

Specification for

Cold rolled steel sections

UDC 669.14 – 423 – 122.2

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- British Constructional Steelwork Association*
- British Ironfounders' Association
- British Mechanical Engineering Confederation
- British Steel Industry*
- British Steel Industry — Wire Section
- The Concrete Society
- Council of Iron Foundry Associations
- Department of Industry (National Physical Laboratory)
- Electricity Supply Industry in England and Wales
- Engineering Equipment Users' Association
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- Society of Motor Manufacturers and Traders Ltd.
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The Government department and scientific and industrial organizations marked with an asterisk in the above list, together with the following, were directly represented on the committee entrusted with the preparation of this standard:

- Cold Rolled Sections Association
- Department of the Environment
- Institution of Civil Engineers

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Foreword

This British Standard, which was first published in 1958, covers a basic range of sections formed by cold rolling from steel strip. The sizes in this revision include equivalents of previously used imperial sizes and also metric sizes adopted by the European Study Group for Cold Rolled Sections (comprised of members from Austria, Belgium, France, Germany, Italy, Netherlands and the United Kingdom).

Although sections may not always be available ex-stock the sizes given in this standard are those most commonly in production. The purchaser would find it advantageous to use these sizes where possible, but size variations can readily be accommodated and in such cases requirements should be discussed with the manufacturer of the section.

Attention is drawn to Addendum no. 1(1975) to BS 449-2 for design and construction details.

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

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Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 to 32, an inside back cover and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

1 Scope

This British Standard specifies the dimensions, mass and geometrical properties of the basic ranges of eight simple and three compound types of cold rolled steel section.

2 Reference

The title of the standards publication referred to in this standard is given on the inside back cover.

3 Basis of calculation

When steel strip is cold roll formed slight thinning occurs at the corners. The actual strip width necessary to form a section is therefore smaller than its theoretical width measured along the centre line of its cross section. For strip widths to be used in practice, experience has evolved reduction factors from which the thinning effect at the corners can be determined. In view of this the properties of the sections given in the tables have been computed using the reduction factors as briefly outlined in Appendix A.

4 Dimensions and tolerances

4.1 Dimensions. The dimensions and profiles of the sections shall be in accordance with Table 1 to Table 14.

The profile dimensions and angular accuracy shall be measured at a point not less than 150 mm from the end of the section.

4.2 Tolerances for simple sections (Table 1 to Table 11). The straightness of any length shall be such that the offset does not exceed 1/600 of that length. The deviation of the profile dimensions shall not exceed ± 0.4 mm. The deviation from the angle of 90° shall not exceed $\pm 1^\circ$. The sections shall be reasonably free from twist and in particular cases the acceptable degree of twist shall be the subject of agreement between the purchaser and the manufacturer.

The proportions of the sections may be such that the stated tolerance on the angle could lead to a variation on the overall profile dimensions exceeding the specified tolerance of ± 0.4 mm. In such cases the acceptable tolerance on the angle shall be the subject of agreement between the purchaser and the manufacturer.

The ± 0.4 mm profile tolerance shall not apply to elements having a free edge, e.g. lengths of the legs of angles, channels, tees and zed sections and the lips of lipped channels and lipped zed sections, etc. In these cases the tolerances shall be as follows.

Thickness	Permissible deviation
mm	mm
less than 3.0	± 0.75
3.0 up to but not including 5.0	± 1.25
5.0 and over	± 1.50

The foregoing tolerances apply to all sections within the ranges included in Table 1 to Table 11 (i.e. sections of the same shape but of intermediate sizes and thicknesses); tolerances on cold rolled sections outside the basic ranges tabulated should be the subject of agreement between the purchaser and the manufacturer.

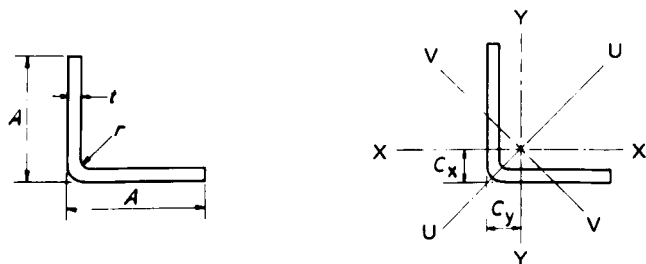
The tolerances on ordered lengths shall be as follows.

