DRAFT EAST AFRICAN STANDARD

DEAS 134:2018- Cold rolled steel section —Specification

EAST AFRICAN COMMUNITY

Foreword

Development of the East African Standards has been necessitated by the need for harmonizing requirements governing quality of products and services in the East African Community. It is envisaged that through harmonized standardization, trade barriers that are encountered when goods and services are exchanged within the Community will be removed.

In order to achieve this objective, the Community established an East African Standards Committee mandated to develop and issue East African Standards.

The Committee is composed of representatives of the National Standards Bodies in Partner States, together with the representatives from the private sectors and consumer organizations. Draft East African Standards are circulated to stakeholders through the National Standards Bodies in the Partner States. The comments received are discussed and incorporated before finalization of standards, in accordance with the procedures of the Community.

East African Standards are subject to review, to keep pace with technological advances. Users of the East African Standards are therefore expected to ensure that they always have the latest versions of the standards they are implementing.

DEAS 134:2018 was prepared by Technical Committee EASC/TC 035 *TC Steel and Steel Products*

Cold rolled steel sections — Specification

1. Scope

This East Africa Draft Standard specifies the dimensions and sectional properties of cold rolled steel sections of thickness up to 8 mm for use in structural and general applications. The sections are listed in Tables 4 to 15.

2. Normative references

The following referenced document is indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 14347, Fatigue — Design procedure for welded hollow-section joints — Recommendations

3. Terms and definition

No terms and definition are listed in this document.

4. Symbols

The following nomenclature shall be used. Units for dimensions are millimetres and those for section properties in centimetres.

- t - section thickness - mm
- p - distance from edge to section centre of gravity mm
- A - sectional area - cm^2
- Z - section modulus of section I/p cm^3
- I - second moment of area - cm^4
- r - radius of gyration of section $\sqrt{I/A}$ mm
- x, y - with reference to x or y axis
- w - mass per linear metre - kg/m
- L - length - m

4. Dimensions and tolerance

4.1 Dimensions

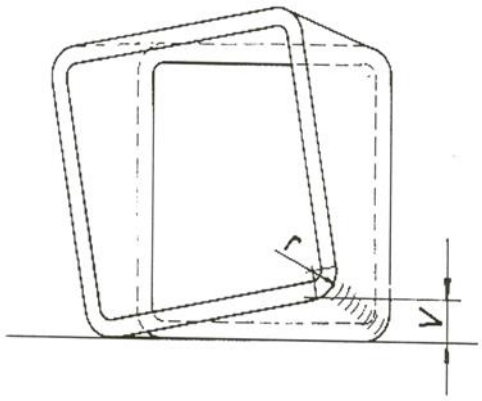
Dimensions of sections shall be in accordance with those listed in the relevant tables of this standard.

4.2 Tolerance

Table x — Tolerances in dimensions

Characteristic	**Tolerance**
Outside dimension [(a)]	± 1.5 mm or 2 %, whichever is less
Deviation from straightness	0.17 % of total length
Squareness of corners	90° ± 2°
Twist	Not to exceed 2 mm ± 0.5 mm per metre
Concavity/convexity	i) lower than 5mm±10% or 0.5 mm whichever is lower ii) above 5mm ± 0.5mm
Outside bend radii for right angle bends	i) If thickness is less than 6mm, tolerance is between 0.15t to 2.5t ii) If thickness is between 6mm to 8mm tolerance s between 2t to 3t
Length (6 metres) – exact - standard	-0 and + 10 mm -0 mm and +50 mm
Thickness	± 3% for 1mm above 1mm ± 7.5%
Deviation from out of roundness	**For D/T ratio ≤ 100: 2%** **For D/T ratio > 100: 2% by agreement**
[a] This tolerance shall be measured at a distance of not less than 100 mm from the end of the section.	

For twist



5 Compound sections

Compound sections may be formed by suitably connecting two or more simple sections. For example, an 'I' section can be made from two channels back-to-back, a tube from two inwardly lipped channels lip-to-lip, a 'T" from two angles, etc. Methods of joining sections are specified in ISO 14347.

Section properties of compound sections may be calculated using the properties of simple sections.

Compound sections shall be flush at matching joints within 2.0 mm.

6 Manufacture

6.1 Manufacture of steel

Unless otherwise agreed at the time of enquiry and order, the steel making process shall be at the option of the manufacturer. If so requested in the order, the purchaser shall be informed about the steel making process used.

6.2 Grade designation

The designation of the grades of material shall be based on minimum permissible yield stress and shall be in accordance with Table 1.

Table 1 — Grade designation

Minimum yield stress, N/mm^2	**Designation of grade**
210	210
250	250
360	360

6.3 Chemical composition

The results of ladle chemical analysis of steel from which a hollow section is manufactured shall comply with appropriate limits of Table 2. For grade 360, it shall be permissible to add suitable grain-refining elements to achieve the minimum specified tensile stress, but the total content of these elements shall not exceed 0.15 %.

Table 2 — Ladle chemical analysis limits

Grade of steel	**Maximum content, %**			
	Carbon	**Phosphorous**	**Sulphur**	**Mn**
210	0.2	0.05	0.05	
250	0.25	0.06	0.06	
360	-	-	0.04	

6.4 Mechanical properties

The mechanical properties obtained from test samples taken from the hollow section in accordance with 6.5, shall comply with the requirements in Table 3. If other grades of steel are used, their mechanical properties shall be agreed on between the purchaser and the manufacturer.

Table 3 — Tensile test requirements

Grade of steel	**Minimum yield stress,** N/mm^2	**Ultimate tensile strength,** N/mm^2	**Minimum elongation as a proportion of gauge length,** %
210	210	340	24
250	250	420	22
360	360	480	20

6.5 Sampling

6.5.1 General

At least one sample shall be selected from the following batch sizes:

a) a 20-tonne or less batch of sections having outside diameter of less than 90 mm; and

b) a batch of less than 40 tonnes for all other sections.

If the test fails, two more samples shall be drawn from the batch and tested. If one or both test specimens re-tested fail, the whole batch shall be deemed not to have complied with the specification unless all sections in the batch are tested individually.

6.5.2 Test pieces

The test piece shall consist of a strip taken from the section. The strip shall be taken longitudinally at any point of the section except for welded sections when it shall not be taken from the weld zone. The strip shall comply with the following conditions:

a) sides of the test piece shall be parallel within a maximum variation, along parallel length, of ± 0.2 % of nominal width;

b) the tripped ends and parallel lengths of the test piece shall be coaxial;

c) $L_0 = 5.65\sqrt{A}$ and shall be within ± 5 % of the nominal value:

where
L_o is the gauge length, and

A is the sectional area.

d) minimum parallel length $L_p = L_o + 2D$ for circular sections, and $L_p = L_o + 2$ nominal width for square or rectangular sections:

where,
L_o is the gauge length;

e) the width of the test piece shall not be less than 6 mm, unless the product width precludes use of wider pieces; and

f) the test piece shall not be flattened and machined between the gauge marks except for the purposes of gripping the test piece in a test machine.

