INTERNATIONAL STANDARD

**ISO
657-2**

First edition
1989-08-01

Hot-rolled steel sections —

Part 2 :
Unequal-leg angles — Dimensions

Profilés en acier laminés à chaud —

Partie 2: Cornières à ailes inégales — Dimensions

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council. They are approved in accordance with ISO procedures requiring at least 75 % approval by the member bodies voting.

International Standard ISO 657-2 was prepared by Technical Committee ISO/TC 17, *Steel*.

It cancels and replaces ISO Recommendation R 657-2 : 1968, of which it constitutes a technical revision.

ISO 657 consists of the following parts, under the general title *Hot-rolled steel sections* :

— *Part 1: Equal-leg angles — Dimensions*

— *Part 2: Unequal-leg angles — Dimensions*

— *Part 5: Equal-leg angles and unequal-leg angles — Tolerances for metric and inch series*

— *Part 6: Parallel flange sections (metric series) — Dimensions*

— *Part 10: Parallel flange sections — Tolerances*

— *Part 11: Sloping flange channel sections (metric series) — Dimensions and sectional properties*

— *Part 13: Tolerances on sloping flange beam, column and channel sections*

— *Part 15: Sloping flange beam sections (metric series) — Dimensions and sectional properties*

— *Part 16: Sloping flange column sections (metric series) — Dimensions and sectional properties*

— *Part 18: L sections for shipbuilding (metric series) — Dimensions, sectional properties and tolerances*

— *Part 19: Bulb flats (metric series) — Dimensions, sectional properties and tolerances*

— *Part 20: Parallel flange channel sections — Dimensions*

— *Part 21: T-sections with equal depth and flange width — Dimensions*

Hot-rolled steel sections —

Part 2 :
Unequal-leg angles — Dimensions

1 Scope

This part of ISO 657 specifies dimensions of hot-rolled unequal-leg angles.

2 Normative reference

The following standard contains provisions which, through reference in this text, constitute provisions of this part of ISO 657. At the time of publication, the edition indicated was valid. All standards are subject to revision, and parties to agreements based on this part of ISO 657 are encouraged to investigate the possibility of applying the most recent edition of the standard indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 657-5 : 1976, *Hot-rolled steel sections — Part 5 : Equal-leg angles and unequal-leg angles — Tolerances for metric and inch series.*

3 Dimensions

3.1 The dimensions of unequal-leg angles are given in table 1. Preferred dimensions are given in bold type.

3.2 The root radii given in table 1 are for information only.

3.3 The toe radius has not been specified and may, if considered necessary, be determined independently for national standards.

4 Sectional properties

The mass, sectional area and sectional properties of unequal-leg angles are given for information in table 1. They have been calculated assuming a toe radius equal to half the root radius.

5 Dimensional tolerances

Tolerances on the dimensions specified in table 1 are covered in ISO 657-5.
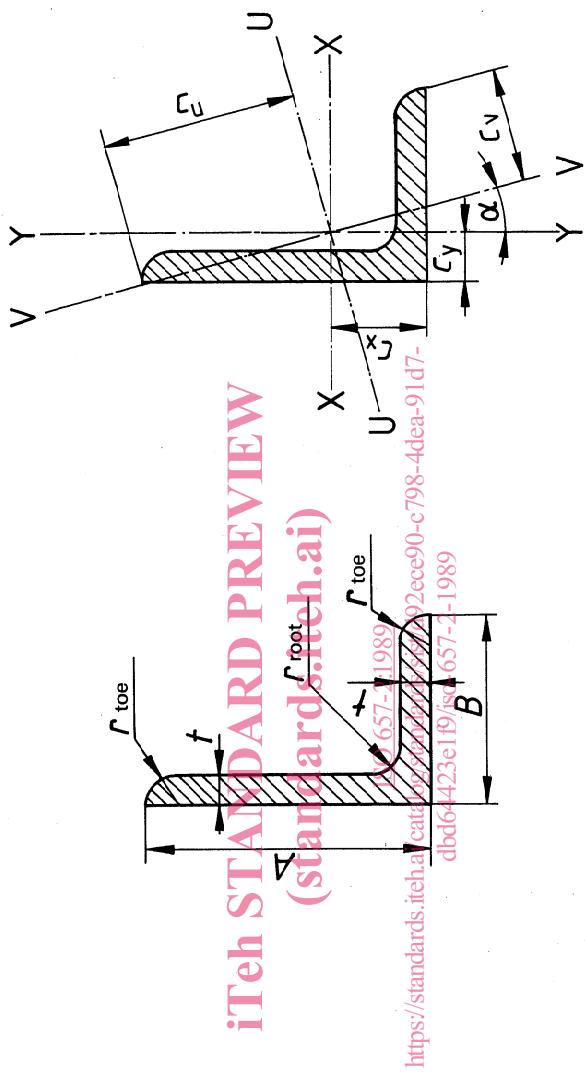
Table 1 — Dimensions and sectional properties of hot-rolled unequal-leg angles

