

STANDARD ALLOYS & TEMPERS					
<b>6061</b>		<b>6063</b>		<b>6101</b>	
O		O		H111	
T1		T1		T6	
T4		T4		T61	
T6		T5		T63	
T6511		T52		T64	
T6511B		T6		T65	
		T832			

STANDARD SHAPES					
Product	Minimum Size		Maximum Size		Maximum Circle Size
	lbs./ft.	Size	lbs./ft.	Size	
Angle	0.100	0.750"	25	10"	14.2"
Channel	0.250	1"	25	15"	15.3"
Beam	0.250	1"	25	12"	15.3"
Tee	0.100	1"	25	12"	14.2"
Zee	0.100	1"	25	12"	14.2"

Notes
Press minimums vary from 1,000 to 3,000 lbs. depending upon size.

# EXTRUDED STANDARD SHAPES ALLOY 6061

## ALLOY DESCRIPTION

A good all purpose alloy for applications requiring good corrosion resistance, medium strength, and good machining characteristics. Appearance after anodizing is excellent.

## TYPICAL MECHANICAL PROPERTIES

Temper	Tensile (.0625" Dia. Specimen)					Hardness Brinell 500kg 10 mm	Shear		Fatigue*1		Modulus*2	
	Ultimate		Yield		Elongation/4D %		Ultimate Shearing Strength		Endurance Limit - R.R. Moore Type		Modulus of Elasticity	
	KSI	MPa	KSI	MPa			KSI	MPa	KSI	MPa	KSI x 10 <sup>3</sup>	Gpa
0	18	124	8	55	25	30	12	83	9	62	10.0	68.3
T4	35	241	21	145	22	65	24	165	14	97	10.0	68.3
T6	45	310	40	276	12	95	30	207	14	97	10.0	68.3

\*1. 5 x 10E8 cycles of reversed stress \*2. Average Tension and Compression

## COMPARATIVE CHARACTERISTICS

Temper	Corrosion Resistance		Cold Workability <sup>3</sup>	Machinability <sup>3</sup>	Anodize Response <sup>3</sup>	Brazeability <sup>4</sup>	Weldability <sup>4</sup>		
	General <sup>1</sup>	Stress <sup>2</sup>					Gas	Arc	Spot
O	B	A	A	D	A	A	A	A	B
T4	B	B	B	C	A	A	A	A	A
T6	B	A	C	C	A	A	A	A	A

- Ratings A through E are relative ratings in decreasing order of merit, based on exposures to sodium chloride solution by intermittent spraying or immersion. Alloys with A and B ratings can be used in industrial and seacoast atmospheres without protection. Alloys with C, D and E ratings generally should be protected at least on faying surfaces.
- Stress-corrosion cracking ratings are based on service experience and on laboratory tests of specimens exposed to the 3.5% sodium chloride alternate immersion test.  
 A= No known instance of failure in service or in laboratory tests.  
 B= No known instance of failure in service; limited failures in laboratory tests of short transverse specimens.  
 C= Service failures with sustained tension stress acting in short transverse direction relative to grain structure; limited failures in laboratory tests of long transverse specimens.  
 D= Limited service failures with sustained longitudinal or long transverse areas.
- Ratings A through D for Workability (cold), A through E for Machinability and A through C for Anodize Response, are relative ratings in decreasing order of merit.
- Ratings A through D for Weldability and Brazeability are relative ratings defined as follows:  
 A= Generally weldable by all commercial procedures and methods.  
 B= Weldable with special techniques or for specific applications that justify preliminary trials or testing to develop welding procedure and weld performance.  
 C= Limited weldability because of crack sensitivity or loss in resistance to corrosion and mechanical properties.  
 D= No commonly used welding methods have been developed.

**APPLICABLE SPECIFICATIONS**

<b>Extruded</b>
ASTM B221
AMS-QQ-A-200/8

**CHEMICAL COMPOSITION LIMITS**

Weight %	Si	Fe	Cu	Mn	Mg	Cr	Zn	Ti	Others	
									Each	Total
Minimum	0.40		0.15		0.80	0.04				
Maximum	0.80	0.70	0.40	0.15	1.20	0.35	0.25	0.15	0.05	0.15

**TYPICAL PHYSICAL PROPERTIES**

Characteristic		English	Metric	
Nominal Density (68 °F / 20 °C)		0.098 lbs./in. <sup>3</sup>	2.70x10 <sup>3</sup> kg/m <sup>3</sup>	
Melting Range		1080 °F - 1206 °F	582 °C - 652 °C	
Specific Heat (212 °F / 100 °C)		0.214 BTU/lb. - °F	0.896 J/kg - °K	
Coefficient of Thermal Expansion	Linear 68 °F - 212 °F	13.1 micro in./in. - °F	23.6 micro m/m - °K	
	20 °C - 100 °C			
Thermal Conductivity (68 °F / 20 °C)	O Temper	1250 BTU/ft. - hr. - °F	180 W/m - °K	
	T4	1070 BTU/ft. - hr. - °F	154 155 W/m - °K	
	T6	1160 BTU/ft. - hr. - °F	167 W/m - °K	
Electrical Conductivity (68 °F / 20 °C)	Equal Volume	O Temper	47% IACS	27 MS/m
		T4	40% IACS	23 MS/m
		T6	43% IACS	25 MS/m
	Equal Weight	O Temper	155% IACS	90 MS/m
		T4	132% IACS	77 MS/m
		T6	142% IACS	82 MS/m

# EXTRUDED STANDARD SHAPES

## ALLOY 6063

### ALLOY DESCRIPTION

Magnesium/Silicon alloy. One of the most popular of the Heat Treatable alloy group. Excellent corrosion resistance and weldability. Finer grain structure than 6061 provides more aesthetically pleasing anodize results. Frequently used for architectural applications.

