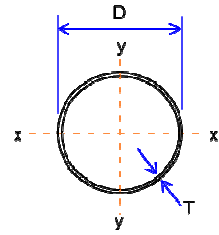


Cold Formed Circular Hollow Sections to EN 10219-2												
Designation		Mass	Area	Ratio for	Second	Radius	Elastic	Plastic	Torsional		Section	Nominal
Outside	Thickness	per	of	Local	Moment	of	Modulus	Modulus	Constants		Surface	Length
Diameter		metre	Section	Buckling	of Area	Gyration			Inertia	Modulus	Area	Per
D	T	M	A	D/t	I	r	Z	S	J	C	$A_s$	Tonne
mm	mm	kg/m	cm <sup>2</sup>		cm <sup>4</sup>	cm	cm <sup>3</sup>	cm <sup>3</sup>	cm <sup>4</sup>	cm <sup>3</sup>	m <sup>2</sup> /m	m
21.3	2	0.952	1.21	10.7	0.571	0.686	0.536	0.748	1.14	1.07	0.0669	1050
21.3	2.5	1.16	1.48	8.52	0.664	0.671	0.623	0.889	1.33	1.25	0.0669	863
21.3	3	1.35	1.72	7.1	0.741	0.656	0.696	1.01	1.48	1.39	0.0669	739
26.9	2	1.23	1.56	13.5	1.22	0.883	0.907	1.24	2.44	1.81	0.0845	814
26.9	2.5	1.5	1.92	10.8	1.44	0.867	1.07	1.49	2.88	2.14	0.0845	665
26.9	3	1.77	2.25	8.97	1.63	0.852	1.21	1.72	3.27	2.42	0.0845	566
26.9	3.2	1.87	2.38	8.41	1.7	0.846	1.27	1.81	3.41	2.54	0.0845	535
33.7	2	1.56	1.99	16.9	2.51	1.12	1.49	2.01	5.02	2.98	0.106	640
33.7	2.5	1.92	2.45	13.5	3	1.11	1.78	2.44	6	3.56	0.106	520
33.7	3	2.27	2.89	11.2	3.44	1.09	2.04	2.84	6.88	4.08	0.106	440
33.7	3.2	2.41	3.07	10.5	3.6	1.08	2.14	2.99	7.21	4.28	0.106	415
33.7	4	2.93	3.73	8.43	4.19	1.06	2.49	3.55	8.38	4.98	0.106	341
42.4	2	1.99	2.54	21.2	5.19	1.43	2.45	3.27	10.4	4.9	0.133	502
42.4	2.5	2.46	3.13	17	6.26	1.41	2.95	3.99	12.5	5.9	0.133	407
42.4	3	2.91	3.71	14.1	7.25	1.4	3.42	4.67	14.5	6.84	0.133	343
42.4	3.2	3.09	3.94	13.2	7.62	1.39	3.59	4.93	15.2	7.18	0.133	323
42.4	3.6	3.44	4.39	11.8	8.33	1.38	3.93	5.44	16.7	7.86	0.133	290
42.4	4	3.79	4.83	10.6	8.99	1.36	4.24	5.92	18	8.48	0.133	264
48.3	2	2.28	2.91	24.2	7.81	1.64	3.23	4.29	15.6	6.46	0.152	438
48.3	2.5	2.82	3.6	19.3	9.46	1.62	3.92	5.25	18.9	7.84	0.152	354
48.3	3	3.35	4.27	16.1	11	1.61	4.55	6.17	22	9.1	0.152	298
48.3	3.2	3.56	4.53	15.1	11.6	1.6	4.8	6.52	23.2	9.6	0.152	281
48.3	3.6	3.97	5.06	13.4	12.7	1.59	5.26	7.21	25.4	10.5	0.152	252
48.3	4	4.37	5.57	12.1	13.8	1.57	5.7	7.87	27.5	11.4	0.152	229
48.3	5	5.34	6.8	9.66	16.2	1.54	6.69	9.42	32.3	13.4	0.152	187
60.3	2	2.88	3.66	30.2	15.6	2.06	5.17	6.8	31.2	10.3	0.189	348
60.3	2.5	3.56	4.54	24.1	19	2.05	6.3	8.36	38	12.6	0.189	281
60.3	3	4.24	5.4	20.1	22.2	2.03	7.37	9.86	44.4	14.7	0.189	236
60.3	3.2	4.51	5.74	18.8	23.5	2.02	7.78	10.4	46.9	15.6	0.189	222
60.3	3.6	5.03	6.41	16.8	25.9	2.01	8.58	11.6	51.7	17.2	0.189	199
60.3	4	5.55	7.07	15.1	28.2	2	9.34	12.7	56.3	18.7	0.189	180
60.3	5	6.82	8.69	12.1	33.5	1.96	11.1	15.3	67	22.2	0.189	147
76.1	2	3.65	4.66	38.1	32	2.62	8.4	11	64	16.8	0.239	274
76.1	2.5	4.54	5.78	30.4	39.2	2.6	10.3	13.5	78.4	20.6	0.239	220
76.1	3	5.41	6.89	25.4	46.1	2.59	12.1	16	92.2	24.2	0.239	185
76.1	3.2	5.75	7.33	23.8	48.8	2.58	12.8	17	97.6	25.6	0.239	174
76.1	3.6	6.44	8.2	21.1	54	2.57	14.2	18.9	108	28.4	0.239	155
76.1	4	7.11	9.06	19	59.1	2.55	15.5	20.8	118	31	0.239	141
76.1	5	8.77	11.2	15.2	70.9	2.52	18.6	25.3	142	37.2	0.239	114
76.1	6	10.4	13.2	12.7	81.8	2.49	21.5	29.6	164	43	0.239	96.4
76.1	6.3	10.8	13.8	12.1	84.8	2.48	22.3	30.8	170	44.6	0.239	92.2
88.9	2	4.29	5.46	44.5	51.6	3.07	11.6	15.1	103	23.2	0.279	233
88.9	2.5	5.33	6.79	35.6	63.4	3.06	14.3	18.7	127	28.6	0.279	188
88.9	3	6.36	8.1	29.6	74.8	3.04	16.8	22.1	150	33.6	0.279	157
88.9	3.2	6.76	8.62	27.8	79.2	3.03	17.8	23.5	158	35.6	0.279	148
88.9	4	8.38	10.7	22.2	96.3	3	21.7	28.9	193	43.4	0.279	119
88.9	5	10.3	13.2	17.8	116	2.97	26.2	35.2	233	52.4	0.279	96.7
88.9	6	12.3	15.6	14.8	135	2.94	30.4	41.3	270	60.8	0.279	81.5
88.9	6.3	12.8	16.3	14.1	140	2.93	31.5	43.1	280	63	0.279	77.9
101.6	2	4.91	6.26	50.8	77.6	3.52	15.3	19.8	155	30.6	0.319	204
101.6	2.5	6.11	7.78	40.6	95.6	3.5	18.8	24.6	191	37.6	0.319	164
101.6	3	7.29	9.29	33.9	113	3.49	22.3	29.2	226	44.6	0.319	137
101.6	4	9.63	12.3	25.4	146	3.45	28.8	38.1	293	57.6	0.319	104
101.6	5	11.9	15.2	20.3	177	3.42	34.9	46.7	355	69.8	0.319	84
101.6	6	14.1	18	16.9	207	3.39	40.7	54.9	413	81.4	0.319	70.7
101.6	6.3	14.8	18.9	16.1	215	3.38	42.3	57.3	430	84.6	0.319	67.5
114.3	2.5	6.89	8.78	45.7	137	3.95	24	31.3	275	48	0.359	145



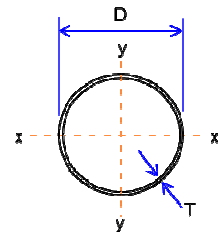
**Cold Formed Circular Hollow Sections to EN 10219-2**

