

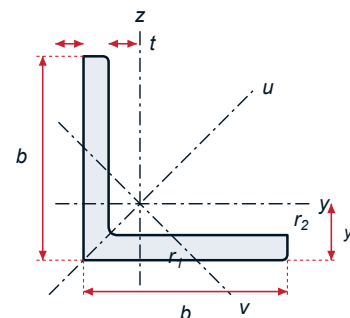
Equal-leg Angle Sections: Mass of 1 m and Section Properties

The tables list equal-leg angles with legs from 20 to 250 mm wide: thickness, mass of 1 m and metres per tonne. For L25×3 to L200×12 they add the section area, the moments of inertia and resistance, the radii of gyration, the centroid position and the hole positions.

Angles with 20–250 mm legs: thickness and mass of 1 m

The designation L63×5 means an angle with legs 63 mm wide and 5 mm thick.

Both legs of an equal-leg angle are the same, so the width is given once.



Equal-leg angle section: dimensions and axes

Hot-rolled equal-leg steel angles · ГОСТ 8509-93

Section	Mass of 1 m, kg	Metres per tonne
L20×3	0.89	1124
L20×4	1.15	870
L25×3	1.12	893
L25×4	1.46	685
L28×3	1.27	787
L30×3	1.36	735
L30×4	1.78	562
L32×3	1.46	685
L32×4	1.91	524
L35×3	1.6	625
L35×4	2.1	476
L35×5	2.58	388
L40×3	1.85	541
L40×4	2.42	413
L40×5	2.98	336
L45×3	2.08	481
L45×4	2.73	366
L50×4	3.05	328
L50×5	3.77	265
L50×6	4.47	224
L56×4	3.44	291
L56×5	4.25	235
L63×4	3.9	256
L63×5	4.81	208
L63×6	5.72	175
L70×4.5	4.87	205
L70×5	5.38	186
L70×6	6.39	156
L70×7	7.39	135

Section	Mass of 1 m, kg	Metres per tonne
L70×8	8.37	119
L75×5	5.8	172
L75×6	6.89	145
L75×7	7.96	126
L75×8	9.02	111
L75×9	10.07	99.3
L80×5.5	6.78	147
L80×6	7.36	136
L80×7	8.51	118
L80×8	9.65	104
L90×6	8.33	120
L90×7	9.64	104
L90×8	10.93	91.5
L90×9	12.2	82
L100×6.5	10.06	99.4
L100×7	10.79	92.7
L100×8	12.25	81.6
L100×10	15.1	66.2
L100×12	17.9	55.9
L100×14	20.63	48.5
L100×16	23.3	42.9
L110×7	11.89	84.1
L110×8	13.5	74.1
L125×8	15.46	64.7
L125×9	17.3	57.8
L125×10	19.1	52.4
L125×12	22.68	44.1
L125×14	26.2	38.2
L125×16	29.65	33.7
L140×9	19.41	51.5
L140×10	21.45	46.6
L140×12	25.5	39.2
L160×10	24.67	40.5
L160×11	27.02	37
L160×12	29.35	34.1
L160×14	34.2	29.2
L160×16	38.52	26
L160×18	43.01	23.3
L160×20	47.41	21.1
L180×11	30.47	32.8
L180×12	33.12	30.2
L200×12	36.97	27
L200×13	39.92	25.1
L200×14	42.8	23.4
L200×16	48.65	20.6
L200×20	60.08	16.6
L200×25	74.02	13.5
L200×30	87.56	11.4
L220×14	47.4	21.1
L220×16	53.83	18.6
L250×16	61.55	16.2
L250×18	68.86	14.5

Section	Mass of 1 m, kg	Metres per tonne
L250×20	76.11	13.1
L250×22	83.31	12
L250×25	93.97	10.6
L250×28	104.5	9.57
L250×30	111.44	8.97
L250×35	128.51	7.78

The mass of 1 m is calculated for a steel density of 7850 kg/m³. In the designation L b×t, b is the leg width and t the thickness, both in millimetres.

Section properties

The area and the moments of inertia and resistance are needed to check a member in tension, compression and buckling. The values are given for the sizes of DSTU 2251-2018.

The y–y and z–z axes are parallel to the legs and pass through the centroid, so they give the same result in the table (the Jy = Jz column). The principal axes u–u and v–v are turned 45° from the legs: the moment of inertia about u–u is the largest and about v–v the smallest. The radii r1 and r2 are the roundings inside the corner and at the leg edge, and y0 is the distance from the outer face of a leg to the centroid.