### TYPICAL MECHANICAL PROPERTIES

Temper	Tensile (.0625" Dia. Specimen)					Hardness Brinell 500kg 10 mm	Shear		Fatigue		Modulus	
	Ultimate		Yield		Elongation/4D %		Ultimate Shearing Strength	Endurance Limit - R.R. Moore Type		Modulus of Elasticity		
	KSI	MPa	KSI	MPa				KSI	MPa	KSI x 10 <sup>3</sup>	Gpa	
O	13	90	7	50		25	10	70	8	55	10.0	69
T4	25	170	13	90	22						10.0	69
T5	27	185	21	145	12	60	17	115	10	70	10.0	69
T52												
T6	35	240	31	215	12	73	22	150	10	70	10.0	69

### COMPARATIVE CHARACTERISTICS

Temper	Corrosion Resistance		Cold Workability <sup>3</sup>	Machinability <sup>3</sup>	Anodize Response <sup>3</sup>	Brazeability <sup>4</sup>	Weldability <sup>4</sup>		
	General <sup>1</sup>	Stress <sup>2</sup>					Gas	Arc	Spot
O	A	A	B	E	A	A	A	A	B
T4	A	A	B	D	A	A	A	A	A
T6	A	A	C	C	A	A	A	A	A

- Ratings A through E are relative ratings in decreasing order of merit, based on exposures to sodium chloride solution by intermittent spraying or immersion. Alloys with A and B ratings can be used in industrial and seacoast atmospheres without protection. Alloys with C, D and E ratings generally should be protected at least on faying surfaces.
- Stress-corrosion cracking ratings are based on service experience and on laboratory tests of specimens exposed to the 3.5% sodium chloride alternate immersion test.
  - A= No known instance of failure in service or in laboratory tests.
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  - A= Generally weldable by all commercial procedures and methods.
  - B= Weldable with special techniques or for specific applications that justify preliminary trials or testing to develop welding procedure and weld performance.
  - C= Limited weldability because of crack sensitivity or loss in resistance to corrosion and mechanical properties.
  - D= No commonly used welding methods have been developed.

# EXTRUDED STANDARD SHAPES ALLOY 6063

## APPLICABLE SPECIFICATIONS

<b>Extruded</b>
ASTM B221
AMS-QQ-A-200/8

## CHEMICAL COMPOSITION LIMITS

Weight %	Si	Fe	Cu	Mn	Mg	Cr	Zn	Ti	Others	
									Each	Total
Minimum	0.20				0.45					
Maximum	0.60	0.35	0.10	0.10	0.90	0.10	0.10	0.10	0.05	0.15

## TYPICAL PHYSICAL PROPERTIES

Characteristic		English	Metric	
Nominal Density (68 °F / 20 °C)		0.097 lbs./in. <sup>3</sup>	2.70x10 <sup>3</sup> kg/m <sup>3</sup>	
Melting Range		1140 °F - 1210 °F	615 °C - 655 °C	
Coefficient of Thermal Expansion	Linear 68 °F - 212 °F 20 °C - 100 °C	13.0 micro in./in. - °F	23.4 micro m/m - °K	
Thermal Conductivity (68 °F / 20 °C)	O Temper	1510 BTU/ft. - hr. - °F	218 W/m - °K	
	T1	1340 BTU/ft. - hr. - °F	193 W/m - °K	
	T6	1390 BTU/ft. - hr. - °F	201 W/m - °K	
Electrical Conductivity (68 °F / 20 °C)	Equal Volume	O Temper	58% IACS	34 MS/m
		T1	50% IACS	29 MS/m
		T5	55% IACS	32 MS/m
		T6	53% IACS	31 MS/m
	Equal Weight	O Temper	191% IACS	111 MS/m
		T1	165% IACS	96 MS/m
		T5	181% IACS	105 MS/m
		T6	175% IACS	102 MS/m

# EXTRUDED STANDARD SHAPES ALLOY 6101

## ALLOY DESCRIPTION

Magnesium/Silicon alloy. Typically used when higher strength is required for electrical applications. Products include Extruded Tube, Pipe, Rod, Bar and profiles. Good corrosion resistance, good weldability and good plating response.

## TYPICAL MECHANICAL PROPERTIES

Temper	Tensile (.0625" Dia. Specimen)					Hardness Brinell 500kg 10 mm	Shear		Fatigue		Modulus	
	Ultimate		Yield		Elongation/4D %		Ultimate Shearing Strength		Endurance Limit - R.R. Moore Type		Modulus of Elasticity	
	KSI	MPa	KSI	MPa			KSI	MPa	KSI	MPa	KSI x 10 <sup>3</sup>	Gpa
H111	14	95	11	75							10.0	69
T6	32	220	28	195	15	71	20	140			10.0	69
T61	17.5	120	11.5	80								
T63	30	207	25	172								
T64	17	117	9	62								
T65	29	200	24	165								

## COMPARATIVE CHARACTERISTICS

Temper	Corrosion Resistance		Cold Workability <sup>3</sup>	Machinability <sup>3</sup>	Anodize Response <sup>3</sup>	Brazeability <sup>4</sup>	Weldability <sup>4</sup>		
	General <sup>1</sup>	Stress <sup>2</sup>					Gas	Arc	Spot
T6	A	A	C	C		A	A	A	A
T61	A	A	B	D		A	A	A	A
T63	A	A	C	C		A	A	A	A
T64	A	A	B	D		A	A	A	A

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# EXTRUDED STANDARD SHAPES ALLOY 6101

## APPLICABLE SPECIFICATIONS

Cold Finished	Extruded

## CHEMICAL COMPOSITION LIMITS

										Others	
Weight %	Si	Fe	Cu	Mn	Mg	Cr	Ni	Zn	Ti	Each	Total
Nominal	0.30 - 0.70	0.50	0.10	0.03	0.35 - 0.80	0.03		0.10		0.03	0.10

