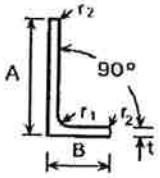
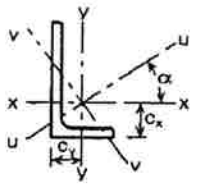
UNEQUAL ANGLES



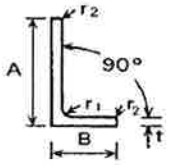


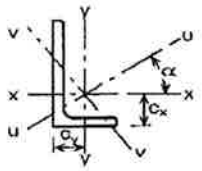
DIMENSIONS AND PROPERTIES

Section Designation		Mass per Metre	Radius		Dimension		Second Moment of Area				Radius of Gyration			
Size A × B mm	Thickness t mm	kg/m	Root r_1 mm	Toe r_2 mm	c_x cm	c_y cm	Axis x-x cm^4	Axis y-y cm^4	Axis u-u cm^4	Axis v-v cm^4	Axis x-x cm	Axis y-y cm	Axis u-u cm	Axis v-v cm
200 × 150	18 #	47.1	15.0	7.50	6.34	3.86	2390	1160	2920	623	6.30	4.38	6.97	3.22
	15	39.6	15.0	7.50	6.21	3.73	2020	979	2480	526	6.33	4.40	7.00	3.23
	12	32.0	15.0	7.50	6.08	3.61	1650	803	2030	430	6.36	4.44	7.04	3.25
200 × 100	15	33.8	15.0	7.50	7.16	2.22	1760	299	1860	193	6.40	2.64	6.59	2.12
	12	27.3	15.0	7.50	7.03	2.10	1440	247	1530	159	6.43	2.67	6.63	2.14
	10	23.0	15.0	7.50	6.93	2.01	1220	210	1290	135	6.46	2.68	6.65	2.15
150 × 90	15	33.9	12.0	6.00	5.21	2.23	761	205	841	126	4.74	2.46	4.98	1.93
	12	21.6	12.0	6.00	5.08	2.12	627	171	694	104	4.77	2.49	5.02	1.94
	10	18.2	12.0	6.00	5.00	2.04	533	146	591	88.3	4.80	2.51	5.05	1.95
150 × 75	15	24.8	12.0	6.00	5.52	1.81	713	119	753	78.6	4.75	1.94	4.88	1.58
	12	20.2	12.0	6.00	5.40	1.69	588	99.6	623	64.7	4.78	1.97	4.92	1.59
	10	17.0	12.0	6.00	5.31	1.61	501	85.6	531	55.1	4.81	1.99	4.95	1.60
125 × 75	12	17.8	11.0	5.50	4.31	1.84	354	95.5	391	58.5	3.95	2.05	4.15	1.61
	10	15.0	11.0	5.50	4.23	1.76	302	82.1	334	49.9	3.97	2.07	4.18	1.61
	8	12.2	11.0	5.50	4.14	1.68	247	67.6	274	40.9	4.00	2.09	4.21	1.63
100 × 75	12	15.4	10.0	5.00	3.27	2.03	189	90.2	230	49.5	3.10	2.14	3.42	1.59
	10	13.0	10.0	5.00	3.19	1.95	162	77.6	197	42.2	3.12	2.16	3.45	1.59