Designation		Mass	Area	Ratio for	Second	Radius	Elastic	Plastic	Torsional		Section	Nominal
Outside	Thickness	per	of	Local	Moment	of	Modulus	Modulus	Constants		Surface	Length
Diameter		metre	Section	Buckling	of Area	Gyration			Inertia	Modulus	Area	Per
D	T	M	A	D/t	I	r	Z	S	J	C	$A_s$	Tonne
mm	mm	kg/m	cm <sup>2</sup>		cm <sup>4</sup>	cm	cm <sup>3</sup>	cm <sup>3</sup>	cm <sup>4</sup>	cm <sup>3</sup>	m <sup>2</sup> /m	m
114.3	3	8.23	10.5	38.1	163	3.94	28.4	37.2	325	56.8	0.359	121
114.3	3.2	8.77	11.2	35.7	172	3.93	30.2	39.5	345	60.4	0.359	114
114.3	3.6	9.83	12.5	31.8	192	3.92	33.6	44.1	384	67.2	0.359	102
114.3	5	13.5	17.2	22.9	257	3.87	45	59.8	514	90	0.359	74.2
114.3	6	16	20.4	19.1	300	3.83	52.5	70.4	600	105	0.359	62.4
114.3	6.3	16.8	21.4	18.1	313	3.82	54.7	73.6	625	109	0.359	59.6
114.3	8	21	26.7	14.3	379	3.77	66.4	90.6	759	133	0.359	47.7
139.7	3	10.1	12.9	46.6	301	4.83	43.1	56.1	602	86.2	0.439	98.9
139.7	4	13.4	17.1	34.9	393	4.8	56.2	73.7	786	112	0.439	74.7
139.7	5	16.6	21.2	27.9	481	4.77	68.8	90.8	961	138	0.439	60.2
139.7	6	19.8	25.2	23.3	564	4.73	80.8	107	1129	162	0.439	50.5
139.7	6.3	20.7	26.4	22.2	589	4.72	84.3	112	1177	169	0.439	48.2
139.7	8	26	33.1	17.5	720	4.66	103	139	1441	206	0.439	38.5
139.7	10	32	40.7	14	862	4.6	123	169	1724	246	0.439	31.3
168.3	3	12.2	15.6	56.1	532	5.85	63.3	82	1065	127	0.529	81.8
168.3	4	16.2	20.6	42.1	697	5.81	82.8	108	1394	166	0.529	61.7
168.3	5	20.1	25.7	33.7	856	5.78	102	133	1712	204	0.529	49.7
168.3	6	24	30.6	28.1	1009	5.74	120	158	2017	240	0.529	41.6
168.3	6.3	25.2	32.1	26.7	1053	5.73	125	165	2107	250	0.529	39.7
168.3	8	31.6	40.3	21	1297	5.67	154	206	2595	308	0.529	31.6
168.3	10	39	49.7	16.8	1564	5.61	186	251	3128	372	0.529	25.6
168.3	12.5	48	61.2	13.5	1868	5.53	222	304	3737	444	0.529	20.8
177.8	4	17.1	21.8	44.5	825	6.15	92.8	121	1650	186	0.559	58.3
177.8	5	21.3	27.1	35.6	1014	6.11	114	149	2028	228	0.559	46.9
177.8	6	25.4	32.4	29.6	1196	6.08	135	177	2392	270	0.559	39.3
177.8	6.3	26.6	33.9	28.2	1250	6.07	141	185	2499	282	0.559	37.5
177.8	8	33.5	42.7	22.2	1541	6.01	173	231	3083	346	0.559	29.9
177.8	10	41.4	52.7	17.8	1862	5.94	209	282	3724	418	0.559	24.2
177.8	12	49.1	62.5	14.8	2159	5.88	243	330	4318	486	0.559	20.4
177.8	12.5	51	64.9	14.2	2230	5.86	251	342	4460	502	0.559	19.6
193.7	4	18.7	23.8	48.4	1073	6.71	111	144	2146	222	0.609	53.4
193.7	4.5	21	26.7	43	1198	6.69	124	161	2395	248	0.609	47.6
193.7	5	23.3	29.6	38.7	1320	6.67	136	178	2640	272	0.609	43
193.7	6	27.8	35.4	32.3	1560	6.64	161	211	3119	322	0.609	36
193.7	6.3	29.1	37.1	30.7	1630	6.63	168	221	3260	336	0.609	34.3
193.7	8	36.6	46.7	24.2	2016	6.57	208	276	4031	416	0.609	27.3
193.7	10	45.3	57.7	19.4	2442	6.5	252	338	4883	504	0.609	22.1
193.7	12	53.8	68.5	16.1	2839	6.44	293	397	5678	586	0.609	18.6
193.7	12.5	55.9	71.2	15.5	2934	6.42	303	411	5869	606	0.609	17.9
219.1	4	21.2	27	54.8	1564	7.61	143	185	3128	286	0.688	47.1
219.1	4.5	23.8	30.3	48.7	1747	7.59	159	207	3494	318	0.688	42
219.1	5	26.4	33.6	43.8	1928	7.57	176	229	3856	352	0.688	37.9
219.1	6	31.5	40.2	36.5	2282	7.54	208	273	4564	416	0.688	31.7
219.1	6.3	33.1	42.1	34.8	2386	7.53	218	285	4772	436	0.688	30.2
219.1	8	41.6	53.1	27.4	2960	7.47	270	357	5919	540	0.688	24
219.1	10	51.6	65.7	21.9	3598	7.4	328	438	7197	656	0.688	19.4
219.1	12	61.3	78.1	18.3	4200	7.33	383	515	8400	766	0.688	16.3
219.1	12.5	63.7	81.1	17.5	4345	7.32	397	534	8689	794	0.688	15.7
219.1	16	80.1	102	13.7	5297	7.2	483	661	10593	966	0.688	12.5
244.5	5	29.5	37.6	48.9	2699	8.47	221	287	5397	442	0.768	33.9
244.5	6	35.3	45	40.8	3199	8.43	262	341	6397	524	0.768	28.3
244.5	6.3	37	47.1	38.8	3346	8.42	274	358	6692	548	0.768	27
244.5	8	46.7	59.4	30.6	4160	8.37	340	448	8321	680	0.768	21.4
244.5	10	57.8	73.7	24.5	5073	8.3	415	550	10146	830	0.768	17.3
244.5	12	68.8	87.7	20.4	5938	8.23	486	649	11877	972	0.768	14.5
244.5	12.5	71.5	91.1	19.6	6147	8.21	503	673	12295	1006	0.768	14

