



**HINDALCO**  
**EXTRUSIONS**

EXPERTISE IS OUR STRENGTH

**Standards - ALUPURAM**

*Printed Dec. 2014*

## Standards: Typical Available Range

<p><b>Rods</b> from 6.35mm to 289mm diameter</p>		<p><b>Flats</b> from 9.00mm to 330mm width</p>	
<p><b>Squares</b> from 6.35mm to 201 mm</p>		<p><b>Equal leg Angles</b> from 12.70mm to 153mm</p>	
<p><b>Channels</b> from 6.00mm to 280mm width</p>		<p><b>Round Tubes</b> from 8mm to 225mm O. D.</p>	
<p><b>Rectangular Tubes</b> from 20.00mm to 200mm width</p>		<p><b>Square Tubes</b> from 12.70mm to 120mm</p>	



**HINDALCO**  
**EXTRUSIONS**  
EXPERTISE IS OUR STRENGTH



## VISION

To be a premium metals major, global in size and reach, excelling in everything we do, and creating value for our stakeholders.

## MISSION

To relentlessly pursue the creation of superior shareholder value, by exceeding customer expectation profitably, unleashing employee potential, while being a responsible corporate citizen adhering to our values.

## VALUES

**Integrity:** Honesty in every action

**Commitment:** Deliver on the promise

**Passion:** Energized action

**Seamlessness:** Boundaryless in letter and spirit

**Speed:** One step ahead always



# Hindalco Standards Catalogue

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## **HINDALCO - An Overview**

**Hindalco Industries Limited**, a USD 15 billion flagship company of the Aditya Birla Group, is a leading producer of aluminium and copper. Hindalco is present across the value chain of Aluminium & Copper. It has global footprint spanning across 13 countries in 5 continents

### **Aluminium**

- Amongst top 5 aluminium majors worldwide.
- World's largest aluminium rolling company.
- Integrated operations - from mines to alumina to metal to value added products
  - ✦ Ingots & redraw rods (wire rods)
  - ✦ Flat Rolled products
  - ✦ Extrusions
  - ✦ Foils

### **Copper**

- World's largest single-location copper smelting capacity.
- Copper mines in Australia.

Hindalco is a leader in Aluminium Extrusions industry in India with two manufacturing facilities. Both the plants are equipped with state of the art equipment, having well established manufacturing processes and quality systems honed over five decades.

- Manufacturing Facilities
  - ✦ Renukoot, U. P. (North India)
  - ✦ Alupuram, Kerala (South India)
- Capacity 60,000 MT per annum
- Expertise in customised alloys including hard alloys
- Catering to wide range of application segments such as Architectural, Electrical, Industrial, Transport, Defence and Consumer Durable.
- Extrusions manufactured from in-house virgin metal
- Quality Certification
  - ✦ ISO 9001-2008
  - ✦ ISO 14001-2004
  - ✦ OHSAS 18001-2007

This Catalogue covers the Geometrical shaped Standard sections from the range manufactured in the Alupuram plant of Hindalco - India's first Extrusions plant started in the year 1955.



## Alupuram Plant



1250 T Lowey Hydraulic Press with 6" container, automatic controls and puller



3300 T Farrel Watson Stillman Press with 9" & 12" containers, automatic controls and puller



Ultramodern Makino Vertical Machining Centre in Die Shop



CNC Wire EDM Machine in Die Shop



Solution Heat Treatment Furnace



Spectrometer for Quantometric Analysis



Branding Machine

Alupuram



Automated Packing Station



TABLE - 1

**Wrought alloys: Near equivalent designations**

INDIA		U.S.A. (A.A.)	BRITAIN (B.S.)	CANADA	GERMANY (DIN)	RUSSIA	I.S.O.	FRENCH ND
NEW I.S.	OLD I.S.							
19501	1E	1050(E.C)	1E	C 1S	E-Al 99.5	-	-	-
19500	1B	1050	1B	1S	A-99.5	-	Al-99.5	1050A
24345	H15	2014	H15	B265	AL-CU-SI	AK	-	-
24534	H14	2017	H14	17S/16S	-	D1	Al-Cu-4Mg Si	-
-	-	2024	-	24S	Al-Cu.Mg2	-	Al-Cu-4Mg 1	2024
31000	N3	3003	N3	3S	Al-Mn	A-Mn	Al-Mn 1	3003
52000	N4	5052	N4	M57S	Al-Mg.2	A-Mg	Al-Mg-2.5	5051
53000	N5	5086	N5	54S	-	A-Mg-3	Al-Mg-4	-
54300	N8	5083	N8	D54S	Al-Mg-4.5 Mn	-	Al-Mg-4.5 Mn	5083
65032	H20	6061	H20	65S	Al-Mg-Si Cu	-	Al-Mg-1Si Cu	-
63400	H9	6063	H9	50S	Al-Mg-Si 0.5	-	Al-Mg Si	-
64430	H30	6351	H30	B51S	Al-Mg-Si 1	AV	Al-Si-1 Mg	6081
64423	H11	6066	H11	C62S	-	-	-	-
62400	-	6005	-	C51S	-	-	-	-
63401	91E	6101	91E	D50S	E.Al.Mg.Si 0.5	-	-	-
64401	-	6201	-	-	-	-	-	-
74530	-	7039	-	D74S	Al-Zn-Mg.1	-	-	3004
-	-	7075	DTD 5124	75S	Al-Zn-Mg Cu 1.5	-	Al-Zn 6 Mg Cu	7075



**TABLE - 2**

## Wrought alloys: Guide to selection

Alloy	Temper	Resistance to Corrosion	Workability (Cold)	Machinability	Brazeability	Weldability	Commonly available forms	Indications of use
EC/1050, 1060 (1B) (19501) (19500) (19600)	F, O	A	A	D	A	A	Flats, Rods, Tubes & other section	Electrical conductors, cable sheathing, impact-extruded Products, pressing utilities of anodizing quality, pen caps, piping etc.
1100 (1C) (19000)	F, O	A	A	D	A	A	Flats, Rods, Tubes & other section	Packaging lightly stresses and decorative assemblies in architecture and transport, equipment for chemical, food and brewing industries.
2014 (H 15) (24345)	T4 T6	C C	C D	B B	D D	C C	Rods & Bars Rods & Bars	Highly stressed component of all types in aircraft, ordnance and general engineering.
2017 (H 14) (24534)	T4	C	C	B	D	C	Rods & Bars	Highly stressed parts in aircraft and other structures, screw machine products.
2024	T4	C	C	B	D	C	Rods & Bars	Load Cell, Highly stressed component of all types in aircraft, ordnance and general engineering.
4043 (N 21) (43000)	F, O	A	A	D	A	A	Rods & other sections	Welding wire, architectural applications
5005 (52000A)	O, F	A	A	D	B	A	Flats, Rods, other sections	Structures exposed to marine attractive anodized finish, architectural, electrical conductors etc.
5052 (N 4)	O, F	A	A	D	C	A	Flats, Rods, Tubes & other sections	Structures exposed to marine atmosphere, aircraft parts, wire rope ferrules, rivet stock.
5086 (N 5) (53000)	O, F	A	A	D	D	A	Flats, Rods & other sections	Ship building and other marine applications, rivets, coinage etc.
5056 (N 6) (55000)	O, F	A	A	D	D	A	Rods	Zips, Welding Rods and Rivets.
6061 (H 20) (65032)	O, F T4 T6	A A A	A C D	D C C	A A A	A A A	Rods, Flats, Tubes & other sections	Heavy duty structures, building hardware, sections for bus body, truck and rail coach, furniture, rivets etc.
6063 (H9)	O, F T4 T6 T5	A A A A	A B C C	D C C C	A A A A	A A A A	Rods, Flats, Tubes & other sections	Building hardware, architectural section with good surface finish, medium strength furniture and anodized sections.





TABLE - 2

**Wrought alloys: Guide to selection**

Alloy	Temper	Resistance to Corrosion	Workability (Cold)	Machinability	Brazeability	Weldability	Commonly available forms	Indications of use
6066 (22450)	O, F T4 T6	B B B	B C C	D B B	A A A	A A A	Rods and other solid sections	For welded structures, textile parts, heavy duty machine parts.
6101 (91 E) (63401)	T4 T6	A A	B B	C C	A A	A A	Rods, Flats, Tubes & other sections	High strength electrical busbar sections.
6201 (64401)	T4	A	A	C	A	A	Redraw Rod	Overhead conductors, ACAR and AAAC
6351 (H 30) (6430)	O, F T4 T6	A A A	A C D	D C C	A A A	A A A	Rods, Flats, Tubes & other sections	Structural and general engineering items such as rail & road transport vehicles, bridges, cranes, roof trusses, rivets etc.
7039 (D74S) (74530)	O, F T4 T6	A A A	A C D	D C C	A A A	A A A	Flats, Tubes, Rods & other sections	Defence structures like mobile bridges etc. Tread and chequered plates, Excellent welding property with no loss of strength in welded zone.
7075 (DTD5124)	O, F T4 T6	A A A	A A D	A A A	A A A	A A A	Rods	Highly stressed structural applications

**Notes:**

1. Relative ratings for corrosion, workability and machinability in decreasing order of merit A, B, C and D.
2. Weldability & brazeability ratings A, B, C and D are relative ratings defined as follows:
  - A. Generally weldable by the commercial procedure & methods.
  - B. Weldable with special technique.
  - C. Limited weldability due to crack sensitivity or loss in corrosion resistance and mechanical properties.
  - D. Generally not weldable.
3. Availability of other forms subject to special enquiries and methods.



TABLE - 3

**Wrought alloys: Chemical composition limits (per cent)**

Alloy (ISS) Old	New	Equivalent alloy (AA) U.S.A.	Copper		Magnesium		Silicon		Iron Max.	Manganese		*Others (Total) Max.	Remarks
			Min.	Max.	Min.	Max.	Min.	Max.		Min.	Max.		
1C	19000	1100	-	0.10	-	-	-	0.5	0.6	-	0.1	0.1	Aluminium 99.0% Min
1 B	19500	1050	-	0.05	-	-	-	0.25	0.4	-	0.05	0.1	Aluminium 99.5% Min
1 E	19501	-	-	0.04	-	-	-	0.15	0.35	-	0.03	0.1	Aluminium 99.5% Min
-	19600	1060	-	0.05	-	-	-	0.25	0.35	-	0.03	0.1	Aluminium 99.6% Min
H 15	24345	2014	3.8	5.0	0.2	0.8	0.5	1.2	0.7	0.3	1.2	0.5	-
H 14	24534	2017	3.5	4.7	0.4	1.2	0.2	0.7	0.7	0.4	1.2	0.5	-
		2024	3.8	4.9	1.2	1.8	-	0.5	0.5	0.3	0.9	0.15	Zn 0.25
N 3	91000	3003	-	0.1	-	0.1	-	0.6	0.7	1.0	1.5	0.4	-
		4032	0.8	1.3	0.8	1.3	-	13.5	0.6	-	0.2	0.15	Ni 0.8 - 1.3
N 4	52000	5052	-	0.1	1.7	2.6	-	0.6	0.5	-	0.5	0.4	Cr + Mn = 0.5
M 5	53000	5086	-	0.1	2.8	4.0	-	0.6	0.5	-	0.5	0.4	Cr + Mn = 0.5
N 8	54300	5083	-	0.1	4.0	4.9	-	0.4	0.7	0.5	1.0	0.4	Chromium up to 0.25
H 20	65032	-	0.15	0.4	0.7	1.2	0.4	0.8	0.7	0.2	0.8	0.4	**Cr = 0.15 - 0.35
-	-	6061	0.15	0.4	0.8	1.2	0.4	0.8	0.7	-	0.15	0.4	Chromium 0.04 to 0.35
H 9	63400	6063	-	0.1	0.4	0.9	0.3	0.7	0.6	-	0.3	0.4	-
-	-	6066	0.7	1.2	0.8	1.4	0.9	1.8	0.7	0.6	1.1	0.4	-
-	64423	-	0.5	1.0	0.5	1.3	0.7	1.3	0.8	-	1.0	-	-
9 1E	63401	6101	-	0.05	0.4	0.9	0.3	0.7	0.5	-	0.03	0.1	-
H 30	64430	6351	-	0.1	0.4	1.2	0.6	1.3	0.6	0.4	1.0	0.3	-
		6082	-	0.1	0.6	1.2	0.7	1.3	0.5	0.4	1.0	0.3	Chromium up to 0.25
-	74530	7039	-	0.2	1.0	1.5	-	0.4	0.7	0.2	0.7	0.4	Zinc 4.0 - 5.0 %
-	-	7075	1.2	2.0	2.1	2.9	-	0.5	0.5	-	0.3	0.2	Zinc (5.1 - 6.1) % & Chromium(0.18-0.28) %

\* Titanium and/or other grain refining elements

\*\* Either Mn or Cr shall be present



TABLE - 4

**Wrought alloys: Mechanical properties**

Heat Treatable Alloys					
Alloy A A Old (ISS) New (ISS)	Temper	Ultimate Tensile Strength Kg/mm <sup>2</sup>		0.2% Proof Stress Kg/mm <sup>2</sup>	Elongation On 50mm GL
		Min.	Max.		
2014 [H15] [24345]	T4[W] T6 [WP]	39 49	- -	24.0 43.0	10 6
2017 [H14] [24534]	T4[W]	39	-	24.0	10
2024 [H9]	T4	40.5		26.5	12
6063 [H9] [63400]	T4[W] T6 [WP]	14 19	- -	8.0 15.5	14 7
6061 [H20] 65032]	M T4[W] T6 [WP]	11.2 19 28.5	- - -	5.1 11.5 24.0	12 14 7
6351[H30] [64430]	M T4[W] T6 [WP]	11.2 19 31.5	- - -	8.2 12.0 27.5	12 14 7
6066	M T4[W] T6 [WP]	11.0 28 35	- - -	- 17.5 31.5	12 14 7
6101[91E] [63401]	T4[W] T6 [WP]	14 20.5	- -	8.0 17.0	12 10
6201 [64401]	T4[W] T8 [WDP]	16 32	- -	7.0 -	14 3
7039 [74530]	T4[W] T6 [WP]	28 31.5	- -	23.5 26.5	9 7
7075	T6 [WP]	54	-	46.5	6

Properties indicated herein are typical properties and are given for information only. However properties of all the profiles in specific alloy shall be as per I. S. Specification.

## Specifications



TABLE - 5

### Wrought alloys: Typical tensile properties at various temperatures (Kg/mm<sup>2</sup>)

Alloy & Tempet	Tensile Strength	Temp. °C									
		Below zero			Above Zero						
		-200	-80	-25	25	100	150	200	250	300	350
1100 M (19000)	Ultimate	17.5	10.5	10.0	9.0	7.0	5.5	4.0	3.0	2.0	1.5
	Yield	4.2	3.9	3.5	3.5	3.2	3.0	2.4	2.0	1.4	1.1
2014 T6* (24345)	Ultimate	59.0	52.0	50.5	49	44.0	28.0	11.0	6.0	4.5	3.0
	Yield	50.0	45.5	43.5	42	40.0	24.5	9.0	5.0	3.5	2.5
2017 T4 (24534)	Ultimate	56.0	45.5	45.0	43.5	40.0	28.0	11.0	6.5	4.0	3.0
	Yield	37.0	29.5	29.0	28.0	27.5	21.0	9.0	5.0	3.5	2.5
3003 M (31000)	Ultimate	23.0	14.0	12.0	11.0	9.0	7.5	6.0	4.0	3.0	2.0
	Yield	6.0	5.0	4.5	4.0	4.0	3.5	3.0	2.5	1.7	1.3
5052 M (52000)	Ultimate	31.0	20.5	19.5	19.5	19.0	16.0	4.0	8.5	5.0	3.5
	Yield	11.0	9.0	9.0	9.0	9.0	9.0	7.5	5.0	4.0	2.0
5086 M (53000)	Ultimate	38.5	27.5	26.5	26.5	26.5	20.5	15.5	12.0	7.5	4.0
	Yield	17.0	15.0	15.0	15.0	15.0	13.5	12.0	7.5	5.0	3.0
6061 T4 (65032)	Ultimate	35.0	26.5	25.0	24.5	-	21.0	13.5	5.0	3.0	2.0
	Yield	19.5	15.5	15.5	14.5	-	14.5	10.5	3.8	1.8	1.5
6061 T6	Ultimate	49.0	34.5	33.0	31.5	29.5	24.0	13.5	5.0	3.2	2.1
	Yield	33.0	29.5	28.5	28.0	26.5	21.5	10.5	3.5	1.9	1.3
6063 T4 (63400)	Ultimate	26.0	20.5	19.5	15.5	-	15.5	6.5	3.5	2.1	1.8
	Yield	12.0	12.0	10.5	9.0	-	9.0	4.5	2.8	1.8	1.4
6063 T6	Ultimate	33.0	26.5	25.0	24.5	21.5	14.5	6.5	3.0	2.5	1.6
	Yield	25.0	23.0	22.5	21.5	19.5	14.0	4.5	2.5	1.8	1.4

\*Subject to special enquiry

TABLE - 6

### Wrought Aluminium & Aluminium Alloys: Mechanical and Electrical Properties

Alloy	Temper Designation	Tensile Strength Min.	0.2 Percent Proof Stress Min	Percent Elongation on 5.65√S <sub>0</sub> Min.	Electrical Conductivity at 20° C, Min	Maximum Electrical Resistivity at 20° C	Thickness	Inside bend radius Min.	Coeff. of thermal expansion	Thermal Conductivity	
AA	IS	Mpa	Mpa		% IACS	ohm mm/mm <sup>2</sup>	mm		per°C at 20°C typical	CGS at 25°C typical	
1050	19501	M	60	-	25	60.00	0.02874	upto 12	1x thickness	23.8 x 10 <sup>-6</sup>	0.56
6101	63401	W	140	80	12	-	-	-	-	-	-
6101	63401	WP (range 1)	170	135	12	56.50	0.03052	3.00 to 9.50	1x thickness	23.4 x 10 <sup>-6</sup>	0.52
6101	63401	WP (range 2)	200	170	10	55.00	0.03135	3.00 to 9.50	2x thickness	23.4 x 10 <sup>-6</sup>	0.52
6201	-	T81	-	-	-	52.50	0.3283	-	235 x 10 <sup>-6</sup>	0.50	-

#### Notes:

1MPa=1N/mm<sup>2</sup> = 0.102 kg/mm<sup>2</sup>

Properties in M temper are only typical values and are given for information only.