## TYPICAL PHYSICAL PROPERTIES

Characteristic		English	Metric
Nominal Density (68 °F / 20 °C)		0.097 lbs./in. <sup>3</sup>	2.70x10 <sup>3</sup> kg/m <sup>3</sup>
Melting Range		1150 °F - 1210 °F	620 °C - 655 °C
Coefficient of Thermal Expansion	Linear 68 °F - 212 °F 20 °C - 100 °C	13 micro in./in. - °F	23.4 micro m/m - °K
Thermal Conductivity (68 °F / 20 °C)	T6	1510 BTU/ft. - hr. - °F	
	T61	1540 BTU/ft. - hr. - °F	
	T63	1510 BTU/ft. - hr. - °F	
	T64	1570 BTU/ft. - hr. - °F	
	T65	1510 BTU/ft. - hr. - °F	
Electrical Conductivity (68 °F / 20 °C)	Equal Volume	T6	33 MS/m
		T61	34 MS/m
		T63	35 MS/m
		T64	
		T65	
	Equal Weight	T6	109 MS/m
		T61	113 MS/m
		T63	111 MS/m
		T64	115 MS/m
		T65	111 MS/m

EFFECTIVE 1-09										
Alloy	Temper	Shape	A Dim	B Dim	T Dim	Wall	Length	Stock # East of Rockies	Stock # West of Rockies	Bundle Weight (lbs.)
6061	T6	Structural Channel, Aluminum Assoc. (3)	3.000	1.750	0.170		25'	639		560
6061	T6	Structural Channel, Aluminum Assoc. (3)	4.000	2.000	0.150		25'	605		522
6061	T6	Structural Channel, Aluminum Assoc. (3)	4.000	2.250	0.190		25'	633		524
6061	T6	Structural Channel, Aluminum Assoc. (3)	6.000	2.500	0.170		25'	625		567
6061	T6	Structural Channel, Aluminum Assoc. (3)	6.000	3.250	0.210		25'	343		1008
6061	T6	Structural Channel, American Standard	3.000	1.410	0.170		25'	615	615	532
6061	T6	Structural Channel, American Standard (3)	3.000	1.498	0.258		25'	619		519
6061	T6	Structural Channel, American Standard	4.000	1.580	0.180		25'	661	661	554
6061	T6	Structural Channel, American Standard	4.000	1.647	0.247		25'	621	621	486
6061	T6	Structural Channel, American Standard (3)	4.000	1.720	0.320		25'	319		501
6061	T6	Structural Channel, American Standard (3)	5.000	1.750	0.190		25'	687		521
6061	T6	Structural Channel, American Standard (2)	6.000	1.920	0.200		25'		610	565
6061	T6	Structural Channel, American Standard	6.000	1.945	0.225		25'	645	645	450
6061	T6	Structural Channel, American Standard (3)	6.000	2.034	0.314		25'	675		542
6061	T6	Structural Channel, American Standard (3)	8.000	2.290	0.250		25'	347		1063
6061	T6	Structural Channel, American Standard (2)	10.000	2.600	0.240		25'		461	1056
6061	T6	Structural Channel, American Standard (2)	12.000	2.960	0.300		25'		463	926
6061	T6	Structural Equal Angle	1.000		0.125		25'	629	629	535
6061	T6	Structural Equal Angle (3)	1.000		0.250		25'	606		514
6061	T6	Structural Equal Angle	1.500		0.125		25'	607	607	508
6061	T6	Structural Equal Angle	1.500		0.188		25'	611	611	542
6061	T6	Structural Equal Angle	1.500		0.250		25'	609	609	505
6061	T6	Structural Equal Angle	2.000		0.125		25'	635	635	519
6061	T6	Structural Equal Angle	2.000		0.188		25'	613	613	531
6061	T6	Structural Equal Angle	2.000		0.250		25'	601	601	555
6061	T6	Structural Equal Angle (3)	2.000		0.375		25'	651		482
6061	T6	Structural Equal Angle (3)	2.500		0.188		25'	653		535
6061	T6	Structural Equal Angle	2.500		0.250		25'	623	623	527
6061	T6	Structural Equal Angle	3.000		0.250		25'	603	603	505
6061	T6	Structural Equal Angle	3.000		0.375		25'	631	631	557
6061	T6	Structural Equal Angle (3)	3.000		0.500		25'		604	1013
6061	T6	Structural Equal Angle	4.000		0.250		25'	655	655	514
6061	T6	Structural Equal Angle (3)	4.000		0.375		25'	657		505
6061	T6	Structural Equal Angle (3)	4.000		0.500		25'	409		993
6061	T6	Structural Equal Angle (2)	6.000		0.500		25'		303	1013
6061	T6	Structural Unequal Angle (3)	2.500	2.000	0.250		25'	693		503
6061	T6	Structural Unequal Angle (3)	3.000	2.000	0.188		25'	673		536
6061	T6	Structural Unequal Angle	3.000	2.000	0.250		25'	617	617	526
6061	T6	Structural Unequal Angle	4.000	3.000	0.250		25'	649	649	497
6061	T6	Structural Unequal Angle (3)	4.000	3.000	0.375		25'	627		585
6061	T6	Structural Unequal Angle (3)	5.000	3.000	0.375		25'	696		502
6061	T6	Structural Unequal Angle (3)	6.000	4.000	0.375		25'	371		1059
6061	T6	Structural Unequal Angle (3)	6.000	4.000	0.500		25'	315		1116

In addition to the standard stock shapes shown above, we have tooling to produce both standard and non-standard sizes in the following ranges in both 6061 and 6063 alloys:

Angles - from 1/2" legs up to 8" legs.  
Beams - from 2" to 12".