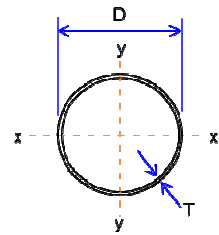


**Cold Formed Circular Hollow Sections to EN 10219-2**

Designation		Mass	Area	Ratio for	Second	Radius	Elastic	Plastic	Torsional		Section	Nominal
Outside	Thickness	per	of	Local	Moment	of	Modulus	Modulus	Constants		Surface	Length
Diameter		metre	Section	Buckling	of Area	Gyration			Inertia	Modulus	Area	Per
D	T	M	A	D/t	I	r	Z	S	J	C	$A_s$	Tonne
mm	mm	kg/m	cm <sup>2</sup>		cm <sup>4</sup>	cm	cm <sup>3</sup>	cm <sup>3</sup>	cm <sup>4</sup>	cm <sup>3</sup>	m <sup>2</sup> /m	m
244.5	16	90.2	115	15.3	7533	8.1	616	837	15066	1232	0.768	11.1
273	5	33	42.1	54.6	3781	9.48	277	359	7562	554	0.858	30.3
273	6	39.5	50.3	45.5	4487	9.44	329	428	8974	658	0.858	25.3
273	6.3	41.4	52.8	43.3	4696	9.43	344	448	9392	688	0.858	24.1
273	8	52.3	66.6	34.1	5852	9.37	429	562	11703	858	0.858	19.1
273	10	64.9	82.6	27.3	7154	9.31	524	692	14308	1048	0.858	15.4
273	12	77.2	98.4	22.8	8396	9.24	615	818	16792	1230	0.858	12.9
273	12.5	80.3	102	21.8	8697	9.22	637	849	17395	1274	0.858	12.5
273	16	101	129	17.1	10707	9.1	784	1058	21414	1568	0.858	9.86
323.9	5	39.3	50.1	64.8	6369	11.3	393	509	12739	786	1.02	25.4
323.9	6	47	59.9	54	7572	11.2	468	606	15145	936	1.02	21.3
323.9	6.3	49.3	62.9	51.4	7929	11.2	490	636	15858	980	1.02	20.3
323.9	8	62.3	79.4	40.5	9910	11.2	612	799	19820	1224	1.02	16
323.9	10	77.4	98.6	32.4	12158	11.1	751	986	24317	1502	1.02	12.9
323.9	12	92.3	118	27	14320	11	884	1168	28639	1768	1.02	10.8
323.9	12.5	96	122	25.9	14847	11	917	1213	29693	1834	1.02	10.4
323.9	16	121	155	20.2	18390	10.9	1136	1518	36780	2272	1.02	8.23
355.6	5	43.2	55.1	71.1	8464	12.4	476	615	16927	952	1.12	23.1
355.6	6	51.7	65.9	59.3	10071	12.4	566	733	20141	1132	1.12	19.3
355.6	6.3	54.3	69.1	56.4	10547	12.4	593	769	21094	1186	1.12	18.4
355.6	8	68.6	87.4	44.5	13201	12.3	742	967	26403	1484	1.12	14.6
355.6	10	85.2	109	35.6	16223	12.2	912	1195	32447	1824	1.12	11.7
355.6	12	102	130	29.6	19139	12.2	1076	1417	38279	2152	1.12	9.83
355.6	12.5	106	135	28.4	19852	12.1	1117	1472	39704	2234	1.12	9.45
355.6	16	134	171	22.2	24663	12	1387	1847	49326	2774	1.12	7.46
355.6	20	166	211	17.8	29792	11.9	1676	2255	59583	3352	1.12	6.04
406.4	6	59.2	75.5	67.7	15128	14.2	745	962	30257	1490	1.28	16.9
406.4	6.3	62.2	79.2	64.5	15849	14.1	780	1009	31699	1560	1.28	16.1
406.4	8	78.6	100	50.8	19874	14.1	978	1270	39748	1956	1.28	12.7
406.4	10	97.8	125	40.6	24476	14	1205	1572	48952	2410	1.28	10.2
406.4	12	117	149	33.9	28937	14	1424	1867	57874	2848	1.28	8.57
406.4	12.5	121	155	32.5	30031	13.9	1478	1940	60061	2956	1.28	8.24
406.4	16	154	196	25.4	37449	13.8	1843	2440	74898	3686	1.28	6.49
406.4	20	191	243	20.3	45432	13.7	2236	2989	90864	4472	1.28	5.25
406.4	25	235	300	16.3	54702	13.5	2692	3642	109404	5384	1.28	4.25
457	6	66.7	85	76.2	21618	15.9	946	1220	43236	1892	1.44	15
457	6.3	70	89.2	72.5	22654	15.9	991	1280	45308	1982	1.44	14.3
457	8	88.6	113	57.1	28446	15.9	1245	1613	56893	2490	1.44	11.3
457	10	110	140	45.7	35091	15.8	1536	1998	70183	3072	1.44	9.07
457	12	132	168	38.1	41556	15.7	1819	2377	83113	3638	1.44	7.59
457	12.5	137	175	36.6	43145	15.7	1888	2470	86290	3776	1.44	7.3
457	16	174	222	28.6	53959	15.6	2361	3113	107919	4722	1.44	5.75
457	17.5	190	242	26.1	58434	15.6	2557	3382	116867	5114	1.44	5.27
457	19.1	206	263	23.9	63102	15.5	2762	3665	126204	5524	1.44	4.85
457	20	216	275	22.9	65681	15.5	2874	3822	131363	5748	1.44	4.64
457	25	266	339	18.3	79415	15.3	3475	4671	158830	6950	1.44	3.75
457	30	316	402	15.2	92173	15.1	4034	5479	184346	8068	1.44	3.17
508	6	74.3	94.6	84.7	29812	17.7	1174	1512	59623	2348	1.6	13.5
508	6.3	77.9	99.3	80.6	31246	17.7	1230	1586	62493	2460	1.6	12.8
508	8	98.6	126	63.5	39280	17.7	1546	2000	78560	3092	1.6	10.1
508	10	123	156	50.8	48520	17.6	1910	2480	97040	3820	1.6	8.14
508	12	147	187	42.3	57536	17.5	2265	2953	115072	4530	1.6	6.81
508	12.5	153	195	40.6	59755	17.5	2353	3070	119511	4706	1.6	6.55
508	16	194	247	31.8	74909	17.4	2949	3874	149818	5898	1.6	5.15
508	17.5	212	270	29	81202	17.4	3197	4212	162404	6394	1.6	4.72
508	19.1	230	293	26.6	87784	17.3	3456	4568	175568	6912	1.6	4.34

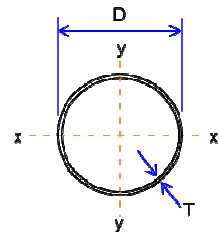


Cold Formed Circular Hollow Sections to EN 10219-2												
Designation		Mass	Area	Ratio for	Second	Radius	Elastic	Plastic	Torsional		Section	Nominal
Outside	Thickness	per	of	Local	Moment	of	Modulus	Modulus	Constants		Surface	Length
Diameter		metre	Section	Buckling	of Area	Gyration			Inertia	Modulus	Area	Per
D	T	M	A	D/t	I	r	Z	S	J	C	$A_s$	Tonne
mm	mm	kg/m	cm <sup>2</sup>		cm <sup>4</sup>	cm	cm <sup>3</sup>	cm <sup>3</sup>	cm <sup>4</sup>	cm <sup>3</sup>	m <sup>2</sup> /m	m
508	20	241	307	25.4	91428	17.3	3600	4766	182856	7200	1.6	4.15
508	25	298	379	20.3	110918	17.1	4367	5837	221837	8734	1.6	3.36
508	30	354	451	16.9	129173	16.9	5086	6864	258346	10172	1.6	2.83
559	6.4	87.2	111	87.3	42416	19.5	1518	1954	84832	3036	1.76	11.5
559	7.9	107	137	70.8	51936	19.5	1858	2399	103872	3716	1.76	9.31
559	8.7	118	150	64.3	56949	19.5	2038	2635	113898	4076	1.76	8.47
559	9.5	129	164	58.8	61918	19.4	2215	2869	123836	4430	1.76	7.77
559	10.3	139	178	54.3	66843	19.4	2392	3101	133686	4784	1.76	7.17
559	11.1	150	191	50.4	71724	19.4	2566	3333	143448	5132	1.76	6.67
559	11.9	161	205	47	76562	19.3	2739	3562	153124	5478	1.76	6.23
559	12.7	171	218	44	81356	19.3	2911	3791	162713	5822	1.76	5.84
559	14.3	192	245	39.1	90817	19.3	3249	4244	181634	6498	1.76	5.21
559	15.9	213	271	35.2	100108	19.2	3582	4691	200216	7164	1.76	4.7
559	17.5	234	298	31.9	109231	19.2	3908	5133	218462	7816	1.76	4.28
559	19.1	254	324	29.3	118189	19.1	4229	5570	236378	8458	1.76	3.93
559	20.6	274	348	27.1	126438	19	4524	5974	252876	9048	1.76	3.66
559	22.2	294	374	25.2	135080	19	4833	6401	270161	9666	1.76	3.4
610	6	89.4	114	102	51924	21.4	1702	2189	103847	3404	1.92	11.2
610	6.3	93.8	119	96.8	54439	21.3	1785	2296	108878	3570	1.92	10.7
610	6.4	95.3	121	95.3	55276	21.3	1812	2332	110552	3624	1.92	10.5
610	7.9	117	149	77.2	67728	21.3	2221	2864	135456	4442	1.92	8.52
610	8	119	151	76.3	68551	21.3	2248	2899	137103	4496	1.92	8.42
610	8.7	129	164	70.1	74292	21.3	2436	3146	148585	4872	1.92	7.75
610	9.5	141	179	64.2	80804	21.2	2649	3426	161607	5298	1.92	7.11
610	10	148	188	61	84847	21.2	2782	3600	169693	5564	1.92	6.76
610	10.3	152	194	59.2	87262	21.2	2861	3705	174525	5722	1.92	6.56
610	11.1	164	209	55	93669	21.2	3071	3982	187338	6142	1.92	6.1
610	11.9	176	224	51.3	100023	21.2	3279	4257	200046	6558	1.92	5.7
610	12	177	225	50.8	100814	21.1	3305	4292	201627	6610	1.92	5.65
610	12.5	184	235	48.8	104755	21.1	3435	4463	209509	6870	1.92	5.43
610	12.7	187	238	48	106326	21.1	3486	4532	212651	6972	1.92	5.35
610	14.3	210	268	42.7	118776	21.1	3894	5075	237552	7788	1.92	4.76
610	15.9	233	297	38.4	131023	21	4296	5613	262045	8592	1.92	4.29
610	16	234	299	38.1	131781	21	4321	5647	263563	8642	1.92	4.27
610	17.5	256	326	34.9	143068	21	4691	6145	286135	9382	1.92	3.91
610	19.1	278	355	31.9	154913	20.9	5079	6671	309827	10158	1.92	3.59
610	20	291	371	30.5	161490	20.9	5295	6965	322979	10590	1.92	3.44
610	20.6	299	381	29.6	165839	20.9	5437	7159	331679	10874	1.92	3.34
610	22.2	322	410	27.5	177305	20.8	5813	7674	354610	11626	1.92	3.11
610	23.8	344	438	25.6	188577	20.7	6183	8183	377155	12366	1.92	2.91
610	25	361	459	24.4	196906	20.7	6456	8561	393813	12912	1.92	2.77
610	30	429	547	20.3	230476	20.5	7557	10101	460952	15114	1.92	2.33
660	6.4	103	131	103	70181	23.1	2127	2734	140361	4254	2.07	9.69
660	7.9	127	162	83.5	86039	23.1	2607	3360	172077	5214	2.07	7.87
660	8.7	140	178	75.9	94406	23	2861	3691	188812	5722	2.07	7.16
660	9.5	152	194	69.5	102711	23	3112	4020	205422	6224	2.07	6.56
660	10.3	165	210	64.1	110954	23	3362	4348	221909	6724	2.07	6.06
660	11.1	178	226	59.5	119136	22.9	3610	4674	238272	7220	2.07	5.63
660	11.9	190	242	55.5	127256	22.9	3856	4999	254513	7712	2.07	5.26
660	12.7	203	258	52	135316	22.9	4100	5322	270631	8200	2.07	4.93
660	14.3	228	290	46.2	151252	22.8	4583	5963	302504	9166	2.07	4.39
660	15.9	253	322	41.5	166948	22.8	5059	6598	333896	10118	2.07	3.96
660	17.5	277	353	37.7	182406	22.7	5527	7226	364812	11054	2.07	3.61
660	19.1	302	385	34.6	197629	22.7	5989	7848	395257	11978	2.07	3.31
660	20.6	325	414	32	211688	22.6	6415	8425	423375	12830	2.07	3.08
660	22.2	349	445	29.7	226460	22.6	6862	9034	452921	13724	2.07	2.86