If required the cross-section shall be calculated from the mass and length of a straight test piece taking density 2.705 for grade 19501 and 2.700 for grade 63401



TABLE - 7

**Wrought alloys: Welding properties**

Relatively Suitable for Joining (*)									
Alloy & Temper	Gas	Arc with Inert Gas	Arc With Flux	Resist. Welding	Pressure Welding	Brazing	Soldering Low Temp High Temp.		Filler Metal (3) +
1050 M	A	A	A	B	A	A	A	A	1260
1100 M	A	A	A	B	A	A	A	A	1100
2017 T4	D	C	C	B	C	D	D	D	4145
T6	D	C	C	B	C	D	D	D	4145
2024 T4	D	C	C	B	C	D	D	D	4145
3003 M	A	A	A	B	A	A	A	A	1100
5005 M	A	A	A	B	A	B	B	A	4043
5052 M	A	A	A	B	B	C	C	C	5356
5086 M	C	A	A	B	C	D	D	D	5356
6061 M	A	A	A	B	A	A	B	A	4043
T4	A	A	A	A	B	A	B	A	4043
T6	A	A	A	A	B	A	B	A	4043
6063 T6	A	A	A	A	B	A	B	A	4043
6101 T6	A	A	A	A	B	A	B	A	4043
6201 T81	A	A	A	A	B	A	B	A	4043
7018 T6	D	C	C	A	C	D	C	C	7039
7039 T6	D	C	C	A	C	D	C	C	7039

1. For general purpose only. For specialised applications, e. g. pressure vessels anodised item etc., special process should be used.
2. \*Joining ratings A, B, C&D are relative ratings in order of merit.  
 A-Readily weldable.  
 B-Special techniques and close control of procedure are required.  
 C-Limited weldability due to crack sensitivity, loss in strength and or loss in resistance to corrosion.  
 D-Not recommended.
3. + Filler metals for general purpose only. For specialised applications requiring high strength ductility, colour match after anodising etc., special filler metals are recommended.





TABLE - 8

### Wrought alloys: Surface Finishing (Suitability)

Alloy	Suitable for				
	Protective Anodising	Anodising & Dyeing	Bright Anodising	Plating	Vitreous Immelgin
1050/1070	E	E	V	V	G
1100	V	V	G	V	G
2014/2017	M	M(D)	U	V	U
3003	G	G	M	G	V
4043	G	G(D)	U	O	G
5005	V	V	V	O	U
5052	V	V	G-V	O	U
5086/5056	V	V	G	O	U
6061	G	G	M	O	O
6063	V	V	G-V	O	O
6066	M	M(D)	U	V	U
6101	V	V	G-V	O	O
6351	G	G	M	O	O

**E** Excellent

**V** Very good

**G** Good

**M** Moderate

**U** Unsuitable

**D** Only Suitably for dark colours

**O** Modified technique is essential and some initial difficulties may occur.



**Standard Manufacturing Tolerances**

The Standard manufacturing tolerance given here are applicable to the average shape. Wider tolerance may be required for some shapes and closer tolerances may be possible for others. For 5052, 5056, 5083, 5086 and other high magnesium alloys, special (wider) tolerances will be applicable.

Tolerances stricter standard shall be subjected to special enquiry.

**TABLE: 9**

**Round Bars/Rods: Diameter Tolerance**

Specified Diameter mm	Tolerance (mm)			
	Class A		Class B	
	+	-	±	
Upto 12.0	0.03	0.07	0.20	
Over 12.0 Upto 25.0	0.05	0.10	0.25	
Over 25.0 Upto 40.0	0.07	0.13	0.30	
Over 40.0 Upto 50.0	0.13	0.13	0.38	
Over 50.0 Upto 56.0	0.15	0.15	0.46	
Over 56.0 Upto 71.0	0.20	0.20	0.53	
Over 71.0 Upto 80.0	0.25	0.25	0.61	
Over 80.0		0.5%	1%	

**Notes:**

1. Class 'A' is for drawn rods.
2. Class 'B' is normal tolerance for extruded rods.

**TABLE: 10**

**Solid Sections : Width Tolerance (at closed ends)**

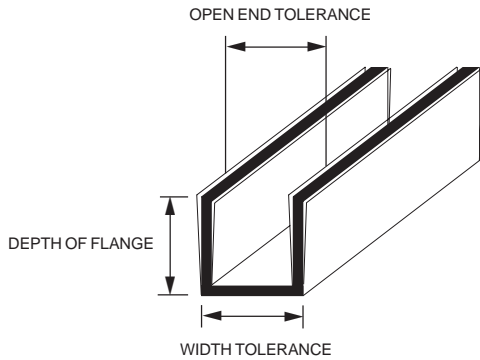
Specified width or across flats mm	Tolerance mm ±
4	0.18
5	0.20
6	0.20
8	0.23
10	0.23
12	0.25
16	0.28
20	0.30
25	0.30
32	0.38
40	0.46
50	0.46
60	0.53
80	0.69
100	0.69
120	0.76
160	1.02
200	1.14
250	1.40

**Notes:**

1. For intermediate size, take tolerance for the next higher value.
2. Width tolerances on open ends of Solid Sections such as Channels, I-Beams, etc. are given separately in table 11



**TABLE 11**  
**Solid Sections: Width Tolerance (at open ends)**



Displacement of any one leg to be controlled independently by tolerance on angle

Tolerance on open ends of channels and I-beams

Specified Width (mm)	Depth of flange or leg (mm)			
	6.5 to 16.0	16.1 to 32.0	32.1 to 64.0	64.1 to 150.0
	Width Tolerance mm ±			
Upto 6.0	0.30	-	-	-
6.1 to 12.0	.35	0.40	0.45	-
12.1 to 20.0	0.40	0.45	0.50	-
20.1 to 25.0	0.45	0.50	0.55	0.65
25.1 to 38.0	0.50	0.55	0.65	0.75
38.1 to 50.0	0.60	0.70	0.80	0.90
50.1 to 100.0	0.80	0.90	1.20	1.50
100.1 to 150.0	1.10	1.30	1.70	2.00
150.1 to 200.0	1.50	1.60	2.10	2.50
200.1 to 250.0	1.70	1.90	2.70	3.00

**Notes:**

- 1.Tolerance on either internal or external gap (between flanges or legs) can be guaranteed depending on requirements.
- 2.Width tolerance at closed ends are given in Table-10.
- 3.These tolerances are applicable to channels, I-Beam and other such sections where there are both opened and closed ends.



**TABLE 12**  
**Solid Sections : Thickness tolerance**

Specified**	Width of section (mm)															
	Thickness	12	16	20	25	32	40	50	63	80	100	125	160	200	250	320
1.2	0.20	0.20	0.20	0.20	0.20	0.20	*	*	*	*	*	*	*	*	*	*
1.6	0.18	0.20	0.20	0.20	0.20	0.20	*	*	*	*	*	*	*	*	*	*
2.0	0.18	0.20	0.20	0.20	0.20	0.20	0.23	0.25	0.28	0.30	0.33	0.36	0.38	0.41	0.46	*
2.5	0.18	0.20	0.20	0.20	0.20	0.20	0.23	0.25	0.28	0.30	0.33	0.36	0.38	0.41	0.46	*
3.2	0.18	0.20	0.20	0.20	0.20	0.23	0.25	0.28	0.30	0.33	0.36	0.38	0.41	0.43	0.48	*
4.0	0.20	0.23	0.23	0.23	0.23	0.25	0.28	0.30	0.33	0.36	0.38	0.43	0.43	0.46	0.51	*
5.0	0.20	0.23	0.23	0.23	0.23	0.25	0.28	0.30	0.33	0.36	0.38	0.41	0.43	0.46	0.51	*
6.0	0.20	0.23	0.23	0.23	0.23	0.25	0.28	0.30	0.33	0.36	0.41	0.46	0.51	0.56	0.66	*
8.0	0.23	0.25	0.25	0.25	0.25	0.28	0.30	0.33	0.36	0.38	0.43	0.48	0.53	0.58	0.71	*
10.0	0.23	0.25	0.25	0.25	0.25	0.28	0.30	0.33	0.36	0.38	0.43	0.48	0.53	0.58	0.71	*
12.0	0.25	0.28	0.28	0.28	0.28	0.30	0.33	0.36	0.38	0.41	0.46	0.48	0.53	0.58	0.74	0.97
16.0	0.28	0.30	0.30	0.30	0.30	0.33	0.36	0.38	0.41	0.43	0.48	0.51	0.56	0.61	0.76	1.02
20.0	-	0.30	0.30	0.30	0.30	0.36	0.38	0.41	0.43	0.46	0.51	0.53	0.61	0.69	0.79	1.04
25.0	-	0.30	0.30	0.30	0.30	0.36	0.38	0.41	0.43	0.46	0.51	0.53	0.61	0.69	0.79	1.04
32.0	-	-	-	-	-	0.38	0.41	0.43	0.46	0.48	0.53	0.56	0.66	0.74	-	-
40.0	-	-	-	-	-	-	0.46	0.48	0.51	0.53	0.56	0.61	0.71	0.79	-	-
50.0	-	-	-	-	-	-	-	0.53	0.56	0.58	0.61	0.66	0.76	0.84	-	-
63.0	-	-	-	-	-	-	-	-	0.61	0.64	0.66	0.71	0.81	0.89	-	-
80.0	-	-	-	-	-	-	-	-	-	0.69	0.71	0.74	0.86	0.94	-	-
100.0	-	-	-	-	-	-	-	-	-	-	0.76	0.79	0.91	0.99	-	-
125.0	-	-	-	-	-	-	-	-	-	-	-	0.89	0.97	1.04	-	-

\* To be regarded as special sections.  
\*\* For intermediate size, take tolerance for the next higher value.

**TABLE -13**  
**Round Tubes : Wall Thickness Tolerance**

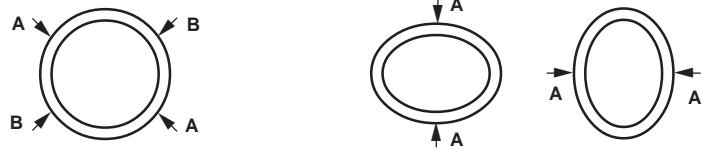
Specified Wall Thickness (mm)	Tolerance (mm)	
	Class 1 ±	Class 2 ±
Upto 1.2	0.30	-
1.60	0.30	-
1.80	0.30	-
2.00	0.30	-
2.24	0.30	-
2.50	0.33	-
2.80	0.36	-
3.15	0.40	0.90
3.55	0.43	0.94
4.00	0.48	0.97
4.50	0.51	1.02
5.00	0.56	1.07
5.50	0.61	1.12
6.30	0.67	1.18
7.10	0.76	1.27
8.00	0.97	1.47
9.00	1.10	1.60
10.00	1.22	1.73
11.20	1.28	1.79
12.50	1.35	1.85

**Notes:**  
1. Tubes with wall thickness intermediate between standard sizes will have the tolerance of the higher wall thickness.  
2. Tolerance on standard wall thickness above 12.50 mm may be as agreed between the purchaser and the supplier.  
3. For Al-Zn-Mg, Al-Mg and Al-Cu alloys, class 2 tolerance shall apply.  
4. For Al, Al-Mn and Al-Mg-Si alloys, class 1 tolerances

## General Information



**TABLE -14**  
**Round Tubes : Diameter Tolerance**



Specified Diameter Outside or Inside mm	Allowable Deviation of Mean Diameter 1/2 (AA+BB) from Specified Diameter (Dia. Tolerance) mm $\pm$	Allowable Deviation of Diameter at any point from Specified Diameter (Ovalness Tolerance) mm $\pm$
From 9 upto 18	0.25	0.50
Over 18 upto 30	0.30	0.60
Over 30 upto 40	0.36	0.80
Over 40 upto 50	0.45	0.90
Over 50 upto 60	0.54	1.00
Over 60 upto 80	0.60	1.30
Over 80	1% of dia	2.5% of dia

**Notes:**

1. When outside diameter, inside diameter and wall thickness are all specified, standard tolerances are applicable to any two of these dimensions, but not to all three.
2. Mean diameter is the average of two diameter measurement taken at right angles to each other at any point along the length. In other words, mean diameter is  $1/2 (AA+ BB)$ .
3. Ovalness tolerance is not applicable for annealed temper or if the wall thickness is less than 2.5% of the outside diameter

**TABLE 15**  
**Hollow sections: Wall Thickness Tolerance**

Wall Thickness mm	Width or overall dimensions (mm)														
	Over 10.0 Upto 20.0	20.0 33.0	30.0 40.0	40.0 50.0	50.0 60.0	60.0 80.0	80.0 100.0	100.0 120.0	120.0 140.0	140.0 160.0	160.0 180.0	180.0 200.0	200.0 225.0	225.0 250.0	
<b>Class B</b>															
Over	Upto														
1.0	1.5	0.28	0.28	0.28	0.30	-	-	-	-	-	-	-	-	-	-
1.5	2.0	0.30	0.33	0.33	0.36	-	-	-	-	-	-	-	-	-	-
2.0	2.5	0.33	0.33	0.36	0.38	0.43	0.46	-	-	-	-	-	-	-	-
2.5	3.0	0.41	0.43	0.46	0.48	0.51	0.53	0.56	-	-	-	-	-	-	-
3.0	4.0	0.53	0.56	0.58	0.61	0.64	0.66	0.69	0.71	0.74	-	-	-	-	-
4.0	5.0	-	0.71	0.74	0.76	0.79	0.81	0.84	0.86	0.89	0.91	0.94	1.02	-	-
5.0	6.0	-	-	0.97	0.99	1.02	1.04	1.07	1.09	1.12	1.14	1.17	1.19	1.22	1.24
6.0	8.0	-	-	-	1.22	1.24	1.27	1.30	1.32	1.35	1.37	1.40	1.42	1.45	1.47
8.0	10.0	-	-	-	-	1.47	1.50	1.52	1.55	1.57	1.60	1.63	1.65	1.68	1.70
10.0	12.0	-	-	-	-	1.73	1.75	1.78	1.80	1.83	1.85	1.88	1.90	1.93	1.96
12.0	16.0	-	-	-	-	-	1.98	2.00	2.03	2.06	2.08	2.11	2.13	2.16	2.18
16.0	20.0	-	-	-	-	-	-	2.24	2.26	2.28	2.31	2.34	2.36	2.39	2.41
20.0	25.0	-	-	-	-	-	-	2.49	2.51	2.54	2.57	2.59	2.62	2.64	2.67
<b>Class A</b>															
1.5	2.0	0.28	0.30	0.30	0.33	-	-	-	-	-	-	-	-	-	-
2.0	2.5	0.30	0.30	0.33	0.36	0.41	0.43	-	-	-	-	-	-	-	-
2.5	3.0	0.30	0.30	0.30	0.36	0.38	0.43	0.46	0.51	-	-	-	-	-	-
3.0	4.0	0.33	0.36	0.38	0.41	0.46	0.51	0.56	0.61	0.69	-	-	-	-	-
4.0	5.0	-	0.41	0.43	0.46	0.51	0.56	0.61	0.69	0.76	0.84	0.91	0.99	-	-
5.0	6.0	-	-	0.46	0.51	0.56	0.61	0.69	0.76	0.84	0.91	0.99	1.07	-	-
6.0	8.0	-	-	-	0.56	0.61	0.69	0.76	0.84	0.91	0.99	1.07	1.14	-	-
8.0	10.0	-	-	-	-	0.69	0.76	0.84	0.91	0.99	1.07	1.14	1.22	-	-
10.0	12.0	-	-	-	-	0.76	0.84	0.91	0.99	1.07	1.14	1.22	1.30	-	-
12.0	16.0	-	-	-	-	-	0.91	0.99	1.07	1.14	1.22	1.30	1.37	-	-
16.0	20.0	-	-	-	-	-	-	1.07	1.14	1.22	1.30	1.37	1.45	-	-

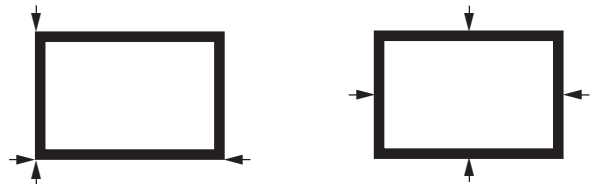
**Notes:**

1. These tolerance are applicable to hollow sections other than round tubes.
2. For non-heat-treatable alloys, these tolerance are applicable when wall thickness of the section is at least 1.5 mm or 1/32 of overall width, whichever is greater. For heat-treated alloys, these tolerances are applicable when all wall thickness is at least 1.5 mm or 1/24 of overall width, whichever is greater.
3. Unless otherwise specified, class B tolerances will be applicable.
4. For high-magnesium non-heat treatable alloys (5052, 5056, 5083, 5086), an extra tolerance of 50% shall be allowed.





**TABLE 16**  
**Hollow Sections: Width Tolerance**

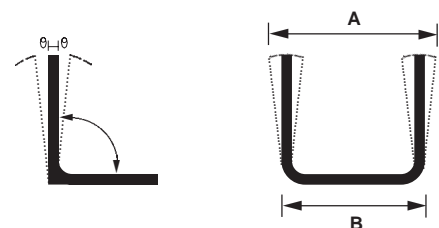


Specified Width or Width across flats (mm)		Width tolerance $\pm$ when measured	
Over	Upto	at corners	at centre
10.0	20.0	0.30	0.46
20.0	30.0	0.38	0.55
30.0	40.0	0.45	0.65
40.0	50.0	0.52	0.80
50.0	60.0	0.60	1.00
60.0	80.0	0.70	1.20
80.0	100.0	0.80	1.40
100.0	120.0	0.89	1.65
120.0	140.0	1.02	1.90
140.0	160.0	1.14	2.20
160.0	180.0	1.27	2.45
180.0	200.0	1.40	2.70

**Notes:**

1. These tolerances are applicable to hollow sections other than round tubes.
2. For non-heat-treatable alloys, these tolerance are applicable when wall thickness of the section is at least 1.5 mm or 1/32 of overall width, whichever is greater. For heat-treatable alloys, these tolerances are applicable when wall thickness is at least 1.5 mm or 1/24 of overall width, whichever is greater.
3. For high-magnesium non-treatable alloys (5052, 5056, 5083, 5086), an extra tolerance of 50% shall be allowed.

