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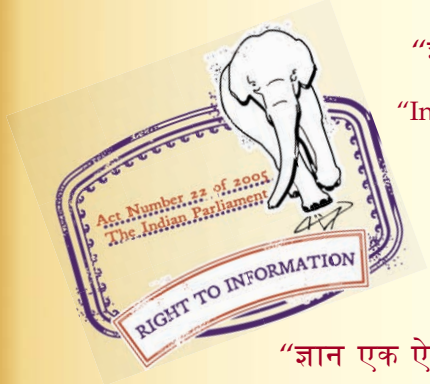

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IS : 3908 - 1986
(Reaffirmed 2003)

Indian Standard

SPECIFICATION FOR ALUMINIUM EQUAL LEG ANGLES

(First Revision)

UDC 669·71-423·2

INDIAN STANDARDS INSTITUTION
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

Gr 3

November 1986

Indian Standard

SPECIFICATION FOR ALUMINIUM EQUAL LEG ANGLES

(First Revision)

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(*Continued on page* 9)

Indian Standard

SPECIFICATION FOR ALUMINIUM EQUAL LEG ANGLES

(First Revision)

0. FOREWORD

0.1 This Indian Standard (First Revision) was adopted by the Indian Standards Institution on 24 March 1986, after the draft finalized by the Structural Sections Sectional Committee had been approved by the Structural and Metals Division Council.

0.2 Aluminium, because of its lightness, strength and better resistance to atmospheric corrosion, has gained popularity in structures especially for use in hilly areas and in defence establishments.

0.3 A large number of variety of aluminium sections are being produced in the country. In order to standardize these sections for their economic production, the Committee had formulated Indian Standard series covering angles, channels, beams and tee sections for structural use and other applications.

0.4 This Indian Standard was first formulated in 1966. In this revision alloys with new designations as covered in IS : 733-1983* have been used, apart from the addition of some more commonly used sections.

0.5 In the preparation of this standard, the Committee kept in view manufacturing and trade practices followed in the country in this field.

0.6 A code of practice for use of aluminium alloys in structure. namely IS : 8147-1976† was published which covers provisions for the design of structures (except bridges and pressure vessels) using aluminium alloys.

0.7 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS : 2-1960‡. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

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*Specification for wrought aluminium and aluminium alloy bars, rods and sections (for general engineering purposes) (*third revision*).

†Code of practice for use of aluminium alloys in structures.

‡Rules for rounding off numerical values (*revised*).

1. SCOPE

1.1 This standard covers the material, dimensions and sectional properties of aluminium equal leg angles for structural use and other applications.

2. TERMINOLOGY

2.0 For the purpose of this standard the following definitions shall apply.

2.1 Y-Y Axis — A line parallel to the axis of either flange and passing through the centre of gravity of the profile of the section.

2.2 X-X Axis — A line passing through the centre of gravity of the profile of the section, and at right angles to the Y-Y axis.

2.3 U-U and V-V Axes — Lines passing through the centre of gravity of the profile of the section, representing the principal axis of angle sections.

3. SYMBOLS

3.1 Letter symbols used in this standard have been indicated in the figure appearing along with Table 1. The letter symbols used in Table 1 shall have the meaning indicated against each as given below:

a = Sectional area;

M = Mass of the section per unit length;

I_x = Moment of inertia about the X-X axis;

I_y = Moment of inertia about the Y-Y axis;

I_u = Moment of inertia (*Max*) about the U-U axis;

I_v = Moment of inertia (*Min*) about the V-V axis;

e_x = Distance of extreme fibre from the X-X axis ($A - C_x$);

e_y = Distance of extreme fibre from the Y-Y axis ($B - C_y$);

$Z_x = \frac{I_y}{e_x}$ = Modulus of section about the X-X axis;

$Z_y = \frac{I_y}{e_y}$ = Modulus of section about the Y-Y axis;

$r_x = \sqrt{\frac{I_x}{a}}$ = Radius of gyration about X-X axis;

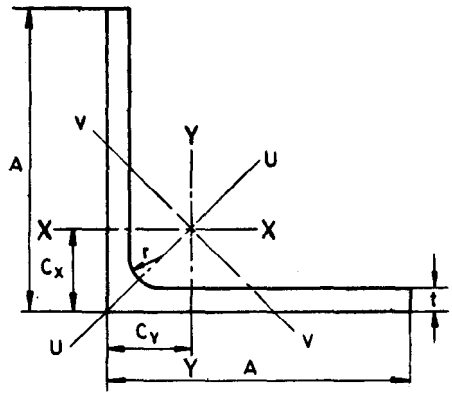
$r_y = \sqrt{\frac{I_y}{a}}$ = Radius of gyration about the Y-Y axis;

$r_u = \sqrt{\frac{I_u}{a}}$ = Radius of gyration about the U-U axis; and

$r_v = \sqrt{\frac{I_v}{a}}$ = Radius of gyration about the V-V axis.