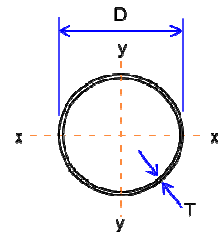


**Cold Formed Circular Hollow Sections to EN 10219-2**

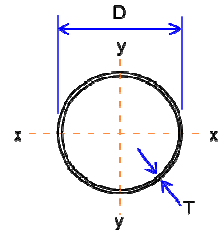
Designation		Mass	Area	Ratio for	Second	Radius	Elastic	Plastic	Torsional		Section	Nominal
Outside	Thickness	per	of	Local	Moment	of	Modulus	Modulus	Constants		Surface	Length
Diameter		metre	Section	Buckling	of Area	Gyration			Inertia	Modulus	Area	Per
D	T	M	A	D/t	I	r	Z	S	J	C	$A_s$	Tonne
mm	mm	kg/m	cm <sup>2</sup>		cm <sup>4</sup>	cm	cm <sup>3</sup>	cm <sup>3</sup>	cm <sup>4</sup>	cm <sup>3</sup>	m <sup>2</sup> /m	m
660	23.8	373	476	27.7	241005	22.5	7303	9638	482009	14606	2.07	2.68
660	25.4	398	506	26	255322	22.5	7737	10234	510645	15474	2.07	2.52
711	6	104	133	119	82568	24.9	2323	2982	165135	4646	2.23	9.59
711	6.3	109	139	113	86586	24.9	2436	3129	173172	4872	2.23	9.13
711	6.4	111	142	111	87923	24.9	2473	3177	175846	4946	2.23	8.99
711	7.9	137	174	90	107843	24.9	3034	3906	215687	6068	2.23	7.3
711	8	139	177	88.9	109162	24.9	3071	3954	218324	6142	2.23	7.21
711	8.7	151	192	81.7	118362	24.8	3329	4291	236725	6658	2.23	6.64
711	9.5	164	209	74.8	128809	24.8	3623	4675	257618	7246	2.23	6.08
711	10	173	220	71.1	135301	24.8	3806	4914	270603	7612	2.23	5.78
711	10.3	178	227	69	139183	24.8	3915	5057	278367	7830	2.23	5.62
711	11.1	192	244	64.1	149486	24.7	4205	5438	298972	8410	2.23	5.22
711	11.9	205	261	59.7	159717	24.7	4493	5817	319434	8986	2.23	4.87
711	12	207	264	59.3	160991	24.7	4529	5864	321981	9058	2.23	4.83
711	12.5	215	274	56.9	167343	24.7	4707	6099	334686	9414	2.23	4.64
711	12.7	219	279	56	169877	24.7	4779	6193	339753	9558	2.23	4.57
711	14.3	246	313	49.7	189984	24.6	5344	6942	379967	10688	2.23	4.07
711	15.9	273	347	44.7	209810	24.6	5902	7684	419620	11804	2.23	3.67
711	16	274	349	44.4	211040	24.6	5936	7730	422080	11872	2.23	3.65
711	17.5	299	381	40.6	229358	24.5	6452	8418	458716	12904	2.23	3.34
711	19.1	326	415	37.2	248630	24.5	6994	9146	497261	13988	2.23	3.07
711	20	341	434	35.6	259351	24.4	7295	9552	518702	14590	2.23	2.93
711	20.6	351	447	34.5	266450	24.4	7495	9822	532900	14990	2.23	2.85
711	22.2	377	480	32	285196	24.4	8022	10536	570392	16044	2.23	2.65
711	23.8	403	514	29.9	303674	24.3	8542	11244	607347	17084	2.23	2.48
711	25	423	539	28.4	317357	24.3	8927	11770	634715	17854	2.23	2.36
711	25.4	429	547	28	321886	24.3	9054	11945	643771	18108	2.23	2.33
711	28.6	481	613	24.9	357524	24.1	10057	13326	715048	20114	2.23	2.08
711	30	504	642	23.7	372790	24.1	10486	13922	745580	20972	2.23	1.98
762	6	112	143	127	101813	26.7	2672	3429	203626	5344	2.39	8.94
762	6.3	117	150	121	106777	26.7	2803	3598	213555	5606	2.39	8.52
762	6.4	119	152	119	108429	26.7	2846	3654	216859	5692	2.39	8.39
762	7.9	147	187	96.5	133052	26.7	3492	4493	266104	6984	2.39	6.81
762	8	149	190	95.3	134683	26.7	3535	4548	269366	7070	2.39	6.72
762	8.7	162	206	87.6	146063	26.6	3834	4937	292127	7668	2.39	6.19
762	9.5	176	225	80.2	158991	26.6	4173	5380	317982	8346	2.39	5.67
762	10	185	236	76.2	167028	26.6	4384	5655	334057	8768	2.39	5.39
762	10.3	191	243	74	171835	26.6	4510	5820	343671	9020	2.39	5.24
762	11.1	206	262	68.6	184597	26.6	4845	6259	369194	9690	2.39	4.86
762	11.9	220	280	64	197276	26.5	5178	6696	394551	10356	2.39	4.54
762	12	222	283	63.5	198855	26.5	5219	6751	397710	10438	2.39	4.51
762	12.5	231	294	61	206731	26.5	5426	7023	413462	10852	2.39	4.33
762	12.7	235	299	60	209873	26.5	5508	7131	419745	11016	2.39	4.26
762	14.3	264	336	53.3	234821	26.4	6163	7995	469642	12326	2.39	3.79
762	15.9	293	373	47.9	259445	26.4	6810	8852	518890	13620	2.39	3.42
762	16	294	375	47.6	260973	26.4	6850	8906	521947	13700	2.39	3.4
762	17.5	321	409	43.5	283747	26.3	7447	9702	567495	14894	2.39	3.11
762	19.1	350	446	39.9	307731	26.3	8077	10544	615462	16154	2.39	2.86
762	20	366	466	38.1	321083	26.2	8427	11014	642166	16854	2.39	2.73
762	20.6	377	480	37	329929	26.2	8660	11326	659857	17320	2.39	2.65
762	22.2	405	516	34.3	353303	26.2	9273	12154	706605	18546	2.39	2.47
762	23.8	433	552	32	376366	26.1	9878	12974	752732	19756	2.39	2.31
762	25	454	579	30.5	393461	26.1	10327	13584	786922	20654	2.39	2.2
762	25.4	461	588	30	399121	26.1	10476	13787	798242	20952	2.39	2.17
762	27	489	623	28.2	421572	26	11065	14593	843143	22130	2.39	2.04
762	28.6	517	659	26.6	443720	25.9	11646	15391	887439	23292	2.39	1.93