**TABLE 17**  
**Solid & Hollow Sections: Angularity Tolerance**



Displacement of any one leg to be controlled independently by angular tolerances

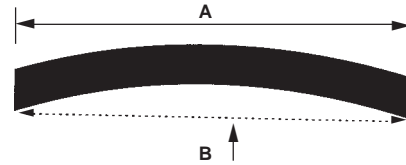
Specified thickness of thinnest leg mm	Allowable deviation from specified angle degree $\pm$
Upto 5.0	2.0
Over 5.0 upto 19.0	1.5
Over 19.0	1.0

**Notes:**

Angles should be measured at the extremities of the section. If the cases of the sections are convex, the angle should be measured by balancing by the arms of the protractor at the middle of the section.



**TABLE 18**  
**Solid & Hollow Sections: Flatness Tolerance**



Width of section (mm) A		Tolerance B
Over	Upto & including	± mm
-	25	0.18
25	38	0.25
38	50	0.30
50	-	0.30 plus 0.13 mm for every 25 mm of width (see ex.below)

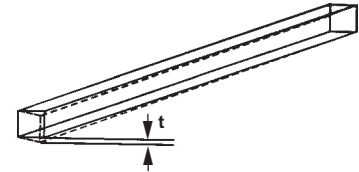
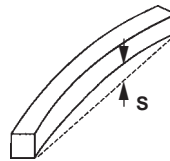
Example: The tolerances for a solid section of 150 mm width shall be as follows:

$$\pm(0.30 + 0.13 \times \frac{150}{25}) = (0.30 \pm 0.13 \times 6) = \pm 1.08 \text{ mm}$$

**Notes:**

1. Flatness tolerances is measure of concavity or convexity.
2. While measuring convexity, the straight edge shall be balanced at the middle of the section.

**TABLE 19**  
**Solid & Hollow Section: Twist & Straightness Tolerance**



**STRAIGHTNESS**

**TWIST**

Diameter of circumscribing circle mm	Allowable deviation from straightness mm per metre of length
Upto & including 25.0	2.1
Over 25.0	1.7

**Notes:**

1. Tolerance values are for same for straightness and twist.
2. Twist is normally measured by placing the extruded section on a flat surface and measuring the maximum distance at any point along its length between the bottom surface of the section and the flat surface. From this measurement, the deviation from true straightness of the section is subtracted. The remainder is the twist. To convert the standard twist tolerance to an equivalent inner value, the tangent of the standard tolerance is multiplied by the width of the surface of the section that is one of the flat surface.

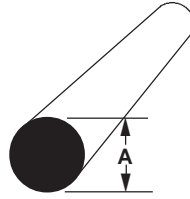
**TABLE 20**  
**Solid & Hollow Section: Cut Length Tolerance**

Width or diameter mm	Length 1,524 to 6,096 tolerance mm ±	Length 6,097 to 9,144 tolerance mm ±
Upto 50.0	6	10
50.1 to 100.0	8	11
100.1 to 150.0	10	13
150.1 to 200	12	14
200.1 to 250	13	16
250.1 to 280	16	19

All dimensions given in this catalogue are in 'mm'

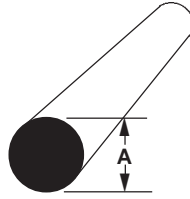


## Round Bar



Sec. No.	A	Kg/m	Sec. No.	A	Kg/m	Sec. No.	A	Kg/m
R001	6.35	0.086	R084	13.00	0.358	R187	21.00	0.935
R007	7.94	0.134	R189	14.00	0.416	R305	21.30	0.962
R182	8.00	0.136	R026	14.30	0.434	R112	21.50	0.980
R152	8.27	0.145	R064	14.70	0.458	R091	22.00	1.026
R156	8.60	0.157	R171	14.98	0.476	R166	22.00	1.026
R031	9.00	0.172	R032	15.00	0.477	R118	22.20	1.045
R100	9.40	0.187	R244	15.25	0.493	R008	22.22	1.047
R101	9.50	0.191	R004	15.88	0.535	R304	22.30	1.055
R002	9.52	0.192	R197	15.88	0.535	R163	22.55	1.078
R153	9.53	0.193	R317	15.88	0.535	R081	22.90	1.112
R145	9.55	0.193	R015	16.00	0.543	R137	23.00	1.122
R194	9.80	0.204	R122	16.00	0.543	R188	23.00	1.122
R013	10.00	0.212	R058	16.20	0.557	R256	23.25	1.146
R148	10.03	0.213	R067	16.70	0.591	R087	23.70	1.191
R010	10.06	0.215	R303	16.80	0.599	R061	23.81	1.202
R157	10.10	0.216	R229	17.00	0.613	R162	24.00	1.221
R165	10.13	0.218	R085	17.10	0.620	R217	24.30	1.252
R208	10.15	0.218	R151	17.40	0.642	R179	24.50	1.273
R019	10.16	0.219	R027	17.50	0.649	R065	25.00	1.325
R203	10.90	0.252	R190	17.50	0.649	R006	25.40	1.368
R011	11.13	0.263	R040	18.00	0.687	R125	25.50	1.379
R014	12.00	0.305	R216	18.30	0.710	R072	25.80	1.412
R038	12.00	0.305	R028	19.00	0.766	R111	25.80	1.412
R079	12.00	0.305	R124	19.00	0.766	R048	26.00	1.434
R149	12.03	0.307	R005	19.05	0.770	R099	26.50	1.489
R309	12.10	0.310	R075	19.05	0.770	R062	26.99	1.545
R034	12.19	0.315	R086	19.60	0.815	R095	28.00	1.663
R102	12.40	0.326	R029	20.00	0.848	R167	28.00	1.663
R104	12.50	0.331	R168	20.00	0.848	R046	28.58	1.732
R185	12.51	0.332	R218	20.30	0.874	R036	28.70	1.747
R176	12.55	0.334	R042	20.65	0.904	R083	28.80	1.759
R103	12.60	0.337	R158	20.80	0.917	R235	29.00	1.783
R003	12.70	0.342	R039	21.00	0.935	R016	30.00	1.909
R033	12.90	0.353	R074	21.00	0.935	R022	30.20	1.934

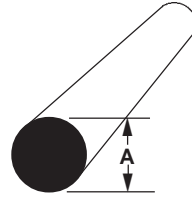
# Round Bar



Sec. No.	A	Kg/m	Sec. No.	A	Kg/m	Sec. No.	A	Kg/m
R155	30.20	1.934	R254	42.90	3.903	R110	63.50	8.551
R280	30.50	1.973	R206	44.45	4.190	R078	65.00	8.959
R023	31.00	2.038	R066	45.00	4.294	R272	65.00	8.959
R205	31.75	2.138	R135	46.00	4.487	R247	65.40	9.070
R041	32.00	2.171	R177	46.80	4.645	R230	66.75	9.448
R144	32.85	2.288	R097	47.00	4.684	R211	68.00	9.806
R180	32.85	2.288	R277	47.62	4.810	R276	69.20	10.155
R278	33.00	2.309	R270	47.70	4.825	R228	69.85	10.346
R043	33.30	2.351	R199	48.00	4.886	R115	70.00	10.391
R311	33.40	2.366	R204	48.00	4.886	R307	70.00	10.391
R275	33.50	2.380	R279	49.00	5.091	R319	70.00	10.391
R286	33.70	2.408	R018	50.00	5.301	R273	71.00	10.690
R246	33.90	2.437	R318	50.00	5.301	R282	71.00	10.690
R045	34.92	2.586	R020	50.80	5.472	R310	72.00	10.993
R117	34.92	2.586	R281	51.75	5.679	R252	73.00	11.301
R131	34.92	2.586	R050	52.00	5.734	R316	73.50	11.456
R134	34.93	2.587	R082	52.00	5.734	R161	75.00	11.928
R106	35.00	2.598	R080	53.00	5.957	R320	75.00	11.928
R107	35.10	2.613	R069	53.50	6.070	R021	76.20	12.313
R284	35.50	2.672	R077	53.50	6.070	R219	76.20	12.313
R251	35.75	2.709	R088	53.50	6.070	R291	78.00	12.902
R089	36.00	2.748	R070	54.00	6.184	R248	79.40	13.369
R140	37.50	2.982	R109	55.00	6.415	R051	80.00	13.572
R287	37.50	2.982	R196	56.00	6.650	R169	80.00	13.572
R024	38.10	3.078	R076	57.15	6.926	R300	80.20	13.640
R071	38.80	3.192	R139	57.15	6.927	R265	81.00	13.913
R098	39.00	3.225	R290	58.00	7.134	R142	82.00	14.259
R299	39.00	3.225	R096	60.00	7.634	R220	82.55	14.451
R017	40.00	3.393	R288	60.32	7.716	R053	84.00	14.963
R119	41.00	3.565	R174	60.50	7.762	R132	85.00	15.321
R186	41.20	3.600	R121	61.00	7.891	R173	85.00	15.321
R068	42.00	3.741	R212	62.50	8.284	R274	86.00	15.684
R181	42.20	3.776	R253	63.33	8.505	R154	87.00	16.051
R049	42.70	3.866	R025	63.50	8.551	R047	88.90	16.759



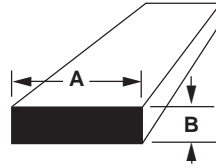
## Round Bar



Sec. No.	A	Kg/m	Sec. No.	A	Kg/m	Sec. No.	A	Kg/m
R113	89.00	16.797	R257	133.35	37.708	R239	197.00	82.297
R056	90.00	17.177	R207	135.00	38.648	R133	200.00	84.823
R321	90.00	17.177	R327	135.00	38.648	R240	203.00	87.387
R090	92.00	17.949	R200	136.00	39.222	R259	203.20	87.559
R105	94.00	18.737	R266	139.70	41.385	R245	205.00	89.117
R289	95.00	19.138	R054	140.00	41.563	R308	207.50	91.304
R221	95.25	19.239	R268	143.00	43.364	R242	209.00	92.629
R315	95.75	19.442	R183	145.00	44.585	R232	210.00	93.517
R123	100.00	21.206	R147	146.05	45.233	R227	211.00	94.410
R322	100.00	21.206	R059	150.00	47.713	R314	215.90	98.846
R292	101.00	21.632	R060	152.40	49.252	R243	216.00	98.937
R030	101.60	21.890	R128	153.00	49.641	R210	220.00	102.636
R215	101.60	21.890	R295	155.00	50.947	R191	226.00	108.310
R222	101.60	21.890	R313	156.00	51.660	R202	230.00	112.179
R120	102.00	22.063	R302	157.00	52.270	R294	234.95	117.059
R249	105.00	23.379	R296	158.75	53.442	R250	241.30	123.163
R298	106.00	23.827	R184	160.00	54.287	R231	250.00	132.536
R035	107.95	24.712	R213	160.00	54.287	R143	254.00	136.811
R223	107.95	24.711	R055	165.00	57.733	R195	254.00	136.811
R138	108.00	24.734	R258	165.10	57.803	R297	260.00	143.351
R052	110.00	25.659	R127	165.50	58.083	R285	266.70	150.834
R324	110.00	25.659	R164	170.00	61.285	R293	270.00	154.590
R224	114.30	27.704	R241	172.00	62.703	R170	280.00	166.253
R234	115.00	28.045	R136	175.00	64.943	R267	284.00	171.037
R301	116.50	28.779	R236	177.00	66.435	R172	289.00	177.113
R057	120.00	30.536	R261	177.80	67.037			
R323	120.00	30.536	R159	180.00	68.707			
R225	120.65	30.868	R237	184.00	71.794			
R073	125.00	33.134	R306	184.00	71.794			
R325	125.00	33.134	R129	187.50	74.552			
R130	126.00	33.666	R063	188.00	74.950			
R226	127.00	34.203	R233	190.00	76.553			
R201	130.00	35.838	R238	190.00	76.553			
R326	130.00	35.838	R260	190.50	76.956			



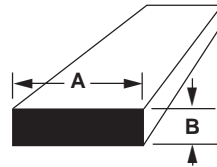
# Flat Bar



Sec. No.	A	B	Kg/m	Sec. No.	A	B	Kg/m
F197	9.30	4.70	0.118	F395	20.00	6.00	0.324
F222	10.00	3.00	0.081	F049	20.00	8.00	0.432
F048	12.00	2.00	0.065	F311	20.00	10.00	0.540
F196	12.00	3.00	0.097	F051	20.00	14.00	0.756
F251	12.00	3.08	0.100	F524	20.00	15.00	0.809
F090	12.00	6.00	0.194	F053	22.23	6.35	0.381
F502	12.70	2.30	0.079	F085	22.23	19.05	1.143
F507	12.70	4.50	0.154	F380	25.00	2.90	0.196
F259	12.70	6.40	0.219	F043	25.00	3.00	0.203
F116	12.70	7.94	0.272	F312	25.00	4.00	0.270
F635	12.70	9.52	0.326	F376	25.00	5.00	0.335
F697	13.00	4.00	0.140	F522	25.00	5.00	0.338
F038	14.27	3.96	0.153	F045	25.00	6.00	0.405
F248	14.98	2.95	0.119	F381	25.00	6.00	0.405
F449	15.00	10.00	0.405	F670	25.00	6.55	0.442
F002	15.09	3.18	0.130	F680	25.00	10.00	0.675
F039	15.88	9.52	0.408	F091	25.00	12.00	0.810
F499	16.00	6.00	0.259	F360	25.00	20.00	1.350
F317	17.00	4.00	0.184	F336	25.40	2.50	0.171
F326	17.00	4.17	0.191	F397	25.40	2.80	0.192
F191	19.00	4.00	0.205	F007	25.40	3.18	0.218
F050	19.00	5.00	0.257	F097	25.40	3.60	0.247
F221	19.05	2.03	0.104	F403	25.40	4.50	0.309
F396	19.05	2.80	0.144	F633	25.40	6.00	0.410
F004	19.05	3.18	0.164	F204	25.40	6.35	0.435
F267	19.05	3.66	0.186	F008	25.40	6.36	0.435
F005	19.05	4.78	0.246	F093	25.40	9.52	0.653
F390	19.05	6.00	0.309	F419	25.40	12.00	0.823
F037	19.05	6.35	0.327	F260	25.40	12.70	0.871
F505	19.05	9.53	0.490	F046	25.40	14.30	0.981
F175	19.05	12.70	0.653	F484	25.40	15.80	1.084
F270	19.05	15.87	0.815	F404	25.40	19.05	1.306
F365	19.20	3.70	0.191	F301	25.40	22.23	1.525
F006	19.84	3.18	0.170	F254	29.75	4.75	0.382
F047	20.00	3.00	0.162	F544	30.00	1.50	0.122
F623	20.00	5.00	0.270	F444	30.00	2.00	0.162

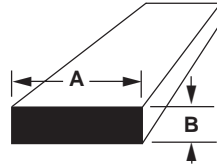


## Flat Bar



Sec. No.	A	B	Kg/m	Sec. No.	A	B	Kg/m
F081	30.00	5.00	0.405	F504	38.10	7.92	0.815
F375	30.00	5.00	0.403	F014	38.10	9.52	0.979
F702	30.00	6.00	0.486	F420	38.10	12.00	1.234
F454	30.00	10.00	0.810	F028	38.10	12.70	1.306
F699	30.00	15.00	1.349	F405	38.10	15.80	1.625
F265	30.00	20.00	1.620	F382	38.10	19.05	1.960
F027	30.18	12.70	1.035	F342	38.10	22.00	2.263
F211	31.75	2.50	0.214	F437	38.10	25.40	2.613
F021	31.75	3.18	0.273	F034	38.10	31.75	3.266
F391	31.75	4.50	0.386	F616	38.10	32.00	3.292
F010	31.75	4.78	0.410	F473	38.50	1.90	0.198
F508	31.75	6.00	0.514	F167	39.00	3.60	0.379
F011	31.75	6.35	0.544	F298	39.50	9.70	1.035
F026	31.75	7.37	0.632	F022	39.70	3.18	0.341
F025	31.75	8.13	0.697	F334	40.00	3.15	0.340
F416	31.75	9.00	0.772	F528	40.00	4.00	0.432
F012	31.75	9.52	0.816	F337	40.00	5.00	0.540
F103	31.75	12.70	1.089	F215	40.00	6.00	0.648
F428	31.75	15.90	1.363	F368	40.00	7.50	0.810
F586	31.75	19.05	1.633	F313	40.00	8.00	0.864
F536	31.75	25.40	2.177	F214	40.00	10.00	1.080
F044	32.00	6.00	0.518	F701	40.00	12.00	1.295
F441	35.00	3.00	0.284	F092	40.00	15.00	1.620
F402	35.00	5.00	0.473	F205	40.00	20.00	2.160
F525	35.00	20.00	1.889	F532	40.00	25.00	2.699
F386	37.50	2.90	0.294	F374	40.00	30.00	3.240
F279	37.50	3.25	0.329	F540	40.00	35.00	3.779
F387	37.50	6.00	0.608	F219	40.50	10.20	1.115
F310	37.50	9.52	0.964	F668	41.68	27.20	3.060
F253	38.10	1.60	0.165	F042	42.00	6.00	0.680
F399	38.10	2.80	0.288	F257	42.35	5.50	0.629
F640	38.10	3.00	0.308	F166	44.00	3.90	0.463
F545	38.10	4.50	0.463	F537	44.00	38.00	4.513
F101	38.10	4.78	0.492	F041	44.45	6.35	0.762
F371	38.10	6.00	0.617	F613	44.45	9.53	1.144
F013	38.10	6.35	0.653	F029	44.45	12.70	1.524

