

Transformed

**ISO**

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION

**ISO RECOMMENDATION  
R 1175**

SHIPBUILDING DETAILS

**DIMENSIONS AND SECTIONAL PROPERTIES  
OF ALUMINIUM ALLOY SECTIONS FOR MARINE USE**

1st EDITION

January 1970

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## BRIEF HISTORY

The ISO Recommendation R 1175, *Shipbuilding details – Dimensions and sectional properties of aluminium alloy sections for marine use*, was drawn up by Technical Committee ISO/TC 8, *Shipbuilding details*, the Secretariat of which is held by the Nederlands Normalisatie-Instituut (NNI).

Work on this question led to the adoption of a Draft ISO Recommendation.

In October 1968, this Draft ISO Recommendation (No. 1714) was circulated to all the ISO Member Bodies for enquiry. It was approved, subject to a few modifications of an editorial nature, by the following Member Bodies :

Australia	Israel	Spain
Belgium	Italy	Sweden
Czechoslovakia	Japan	Thailand
France	Netherlands	Turkey
Germany	New Zealand	U.A.R.
Greece	Norway	United Kingdom
India	Poland	Yugoslavia

One Member Body opposed the approval of the Draft :

U.S.S.R.

This Draft ISO Recommendation was then submitted by correspondence to the ISO Council, which decided, in January 1970, to accept it as an ISO RECOMMENDATION.

## SHIPBUILDING DETAILS

DIMENSIONS AND SECTIONAL PROPERTIES  
OF ALUMINIUM ALLOY SECTIONS FOR MARINE USE

## 1. SCOPE

This ISO Recommendation covers dimensions, sectional properties and masses of aluminium alloy sections, with and without welding flange, for marine use.

## 2. CLASSIFICATION

The dimensions, sectional properties and masses of the following aluminium alloy sections are given under section 3 :

- tee bars without welding flange;
- tee bars with welding flange;
- bulb plates without welding flange;
- bulb plates with welding flange;
- bulb angles.

## 3. DIMENSIONS AND SECTIONAL PROPERTIES

The calculated masses in kilogrammes per metre, shown in the tables, are based on an average density of  $2.65 \text{ kg/dm}^3$ .

Where  $e_{NA} > A$ , the neutral axis lies in the plate.

Where  $e_{NA} < \frac{A+t}{2}$ , the neutral axis is closer to the outer face of the tee bar or bulb plate than to the upper face of the plate.

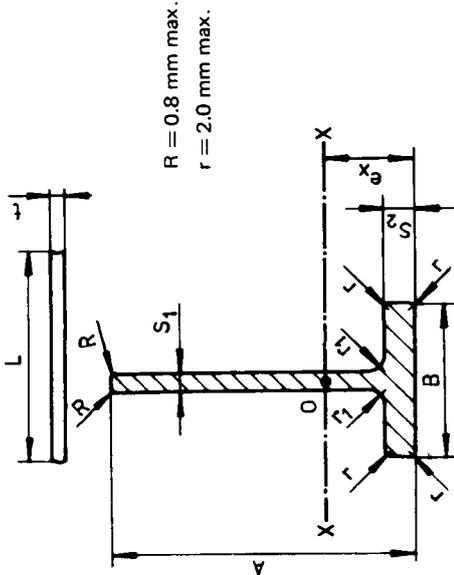
3.1 Tee bars without welding flange

Section without plate

- $F$  = sectional area
- $0$  = centre of gravity
- $e_x$  = distance of centre of gravity from the outer face of the flange
- $G$  = mass
- $I_x$  = second moment of area

Section with plate

- NA = neutral axis
- $e_{NA}$  = distance of centre of gravity of assembly from the outer face of the flange
- $I$  = distance of neutral axis from the extreme outer fibres
- $Z = \frac{I}{e_{NA}}$  = second moment of area
- $t$  = section modulus
- $L$  = plate thickness : 5, 10 or 15 mm
- $40 t$  =