Designation	Mass	Sectional area	Dimensions				Distances of centre of gravity				Sectional properties about axes										Incli-nation of V-V axis
			A	B	l	r_root	c_x	c_y	c_u	c_v	X-X			Y-Y			U-U		V-V		tan α
	kg/m	cm²	mm	mm	mm	mm	cm	cm	cm	cm	I_x cm⁴	r_x cm	Z_x cm³	I_y cm⁴	r_y cm	Z_y cm³	I_u cm⁴	r_u cm	I_v cm⁴	r_v cm	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
30 × 20 × 3	1,12	1,43	30	20	3	4	0,990	0,502	2,05	1,04	1,25	0,935	0,621	0,437	0,553	0,292	1,43	1,00	0,256	0,424	0,427
30 × 20 × 4	1,46	1,86	30	20	4	4	1,03	0,541	2,02	1,04	1,59	0,925	0,807	0,553	0,546	0,379	1,81	0,988	0,330	0,421	0,421
40 × 20 × 4	1,77	2,26	40	20	4	4	1,47	0,48	2,58	1,17	3,59	1,26	1,42	0,600	0,514	0,393	3,80	1,30	0,393	0,417	0,252
40 × 25 × 4	1,93	2,46	40	25	4	4	1,36	0,623	2,69	1,35	3,89	1,26	1,47	1,16	0,687	0,619	4,35	1,33	0,700	0,534	0,380
45 × 30 × 5	2,76	3,52	45	30	5	4	1,52	0,779	3,04	1,58	6,98	1,41	2,35	2,47	0,837	1,11	8,00	1,51	1,45	0,641	0,429
50 × 30 × 4	2,41	3,07	50	30	4	5	1,68	0,701	3,36	1,67	7,71	1,59	2,33	2,09	0,825	0,907	8,53	1,67	1,27	0,644	0,356
50 × 30 × 5	2,96	3,78	50	30	5	5	1,73	0,741	3,33	1,65	9,36	1,57	2,86	2,51	0,816	1,11	10,3	1,65	1,54	0,639	0,352
50 × 40 × 5	3,36	4,28	50	40	5	5	1,55	1,06	3,49	1,85	10,3	1,55	3,00	5,85	1,17	1,99	13,2	1,75	3,03	0,842	0,621
60 × 30 × 5	3,36	4,28	60	30	5	5	2,17	0,684	3,88	1,77	15,6	1,91	4,07	2,63	0,784	1,14	16,5	1,97	1,71	0,633	0,257
60 × 30 × 6	3,98	5,07	60	30	6	5	2,21	0,723	3,85	1,76	18,2	1,90	4,81	3,05	0,776	1,34	19,3	1,95	2,01	0,630	0,253

Table 1 — Dimensions and sectional properties of hot-rolled unequal-leg angles (continued)