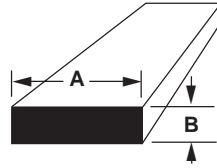
# Flat Bar



Sec. No.	A	B	Kg/m	Sec. No.	A	B	Kg/m
F598	44.45	15.88	1.906	F637	50.80	8.00	1.097
F615	44.45	19.05	2.286	F612	50.80	8.20	1.125
F600	44.45	25.40	3.048	F672	50.80	9.00	1.234
F343	44.45	31.75	3.810	F016	50.80	9.52	1.306
F485	44.45	38.10	4.573	F030	50.80	12.70	1.742
F353	45.00	5.00	0.608	F406	50.80	15.80	2.167
F203	45.00	25.00	3.038	F280	50.80	19.00	2.606
F291	45.00	25.00	3.038	F122	50.80	22.23	3.049
F617	45.00	32.00	3.888	F281	50.80	25.40	3.484
F539	47.63	9.53	1.225	F061	50.80	31.75	4.355
F331	49.00	1.40	0.187	F519	50.80	32.00	4.387
F082	50.00	2.50	0.338	F352	50.80	36.00	4.938
F576	50.00	3.00	0.405	F438	50.80	38.10	5.226
F136	50.00	5.00	0.675	F619	50.80	40.00	5.486
F302	50.00	5.05	0.682	F062	50.80	44.45	6.097
F393	50.00	6.00	0.810	F378	51.80	33.80	4.727
F455	50.00	6.00	0.810	F350	52.50	2.00	0.284
F238	50.00	6.50	0.878	F084	53.98	19.05	2.776
F666	50.00	6.70	0.904	F335	55.00	3.15	0.468
F282	50.00	8.00	1.080	F233	55.00	40.00	5.940
F316	50.00	9.52	1.285	F098	57.00	4.40	0.677
F137	50.00	10.00	1.350	F526	57.00	12.00	1.846
F177	50.00	11.30	1.526	F131	57.15	4.70	0.725
F329	50.00	12.00	1.620	F344	57.15	19.05	2.940
F240	50.00	13.00	1.755	F517	57.15	25.40	3.918
F671	50.00	15.00	2.025	F558	58.00	8.00	1.251
F125	50.00	20.00	2.700	F348	59.54	6.35	1.021
F292	50.00	20.00	2.700	F114	60.00	2.00	0.324
F695	50.00	30.00	4.049	F138	60.00	5.00	0.810
F653	50.00	40.00	5.400	F347	60.00	6.00	0.972
F024	50.80	1.98	0.272	F135	60.00	8.00	1.296
F592	50.80	3.18	0.436	F139	60.00	10.00	1.620
F410	50.80	4.50	0.617	F239	60.00	10.00	1.620
F401	50.80	5.80	0.796	F584	60.00	15.00	2.430
F678	50.80	6.00	0.823	F585	60.00	20.00	3.240
F015	50.80	6.35	0.871	F206	60.00	25.00	4.050

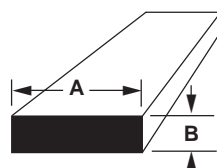


## Flat Bar



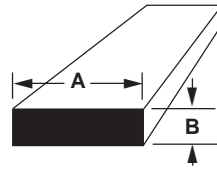
Sec. No.	A	B	Kg/m	Sec. No.	A	B	Kg/m
F207	60.00	30.00	4.860	F450	70.00	15.00	2.835
F515	60.00	36.00	5.831	F209	70.00	25.00	4.725
F059	60.00	38.00	6.156	F486	70.00	30.00	5.669
F290	60.00	40.00	6.480	F433	70.00	40.00	7.560
F409	62.00	3.00	0.502	F234	70.00	50.00	9.450
F160	63.00	3.25	0.553	F414	74.00	2.28	0.456
F146	63.00	4.00	0.680	F442	74.00	3.00	0.599
F295	63.00	12.00	2.041	F161	75.00	4.40	0.891
F056	63.00	19.00	3.232	F394	75.00	6.00	1.215
F462	63.50	3.00	0.514	F241	75.00	6.50	1.316
F149	63.50	4.37	0.749	F327	75.00	9.52	1.928
F673	63.50	4.50	0.771	F263	75.00	10.00	2.016
F392	63.50	6.00	1.029	F296	75.00	12.00	2.430
F074	63.50	6.35	1.089	F244	75.00	13.00	2.633
F300	63.50	6.40	1.097	F266	75.00	25.00	5.063
F482	63.50	7.92	1.358	F289	75.00	35.00	7.088
F418	63.50	9.00	1.543	F245	75.00	55.00	11.136
F031	63.50	9.52	1.632	F413	76.00	3.30	0.677
F421	63.50	12.00	2.057	F258	76.00	15.00	3.078
F052	63.50	12.70	2.177	F634	76.20	3.18	0.653
F463	63.50	15.90	2.726	F032	76.20	4.78	0.983
F412	63.50	19.05	3.266	F134	76.20	5.50	1.132
F123	63.50	22.23	3.811	F411	76.20	6.00	1.234
F464	63.50	25.40	4.355	F033	76.20	6.35	1.306
F601	63.50	31.75	5.444	F261	76.20	6.40	1.317
F602	63.50	38.10	6.532	F439	76.20	7.94	1.634
F677	63.50	44.45	7.621	F372	76.20	9.00	1.852
F646	63.50	50.80	8.704	F182	76.20	9.52	1.959
F057	65.00	22.00	3.861	F491	76.20	10.00	2.057
F252	65.00	25.00	4.388	F578	76.20	12.00	2.467
F618	65.00	32.00	5.616	F262	76.20	12.70	2.613
F208	65.00	35.00	6.143	F407	76.20	15.80	3.251
F620	65.00	40.00	7.020	F383	76.20	19.05	3.919
F621	65.00	52.00	9.126	F080	76.20	22.22	4.572
F159	69.00	5.50	1.025	F384	76.20	25.40	5.226
F152	69.50	3.60	0.676	F589	76.20	31.75	6.532

# Flat Bar



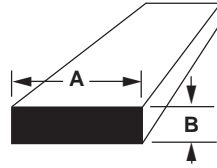
Sec. No.	A	B	Kg/m	Sec. No.	A	B	Kg/m
F465	76.20	38.10	7.839	F688	88.90	50.80	12.193
F107	76.20	40.00	8.230	F691	88.90	63.50	15.240
F073	76.20	44.45	9.144	F189	88.90	76.20	18.288
F588	76.20	50.80	10.452	F520	89.20	76.50	18.424
F603	76.20	63.50	13.064	F278	90.00	2.45	0.595
F127	78.00	3.50	0.737	F480	90.00	9.50	2.309
F622	78.00	52.00	10.951	F423	90.00	10.00	2.430
F489	80.00	2.50	0.540	F108	90.00	32.00	7.776
F168	80.00	4.70	1.015	F452	90.00	70.00	17.010
F195	80.00	6.00	1.296	F171	92.00	3.25	0.807
F227	80.00	6.00	1.296	F172	92.00	3.50	0.869
F226	80.00	8.00	1.728	F173	92.00	4.00	0.994
F304	80.00	8.05	1.739	F477	93.00	35.00	8.786
F220	80.00	10.00	2.160	F641	100.00	3.00	0.810
F332	80.00	12.00	2.592	F495	100.00	5.00	1.350
F487	80.00	15.00	3.239	F133	100.00	5.25	1.418
F210	80.00	20.00	4.320	F330	100.00	6.00	1.620
F324	80.00	25.00	5.400	F237	100.00	6.50	1.755
F314	80.00	30.00	6.480	F283	100.00	8.00	2.160
F017	80.16	5.94	1.286	F094	100.00	10.00	2.700
F162	81.00	3.20	0.700	F235	100.00	10.00	2.700
F065	85.00	7.50	1.721	F264	100.00	10.00	2.691
F559	85.00	8.00	1.835	F307	100.00	10.05	2.714
F510	85.00	22.00	5.049	F305	100.00	10.10	2.727
F058	85.00	28.00	6.426	F297	100.00	12.00	3.240
F315	85.00	65.00	14.918	F243	100.00	13.00	3.510
F288	85.00	68.00	15.606	F361	100.00	15.00	4.050
F593	88.90	6.00	1.440	F379	100.00	16.00	4.318
F687	88.90	6.35	1.524	F461	100.00	20.00	5.400
F614	88.90	9.53	2.287	F110	100.00	25.00	6.750
F229	88.90	12.70	3.048	F501	101.60	3.00	0.823
F594	88.90	15.88	3.811	F694	101.60	3.17	0.870
F604	88.90	19.05	4.573	F503	101.60	4.50	1.234
F104	88.90	25.40	6.097	F373	101.60	6.00	1.646
F457	88.90	38.10	9.145	F388	101.60	6.00	1.646
F299	88.90	44.45	10.669	F036	101.60	6.35	1.742





Sec. No.	A	B	Kg/m	Sec. No.	A	B	Kg/m
F102	101.60	6.35	1.742	F200	112.00	6.40	1.935
F577	101.60	8.00	2.178	F476	114.30	6.35	1.960
F661	101.60	9.00	2.467	F706	114.30	25.40	7.838
F096	101.60	9.52	2.612	F447	114.30	38.10	11.758
F422	101.60	12.00	3.292	F493	114.30	50.80	15.677
F066	101.60	12.70	3.484	F459	114.30	88.90	27.436
F479	101.60	15.90	4.362	F642	115.00	73.00	22.667
F408	101.60	19.05	5.226	F551	120.00	8.00	2.591
F124	101.60	22.23	6.098	F431	120.00	10.00	3.240
F105	101.60	25.40	6.968	F516	120.00	12.00	3.887
F548	101.60	31.75	8.710	F246	120.00	30.00	9.719
F077	101.60	34.93	9.582	F514	120.00	50.00	16.200
F546	101.60	38.10	10.452	F451	120.00	60.00	19.440
F169	101.60	40.00	10.973	F247	120.00	70.00	22.679
F118	101.60	44.45	12.194	F115	120.00	80.00	25.920
F079	101.60	50.80	13.935	F364	123.00	3.20	1.063
F467	101.60	57.15	15.677	F705	124.00	4.00	1.339
F605	101.60	63.50	17.419	F121	125.00	5.08	1.715
F638	101.60	76.20	20.903	F163	125.00	5.50	1.856
F333	101.60	82.55	22.643	F180	125.00	10.00	3.375
F150	103.00	69.00	19.189	F294	125.00	12.00	4.050
F132	105.00	4.40	1.247	F509	125.00	22.00	7.425
F527	105.00	5.00	1.417	F249	127.00	6.35	2.177
F100	106.36	4.76	1.367	F113	127.00	9.52	3.264
F198	107.00	6.35	1.835	F144	127.00	12.70	4.355
F468	107.95	19.05	5.552	F500	127.00	12.70	4.355
F458	107.95	25.40	7.403	F303	127.00	12.72	4.362
F106	108.00	5.00	1.458	F555	127.00	15.80	5.418
F708	108.00	8.00	2.331	F385	127.00	19.05	6.532
F224	108.00	98.00	28.577	F129	127.00	22.23	7.623
F325	110.00	4.35	1.292	F606	127.00	25.40	8.710
F286	110.00	6.00	1.782	F078	127.00	28.58	9.800
F328	110.00	6.35	1.886	F086	127.00	31.75	10.887
F184	110.00	6.40	1.901	F639	127.00	38.10	13.064
F471	110.00	40.00	11.880	F709	127.00	44.45	15.240
F111	110.00	60.00	17.820	F590	127.00	50.80	17.419

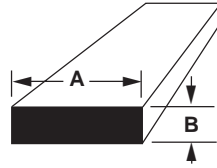
# Flat Bar



Sec. No.	A	B	Kg/m	Sec. No.	A	B	Kg/m
F187	127.00	57.15	19.597	F067	152.40	12.70	5.226
F448	127.00	63.50	21.774	F636	152.40	15.88	6.532
F188	127.00	76.20	26.129	F690	152.40	19.05	7.837
F435	130.00	10.00	3.510	F498	152.40	25.40	10.452
F109	130.00	30.00	10.530	F170	152.40	31.75	13.064
F436	130.00	45.00	15.794	F684	152.40	38.10	15.677
F523	130.00	50.80	17.830	F497	152.40	50.80	20.903
F644	130.00	65.00	22.814	F478	152.40	63.50	26.127
F284	135.00	8.00	2.916	F607	152.40	76.20	31.355
F470	135.00	24.00	8.748	F700	152.40	88.90	36.579
F556	137.16	8.38	3.103	F591	152.40	101.60	41.806
F277	138.00	30.00	11.178	F608	152.40	101.60	41.806
F456	139.70	25.40	9.580	F440	152.42	19.05	7.840
F199	140.00	20.00	7.560	F154	153.00	21.50	8.882
F345	140.00	22.00	8.316	F145	155.00	65.00	27.203
F349	140.00	35.00	13.230	F274	160.00	10.00	4.320
F218	140.00	45.00	17.010	F481	160.00	16.00	6.912
F217	140.00	90.00	34.020	F538	160.00	16.35	7.062
F704	141.00	16.50	6.280	F141	170.00	15.00	6.885
F557	142.24	6.86	2.634	F426	170.00	32.00	14.688
F521	145.00	115.00	45.021	F216	172.00	6.40	2.970
F595	150.00	6.00	2.430	F692	172.00	12.00	5.572
F089	150.00	7.50	3.038	F693	173.00	14.00	6.539
F285	150.00	8.00	3.240	F429	175.00	5.00	2.363
F095	150.00	10.00	4.050	F351	175.00	38.00	17.955
F230	150.00	10.00	4.050	F321	175.00	52.00	24.570
F268	150.00	10.00	4.050	F322	175.00	95.00	44.888
F596	150.00	12.00	4.860	F518	176.00	13.00	6.178
F140	150.00	25.00	10.125	F496	177.80	25.00	12.193
F213	150.00	30.00	12.150	F003	178.10	16.00	7.694
F549	150.00	40.00	16.200	F275	180.00	10.00	4.860
F076	150.00	75.00	30.375	F445	180.00	77.00	37.421
F075	152.00	6.00	2.462	F112	182.88	19.05	9.406
F625	152.40	4.76	1.959	F446	185.00	30.00	14.985
F271	152.40	6.35	2.613	F543	185.00	70.00	34.965
F272	152.40	9.52	3.917	F657	185.00	85.00	42.457



## Flat Bar

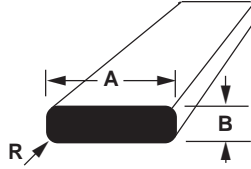


Sec. No.	A	B	Kg/m	Sec. No.	A	B	Kg/m
F359	186.00	10.00	5.022	F541	235.00	35.00	22.208
F425	190.00	50.00	25.650	F542	235.00	50.00	31.725
F369	200.00	8.00	4.320	F201	245.00	14.00	9.261
F193	200.00	10.00	5.400	F696	250.00	9.20	6.209
F432	200.00	12.00	6.480	F181	250.00	16.00	10.800
F242	200.00	13.00	7.020	F647	253.00	12.00	8.197
F654	200.00	16.00	8.640	F069	254.00	12.70	8.710
F276	200.00	20.00	10.800	F683	254.00	25.40	17.418
F306	200.00	20.05	10.827	F466	254.00	50.80	34.839
F319	200.00	25.00	13.500	F338	255.00	17.00	11.705
F143	200.00	35.00	18.900	F453	255.00	22.00	15.147
F370	200.00	40.00	21.600	F339	257.00	15.88	11.019
F658	200.00	50.00	26.999	F648	260.00	15.00	10.530
F320	200.00	52.00	28.080	F424	260.00	38.00	26.676
F323	200.00	59.00	31.860	F663	260.00	40.00	28.079
F363	200.00	76.20	41.148	F530	260.00	55.00	38.609
F474	203.20	6.00	3.291	F231	265.00	4.70	3.363
F483	203.20	6.35	3.484	F358	266.70	25.40	18.290
F273	203.20	9.52	5.223	F553	270.00	65.00	47.385
F054	203.20	12.70	6.968	F492	275.00	23.00	17.078
F571	203.20	12.70	6.966	F087	279.40	12.70	9.581
F072	203.20	25.40	13.935	F488	280.00	9.53	7.205
F707	205.00	15.00	8.301	F649	283.00	15.00	11.462
F662	205.00	85.00	47.046	F362	285.00	25.00	19.238
F552	210.00	8.00	4.535	F513	286.00	6.35	4.903
F669	212.00	38.00	21.750	F652	286.00	18.00	13.900
F659	220.00	55.00	32.669	F511	290.00	9.53	7.462
F287	222.00	32.00	19.181	F308	300.00	6.00	4.860
F070	223.00	52.00	31.309	F068	304.80	12.70	10.452
F512	224.00	4.83	2.921	F645	305.00	23.00	18.941
F293	225.00	10.00	6.074	F064	305.00	25.40	20.917
F158	225.00	43.00	26.123	F165	305.00	43.00	35.411
F534	229.00	19.00	11.748	F494	310.00	16.00	13.392
F472	229.50	15.00	9.295	F665	310.00	25.40	21.259
F309	230.00	6.00	3.726	F427	315.00	24.00	20.412
F533	230.00	16.00	9.935	F367	315.00	65.00	55.283