7. Marking

Each piece shall be indelibly and legibly marked /printed at least once in every 6 meters length with the following

i) Manufacturer's name and/ or registered trademark

ii) The outside dimension

iii) Nominal thickness

iii) The steel grade

iv) Country of origin

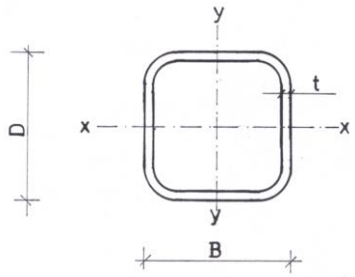


Figure 1: Square hollow sections

Table 4 – Dimensions and properties for cold rolled square hollow sections

Size B x D mm	Thickness t mm	Area A cm^2	Mass w Kg/m	Axes x-x and y-y		
				$I_x = I_y$ cm^4	$z_x = z_y$ cm^3	$r_x = r_y$ cm
12 x 12	1.0	0.44	0.35	0.09	0.089	0.45
12 x 12	1.2	0.51	0.41	0.102	0.170	0.44
12 x 12	1.5	0.63	0.49	0.118	0.196	0.43
14 x 14	1.2	0.61	0.48	0.169	0.241	0.52
14 x 14	1.5	0.75	0.59	0.196	0.263	0.51
16 x 16	1.0	0.61	0.48	0.226	0.282	0.61
16 x 16	1.2	0.71	0.56	0.261	0.326	0.60
16 x 16	1.5	0.87	0.68	0.308	0.365	0.59
16 x 16	2.0	1.12	0.88	0.373	0.466	0.57
20 x 20	1.0	0.79	0.62	0.459	0.458	0.76
20 x 20	1.2	0.90	0.71	0.533	0.533	0.77
20 x 20	1.5	1.11	0.87	0.637	0.637	0.75
20 x 20	2.0	1.44	1.13	0.787	0.787	0.73
23 x 23	1.0	0.88	0.69	0.711	0.619	0.899
23 x 23	1.2	1.05	0.82	0.831	0.723	0.891
23 x 23	1.5	1.29	1.01	0.999	0.868	0.880
23 x 23	2.0	1.68	1.32	1.246	1.083	0.861
25 x 25	1.0	0.96	0.79	0.923	0.738	0.96
25 x 25	1.2	1.14	0.90	1.081	0.864	0.97
25 x 25	1.5	1.41	1.11	1.303	1.042	0.96
25 x 25	2.0	1.84	1.44	1.634	1.307	0.94
25 x 25	3.0	2.64	2.07	2.169	1.735	0.90
30 x 30	1.0	1.19	0.94	1.627	1.307	1.17
30 x 30	1.2	1.38	1.08	2.297	1.531	1.29
30 x 30	1.5	1.71	1.34	2.321	1.547	1.16
30 x 30	2.0	2.24	1.75	2.941	1.960	1.14
30 x 30	3.0	3.24	2.54	3.985	2.656	1.11
40 x 40	1.0	1.51	1.19	3.957	1.978	1.62
40 x 40	1.2	1.86	1.46	4.677	2.338	1.58
40 x 40	1.5	2.31	1.81	5.715	2.857	1.57
40 x 40	2.0	3.04	2.39	7.336	3.668	1.55
40 x 40	3.0	4.44	3.48	10.190	5.095	1.51

Size B x D mm	Thickness t mm	Area A cm^2	Mass w Kg/m	Axes x-x and y-y		
				$I_x = I_y$ cm^4	$z_x = z_y$ cm^3	$r_x = r_y$ cm
50 x 50	1.2	2.34	1.84	9.30	3.720	1.99
50 x 50	1.5	2.91	2.28	11.42	4.568	1.98
50 x 50	2.0	3.84	3.01	14.77	5.908	1.96
50 x 50	3.0	5.64	4.43	20.85	8.340	1.92
50 x 50	4.0	7.36	5.78	26.15	10.460	1.88
60 x 60	1.5	3.51	2.75	20.03	6.67	2.38
60 x 60	2	4.64	3.64	26.04	8.68	2.37
60 x 60	3	6.84	5.37	37.14	12.38	2.33
60 x 60	4	8.96	7.03	47.07	15.69	2.29
75 x 75	1.5	4.41	3.46	39.72	10.59	3.00
75 x 75	2	5.84	4.58	51.91	13.84	2.98
75 x 75	3	8.64	6.78	74.78	19.94	2.94
75 x 75	4	11.36	8.92	95.75	25.53	2.90
75 x 75	5	14.00	11.00	114.92	30.65	2.87
75 x 75	6	16.56	13.00	132.40	35.31	2.83
100 x 100	3	11.64	9.14	182.70	36.54	3.96
100 x 100	4	15.36	12.18	236.34	47.26	3.91
100 x 100	5	19.00	14.92	286.58	57.32	3.88
100 x 100	6	22.56	17.71	333.59	66.72	3.85
120 x 120	3	14.04	11.02	320.53	53.42	4.77
120 x 120	4	18.56	14.57	416.73	69.45	4.74
120 x 120	6	27.36	21.48	594.26	99.04	4.66
125 x 125	3	14.64	11.49	363.39	58.14	3.05
125 x 125	4	19.36	15.20	472.93	75.67	4.94
125 x 125	5	24.00	18.84	577.00	92.32	4.90
125 x 125	6	28.56	22.42	675.78	108.12	4.90
150 x 150	4	23.36	18.34	830.53	110.74	5.96
150 x 150	5	29.00	22.76	1017.42	135.66	5.92
150 x 150	6	34.56	27.13	196.47	159.53	5.88
150 x 150	8	45.44	35.67	1531.93	204.26	5.81
175 x 175	4	27.36	21.48	1334.12	152.47	6.98
175 x 175	5	34.00	29.69	1639.08	187.32	6.94
175 x 175	6	40.56	31.84	1932.45	220.85	6.90
175 x 175	8	53.44	41.95	2489.68	284.53	6.83
200 x 200	4	31.36	24.62	2008.71	200.80	8.00
200 x 200	5	38.40	30.10	2410	241	7.92
200 x 200	6	46.46	36.55	2923.34	292.35	7.92
200 x 200	8	61.44	48.23	3781.43	378.14	7.85
250 x 250	4	39.36	30.90	3970.90	317.67	10.04
250 x 250	5	49.00	38.47	4904.08	392.33	10.00
250 x 250	6	58.56	45.97	5814.23	465.14	9.96
250 x 250	8	77.44	60.79	7566.92	605.35	9.89