Hot-rolled equal-leg steel angles · ДСТУ 2251-2018

Section	b, mm	t, mm	r1, mm	r2, mm	A, cm ²	Mass of 1 m, kg	Metres per tonne	Jy = Jz, cm ⁴	Wy, cm ³	iy, mm	Ju, cm ⁴	iu, mm	Jv, cm ⁴	Wv, cm ³	iv, mm	Jyz, cm ⁴	y0, mm
L25×3	25	3	3.5	1.2	1.43	1.12	893	0.81	0.46	7.5	1.29	9.5	0.34	0.33	4.9	0.47	7.3
L25×4	25	4	3.5	1.2	1.86	1.46	685	1.03	0.59	7.4	1.62	9.3	0.44	0.41	4.8	0.59	7.6
L30×3	30	3	4	1.3	1.74	1.36	735	1.45	0.67	9.1	2.3	11.5	0.6	0.53	5.9	0.85	8.5
L30×4	30	4	4	1.3	2.27	1.78	562	1.84	0.87	9	2.92	11.3	0.77	0.61	5.8	1.08	8.9
L32×3	32	3	4.5	1.5	1.86	1.46	685	1.77	0.77	9.7	2.8	12.3	0.74	0.59	6.3	1.03	8.9
L32×4	32	4	4.5	1.5	2.43	1.91	524	2.26	1	9.6	3.58	12.1	0.94	0.71	6.2	1.32	9.4
L35×3	35	3	4.5	1.5	2.04	1.6	625	2.35	0.93	10.7	3.72	13.5	0.97	0.71	6.9	1.37	9.7
L35×4	35	4	4.5	1.5	2.67	2.1	476	3.01	1.21	10.6	4.76	13.3	1.25	0.88	6.8	1.75	10.1
L40×3	40	3	5	1.7	2.35	1.85	541	3.55	1.22	12.3	5.63	15.5	1.47	0.95	7.9	2.08	10.9
L40×4	40	4	5	1.7	3.08	2.42	413	4.58	1.6	12.2	7.26	15.3	1.9	1.19	7.8	2.68	11.3
L40×5	40	5	5	1.7	3.79	2.98	336	5.53	1.95	12.1	8.75	15.2	2.3	1.39	7.8	3.22	11.7
L45×4	45	4	5	1.7	3.48	2.73	366	6.63	2.04	13.8	10.5	17.4	2.74	1.54	8.9	3.89	12.6
L50×3	50	3	5.5	1.8	2.96	2.32	431	7.11	1.94	15.5	11.3	19.5	2.95	1.57	10	4.16	13.3
L50×4	50	4	5.5	1.8	3.89	3.05	328	9.21	2.54	15.4	14.6	19.4	3.8	1.95	9.9	5.42	13.8
L50×5	50	5	5.5	1.8	4.8	3.77	265	11.2	3.13	15.3	17.8	19.2	4.63	2.3	9.8	6.57	14.2
L63×5	63	5	7	2.3	6.13	4.81	208	23.1	5.05	19.4	36.8	24.4	9.52	3.87	12.5	13.7	17.4
L63×6	63	6	7	2.3	7.28	5.72	175	27.1	5.98	19.3	42.9	24.3	11.2	4.44	12.4	15.9	17.8
L75×5	75	5	9	3	7.39	5.8	172	39.5	7.21	23.1	62.7	29.1	16.4	5.74	14.9	23.1	20.2
L75×6	75	6	9	3	8.78	6.89	145	46.6	8.57	23	73.9	29	19.3	6.62	14.8	27.3	20.6
L75×8	75	8	9	3	11.5	9.02	111	59.8	11.2	22.8	94.9	28.7	24.8	8.16	14.7	35	21.5
L80×6	80	6	9	3	9.38	7.36	136	57	9.8	24.7	90.4	31.1	23.5	7.6	15.8	33.4	21.9
L80×7	80	7	9	3	10.85	8.51	118	65.3	11.3	24.5	104	30.9	27	8.55	15.8	38.3	22.3
L80×8	80	8	9	3	12.3	9.65	104	73.4	12.8	24.4	116	30.8	30.3	9.44	15.7	43	22.7
L90×6	90	6	10	3.3	10.61	8.33	120	82.1	12.5	27.8	130	35	34	9.88	17.9	48.1	24.3
L90×7	90	7	10	3.3	12.28	9.64	104	94.3	14.5	27.7	150	34.9	38.9	11.2	17.8	55.4	24.7
L90×8	90	8	10	3.3	13.93	10.93	91.5	106	16.4	27.6	168	34.8	43.8	12.3	17.7	62.3	25.1
L100×6.5	100	6.5	12	4	12.82	10.06	99.4	122	16.7	30.9	193	38.9	50.7	13.4	19.9	71.4	26.8
L100×7	100	7	12	4	13.75	10.79	92.7	131	17.9	30.8	207	38.8	54.2	14.1	19.8	76.4	27.1
L100×8	100	8	12	4	15.6	12.25	81.6	147	20.3	30.7	233	38.7	60.9	15.7	19.8	86.3	27.5
L100×10	100	10	12	4	19.24	15.1	66.2	179	25	30.5	284	38.4	74.1	18.5	19.6	110	28.3
L125×8	125	8	14	4.6	19.69	15.46	64.7	294	32.2	38.7	467	48.7	122	25.7	24.9	172	33.6
L125×9	125	9	14	4.6	22	17.3	57.8	327	36	38.6	520	48.6	136	28.3	24.8	192	34