Cold Formed Circular Hollow Sections to EN 10219-2												
Designation		Mass	Area	Ratio for	Second	Radius	Elastic	Plastic	Torsional		Section	Nominal
Outside	Thickness	per	of	Local	Moment	of	Modulus	Modulus	Constants		Surface	Length
Diameter		metre	Section	Buckling	of Area	Gyration	Z	S	J	C	Area	Per
D	T	M	A	D/t	I	r	Z	S	J	C	A <sub>s</sub>	Tonne
mm	mm	kg/m	cm <sup>2</sup>		cm <sup>4</sup>	cm	cm <sup>3</sup>	cm <sup>3</sup>	cm <sup>4</sup>	cm <sup>3</sup>	m <sup>2</sup> /m	m
762	30	542	690	25.4	462853	25.9	12148	16084	925706	24296	2.39	1.85
813	7.9	157	200	103	161912	28.5	3983	5121	323823	7966	2.55	6.38
813	8	159	202	102	163901	28.5	4032	5184	327801	8064	2.55	6.3
813	8.7	173	220	93.4	177781	28.4	4373	5628	355561	8746	2.55	5.79
813	9.5	188	240	85.6	193554	28.4	4761	6134	387108	9522	2.55	5.31
813	10	198	252	81.3	203364	28.4	5003	6448	406728	10006	2.55	5.05
813	10.3	204	260	78.9	209232	28.4	5147	6637	418464	10294	2.55	4.9
813	11.1	220	280	73.2	224816	28.4	5531	7138	449631	11062	2.55	4.56
813	11.9	235	299	68.3	240305	28.3	5912	7638	480610	11824	2.55	4.25
813	12	237	302	67.8	242235	28.3	5959	7700	484469	11918	2.55	4.22
813	12.5	247	314	65	251860	28.3	6196	8011	503721	12392	2.55	4.05
813	12.7	251	319	64	255700	28.3	6290	8135	511401	12580	2.55	3.99
813	14.3	282	359	56.9	286211	28.2	7041	9123	572422	14082	2.55	3.55
813	15.9	313	398	51.1	316350	28.2	7782	10104	632701	15564	2.55	3.2
813	16	314	401	50.8	318222	28.2	7828	10165	636443	15656	2.55	3.18
813	17.5	343	437	46.5	346122	28.1	8515	11076	692243	17030	2.55	2.91
813	19.1	374	476	42.6	375528	28.1	9238	12041	751055	18476	2.55	2.67
813	20	391	498	40.7	391909	28	9641	12580	783819	19282	2.55	2.56
813	20.6	403	513	39.5	402767	28	9908	12938	805534	19816	2.55	2.48
813	22.2	433	552	36.6	431474	28	10614	13887	862949	21228	2.55	2.31
813	23.8	463	590	34.2	459825	27.9	11312	14828	919651	22624	2.55	2.16
813	25	486	619	32.5	480856	27.9	11829	15529	961713	23658	2.55	2.06
813	25.4	493	628	32	487823	27.9	12001	15761	975646	24002	2.55	2.03
813	27	523	667	30.1	515470	27.8	12681	16687	1030940	25362	2.55	1.91
813	28.6	553	705	28.4	542770	27.8	13352	17605	1085540	26704	2.55	1.81
813	30	579	738	27.1	566374	27.7	13933	18402	1132748	27866	2.55	1.73
864	7.9	167	212	109	194669	30.3	4506	5790	389339	9012	2.71	6
864	8.7	184	234	99.3	213786	30.2	4949	6365	427572	9898	2.71	5.45
864	9.5	200	255	90.9	232795	30.2	5389	6937	465590	10778	2.71	5
864	10.3	217	276	83.9	251696	30.2	5826	7507	503392	11652	2.71	4.61
864	11.1	233	297	77.8	270490	30.2	6261	8075	540979	12522	2.71	4.28
864	11.9	250	319	72.6	289177	30.1	6694	8641	578353	13388	2.71	4
864	12.7	267	340	68	307757	30.1	7124	9205	615514	14248	2.71	3.75
864	14.3	300	382	60.4	344600	30	7977	10325	689201	15954	2.71	3.34
864	15.9	333	424	54.3	381023	30	8820	11438	762045	17640	2.71	3.01
864	17.5	365	465	49.4	417027	29.9	9653	12542	834054	19306	2.71	2.74
864	19.1	398	507	45.2	452617	29.9	10477	13637	905234	20954	2.71	2.51
864	20.6	428	546	41.9	485609	29.8	11241	14656	971218	22482	2.71	2.33
864	22.2	461	587	38.9	520405	29.8	12046	15735	1040810	24092	2.71	2.17
864	23.8	493	628	36.3	554796	29.7	12842	16806	1109592	25684	2.71	2.03
864	25.4	525	669	34	588785	29.7	13629	17868	1177569	27258	2.71	1.9
864	27	557	710	32	622374	29.6	14407	18922	1244749	28814	2.71	1.79
864	28.6	589	751	30.2	655568	29.6	15175	19968	1311137	30350	2.71	1.7
914	7.9	177	225	116	230807	32	5050	6486	461613	10100	2.87	5.66
914	8	179	228	114	233651	32	5113	6567	467303	10226	2.87	5.59
914	8.7	194	247	105	253511	32	5547	7130	507022	11094	2.87	5.15
914	9.5	212	270	96.2	276094	32	6041	7772	552188	12082	2.87	4.72
914	10	223	284	91.4	290147	32	6349	8172	580294	12698	2.87	4.49
914	10.3	230	292	88.7	298556	32	6533	8412	597113	13066	2.87	4.36
914	11.1	247	315	82.3	320898	31.9	7022	9049	641797	14044	2.87	4.05
914	11.9	265	337	76.8	343120	31.9	7508	9685	686241	15016	2.87	3.78
914	12	267	340	76.2	345890	31.9	7569	9764	691779	15138	2.87	3.75
914	12.5	278	354	73.1	359708	31.9	7871	10159	719417	15742	2.87	3.6
914	12.7	282	360	72	365223	31.9	7992	10317	730446	15984	2.87	3.54
914	14.3	317	404	63.9	409071	31.8	8951	11576	818142	17902	2.87	3.15
914	15.9	352	449	57.5	452446	31.8	9900	12826	904893	19800	2.87	2.84

