

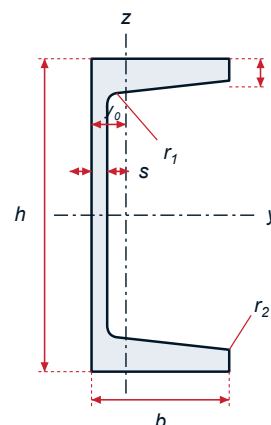
Channel Sections: Mass of 1 m, Dimensions and Section Properties

The tables list channels No. 5–40 of the U and P series: height, flange width, web and flange thickness and the mass of 1 m. For sizes 6.5U to 30U they add the section area, the moments of inertia and resistance, the radii of gyration, the centroid distance and the hole positions.

Channels No. 5–40: dimensions and mass of 1 m

The channel number equals its height in centimetres, so a No. 20 channel is 200 mm high. The letter "a" in the number, as in 16a, marks a profile of the same height with a wider flange.

The U and P series differ in the shape of the flanges. In the U series the inner flange faces are sloped, in the P series they are parallel. The table below gives the dimensions and the mass of 1 m for both series in a single row.



Channel section: dimensions and axes

Hot-rolled steel channels (U and P series) · ГОСТ 8240-89

Section	h, mm	b, mm	s, mm	t, mm	Mass of 1 m, kg	Metres per tonne
5	50	32	4.4	7	4.84	207
6,5	65	36	4.4	7.2	5.9	169
8	80	40	4.5	7.4	7.05	142
10	100	46	4.5	7.6	8.59	116
12	120	52	4.8	7.8	10.4	96.2
14	140	58	4.9	8.1	12.3	81.3
16	160	64	5	8.4	14.2	70.4
16a	160	68	5	9	15.3	65.4
18	180	70	5.1	8.7	16.3	61.3
18a	180	74	5.1	9.3	17.4	57.5
20	200	76	5.2	9	18.4	54.3
22	220	82	5.4	9.5	21	47.6
24	240	90	5.6	10	24	41.7
27	270	95	6	10.5	27.7	36.1
30	300	100	6.5	11	31.8	31.4
33	330	105	7	11.7	36.5	27.4
36	360	110	7.5	12.6	41.9	23.9
40	400	115	8	13.5	48.3	20.7
6,5	65	36	4.4	7.2	5.9	169

h is the height, b the flange width, s the web thickness and t the mean flange thickness, all in millimetres. The mass of 1 m assumes steel of 7850 kg/m³.

Section properties

To check a channel in bending or compression you need the section area and the moments of inertia and resistance. The values are given for the U series of the DSTU 3436-96 range, from 6.5U to 30U.

Look separately at y_0 . It is the distance from the web axis to the centroid of the section: a channel is not symmetrical, so its centroid sits toward the web, and this offset matters when the channel acts as a column or carries a load from the side.

Hot-rolled steel channels (U series) · ДСТУ 3436-96

Section	h, mm	b, mm	s, mm	t, mm	r1, mm	r2, mm	A, cm ²	Mass of 1 m, kg	Metres per tonne	Jy, cm ⁴	Wy, cm ³	iy, mm	Sy, cm ³	Jz, cm ⁴	Wz, cm ³	iz, mm	y0, mm
6.5U	65	36	4.4	7.2	6	2.5	7.51	5.9	169	48.6	15	25.4	9	8.7	3.68	10.8	12.4
8U	80	40	4.5	7.4	6.5	2.5	8.98	7.05	142	89.4	22.4	31.6	13.3	12.8	4.75	11.9	13.1
10U	100	46	4.5	7.6	7	3	10.9	8.59	116	174	34.8	39.9	20.4	20.4	6.46	13.7	14.4
14U	140	58	4.9	8.1	8	3	15.6	12.3	81.3	491	70.2	56	40.8	45.4	11	17	16.7
16U	160	64	5	8.4	8.5	3.5	18.1	14.2	70.4	747	93.4	64.2	54.1	63.3	13.8	18.7	18
18U	180	70	5.1	8.7	9	3.5	20.7	16.3	61.3	1090	121	72.4	69.8	86	17	20.4	19.4
20U	200	76	5.2	9	9.5	4	23.4	18.4	54.3	1520	152	80.7	87.8	113	20.5	22	20.7
22U	220	82	5.4	9.5	10	4	26.7	21	47.6	2110	192	88.9	110	151	25.1	23.7	22.1
24U	240	90	5.6	10	10.5	4	30.6	24	41.7	2900	242	97.3	139	208	31.6	26	24.2
27U	270	95	6	10.5	11	4.5	35.2	27.7	36.1	4160	308	109	178	262	37.3	27.3	24.7
30U	300	100	6.5	11	12	5	40.5	31.8	31.4	5810	387	120	224	327	43.6	28.4	25.2

A is the section area. About the y–y axis, parallel to the web: Jy is the moment of inertia, Wy the section modulus, iy the radius of gyration and Sy the first moment of half the section. Jz, Wz, iz are the same quantities about z–z. y0 is the distance from the web axis to the centroid.

Hole positions · Hot-rolled steel channels (U series)

Section	a1, mm	d1 max, mm	a2, mm	d2 max, mm
6.5U	20	11	32.5	11
8U	25	11	40	15
10U	30	13	33	11
14U	35	19	45	17
16U	40	19	50	19
18U	40	23	55	23
20U	45	25	60	25
22U	50	25	65	28
24U	50	28	65	25
27U	60	28	70	28
30U	60	31	70	28

Holes in the flange (a1, d1 max) and in the web (a2, d2 max): a is the distance to the hole axis, d max the largest diameter. Reference data.

How to get the mass of a channel from the table

The mass is the mass per metre times the length. A No. 20 channel weighs 18.4 kg/m, so a six-metre piece is 110 kg, and a tonne of this section is about 54 m long.

No. 30 has 31.8 kg per metre, so six metres give 191 kg. When you buy by weight, use the "Metres per tonne" column: divide the length by that number to get tonnes.

Where channels are used

A channel works well in bending in the plane of the web, so it is used for purlins and for frame and lintel beams. Two channels set flange to flange or back to back make a column. Channels also go into truss chords and into frames under equipment.

Calculator and ordering

Use the rolled metal calculator to weigh a whole batch of channels. The other sections are collected in the rolled metal handbook. If you need the channels as part of a structure, send a drawing or a specification: the POLYGONAL company makes steel structures to the customer's drawings and galvanizes the products.

Frequently asked questions

How much does a No. 10 channel weigh?

A No. 10 channel weighs 8.59 kg per metre. A six-metre piece is about 51.5 kg, and a tonne gives roughly 116 m.

What does the channel number mean?

The height of the profile in centimetres, so No. 24 is 240 mm high. An "a" after the number means a wider flange than the base profile of that size.

How does a U-series channel differ from a P-series one?

In the U series the inner flange faces are sloped, in the P series they are parallel. The table gives the dimensions and the mass of 1 m for both series together.

How do I find how many metres of channel make a tonne?

Divide 1000 kg by the mass of 1 m. For a No. 16 channel (14.2 kg/m) it is about 70 m.

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