Ordered length	Permissible deviation
m	mm
up to and including 3	± 0.8
over 3, up to and including 6	± 1.5
over 6	± 3.0

For manufacturing reasons the corner radii may vary slightly from those shown in the tables. This, however, has a negligible effect on the properties of the section.

4.3 Tolerances for compound sections (Table 12, Table 13 and Table 14). For compound sections, the tolerances shall be the subject of agreement between the purchaser and the manufacturer.

Table 1 — Equal angles

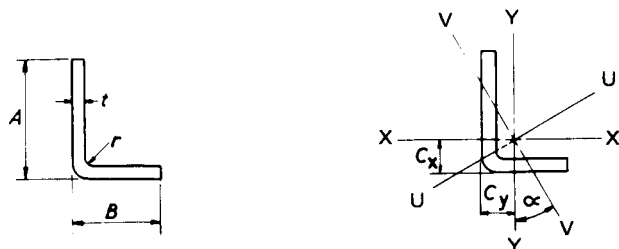


Designation	Dimensions			Mass/unit lengths	Area of section	Centre of gravity		Moment of inertia			Radius of gyration			Elastic modulus	Product moment of inertia
$A \times A \times t$	A	t	r			C_x	C_y	About X-X, Y-Y	About U-U	About V-V	About X-X, Y-Y	About U-U	About V-V	About X-X, Y-Y	About XY
mm	mm	mm	mm	kg/m	cm ²	cm	cm	cm ⁴	cm ⁴	cm ⁴	cm	cm	cm	cm ³	cm ⁴
20 × 20 × 1.2		1.2	1.2	0.355	0.452	0.560	0.560	0.179	0.292	0.0667	0.630	0.804	0.384	0.125	0.133
20 × 20 × 1.6	20	1.6	1.6	0.463	0.590	0.580	0.580	0.231	0.378	0.0834	0.625	0.800	0.376	0.162	0.147
20 × 20 × 2		2	2	0.567	0.722	0.600	0.600	0.278	0.458	0.0977	0.620	0.797	0.368	0.198	0.180
25 × 25 × 1.6		1.6	1.6	0.589	0.750	0.705	0.705	0.464	0.756	0.171	0.787	1.00	0.478	0.258	0.293
25 × 25 × 2	25	2	2	0.724	0.922	0.725	0.725	0.563	0.923	0.204	0.782	1.00	0.470	0.317	0.359
25 × 25 × 3		3	3	1.04	1.32	0.776	0.776	0.784	1.30	0.258	0.769	0.991	0.450	0.455	0.516
30 × 30 × 1.6		1.6	1.6	0.714	0.910	0.830	0.830	0.817	1.33	0.306	0.948	1.21	0.580	0.377	0.511
30 × 30 × 2	30	2	2	0.881	1.12	0.850	0.850	0.997	1.63	0.367	0.943	1.20	0.572	0.464	0.630
30 × 30 × 3		3	3	1.27	1.62	0.900	0.900	1.41	2.32	0.495	0.931	1.19	0.552	0.670	0.912
40 × 40 × 1.6		1.6	1.6	0.965	1.23	1.08	1.08	1.99	3.21	0.757	1.27	1.62	0.784	0.680	1.23
40 × 40 × 2	40	2	2	1.19	1.52	1.10	1.10	2.44	3.96	0.917	1.27	1.61	0.776	0.840	1.52
40 × 40 × 2.5		2.5	2.5	1.47	1.88	1.12	1.12	2.98	4.85	1.10	1.26	1.61	0.766	1.04	1.88
40 × 40 × 3		3	3	1.75	2.22	1.15	1.15	3.49	5.71	1.27	1.25	1.60	0.756	1.23	2.22
50 × 50 × 2		2	2	1.51	1.92	1.35	1.35	4.85	7.85	1.85	1.59	2.02	0.980	1.33	3.00
50 × 50 × 2.5	50	2.5	2.5	1.87	2.38	1.37	1.37	5.95	9.66	2.24	1.58	2.02	0.970	1.64	3.71
50 × 50 × 3		3	3	2.22	2.82	1.40	1.40	7.01	11.4	2.60	1.58	2.01	0.960	1.95	4.41