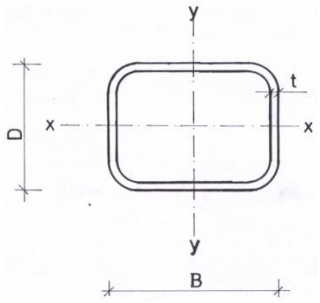


Figure 2 — Rectangular section

Table 5 – Dimensions and properties for cold rolled rectangular hollow sections

Size B x D mm	Thickness t mm	Area A cm^2	Mass w kg/m	Axis x-x			Axis y-y		
				I_x cm^4	z_x cm^3	r_x cm	I_y cm^4	z_y cm^3	r_y cm
30 x 20	1.0	0.96	0.75	0.639	0.639	0.80	1.207	0.804	1.12
30 x 20	1.2	1.14	0.90	0.730	0.730	0.80	1.369	0.913	1.10
30 x 20	1.5	1.41	1.11	0.887	0.887	0.79	1.663	1.109	1.09
30 x 20	2.0	1.83	1.44	1.096	1.096	0.77	2.095	1.370	1.07
35 x 15	1.2	1.14	0.90	0.433	0.577	0.62	1.725	1.150	1.23
35 x 15	1.5	1.41	1.11	0.520	0.693	0.61	2.064	1.376	1,21
35 x 15	2.0	1.83	1.44	0.639	0.852	0.59	2.635	1.757	1.20
35 x 15	3.0	2.90	2.07	0.781	1.055	0.52	3.509	2.339	1.10
35 x 25	1.2	1.37	1.08	1.409	1.127	1.01	2.387	1.364	1.32
35 x 25	1.5	1.70	1.34	1.707	1.366	1.00	2.817	1.610	1.31
35 x 25	2.0	2.24	1.76	2.147	1.718	0.98	3.728	2.130	1.29
35 x 25	3.0	3.23	2.54	2.872	2.298	0.94	5.047	2.884	1.25
35 x 30	1.2	1.50	1.18	2.160	1.440	1.20	2.497	1.427	1.35
35 x 30	1.5	1.85	1.46	2.607	1.738	1.19	3.322	1.898	1.34
35 x 30	2.0	2.43	1.91	3.326	2.217	1.17	4.234	2.419	1.32
35 x 30	3.0	3.54	2.78	4.488	2.992	1.13	5.800	3.314	1.28
40 x 10	1.2	1.14	0.90	0.190	0.380	0.41	1.956	0.978	1.31
40 x 10	1.5	1.41	1.11	0.217	0.434	0.39	2.383	1.192	1.30
40 x 10	2.0	1.83	1.44	0.260	0.520	0.38	5.929	2.965	1.28
40 x 20	1.0	1.19	0.94	0.816	0.816	0.83	2.427	1.214	1.43
40 x 20	1.2	1.37	1.08	0.948	0.948	0.83	2.841	1.421	1.44
40 x 20	1.5	1.70	1.34	1.140	1.140	0.82	3.476	1.738	1.43
40 x 20	2.0	2.24	1.76	1.419	1.419	0.80	4.453	2.227	1.41
40 x 20	3.0	3.23	2.54	1.282	1.282	0.63	6.062	3.031	1.37
40 x 25	1.0	1.29	1.01	1.355	1.084	1.03	2.816	1.408	1.48
40 x 25	1.2	1.50	1.18	1.588	1.270	1.03	3.330	1.665	1.49
40 x 25	1.5	1.85	1.46	1.917	1.534	1.02	4.052	2.026	1.48
40 x 25	2.0	2.43	1.91	2.430	1.944	1.00	5.180	2.590	1.46
40 x 25	3.0	3.59	2.78	3.302	2.642	0.96	7.239	3.620	1.42

Size B x D mm	Thickness t mm	Area A cm^2	Mass w kg/m	Axis x-x			Axis y-y		
				I_x cm^4	z_x cm^3	r_x cm	I_y cm^4	z_y cm^3	r_y cm
40 x 35	1.2	1.74	1.37	3.425	1.957	1.40	4.234	2.117	1.56
40 x 35	1.5	2.15	1.69	4.178	2.387	1.39	5.165	2.583	1.55
40 x 35	2.0	2.84	2.23	5.346	3.055	1.37	6.648	3.324	1.53
40 x 35	3.0	4.14	3.25	7.378	4.216	1.34	9.191	4.596	1.49
45 x 15	1.2	1.37	1.08	0.551	0.734	0.63	3.249	1.444	1.54
45 x 15	1.5	1.70	1.34	0.660	0.880	0.62	3.980	1.769	1.53
45 x 30	1.2	1.74	1.37	2.658	1.772	1.24	4.970	2.209	1.69
45 x 30	1.5	2.15	1.69	3.232	2.154	1.23	6.068	2.697	1.68
45 x 30	2.0	2.84	2.23	4.110	2.740	1.20	7.826	3.478	1.66
45 x 30	3.0	4.14	3.25	5.629	3.752	1.17	10.865	4.829	1.62
50 x 10	1.0	1.16	0.91	0.21	0.42	0.43	3.04	1.22	1.62
50 x 10	1.2	1.37	1.08	0.241	0.481	0.42	3.551	1.420	1.61
50 x 10	1.5	1.70	1.34	0.279	0.558	0.41	4.352	1.741	1.60
50 x 10	2.0	2.24	1.76	0.329	0.657	0.38	5.592	2.237	1.58
50 x 10	3.0	3.23	2.54	0.389	0.779	0.35	7.561	3.024	1.53
50 x 15	1.2	1.50	1.18	0.609	0.812	0.64	4.284	1.714	1.69
50 x 15	1.5	1.85	1.46	0.720	0.960	0.62	5.221	2.089	1.68
50 x 15	2.0	2.44	1.92	0.890	1.187	0.60	6.724	2.689	1.66
50 x 15	3.0	3.54	2.78	1.130	1.507	0.57	9.290	3.716	1.62
50 x 25	1.0	1.46	1.15	1.64	1.31	1.06	4.84	1.94	1.82
50 x 25	1.2	1.74	1.37	1.93	1.55	1.05	5.73	2.29	1.81
50 x 25	1.5	2.16	1.70	2.34	1.87	1.04	7.01	2.80	1.80
50 x 25	2.0	2.84	2.23	2.96	2.37	1.02	9.01	3.60	1.78
50 x 25	3.0	4.14	3.25	4.00	3.20	0.98	12.55	5.02	1.74
55 x 10	2.0	2.43	1.91	0.358	0.717	0.38	7.189	2.614	1.72
55 x 10	3.0	3.54	2.78	0.429	0.857	0.35	9.991	3.633	1.68
55 x 20	1.2	1.74	1.37	1.266	1.266	0.85	6.414	2.332	1.92
55 x 20	1.5	2.15	1.69	1.528	1.528	0.84	7.762	2.822	1.90
55 x 20	2.0	2.84	2.23	1.919	1.919	0.82	10.038	3.650	1.88
55 x 20	3.0	4.14	3.25	2.545	2.545	0.78	14.016	2.750	1.84
55 x 25	1.2	1.85	1.46	4.795	3.836	1.61	6.061	2.024	1.81
55 x 25	1.5	2.30	1.81	5.244	4.195	1.51	7.452	2.710	1.80
55 x 25	2.0	3.04	2.39	3.163	2.530	1.02	3.040	1.105	1.78
55 x 25	3.0	4.43	3.48	4.351	3.480	0.99	13.412	4.877	1.74
55 x 35	1.2	2.10	1.65	4.458	2.547	1.46	8.998	3.272	2.07
55 x 35	1.5	2.61	2.05	5.450	3.114	1.45	10.969	3.989	2.05
55 x 35	2.0	3.43	2.70	6.819	3.897	1.41	14.274	5.191	2.04
55 x 35	3.0	5.03	3.95	9.691	5,537	1.39	20.120	7.316	2.00
55 x 45	1.2	2.34	1.84	7.845	3.487	1.83	10.616	3.860	2.13
55 x 45	1.5	2.90	2.28	9.606	4.269	1.82	13.034	4.470	2.12
55 x 45	2.0	3.83	3.01	12.437	5.527	1.80	16.890	6.142	2.10
55 x 45	3.0	5.64	4.43	17.530	7.791	1.76	24.167	8.787	2.07
60 x 15	1.2	1.74	1.37	0.724	0.965	0.65	6.890	2.297	1.99
60 x 15	1.5	2.15	1.69	0.867	1.156	0.64	8.429	2.810	1.98
60 x 15	2.0	2.84	2.23	1.057	1.409	0.61	10.910	3.637	1.96
60 x 15	3.0	4.15	3.25	1.423	1.898	0.57	15.299	5.100	1.92