	8	10.6	10.0	5.00	3.10	1.87	133	64.1	162	34.6	3.14	2.18	3.47	1.60
100 × 65	10 #	12.3	10.0	5.00	3.36	1.63	154	51.0	175	30.1	3.14	1.81	3.35	1.39
	8 #	9.94	10.0	5.00	3.27	1.55	127	42.2	144	24.8	3.16	1.83	3.37	1.40
	7 #	8.77	10.0	5.00	3.23	1.51	113	37.6	128	22.0	3.17	1.83	3.39	1.40
100 × 50	8 ‡	8.97	8.00	4.00	3.60	1.13	116	19.7	123	12.8	3.19	1.31	3.28	1.06
	6 ‡	6.84	8.00	4.00	3.51	1.05	89.9	15.4	95.4	9.92	3.21	1.33	3.31	1.07
80 × 60	7 ‡	7.36	8.00	4.00	2.51	1.52	59.0	28.4	72.0	15.4	2.51	1.74	2.77	1.28
80 × 40	8 ‡	7.07	7.00	3.50	2.94	0.963	57.6	9.61	60.9	6.34	2.53	1.03	2.60	0.838
	6 ‡	5.41	7.00	3.50	2.85	0.884	44.9	7.59	47.6	4.93	2.55	1.05	2.63	0.845
75 × 50	8 ‡	7.39	7.00	3.50	2.52	1.29	52.0	18.4	59.6	10.8	2.35	1.40	2.52	1.07
	6 ‡	5.65	7.00	3.50	2.44	1.21	40.5	14.4	46.6	8.36	2.37	1.42	2.55	1.08
70 × 50	6 ‡	5.41	7.00	3.50	2.23	1.25	33.4	14.2	39.7	7.92	2.20	1.43	2.40	1.07
65 × 50	5 ‡	4.35	6.00	3.00	1.99	1.25	23.2	11.9	28.8	6.32	2.05	1.47	2.28	1.07
60 × 40	6 ‡	4.46	6.00	3.00	2.00	1.01	20.1	7.12	23.1	4.16	1.88	1.12	2.02	0.855
	5 ‡	3.76	6.00	3.00	1.96	0.972	17.2	6.11	19.7	3.54	1.89	1.13	2.03	0.860
60 × 30	5 ‡	3.36	5.00	2.50	2.17	0.684	15.6	2.63	16.5	1.71	1.91	0.784	1.97	0.633
50 × 30	5 ‡	2.96	5.00	2.50	1.73	0.741	9.36	2.51	10.3	1.54	1.57	0.816	1.65	0.639
45 × 30	4 ‡	2.25	4.50	2.25	1.48	0.740	5.78	2.05	6.65	1.18	1.42	0.850	1.52	0.640
40 × 25	4 ‡	1.93	4.00	2.00	1.36	0.623	3.89	1.16	4.35	0.700	1.26	0.687	1.33	0.534
40 × 20	4 ‡	1.77	4.00	2.00	1.47	0.480	3.59	0.600	3.80	0.393	1.26	0.514	1.30	0.417
30 × 20	4 ‡	1.46	4.00	2.00	1.03	0.541	1.59	0.553	1.81	0.330	0.925	0.546	0.988	0.421
	3 ‡	1.12	4.00	2.00	0.990	0.502	1.25	0.437	1.43	0.256	0.935	0.553	1.00	0.424