TABLE 1 INDIAN STANDARD ALUMINIUM EQUAL LEG ANGLES

(*Clauses* 3.1, 5.1 *and* 5.1.1)



Designation and Size ($A \times A \times t$ in mm)	Mass* per Metre (M) kg/m	Sectional Area (a) cm²	Radius at Root (r) mm	Centre of Gravity $C_X = C_Y$ cm	Moment of Inertia $I_X = I_Y$ cm⁴	Moment of Inertia I_u (*Max*) cm⁴	Moment of Inertia I_v (*Min*) cm⁴	Radius of Gyration $r_X = r_Y$ cm	Radius of Gyration r_u (*Max*) cm	Radius of Gyration r_v (*Min*) cm	Modulus of Sections $Z_X = Z_Y$ cm³
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
ALE 10×10×1·5	0·08	0·30	3·0	0·30	0·03	0·04	0·01	0·29	0·37	0·19	0·04
ALE 10×10×2·0	0·10	0·38	3·0	0·32	0·03	0·05	0·01	0·29	0·36	0·19	0·05
ALE 15×15×1·5	0·12	0·45	3·0	0·42	0·09	0·15	0·04	0·45	0·57	0·29	0·09
ALE 15×15×2·0	0·16	0·58	3·0	0·44	0·12	0·18	0·05	0·45	0·56	0·29	0·11
ALE 15×15×3·0	0·22	0·83	3·0	0·48	0·16	0·25	0·07	0·44	0·55	0·29	0·16
ALE 20×20×2·0	0·21	0·79	4·0	0·56	0·29	0·46	0·12	0·61	0·76	0·39	0·20
ALE 20×20×3·0	0·31	1·14	4·0	0·60	0·40	0·64	0·17	0·59	0·75	0·39	0·29
ALE 25×25×2·0	0·27	0·99	4·0	0·68	0·58	0.92	0·24	0·77	0·96	0·50	0·32
ALE 25×25×3·0	0·39	1·44	4·0	0·73	0·82	1·31	0·34	0·76	0·95	0·49	0·47
ALE 25×25×4·0	0·51	1·87	4·0	0·77	1·04	1·64	0·44	0·74	0·93	0·48	0·60
ALE 30×30×3·0	0·48	1 76	5·0	0·85	1·47	2·33	0·61	0·91	1·15	0·59	0·68
ALE 30×30×4·0	0·62	2·29	5·0	0·89	1·86	2·95	0·78	0·90	1·13	0·58	0·88
ALE 30×30×5·0	0·76	2·80	5·0	0·93	2·22	3·50	0·94	0·89	1·12	0·58	1·07
ALE 35×35×3·0	0·56	2·06	5·0	0·97	2·38	3·77	0·99	1·07	1·35	0·69	0·94
ALE 35×35×4·0	0·73	2·69	5·0	1·01	3·04	4·81	1·26	1·06	1.34	0·69	1·22
ALE 35×35×5·0	0·89	3·30	5·0	1·05	3·66	5·76	1·53	1·05	1·32	0·68	1·49
ALE 40×40×3·0	0·64	2·36	5·0	1·10	3·61	5·72	1·50	1·24	1·56	0·80	1·24
ALE 40×40×4·0	0·84	3·09	5·0	1·14	4·63	7·34	1·92	1·22	1·54	0·79	1·62
ALE 40×40×5·0	1·03	3·80	5·0	1·18	5·58	8·84	2·32	1·21	1·52	0·78	1·98
ALE 45×45×3·0	0·73	2·69	6·0	1·21	5·21	8·22	2·20	1·39	1·75	0·90	1·58
ALE 45×45×4.0	0·95	3·52	6·0	1·26	6·66	10·61	2·71	1·38	1·74	0·88	2·06
ALE 45×45×5·0	1·17	4·33	6·0	1·30	8·06	12·83	3·29	1·36	1·72	0·87	2·52
ALE 50×50×3·0	0·81	2·99	6·0	1·34	7·22	11·43	3·00	1·55	1·96	1·00	1·97
ALE 50×50×4·0	0·06	3·92	6·0	1·38	9·32	14·78	3·86	1·54	1·94	0·99	2·57
ALE 50×50×5·0	1·30	4·83	6·0	1·42	11·30	17·92	4·68	1·53	1·93	0·98	3·16
ALE 50×50×6·0	1·54	5·72	6·0	1·46	13·17	20·86	5·47	1·52	1·91	0·98	3·72
ALE 60×60×4·0	1·28	4·75	7·0	1·62	16·44	26·06	6·81	1·86	2·34	1·20	3·76
ALE 60×60×5·0	1·58	5·86	7·0	1·67	20·02	31·76	8·27	1·85	2·33	1·19	4·62
ALE 60×60×6·0	1·88	6·95	7·0	1·71	23·43	37·16	9·69	1·84	2·31	1·18	5·46
ALE 70×70×5·0	1·86	6·89	8·0	1·91	32·35	51·31	13·39	2·17	2·73	1·39	6·36
ALE 70×70×6·0	2·21	8·18	8·0	1·95	38·03	60·26	15·80	2·16	2·71	1·39	7·53
ALE 70×70×7·0	2·55	9·45	8·0	1·99	43·43	68·80	18·06	2·14	2·70	1·38	8·67
ALE 80×80×6·0	2·53	9·38	8·0	2·20	57·59	91·48	23·71	2·48	3·12	1·59	9·93
ALE 80×80×8·0	3·32	12·30	8·0	2·28	73·97	117·43	30·50	2·45	3·09	1·57	12·93
ALE 80×80×10·0	4·09	15·14	8·0	2·36	89·18	141·32	37·04	2·43	3·06	1·56	15·80
ALE 100×100×6·0	3·17	11·81	9·0	2·72	115·15	182·92	47·42	3·10	3·92	1·99	15·78
ALE 100×100×8·0	4·19	15·53	9·0	2·78	148·73	236·41	61·06	3·09	3·90	1·98	20·59
ALE 100×100×10·0	5·18	19·17	9·0	2·85	180·49	286·67	74·30	3·07	3·87	1 97	25·23
ALE 120×120×12·0	6·14	22·73	9·0	2·93	210·43	333·70	87·15	3·04	3·83	1·96	29·76
ALE 120×120×10·0	6·27	23·21	10·0	3·35	319·51	508·04	130·99	3·71	4·68	2·38	36·94
ALE 120×120×12 0	7·45	27·57	10·0	3·43	374·13	594·41	153·85	3·68	4·64	2·36	43·64
ALE 120×120×16·0	9·73	36·05	10·0	3·58	475·66	753·35	191·97	3·63	4·57	2·34	56·43
ALE 150×150×10·0	7·91	29·31	12·0	4·09	639·75	1 017·61	261·88	4·67	5·89	2·99	58·64
ALE 150×150×12·0	9·41	34·87	12·0	4·17	752·41	1 196·72	308·11	4·65	5·86	2·97	69·47
ALE 150×150×16·0	12·35	45·75	12·0	4·32	964·79	1 532·30	397·29	4·59	5·79	2·95	90·35
ALE 200×200×12·0	12·72	47·11	16·0	5·40	1 838·49	2 923·90	753·08	6·25	7·88	4·00	125·92
ALE 200×200×16·0	16·74	61·99	16·0	5·56	2 782·00	3 782·21	973·79	6·19	7·81	3·96	164·68
ALE 200×200×20·0	20·67	76·55	16·0	5·71	2 886·35	4 586·40	1 186·30	6·14	7·74	3·94	202·02