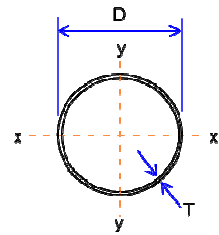


Cold Formed Circular Hollow Sections to EN 10219-2												
Designation		Mass	Area	Ratio for	Second	Radius	Elastic	Plastic	Torsional		Section	Nominal
Outside	Thickness	per	of	Local	Moment	of	Modulus	Modulus	Constants		Surface	Length
Diameter		metre	Section	Buckling	of Area	Gyration			Inertia	Modulus	Area	Per
D	T	M	A	D/t	I	r	Z	S	J	C	A <sub>s</sub>	Tonne
mm	mm	kg/m	cm <sup>2</sup>		cm <sup>4</sup>	cm	cm <sup>3</sup>	cm <sup>3</sup>	cm <sup>4</sup>	cm <sup>3</sup>	m <sup>2</sup> /m	m
914	16	354	451	57.1	455142	31.8	9959	12904	910284	19918	2.87	2.82
914	17.5	387	493	52.2	495352	31.7	10839	14067	990705	21678	2.87	2.58
914	19.1	422	537	47.9	537792	31.6	11768	15298	1075585	23536	2.87	2.37
914	20	441	562	45.7	561461	31.6	12286	15987	1122922	24572	2.87	2.27
914	20.6	454	578	44.4	577159	31.6	12629	16445	1154319	25258	2.87	2.2
914	22.2	488	622	41.2	618706	31.5	13538	17659	1237412	27076	2.87	2.05
914	23.8	522	666	38.4	659796	31.5	14438	18865	1319593	28876	2.87	1.91
914	25	548	698	36.6	690317	31.4	15105	19763	1380634	30210	2.87	1.82
914	25.4	557	709	36	700434	31.4	15327	20062	1400868	30654	2.87	1.8
914	27	591	752	33.9	740622	31.4	16206	21249	1481244	32412	2.87	1.69
914	28.6	624	796	32	780364	31.3	17076	22428	1560729	34152	2.87	1.6
914	30	654	833	30.5	814775	31.3	17829	23453	1629550	35658	2.87	1.53
965	7.9	186	238	122	272012	33.8	5638	7237	544025	11276	3.03	5.36
965	8.7	205	261	111	298812	33.8	6193	7956	597623	12386	3.03	4.87
965	9.5	224	285	102	325476	33.8	6746	8674	650951	13492	3.03	4.47
965	10.3	243	309	93.7	352005	33.8	7295	9388	704009	14590	3.03	4.12
965	11.1	261	333	86.9	378399	33.7	7842	10101	756798	15684	3.03	3.83
965	11.9	280	356	81.1	404660	33.7	8387	10811	809319	16774	3.03	3.58
965	12.7	298	380	76	430787	33.7	8928	11518	861573	17856	3.03	3.35
965	14.3	335	427	67.5	482641	33.6	10003	12926	965283	20006	3.03	2.98
965	15.9	372	474	60.7	533967	33.6	11067	14324	1067935	22134	3.03	2.69
965	17.5	409	521	55.1	584768	33.5	12120	15713	1169536	24240	3.03	2.45
965	19.1	446	568	50.5	635047	33.4	13162	17092	1270094	26324	3.03	2.24
965	20.6	480	611	46.8	681713	33.4	14129	18376	1363426	28258	3.03	2.08
965	22.2	516	658	43.5	730991	33.3	15150	19737	1461983	30300	3.03	1.94
965	23.8	552	704	40.5	779759	33.3	16161	21088	1559517	32322	3.03	1.81
965	25.4	589	750	38	828018	33.2	17161	22430	1656036	34322	3.03	1.7
965	27	625	796	35.7	875774	33.2	18151	23762	1751547	36302	3.03	1.6
965	28.6	660	841	33.7	923028	33.1	19130	25086	1846057	38260	3.03	1.51
1016	7.9	196	250	129	317852	35.6	6257	8029	635703	12514	3.19	5.09
1016	8	199	253	127	321780	35.6	6334	8129	643560	12668	3.19	5.03
1016	8.7	216	275	117	349211	35.6	6874	8828	698422	13748	3.19	4.63
1016	9.5	236	300	107	380420	35.6	7489	9624	760840	14978	3.19	4.24
1016	10	248	316	102	399850	35.6	7871	10121	799699	15742	3.19	4.03
1016	10.3	255	325	98.6	411479	35.6	8100	10418	822959	16200	3.19	3.91
1016	11.1	275	350	91.5	442389	35.5	8708	11210	884778	17416	3.19	3.64
1016	11.9	295	375	85.4	473150	35.5	9314	11998	946300	18628	3.19	3.39
1016	12	297	378	84.7	476985	35.5	9389	12097	953969	18778	3.19	3.37
1016	12.5	309	394	81.3	496123	35.5	9766	12588	992246	19532	3.19	3.23
1016	12.7	314	400	80	503762	35.5	9917	12785	1007525	19834	3.19	3.18
1016	14.3	353	450	71	564544	35.4	11113	14350	1129087	22226	3.19	2.83
1016	15.9	392	500	63.9	624737	35.4	12298	15905	1249473	24596	3.19	2.55
1016	16	395	503	63.5	628479	35.4	12372	16001	1256959	24744	3.19	2.53
1016	17.5	431	549	58.1	684346	35.3	13471	17449	1368691	26942	3.19	2.32
1016	19.1	470	598	53.2	743374	35.3	14633	18984	1486748	29266	3.19	2.13
1016	20	491	626	50.8	776324	35.2	15282	19843	1552648	30564	3.19	2.04
1016	20.6	506	644	49.3	798189	35.2	15712	20414	1596379	31424	3.19	1.98
1016	22.2	544	693	45.8	856104	35.1	16852	21929	1712208	33704	3.19	1.84
1016	23.8	582	742	42.7	913449	35.1	17981	23435	1826898	35962	3.19	1.72
1016	25	611	778	40.6	956086	35	18821	24557	1912173	37642	3.19	1.64
1016	25.4	621	790	40	970228	35	19099	24930	1940457	38198	3.19	1.61
1016	27	659	839	37.6	1026446	35	20206	26416	2052892	40412	3.19	1.52
1016	28.6	696	887	35.5	1082105	34.9	21301	27892	2164210	42602	3.19	1.44
1016	30	729	929	33.9	1130352	34.9	22251	29175	2260704	44502	3.19	1.37
1067	9.5	248	316	112	441225	37.4	8270	10624	882449	16540	3.35	4.04
1067	10	261	332	107	463792	37.4	8693	11173	927585	17386	3.35	3.84