Channels - from 1/2" widths up to 12" widths.  
Tees and Zees - from 1" to 10".

# SOFT ALLOY EXTRUSIONS



## PRODUCT ADDERS

ALLOY & TEMPER ADDERS			
Alloy / Temper	Adder / Deductor	Alloy / Temper	Adder / Deductor
6061 T6, T6511 (fine grain)	+.05 / lb. to 6061 base price	6101 all tempers**	+.10 / lb. to 6061 base price
6061, 6063 F	-.01 / lb. from alloy base price	6005 all tempers**	Use 6061 base price
1100 F**	+.25 / lb. to 6061 base price	6105 all tempers**	+.05 / lb. to 6061 base price
3003 H112**	+.35 / lb. to 6061 base price	7005 all tempers**	+.25 / lb. to 6061 base price
1350 H111**	+.25 / lb. to 6063 base price	6082 F, T6	+.05 / lb. to 6061 base price
6070** all tempers	+.10 / lb. to 6061 base price	6061 T6B2, T6B11	+.05 / lb. to 6061 base price
O (annealed) temper			
500 - 1,999 lbs.	+.20 / lb. to alloy base price	5,000 - 9,999 lbs.	+.06 / lb. to alloy base price
2,000 - 4,999 lbs.	+.12 / lb. to alloy base price	10,000 - 30,000 lbs.	+.03 / lb. to alloy base price

\*Excludes Drawn Tube / Tempers T61, T63, T64 & T65 are subject to 10,000# age oven minimums / \*\*Select alloys - Subject to inquiry

SPECIFIED LENGTH ADDERS				
Specified Length	lbs. / ft.			
	.125 - .249	.250 - .499	.500 - .999	1.00 & over
3' - 5'	+.055 / lb.	+.040 / lb.	+.035 / lb.	+.030 / lb.
Over 5' - 7'	+.025 / lb.	+.020 / lb.	+.015 / lb.	+.010 / lb.
Over 7' - 40'	BASE	BASE	BASE	BASE
Over 40' - 48'	+.025 / lb.	+.020 / lb.	+.015 / lb.	+.010 / lb.
Over 48'	Subject to inquiry - may require special transportation with additional charge			

PRODUCT ADDERS		
Light Weight Adders	Weight Per Foot	Adder
	.100 to less than .150	+.10 / lb.
	.150 to less than .200	+.07 / lb.
6061 Thin / Wide Bar Adders	.200 to less than .400	+.05 / lb.
	.125" Thickness	Adder
	Widths 5" to not including 6"	+.10 / lb.
	Widths 6" to not including 7"	+.15 / lb.
	Widths 7" and over	+.20 / lb.

STANDARD SHIPPING TOLERANCE	
10,000 lbs. & over	5%
2,000 lbs. - 9,999 lbs.	8%
500 lbs. - 1,999 lbs.	15%
Under 500 lbs.	35%

PACKAGING ADDERS			
Paper or Stretch Wrap Bundle	\$0.05 / lb.	Dustcover	\$0.02 / lb.
Individual Paper Wrap	\$0.10 / lb.	Sling Board	\$0.04 / lb.
Chipboard Strip Layer Separation	\$0.03 / lb.	Skid	\$0.06 / lb.
Fiberboard Overwrap	\$0.03 / lb.	Fiber Box	\$0.06 / lb.
Paper Layer Separation	\$0.04 / lb.	Tri-Wall Box	\$0.09 / lb.
Horizontal & Vertical Separation	\$0.05 / lb.	Angle Board Crate (300 lb. min.)	\$0.11 / lb.
Interleaving	\$0.06 / lb.	Wooden Box (300 lb. min.)	\$0.35 / lb.
Styrofoam Saddle Pack	\$0.07 / lb.	Export Treated Wood	\$0.03 / lb.

OTHER ADDERS			
Actual Chemistry	\$100 / lot	Drop Ship Fee	\$400 / load
Mechanical Testing	\$50 / item	Oiling	\$0.05 / lb.
100% Visual Inspection	\$0.02 / lb.	High Voltage Bus Pipe	\$0.10 / lb. + Freight
Dimensional Checking	\$0.02 / lb.	Roll Contour - 50%	\$0.05 / lb.
Exact Piece Count	\$250 / item	Roll Contour - 100%	\$0.10 / lb.
Warehouse Restocking Fee	\$0.10 / lb. + Freight		

# SOFT ALLOY EXTRUSIONS



## PRESS MINIMUMS

ROD & BAR PRODUCTS – EXCLUDING MANIFOLD BAR*	
Size Range	Press Minimum
Up to 4.99 lbs. / ft.	1,000 lbs.
5.00 Up to 14.99 lbs. / ft.	1,500 lbs.
15.00 Up to 19.99 lbs. / ft.	2,000 lbs.
20.00 Up to 44.99 lbs. / ft.	3,000 lbs.
45.00 lbs. / ft. & greater	4,000 lbs.
STANDARD STRUCTURALS	
Size Range	Press Minimum
Up to 5.99" Circle Size	1,000 lbs.
6.00" Circle Size to 9.99" Circle Size	2,000 lbs.
10.00" Circle Size & greater	3,000 lbs.
SOLID SHAPES	
Size Range	Press Minimum
Up to 8.00" Circle Size	2,000 lbs.
Over 8.00" Circle Size	3,000 lbs.
SEMI-HOLLOW/HOLLOW SHAPES	
Size Range	Press Minimum
Up to 5.99" Circle Size	2,000 lbs.
6.00" Circle Size & greater	3,000 lbs.
STRUCTURAL TUBE/PIPE	
Size Range	Press Minimum
Up to 3.99" Circle Size	1,000 lbs.
4.00" Circle Size to 5.99" Circle Size	2,000 lbs.
6.00" Circle Size & greater	3,000 lbs.
SEAMLESS TUBE/PIPE	
Size Range	Press Minimum
Small Press (Thru 6.000" O.D. & 4.100 lbs. / ft.)	500 lbs.
Large Press (Over 6.000" O.D. & 4.101 lbs. / ft.)	1,000 lbs.
DRAWN SEAMLESS TUBE	
Size Range	Press Minimum
2.125" thru 6.250" O.D.	2,000 lbs.
*MANIFOLD BAR	
Size Range	Press Minimum
Manifold Bar - up to 44.99 lbs. / ft.	3,000 lbs.
Manifold Bar - 45.00 lbs. / ft. & greater	4,000 lbs.