Designation	Mass	Sectional area	Dimensions				Distances of centre of gravity				Sectional properties about axes										Inclination of V-V axis
			A	B	t	r_{root}	c_x	c_y	c_u	c_v	X-X			Y-Y			U-U		V-V		$\tan\alpha$
											I_x	r_x	Z_x	I_y	r_y	Z_y	I_u	r_u	I_v	r_v	
	kg/m	cm²	mm	mm	mm	mm	cm	cm	cm	cm	cm⁴	cm	cm³	cm⁴	cm	cm³	cm⁴	cm	cm⁴	cm	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
60 × 40 × 5	3,76	4,79	60	40	5	6	1,96	0,972	4,10	2,11	17,2	1,89	4,25	6,11	1,13	2,02	19,7	2,03	3,54	0,86	0,434
60 × 40 × 6	4,46	5,68	60	40	6	6	2,00	1,01	4,08	2,10	20,1	1,88	5,03	7,12	1,12	2,38	23,1	2,02	4,16	0,855	0,431
60 × 50 × 6	4,93	6,28	60	50	6	6	1,84	1,34	4,20	2,22	21,7	1,86	5,22	13,7	1,47	3,73	28,5	2,13	6,84	1,04	0,677
60 × 50 × 8	6,44	8,20	60	50	8	6	1,91	1,42	4,18	2,24	27,7	1,84	6,77	17,3	1,45	4,84	36,2	2,10	8,81	1,04	0,672
65 × 50 × 5	4,35	5,54	65	50	5	6	1,99	1,25	4,53	2,39	23,2	2,05	5,14	11,9	1,47	3,19	28,8	2,28	6,32	1,07	0,577
65 × 50 × 6	5,16	6,58	65	50	6	6	2,04	1,29	4,52	2,39	27,2	2,03	6,10	14,0	1,46	3,77	33,8	2,27	7,43	1,06	0,575
65 × 50 × 8	6,75	8,60	65	50	8	6	2,12	1,37	4,49	2,39	34,8	2,01	7,93	17,7	1,44	4,89	43,0	2,23	9,57	1,05	0,569
70 × 50 × 6	5,41	6,89	70	50	6	7	2,23	1,25	4,83	2,52	33,4	2,20	7,01	14,2	1,43	3,78	39,7	2,40	7,92	1,07	0,500
70 × 50 × 7	6,25	7,96	70	50	7	7	2,27	1,29	4,81	2,52	38,2	2,19	8,08	16,0	1,42	4,35	45,3	2,39	9,06	1,07	0,493
75 × 50 × 6	5,65	7,19	75	50	6	7	2,44	1,21	5,12	2,64	40,5	2,37	8,01	14,4	1,42	3,81	46,6	2,55	8,36	1,08	0,435
75 × 50 × 8	7,39	9,41	75	50	8	7	2,52	1,29	5,08	2,62	52,0	2,35	10,4	18,4	1,40	4,95	59,6	2,52	10,8	1,07	0,430
80 × 40 × 6	5,41	6,89	80	40	6	7	2,85	0,884	5,20	2,38	44,9	2,55	8,73	7,59	1,05	2,44	47,6	2,63	4,93	0,845	0,258
80 × 40 × 8	7,07	9,01	80	40	8	7	2,94	0,963	5,14	2,34	57,6	2,53	11,4	9,61	1,03	3,16	60,9	2,60	6,34	0,838	0,253
80 × 60 × 6	6,37	8,11	80	60	6	8	2,47	1,48	5,57	2,92	51,4	2,52	9,29	24,8	1,75	5,49	62,8	2,78	13,4	1,29	0,547
80 × 60 × 7	7,36	9,38	80	60	7	8	2,51	1,52	5,55	2,92	59,0	2,51	10,7	28,4	1,74	6,34	72,0	2,77	15,4	1,28	0,546
80 × 60 × 8	8,34	10,6	80	60	8	8	2,55	1,56	5,53	2,92	66,3	2,50	12,2	31,8	1,73	7,16	80,8	2,76	17,3	1,27	0,544
90 × 60 × 8	8,97	11,4	90	60	8	8	2,96	1,48	6,13	3,16	92,3	2,84	15,3	32,8	1,70	7,27	106	3,05	19,0	1,29	0,434
90 × 65 × 6	7,07	9,01	90	65	6	8	2,79	1,56	6,24	3,27	73,4	2,85	11,8	32,3	1,89	6,53	87,9	3,12	17,8	1,41	0,510
90 × 65 × 8	9,29	11,8	90	65	8	8	2,88	1,64	6,20	3,26	94,9	2,83	15,5	41,5	1,87	8,54	113	3,10	23,0	1,39	0,507
90 × 75 × 8	9,91	12,6	90	75	8	8	2,72	1,98	6,31	3,35	99,5	2,81	15,8	62,7	2,23	11,4	131	3,22	31,2	1,57	0,679
90 × 75 × 10	12,2	15,6	90	75	10	8	2,80	2,06	6,29	3,35	121	2,79	19,5	75,8	2,21	13,9	159	3,19	38,1	1,56	0,676
90 × 75 × 13	15,6	19,8	90	75	13	8	2,91	2,17	6,26	3,38	150	2,75	24,6	93,7	2,17	17,6	196	3,14	47,9	1,55	0,670
100 × 50 × 6	6,84	8,71	100	50	6	8	3,51	1,05	6,55	3,00	89,9	3,21	13,8	15,4	1,33	3,89	95,4	3,31	9,92	1,07	0,262
100 × 50 × 8	8,97	11,4	100	50	8	8	3,60	1,13	6,48	2,96	116	3,19	18,2	19,7	1,31	5,08	123	3,28	12,8	1,06	0,258
100 × 50 × 10	11,0	14,1	100	50	10	8	3,68	1,21	6,42	2,93	141	3,16	22,3	23,6	1,29	6,21	149	3,25	15,5	1,05	0,253
100 × 65 × 7	8,77	11,2	100	65	7	10	3,23	1,51	6,83	3,49	113	3,17	16,6	37,6	1,83	7,53	128	3,39	22,0	1,40	0,415
100 × 65 × 8	9,94	12,7	100	65	8	10	3,27	1,55	6,81	3,47	127	3,16	18,9	42,2	1,83	8,54	144	3,37	24,8	1,40	0,413
100 × 65 × 10	12,3	15,6	100	65	10	10	3,36	1,63	6,76	3,45	154	3,14	23,2	51,0	1,81	10,5	175	3,35	30,1	1,39	0,410
100 × 75 × 8	10,6	13,5	100	75	8	10	3,10	1,87	6,95	3,65	133	3,14	19,3	64,1	2,18	11,4	162	3,47	34,6	1,60	0,547
100 × 75 × 10	13,0	16,6	100	75	10	10	3,19	1,95	6,92	3,65	162	3,12	23,8	77,6	2,16	14,0	197	3,45	42,2	1,59	0,544
100 × 75 × 12	15,4	19,7	100	75	12	10	3,27	2,03	6,89	3,65	189	3,10	28,0	90,2	2,14	16,5	230	3,42	49,5	1,59	0,540