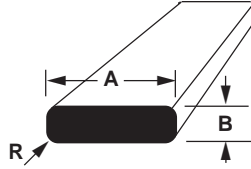


## Flat Bar with corner radius



Sec. No.	A	B	R	Kg/m	Sec. No.	A	B	R	Kg/m
6305	9.93	7.95	1.60	0.207	5576	50.00	12.00	3.00	1.599
5501	15.88	2.03	0.00	0.085	5316	50.00	16.00	1.60	2.154
5529	15.88	2.38	0.64	0.101	5355	50.00	20.00	1.00	2.698
5564	18.80	3.66	0.80	0.184	5510	50.80	2.39	0.79	0.327
5502	19.05	2.64	1.32	0.132	WB01	50.80	50.80	6.35	6.874
5516	19.05	3.18	0.00	0.158	5240	51.00	47.00	3.00	6.451
5519	20.00	3.00	1.50	0.159	5587	51.50	12.70	4.00	1.729
5506	20.00	5.00	2.50	0.263	5243	52.00	42.00	2.00	5.888
5551	22.00	2.00	0.30	0.119	5589	52.00	47.00	2.00	6.590
5209	22.00	14.00	1.00	0.809	5350	57.15	31.75	1.80	4.892
5590	25.00	2.85	2.85	0.183	5577	60.00	10.00	1.50	1.606
5570	25.00	3.00	0.80	0.201	5568	60.00	10.00	2.00	1.611
F531	25.40	3.18	0.80	0.217	5257	63.50	50.80	1.00	8.707
5505	25.40	3.18	1.98	0.213	5242	65.00	27.50	2.00	4.817
5341	25.40	4.76	2.38	0.313	5328	66.50	28.40	5.00	5.041
5504	28.58	3.18	1.59	0.242	5323	66.50	34.75	5.00	6.181
5567	30.00	10.00	2.00	0.801	5324	66.50	53.80	5.00	9.602
5525	31.20	8.05	1.20	0.675	5252	68.00	14.00	1.00	2.568
5255	31.75	19.05	1.50	1.628	5348	75.00	6.00	2.00	1.206
5571	35.00	20.00	0.00	1.889	5244	75.00	6.00	3.00	1.194
5235	40.00	25.00	3.00	2.679	5202	75.00	10.00	2.00	2.016
5228	40.00	27.50	3.00	2.949	5211	75.00	10.00	2.00	2.016
5550	40.64	10.16	2.00	1.106	5595	75.00	10.00	2.00	2.016
5226	40.64	11.40	2.00	1.242	5536	76.20	6.35	2.00	1.297
5223	40.64	12.70	2.00	1.384	5572	76.20	6.35	3.17	1.283
5219	44.00	34.00	0.00	4.002	5549	76.20	9.52	2.00	1.949
5542	45.00	10.00	5.00	1.186	5217	76.20	12.70	4.00	2.576
5246	50.00	6.00	2.00	0.801	WB03	76.20	76.20	9.50	15.468
6374	50.00	6.30	0.00	0.827	5596	80.00	10.00	3.00	2.139
5338	50.00	10.00	3.00	1.329	5351	80.00	60.00	1.80	12.952
5200	50.00	12.00	3.00	1.599	5354	82.55	41.27	2.50	9.184

## Flat Bar with corner radius

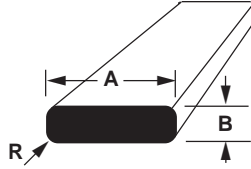


Sec. No.	A	B	R	Kg/m	Sec. No.	A	B	R	Kg/m
5225	88.90	31.75	1.50	7.616	5298	150.00	40.00	3.00	16.179
5325	95.00	75.00	10.00	19.006	5582	150.00	100.00	3.00	40.479
5222	96.00	64.00	2.00	16.580	5291	152.00	63.00	3.00	25.834
5267	97.40	51.50	16.00	12.950	5343	152.00	112.00	5.00	45.907
5212	100.00	10.00	2.00	2.691	5538	152.40	6.35	2.00	2.604
5599	100.00	12.00	3.00	3.219	5574	152.40	6.35	3.17	2.590
5247	100.00	17.00	2.00	4.581	5258	152.40	16.00	1.00	6.581
5218	100.00	20.00	3.00	5.379	5265	155.00	125.00	3.00	52.292
5352	100.00	25.00	1.00	6.748	5314	160.00	90.00	3.00	38.859
5537	101.60	6.35	2.00	1.733	5339	165.00	120.00	0.00	53.460
5573	101.60	6.35	3.17	1.719	5268	170.00	135.00	2.00	61.956
5555	101.60	9.52	2.00	2.602	5335	175.00	3.18	0.00	1.497
5230	101.60	50.80	2.00	13.926	5321	180.00	150.00	5.00	72.842
5326	101.60	88.90	2.00	24.378	5264	193.00	93.00	3.00	48.442
WB02	101.60	101.60	12.70	27.497	5344	200.00	6.00	2.00	3.231
5591	102.00	4.50	2.00	1.230	5598	200.00	12.00	3.00	6.459
5317	108.00	76.00	2.00	22.152	5278	200.00	35.00	5.00	18.842
5237	117.00	62.20	20.00	18.722	5569	200.00	80.00	3.00	43.179
5594	120.00	16.00	3.00	5.163	5336	203.00	52.00	5.00	28.443
5340	120.65	63.50	1.80	20.678	5337	203.00	62.00	1.00	33.980
5565	125.00	2.50	1.25	0.840	5295	206.00	56.00	3.00	31.126
5345	125.00	6.00	2.00	2.016	5275	215.00	38.00	3.00	22.038
5204	127.00	6.35	0.00	2.154	5584	220.00	75.00	2.00	44.541
5287	127.00	25.40	5.00	8.573	5583	220.00	95.00	2.00	56.421
5346	127.00	44.45	1.80	15.234	5322	230.00	100.00	2.00	62.091
5347	127.00	44.45	1.80	15.234	5227	233.00	17.50	2.00	11.000
5320	127.00	101.60	2.00	34.829	5289	235.00	16.00	1.50	10.147
5231	140.00	22.00	2.00	8.307	5271	235.00	115.00	3.00	72.947
5349	150.00	6.00	2.00	2.421	5269	235.00	130.00	2.00	82.476
5245	150.00	12.00	3.00	4.839	5221	235.00	155.00	8.00	98.199
5353	150.00	30.00	1.00	12.148	5292	242.00	60.00	3.00	39.183



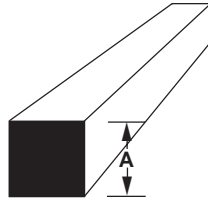


## Flat Bar with corner radius



Sec. No.	A	B	R	Kg/m	Sec. No.	A	B	R	Kg/m
5273	244.00	38.00	2.00	25.025	5282	290.00	29.00	3.00	22.686
5308	245.00	115.00	5.00	76.014	5297	295.00	75.00	5.00	59.679
5293	246.00	63.00	3.00	41.824	5597	300.00	6.00	3.00	4.839
5283	250.00	41.00	5.00	27.617	5302	300.00	25.00	3.00	20.229
5296	250.00	70.00	3.00	47.229	5303	300.00	28.00	3.00	22.659
5331	255.00	17.00	5.00	11.647	5229	300.00	40.00	3.00	32.379
5588	255.00	22.00	2.50	15.138	5332	300.00	50.00	2.00	40.491
5300	255.00	25.00	3.00	17.192	5304	300.00	63.00	5.00	50.972
5327	255.00	95.00	10.00	65.176	5333	300.00	70.00	2.00	56.691
5241	255.00	125.00	5.00	86.004	5334	300.00	90.00	2.00	72.891
5259	256.00	4.82	2.00	3.322	5313	305.00	20.71	3.00	17.034
5260	256.00	9.52	2.00	6.571	5266	305.00	23.00	1.50	18.920
5277	256.00	10.00	2.00	6.903	5556	306.40	25.40	1.50	21.008
5301	260.00	19.00	2.00	13.329	5305	310.00	50.00	5.00	41.792
5286	260.00	23.00	3.00	16.125	5233	315.00	50.00	4.00	42.488
5329	267.00	23.00	3.00	16.560	5234	315.00	65.00	4.00	55.245
5330	270.00	23.00	5.00	16.709	5315	325.00	40.00	5.00	35.042
5249	270.00	65.00	1.00	47.383	5239	330.00	8.00	2.00	7.119
5285	272.20	42.20	3.00	30.994					

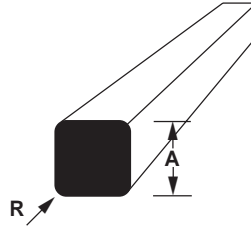
# Square Bar



Sec. No.	A	Kg/m	Sec. No.	A	Kg/m
S001	6.35	0.109	S023	80.00	17.280
S002	9.52	0.245	S029	41.28	4.601
S003	12.70	0.435	S034	75.05	15.187
S004	15.88	0.681	S035	141.00	53.679
S005	19.05	0.980	S039	65.00	11.408
S006	25.40	1.742	S042	22.00	1.307
S007	10.00	0.270	S043	76.20	15.677
S008	16.00	0.691	S044	63.50	10.887
S009	20.00	1.080	S048	31.75	2.722
S010	38.10	3.919	S049	57.15	8.817
S011	60.00	9.720	S050	114.30	35.274
S012	75.00	15.188	S051	70.00	13.229
S013	45.00	5.468	S052	165.10	73.576
S014	85.00	19.508	S056	44.45	5.334
S015	90.00	21.870	S063	100.00	27.000
S016	110.00	32.670	S066	30.00	2.430
S017	150.00	60.750	S070	40.00	4.320
S018	12.00	0.389	S072	15.00	0.607
S019	35.00	3.308	S073	11.90	0.382
S020	7.00	0.132	S074	65.00	11.408
S021	50.80	6.968	S077	101.60	27.869
S022	50.00	6.749			

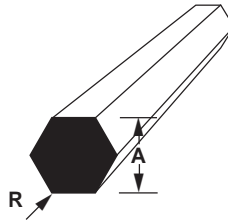


## Square Bar with corner radius



Sec. No.	A	R	Kg/m	Sec. No.	A	R	Kg/m
S076	25.00	0.80	1.686	S069	100.00	10.00	26.768
S080	32.00	0.40	2.764	S086	100.00	2.50	26.986
S046	40.00	3.00	4.299	S032	101.60	2.00	27.862
S087	40.00	1.50	4.315	S067	102.30	2.00	28.247
S075	44.45	4.00	5.298	S071	107.95	2.00	31.454
S083	45.00	1.50	5.462	S058	110.00	5.00	32.612
S041	47.60	3.00	6.097	S024	120.00	2.00	38.871
S059	50.00	4.00	6.713	S025	125.00	2.00	42.178
S084	50.00	1.50	6.745	S079	127.00	1.00	43.546
S082	50.80	5.00	6.910	S064	127.70	2.00	44.021
S037	55.00	3.00	8.147	S026	130.00	2.00	45.621
S085	60.00	2.00	9.711	S062	140.00	2.00	52.911
S033	63.00	2.00	10.707	S027	150.80	2.00	60.741
S060	64.00	5.00	11.001	S055	152.40	5.00	62.652
S053	79.00	2.00	16.841	S068	152.40	2.00	62.700
S031	80.00	3.00	17.259	S028	155.00	2.00	64.858
S081	80.00	5.00	17.222	S057	177.80	3.00	85.334
S038	82.55	3.00	18.378	S045	190.00	3.00	97.449
S078	88.90	0.80	21.337	S040	200.00	5.00	107.942
6538	90.00	5.00	21.812	S065	201.00	20.00	108.156
S061	95.25	2.00	24.487				

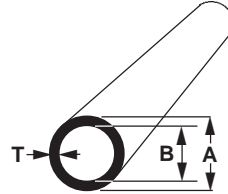
# Hexagonal Bar



Sec. No.	A	R	Kg/m	Sec. No.	A	R	Kg/m
H029	6.35		0.094	H042	24.00		1.347
H006	7.00		0.115	H025	25.40		1.509
H022	8.00		0.150	H008	27.00		1.704
H001	9.52		0.212	H043	27.00		1.705
H031	11.00		0.283	H030	28.50		1.899
H002	12.70		0.377	H015	30.00		2.105
H026	13.00		0.395	H016	31.75		2.357
H039	14.00		0.458	H017	32.00		2.394
H032	14.20		0.471	H044	32.00	3.00	2.387
H003	15.88		0.589	H014	33.00		2.547
H018	17.00		0.676	H023	36.00		3.030
H037	17.00		0.676	H036	38.10	0.80	3.394
H040	17.00		0.676	H024	41.00	1.00	3.930
H010	18.00		0.758	H027	41.26	2.00	3.977
H041	19.00		0.844	H045	42.42	0.40	4.208
H004	19.05		0.849	H035	50.00		5.846
H009	22.00		1.132	H021	55.00	1.00	7.073
H033	22.00		1.132	H028	63.50	0.50	9.428
H019	22.22		1.154	H038	70.00		11.458
H020	24.00		1.347				

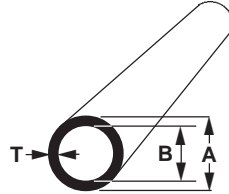


## Round Tube



Sec. No.	A	T	B	Kg/m	Sec. No.	A	T	B	Kg/m
9588	7.94	1.27	5.40	0.072	8047	20.10	5.70	8.70	0.696
9748	7.94	1.27	5.40	0.072	9919	21.00	2.00	17.00	0.322
9915	9.52	1.20	7.12	0.085	8256	21.00	4.40	12.20	0.620
9006	9.52	1.40	6.72	0.096	8123	21.00	5.00	11.00	0.679
9647	11.11	1.68	7.75	0.134	9512	22.00	1.19	19.50	0.220
9881	12.00	0.80	10.40	0.076	9440	22.00	2.50	17.00	0.414
9651	12.20	1.27	9.66	0.118	8255	22.00	3.75	14.50	0.581
8007	12.60	2.40	7.80	0.208	8045	22.00	5.48	11.00	0.770
9537	12.70	1.27	10.16	0.123	9479	22.01	1.60	18.80	0.277
8153	12.70	1.63	9.44	0.153	8003	22.22	1.22	19.78	0.217
8008	14.20	3.20	7.80	0.299	8154	22.22	1.63	18.96	0.285
9012	15.88	1.30	13.28	0.161	8046	23.20	4.75	13.70	0.743
9540	15.88	2.80	10.28	0.311	8230	23.20	6.00	11.20	0.875
9467	16.00	1.60	12.80	0.198	9029	24.00	2.75	20.50	0.496
8057	16.00	1.80	12.40	0.217	9073	25.00	1.20	22.60	0.242
8030	16.00	2.93	10.15	0.324	8112	25.00	1.50	22.00	0.299
8198	16.00	3.00	10.00	0.331	9466	25.00	1.60	21.80	0.318
9464	16.00	4.00	8.00	0.407	9046	25.00	1.62	21.76	0.321
9716	16.25	2.50	11.25	0.292	9074	25.00	1.80	21.40	0.354
8109	16.26	2.28	11.70	0.270	9469	25.00	2.00	21.00	0.390
8175	18.00	2.25	13.50	0.301	9032	25.00	2.50	20.00	0.477
9708	19.00	4.00	11.00	0.509	9543	25.00	2.50	20.00	0.477
9013	19.05	1.30	16.45	0.196	9443	25.00	3.00	19.00	0.560
9599	19.05	1.83	15.39	0.267	8144	25.00	3.75	17.50	0.676
8094	19.05	2.90	13.25	0.397	8025	25.00	6.48	12.05	1.017
8066	19.25	2.23	14.79	0.322	9924	25.40	1.35	22.70	0.275
8178	19.60	6.05	7.50	0.695	9661	25.40	2.03	21.34	0.402
8122	20.00	1.50	17.00	0.235	8095	25.40	2.90	19.60	0.553
9478	20.00	1.60	16.80	0.250	9431	25.40	3.18	19.04	0.599
9510	20.00	2.00	16.00	0.305	8244	25.40	3.25	18.90	0.611
9542	20.00	3.00	14.00	0.433	8116	25.40	4.50	16.40	0.798
8048	20.00	4.50	11.00	0.592	8050	25.40	5.15	15.10	0.885

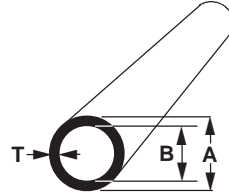
## Round Tube



Sec. No.	A	T	B	Kg/m	Sec. No.	A	T	B	Kg/m
8251	25.40	6.00	13.40	0.987	8179	32.50	11.75	9.00	2.068
8177	25.40	6.45	12.50	1.037	8078	32.80	9.15	14.50	1.836
8100	25.50	7.38	10.75	1.134	9666	33.40	3.38	26.64	0.861
8017	26.10	4.25	17.60	0.788	9667	33.40	4.55	24.30	1.113
8119	26.10	4.40	17.30	0.761	8026	34.60	4.25	26.10	1.094
8079	26.10	5.80	14.50	0.999	8299	34.85	4.35	26.15	1.125
8226	26.50	1.25	24.00	0.268	8028	35.00	1.30	32.40	0.372
8125	27.00	5.50	16.00	1.003	9702	35.00	3.18	28.64	0.858
9735	28.00	2.50	23.00	0.541	9441	35.00	5.00	25.00	1.272
9033	28.00	4.00	20.00	0.814	9731	35.00	7.00	21.00	1.663
8220	28.00	9.25	9.50	1.471	8063	35.00	9.00	17.00	1.985
9098	28.20	7.85	12.50	1.355	8103	35.00	12.50	10.00	2.386
9010	28.58	1.80	24.98	0.409	8292	35.10	4.45	26.20	1.157
9527	28.58	2.03	24.52	0.457	8015	35.35	8.83	17.69	1.986
8253	28.58	4.50	19.58	0.919	8285	35.50	4.70	26.10	1.228
9456	29.00	2.50	24.00	0.562	9480	36.00	2.00	32.00	0.577
8227	29.40	1.30	26.80	0.310	9541	36.00	3.25	29.50	0.903
8172	30.00	5.00	20.00	1.060	9684	36.00	4.00	28.00	1.086
9555	30.14	6.74	16.66	1.338	8225	36.10	4.95	26.20	1.308
8014	30.40	1.20	28.00	0.297	8241	36.50	3.75	29.00	1.042
8022	31.00	3.00	25.00	0.713	9060	36.60	4.20	28.20	1.154
8005	31.75	2.64	26.47	0.652	8023	37.50	3.00	31.50	0.878
8162	31.75	2.96	25.83	0.721	9078	37.50	4.25	29.00	1.199
9882	31.75	3.05	25.65	0.743	9062	38.00	2.00	34.00	0.611
9496	31.75	3.25	25.25	0.786	9463	38.00	2.00	34.00	0.611
8117	31.75	6.00	19.75	1.311	9036	38.00	2.75	34.50	0.822
8229	31.80	4.50	22.80	1.042	9014	38.00	7.50	23.00	1.940
9799	32.00	1.27	29.46	0.331	9038	38.00	7.90	22.20	2.017
9483	32.00	1.60	28.80	0.413	9571	38.10	1.27	35.56	0.397
9609	32.00	1.80	28.40	0.461	9662	38.10	2.03	34.04	0.621
9027	32.00	3.50	25.00	0.846	8096	38.10	2.90	32.30	0.866
9011	32.00	4.00	24.00	0.950	8012	38.10	3.17	31.76	0.939