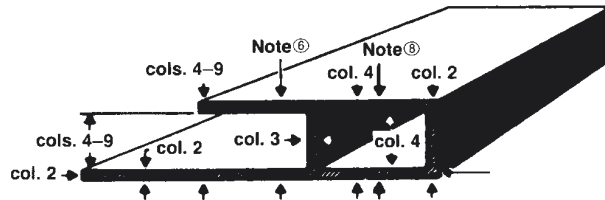
### Notes

The plant reserves the right to request a special press minimum on high difficulty shapes.

The above applies to 6061, 6262 & 6063 only in standard tempers.

**TABLE 11.2 Cross-Sectional Dimension Tolerances—Profiles ①**

EXCEPT FOR T3510, T4510, T6510, T73510, T76510 AND T8510 TEMPER ⑦



SPECIFIED DIMENSION in.	TOLERANCE ② ③—in. plus and minus															
	METAL DIMENSIONS				SPACE DIMENSIONS											
	ALLOWABLE DEVIATION FROM SPECIFIED DIMENSION WHERE 75 PERCENT OR MORE OF THE DIMENSION IS METAL ⑨ ⑩				ALLOWABLE DEVIATION FROM SPECIFIED DIMENSION WHERE MORE THAN 25 PERCENT OF THE DIMENSION IS SPACE ⑥ ⑧											
	All Except Those Covered by Column 3		Wall Thickness ④ Completely ⑤ Enclosing Space 0.11 sq. in. and Over (Eccentricity)		At Dimensioned Points 0.250–0.624 inches from Base of Leg		At Dimensioned Points 0.625–1.249 inches from Base of Leg		At Dimensioned Points 1.250–2.499 inches from Base of Leg		At Dimensioned Points 2.500–3.999 inches from Base of Leg		At Dimensioned Points 4.000–5.999 inches from Base of Leg		At Dimensioned Points 6.000–8.000 inches from Base of Leg	
Col. 2		Col. 3		Col. 4		Col. 5		Col. 6		Col. 7		Col. 8		Col. 9		
Standard Tolerance, All Except 5XXX Alloys ⑪	Precision Tolerance, All Except 5XXX Alloys	Standard Tolerance, All Except 5XXX Alloys ⑪	Precision Tolerance, All Except 5XXX Alloys	Standard Tolerance, All Except 5XXX Alloys ⑪	Precision Tolerance, All Except 5XXX Alloys	Standard Tolerance, All Except 5XXX Alloys ⑪	Precision Tolerance, All Except 5XXX Alloys	Standard Tolerance, All Except 5XXX Alloys ⑪	Precision Tolerance, All Except 5XXX Alloys	Standard Tolerance, All Except 5XXX Alloys ⑪	Precision Tolerance, All Except 5XXX Alloys	Standard Tolerance, All Except 5XXX Alloys ⑪	Precision Tolerance, All Except 5XXX Alloys	Standard Tolerance, All Except 5XXX Alloys ⑪	Precision Tolerance, All Except 5XXX Alloys	

**CIRCUMSCRIBING CIRCLE SIZES LESS THAN 10 INCHES IN DIAMETER**

Up thru 0.124	0.006	0.004	±15% of specified dimension; ±.090 max. ±.015 min.	±10% of specified dimension; ±.060 max. ±.010 min.	0.010	0.007	0.012	0.008	..	..	..	..	..	..	..	..	
0.125–0.249	0.007	0.005			0.012	0.008	0.014	0.009	0.016	0.011	0.018	0.012	0.020	0.013	..	..	..
0.250–0.499	0.008	0.005			0.014	0.009	0.016	0.011	0.018	0.012	0.020	0.013	0.022	0.015	..	..	..
0.500–0.749	0.009	0.006			0.016	0.011	0.018	0.012	0.020	0.013	0.022	0.015	0.017	0.015	..	..	..
0.750–0.999	0.010	0.007			0.018	0.012	0.020	0.013	0.022	0.015	0.025	0.017	0.025	0.017	0.030	0.020	0.020
1.000–1.499	0.012	0.008	±15% of specified dimension; ±.090 max. ±.015 min.	±10% of specified dimension; ±.060 max. ±.010 min.	0.021	0.014	0.023	0.015	0.026	0.017	0.030	0.020	0.035	0.023	..	..	
1.500–1.999	0.014	0.009			0.024	0.016	0.026	0.017	0.031	0.020	0.036	0.024	0.042	0.028	0.050	0.033	..
2.000–3.999	0.024	0.016			0.034	0.022	0.038	0.025	0.048	0.032	0.057	0.038	0.068	0.045	0.080	0.053	..
4.000–5.999	0.034	0.022			0.044	0.029	0.050	0.033	0.064	0.042	0.078	0.051	0.094	0.062	0.110	0.073	..
6.000–7.999	0.044	0.029			0.054	0.036	0.062	0.041	0.082	0.054	0.099	0.065	0.120	0.079	0.140	0.092	..
8.000–9.999	0.054	0.036			0.064	0.042	0.074	0.049	0.100	0.066	0.120	0.079	0.145	0.096	0.170	0.112	..