Table 1 — Dimensions and sectional properties of hot-rolled unequal-leg angles (concluded)

Designation	Mass	Sectional area	Dimensions				Distances of centre of gravity				Sectional properties about axes										Inclination of V-V axis
			A	B	t	r_root	c_x	c_y	c_u	c_v	X-X			Y-Y			U-U		V-V		tan α
											I_x	r_x	Z_x	I_y	r_y	Z_y	I_u	r_u	I_v	r_v	
	kg/m	cm²	mm	mm	mm	mm	cm	cm	cm	cm	cm⁴	cm	cm³	cm⁴	cm	cm³	cm⁴	cm	cm⁴	cm	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
100×90×10	14,2	18,1	100	90	10	10	2,96	2,47	7,04	3,68	172	3,08	24,4	132	2,69	20,1	242	3,66	61,2	1,84	0,797
100×90×13	18,1	23,1	100	90	13	10	3,08	2,59	7,03	3,71	215	3,05	31,0	164	2,66	25,5	301	3,61	77,1	1,83	0,794
120×80×8	12,2	15,5	120	80	8	11	3,83	1,87	8,23	4,23	226	3,82	27,6	80,8	2,28	13,2	260	4,10	46,6	1,74	0,437
120×80×10	15,0	19,1	120	80	10	11	3,92	1,95	8,19	4,21	276	3,80	34,1	98,1	2,26	16,2	317	4,07	56,8	1,72	0,435
120×80×12	17,8	22,7	120	80	12	11	4,00	2,03	8,15	4,20	323	3,77	40,4	114	2,24	19,1	371	4,04	66,7	1,71	0,431
125×75×8	12,2	15,5	125	75	8	11	4,14	1,68	8,44	4,20	247	4,00	29,6	67,6	2,09	11,6	274	4,21	40,9	1,63	0,360
125×75×10	15,0	19,1	125	75	10	11	4,23	1,76	8,39	4,17	302	3,97	36,5	82,1	2,07	14,3	334	4,18	49,9	1,61	0,357
125×75×12	17,8	22,7	125	75	12	11	4,31	1,84	8,33	4,15	354	3,95	43,2	95,5	2,05	16,9	391	4,15	58,5	1,61	0,354
125×90×10	16,2	20,6	125	90	10	11	3,95	2,23	8,63	4,52	321	3,95	37,7	140	2,60	20,6	384	4,31	77,4	1,94	0,506
125×90×13	20,7	26,4	125	90	13	11	4,08	2,34	8,58	4,52	404	3,91	48,0	175	2,57	26,2	481	4,27	97,4	1,92	0,501
135×65×8	12,2	15,5	135	65	8	11	4,78	1,34	8,79	3,95	291	4,34	33,4	45,2	1,71	8,75	307	4,45	29,4	1,38	0,245
135×65×10	15,0	19,1	135	65	10	11	4,88	1,42	8,73	3,91	356	4,31	41,3	54,7	1,69	10,8	375	4,43	35,9	1,37	0,243
150×75×9	15,4	19,6	150	75	9	12	5,26	1,57	9,81	4,50	455	4,82	46,7	77,9	1,99	13,1	483	4,96	50,2	1,60	0,261
150×75×10	17,0	21,7	150	75	10	12	5,31	1,61	9,79	4,48	501	4,81	51,6	85,6	1,99	14,5	531	4,95	55,1	1,60	0,261
150×75×12	20,2	25,7	150	75	12	12	5,40	1,69	9,72	4,44	588	4,78	61,3	99,6	1,97	17,1	623	4,92	64,7	1,59	0,258
150×75×15	24,8	31,7	150	75	15	12	5,52	1,81	9,63	4,40	713	4,75	75,2	119	1,94	21,0	753	4,88	78,6	1,58	0,253
150×90×10	18,2	23,2	150	90	10	12	5,00	2,04	10,1	5,03	533	4,80	53,3	146	2,51	21,0	591	5,05	88,3	1,95	0,360