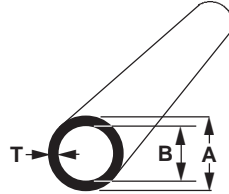
## Round Tube



Sec. No.	A	T	B	Kg/m	Sec. No.	A	T	B	Kg/m
8192	38.10	4.50	29.10	1.283	9668	42.16	3.56	35.04	1.166
9498	38.10	4.76	28.58	1.346	9669	42.16	4.85	32.46	1.535
8168	38.10	6.00	26.10	1.634	8202	42.20	4.75	32.70	1.509
8166	38.10	6.35	25.40	1.710	8158	44.00	1.52	40.96	0.548
8282	38.10	10.90	16.30	2.515	9067	44.45	3.00	38.45	1.055
8105	38.10	12.50	13.10	2.714	9077	44.45	3.25	37.95	1.136
8126	38.50	9.75	19.00	2.378	8114	44.45	4.50	35.45	1.525
9065	38.60	1.80	35.00	0.562	8152	44.45	4.50	35.45	1.525
8228	39.10	1.30	36.50	0.417	8142	44.45	6.00	32.45	1.957
8240	39.10	4.60	29.90	1.346	8029	44.45	11.12	22.21	3.144
9911	39.50	1.50	36.50	0.483	9017	45.00	4.00	37.00	1.391
9755	40.00	1.14	37.72	0.376	9517	45.00	5.00	35.00	1.696
8011	40.00	2.00	36.00	0.645	8102	45.00	12.50	20.00	3.446
9481	40.00	3.15	33.70	0.985	9025	46.00	5.00	36.00	1.739
9457	40.00	5.00	30.00	1.484	9522	46.30	1.63	43.05	0.616
9083	40.65	2.70	35.25	0.869	8006	47.80	14.40	19.00	4.080
8272	41.00	4.00	33.00	1.255	8016	48.00	3.00	42.00	1.145
9003	41.28	2.00	37.28	0.666	8120	48.00	4.00	40.00	1.492
9054	41.28	2.00	37.28	0.666	9015	48.00	8.50	31.00	2.848
9081	41.28	4.00	33.28	1.265	9039	48.00	9.00	30.00	2.977
8104	41.28	12.50	16.28	3.052	9042	48.00	9.75	28.50	3.163
8231	41.81	4.50	32.81	1.424	8291	48.10	4.65	38.80	1.714
8294	41.82	4.56	32.70	1.441	8246	48.20	4.50	39.20	1.668
8293	41.86	4.60	32.66	1.454	8295	48.21	4.56	39.09	1.688
8206	41.90	32.70	4.60	1.455	9435	48.26	3.68	40.90	1.392
9075	42.00	2.00	38.00	0.679	8207	48.29	4.60	39.09	1.705
9674	42.00	2.00	38.00	0.679	8184	48.40	2.60	43.20	1.010
9718	42.00	2.00	38.00	0.679	8155	48.41	4.47	39.47	1.666
9044	42.00	4.00	34.00	1.289	8222	48.49	4.70	39.09	1.746
8041	42.00	7.50	27.00	2.195	8297	48.49	4.70	39.09	1.746
9899	42.00	11.50	19.00	2.975	8298	48.79	4.80	39.19	1.791
8221	42.06	4.70	32.66	1.489	9465	49.70	3.00	43.70	1.188



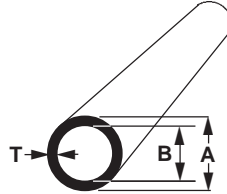
## Round Tube



Sec. No.	A	T	B	Kg/m	Sec. No.	A	T	B	Kg/m
9035	50.00	2.50	45.00	1.007	8180	57.15	13.57	30.01	5.016
9063	50.00	3.00	44.00	1.196	9064	58.20	7.40	43.40	3.189
9990	50.00	3.00	44.00	1.161	8010	58.30	3.00	52.30	1.407
9398	50.00	5.50	39.00	2.076	9909	59.00	10.75	37.50	4.400
9788	50.00	7.50	35.00	2.704	9001	60.00	2.00	56.00	0.984
8290	50.00	8.00	34.00	2.850	9016	60.00	2.50	55.00	1.219
9793	50.50	2.00	46.50	0.823	8159	60.00	3.00	54.00	1.450
8135	50.70	6.00	38.70	2.275	9021	60.00	5.00	50.00	2.333
IT02	50.80	1.27	48.26	0.534	8258	60.00	10.00	40.00	4.241
8089	50.80	1.60	47.60	0.668	8235	60.00	12.50	35.00	5.036
8062	50.80	3.00	44.80	1.216	9654	60.32	3.91	52.50	1.871
9505	50.80	3.25	44.30	1.311	9560	60.33	5.54	49.25	2.575
8098	50.80	4.50	41.80	1.767	9477	61.93	2.39	57.15	1.207
8196	50.80	4.76	41.28	1.859	8139	62.00	16.00	30.00	6.243
9923	50.80	6.00	38.80	2.280	9935	62.50	3.60	55.30	1.799
9515	50.80	6.35	38.10	2.394	9591	63.00	8.00	47.00	3.732
8236	50.80	12.70	25.40	4.104	9068	63.50	3.00	57.50	1.540
8283	50.80	14.10	22.60	4.389	9525	63.50	3.18	57.14	1.627
9509	51.00	3.25	44.50	1.316	9989	63.50	3.18	57.14	1.587
8234	51.00	10.50	30.00	3.607	8018	63.50	4.00	55.50	2.019
8019	51.30	3.65	44.00	1.475	8165	63.50	6.00	51.50	2.926
9675	51.50	3.20	45.10	1.311	8232	63.50	6.35	50.80	3.078
9034	52.00	2.50	47.00	1.050	9921	63.50	7.50	48.50	3.563
8065	52.00	7.00	38.00	2.672	8260	63.50	12.70	38.10	5.472
8181	52.00	16.00	20.00	4.886	8060	65.00	7.50	50.00	3.658
8149	53.98	1.54	50.90	0.685	8148	65.20	3.20	58.80	1.683
9007	55.00	10.00	35.00	3.817	8081	66.00	6.00	54.00	3.054
9059	56.00	1.50	53.00	0.693	8051	66.10	3.80	58.50	2.008
8173	56.00	19.00	18.00	5.963	9616	69.50	15.25	39.00	7.018
8042	57.00	5.00	47.00	2.205	9018	70.00	2.00	66.00	1.153
8188	57.00	10.00	37.00	3.987	9503	70.00	2.00	66.00	1.154
9526	57.15	3.18	50.79	1.456	8037	72.00	4.00	64.00	2.307

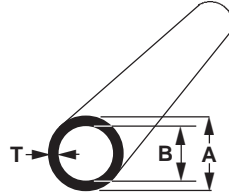


## Round Tube



Sec. No.	A	T	B	Kg/m	Sec. No.	A	T	B	Kg/m
9002	72.00	11.00	50.00	5.692	9019	80.00	15.00	50.00	8.270
8174	72.00	20.00	32.00	8.822	8263	80.00	20.00	40.00	10.179
9436	73.02	5.16	62.70	2.970	9507	80.78	2.39	76.00	1.589
9561	73.03	7.01	59.01	3.926	9589	81.20	2.50	76.20	1.669
9050	74.10	2.45	69.20	1.489	8027	82.00	2.50	77.00	1.686
9506	74.78	2.39	70.00	1.468	8248	82.20	3.00	76.20	2.015
8004	75.00	3.00	69.00	1.832	8249	82.55	3.25	76.05	2.186
8160	75.00	4.00	67.00	2.409	8056	82.55	16.88	48.79	9.403
8020	76.00	3.50	69.00	2.152	9091	84.00	29.50	25.00	13.637
8077	76.15	7.95	60.25	4.599	8250	84.20	4.00	76.20	2.721
8053	76.20	0.00	76.20	1.967	8137	86.00	9.00	68.00	5.878
IT03	76.20	1.27	73.66	0.807	8186	86.00	9.25	67.50	6.022
8245	76.20	1.60	73.00	1.012	9713	86.50	5.80	74.90	3.970
8136	76.20	2.90	70.40	1.803	9530	87.00	1.50	84.00	1.088
8163	76.20	3.18	69.84	1.970	9529	87.00	6.00	75.00	4.122
9088	76.20	4.50	67.20	2.737	9987	88.90	3.20	82.50	2.286
9089	76.20	6.00	64.20	3.573	9043	88.90	4.00	80.90	2.881
8204	76.20	6.35	63.50	3.762	8194	88.90	4.50	79.90	3.222
8238	76.20	9.53	57.14	5.389	9940	88.90	5.49	77.92	4.107
8284	76.20	23.60	29.00	10.530	8170	88.90	6.00	76.90	4.219
8058	76.96	3.55	69.85	2.213	9562	88.90	7.62	73.66	5.254
8059	76.96	5.14	66.68	3.131	9941	88.90	7.62	73.66	5.254
8121	77.00	2.00	73.00	1.272	9787	88.90	9.53	69.84	6.416
9988	77.00	3.00	71.00	1.848	9099	89.00	11.00	67.00	8.007
8127	78.00	5.00	68.00	3.096	9485	90.00	2.50	85.00	1.856
8257	78.00	15.50	47.00	8.217	8259	90.00	10.00	70.00	6.786
9484	80.00	2.50	75.00	1.643	9056	91.00	13.50	84.00	8.875
8151	80.00	4.00	72.00	2.579	9782	94.23	24.89	44.45	14.639
8133	80.00	5.00	70.00	3.181	9048	95.00	2.50	90.00	1.962
9939	80.00	8.00	64.00	4.886	9399	96.50	5.50	85.50	4.245
8150	80.00	10.00	60.00	5.938	8001	97.00	19.50	58.00	12.819
9085	80.00	12.00	56.00	6.922	9093	97.30	1.75	93.80	1.418

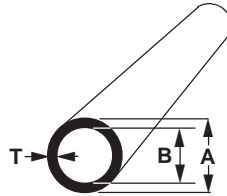
# Round Tube



Sec. No.	A	T	B	Kg/m	Sec. No.	A	T	B	Kg/m
9646	98.00	26.75	44.50	16.176	9066	114.00	4.00	106.00	3.732
9009	100.00	4.00	92.00	3.257	8200	114.00	24.50	65.00	18.600
8270	100.00	10.00	80.00	7.634	9942	114.20	6.02	102.16	5.524
8264	100.00	30.00	40.00	17.813	9943	114.20	8.51	97.18	7.963
9022	101.00	3.15	94.70	2.614	9047	114.30	8.56	97.18	8.399
9061	101.00	3.15	94.70	2.614	8082	114.30	22.15	70.00	17.313
IT04	101.60	1.27	99.06	1.080	9672	114.60	6.17	102.26	5.675
9095	101.60	2.50	96.60	2.101	9603	115.00	12.00	91.00	10.484
9070	101.60	3.00	95.60	2.509	8208	115.00	31.50	52.00	22.311
8242	101.60	3.25	95.10	2.711	8271	119.00	13.50	92.00	12.081
8031	101.60	3.50	94.60	2.912	9076	120.00	8.00	104.00	7.600
8197	101.60	4.50	92.60	3.706	8024	120.00	10.00	100.00	9.331
9670	101.60	5.74	90.12	4.667	8043	120.00	12.00	96.00	10.993
8274	101.60	6.00	89.60	4.865	8049	120.00	12.00	96.00	10.993
8161	101.60	6.35	88.90	5.130	8129	123.00	4.00	115.00	4.038
9671	101.60	8.08	85.44	6.410	8091	125.00	7.00	111.00	7.006
8111	101.60	10.00	81.60	7.770	8201	125.00	10.00	105.00	9.755
8147	101.60	25.00	51.60	16.244	9052	125.00	15.00	95.00	13.996
9627	102.00	3.50	95.00	2.924	9781	125.00	20.00	85.00	17.813
8128	103.00	20.00	63.00	14.081	8266	125.00	37.50	50.00	27.833
8040	105.00	3.00	99.00	2.596	8115	127.00	2.90	121.20	3.053
8061	106.50	7.00	92.50	5.908	8243	127.00	3.25	120.50	3.411
9640	108.00	3.00	102.00	2.621	9626	127.00	6.00	115.00	6.158
8203	110.00	16.00	78.00	12.757	8113	127.00	9.02	108.96	9.027
8265	110.00	32.50	45.00	21.365	9051	127.00	9.02	108.96	9.027
9706	111.00	3.00	105.00	2.748	8107	127.00	9.15	108.70	9.147
9528	112.00	6.00	100.00	5.395	8110	127.00	9.50	108.00	9.468
9916	112.00	12.50	87.00	10.550	8268	127.00	12.70	101.60	12.313
8032	113.00	3.50	106.00	3.251	9604	130.00	7.00	116.00	7.303
8190	113.00	15.00	83.00	12.469	8080	130.00	12.00	106.00	12.011
9592	113.90	3.00	107.90	2.822	9751	133.00	5.00	123.00	5.429
9932	114.00	2.00	110.00	1.900	9045	133.00	20.00	93.00	19.170

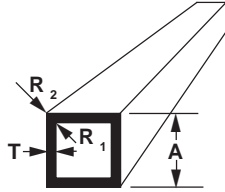


## Round Tube



Sec. No.	A	T	B	Kg/m	Sec. No.	A	T	B	Kg/m
8273	135.00	10.00	115.00	10.603	85263	163.50	5.50	152.50	7.372
8140	139.70	6.00	127.70	6.805	9020	163.80	7.00	149.80	9.310
9094	140.00	35.00	70.00	31.173	9058	165.00	18.50	128.00	22.989
8069	141.30	6.56	128.19	7.492	9053	168.00	5.00	158.00	6.913
8167	141.30	9.53	122.24	10.652	9072	168.00	7.50	153.00	10.481
8038	143.00	21.00	101.00	21.732	8280	168.00	18.00	132.00	22.902
8176	145.00	7.50	130.00	8.747	8278	168.30	7.11	154.08	9.721
9918	145.00	17.50	110.00	18.926	8279	168.30	10.97	146.36	14.640
9729	150.00	7.00	136.00	8.491	8055	170.00	8.00	154.00	13.403
8009	150.00	7.50	135.00	9.065	8064	172.00	10.00	152.00	13.741
8277	150.00	8.00	134.00	9.636	8067	172.00	17.00	138.00	22.351
8288	150.00	10.00	130.00	11.875	8092	173.00	24.00	125.00	30.333
9665	151.00	30.00	91.00	31.174	8054	180.00	8.50	163.00	12.365
8195	152.40	6.00	140.40	7.451	8093	180.00	15.00	150.00	20.994
9502	153.00	42.00	69.00	39.544	8035	184.00	5.50	173.00	8.328
8002	154.00	5.00	144.00	6.319	8034	195.00	13.50	168.00	20.784
9938	156.00	10.00	136.00	12.384	8068	195.00	25.00	145.00	36.050
8052	157.00	15.00	127.00	18.067	8247	202.00	16.00	170.00	25.243
8183	157.00	16.50	124.00	19.664	8039	220.00	17.00	186.00	29.272
9082	160.00	3.50	153.00	4.646	9000	224.00	13.50	197.00	24.105
9087	160.00	10.00	140.00	12.723	8134	225.00	16.50	192.00	29.181
8044	160.00	12.50	135.00	15.639	8097	225.00	25.00	175.00	42.411
8191	163.50	5.00	153.50	6.722					

# Square Tube

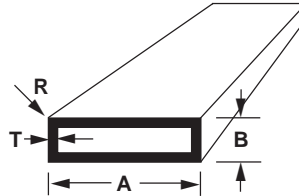


Sec. No.	A	T	R <sub>1</sub>	R <sub>2</sub>	Kg/m
9405	12.70	1.65			0.197
9811	18.50	1.20			0.224
8464	19.00	1.00			0.194
9806	19.00	1.60		2.00	0.294
9448	19.05	1.42			0.270
8469	19.05	1.50			0.284
9406	19.05	1.65			0.310
8316	19.05	3.25			0.554
8302	20.00	2.00			0.389
9446	20.00	2.50		2.50	0.458
9860	21.00	1.60	1.00	1.00	0.335
8472	23.00	1.00	1.00	1.00	0.237
9810	24.00	1.20			0.295
8318	24.30	1.35			0.334
8465	25.00	1.20			0.308
8332	25.00	2.00			0.497
8311	25.40	1.00			0.264
9769	25.40	1.42			0.368
8301	25.40	1.63			0.418
8336	25.40	2.00			0.505
9407	25.40	2.41			0.598
9887	25.40	2.41	3.00	4.00	0.582
9655	25.40	2.80		3.00	0.683
8457	25.40	3.25			0.777
8323	27.50	3.00		2.00	0.785
8319	30.00	2.00		0.50	0.604
8306	31.75				0.875
8349	31.75	2.00			0.643
9408	31.75	2.41			0.761
8324	31.75	3.00			0.932
8459	31.75	3.25			1.000
8473	37.00	1.10			0.426
8474	38.00	1.50	1.50	3.00	0.576