Size B x D mm	Thickness t mm	Area A cm^2	Mass w kg/m	Axis x-x			Axis y-y		
				I_x cm^4	z_x cm^3	r_x cm	I_y cm^4	z_y cm^3	r_y cm
60 x 20	1.2	1.85	1.46	1.378	1.378	0.86	8.004	2.668	2.08
60 x 20	1.5	2.30	1.81	1.662	1.662	0.85	9.760	3.253	2.06
60 x 20	2.0	3.04	2.39	2.079	2.079	0.83	12.528	4.176	2.03
60 x 20	3.0	4.43	3.48	2.765	2.765	0.79	17.543	5.848	1.99
60 x 30	1.2	2.10	1.65	3.392	2.262	1.27	9.980	3.327	2.18
60 x 30	1.5	2.61	2.05	4.150	2.767	1.26	12.290	4.097	2.17
60 x 30	2.0	3.43	2.70	5.282	3.522	1.24	15.855	5.285	2.15
60 x 30	3.0	5.03	3.95	7.255	4.837	1.20	22.607	7.536	2.12
60 x 40	1.0	1.96	1.54	5.48	2.74	1.67	10.21	3.40	2.28
60 x 40	1.2	2.34	1.84	6.456	3.228	1.66	12.058	4.019	2.27
60 x 40	1.5	2.90	2.28	7.905	3.952	1.65	14.812	4.937	2.26
60 x 40	2.0	3.83	3.01	10.188	5.094	1.63	19.217	6.406	2.24
60 x 40	3.0	5.64	4.43	14.294	7.147	1.59	27.546	9.182	2.21
60 x 40	4.0	7.36	5.78	18.211	9.106	1.57	34.339	11.446	2.16
65 x 25	1.2	2.10	1.65	6.654	5.323	1.78	11.013	3.388	2.29
65 x 25	1.5	2.61	2.05	6.850	5.480	1.62	13.449	4.138	2.27
65 x 25	2.0	3.43	2.70	3.710	2.968	1.04	17.364	5.343	2.25
65 x 25	3.0	5.03	3.95	5.121	4.097	1.01	24.790	7.628	2.22
65 x 25	4.0	6.56	5.15	6.109	4.887	0.97	31.176	9.593	2.18
65 x 30	1.2	2.21	1.74	3.604	2.403	1.28	12.309	3.787	2.36
65 x 30	1.5	2.76	2.17	4.431	2.954	1.27	14.984	4.610	2.33
65 x 30	2.0	3.64	2.86	5.715	3.810	1.25	19.423	5.976	2.31
65 x 30	3.0	5.33	4.19	7.791	5.194	1.21	27.465	8.451	2.27
65 x 30	4.0	6.95	5.46	9.400	6.267	1.16	34.562	10.634	2.23
65 x 35	1.2	2.34	1.84	5.139	2.895	1.48	13.478	4.147	2.40
65 x 35	1.5	2.90	2.28	6.275	3.586	1.47	16.565	5.097	2.39
65 x 35	2.0	3.83	3.01	8.064	4.608	1.45	21.513	6.619	2.37
65 x 35	3.0	5.64	4.43	11.245	6.426	1.41	30.357	9.341	2.32
65 x 35	4.0	7.36	5.78	13.875	7.928	1.37	38.597	11.876	2.29
70 x 20	1.2	2.10	1.65	1.589	1.589	0.87	11.895	3.399	2.38
70 x 20	1.5	2.60	2.05	1.918	1.918	0.86	14.481	4.137	2.36
70 x 20	2.0	3.43	2.70	2.409	2.409	0.84	18.781	5.366	2.34
70 x 20	3.0	5.03	3.95	3.203	3.203	0.80	26.609	7.602	2.30
70 x 20	4.0	6.46	5.15	3.712	3.712	0.76	32.704	9.344	2.25
70 x 30	1.2	2.34	1.84	3.900	2.600	1.29	14.625	4.179	2.50
70 x 30	1.5	2.90	2.28	4.759	3.173	1.28	17.980	5.137	2.49
70 x 30	2.0	3.83	3.01	6.071	4.047	1.26	23.556	6.730	2.48
70 x 30	3.0	5.64	4.43	8.381	5.587	1.22	33.304	9.515	2.43
70 x 30	4.0	7.36	5.78	10.231	6.820	1.18	42.041	12.012	2.39
70 x 50	1.2	2.82	2.22	15.974	6.389	2.38	20.406	5.830	2.69
70 x 50	1.5	3.51	2.76	18.892	7.557	2.32	25.022	7.149	2.67
70 x 50	2.0	4.63	3.64	22.839	9.136	2.22	32.760	9.360	2.66
70 x 50	3.0	6.84	5.37	30.107	12.043	2.10	46.952	13.415	2.62
70 x 50	4.0	8.95	7.03	34.664	13.865	1.97	59.575	17.021	2.58

Size B x D mm	Thickness t mm	Area A cm^2	Mass w kg/m	Axis x-x			Axis y-y		
				I_x cm^4	z_x cm^3	r_x cm	I_y cm^4	z_y cm^3	r_y cm
75 x 50	2.0	4.84	3.80	20.539	8.212	2.06	38.490	10.464	2.82
75 x 50	2.5	6.00	4.71	24.970	9.988	2.04	47.040	12.544	2.80
75 x 50	3.0	7.14	5.60	29.134	11.654	2.02	55.181	14.715	2.78
75 x 50	4.0	9.36	7.34	36.695	14.678	1.98	70.271	18.739	2.74
80 x 40	1.2	2.82	2.21	8.246	4.123	1.71	24.209	6.052	2.93
80 x 40	1.5	3.51	2.76	10.144	5.072	1.70	29.928	7.482	2.92
80 x 40	2.0	4.63	3.64	13.083	6.512	1.68	38.938	9.735	2.90
80 x 40	3.0	6.84	5.37	18.397	9.199	1.64	55.948	13.987	2.86
80 x 40	4.0	8.95	7.03	22.998	11.499	1.60	71.174	17.793	2.82
80 x 60	1.5	4.11	3.23	25.115	8.372	2.47	38.989	9.747	3.08

80 x 60	2.0	5.43	4.27	32.860	10.953	2.46	51.177	12.794	3.07
80 x 60	3.0	8.03	6.31	47.027	15.676	2.42	73.723	18.430	3.03
80 x 60	4.0	10.56	9.29	59.766	19.922	2.38	94.407	23.602	2.99
90 x 30	1.5	3.51	2.76	5.959	3.973	1.30	34.168	7.593	3.12
90 x 30	2.0	4.63	3.64	7.633	5.089	1.28	44.208	9.824	3.09
90 x 30	3.0	6.84	5.37	10.517	7.011	1.24	63.629	14.140	3.05
90 x 30	4.0	8.95	7.03	12.974	8.649	1.20	80.550	17.900	3.00
100 x 20	1.5	3.51	2.76	2.687	2.687	0.88	37.303	7.461	3.26
100 x 20	2.0	4.63	3.64	3.377	3.377	0.85	48.604	9.721	3.24
100 x 20	3.0	6.84	5.37	4.510	4.510	0.81	69.605	13.921	3.19
100 x 20	4.0	8.95	7.03	5.334	5.334	0.77	88.806	17 761	3.15
100 x 40	2.0	5.43	4.27	15.952	7.976	1.71	68.047	13.609	3.54
100 x 40	3.0	8.03	6.31	22.323	11.162	1.67	98.368	19.674	3.50
100 x 40	4.0	10.56	8.29	28.160	14.080	1.63	125.690	25.138	3.45
100 x 50	2.0	5.83	4.58	26.227	10.490	2.12	77.245	30.898	3.64
100 x 50	2.5	7.25	5.69	31.972	12.789	2.10	95.007	19.001	3.62
100 x 50	3.0	8.63	6.78	37.337	14.935	2.08	112.11	22.422	3.60
100 x 50	4.0	11.36	8.92	47.276	18.910	2.04	144.12	28.824	3.56
100 x 50	5.0	14.00	11.00	56.000	22.400	2.00	173.67	34.734	3.52
100 x 50	6.0	16.56	13.00	63.617	25.447	1.96	200.87	40.174	3.48
120 x 80	2.0	7.83	6.15	87.453	21.863	3.34	163.53	27.255	4.57
120 x 80	3.0	11.64	9.14	128.30	32.075	3.32	235.77	39.295	4.52
120 x 80	4.0	15.36	12.06	163.34	40.835	3.26	306.91	51.152	4.47
125 x 75	3.0	11.64	9.14	113.68	30.315	3.13	251.74	40.278	4.65
125 x 75	4.0	15.36	12.06	146.21	38.989	3.09	326.47	52.235	4.61
125 x 75	5.0	19.00	14.92	176.27	47.005	3.05	396.90	63.504	4.57
125 x 75	6.0	22.56	17.71	203.99	54.397	3.01	463.18	74.109	4.53
140 x 60	2.0	7.83	6.15	52.890	17.630	2.56	198.11	28.301	5.03
140 x 60	3.0	11.64	9.14	76.165	25.388	2.56	288.68	41.240	4.98
140 x 60	4.0	15.36	12.06	97.387	32.862	2.52	374.84	53.549	4.94
150 x 50	2.0	7.83	6.15	37.897	15.159	2.20	213.26	28.435	5.22
150 x 50	3.0	11.64	9.14	54.308	21.723	2.16	311.38	41.517	5.17
150 x 50	4	15.36	12.06	68.58	27.43	2.11	404.10	53.88	5.13
150 x 50	5	19.00	14.92	81.58	32.63	2.07	491.58	65.54	5.09
150 x 50	6	22.56	17.71	93.15	37.26	2.03	574.03	76.54	5.04