**CIRCUMSCRIBING CIRCLE SIZES 10 INCHES IN DIAMETER AND OVER**

Up thru 0.124	0.014	0.009	±15% of specified dimension; ±.090 max. ±.015 min.	±10% of specified dimension; ±.060 max. ±.010 min.	0.018	0.012	0.020	0.013	..	..	..	..	..	..	..	..	
0.125–0.249	0.015	0.010			0.019	0.013	0.022	0.015	0.028	0.018	..	..	..	..	..	..	..
0.250–0.499	0.016	0.011			0.020	0.013	0.024	0.016	0.030	0.020	0.050	0.033	..	..	..	..	..
0.500–0.749	0.017	0.011			0.022	0.015	0.027	0.018	0.040	0.026	0.060	0.040	..	..	..	..	..
0.750–0.999	0.018	0.012			0.023	0.015	0.030	0.020	0.050	0.033	0.070	0.046	0.090	0.059	0.100	0.073	..
1.000–1.499	0.019	0.013	±15% of specified dimension; ±.090 max. ±.015 min.	±10% of specified dimension; ±.060 max. ±.010 min.	0.024	0.016	0.034	0.022	0.060	0.040	0.080	0.053	0.100	0.066	..	..	
1.500–1.999	0.024	0.016			0.034	0.022	0.044	0.029	0.070	0.046	0.090	0.059	0.110	0.073	0.170	0.112	..
2.000–3.999	0.034	0.022			0.044	0.029	0.054	0.036	0.080	0.053	0.100	0.066	0.120	0.079	0.180	0.119	..
4.000–5.999	0.044	0.029			0.054	0.036	0.064	0.042	0.090	0.059	0.110	0.073	0.130	0.086	0.190	0.125	..
6.000–7.999	0.054	0.036			0.064	0.042	0.074	0.049	0.100	0.066	0.120	0.079	0.140	0.092	0.200	0.132	..
8.000–9.999	0.064	0.042			0.074	0.049	0.084	0.055	0.110	0.073	0.130	0.086	0.150	0.099	0.210	0.139	..
10.000–11.999	0.074	0.049			0.084	0.055	0.094	0.062	0.120	0.079	0.140	0.092	0.160	0.106	0.220	0.145	..
12.000–13.999	0.084	0.055			0.094	0.062	0.104	0.069	0.130	0.086	0.150	0.099	0.170	0.112	0.230	0.152	..
14.000–15.999	0.094	0.062			0.104	0.069	0.114	0.075	0.140	0.092	0.160	0.106	0.180	0.119	0.240	0.158	..
16.000–17.999	0.104	0.069			0.114	0.075	0.124	0.082	0.150	0.099	0.170	0.112	0.190	0.125	0.250	0.165	..
18.000–19.999	0.114	0.075	±15% of specified dimension; ±.090 max. ±.015 min.	±10% of specified dimension; ±.060 max. ±.010 min.	0.124	0.082	0.134	0.088	0.160	0.106	1.800	1.188	0.200	0.132	0.260	0.172	
20.000–21.999	0.124	0.082			0.134	0.088	0.144	0.095	0.170	0.112	0.190	0.125	0.210	0.139	0.270	0.178	
22.000–24.000	0.134	0.088			0.144	0.095	0.154	0.102	0.180	0.119	0.200	0.132	0.220	0.145	0.280	0.185	

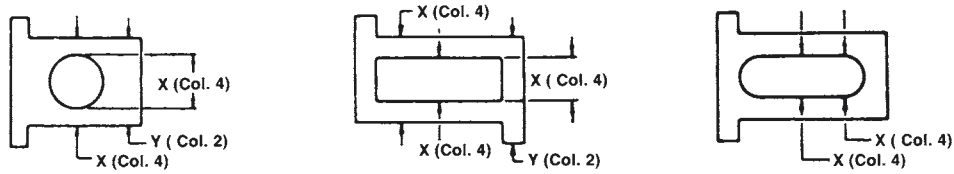
① These Standard and Precision Tolerances are applicable to the average profile. The extrusion conditions required to produce the wide variety of alloy-temper and profile combinations require close review between customer and producer to determine critical characteristics and tolerance capability. Aggressive profile characteristics may require wider than standard tolerance and closer than precision tolerance may be feasible for other characteristics.  
 ② The tolerance applicable to a dimension composed of two or more component dimensions is the sum of the tolerances of the component dimensions if all of the component dimensions are indicated.  
 ③ When a dimension tolerance is specified other than as an equal bilateral tolerance, the value of the standard tolerance is that which applies to the mean of the

maximum and minimum dimensions permissible under the tolerance for the dimension under consideration.  
 ④ Where dimensions specified are outside and inside, rather than wall thickness itself, the allowable deviation (eccentricity) given in Column 3 applies to mean wall thickness. (Mean wall thickness is the average of two wall thickness measurements taken at opposite sides of the void.)  
 ⑤ In the case of Class 1 Hollow Profiles the standard wall thickness tolerance for extruded round tube is applicable. (A Class 1 Hollow Profile is one whose void is round and one inch or more in diameter and whose weight is equally distributed on opposite sides of two or more equally spaced axes.)