‡ Not available from some leading producers. Check availability.
# Check availability.
c_x is the distance from the back of the short leg to the centre of gravity.
c_y is the distance from the back of the long leg to the centre of gravity.

UNEQUAL ANGLES



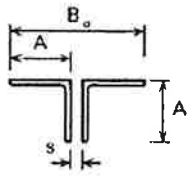


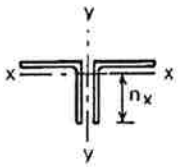
DIMENSIONS AND PROPERTIES (CONTINUED)

Section Designation		Elastic Modulus		Angle Axis x-x to Axis u-u	Torsional Constant	Equivalent Slenderness Coefficient		Mono-symmetry Index	Area of Section
Size A × B mm	Thickness t mm	Axis x-x cm^3	Axis y-y cm^3	Tan α	J cm^4	Min ϕ_a	Max ϕ_a	ψ_a	cm^2
200 × 150	18 #	175	104	0.549	67.9	2.93	3.72	4.60	60.1
	15	147	86.9	0.551	39.9	3.53	4.50	5.55	50.5
	12	119	70.5	0.552	20.9	4.43	5.70	6.97	40.8
200 × 100	15	137	38.5	0.260	34.3	3.54	5.17	9.19	43.0
	12	111	31.3	0.262	18.0	4.42	6.57	11.5	34.8
	10	93.2	26.3	0.263	10.66	5.26	7.92	13.9	29.2
150 × 90	15	77.7	30.4	0.354	26.8	2.58	3.59	5.96	33.9
	12	63.3	24.8	0.358	14.1	3.24	4.58	7.50	27.5
	10	53.3	21.0	0.360	8.30	3.89	5.56	9.03	23.2
150 × 75	15	75.2	21.0	0.253	25.1	2.62	3.74	6.84	31.7
	12	61.3	17.1	0.258	13.2	3.30	4.79	8.60	25.7
	10	51.6	14.5	0.261	7.80	3.95	5.83	10.4	21.7
125 × 75	12	43.2	16.9	0.354	11.6	2.66	3.73	6.23	22.7
	10	36.5	14.3	0.357	6.87	3.21	4.55	7.50	19.1
	8	29.6	11.6	0.360	3.62	4.00	5.75	9.43	15.5
100 × 75	12	28.0	16.5	0.540	10.05	2.10	2.64	3.46	19.7
	10	23.8	14.0	0.544	5.95	2.54	3.22	4.17	16.6
	8	19.3	11.4	0.547	3.13	3.18	4.08	5.24	13.5
100 × 65	10 #	23.2	10.5	0.410	5.61	2.52	3.43	5.45	15.6
	8 #	18.9	8.54	0.413	2.96	3.14	4.35	6.86	12.7
	7 #	16.6	7.53	0.415	2.02	3.58	5.00	7.85	11.2
100 × 50	8 ‡	18.2	5.08	0.258	2.61	3.30	4.80	8.61	11.4
	6 ‡	13.8	3.89	0.262	1.14	4.38	6.52	11.6	8.71
80 × 60	7 ‡	10.7	6.34	0.546	1.66	2.92	3.72	4.78	9.38
80 × 40	8 ‡	11.4	3.16	0.253	2.05	2.61	3.73	6.85	9.01
	6 ‡	8.73	2.44	0.258	0.899	3.48	5.12	9.22	6.89
75 × 50	8 ‡	10.4	4.95	0.430	2.14	2.36	3.18	4.92	9.41
	6 ‡	8.01	3.81	0.435	0.935	3.18	4.34	6.60	7.19
70 × 50	6 ‡	7.01	3.78	0.500	0.899	2.96	3.89	5.44	6.89
65 × 50	5 ‡	5.14	3.19	0.577	0.498	3.38	4.26	5.08	5.54
60 × 40	6 ‡	5.03	2.38	0.431	0.735	2.51	3.39	5.26	5.68
	5 ‡	4.25	2.02	0.434	0.435	3.02	4.11	6.34	4.79
60 × 30	5 ‡	4.07	1.14	0.257	0.382	3.15	4.56	8.26	4.28
50 × 30	5 ‡	2.86	1.11	0.352	0.340	2.51	3.52	5.99	3.78
45 × 30	4 ‡	1.91	0.910	0.436	0.166	2.85	3.87	5.92	2.87
40 × 25	4 ‡	1.47	0.619	0.380	0.142	2.51	3.48	5.75	2.46
40 × 20	4 ‡	1.42	0.393	0.252	0.131	2.57	3.68	6.86	2.26
30 × 20	4 ‡	0.807	0.379	0.421	0.1096	1.79	2.39	3.95	1.86
	3 ‡	0.621	0.292	0.427	0.0486	2.40	3.28	5.31	1.43

‡ Not available from some leading producers. Check availability.
# Check availability.