Size B x D mm	Thickness t mm	Area A cm^2	Mass w kg/m	Axis x-x			Axis y-y		
				I_x cm^4	z_x cm^3	r_x cm	I_y cm^4	z_y cm^3	r_y cm
150 x 75	3.0	13.14	10.31	133.13	35.50	3.18	392.43	52.32	5.46
150 x 75	4.0	17.36	13.63	171.44	45.72	3.14	510.71	68.09	5.42
150 x 75	5.0	21.50	16.88	206.95	55.19	3.10	623.04	83.07	5.38
150 x 75	6.0	25.56	20.06	239.79	63.94	3.06	729.64	97.28	5.34
150 x 100	3.0	14.64	14.49	253.30	50.66	4.16	473.48	63.13	5.69
150 x 100	4.0	19.36	15.20	328.55	65.71	4.12	617.31	82.31	5.65
150 x 100	5.0	24.00	18.84	399.50	79.90	4.08	754.50	100.60	5.61
150 x 100	6.0	28.56	28.56	466.31	93.26	4.04	885.25	118.03	5.57
200 x 50	3.0	14.63	11.48	70.62	28.25	2.20	656.16	65.62	6.69
200 x 50	4.0	19.36	15.20	328.55	35.92	2.15	856.07	85.61	6.65
200 x 100	4.0	23.36	18.33	420.77	84.15	4.24	1240.29	124.63	7.29
200 x 100	6.0	35.56	27.13	599.03	119.81	4.16	1793.91	179.39	7.14
200 x 100	8.0	45.44	36.93	757.85	151.57	4.09	2306.10	230.60	7.00
200 x 150	4	27.36	21.48	1043.74	139.17	6.18	1624.50	162.45	7.71
200 x 150	5	34.00	26.69	1280.33	170.71	6.14	1997.83	199.78	7.67
200 x 150	6	40.56	31.84	1507.69	201.02	6.10	2358.63	235.86	7.63
200 x 150	8	53.44	41.95	1935.64	258.09	6.02	3043.72	304.37	7.55
300 x 100	4	31.36	24.62	605.19	121.04	4.39	3412.23	227.48	10.43
300 x 100	6	46.56	36.55	864.47	172.89	4.31	4982.23	332.15	10.34
300 x 100	8	61.44	48.23	1097.27	219.45	4.23	6465.59	431.04	10.26

300 x 200	4	39.36	30.90	2777.14	277.71	8.40	5164.66	344.31	11.45
300 x 200	6	58.56	45.97	4052.79	405.28	8.32	7575.67	505.04	11.37
300 x 200	8	77.44	60.79	5256.84	525.68	8.24	9877.00	658.47	11.29
350 x 150	4	39.36	30.90	1683.38	224.45	6.54	6258.42	357.62	12.61
350 x 150	6	58.56	45.97	2441.35	325.51	6.46	9187.11	524.98	12.53
350 x 150	8	77.44	60.79	3146.76	419.57	6.37	11987.08	684.98	12.44
400 x 100	6	58.56	45.97	1129.91	225.98	4.39	10498.55	524.93	13.39
0400 x 100	8	77.44	60.79	1436.68	287.34	4.31	13697.16	684.86	13.30

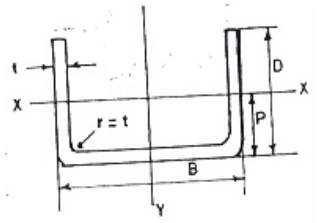


Figure 3 — Plain channel section

Table 6 — Dimensions and properties for cold rolled plain channel sections

Size B × D mm	Thickness, t, mm	A cm^2	Mass, w, kg/m	P cm	Axis X-X			Axis Y-Y		
					I_x cm^4	Z_x cm^3	r_x cm	I_y cm^4	Z_y cm^3	r_y cm
40 x 25	1.5	1.26	0.99		3.41	1.62	1.71	0.83	0.80	0.48
40 x 25	2.0	1.64	1.29		4.39	1.60	2.20	1.08	0.79	0.62
40 x 40	1.5	1.71	1.34		5.08	1.70	2.54	3.01	1.31	1.15
40 x 40	2.0	2.24	1.76		6.32	1.68	3.13	3.79	1.30	1.48
50 x 25	3	2.70	2.12	0.77	1.56	0.90	0.77	9.45	3.78	1.89
60 x 40	3	3.90	3.06	1.30	6.33	2.34	1.27	22.05	7.35	2.38
60 x 40	4	5.60	3.98	1.36	7.99	3.02	1.26	27.32	9.10	2.34
75 x 40	3	4.34	3.41	1.13	39.33	10.49	3.01	7.02	2.45	1.27
75 x 40	4	5.64	4.43	1.12	50.40	13.44	2.99	7.74	2.69	1.17
75 x 40	4.5	6.27	4.92	1.18	55.57	14.82	2.98	9.98	3.54	1.26
100 x 50	3	5.70	4.47	1.40	14.05	3.90	1.57	87.30	17.46	3.91
100 x 50	4	7.42	5.82	1.45	18.07	5.08	1.56	111.12	22.21	3.86
100 x 50	4.5	8.29	6.51	1.40	130.94	13.09	3.97	20.54	5.71	1.57
100 x 50	6	10.81	8.49	1,56	24.74	7.19	1.52	152.58	30.51	3.75
120 x 50	6	12.01	9.43	1.44	26.49	7.44	1.48	238.17	39.69	4.45
120 X 65	4.5	10.77	8.45	1.81	270.99	43.36	5.02	45.93	9.79	2.07
125 X 65	6	14.04	11.02	1.86	348.52	55.67	4.98	59.34	12.79	2.06
150 x 50	6	13.81	10.84	1.29	28.53	7.69	1.43	412.33	54.97	5.46
150 x 70	4	10.90	8.61	1.88	53.03	10.35	2.19	376.90	50.25	5.85
150 x 70	6	16.21	12.72	1.99	74.71	14.91	2.15	536.82	71.57	5.75
150 x 72,5	4.5	12.79	10.04	2.03	462.48	61.66	6.01	72.39	13.23	2.38
150 x 75	6	16.74	13.14	2.07	598.23	79.76	5.98	93.78	17.27	2.37
200 x 75	4.5	15.04	11.81	1.64	906.38	90.64	7.76	79.05	13.49	2.29