Sec. No.	A	T	R <sub>1</sub>	R <sub>2</sub>	Kg/m
8468	38.10	2.00		0.80	0.778
8339	38.10	2.90			1.102
9879	38.10	3.18			1.199
8305	38.10	4.50			1.633
8462	38.10	6.00			2.080
8308	38.50	2.70			1.044
8456	40.00	3.00			1.198
8303	40.00	4.00			1.555
8466	44.45	3.00			1.343
8312	50.00	1.20			0.632
8477	50.00	1.60	3.40	5.00	0.805
8479	50.00	1.60			0.836
8300	50.00	2.00			1.037
8309	50.00	2.00			1.037
8455	50.00	3.00			1.522
8454	50.00	5.00			2.430
8335	50.80	2.00			1.054
8326	50.80	3.05			1.460
9410	50.80	3.05			1.573
9404	50.80	3.25			1.669
8467	50.80	4.50			2.250
8327	50.80	4.78	6.35	10.16	2.228
8322	50.80	6.35	6.35	6.35	3.048
8470	50.80	6.35			3.048
9886	61.00	5.00	3.00		3.045
8461	63.50	3.25			2.114
8325	63.50	6.00			3.726
9867	70.00	3.60			2.582
8334	76.20	2.80			2.220
8478	76.20	3.18			2.507
8458	76.20	3.25			2.560
8328	76.20	6.35		6.35	4.720
8330	76.20	6.35		1.00	4.788
8345	80.00	2.00			1.685
8471	80.00	4.00			3.283
8480	90.00	2.00			1.864
8333	100.00	3.00			3.142
8342	101.60	3.00	1.00	1.00	3.195
8460	101.60	3.25			3.452
8331	101.60	6.00	1.50	1.50	6.195
8482	101.60	6.35		1.50	6.532
9862	120.00	3.00	1.50	2.50	3.782

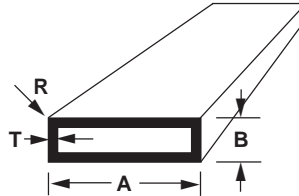


## Rectangular Tube

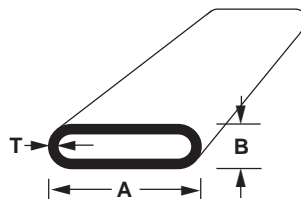


Sec. No.	A	B	T	R	Kg/m	Sec. No.	A	B	T	R	Kg/m
9908	20.00	12.00	1.20	1.20	0.192	9413	50.80	25.40	2.41		0.929
9403	22.23	18.26	2.39	2.39	0.448	8407	50.80	25.40	3.00		1.137
9736	24.00	15.00	2.00	0.50	0.377	8406	50.80	25.40	3.18		1.199
8366	30.00	20.00	1.50	0.50	0.380	8405	50.80	25.40	3.25		1.223
8363	33.00	20.00	1.20	2.50	0.317	8413	50.80	25.40	4.50		1.633
8400	37.00	24.00	0.90		0.287	8317	50.80	38.10	3.25		1.446
8420	37.00	24.00	1.00		0.318	8509	55.00	35.00	3.00	2.00	1.352
8431	37.00	24.00	1.15		0.364	9454	55.58	15.88	3.18	1.60	1.123
9826	38.10	25.40	1.50		0.490	9833	63.00	37.00	1.20	0.40	0.635
9827	38.10	25.40	2.00		0.643	9809	63.00	37.00	1.50		0.786
9412	38.10	25.40	2.41		0.764	8411	63.50	38.10	1.28		0.687
8389	38.10	25.40	2.90		0.904	8430	63.50	38.10	1.80		0.953
8409	38.10	25.40	3.25	3.25	1.000	9771	63.50	38.10	2.00	2.00	1.054
8399	40.00	20.00	2.00		0.605	8352	63.50	38.10	3.00		1.549
9927	40.00	20.00	3.00		0.877	9414	63.50	38.10	3.05		1.573
8432	40.00	25.00	2.00		0.659	8404	65.00	25.40	1.15		0.547
8578	40.00	35.00	3.50	1.50	1.431	8372	75.00	45.00	5.00	1.00	2.970
9926	41.00	20.00	3.00	0.00	0.893	8350	76.20	25.40	1.20		0.643
9612	44.45	25.40	2.41	2.41	0.846	8384	76.20	25.40	2.80		1.452
8433	44.45	38.10	3.18	0.40	1.308	8385	76.20	44.45	2.90		1.799
8371	45.00	25.00	5.00	1.00	1.620	8393	76.20	50.80	2.00		1.328
8421	48.00	24.00	1.00		0.378	8382	76.20	50.80	2.80		1.836
8362	49.80	20.00	1.20	2.50	0.426	8410	76.20	50.80	3.25	3.25	2.114
8423	50.00	25.00	3.00		1.117	8415	76.20	50.80	4.50		2.867
8365	50.00	30.00	2.00	0.50	0.820	8412	76.20	50.80	6.35		3.919
8368	50.00	40.00	2.00	0.50	0.929	9917	80.00	40.00	4.00		2.419
8379	50.80	25.40			1.127	8358	80.00	60.00	2.00		1.469
8351	50.80	25.40	1.20		0.478	8481	80.00	80.00	6.00		4.795
8354	50.80	25.40	1.44		0.570	9832	82.00	37.00	1.50		0.942
9836	50.80	25.40	1.50	1.50	0.593	9808	82.00	37.00	1.80		1.122
8429	50.80	25.40	1.80		0.706	9896	100.00	40.00	1.50		1.110
9835	50.80	25.40	2.00		0.780	8375	100.00	50.00	1.60		1.268

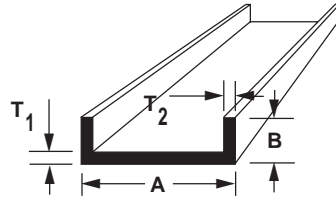
## Rectangular Tube & Oval Tube



Sec. No.	A	B	T	R	Kg/m	Sec. No.	A	B	T	R	Kg/m
8356	100.00	50.00	4.00	1.00	3.065	8426	110.00	100.00	4.00	4.00	4.363
8359	100.00	60.00	2.00	0.30	1.685	8357	115.00	100.00	4.00		4.471
8370	100.00	76.00	3.00	5.00	2.717	8402	120.00	60.00	2.00		1.901
8417	101.50	44.50	1.60		1.236	8361	125.00	60.00	8.00	0.30	6.113
9831	101.50	44.50	1.80		1.386	8381	127.00	50.80	4.76		4.325
8387	101.60	25.40	2.90		1.898	9726	127.00	63.50	4.00	4.00	3.979
8390	101.60	25.40	3.25		2.114	8376	150.00	50.00	3.00		3.143
9491	101.60	44.45	3.18		2.398	8353	150.00	50.00	4.00		4.147
8355	101.60	44.75	1.35		1.047	8360	150.00	60.00	3.00	0.30	3.305
8425	101.60	50.80	3.18		2.507	8397	152.40	50.80	3.00	1.00	3.195
8403	101.60	50.80	3.25		2.560	8419	152.40	50.80	6.35		6.532
8380	101.60	50.80	4.78	0.40	3.687	9594	152.40	69.85	9.50	1.58	10.422
8364	101.60	50.80	6.35	1.00	4.788	8377	200.00	50.00	3.00		3.953
9801	108.00	58.00	12.00	0.80	8.887						



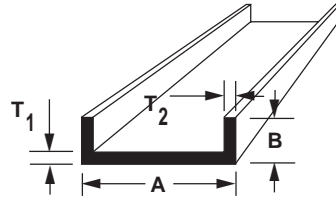
Sec. No.	A	B	T	Kg/m	Sec. No.	A	B	T	Kg/m
9660	15.10	9.70	2.23	0.206	9423	26.41	15.21	1.65	0.290
9493	15.24	9.65	1.65	0.162	9586	29.72	19.11	4.38	0.793
9428	17.70	10.84	1.65	0.190	9861	31.80	21.00	5.00	0.970
9429	19.12	11.63	1.65	0.206	9574	35.40	22.69	5.13	1.116
9577	19.30	12.40	2.84	0.336	9573	41.61	26.80	6.15	1.569
9417	20.55	12.42	1.65	0.223	9855	46.00	18.00	2.00	0.574



Sec. No.	A	B	T <sub>1</sub>	T <sub>2</sub>	Kg/m	Sec. No.	A	B	T <sub>1</sub>	T <sub>2</sub>	Kg/m
2218	6.25	10.30	3.00	1.30	0.101	2315	50.00	30.00	2.50		0.687
2221	8.75	9.50	1.50	1.20	0.087	2238	50.80	25.00	6.00	15.00	2.361
2227	12.70	15.80		2.40	0.255	2255	50.80	25.40		2.90	0.750
2369	13.40	11.11	2.70	2.35	0.204	2247	50.80	25.40		3.20	0.822
2230	13.49	11.11	3.50	2.38	0.225	2202	50.80	25.40	4.76		1.183
2310	16.00	12.70		1.55	0.160	2374	50.80	25.40	4.76	4.76	1.069
2169	19.00	13.00	1.00		0.116	2280	51.20	40.00	4.10	4.10	1.364
2208	20.65	14.30	1.60		0.198	2375	53.80	25.40	4.76	4.76	1.107
2261	24.00	12.00		2.64	0.305	2217	54.00	32.00	3.00		0.907
2200	25.40	12.70	3.18		0.381	2361	57.00	45.00	3.00	3.00	1.136
2337	25.40	19.00	3.20		0.481	2103	60.00	45.00	2.50	2.50	0.985
2334	28.00	19.00	2.00		0.319	2373	63.50	25.40	4.76	4.76	1.232
2287	30.00	12.70		1.20	0.172	2403	66.00	26.00		1.50	0.458
2359	30.00	15.00	3.00		0.428	2223	75.00	35.00	6.00		2.164
2259	31.50	19.00		3.00	0.514	2224	75.00	35.00	8.00	0.00	2.796
2316	31.75	25.40	3.17		0.652	2125	75.00	40.00		5.00	1.957
2612	31.75	25.40	4.76	3.18	0.762	2297	75.00	72.50	66.50	3.00	1.752
2204	31.76	12.70	3.18		0.436	2219	76.00	64.00	10.00	10.00	4.713
2263	33.00	15.00		2.00	0.319	2232	76.00	72.00	10.00	10.00	5.145
2389	35.06	38.10		3.18	0.900	2311	76.20	25.40	3.18	3.18	1.032
2341	38.10	10.50		2.40	0.351	2364	76.20	32.00	4.00		1.424
2201	38.10	19.05	3.18		0.599	2305	76.20	38.10	3.96	5.56	1.906
2320	39.04	9.53	3.25		0.443	2258	76.20	38.10	6.35		2.395
2321	39.04	15.88	3.25		0.540	2236	76.20	38.10	6.35	7.94	2.667
2244	40.00	25.00		4.00	0.885	2300	76.20	38.10	6.35	7.94	2.735
2243	40.00	25.00	6.00	8.00	1.468	2382	76.20	38.10	6.35	7.94	2.726
2138	41.35	18.49	2.24	1.60	0.388	2366	76.20	50.80		6.35	2.825
2381	44.45	25.40	4.40	2.90	0.856	2355	80.00	125.00		6.00	5.026
2613	44.45	25.40	4.76	3.18	0.925	2306	88.90	38.10	3.96	5.56	2.042
2308	44.45	28.58	1.98		0.528	2301	88.90	38.10	6.35	7.94	2.952
2307	44.50	19.05	1.98		0.430	2146	89.00	26.00		1.50	0.566
2344	45.00	25.40	4.80	3.25	0.949	2309	90.00	40.00	4.00	5.00	1.962
2199	50.00	25.00	3.00	3.00	0.761						



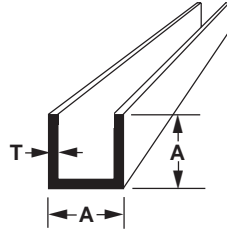
# Channel



Sec. No.	A	B	T <sub>1</sub>	T <sub>2</sub>	Kg/m	Sec. No.	A	B	T <sub>1</sub>	T <sub>2</sub>	Kg/m
2406	95.00	33.50	6.50	10.00	3.241	2242	138.00	68.00	6.00	6.00	4.286
2157	99.20	49.60		1.60	0.844	2229	140.00	60.00	12.00		7.637
2249	100.00	25.00	1.60		0.642	2407	149.00	43.50	6.50	12.00	5.179
2228	100.00	40.00	10.00		4.311	2714	150.00	50.00	4.00	6.00	3.118
2250	100.00	50.00		5.00	2.564	2333	150.00	75.00	4.88		3.991
2342	100.00	50.00	6.25	8.00	3.693	2246	150.00	76.00	12.00	12.00	9.132
2328	100.00	50.00	8.00	8.00	3.971	2273	152.40	50.80	6.35	7.93	4.513
2347	100.00	63.00	6.00	0.00	3.508	2338	152.40	50.80	6.35	7.94	4.562
2352	100.00	65.00	6.35	7.94	4.325	2376	152.40	50.80	9.53	9.53	6.074
2270	100.00	75.00	6.00		3.855	2332	152.40	51.66	8.10		5.381
2216	100.00	76.00	12.00	12.00	7.512	2392	152.40	76.20	6.00	8.00	5.527
2215	100.00	76.00	14.00	14.00	8.592	2327	152.40	76.20	6.35	9.52	6.375
2294	101.60	25.40		2.90	1.148	2339	152.40	76.20	6.35	9.52	6.247
2322	101.60	41.83	6.68		3.205	2379	152.40	76.20	9.53	12.70	8.602
2141	101.60	50.80		6.00	3.100	2349	177.00	76.00	0.00	8.00	6.900
2398	101.60	50.80		6.00	3.097	2319	177.80	58.40	9.98		7.543
2377	101.60	50.80		6.35	3.261	2380	177.80	76.20	9.53	12.70	9.255
2288	101.60	50.80	3.00		1.597	2267	180.00	75.00	10.00	10.00	8.380
2237	101.60	50.80	6.35	7.94	3.647	3393	194.00	29.00	9.00	20.00	6.712
2302	101.60	50.80	6.35	7.94	3.744	2350	200.00	50.00	10.00	10.00	7.560
2335	101.60	76.20	9.53	9.53	6.042	2245	200.00	60.00	0.00	8.00	6.565
2343	101.72	50.80	6.35	8.00	3.744	2416	200.00	70.00	4.00	7.00	4.654
2220	102.00	16.00	3.00	5.00	1.177	2317	203.20	65.00	11.84		10.081
2206	104.00	100.00	12.00	12.00	9.177	2378	203.20	76.20	9.53	12.70	9.909
2124	110.00	39.00	11.00	6.00	4.174	2323	203.20	101.60	9.58	14.29	12.580
2391	114.00	107.50	6.00		5.010	2326	203.20	101.60	9.58	14.29	12.593
2405	120.00	38.50	6.50	10.00	3.949	2351	216.00	112.00	12.00	12.00	13.478
2336	127.00	48.00	8.00		4.575	2396	254.00	92.07	0.00	13.18	14.615
2262	127.00	48.00	12.00		6.448	2318	254.00	92.07	13.18		14.615
2417	127.00	50.80	6.00	6.00	3.509	2414	280.00	70.00	12.00	12.00	12.309



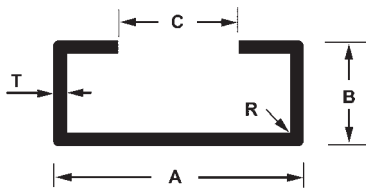
# Channel



## Equal base and flange

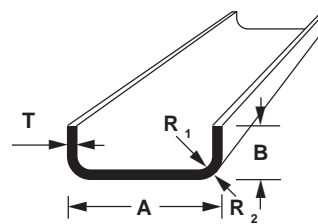
Sec. No.	A	T	Kg/m
2284	9.52	1.20	0.085
2209	9.52	1.60	0.109
2241	12.70	1.59	0.149
2386	19.05	3.18	0.436
2387	22.22	3.18	0.517
2256	25.40	2.90	0.551
2388	25.40	3.18	0.599
2234	26.00	3.00	0.583
2293	31.75	3.18	0.763

Sec. No.	A	T	Kg/m
2798	31.75	3.18	0.763
2304	38.10	4.76	1.344
2393	38.10	3.18	0.926
2281	50.00	3.00	1.166
2298	50.80	6.35	2.390
2105	50.80	3.17	1.250
2279	75.00	3.00	1.774
2365	76.20	12.70	6.963
2312	100.00	10.00	7.559



## Base with corner radius

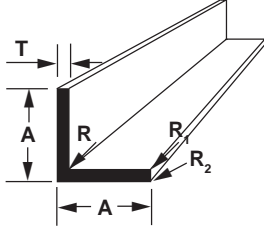
Sec	A	B	C	T	R	Kg/m
2751	22.50	14.00	9.00	2.50		0.364
2715	100.00	50.00	60.00	4.00	2.00	2.345



**2340** **3.696 Kg/m**

Sec	A	B	T	R <sub>1</sub>	R <sub>2</sub>	Kg/m
2337	25.40	19.00	3.20	1.00	4.20	0.48
2355	80.00	125.00	6.00	6.00	12.00	5.26
2404	88.90	28.58	3.00	2.00	5.00	1.11

# Equal Leg Angle

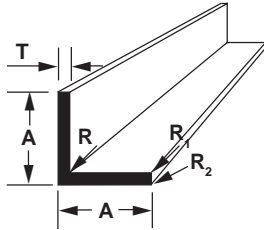


Sec. No.	A	T	R	R1	R2	Kg/m
1614	12.70	1.50				0.096
1835	12.70	1.50				0.097
1740	12.70	2.90				0.168
1750	12.70	3.18	0.79			0.191
1741	15.87	2.90				0.226
1793	19.00	1.50				0.147
1795	19.05	1.59				0.157
1788	19.05	3.00				0.284
1751	19.05	3.18	0.79			0.300
1897	19.05	3.18				0.300
1609	20.00	2.00				0.200
1702	20.64	1.98				0.210
1781	21.00	2.00				0.216
1709	23.50	1.50				0.184
1705	23.83	1.57				0.195
1746	25.00	1.50	0.79			0.197
1785	25.00	1.60				0.208
1773	25.00	2.00	0.80			0.259
1783	25.00	3.00				0.381
1787	25.40	1.10				0.148
1794	25.40	1.59				0.211
1801	25.40	1.60	1.60	0.79	0.40	0.213
1805	25.40	2.36				0.299
1745	25.40	2.90				0.375
1700	25.40	3.18				0.408
1752	25.40	3.18	0.79			0.409
1798	25.40	4.50				0.562
1830	25.40	5.80				0.705
1605	25.40	6.00				0.725
1607	25.40	8.00				0.924
1638	25.40	25.40	3.18			0.414
1834	28.57	3.18				0.463