150×90×12	21,6	27,5	150	90	12	12	5,08	2,12	10,10	5,00	627	4,77	63,3	171	2,49	24,8	694	5,02	104	1,94	0,358
150×90×15	26,6	33,9	150	90	15	12	5,21	2,23	9,98	4,98	761	4,74	77,7	205	2,46	30,4	841	4,98	126	1,93	0,354
150×100×10	19,0	24,2	150	100	10	12	4,81	2,34	10,3	5,29	553	4,79	54,2	199	2,87	25,9	637	5,13	114	2,17	0,438
150×100×12	22,5	28,7	150	100	12	12	4,89	2,42	10,2	5,28	651	4,76	64,4	233	2,85	30,7	749	5,11	134	2,16	0,436
150×100×16	29,5	37,6	150	100	16	12	5,06	2,58	10,2	5,26	834	4,71	83,9	296	2,80	39,8	957	5,05	173	2,14	0,431
180×90×10	20,5	26,2	180	90	10	12	6,31	1,86	11,8	5,42	882	5,81	75,4	153	2,42	21,4	937	5,99	97,9	1,94	0,264
200×100×10	23,0	29,2	200	100	10	15	6,93	2,01	13,2	6,05	1 220	6,46	93,2	210	2,68	26,3	1 290	6,65	135	2,15	0,263
200×100×12	27,3	34,8	200	100	12	15	7,03	2,10	13,1	6,00	1 440	6,43	111	247	2,67	31,3	1 530	6,63	159	2,14	0,262
200×100×14	31,6	40,3	200	100	14	15	7,12	2,18	13,0	5,96	1 650	6,41	128	282	2,65	36,1	1 750	6,60	182	2,13	0,261
200×100×16	35,9	45,7	200	100	16	15	7,20	2,26	13,0	5,93	1 861	6,38	145	316	2,63	40,8	1 972	6,57	205	2,12	0,259
200×150×12	32,0	40,8	200	150	12	15	6,08	3,61	13,9	7,34	1 650	6,36	119	803	4,44	70,5	2 030	7,04	430	3,25	0,552
200×150×15	39,6	50,5	200	150	15	15	6,21	3,73	13,9	7,33	2 022	6,33	147	979	4,40	86,9	2 476	7,00	526	3,23	0,551
200×150×20	52,0	66,2	200	150	20	15	6,41	3,93	13,8	7,34	2 602	6,27	191	1 252	4,35	113	3 176	6,92	678	3,20	0,546
200×150×25	64,0	81,5	200	150	25	15	6,60	4,11	13,7	7,36	3 139	6,21	234	1 501	4,29	138	3 816	6,84	825	3,18	0,541

NOTES

1 Member countries may choose, to be included in their national standards, the sizes which are required to meet their demand.

For the angles so chosen, only thicknesses which can be rolled in their mills to meet the demand of the users may be selected from the list of thicknesses corresponding to unequal angles in table 1.

2 The sectional area has been calculated using the formula

$$S = [t(A + B - t) + 0{,}214\,6(r_{root}^2 - 2r_{toe}^2)] \times \frac{1}{100}$$

where

S is the sectional area, in square centimetres;

t is the thickness, in millimetres;

r_{root} is the root radius, in millimetres;

r_{toe} is the toe radius, in millimetres;

A and B are the leg lengths, in millimetres.

3 Mass is calculated on the basis of density of steel of 7,85 kg/dm³.

ISO 657-2 : 1989 (E)