200 x 75	5	16.63	13.03	1.72	1006.25	100.63	7.78	99.85	17.28	2.45
200 x 75	6	19.74	15.50	1.80	1179.31	117.93	7.73	102.13	17.92	2.27
200 x 100	6	22.64	17.77	2.79	224.98	31.20	3.15	1393.93	139.39	7.84

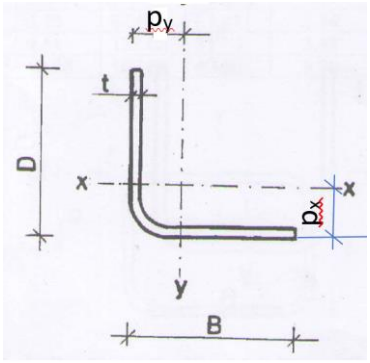


Figure 4 — Plain equal angles section

Table 7 – Dimensions and properties for cold rolled plain equal angle sections

Size B x D mm	Thickness t mm	Area A cm^2	Mass w Kg/m	Centroid $p_x = p_y$ cm	Axis x-x = Axis y-y		
					I_x cm^4	z_x cm^3	r_x cm
20 x 20	2.5	0.88	0.69	1.10	0.33	0.24	0.62
25 x 25	2.0	0.93	0.73	0.72	0.56	0.32	0.78
25 x 25	2.5	1.13	0.89	0.75	0.68	0.39	0.78
25 x 25	3.0	1.33	1.05	0.78	0.80	0.46	0.77
30 x 30	2.0	1.12	0.88	0.84	1.10	0.46	0.94
30 x 30	2.5	1.38	1.08	0.87	1.24	0.58	0.94
30 x 30	3.0	1.63	1.28	0.90	1.43	0.68	0.94
32 x 32	3.0	1.74	1.37	0.91	1.54	0.67	0.94
32 x 32	4.0	2.24	1.76	0.90	1.86	0.81	0.91
32 x 32	4.5	2.48	1.88	0.91	1.99	0.87	0.90
32 x 32	6.0	3.12	2.45	1.03	2.30	1.06	0.86
40 x 40	2.0	1.53	1.20	1.10	2.46	0.84	1.26
40 x 40	2.5	1.88	1.47	1.12	2.96	1.03	1.25
40 x 40	3.0	2.23	1.75	1.15	3.49	1.23	1.25
40 x 40	4.0	2.88	2.26	1.10	3.92	1.32	1.17
40 x 40	4.5	3.20	2.51	1,11	4.24	1.47	1.15
40 x 40	6.0	4.08	3.20	1.24	5’66	2.04	1.18
50 x 50	2.0	1.92	1.51	1.34	4.85	1.32	1.59
50 x 50	3.0	2.83	2.22	1.40	7.01	1.94	1.57
50 x 50	4.0	3.70	2.90	1.45	8.89	2.50	1.56
50 x 50	4.5	4.10	3.22	1.42	8.91	2.49	1.47
50 x 50	6.0	5.28	4.14	1.48	12.43	3.53	1.53
60 x 60	4.0	4.50	3.53	1.68	16.01	3.70	1.88
60 x 60	6.0	6.53	5.13	1.80	22.55	5.37	1.87
65 x 65	4.5	5.45	4.28	1.79	19.03	4.04	1.87
65 x 65	6.0	7.08	5.56	1.85	25.90	5.57	1.91
75 x 75	6.0	8.69	6.78	2.08	46.88	8.67	2.33
90 x 90	6.0	10.13	7.95	2.55	80.73	12.51	2.83
100 x 100	6.0	11.30	8.87	2.80	112.28	15.59	3.15

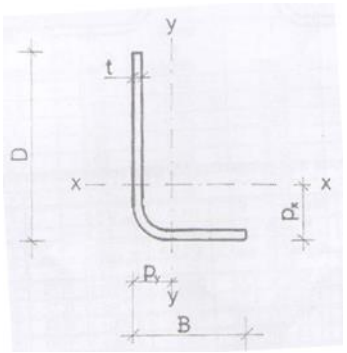


Figure 5: Plain unequal angles

Table 8 – Dimensions and properties for cold rolled plain unequal angle sections

Size B x D mm	Thickness t mm	Area A cm^2	Mass w Kg/m	Centroid		Axis x-x			Axis y-y		
				P_x cm	P_y cm	I_x cm^4	z_x cm^3	r_x cm	I_y cm^4	z_y cm^3	r_y cm
50 x 40	6.0	4.65	3.67	1.53		9.96	2.87	1.04	5.41	1.83	1.08
65 x 50	6.0	6.18	4.85	1.99		11.68	2.59	1.24	11.74	3.12	1.38
75 x 50	6.0	6.78	5.32	2.40		35.81	7.02	1.15	17.58	4.57	1.61
90 x 65	6.0	8.58	6.73	2.76		66.56	10.67	1.51	28.58	5.73	1.83
90 x 75	6.0	9.78	7.61	3.01		94.54	13.53	1.76	45.09	7.86	2.15

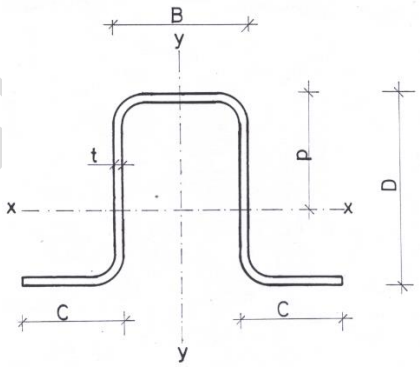


Figure 6 — Cold rolled outwardly lipped channel section

Table 9 – Dimensions and properties for cold rolled outwardly lipped channel sections

Size			Thickness t mm	Area A cm^2	Mass w Kg/m	Centroid p cm	Axis x-x			Axis y-y		
B mm	D mm	C mm					I_x cm^4	z_x cm^3	r_x cm	I_y cm^4	z_y cm^3	r_y cm
20	20	10	1.5	1.202	0.94	1.116	0.686	0.61	1.750	1.726	1.73	1.195
20	20	15	2.0	1.536	1.20	1.118	0.791	0.71	0.720	2.130	0.93	1.180
25	25	15	1.5	1.427	1.12	1.305	1.290	0.99	0.951	2.654	1.02	1.363
25	25	15	2.0	1.836	1.44	1.313	1.563	0.92	0.920	3.300	1.29	1.340
40	25	15	1.5	1.877	1.47	2.077	4.047	1.95	1.468	3.276	1.26	1.321
40	25	15	2.0	2.438	1.91	2.078	5.022	2.41	1.435	4.090	1.60	1.295
50	50	20	1.5	2.702	2.12	2.366	10.08	3.82	1.932	16.45	3.78	2.467
50	50	20	2.0	3.536	2.77	2.365	12.80	3.85	1.900	21.06	4.90	2.442
75	50	20	2.0	4.736	3.71	3.590	36.97	9.85	2.792	31.01	6.46	2.559