EQUAL ANGLES BACK TO BACK



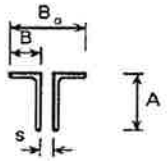


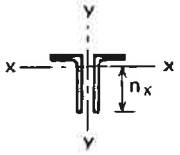
DIMENSIONS AND PROPERTIES

Composed of Two Angles		Total Mass per Metre	Distance	Total Area	Properties about Axis x-x			Radius of Gyration r_y about Axis y-y (cm)				
								Space between angles, s, (mm)				
A × A mm	t mm	kg/m	n_x cm	cm^2	I_x cm^4	r_x cm	Z_x cm^3	0	8	10	12	15
200 × 200	24 #	142	14.2	181	6660	6.06	470	8.42	8.70	8.77	8.84	8.95
	20	120	14.3	153	5700	6.11	398	8.34	8.62	8.69	8.76	8.87
	18	109	14.4	138	5200	6.13	362	8.31	8.58	8.65	8.72	8.83
	16	97.0	14.5	124	4680	6.16	324	8.27	8.54	8.61	8.68	8.79
150 × 150	18 #	80.2	10.6	102	2120	4.55	200	6.32	6.60	6.67	6.75	6.86
	15	67.6	10.8	86.0	1800	4.57	167	6.24	6.52	6.59	6.66	6.77
	12	54.6	10.9	69.6	1470	4.60	135	6.18	6.45	6.52	6.59	6.70
	10	46.0	11.0	58.6	1250	4.62	114	6.13	6.40	6.47	6.54	6.64
120 × 120	15 #	53.2	8.48	68.0	896	3.63	106	5.06	5.34	5.42	5.49	5.60
	12	43.2	8.60	55.0	736	3.65	85.4	4.99	5.27	5.35	5.42	5.53
	10	36.4	8.69	46.4	626	3.67	72.0	4.94	5.22	5.29	5.36	5.47
	8 #	29.4	8.76	37.6	518	3.71	59.0	4.93	5.20	5.27	5.34	5.45
100 × 100	15 #	43.8	6.98	56.0	500	2.99	71.6	4.25	4.54	4.62	4.69	4.81
	12	35.6	7.10	45.4	414	3.02	58.2	4.19	4.47	4.55	4.62	4.74
	10	30.0	7.18	38.4	354	3.04	49.2	4.14	4.43	4.50	4.57	4.69
	8	24.4	7.26	31.0	290	3.06	39.8	4.11	4.38	4.46	4.53	4.64
90 × 90	12 #	31.8	6.34	40.6	298	2.71	47.0	3.80	4.09	4.16	4.24	4.36
	10	26.8	6.42	34.2	254	2.72	39.6	3.75	4.04	4.11	4.19	4.30
	8	21.8	6.50	27.8	208	2.74	32.2	3.71	3.99	4.06	4.13	4.25
	7 #	19.2	6.55	24.4	185	2.75	28.2	3.69	3.96	4.04	4.11	4.22
80 × 80	10 ‡	23.8	5.66	30.2	175	2.41	30.8	3.36	3.65	3.72	3.80	3.92
	8 ‡	19.3	5.74	24.6	144	2.43	25.2	3.31	3.60	3.67	3.75	3.86
75 × 75	8 ‡	18.0	5.36	22.8	118	2.27	22.0	3.12	3.41	3.49	3.56	3.68
	6 ‡	13.7	5.45	17.5	91.6	2.29	16.8	3.07	3.35	3.43	3.50	3.62
70 × 70	7 ‡	14.8	5.03	18.8	84.6	2.12	16.8	2.89	3.18	3.26	3.33	3.45
	6 ‡	12.8	5.07	16.3	73.8	2.13	14.5	2.87	3.16	3.23	3.31	3.42
65 × 65	7 ‡	13.7	4.45	17.5	66.8	1.96	14.4	2.83	3.14	3.21	3.29	3.42
60 × 60	8 ‡	14.2	4.23	18.1	58.4	1.80	13.8	2.52	2.82	2.90	2.97	3.10
	6 ‡	10.8	4.31	13.8	45.6	1.82	10.6	2.48	2.77	2.85	2.92	3.04
	5 ‡	9.14	4.36	11.6	38.8	1.82	8.90	2.45	2.74	2.81	2.89	3.01
50 × 50	6 ‡	8.94	3.55	11.4	25.6	1.50	7.22	2.09	2.38	2.46	2.54	2.66
	5 ‡	7.54	3.60	9.60	22.0	1.51	6.10	2.06	2.35	2.43	2.51	2.63
	4 ‡	6.12	3.64	7.78	17.9	1.52	4.92	2.04	2.32	2.40	2.48	2.60

‡ Not available from some leading producers. Check availability.
# Check availability.
Properties about y-y axis:
I_y = (Total Area) · $(r_y)^2$
$Z_y = I_y/(0.5B_o)$