Table 1 — Equal angles

Designation	Dimensions			Mass/unit lengths	Area of section	Centre of gravity		Moment of inertia			Radius of gyration			Elastic modulus	Product moment of inertia
$A \times A \times t$	A	t	r			C_x	C_y	About X-X, Y-Y	About U-U	About V-V	About X-X, Y-Y	About U-U	About V-V	About X-X, Y-Y	About XY
mm	mm	mm	mm	kg/m	cm ²	cm	cm	cm ⁴	cm ⁴	cm ⁴	cm	cm	cm	cm ³	cm ⁴
60 × 60 × 2	60	2	2	1.82	2.32	1.60	1.60	8.48	13.7	3.26	1.91	2.43	1.18	1.93	5.22
60 × 60 × 2.5		2.5	2.5	2.26	2.88	1.62	1.62	10.4	16.9	3.97	1.90	2.42	1.17	2.39	6.47
60 × 60 × 3		3	3	2.69	3.42	1.65	1.65	12.3	20.0	4.64	1.90	2.42	1.16	2.84	7.69
60 × 60 × 4		4	4	3.52	4.49	1.70	1.70	16.0	26.0	5.87	1.89	2.41	1.14	3.71	10.1
70 × 70 × 3	70	3	3	3.16	4.02	1.90	1.90	19.8	32.2	7.54	2.22	2.83	1.37	3.89	12.3
70 × 70 × 4		4	4	4.15	5.29	1.95	1.95	25.8	42.0	9.61	2.21	2.82	1.35	5.10	16.2
70 × 70 × 5		5	7.5	5.08	6.48	2.01	2.01	31.2	51.3	11.2	2.20	2.81	1.31	6.26	20.0
80 × 80 × 3	80	3	3	3.63	4.62	2.15	2.15	29.9	48.4	11.4	2.54	3.23	1.57	5.11	18.5
80 × 80 × 4		4	4	4.78	6.09	2.20	2.20	39.0	63.3	14.7	2.53	3.22	1.55	6.72	24.3
80 × 80 × 5		5	7.5	5.87	7.48	2.26	2.26	47.4	77.6	17.3	2.52	3.22	1.52	8.27	30.2
80 × 80 × 6		6	9	6.94	8.85	2.31	2.31	55.6	91.4	19.8	2.51	3.21	1.50	9.77	35.8
100 × 100 × 3	100	3	3	4.57	5.82	2.65	2.65	59.2	95.6	22.9	3.19	4.05	1.98	8.06	36.4
100 × 100 × 4		4	4	6.03	7.69	2.70	2.70	77.5	126	29.6	3.18	4.04	1.96	10.6	48.0
100 × 100 × 5		5	7.5	7.44	9.48	2.76	2.76	94.9	155	35.3	3.16	4.04	1.93	13.1	59.6
100 × 100 × 6		6	9	8.83	11.2	2.81	2.81	112	183	40.8	3.15	4.03	1.91	15.5	70.9