Footnotes continued on page KA-SH-AA2-1.09

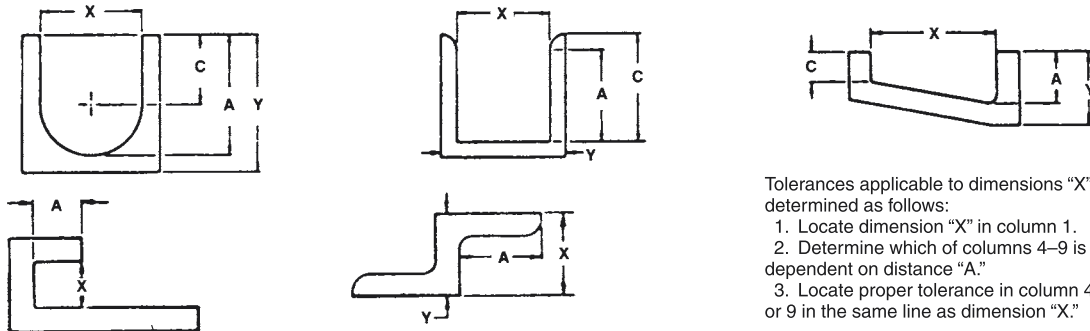
## Examples Illustrating Use of Table 11.2

### Closed-Space Dimensions



All dimensions designated "Y" are classed as "metal dimensions," and tolerances are determined from column 2. Dimensions designated "X" are classed as "space dimensions through an enclosed void," and the tolerances applicable are determined from column 4 unless 75 percent or more of the dimension is metal, in which case column 2 applies.

### Open-Space Dimensions



Dimensions "Y" are "metal dimensions"; tolerances are determined from column 2. Distances "C" are shown merely to indicate incorrect values for determining which of columns 4-9 apply.

Tolerances applicable to dimensions "X" are determined as follows:

1. Locate dimension "X" in column 1.
2. Determine which of columns 4-9 is applicable, dependent on distance "A."
3. Locate proper tolerance in column 4, 5, 6, 7, 8 or 9 in the same line as dimension "X."



Tolerances applicable to dimensions "X" are determined as follows:

1. Locate distance "B" in column 1.
2. Determine which of columns 4-9 is applicable, dependent on distance "A."
3. Locate proper tolerance in column 4, 5, 6, 7, 8 or 9 in the same line as value chosen in column 1.

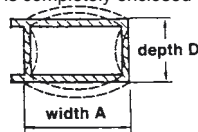
Tolerances applicable to dimensions "X" are not determined from Table 11.2; tolerances are determined by standard tolerances applicable to angles "A."

### Footnotes for Table 11.2 (continued)

⑥ At points less than 0.250 inch from base of leg the tolerances in Col. 2 are applicable.

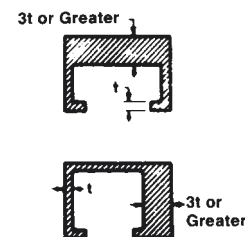
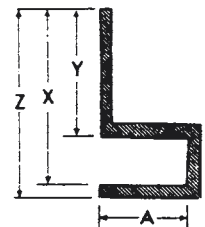
⑦ Tolerances for extruded profiles in T3510, T4510, T6510, T73510, T76510 and T8510 tempers shall be as agreed upon between purchaser and vendor at the time the contract or order is entered.

⑧ The following tolerances apply where the space is completely enclosed (hollow profiles); For the width (A), the tolerance is the value shown in Col. 4 for the width dimension (A). In no case is the tolerance for either width or depth less than the metal dimensions (Col. 2) at the corners.



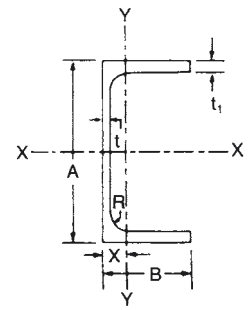
Example—Alloy 6061 hollow profile having 1 × 3 rectangular outside dimensions; width tolerance is ±0.021 inch and depth tolerance ±.034 inch. (Tolerances at corners, Col. 2, metal dimensions, are ±0.024 inch for the width and ±0.012 inch for the depth.) Note that the Col. 4 tolerance of 0.021 inch must be adjusted to 0.024 inch so that it is not less than the Col. 2 tolerance.

⑨ These tolerances do not apply to space dimensions such as dimensions "X" and "Z" of the example (right), even when "Y" is 75 percent or more of "X." For the tolerance applicable to dimensions "X" and "Z," use Col. 4, 5, 6, 7, 8 or 9, dependent on distance "A."



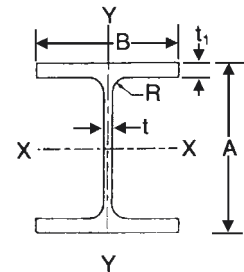
⑩ The wall thickness tolerance for hollow or semihollow profiles shall be as agreed upon between purchaser and vendor at the time the contract or order is entered when the nominal thickness of one wall is three times or greater than that of the opposite wall.

⑪ For those 5xxx alloys with a magnesium content of greater than or equal to 4.0% nominal, tolerances are 150% of those values shown in the standard tolerance columns.