UNEQUAL ANGLES LONG LEGS BACK TO BACK





DIMENSIONS AND PROPERTIES

Composed of Two Angles		Total Mass per Metre	Distance	Total Area	Properties about Axis x-x			Radius of Gyration r_y about Axis y-y (cm)				
								Space between angles, s, (mm)				
A × B mm	t mm	kg/m	n_x cm	cm²	I_x cm⁴	r_x cm	Z_x cm³	0	8	10	12	15
200 × 150	18 #	94.2	13.7	120	4780	6.30	350	5.84	6.11	6.18	6.25	6.36
	15	79.2	13.8	101	4040	6.33	294	5.77	6.04	6.11	6.18	6.28
	12	64.0	13.9	81.6	3300	6.36	238	5.72	5.98	6.05	6.12	6.22
200 × 100	15	67.5	12.8	86.0	3520	6.40	274	3.45	3.72	3.79	3.86	3.97
	12	54.6	13.0	69.6	2880	6.43	222	3.39	3.65	3.72	3.79	3.90
	10	46.0	13.1	58.4	2440	6.46	186	3.35	3.61	3.67	3.74	3.85
150 × 90	15	53.2	9.79	67.8	1522	4.74	155	3.32	3.60	3.67	3.75	3.86
	12	43.2	9.92	55.0	1250	4.77	127	3.27	3.55	3.62	3.69	3.80
	10	36.4	10.0	46.4	1070	4.80	107	3.23	3.50	3.57	3.64	3.75
150 × 75	15	49.6	9.48	63.4	1430	4.75	150	2.65	2.94	3.01	3.09	3.21
	12	40.4	9.60	51.4	1180	4.78	123	2.59	2.87	2.94	3.02	3.14
	10	34.0	9.69	43.4	1000	4.81	103	2.56	2.83	2.90	2.97	3.08
125 × 75	12	35.6	8.19	45.4	708	3.95	86.4	2.76	3.04	3.11	3.19	3.30
	10	30.0	8.27	38.2	604	3.97	73.0	2.72	2.99	3.07	3.14	3.26
	8	24.4	8.36	31.0	494	4.00	59.2	2.68	2.95	3.02	3.09	3.20
100 × 75	12	30.8	6.73	39.4	378	3.10	56.0	2.95	3.24	3.31	3.39	3.51
	10	26.0	6.81	33.2	324	3.12	47.6	2.91	3.19	3.27	3.34	3.46
	8	21.2	6.90	27.0	266	3.14	38.6	2.87	3.15	3.22	3.29	3.41
100 × 65	10 #	24.6	6.64	31.2	308	3.14	46.4	2.43	2.72	2.79	2.87	2.99
	8 #	19.9	6.73	25.4	254	3.16	37.8	2.39	2.67	2.74	2.82	2.93
	7 #	17.5	6.77	22.4	226	3.17	33.2	2.37	2.65	2.72	2.79	2.91
100 × 50	8 ‡	17.9	6.40	22.8	232	3.19	36.4	1.73	2.02	2.09	2.17	2.29
	6 ‡	13.7	6.49	17.4	180	3.21	27.6	1.69	1.97	2.04	2.12	2.24
80 × 60	7 ‡	14.7	5.49	18.8	118	2.51	21.4	2.31	2.59	2.67	2.74	2.86
80 × 40	8 ‡	14.1	5.06	18.0	115	2.53	22.8	1.41	1.71	1.79	1.87	2.00
	6 ‡	10.8	5.15	13.8	89.8	2.55	17.5	1.37	1.66	1.74	1.82	1.97
75 × 50	8 ‡	14.8	4.98	18.8	104	2.35	20.8	1.90	2.19	2.27	2.35	2.47
	6 ‡	11.3	5.06	14.4	81.0	2.37	16.0	1.86	2.14	2.22	2.30	2.42
70 × 50	6 ‡	10.8	4.77	13.8	66.8	2.20	14.0	1.90	2.19	2.26	2.34	2.46
65 × 50	5 ‡	8.70	4.51	11.1	46.4	2.05	10.3	1.93	2.21	2.28	2.36	2.48
60 × 40	6 ‡	8.92	4.00	11.4	40.2	1.88	10.1	1.51	1.80	1.88	1.96	2.09
	5 ‡	7.52	4.04	9.58	34.4	1.89	8.50	1.49	1.78	1.86	1.94	2.06

‡ Not available from some leading producers. Check availability.
# Check availability.
Properties about y-y axis:
I_y = (Total Area) · $(r_y)^2$
$Z_y = I_y/(0.5B_o)$