Sectional properties

A mm	Dimensions			Mass (without plate)	Section without plate					Section with plate							
	B mm	S <sub>1</sub> mm	S <sub>2</sub> mm		r <sub>1</sub> mm	F cm <sup>2</sup>	e <sub>x</sub> cm	I <sub>x</sub> cm <sup>4</sup>	L X t : 200 mm X 5 mm			L X t : 400 mm X 10 mm			L X t : 600 mm X 15 mm		
									e <sub>NA</sub> cm	I cm <sup>4</sup>	Z cm <sup>3</sup>	e <sub>NA</sub> cm	I cm <sup>4</sup>	Z cm <sup>3</sup>	e <sub>NA</sub> cm	I cm <sup>4</sup>	Z cm <sup>3</sup>
80	40	4.0	8.0	6.0	6.197	2.27	36.9	5.96	174.0	29.2	7.66	248.6	32.4	8.33	297.4	35.7	
90	45	4.0	9.0	6.0	7.407	2.43	54.5	6.35	252.8	39.8	8.39	370.5	44.1	9.19	438.4	47.7	
100	50	4.0	10.0	6.0	8.717	2.57	77.1	6.67	351.8	52.7	9.08	530.1	58.4	10.03	625.3	62.4	
110	55	4.0	11.0	6.0	10.127	2.71	105.3	6.95	472.7	68.0	9.72	733.3	75.4	10.84	866.4	80.0	
120	60	4.0	12.0	6.0	11.637	2.83	140.0	7.19	617.0	85.9	10.32	985.5	95.5	11.61	1170.1	100.7	
130	65	4.5	13.0	7.0	13.888	3.12	198.4	7.36	794.7	107.9	10.83	1311.6	121.2	12.33	1573.8	127.6	
140	70	5.0	14.0	7.5	16.304	3.42	273.1	7.53	1000.9	132.8	11.29	1699.6	150.5	13.01	2063.4	158.6	
150	75	5.0	15.0	7.5	18.204	3.54	342.1	7.69	1227.3	159.5	11.76	2134.7	181.5	13.70	2616.0	191.0	
160	80	5.5	16.0	8.5	20.993	3.83	453.3	7.84	1498.2	191.2	12.14	2666.4	219.7	14.31	3311.3	231.5	
170	85	6.0	17.0	9.0	23.941	4.12	589.0	7.99	1804.8	225.9	12.49	3272.5	262.0	14.89	4117.6	276.6	
180	90	6.0	18.0	9.0	26.231	4.25	709.9	8.11	2129.5	262.5	12.86	3931.1	305.8	15.48	4998.4	323.0	
190	95	6.5	19.0	10.0	29.557	4.54	898.6	8.26	2516.1	304.7	13.14	4707.0	358.2	15.99	6064.3	379.3	
200	100	7.0	20.0	10.5	33.036	4.83	1121.9	8.41	2947.4	350.3	13.41	5567.9	415.1	16.48	7263.4	440.9	
220	110	7.5	22.0	11.0	39.532	5.25	1611.2	8.68	3918.4	451.4	13.92	7531.9	540.9	17.41	10041.6	576.8	
240	120	8.0	24.0	12.0	46.661	5.66	2244.8	8.94	5090.4	569.2	14.36	9891.0	688.9	18.23	13457.9	738.1	
260	130	9.0	26.0	13.5	55.605	6.24	3179.7	9.29	6571.9	707.1	14.72	12727.7	864.7	18.92	17647.8	932.8	