Table 2 — Unequal angles

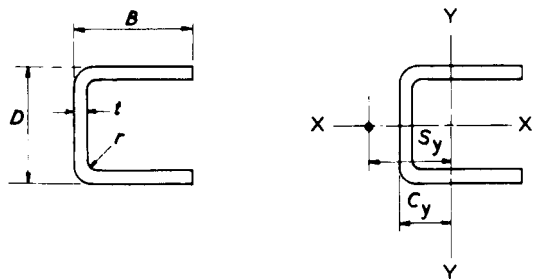


Designation	Dimensions				Mass/unit length	Area of section	Centre of gravity		Moment of inertia				Radius of gyration				Angle α	Elastic modulus		Product moment of inertia
$A \times B \times t$	A	B	t	r			C_x	C_y	About X-X	About Y-Y	About U-U	About V-V	About X-X	About Y-Y	About U-U	About V-V		About X-X	About Y-Y	About XY
mm	mm	mm	mm	mm	kg/m	cm ²	cm	cm	cm ⁴	cm ⁴	cm ⁴	cm ⁴	cm	cm	cm	cm	tan α	cm ³	cm ³	cm ⁴
$20 \times 15 \times 1.2$	20	15	1.2	1.2	0.308	0.392	0.636	0.378	0.162	0.0802	0.204	0.0386	0.643	0.452	0.721	0.314	0.580	0.119	0.0714	0.0716
$20 \times 15 \times 1.6$			1.6	1.6	0.400	0.510	0.658	0.396	0.207	0.102	0.262	0.0479	0.638	0.448	0.716	0.306	0.584	0.155	0.0927	0.0931
$20 \times 15 \times 2$			2	2	0.488	0.622	0.681	0.415	0.248	0.122	0.315	0.0556	0.632	0.443	0.712	0.299	0.588	0.188	0.113	0.113
$30 \times 15 \times 1.2$	30	15	1.2	1.2	0.402	0.512	1.07	0.303	0.491	0.0896	0.527	0.0533	0.980	0.418	1.02	0.323	0.288	0.255	0.0749	0.126
$30 \times 15 \times 1.6$			1.6	1.6	0.526	0.670	1.10	0.321	0.634	0.115	0.681	0.0673	0.973	0.414	1.01	0.317	0.290	0.333	0.0973	0.164
$30 \times 15 \times 2$			2	2	0.645	0.822	1.12	0.338	0.766	0.138	0.824	0.0796	0.966	0.410	1.00	0.311	0.292	0.408	0.119	0.200
$30 \times 20 \times 1.6$	30	20	1.6	1.6	0.589	0.750	0.990	0.473	0.708	0.262	0.834	0.137	0.972	0.592	1.05	0.427	0.469	0.352	0.172	0.268
$30 \times 20 \times 2$			2	2	0.724	0.922	1.01	0.492	0.860	0.318	1.01	0.162	0.966	0.587	1.05	0.420	0.472	0.433	0.211	0.329
$40 \times 20 \times 1.6$	40	20	1.6	1.6	0.714	0.910	1.43	0.404	1.55	0.283	1.67	0.169	1.31	0.558	1.35	0.430	0.288	0.604	0.177	0.398
$40 \times 20 \times 2$			2	2	0.881	1.12	1.46	0.422	1.89	0.343	2.03	0.202	1.30	0.553	1.35	0.424	0.289	0.744	0.218	0.489
$40 \times 20 \times 2.5$			2.5	2.5	1.08	1.38	1.49	0.444	2.29	0.414	2.47	0.240	1.29	0.548	1.34	0.417	0.291	0.913	0.266	0.598
$40 \times 25 \times 2$	40	25	2	2	0.959	1.22	1.34	0.571	2.06	0.652	2.36	0.352	1.30	0.731	1.39	0.537	0.419	0.777	0.338	0.717
$40 \times 25 \times 2.5$			2.5	2.5	1.18	1.50	1.37	0.594	2.51	0.790	2.88	0.420	1.29	0.725	1.38	0.528	0.421	0.955	0.415	0.880
$50 \times 25 \times 1.6$	50	25	1.6	1.6	0.903	1.15	1.76	0.487	3.09	0.567	3.32	0.340	1.64	0.702	1.70	0.544	0.287	0.955	0.282	0.789
$50 \times 25 \times 2$			2	2	1.12	1.42	1.79	0.505	3.79	0.691	4.07	0.412	1.63	0.697	1.69	0.538	0.288	1.18	0.347	0.972
$50 \times 25 \times 2.5$			2.5	2.5	1.38	1.75	1.82	0.527	4.62	0.839	4.97	0.493	1.62	0.692	1.68	0.531	0.289	1.45	0.425	1.19

