

Roll-Formed Angle Sections: Mass per Metre, Dimensions and Section Properties

The tables list roll-formed angles: equal-leg to GOST 19771-93 and unequal-leg to GOST 19772-93. For every size the cross-sectional area, mass of 1 m, metres per tonne, moments of inertia and radii of gyration are given.

What a roll-formed angle is and how it differs from a hot-rolled one

A hot-rolled angle is rolled red-hot, and its legs are thick. A roll-formed angle is made on a profile-bending line from sheet steel: a strip is bent by rolls to a right angle. Its legs are thinner and the corners are rounded, so the section is lighter. Hot-rolled angles are listed on the equal angles page and the unequal angles page.

Roll-formed angles are used in light structures: framing, stiffeners, supporting parts. For heavy loads a hot-rolled angle is better.

Equal-leg roll-formed angles: dimensions and mass of 1 m

A size is written with two numbers: leg width b and thickness S in millimetres. 100×4 means an angle with 100 mm legs and 4 mm thickness. The standard has two tables: the first for steel with a tensile strength up to 460 N/mm^2 , the second for steel above 460 N/mm^2 . That is why some sizes appear in both tables with slightly different values.

The $x-x$ axis is parallel to a leg; the x_0-x_0 and y_0-y_0 axes lie at 45° and are the principal axes of inertia. The distance x_0 shows where the centroid lies from the outer face of the leg.

Roll-formed equal-leg steel angles: steel with tensile strength up to 460 N/mm^2 · ГOST 19771-93

Size	A, cm^2	Mass of 1 m, kg	Metres per tonne	Jx, cm^4	ix, cm	Jx ₀ , cm^4	ix ₀ , cm	Jy ₀ , cm^4	iy ₀ , cm	x ₀ , cm
36×3	2	1.57	637	2.51	1.12	4.11	1.43	0.91	0.68	1.04
40×2.5	1.89	1.48	676	2.98	1.25	4.84	1.6	1.19	0.77	1.12
40×3	2.24	1.76	568	3.5	1.25	5.71	1.6	1.29	0.76	1.14
50×3	2.84	2.23	448	7.02	1.57	11.42	2	2.63	0.96	1.39
50×4	3.7	2.9	345	8.94	1.55	14.7	1.99	3.2	0.93	1.45
60×3	3.44	2.7	370	12.36	1.89	20.03	2.41	4.69	1.17	1.64
60×4	4.5	3.53	283	15.96	1.88	26.06	2.4	5.88	1.14	1.7
70×4	5.3	4.16	240	25.79	2.2	41.95	2.81	9.62	1.35	1.95
80×3	4.64	3.64	275	29.96	2.54	48.39	3.23	11.52	1.58	2.14
80×4	6.1	4.79	209	39	2.53	63.31	3.22	14.7	1.55	2.2
80×5	7.55	5.92	169	47.7	2.51	77.64	3.2	17.76	1.53	2.24
80×6	8.93	7.01	143	55.5	2.49	91.03	3.19	20	1.5	2.3
80×7	10.33	8.11	123	63.9	2.49	104.61	3.18	23.19	1.5	2.34
100×4	7.7	6.05	165	77.58	3.17	125.54	4.04	29.63	1.96	2.69
100×5	9.55	7.49	134	95.31	3.16	154.6	4.02	36.06	1.94	2.74
100×6	11.33	8.89	112	112.19	3.15	182.66	4.01	41.72	1.92	2.79
100×7	13.13	10.31	97	124.16	3.08	205.69	3.96	42.62	1.3	2.83
120×5	11.55	9.06	110	167.19	3.8	270.48	4.84	63.91	2.35	3.24
120×6	13.78	10.78	92.8	197.46	3.79	320.48	4.83	74.44	2.33	3.29

$b \times S$ is the leg width and thickness, mm. A is the cross-sectional area. J_x , i_x are the moment of inertia and radius of gyration about the $x-x$ axis (the same for both axes parallel to the legs); J_{x_0} , i_{x_0} and J_{y_0} , i_{y_0} are about the principal axes x_0-x_0 and y_0-y_0 ; x_0 is the distance to the centroid.

Roll-formed equal-leg steel angles: steel with tensile strength over 460 N/mm^2 · ГOST 19771-93

Size	A, cm^2	Mass of 1 m, kg	Metres per tonne	Jx, cm^4	ix, cm	Jx ₀ , cm^4	ix ₀ , cm	Jy ₀ , cm^4	iy ₀ , cm	x ₀ , cm
55×3	3.1	2.43	412	9.01	1.7	15.01	2.2	3.02	0.99	1.54
60×3	3.4	2.67	375	12.25	1.9	20.02	2.43	4.47	1.15	1.66
70×4	5.34	4.1	244	25.51	2.22	41.93	2.83	9.09	1.32	1.97
80×4	6.03	4.74	211	38.65	2.63	63.28	3.24	14.01	1.52	2.22