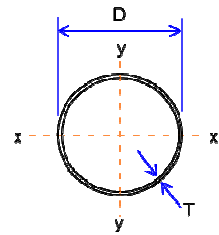


Cold Formed Circular Hollow Sections to EN 10219-2												
Designation		Mass	Area	Ratio for	Second	Radius	Elastic	Plastic	Torsional		Section	Nominal
Outside	Thickness	per	of	Local	Moment	of	Modulus	Modulus	Constants		Surface	Length
Diameter		metre	Section	Buckling	of Area	Gyration			Inertia	Modulus	Area	Per
D	T	M	A	D/t	I	r	Z	S	J	C	A <sub>s</sub>	Tonne
mm	mm	kg/m	cm <sup>2</sup>		cm <sup>4</sup>	cm	cm <sup>3</sup>	cm <sup>3</sup>	cm <sup>4</sup>	cm <sup>3</sup>	m <sup>2</sup> /m	m
1067	10.3	268	342	104	477302	37.4	8947	11501	954605	17894	3.35	3.73
1067	11.1	289	368	96.1	513215	37.3	9620	12376	1026430	19240	3.35	3.46
1067	11.9	310	394	89.7	548963	37.3	10290	13248	1097926	20580	3.35	3.23
1067	12	312	398	88.9	553420	37.3	10373	13357	1106840	20746	3.35	3.2
1067	12.5	325	414	85.4	575666	37.3	10790	13900	1151332	21580	3.35	3.08
1067	12.7	330	421	84	584547	37.3	10957	14117	1169093	21914	3.35	3.03
1067	14.3	371	473	74.6	655224	37.2	12282	15848	1310448	24564	3.35	2.69
1067	15.9	412	525	67.1	725251	37.2	13594	17568	1450502	27188	3.35	2.43
1067	16	415	528	66.7	729606	37.2	13676	17675	1459213	27352	3.35	2.41
1067	17.5	453	577	61	794632	37.1	14895	19277	1589264	29790	3.35	2.21
1067	19.1	494	629	55.9	863370	37.1	16183	20976	1726740	32366	3.35	2.03
1067	20	516	658	53.4	901755	37	16903	21927	1803509	33806	3.35	1.94
1067	20.6	532	677	51.8	927232	37	17380	22559	1854465	34760	3.35	1.88
1067	22.2	572	729	48.1	994737	36.9	18645	24237	1989475	37290	3.35	1.75
1067	23.8	612	780	44.8	1061611	36.9	19899	25905	2123223	39798	3.35	1.63
1067	25	642	818	42.7	1111355	36.9	20831	27149	2222711	41662	3.35	1.56
1067	25.4	652	831	42	1127859	36.8	21141	27563	2255717	42282	3.35	1.53
1067	27	692	882	39.5	1193483	36.8	22371	29210	2386966	44742	3.35	1.44
1067	28.6	732	933	37.3	1258489	36.7	23589	30846	2516977	47178	3.35	1.37
1067	30	767	977	35.6	1314864	36.7	24646	32270	2629727	49292	3.35	1.3
1118	9.5	260	331	118	508186	39.2	9091	11674	1016371	18182	3.51	3.85
1118	10.3	281	358	109	549795	39.2	9835	12638	1099591	19670	3.51	3.55
1118	11.1	303	386	101	591224	39.1	10576	13600	1182447	21152	3.51	3.3
1118	11.9	325	414	93.9	632471	39.1	11314	14560	1264941	22628	3.51	3.08
1118	12.7	346	441	88	673537	39.1	12049	15516	1347074	24098	3.51	2.89
1118	14.3	389	496	78.2	755130	39	13509	17421	1510261	27018	3.51	2.57
1118	15.9	432	551	70.3	836008	39	14955	19314	1672016	29910	3.51	2.31
1118	17.5	475	605	63.9	916174	38.9	16390	21196	1832348	32780	3.51	2.11
1118	19.1	518	659	58.5	995632	38.9	17811	23067	1991264	35622	3.51	1.93
1118	20.6	558	710	54.3	1069486	38.8	19132	24811	2138971	38264	3.51	1.79
1118	22.2	600	764	50.4	1147585	38.8	20529	26661	2295171	41058	3.51	1.67
1168	9.5	271	346	123	580097	41	9933	12750	1160195	19866	3.67	3.68
1168	10	286	364	117	609843	40.9	10443	13410	1219686	20886	3.67	3.5
1168	10.3	294	375	113	627653	40.9	10747	13805	1255306	21494	3.67	3.4
1168	11.1	317	403	105	675010	40.9	11558	14857	1350020	23116	3.67	3.16
1168	11.9	339	432	98.2	722169	40.9	12366	15906	1444339	24732	3.67	2.95
1168	12	342	436	97.3	728050	40.9	12467	16037	1456101	24934	3.67	2.92
1168	12.5	356	454	93.4	757409	40.9	12969	16690	1514818	25938	3.67	2.81
1168	12.7	362	461	92	769131	40.8	13170	16952	1538262	26340	3.67	2.76
1168	14.3	407	518	81.7	862465	40.8	14768	19035	1724929	29536	3.67	2.46
1168	15.9	452	575	73.5	955015	40.7	16353	21106	1910030	32706	3.67	2.21
1168	16	455	579	73	960774	40.7	16452	21235	1921547	32904	3.67	2.2
1168	17.5	497	633	66.7	1046787	40.7	17924	23166	2093574	35848	3.67	2.01
1168	19.1	541	689	61.2	1137784	40.6	19483	25214	2275569	38966	3.67	1.85
1168	20	566	721	58.4	1188632	40.6	20353	26361	2377264	40706	3.67	1.77
1168	20.6	583	743	56.7	1222395	40.6	20931	27123	2444790	41862	3.67	1.72
1168	22.2	627	799	52.6	1311905	40.5	22464	29149	2623810	44928	3.67	1.59
1168	25	705	898	46.7	1466717	40.4	25115	32666	2933434	50230	3.67	1.42
1219	9.5	283	361	128	660128	42.8	10831	13898	1320255	21662	3.83	3.53
1219	10	298	380	122	694014	42.7	11387	14617	1388029	22774	3.83	3.35
1219	10.3	307	391	118	714306	42.7	11720	15048	1428612	23440	3.83	3.26
1219	11.1	331	421	110	768268	42.7	12605	16196	1536535	25210	3.83	3.02
1219	11.9	354	451	102	822013	42.7	13487	17340	1644026	26974	3.83	2.82
1219	12	357	455	102	828716	42.7	13597	17483	1657433	27194	3.83	2.8
1219	12.5	372	474	97.5	862181	42.7	14146	18196	1724362	28292	3.83	2.69
1219	12.7	378	481	96	875543	42.7	14365	18481	1751087	28730	3.83	2.65





Cold Formed Circular Hollow Sections to EN 10219-2												
Designation		Mass	Area	Ratio for	Second	Radius	Elastic	Plastic	Torsional		Section	Nominal
Outside	Thickness	per	of	Local	Moment	of	Modulus	Modulus	Constants		Surface	Length
Diameter		metre	Section	Buckling	of Area	Gyration			Inertia	Modulus	Area	Per
D	T	M	A	D/t	I	r	Z	S	J	C	A <sub>s</sub>	Tonne
mm	mm	kg/m	cm <sup>2</sup>		cm <sup>4</sup>	cm	cm <sup>3</sup>	cm <sup>3</sup>	cm <sup>4</sup>	cm <sup>3</sup>	m <sup>2</sup> /m	m
1219	14.3	425	541	85.2	981960	42.6	16111	20755	1963920	32222	3.83	2.35
1219	15.9	472	601	76.7	1087522	42.5	17843	23016	2175044	35686	3.83	2.12
1219	16	475	605	76.2	1094091	42.5	17951	23157	2188183	35902	3.83	2.11
1219	17.5	519	661	69.7	1192234	42.5	19561	25265	2384467	39122	3.83	1.93
1219	19.1	565	720	63.8	1296100	42.4	21265	27502	2592200	42530	3.83	1.77
1219	20	591	753	61	1354155	42.4	22217	28755	2708309	44434	3.83	1.69
1219	20.6	609	776	59.2	1392710	42.4	22850	29588	2785421	45700	3.83	1.64
1219	22.2	655	835	54.9	1494951	42.3	24528	31801	2989902	49056	3.83	1.53
1219	25	736	938	48.8	1671873	42.2	27430	35646	3343746	54860	3.83	1.36
1270	9.5	295	376	134	747200	44.6	11767	15094	1494399	23534	3.99	3.39
1270	10.3	320	408	123	808588	44.5	12734	16345	1617177	25468	3.99	3.13
1270	11.1	345	439	114	869742	44.5	13697	17592	1739484	27394	3.99	2.9
1270	11.9	369	470	107	930660	44.5	14656	18836	1861321	29312	3.99	2.71
1270	12.7	394	502	100	991345	44.5	15612	20077	1982689	31224	3.99	2.54
1270	14.3	443	564	88.8	1112013	44.4	17512	22549	2224026	35024	3.99	2.26
1270	15.9	492	626	79.9	1231752	44.3	19398	25008	2463504	38796	3.99	2.03
1270	17.5	541	689	72.6	1350566	44.3	21269	27455	2701133	42538	3.99	1.85
1270	19.1	589	751	66.5	1468461	44.2	23125	29889	2936921	46250	3.99	1.7
1270	20.6	635	809	61.7	1578155	44.2	24853	32160	3156310	49706	3.99	1.58
1270	22.2	683	870	57.2	1694280	44.1	26682	34569	3388561	53364	3.99	1.46
1321	9.5	307	391	139	841611	46.4	12742	16341	1683221	25484	4.15	3.25
1321	10.3	333	424	128	910823	46.3	13790	17695	1821645	27580	4.15	3
1321	11.1	359	457	119	979780	46.3	14834	19046	1959560	29668	4.15	2.79
1321	11.9	384	489	111	1048483	46.3	15874	20394	2096965	31748	4.15	2.6
1321	12.7	410	522	104	1116932	46.3	16910	21739	2233863	33820	4.15	2.44
1321	14.3	461	587	92.4	1253071	46.2	18972	24418	2506142	37944	4.15	2.17
1321	15.9	512	652	83.1	1388203	46.1	21017	27084	2776405	42034	4.15	1.95
1321	17.5	563	717	75.5	1522332	46.1	23048	29736	3044664	46096	4.15	1.78
1321	19.1	613	781	69.2	1655463	46	25064	32376	3310927	50128	4.15	1.63
1321	20.6	661	842	64.1	1779373	46	26940	34838	3558746	53880	4.15	1.51
1321	22.2	711	906	59.5	1910586	45.9	28926	37452	3821172	57852	4.15	1.41
1372	9.5	319	407	144	943657	48.2	13756	17636	1887314	27512	4.31	3.13
1372	10.3	346	441	133	1021330	48.1	14888	19099	2042661	29776	4.31	2.89
1372	11.1	373	475	124	1098729	48.1	16016	20558	2197457	32032	4.31	2.68
1372	11.9	399	508	115	1175852	48.1	17141	22014	2351704	34282	4.31	2.51
1372	12.7	426	542	108	1252701	48.1	18261	23466	2505402	36522	4.31	2.35
1372	14.3	479	610	95.9	1405580	48	20490	26361	2811160	40980	4.31	2.09
1372	15.9	532	677	86.3	1557370	47.9	22702	29242	3114740	45404	4.31	1.88
1372	17.5	585	745	78.4	1708077	47.9	24899	32109	3416154	49798	4.31	1.71
1372	19.1	637	812	71.8	1857706	47.8	27080	34962	3715411	54160	4.31	1.57
1372	20.6	687	875	66.6	1997008	47.8	29111	37624	3994016	58222	4.31	1.46
1372	22.2	739	941	61.8	2144562	47.7	31262	40451	4289124	62524	4.31	1.35
1422	11.9	414	527	119	1310351	49.9	18430	23662	2620701	36860	4.47	2.42
1422	12.7	441	562	112	1396077	49.8	19635	25224	2792153	39270	4.47	2.27
1422	14.3	496	632	99.4	1566647	49.8	22034	28338	3133293	44068	4.47	2.01
1422	15.9	551	702	89.4	1736046	49.7	24417	31438	3472091	48834	4.47	1.81
1422	17.5	606	772	81.3	1904279	49.7	26783	34523	3808558	53566	4.47	1.65
1422	19.1	661	842	74.5	2071352	49.6	29133	37594	4142704	58266	4.47	1.51
1422	20.6	712	907	69	2226934	49.6	31321	40460	4453867	62642	4.47	1.4
1422	22.2	766	976	64.1	2391773	49.5	33640	43503	4783547	67280	4.47	1.3
1473	11.9	429	546	124	1457725	51.7	19793	25405	2915449	39586	4.63	2.33
1473	12.7	457	583	116	1553183	51.6	21089	27083	3106367	42178	4.63	2.19
1473	14.3	514	655	103	1743153	51.6	23668	30429	3486307	47336	4.63	1.94
1473	15.9	571	728	92.6	1931865	51.5	26230	33759	3863730	52460	4.63	1.75
1473	17.5	628	800	84.2	2119324	51.5	28776	37075	4238648	57552	4.63	1.59
1473	19.1	685	872	77.1	2305535	51.4	31304	40376	4611071	62608	4.63	1.46