75	50	20	2.5	5.839	4.58	3.588	44.57	11.88	2.762	37.43	7.88	2.532
75	50	20	3.0	6.908	5.42	3.586	51.56	13.74	2.731	43.40	9.23	2.507
100	50	30	2.0	5.930	4.66	5.166	79.36	15.36	3.658	41.85	7.89	2.657
100	50	30	2.5	7.330	5.76	5.167	96.40	18.65	3.626	50.74	9.66	2.631
100	50	30	3.0	8.700	6.28	5.166	112.4	21.75	3.596	59.06	11.35	2.605

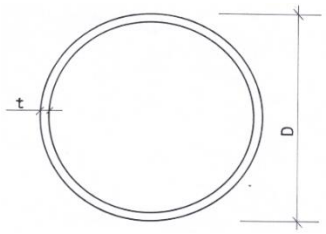


Figure 7 — Circular tubes

Table 10 – Dimensions and properties for cold rolled circular tubes

Diameter D mm	Thickness t mm	Area A cm^2	Mass w kg/m	I cm^4	z cm^3	r cm
16	1	0.47	0.37	0.13	0.17	0.53
16	1.2	0.56	0.44	0.15	0.19	0.52
16	1.5	0.68	0.54	0.18	0.23	0.52
16	2.0	0.87	0.69	0.22	0.27	0.50
19	1.2	0.67	0.54	0.27	0.28	0.63
19	1.5	0.82	0.66	0.32	0.33	0.63
19	2.0	1.07	0.86	0.39	0.41	0.60
20	1	0.60	0.47	0.27	0.27	0.67
20	1.2	0.71	0.56	0.31	0.31	0.67
20	1.5	0.87	0.69	0.38	0.38	0.66
22	1	0.66	0.52	0.36	0.33	0.74
22	1.2	0.78	0.62	0.43	0.39	0.74
22	1.5	0.97	0.78	0.51	0.46	0.73
22	2.0	1.26	0.99	0.63	0.58	0.71
25	1	0.75	0.59	0.54	0.44	0.85
25	1.2	0.89	0.70	0.64	0.51	0.84
25	1.5	1.10	0.87	0.77	0.61	0.83
25	2.0	1.43	1.13	0.96	0.77	0.82
26.75	1.2	0.95	0.75	0.79	0.59	0.91
26.75	1.5	1.18	0.93	0.95	0.72	0.90
26.75	2.0	1.55	1.22	1.19	0.90	0.88
28.70	1.2	1.04	0.82	0.98	0.68	0.97
28.70	1.5	1.28	1.01	1.18	0.83	0.96
28.70	2.0	1.68	1.32	1.50	1.04	0.94
30	1	0.91	0.72	0.96	0.64	1.03
32	1	0.97	0.76	1.17	0.73	1.10
32	1.2	1.15	0.91	1.37	0.86	1.09
32	1.5	1.43	1.13	1.67	1.04	1.08
32	2.0	1.88	1.48	2.13	1.33	1.05
32	3.0	2.72	2.14	2.90	1.81	1.03
38	1	1.16	0.91	1.99	1.05	1.31
38.70	1.2	1.42	1.12	2.48	1.28	1.32
38.70	1.5	1.75	1.38	3.03	1.57	1.31
38.70	2.0	2.31	1.82	3.89	2.01	1.30
38.70	3.0	3.37	2.65	5.39	2.79	1.26
42	1	1.29	1.01	2.71	1.29	1.45
42.25	1.2	1.54	1.21	3.26	1.54	1.47
42.25	1.5	1.96	1.54	3.99	1.89	1.42
42.25	2.0	2.52	1.98	5.13	2.43	1.42
42.25	3.0	3.69	2.90	7.16	3.39	1.39
45	1	1.38	1.09	3.35	1.49	1.56
48	1	1.48	1.16	4.08	1.70	1.66

Diameter D mm	Thickness t mm	Area A cm^2	Mass w kg/m	I cm^4	z cm^3	r cm

51	1	1.57	1.23	4.91	1.93	1.77
51	1.2	1.87	1.47	5.82	2.28	1.76
51	1.5	2.33	1.83	7.15	2.80	1.75
51	2.0	3.08	2.42	9.25	3.63	1.73
51	3.0	4.52	3.55	13.08	5.13	1.70
57	1.2	2.10	1.65	8.19	2.87	1.97
57	1.5	2.61	2.05	10.07	3.53	1.96
57	2.0	3.50	2.75	13.08	4.59	1.93
57	3.0	5.09	4.00	18.61	6.53	1.91
60	1.2	2.21	1.74	9.58	3.19	2.08
60	1.5	2.75	2.16	11.80	3.93	2.07
60	2.0	3.64	2.86	15.34	5.11	2.06
60	3.0	5.37	4.22	21.88	7.29	2.02
63	1	1.95	1.53	9.37	2.97	2.19
63	1.2	2.33	1.85	11.12	3.53	2.18
63	1.5	2.90	2.30	13.70	4.35	2.17
63	2.0	3.83	3.01	17.84	5.66	2.15
63	3.0	5.65	4.51	25.50	8.09	2.10
75.50	4.0	8.92	7.01	57.61	15.28	2.54
75.50	4.5	10.1	7.90	64.8	16.83	2.52
76	1.5	3.51	2.77	24.35	6.41	2.62
76	2.0	4.65	3.64	31.83	8.38	2.60
76	3.0	6.88	5.44	45.88	12.07	2.56
89	2.0	5.46	4.29	51.75	11.63	3.08
89	3.0	8.10	6.36	75.04	16.86	3.04
89	3.25	8.72	6.81	79.7	18.12	3.03
89	4.0	10.67	8.38	96.70	21.73	3.01
89	4.85	20.60	16.17	470.93	67.27	4.78
100	2	6.16	4.84	73.98	14.80	3.47
100	3.0	9.24	7.26	107.62	21.52	3.41
100	4.0	12.25	9.61	139.22	27.82	3.37
114	2	7.04	5.53	110.42	19.37	3.96
114.30	3.0	10.50	8.25	162.69	28.47	3.94
114.30	3.65	12.69	9.89	194.46	34.03	3.37
114.30	4.0	13.87	10.89	211.11	36.97	3.90
114.30	4.5	15.53	12.19	234.63	41.01	3.88
114.30	5.4	18.48	14.84	274.63	48.05	3.86
140	4.85	20.60	16.17	470.93	67.27	4.78
140	5.4	22.84	17.92	518.12	74.02	4.76
152	3.0	14.05	11.03	389.99	51.32	5.27
152	4.0	18.61	14.61	509.75	67.07	5.23
165	3	15.27	11.99	501.24	60.76	5.73
165	4.0	20.24	15.89	656.21	79.54	5.69
165	4.85	24.41	19.16	783.35	94.95	5.66
216	5.0	33.16	26.03	1846.11	170.95	7.46
216	6.0	39.60	31.09	2184.33	202.27	7.43
216	7.0	45.98	36.09	2515.71	232.94	7.39