Sec. No.	A	T	R	R1	R2	Kg/m
1833	30.00	1.50				0.237
1618	30.00	3.00				0.461
1744	31.74	2.90				0.474
1616	31.75	1.58				0.264
1730	31.75	3.00				0.490
1753	31.75	3.18	5.08			0.532
1796	31.75	3.18				0.518
1821	31.75	4.50				0.717
1749	31.75	4.76				0.755
1733	31.75	5.80				0.903
1838	32.00	3.00				0.494
1747	38.00	3.00				0.591
1604	38.10	1.58	1.58			0.318
1701	38.10	1.63				0.328
1728	38.10	3.00				0.593
1711	38.10	3.18	0.79			0.627
1755	38.10	3.18	0.79			0.627
1875	38.10	4.50				0.871
1712	38.10	4.76				0.918
1756	38.10	4.76	5.33			0.934
1774	38.10	4.80				0.938
1937	38.10	4.80				0.924
1808	38.10	5.80				1.102
1714	38.10	6.35				1.197
1636	38.10	38.10	3.18			0.631
1639	38.10	38.10	4.77			0.933
1831	40.00	2.00				0.421
1776	40.00	3.50	3.00			0.722
1955	40.00	3.75				0.772
1956	40.00	4.00				0.820
1620	40.00	5.00	1.00			0.995
1790	40.00	5.00				1.011
1601	44.45	3.18				0.736
1767	44.45	4.78	5.84			1.105
1780	44.45	4.78				1.085
1816	44.45	6.00				1.343
1764	44.45	6.35				1.435
1802	44.45	6.35	4.78	3.18		1.417
2075	44.50	6.00	5.00	3.00		1.349



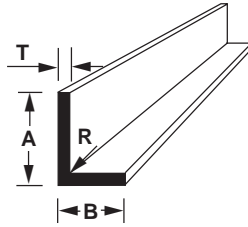
## Equal Leg Angle



Sec. No.	A	T	R	R1	R2	Kg/m
1789	45.00	5.00				1.147
1622	45.00	8.00				1.792
1832	50.00	2.00				0.529
1732	50.00	3.00				0.786
1782	50.00	3.00				0.786
1848	50.00	4.50				1.160
1611	50.00	5.00				1.282
1621	50.00	6.00	1.00			1.497
1836	50.00	6.00				1.522
1844	50.00	6.00				1.522
1839	50.80	1.58				0.426
1729	50.80	3.00	0.30			0.799
1797	50.80	3.18				0.845
1720	50.80	4.50				1.179
1721	50.80	4.50				1.179
1713	50.80	4.76				1.244
1757	50.80	4.76	0.79			1.244
1766	50.80	4.78				1.265
1810	50.80	5.00				1.304
1807	50.80	5.80				1.500
1722	50.80	6.00				1.548
1715	50.80	6.35				1.633
1718	50.80	6.35				1.637
1765	50.80	6.35	6.10			1.654
1775	50.80	6.35				1.639
1739	50.80	9.52				2.367
1635	50.80	50.80	4.77			1.268
1637	50.80	50.80	3.18			0.849
1624	60.00	8.00				2.440
1704	60.00	8.00				2.419
1707	60.33	5.56				1.728
1748	63.50	2.90				0.972

Sec. No.	A	T	R	R1	R2	Kg/m
1631	63.50	3.18				1.063
1735	63.50	4.50				1.488
1768	63.50	4.78	6.86			1.604
1743	63.50	6.00				1.960
1759	63.50	6.35	0.79			2.068
1760	63.50	6.35	6.86			2.095
1769	63.50	7.94	6.86			2.579
1828	63.50	9.50				3.014
1619	65.00	6.00				2.008
1603	70.00	2.00				0.745
1716	75.00	6.00		3.00		2.322
1813	75.00	6.00				2.336
1742	76.20	3.00				1.210
1770	76.20	3.18				1.279
1806	76.20	4.75				1.893
1734	76.20	5.80				2.296
1784	76.20	6.00				2.371
1845	76.20	6.35				2.504
1719	76.20	9.00				3.484
1771	76.20	9.52	7.62			3.706
1843	76.20	9.52				3.672
1608	76.20	12.70				4.788
1814	80.00	8.00				3.283
1762	88.90	6.35	8.38			2.980
1625	90.00	10.00				4.604
1606	101.60	3.18				1.717
1731	101.60	6.00				3.195
1600	101.60	6.35				3.374
1799	101.60	9.00				4.719
1738	101.60	12.70				6.532
1723	101.60	9.52				4.978
1938	101.60	9.53				4.983
1628	110.00	12.00				6.734
1724	127.00	6.35				4.246
1811	127.00	9.52				6.282
1727	127.00	12.70				8.274
1809	152.40	6.00				4.841
1812	152.40	12.70				10.014
1804	153.00	9.60	20.00		9.60	7.808

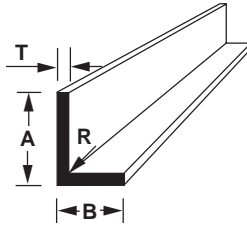
# Unequal Leg Angle



Sec. No.	A	B	T	R	Kg/m	Sec. No.	A	B	T	R	Kg/m
1988	18.00	12.00			0.151	1945	40.00	20.00	2.00		0.313
1737	19.05	9.52			0.115	1880	40.00	20.00		2.00	0.223
1912	19.05	15.88		0.79	0.209	1959	50.00	25.00	2.00		0.394
1857	20.64	10.32			0.155	1960	50.00	25.00	3.00		0.583
1725	22.00	12.70	3.10		0.264	1633	50.00	30.00	4.00	2.50	0.824
1864	22.22	12.70			0.144	1919	50.80	20.65		5.18	1.132
2036	23.90	11.30	7.50	0.20	0.616	1976	50.80	25.40	3.18		0.626
1850	25.40	12.70	1.59		0.157	1978	50.80	25.40	4.76		0.918
1866	25.40	12.70			0.299	1893	50.80	25.40			0.627
1860	25.40	15.88			0.327	1911	50.80	25.40		5.33	0.643
1859	25.40	20.64			0.368	1975	50.80	25.40			1.197
1861	25.40	20.64			0.235	1856	50.80	38.10			1.415
1873	28.58	20.65			0.164	1929	50.80	101.60	6.00	5.00	2.386
1863	30.18	9.93			0.203	1623	60.00	50.00	6.00	6.00	1.693
1853	30.18	25.40			0.502	1949	63.50	38.10			0.845
2037	31.20	9.65	7.50	0.20	0.703	1982	63.50	38.10			1.180
2039	31.20	11.30	7.50	0.20	0.839	1903	63.50	50.80		6.60	1.433
1854	31.75	19.05			0.408	1950	63.50	50.80		6.35	2.294
1874	31.75	19.05			0.212	1634	65.00	33.00	7.00	5.00	1.264
1948	31.75	25.40	3.18		0.463	1927	75.00	50.00	6.00		1.927
1920	31.75	25.40		2.30	0.391	1981	76.20	25.40	6.00		1.548
1779	32.00	30.00	6.00	3.00	0.901	1974	76.20	25.40			0.845
1879	33.50	25.00			0.477	1944	76.20	38.10			1.334
1786	36.00	30.00	1.20	0.60	0.208	1951	76.20	38.10			1.850
1881	38.00	25.00	3.00		0.486	1946	76.20	50.80	2.90		0.972
1958	38.10	19.05			0.463	1980	76.20	50.80	3.18		1.063
1987	38.10	25.40	2.30		0.380	1926	76.20	50.80	6.00	5.00	1.974
1890	38.10	25.40	2.90		0.474	1815	76.20	50.80	6.35		2.091
1855	38.10	25.40			0.517	1892	76.20	50.80	6.35		2.069
1877	38.10	25.40			0.753	1904	76.20	50.80		6.86	2.095
1985	38.10	25.40			0.364	1930	76.20	50.80			1.488
1954	40.00	18.00		1.50	0.444	2043	76.20	50.80		4.78	2.542

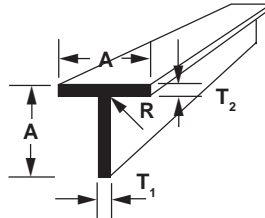


## Unequal Leg Angle



Sec. No.	A	B	T	R	Kg/m	Sec. No.	A	B	T	R	Kg/m
1913	76.20	63.50		6.86	2.851	1922	125.00	100.00		8.00	3.871
1905	88.90	63.50		7.62	2.537	1971	127.00	50.80	6.00		2.783
1906	88.90	76.20		8.13	2.760	1947	127.00	50.80	6.35		2.939
1977	100.00	50.00	6.00		2.332	1964	127.00	50.80	9.53		4.330
1717	100.00	60.00	6.00	5.00	2.509	1952	127.00	76.20	6.35		3.375
1626	100.00	75.00	1.00	6.00	4.465	1966	127.00	76.20	9.53	5.00	4.995
1627	100.00	90.00	1.00	1.00	4.917	1894	127.00	76.20			3.375
1931	101.60	25.40			0.972	1940	127.00	88.90			3.591
1941	101.60	25.40			0.972	1928	146.00	97.00	15.00	0.40	9.234
1967	101.60	50.80	3.18		1.281	1629	150.00	100.00	1.00	1.00	6.537
1884	101.60	50.80	6.00		2.372	1963	152.40	50.80	6.00		3.195
1968	101.60	50.80	6.35		2.504	1885	152.40	76.20	6.00		3.606
1965	101.60	50.80	9.53		3.676	1973	152.40	76.20	12.70	12.70	7.496
1962	101.60	50.80	12.70		4.790	1792	152.40	101.60	12.70	5.00	8.286
1934	101.60	76.20	6.00		2.783	1900	180.00	40.00	3.00	3.00	1.762
1936	101.60	76.20	6.35		2.939	1630	200.00	138.00	8.00		7.128
1916	101.60	76.20		8.38	4.366	1918	210.00	39.00	4.00	3.00	2.376
1925	116.00	50.00		3.00	2.597	1632	216.00	112.00	12.00		10.238

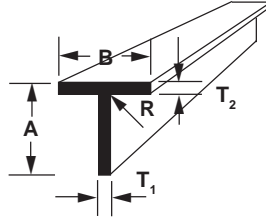
## Equal Stem & Flange Tee



Sec. No.	A	T <sub>1</sub>	T <sub>2</sub>	R	Kg/m
3100	12.70	1.59	1.59		0.102
3101	19.05	3.18			0.299
3198	19.05		3.18		0.300
3250	19.05	1.50			0.148
3102	25.40	3.18			0.408
3186	30.00	3.00	3.00	4.00	0.476
3118	31.75	1.60			0.267
3004	38.10	4.50	4.50	5.00	0.900
3103	38.10	3.18			0.627
3199	38.10	3.18			0.627
3254	38.10	3.00			0.592
3015	40.00	4.00	4.00	3.00	0.831
3219	42.00	8.00	4.00		1.274
3019	50.00	6.00	6.00		1.522
3002	50.80	6.00	6.00	5.00	1.577
3003	50.80	5.00	5.00	5.00	1.333
3234	50.80		4.50		1.179
3235	50.80	4.50	4.50	5.00	1.208
3236	50.80	6.00	6.00	5.00	1.577
3246	50.80	3.00			0.799
3252	50.80		6.00		1.550
3255	50.80	3.00			0.797
3256	50.80		6.35		1.633
3013	60.00	5.00	5.00	3.00	1.549
3001	63.50	6.00	6.00	5.00	1.989
3237	70.00	6.00	6.00	5.00	2.199
3233	75.00		5.00		1.957
3107	76.00	1.00	1.00	1.00	3.949
3008	76.20		6.00		2.398
3012	100.00	8.00	8.00	4.00	4.152



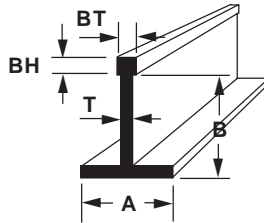
## Unequal Stem & Flange Tee



Sec. No.	A	B	T <sub>1</sub>	T <sub>2</sub>	R	Kg/m
3119	12.70	25.40		1.27	1.60	0.129
3115	25.00	50.00	3.00	3.00	5.33	0.616
3181	32.00	21.00	1.40			0.195
3120	38.10	31.75	1.60			0.294
3168	40.00	80.00		3.50	2.00	1.106
3141	44.00	42.00	9.00	4.00		1.425
3182	44.00	42.00	8.00	4.00		1.317
3159	50.80	95.25		6.35	7.44	2.459
3016	60.00	50.00	4.00	6.00	4.00	1.411
3017	70.00	50.00	4.00	8.00	4.00	1.767
3106	75.00	150.00	6.00	6.00	5.00	3.576
3007	80.00	40.00		6.00		1.875
3000	100.00	50.00	5.00	5.00	5.00	1.986
3009	100.00	65.00		6.00		2.604
3021	100.00	65.00	6.00	6.00		2.575
3258	100.00	50.00	6.00	12.00	6.00	3.038
3220	116.00	100.00	6.00	8.00	3.00	3.919
3010	125.00	50.80	6.00	5.00		2.628
3265	125.00	80.00	8.00	8.00	6.00	4.296
3229	150.00	80.00	5.00	8.00		3.673
3266	150.00	80.00	8.00	8.00	6.00	4.836
3020	156.00	50.00	6.00	6.00		3.239
3011	156.00	50.80	6.00	6.00		3.251
3228	156.00	80.00	6.00		6.00	3.760



# Bulb Tee

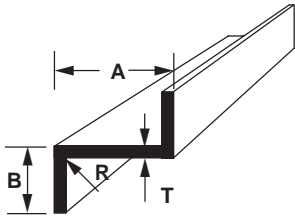


Sec. No.	A	B	T	BH	BT	Kg/m
3247	23.50	20.00	1.10	3.00	2.50	0.137
3122	23.50	23.80		4.78	3.18	0.215
3209	23.50	24.00	1.50	15.00	3.00	0.206
3190	23.50	26.40		2.00	2.80	0.196
3121	23.50	36.50	1.57	4.78	3.18	0.268
3135	25.00	25.00		3.00	2.50	0.176
3185	25.00	25.00		3.00	2.50	0.192
3245	25.00	25.00	1.00	3.00	2.50	0.144
3137	25.00	38.00	1.27	4.00	4.00	0.256
3183	25.00	38.00	1.50	4.00	4.00	0.276
3215	25.40	25.40		3.80	3.80	0.235
3218	25.40	25.40	1.50	3.80	3.80	0.223
3142	25.40	34.90	3.00		5.00	0.478
3216	25.40	36.50	1.60	3.80	3.80	0.283
3139	26.00	40.00	2.00	4.00	6.00	0.389
3133	32.00	2.20				0.243
3134	32.00	32.00	1.20	3.00	2.20	0.211
3138	32.00	32.00	1.50	3.00	2.50	0.261
3191	38.00	38.00	1.40	5.00	3.00	0.303
3192	38.00	38.00	1.50	5.00	3.00	0.321
3193	38.10	38.10	1.60	5.00	3.00	0.341



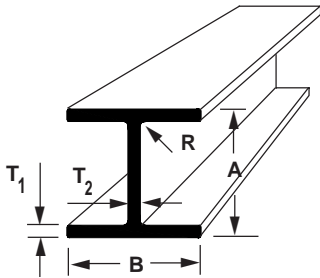
## Z, I-Beam & Top Hat

### Z Section



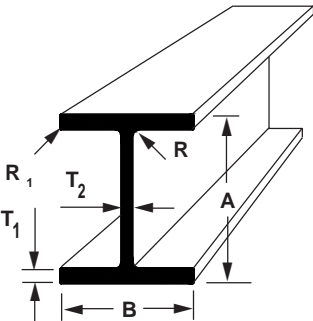
Sec. No.	A	B	T	R	Kg/m
3405	44.45	19.05	1.60	1.60	0.345
3402	44.45	25.40	3.18	3.18	0.774
3413	215.90	38.10	6.35	4.76	4.816

### I Beam



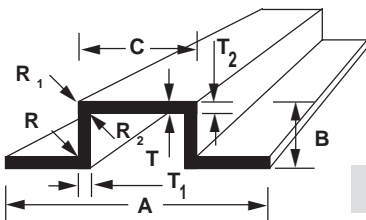
Sec. No.	A	B	T <sub>1</sub>	T <sub>2</sub>	R	Kg/m
2835	31.00	32.00	3.00	3.00	1.00	0.722
2800	41.27	44.45	3.18	3.18	3.18	1.140
2847	53.00	64.00	2.50	4.00	3.00	1.402

### I Beam



Sec. No.	A	B	T <sub>1</sub>	T <sub>2</sub>	R	R <sub>1</sub>	Kg/m
2816	101.60	50.80	3.50	3.50	5.00	1.00	1.900
2850	127.00	86.90	7.92	6.35	11.10		5.995
2859	127.00	100.00	10.00	10.00	10.00	2.00	8.502
2919	150.00	75.00	8.00	8.00	3.00	3.00	6.134
2851	155.00	100.00	8.00	6.20	3.00		6.668
2842	200.00	100.00	8.00	8.00			8.294

### Top Hat



Sec.No.	A	B	C	T <sub>1</sub>	T <sub>2</sub>	R	R <sub>1</sub>	R <sub>2</sub>	Kg/m
2657	63.50	31.75	25.40	3.18	3.18	1.60		1.60	1.017
2626	68.00	31.50	30.00	3.00	3.00			2.00	1.021
2651	69.84	44.45	38.10	3.18	3.18	3.18	1.00	4.76	1.343
2654	88.89	44.45	44.45	3.18	3.18	3.30	1.00	3.30	1.494
2780	109.00	36.00	65.00	3.00	3.00			1.00	1.417

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