Table 2 — Unequal angles

Designation	Dimensions				Mass/unit length	Area of section	Centre of gravity		Moment of inertia				Radius of gyration				Angle α	Elastic modulus		Product moment of inertia
	$A \times B \times t$	A	B	t			C_x	C_y	About X-X	About Y-Y	About U-U	About V-V	About X-X	About Y-Y	About U-U	About V-V		About X-X	About Y-Y	About XY
	mm	mm	mm	mm	kg/m	cm ²	cm	cm	cm ⁴	cm ⁴	cm ⁴	cm ⁴	cm	cm	cm	cm	tan α	cm ³	cm ³	cm ⁴
$60 \times 30 \times 2$	60	30	2	2	1.35	1.72	2.12	0.588	6.66	1.22	7.14	0.731	1.97	0.841	2.04	0.652	0.287	1.72	0.505	1.70
$60 \times 30 \times 3$			3	3	1.98	2.52	2.18	0.633	9.59	1.74	10.3	1.02	1.95	0.830	2.02	0.637	0.289	2.51	0.735	2.48
$80 \times 30 \times 2.5$	80	30	2	2	1.67	2.12	3.04	0.496	14.5	1.30	15.0	0.850	2.62	0.782	2.66	0.633	0.181	2.93	0.518	2.47
$80 \times 30 \times 2.5$			2.5	2.5	2.06	2.63	3.08	0.518	17.8	1.58	18.4	1.03	2.61	0.776	2.65	0.626	0.181	3.62	0.638	3.05
$80 \times 30 \times 3$			3	3	2.45	3.12	3.11	0.540	21.0	1.86	21.7	1.20	2.59	0.771	2.63	0.620	0.182	4.30	0.755	3.60
$80 \times 50 \times 3$	80	50	3	3	2.92	3.72	2.63	1.10	25.4	8.08	29.1	4.43	2.61	1.47	2.79	1.09	0.417	4.74	2.07	8.76
$80 \times 50 \times 4$			4	4	3.84	4.89	2.69	1.14	33.0	10.4	37.8	5.64	2.60	1.46	2.78	1.07	0.419	6.21	2.71	11.5
$80 \times 50 \times 5$			5	7.5	4.69	5.98	2.76	1.20	39.8	12.6	45.9	6.54	2.58	1.45	2.77	1.05	0.426	7.61	3.31	14.2
$100 \times 30 \times 3$	100	30	3	3	2.92	3.72	4.06	0.477	38.7	1.94	39.3	1.33	3.22	0.721	3.25	0.598	0.127	6.51	0.768	4.76
$100 \times 30 \times 4$			4	4	3.84	4.89	4.13	0.521	50.0	2.47	50.8	1.69	3.20	0.711	3.22	0.588	0.127	8.52	0.997	6.15
$100 \times 30 \times 5$			5	7.5	4.69	5.98	4.23	0.569	59.9	2.95	60.9	1.97	3.17	0.703	3.19	0.574	0.130	10.4	1.22	7.54
$100 \times 50 \times 3$	100	50	3	3	3.39	4.32	3.52	0.966	46.6	8.55	50.0	5.15	3.28	1.41	3.40	1.09	0.286	7.19	2.12	11.9
$100 \times 50 \times 4$			4	4	4.46	5.69	3.58	1.01	60.6	11.1	65.1	6.58	3.27	1.39	3.38	1.08	0.288	9.44	2.77	15.6
$100 \times 50 \times 5$			5	7.5	5.48	6.98	3.66	1.06	73.5	13.4	79.1	7.74	3.24	1.38	3.37	1.05	0.293	11.6	3.39	19.2
$100 \times 50 \times 6$			6	9	6.47	8.25	3.73	1.11	85.8	15.6	92.5	8.86	3.23	1.37	3.35	1.04	0.295	13.7	4.00	22.7