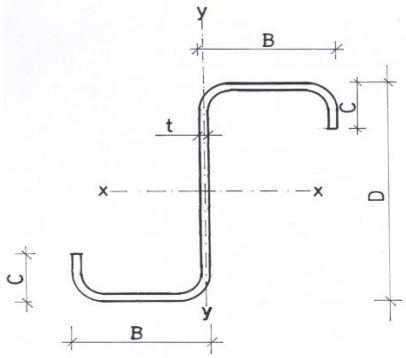


Figure 8 — Zed purlins

Table 11 – Dimensions and properties for cold rolled steel zed purlins

Dimensions (mm)				Area	Mass	Axis x-x			Axis y-y		
B mm	D mm	C mm	t mm	A cm^2	w kg/m	I_x cm^4	z_x cm^3	r_x cm	I_y cm^4	z_y cm^3	r_y cm
50	100	22	2.0	4.44	3.54	70.10	18.81	3.83	33.87	6.80	2.70
50	115	22	2.0	4.78	3.78	98.24	17.91	4.47	33.89	6.80	2.82
50	130	22	2.0	5.06	4.02	125.99	19.04	4.94	33.87	6.80	2.56
50	140	22	2.0	5.28	4.17	157.80	22.60	5.40	33.87	6.80	2.50
50	150	22	2.0	5.44	4.33	194.14	25.47	5.85	33.87	6.80	2.44
50.8	165.1	22.2	2.0	5.92	4.65	234.96	28.46	6.30	33.87	6.80	2.39
50.8	165.1	22.2	2.5	7.25	5.94	278.7	33.78	6.43	33.87	7.59	2.33
50.8	177.8	22.2	2.5	7.59	5.90	340.73	38.32	6.72	37.63	7.59	2.23
63.5	177.8	22.2	2.5	8.23	6.40	389.51	43.81	6.90	67.91	10.91	2.88
65	175	22	2.0	6.58	5.17	331.7	37.31	6.97	36.13	10.10	3.04
76.2	177.8	22.2	3.0	10.42	8.17	516.52	58.10	7.02	128.58	17.21	3.50
76.2	254	22.2	3.0	13.12	10.30	123.60	97.38	9.70	148.99	19.95	3.37

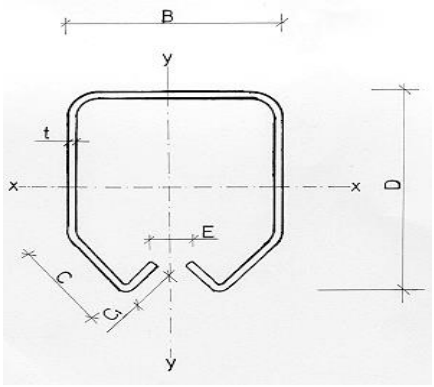


Figure 9 — Cold rolled mono rail sections

Table 12 – Dimensions and properties or cold rolled steel mono rail sections

Dimensions					Thickness	Area	Mass	Axis x-x			Axis y-y		
B mm	D mm	C mm	C_1 mm	E mm	t mm	A cm^2	w kg/m	I_x cm^4	z_x cm^3	r_x cm	I_y cm^4	z_y cm^3	r_x cm
57	67	15	10	13.7	3	6.27	4.92	34.34	9.19	2.34	31.63	11.10	2.25
42	54	12.5	8	8	2.5	3.97	3.12	14.35	4.64	1.90	11.11	5.29	1.67
33	34	9.5	6.5	10.5	2	2.22	1.74	3.22	1.65	1.20	3.67	2.22	1.28

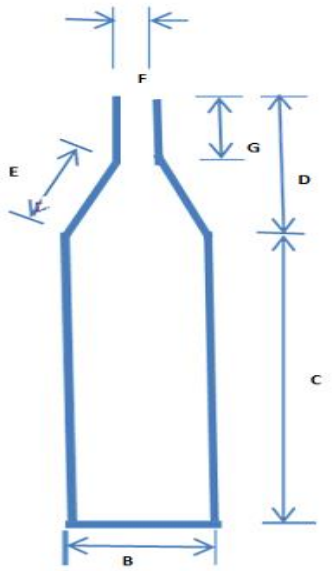


Figure 10 — Bottle sections

Table 13 – Dimensions and properties of cold rolled steel bottle sections

Nominal size	Dimensions						Thickness t mm	Mass w kg/m
	B mm	C mm	D mm	E mm	F mm	G mm		
94	34	64	30	15	2	15	1.2	2.1
94	34	64	30	15	2	15	1.5	2.6
94	34	64	30	15	2	15	2.0	3.5

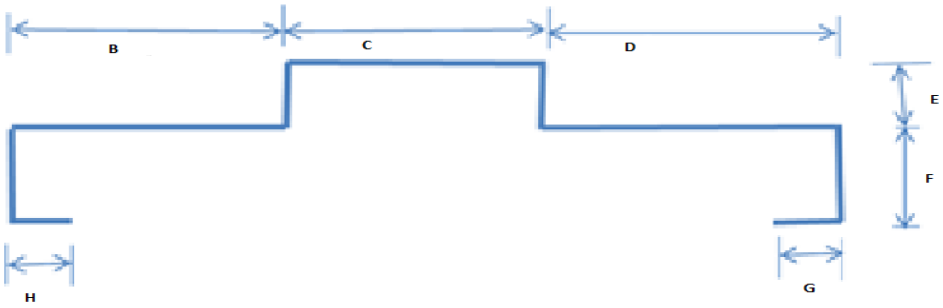


Figure 11 — Door frame

Table 14 (a) – Dimensions and properties of cold rolled steel door frame sections

Nominal size	Dimensions						Thickness	Mass
	B mm	C mm	D mm	E mm	F mm	G/H mm	t mm	w kg/m
130	45	50	35	15.00	30.15	15.15	1.0	1.8
130	45	50	35	15.00	30.15	15.15	1.2	2.1
130	45	50	35	15.00	30.15	15.15	1.5	2.6
130	45	50	35	15.00	30.15	15.15	2.0	3.5

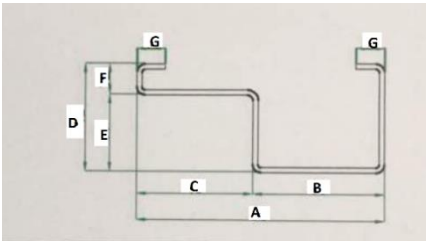


Figure 12; Half door frame section

Table 14 (b) – Dimensions and properties of cold rolled steel door frame sections

A	B	C	D	E	F	G	THICK
95	50	45	42	30	12	11	1.0
95	50	45	42	30	12	11	1.2
95	50	45	42	30	12	11	1.5
105	60	45	60	15	45	12	1.0
105	60	45	60	15	45	12	1.2
105	60	45	60	15	45	12	1.5
125	70	55	60	15	45	12	1.0
125	70	55	60	15	45	12	1.2
125	70	55	60	15	45	12	1.5

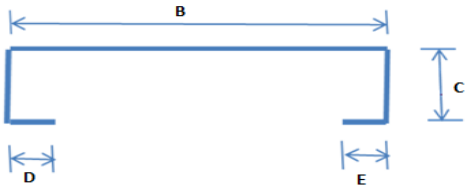


Figure 13 — Cold rolled facia board

Table 15 – Dimensions and properties of cold rolled steel fascia board sections

Nominal size	Dimensions			Thickness t mm	Mass w kg/m
	B mm	C mm	D/E mm		
150 x 30	150	30	5.75	1.2	2.17
150 x 30	150	30	5.75	1.5	2.58
190 x 30	190	30	5.75	1.2	2.38
190 x 30	190	30	5.75	1.5	2.88
200 x 30	200	30	5.75	1.2	2.67
200 x 30	200	30	5.75	1.5	3.25

Figure 14 — Omega sections

Table 16 – Dimensions and properties of Omega sections

A mm	B mm	C mm	D mm	THICKNESS t mm
35	50	45	17	1.0 mm
35	50	45	17	1.2 mm
35	50	45	17	1.5 mm
35	50	45	17	2.0 mm

FORMULAS FOR SECTIONAL PROPERTIES

Measurement of dimensions.docx