*Based on density of 2·7 gm/cm³.

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4. DESIGNATION

4.1 Aluminium equal leg angles sections shall be designated as ALE followed by lengths of legs and thickness of the section in mm.

For example ALE 80 × 80 × 6

5. DIMENSIONS AND SECTIONAL PROPERTIES

5.1 Dimensions and mass of Indian Standard aluminium equal leg angles shall be as given in Table 1. For convenience of reference sectional properties are also given in Table 1.

5.1.1 Sections of dimensions other than those included in Table 1 may also be manufactured subject to the agreement between the purchaser and the manufacturer.

5.1.2 Sections without root radius (square fillet) may also be manufactured subject to the agreement between the purchaser and the manufacturer.

5.2 Dimensional tolerances for the sections shall be as specified in IS : 3965-1981*.

6. MATERIAL

6.1 Aluminium sections covered in this standard shall be manufactured from the following alloys in appropriate temper:

19000, 24345, 24534, 52000, 53000, 54300, 63400, 64423, 64430, 65032 and 74530.

6.1.1 Aluminium alloys and temper selected shall conform to the provisions of IS : 733-1983†.

7. PACKING

7.1 Equal leg angle sections shall be securely bundled and wrapped in bitumanised hessian cloth or in wooden boxes or as mutually agreed. Weight of each bundle may be as agreed to between the purchaser and the manufacturer.

8. MARKING

8.1 Each lot/bundle of aluminium equal leg angles shall be clearly marked with designation, alloy and temper, manufacturer's name and lot number/year of manufacture.

---

*Dimensions for wrought aluminium and aluminium alloys, bar, rod and section (*first revision*).

†Specification for wrought aluminium and aluminium alloy, bars, rods and sections (for general engineering purposes) (*third revision*).

8.2 Equal leg angles may also be marked with the ISI Certification Mark.

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Base Units

Quantity	Unit	Symbol
Length	metre	m
Mass	kilogram	kg
Time	second	s
Electric current	ampere	A
Thermodynamic temperature	kelvin	K
Luminous intensity	candela	cd
Amount of substance	mole	mol

Supplementary Units

Quantity	Unit	Symbol
Plane angle	radian	rad
Solid angle	steradian	sr

Derived Units

Quantity	Unit	Symbol	Definition
Force	newton	N	1 N = 1 kg.m/s^2
Energy	joule	J	1 J = 1 N.m
Power	watt	W	1 W = 1 J/s
Flux	weber	Wb	1 Wb = 1 V.s
Flux density	tesla	T	1 T = 1 Wb/m^2
Frequency	hertz	Hz	1 Hz = 1 c/s (s^{-1})
Electric conductance	siemens	S	1 S = 1 A/V
Electromotive force	volt	V	1 V = 1 W/A
Pressure, stress	pascal	Pa	1 Pa = 1 N/m^2

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