Table 3 — Plain channels

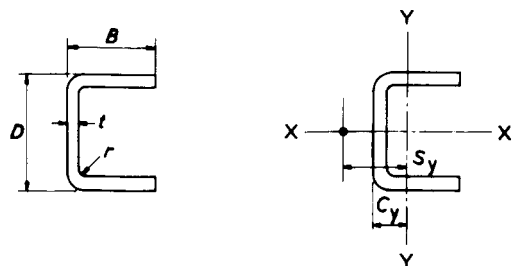


Designation	Dimensions				Mass/unit length	Area of section	Centre of gravity	Moment of inertia		Radius of gyration		Elastic modulus		Shear centre	Torsion constant	Warping constant
	$D \times B \times t$	D	B	t			C_y	About X-X	About Y-Y	About X-X	About Y-Y	About X-X	About Y-Y	S_y	K	I_w
	mm	mm	mm	mm	kg/m	cm ²	cm	cm ⁴	cm ⁴	cm	cm	cm ³	cm ³	cm	cm ⁴	cm ⁶
20 × 20 × 1.2	20	20	1.2	1.2	0.521	0.664	0.741	0.454	0.277	0.827	0.646	0.454	0.220	1.55	0.0031	0.164
20 × 20 × 1.6			1.6	1.6	0.675	0.860	0.766	0.563	0.351	0.809	0.639	0.563	0.284	1.55	0.0071	0.193
20 × 20 × 2			2	2	0.819	1.04	0.792	0.653	0.416	0.791	0.631	0.653	0.344	1.55	0.0134	0.211
25 × 25 × 1.2	25	25	1.2	1.2	0.662	0.844	0.907	0.926	0.557	1.05	0.813	0.741	0.350	1.93	0.0040	0.537
25 × 25 × 1.6			1.6	1.6	0.863	1.10	0.932	1.17	0.714	1.03	0.806	0.932	0.455	1.93	0.0092	0.650
25 × 25 × 2			2	2	1.05	1.34	0.957	1.37	0.857	1.01	0.799	1.10	0.555	1.94	0.0174	0.735
25 × 25 × 2.5			2.5	2.5	1.28	1.63	0.990	1.59	1.02	0.989	0.789	1.28	0.672	1.93	0.0326	0.805
30 × 30 × 1.6	30	30	1.6	1.6	1.05	1.34	1.10	2.09	1.27	1.25	0.973	1.40	0.666	2.32	0.0112	1.72
30 × 30 × 2			2	2	1.29	1.64	1.12	2.49	1.53	1.23	0.966	1.66	0.816	2.32	0.0214	1.99
30 × 30 × 3			3	3	1.84	2.35	1.19	3.31	2.11	1.19	0.947	2.20	1.16	2.32	0.0677	2.40
40 × 40 × 1.6	40	40	1.6	1.6	1.43	1.82	1.43	5.20	3.10	1.69	1.31	2.60	1.21	3.08	0.0153	7.86
40 × 40 × 2			2	2	1.76	2.24	1.46	6.27	3.79	1.67	1.30	3.14	1.49	3.09	0.0294	9.27
40 × 40 × 2.5			2.5	2.5	2.16	2.76	1.49	7.50	4.59	1.65	1.29	3.75	1.83	3.09	0.0561	10.7
40 × 40 × 3			3	3	2.55	3.25	1.52	8.60	5.33	1.63	1.28	4.30	2.15	3.10	0.0947	11.9
50 × 50 × 2	50	50	2	2	2.23	2.84	1.79	12.7	7.58	2.11	1.63	5.08	2.36	3.85	0.0374	30.0
50 × 50 × 2.5			2.5	2.5	2.75	3.51	1.82	15.3	9.24	2.09	1.62	6.13	2.91	3.86	0.0717	35.4
50 × 50 × 3			3	3	3.26	4.15	1.85	17.7	10.8	2.07	1.62	7.09	3.44	3.87	0.122	40.0
50 × 50 × 4			4	4	4.22	5.37	1.91	22.0	13.7	2.02	1.60	8.79	4.44	3.87	0.278	47.0

Table 3 — Plain channels

Designation	Dimensions				Mass/unit length	Area of section	Centre of gravity	Moment of inertia		Radius of gyration		Elastic modulus		Shear centre	Torsion constant	Warping constant
$D \times B \times t$	D	B	t	r			C_y	About X-X	About Y-Y	About X-X	About Y-Y	About X-X	About Y-Y	S_y	K	I_w
mm	mm	mm	mm	mm	kg/m	cm ²	cm	cm ⁴	cm ⁴	cm	cm	cm ³	cm ³	cm	cm ⁴	cm ⁶
60 × 60 × 2	60	60	2	2	2.70	3.44	2.12	22.5	13.3	2.55	1.97	7.49	3.43	4.62	0.0454	77.4
60 × 60 × 3			3	3	3.96	5.05	2.18	31.8	19.2	2.51	1.95	10.6	5.02	4.63	0.149	106
60 × 60 × 4			4	4	5.16	6.57	2.25	39.9	24.5	2.46	1.93	13.3	6.53	4.64	0.342	127
80 × 80 × 2	80	80	2	2	3.65	4.64	2.79	54.8	32.7	3.44	2.63	13.7	6.18	6.14	0.0614	342
80 × 80 × 3			3	3	5.38	6.85	2.85	78.7	46.9	3.39	2.62	19.7	9.10	6.16	0.203	478
80 × 80 × 5			5	7.5	8.60	11.0	2.99	119	72.7	3.29	2.58	29.7	14.5	6.20	0.895	666
80 × 80 × 6			6	9	10.1	12.9	3.06	136	84.3	3.25	2.56	34.0	17.1	6.20	1.51	732
100 × 100 × 2	100	100	2	2	4.59	5.84	3.45	109	63.6	4.32	3.30	21.8	9.72	7.67	0.0774	1 070
100 × 100 × 3			3	3	6.79	8.65	3.52	158	93.2	4.27	3.28	31.6	14.4	7.69	0.257	1 520
100 × 100 × 5			5	7.5	11.0	14.0	3.66	243	147	4.18	3.24	48.7	23.2	7.74	1.15	2 210
100 × 100 × 6			6	9	12.9	16.5	3.73	281	172	4.13	3.23	56.2	27.4	7.75	1.94	2 480