Section	b, mm	t, mm	r1, mm	r2, mm	A, cm ²	Mass of 1 m, kg	Metres per tonne	Jy = Jz, cm ⁴	Wy, cm ³	iy, mm	Ju, cm ⁴	iu, mm	Jv, cm ⁴	Wv, cm ³	iv, mm	Jyz, cm ⁴	y0, mm
L125×10	125	10	14	4.6	24.33	19.1	52.4	360	39.7	38.5	571	48.4	149	30.5	24.7	211	34.5
L140×9	140	9	14	4.6	24.72	19.41	51.5	466	45.6	43.4	739	54.7	192	35.9	27.9	274	37.8
L140×10	140	10	14	4.6	27.33	21.45	46.6	512	50.3	43.3	814	54.6	211	39.1	27.8	301	38.2
L160×10	160	10	16	5.3	31.43	24.67	40.5	774	66.2	49.6	1229	62.5	319	52.5	31.9	455	43
L160×12	160	12	16	5.3	37.39	29.35	34.1	913	78.6	49.4	1450	62.3	376	60.5	31.7	537	43.9
L200×12	200	12	18	6	47.1	36.97	27	1823	125	62.2	2896	78.4	749	98.7	39.9	1073	53.7

A is the section area; Jy, Wy, iy are the moment of inertia, section modulus and radius of gyration about the y–y and z–z axes; Ju, iu and Jv, Wv, iv are the same about the principal axes u–u and v–v; Jyz is the product of inertia; y0 is the distance to the centroid.

Hole positions · Hot-rolled equal-leg steel angles

Section	a1, mm	d1 max, mm
L45×4	25	13
L50×3	30	15
L50×4	30	15
L50×5	30	15
L63×5	35	19
L63×6	35	19
L75×5	45	25
L75×6	45	25
L75×8	45	25
L80×6	45	25
L80×7	45	25
L80×8	45	25
L90×6	50	31
L90×7	50	31
L90×8	50	28
L100×6.5	60	31
L100×7	60	31
L100×8	60	31
L100×10	60	31
L125×8	75	31
L125×9	75	31
L125×10	75	31

a1 is the distance to the hole axis in the leg, d1 max is the largest hole diameter. The values are for reference.

How to get the mass of an angle from the table

The mass is the mass per metre times the length. An L63×5 angle weighs 4.81 kg/m, so a six-metre bar is about 28.9 kg, and a tonne of this angle is 208 m long. A heavier L200×12 (36.97 kg/m) gives about 27 m per tonne.

If you need a given quantity of angles, work out the metres and divide them by the "Metres per tonne" figure to get the mass in tonnes.

Where angles are used

An angle works in tension and compression, so it is used for bracing, the web members of trusses and lattice structures, posts and diagonals. It also serves for frame edging, seats under beams and brackets.

Lattice structures are assembled from angle sections, and the POLYGONAL company hot-dip galvanizes the finished products.

Calculator and ordering

The mass of any number of angles can be worked out in the rolled metal calculator. The general table of standards and the formulas are collected in the rolled metal handbook.

Angles within a structure: send a drawing or a specification. The POLYGONAL company produces steel structures to the customer's drawings, develops KM and KMD drawings and galvanizes the products.

Frequently asked questions

How much does a 50×5 angle weigh?

An L50×5 angle weighs 3.77 kg per metre. A six-metre bar is about 22.6 kg.

What does L63×5 mean?

It is an equal-leg angle with 63 mm legs and a thickness of 5 mm. The mass of 1 m is 4.81 kg.

How many metres of angle make a tonne?

Divide 1000 kg by the mass of 1 m. For L75×6 (6.89 kg/m) it is about 145 m.

What is y₀ in the angle table?

It is the distance from the outer face of a leg to the centroid of the section. For L63×5 it is 17.4 mm.

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