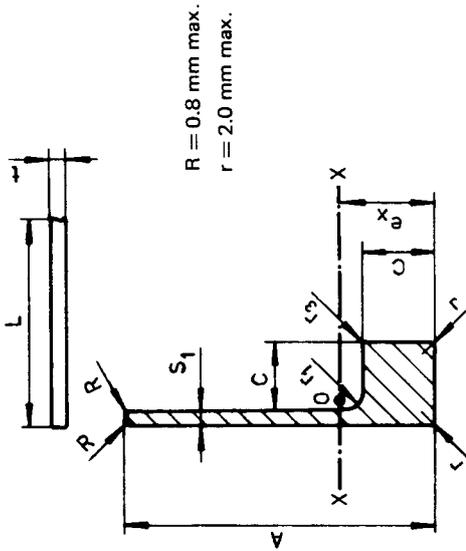
3.3 Bulb plates without welding flange

Section without plate

- $F$  = sectional area
- $0$  = centre of gravity
- $e_x$  = distance of centre of gravity from the outer face of the bulb
- $G$  = mass
- $I_x$  = second moment of area

Section with plate

- NA = neutral axis
- $e_{NA}$  = distance of centre of gravity of assembly from the outer face of the bulb
- $I$  = distance of neutral axis from the extreme outer fibres
- $Z = \frac{I}{e_{NA}}$  = section modulus
- $t$  = plate thickness : 5, 10 or 15 mm
- $L$  =  $40 t$



$R = 0.8 \text{ mm max.}$   
 $r = 2.0 \text{ mm max.}$

Dimensions		Mass (without plate)	Sectional properties												
			Section without plate					Section with plate							
A	C	$r_1$	$r_3$	$F$	$e_x$	$I_x$	$e_{NA}$	$I$	$Z$	$e_{NA}$	$I$	$Z$	$e_{NA}$	$I$	$Z$
50	12	4.5	3.0	3.214	1.67	6.79	4.38	38.25	8.74	5.21	53.86	10.33	5.61	75.43	13.45
60	14	4.5	3.0	4.084	1.91	12.18	4.99	66.95	13.41	6.07	93.51	15.39	6.54	120.49	18.42
70	16	4.5	3.0	5.034	2.14	19.97	5.54	107.55	19.41	6.90	151.68	21.98	7.45	186.79	25.06
80	18	5.5	3.0	6.466	2.44	33.24	5.97	165.94	27.80	7.66	240.89	31.46	8.33	290.20	34.85
90	20	4.5	3.0	8.088	2.76	53.11	6.35	241.63	38.06	8.37	362.02	43.27	9.17	432.53	47.15
100	22	6.0	4.0	9.363	2.98	74.64	6.73	330.41	49.06	9.07	507.01	55.88	10.02	603.50	60.24
110	24	7.0	4.0	11.311	3.30	109.93	7.03	445.63	63.39	9.69	706.22	72.86	10.81	844.34	78.13
120	26	5.0	4.0	12.826	3.51	145.65	7.34	575.24	78.39	10.32	934.18	90.55	11.60	1121.32	96.69
130	28	5.5	4.0	15.091	3.83	202.67	7.58	736.68	97.14	10.85	1230.77	113.43	12.33	1491.55	121.01
140	30	6.0	4.0	17.520	4.15	274.93	7.82	924.48	118.21	11.35	1583.22	139.52	13.02	1939.35	148.92
150	32	6.0	4.5	19.350	4.30	343.69	8.07	1126.28	139.60	11.87	1966.51	165.72	13.73	2428.01	176.79
160	34	6.5	4.5	22.111	4.68	449.73	8.28	1731.99	165.66	12.29	2443.13	198.77	14.37	3053.32	212.49
170	36	7.0	4.5	25.033	5.00	578.48	8.50	1650.83	194.28	12.69	2987.32	235.43	14.98	3778.84	252.33
180	38	7.5	4.5	28.160	5.32	733.01	8.71	1966.54	225.78	13.06	3606.14	276.21	15.55	4617.27	296.93
200	42	8.0	4.5	33.886	5.85	1082.22	9.13	2683.79	293.94	13.78	5023.42	364.53	16.67	6565.21	393.75
220	46	9.0	4.5	41.288	6.49	1609.57	9.57	3608.23	377.19	14.37	6817.83	474.44	17.64	9105.72	516.26