Cold Formed Circular Hollow Sections to EN 10219-2												
Designation		Mass	Area	Ratio for	Second	Radius	Elastic	Plastic	Torsional		Section	Nominal
Outside	Thickness	per	of	Local	Moment	of	Modulus	Modulus	Constants		Surface	Length
Diameter		metre	Section	Buckling	of Area	Gyration			Inertia	Modulus	Area	Per
D	T	M	A	D/t	I	r	Z	S	J	C	$A_s$	Tonne
mm	mm	kg/m	cm <sup>2</sup>		cm <sup>4</sup>	cm	cm <sup>3</sup>	cm <sup>3</sup>	cm <sup>4</sup>	cm <sup>3</sup>	m <sup>2</sup> /m	m
1473	20.6	738	940	71.5	2478981	51.4	33659	43458	4957962	67318	4.63	1.36
1473	22.2	794	1012	66.4	2662792	51.3	36155	46731	5325583	72310	4.63	1.26
1524	11.9	444	565	128	1615754	53.5	21204	27209	3231508	42408	4.79	2.25
1524	12.7	473	603	120	1721656	53.4	22594	29008	3443312	45188	4.79	2.11
1524	14.3	532	678	107	1932444	53.4	25360	32593	3864887	50720	4.79	1.88
1524	15.9	591	753	95.8	2141883	53.3	28109	36164	4283766	56218	4.79	1.69
1524	17.5	650	828	87.1	2349979	53.3	30840	39719	4699958	61680	4.79	1.54
1524	19.1	709	903	79.8	2556737	53.2	33553	43259	5113475	67106	4.79	1.41
1524	20.6	764	973	74	2749364	53.2	36081	46563	5498728	72162	4.79	1.31
1524	22.2	822	1047	68.6	2953548	53.1	38760	50074	5907096	77520	4.79	1.22
1626	11.9	474	603	137	1965268	57.1	24173	31004	3930536	48346	5.11	2.11
1626	12.7	505	644	128	2094286	57	25760	33055	4188571	51520	5.11	1.98
1626	14.3	568	724	114	2351163	57	28920	37146	4702326	57840	5.11	1.76
1626	15.9	631	804	102	2606501	56.9	32060	41221	5213002	64120	5.11	1.58
1626	17.5	694	884	92.9	2860306	56.9	35182	45279	5720612	70364	5.11	1.44
1626	19.1	757	964	85.1	3112585	56.8	38285	49321	6225169	76570	5.11	1.32
1626	20.6	816	1039	78.9	3347714	56.8	41177	53095	6695429	82354	5.11	1.23
1626	22.2	878	1119	73.2	3597052	56.7	44244	57106	7194104	88488	5.11	1.14
1676	11.9	488	622	141	2153611	58.8	25699	32954	4307223	51398	5.27	2.05
1676	12.7	521	664	132	2295095	58.8	27388	35136	4590190	54776	5.27	1.92
1676	14.3	586	747	117	2576831	58.8	30750	39487	5153662	61500	5.27	1.71
1676	15.9	651	829	105	2856930	58.7	34092	43821	5713860	68184	5.27	1.54
1676	17.5	716	912	95.8	3135398	58.6	37415	48138	6270797	74830	5.27	1.4
1676	19.1	780	994	87.7	3412242	58.6	40719	52438	6824484	81438	5.27	1.28
1676	20.6	841	1071	81.4	3670314	58.5	43798	56454	7340628	87596	5.27	1.19
1676	22.2	905	1153	75.5	3944029	58.5	47065	60722	7888058	94130	5.27	1.1
1829	11.9	533	679	154	2803896	64.2	30860	39293	5607793	61320	5.75	1.88
1829	12.7	569	725	144	2988461	64.2	32679	41897	5976922	65358	5.75	1.76
1829	14.3	640	815	128	3356119	64.2	36699	47093	6712239	73398	5.75	1.56
1829	15.9	711	906	115	3721823	64.1	40698	52270	7443645	81396	5.75	1.41
1829	17.5	782	996	105	4085578	64	44676	57429	8171155	89352	5.75	1.28
1829	19.1	853	1086	95.8	4447391	64	48632	62569	8894783	97264	5.75	1.17
1829	20.6	919	1170	88.8	4784835	63.9	52322	67371	9569670	104644	5.75	1.09
1829	22.2	989	1260	82.4	5142907	63.9	56237	72476	10285814	112474	5.75	1.01
2020	11.9	589	751	170	3784235	71	37468	47987	7568470	74936	6.35	1.7
2020	12.7	629	801	159	4033832	71	39939	51172	8067665	79878	6.35	1.59
2020	14.3	707	901	141	4531228	70.9	44864	57527	9062456	89728	6.35	1.41
2020	15.9	786	1001	127	5026232	70.9	49765	63862	10052464	99530	6.35	1.27
2020	17.5	864	1101	115	5518851	70.8	54642	70177	11037702	109284	6.35	1.16
2020	19.1	942	1201	106	6009094	70.7	59496	76471	12018187	118992	6.35	1.06
2020	20.6	1016	1294	98.1	6466544	70.7	64025	82353	12933089	128050	6.35	0.984
2020	22.2	1094	1393	91	6952204	70.6	68834	88608	13904408	137668	6.35	0.914
2134	11.9	623	793	179	4465993	75	41856	53590	8931986	83712	6.7	1.61
2134	12.7	664	846	168	4760860	75	44619	57150	9521721	89238	6.7	1.51
2134	14.3	748	952	149	5348585	74.9	50127	64253	10697170	100254	6.7	1.34
2134	15.9	831	1058	134	5933635	74.9	55610	71334	11867271	111220	6.7	1.2
2134	17.5	913	1164	122	6516021	74.8	61069	78394	13032041	122138	6.7	1.09
2134	19.1	996	1269	112	7095748	74.8	66502	85433	14191496	133004	6.7	1
2134	20.6	1074	1368	104	7636836	74.7	71573	92012	15273672	143146	6.7	0.931
2134	22.2	1156	1473	96.1	8211438	74.7	76958	99009	16422876	153916	6.7	0.865