Table 4 — Plain channels



Designation	Dimensions				Mass/unit length	Area of section	Centre of gravity	Moment of inertia		Radius of gyration		Elastic modulus		Shear centre	Torsion constant	Warping constant
$D \times B \times t$	D	B	t	r			C_y	About X-X	About Y-Y	About X-X	About Y-Y	About X-X	About Y-Y	S_y	K	I_w
mm	mm	mm	mm	mm	kg/m	cm ²	cm	cm ⁴	cm ⁴	cm	cm	cm ³	cm ³	cm	cm ⁴	cm ⁶
30 × 15 × 1.2	30	15	1.2	1.2	0.521	0.664	0.435	0.899	0.146	1.16	0.469	0.599	0.137	0.941	0.0031	0.197
30 × 15 × 1.6			1.6	1.6	0.675	0.860	0.455	1.12	0.185	1.14	0.464	0.749	0.177	0.940	0.0071	0.234
30 × 20 × 1.2	30	20	1.2	1.2	0.615	0.784	0.636	1.15	0.324	1.21	0.643	0.765	0.238	1.38	0.0037	0.444
30 × 20 × 2			2	2	0.976	1.24	0.681	1.71	0.497	1.17	0.632	1.14	0.377	1.39	0.0160	0.606
40 × 15 × 1.2	40	15	1.2	1.2	0.615	0.784	0.378	1.78	0.160	1.51	0.452	0.891	0.143	0.838	0.0037	0.403
40 × 15 × 2			2	2	0.976	1.24	0.415	2.66	0.244	1.46	0.443	1.33	0.225	0.832	0.0160	0.552
40 × 20 × 2	40	20	2	2	1.13	1.44	0.600	3.38	0.556	1.53	0.620	1.69	0.397	1.25	0.0187	1.27
40 × 20 × 3			3	3	1.61	2.05	0.651	4.48	0.758	1.48	0.608	2.24	0.562	1.25	0.0587	1.51
40 × 25 × 1.6	40	25	1.6	1.6	1.05	1.34	0.779	3.43	0.858	1.60	0.800	1.72	0.498	1.70	0.0112	2.08
40 × 25 × 2			2	2	1.29	1.64	0.801	4.11	1.04	1.58	0.795	2.05	0.611	1.70	0.0214	2.41
40 × 25 × 2.5			2.5	2.5	1.57	2.01	0.828	4.86	1.25	1.56	0.788	2.43	0.745	1.70	0.0405	2.73
50 × 25 × 1.6	50	25	1.6	1.6	1.18	1.50	0.705	5.76	0.928	1.96	0.787	2.30	0.517	1.57	0.0126	3.60
50 × 25 × 2			2	2	1.45	1.84	0.725	6.93	1.13	1.94	0.782	2.77	0.634	1.57	0.0240	4.22
50 × 25 × 2.5			2.5	2.5	1.77	2.26	0.750	8.26	1.36	1.91	0.776	3.30	0.775	1.57	0.0457	4.85
50 × 25 × 3			3	3	2.08	2.65	0.776	9.44	1.57	1.89	0.769	3.78	0.909	1.56	0.0767	5.32
50 × 40 × 1.6	50	40	1.6	1.6	1.55	1.98	1.32	8.57	3.37	2.08	1.31	3.43	1.26	2.91	0.0167	13.4
50 × 40 × 2			2	2	1.92	2.44	1.34	10.4	4.12	2.06	1.30	4.16	1.55	2.92	0.0320	15.9
50 × 40 × 2.5			2.5	2.5	2.36	3.01	1.37	12.5	5.01	2.04	1.29	5.00	1.91	2.92	0.0613	18.6
50 × 40 × 3			3	3	2.78	3.55	1.40	14.4	5.85	2.02	1.28	5.77	2.25	2.92	0.104	20.9
60 × 30 × 1.6	60	30	1.6	1.6	1.43	1.82	0.830	10.2	1.63	2.37	0.948	3.40	0.753	1.88	0.0153	9.34
60 × 30 × 2			2	2	1.76	2.24	0.850	12.4	1.99	2.35	0.943	4.12	0.927	1.88	0.0294	11.1
60 × 30 × 3			3	3	2.55	3.25	0.900	17.1	2.81	2.30	0.931	5.71	1.34	1.88	0.0947	14.5
60 × 30 × 4			4	4	3.28	4.17	0.951	21.0	3.52	2.25	0.919	7.01	1.72	1.87	0.214	16.6