Size	A, cm ²	Mass of 1 m, kg	Metres per tonne	J _x , cm ⁴	i _x , cm	J _y , cm ⁴	i _y , cm	x ₀ , cm
80×5	7.48	5.87	170	47.36	2.51	77.61	3.22	17.1
100×4	7.63	6	167	77.05	3.18	125.51	4.05	28.59
100×5	9.48	7.44	134	94.8	3.16	154.53	4.04	35.07
100×6	11.2	8.79	114	111.1	3.15	182.57	4.04	39.69
160×4	12.43	9.76	102	325.24	5.11	525.96	6.5	124.51

Unequal-leg roll-formed angles

An unequal-leg angle has different legs: 90×70×4 means legs of 90 and 70 mm and a thickness of 4 mm. The standard has two tables: the first for steel with a tensile strength up to 460 N/mm², the second for steel above 460 N/mm² and for low-alloy steel.

Roll-formed unequal-leg steel angles: steel with tensile strength up to 460 N/mm² · ГОСТ 19772-93

Size	A, cm ²	Mass of 1 m, kg	Metres per tonne	J _x , cm ⁴	i _x , cm	J _y , cm ⁴	i _y , cm
32×25×2	1.06	0.84	1190	1.12	1.02	0.61	0.76
32×25×2.5	1.32	1.03	971	1.35	1.01	0.73	0.75
50×35×3.2	2.53	1.98	505	6.52	1.61	2.72	1.04
60×40×3	2.84	2.23	448	10.73	1.94	3.97	—
70×50×4	4.5	3.53	283	22.9	2.25	10.04	1.49
80×63×4	5.42	4.26	235	35.95	2.57	20.06	1.92
85×35×4	4.5	3.53	283	34.02	2.75	3.77	0.92
90×70×4	6.1	4.79	209	51.53	2.9	27.92	2.14
100×65×4	6.3	4.95	202	66.91	3.26	23.36	1.93
105×100×3	5.98	4.69	213	67.66	3.36	60.12	3.17
180×140×6	18.53	14.55	68.7	632.17	5.84	343.25	4.3

B×b×S is the width of the larger and smaller leg and the thickness, mm. *A* is the cross-sectional area. *J_x*, *i_x* are about the *x*–*x* axis, parallel to the larger leg; *J_y*, *i_y* are about the *y*–*y* axis, parallel to the smaller leg. A dash marks a value that could not be read in the text of the standard.

Roll-formed unequal-leg steel angles: steel with tensile strength over 460 N/mm² and low-alloy steel · ГОСТ 19772-93

Size	A, cm ²	Mass of 1 m, kg	Metres per tonne	J _x , cm ⁴	i _x , cm	J _y , cm ⁴	i _y , cm
40×25×2.5	1.48	1.16	862	2.46	1.29	0.78	0.72
70×50×4	4.43	3.48	287	22.52	2.25	9.93	1.5
85×67×4	5.71	4.49	223	42.89	2.74	24.07	2.05
90×70×4	6.03	4.74	211	50.97	2.91	27.7	2.14
110×90×5	9.48	7.44	134	118.85	3.54	72.96	2.77
115×65×5	8.48	6.66	150	119.02	3.75	29.47	1.86
147×125×8	20.3	15.93	62.8	448.55	4.7	302.59	3.86
152×100×5.5	13.21	10.37	96.4	324.94	4.96	117.37	2.98
155×100×6	14.5	11.38	87.9	370.31	5.05	127.51	2.97

How to get the mass from the table

Mass is the mass of 1 m times the length. A 100×4 mm equal-leg angle has 6.05 kg per metre, so a six-metre piece weighs about 36 kg, and a tonne of such angle is roughly 165 m. A 90×70×4 mm unequal-leg angle has 4.79 kg per metre, and six metres give about 29 kg.

If you buy by weight, look at the “Metres per tonne” column.

Calculator and ordering

The metal weight calculator gives the mass of a batch of angles quickly. Other sections are collected in the rolled metal handbook. If you need a structure made of roll-formed sections to your drawings, send them with the request and we will price fabrication and galvanizing.

Frequently asked questions

How much does a 100×4 roll-formed angle weigh?

A 100×4 mm equal-leg roll-formed angle weighs 6.05 kg per metre. A six-metre piece is about 36 kg, and a tonne is roughly 165 m.

How does a roll-formed angle differ from a hot-rolled one?

A roll-formed angle is made by bending sheet on a profile-bending line, so its legs are thinner and its mass lower. A hot-rolled angle is rolled red-hot, and is thicker and heavier.

Why does one size appear in two tables?

The standard has separate tables for steel with a tensile strength up to 460 N/mm² and above 460 N/mm². The dimensions are the same, while the area and mass differ slightly.

What is x0 in the table?

The distance from the outer face of a leg to the centroid of the angle, in centimetres.

Reference information. Check the values against the current standard before using them in a project.