**TABLE 13.3 Aluminum Association Standard Channels—  
Dimensions, Areas, Weights and Section Properties ④**

Size		Area ① in. <sup>2</sup>	Weight ② lb./ft.	Flange Thickness t <sub>1</sub> in.	Web Thickness t in.	Fillet Radius R in.	Section Properties ③						
Depth A in.	Width B in.						Axis X-X			Axis Y-Y			
							I in. <sup>4</sup>	S in. <sup>3</sup>	r in.	I in. <sup>4</sup>	S in. <sup>3</sup>	r in.	x in.
2.00	1.00	0.491	0.557	0.13	0.13	0.10	0.288	0.288	0.766	0.045	0.064	0.303	0.298
2.00	1.25	0.911	1.071	0.26	0.17	0.15	0.546	0.546	0.774	0.139	0.178	0.391	0.471
3.00	1.50	0.965	1.135	0.20	0.13	0.25	1.41	0.94	1.21	0.22	0.22	0.47	0.49
3.00	1.75	1.358	1.597	0.26	0.17	0.25	1.97	1.31	1.20	0.42	0.37	0.55	0.62
4.00	2.00	1.478	1.738	0.23	0.15	0.25	3.91	1.95	1.63	0.60	0.45	0.64	0.65
4.00	2.25	1.982	2.331	0.29	0.19	0.25	5.21	2.60	1.62	1.02	0.69	0.72	0.78
5.00	2.25	1.881	2.212	0.26	0.15	0.30	7.88	3.15	2.05	0.98	0.64	0.72	0.73
5.00	2.75	2.627	3.089	0.32	0.19	0.30	11.14	4.45	2.06	2.05	1.14	0.88	0.95
6.00	2.50	2.410	2.834	0.29	0.17	0.30	14.35	4.78	2.44	1.53	0.90	0.80	0.79
6.00	3.25	3.427	4.030	0.35	0.21	0.30	21.04	7.01	2.48	3.76	1.76	1.05	1.12
7.00	2.75	2.725	3.205	0.29	0.17	0.30	22.09	6.31	2.85	2.10	1.10	0.88	0.84
7.00	3.50	4.009	4.715	0.38	0.21	0.30	33.79	9.65	2.90	5.13	2.23	1.13	1.20
8.00	3.00	3.526	4.147	0.35	0.19	0.30	37.40	9.35	3.26	3.25	1.57	0.96	0.93
8.00	3.75	4.923	5.789	0.41	0.25	0.35	52.69	13.17	3.27	7.13	2.82	1.20	1.22
9.00	3.25	4.237	4.983	0.35	0.23	0.35	54.41	12.09	3.58	4.40	1.89	1.02	0.93
9.00	4.00	5.927	6.970	0.44	0.29	0.35	78.31	17.40	3.63	9.61	3.49	1.27	1.25
10.00	3.50	5.218	6.136	0.41	0.25	0.35	83.22	16.64	3.99	6.33	2.56	1.10	1.02
10.00	4.25	7.109	8.360	0.50	0.31	0.40	116.15	23.23	4.04	13.02	4.47	1.35	1.34
12.00	4.00	7.036	8.274	0.47	0.29	0.40	159.76	26.63	4.77	11.03	3.86	1.25	1.14
12.00	5.00	10.053	11.822	0.62	0.35	0.45	239.69	39.95	4.88	25.74	7.60	1.60	1.61



**TABLE 13.4 Aluminum Association Standard I-Beams—  
Dimensions, Areas, Weights and Section Properties ④**

Size		Area ① in. <sup>2</sup>	Weight ② lb./ft.	Flange Thickness t <sub>1</sub> in.	Web Thickness t in.	Fillet Radius R in.	Section Properties ③					
Depth A in.	Width B in.						Axis X-X			Axis Y-Y		
							I in. <sup>4</sup>	S in. <sup>3</sup>	r in.	I in. <sup>4</sup>	S in. <sup>3</sup>	r in.
3.00	2.50	1.392	1.637	0.20	0.13	0.25	2.24	1.49	1.27	0.52	0.42	0.61
3.00	2.50	1.726	2.030	0.26	0.15	0.25	2.71	1.81	1.25	0.68	0.54	0.63
4.00	3.00	1.965	2.311	0.23	0.15	0.25	5.62	2.81	1.69	1.04	0.69	0.73
4.00	3.00	2.375	2.793	0.29	0.17	0.25	6.71	3.36	1.68	1.31	0.87	0.74
5.00	3.50	3.146	3.700	0.32	0.19	0.30	13.94	5.58	2.11	2.29	1.31	0.85
6.00	4.00	3.427	4.030	0.29	0.19	0.30	21.99	7.33	2.53	3.10	1.55	0.95
6.00	4.00	3.990	4.692	0.35	0.21	0.30	25.50	8.50	2.53	3.74	1.87	0.97
7.00	4.50	4.932	5.800	0.38	0.23	0.30	42.89	12.25	2.95	5.78	2.57	1.08
8.00	5.00	5.256	6.181	0.35	0.23	0.30	59.69	14.92	3.37	7.30	2.92	1.18
8.00	5.00	5.972	7.023	0.41	0.25	0.30	67.78	16.94	3.37	8.55	3.42	1.20
9.00	5.50	7.110	8.361	0.44	0.27	0.30	102.02	22.67	3.79	12.22	4.44	1.31
10.00	6.00	7.352	8.646	0.41	0.25	0.40	132.09	26.42	4.24	14.78	4.93	1.42
10.00	6.00	8.747	10.286	0.50	0.29	0.40	155.79	31.16	4.22	18.03	6.01	1.44
12.00	7.00	9.925	11.672	0.47	0.29	0.40	255.57	42.60	5.07	26.90	7.69	1.65
12.00	7.00	12.153	14.292	0.62	0.31	0.40	317.33	52.89	5.11	35.48	10.14	1.71

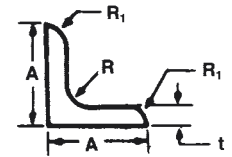
**Footnotes for Tables 13.3 and 13.4**

① Areas listed are based on nominal dimensions.

② Weights per foot are based on nominal dimensions and a density of 0.098 pound per cubic inch, which is the density of alloy 6061.

③ I = moment of inertia; S = section modulus; r = radius of gyration.

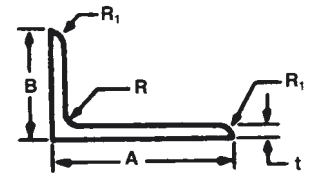
④ Users are encouraged to ascertain current availability of particular structural profiles through inquiries to their suppliers.



**TABLE 13.5 American Standard Structural Profiles—Equal Angles ③**

A	t	R	R <sub>1</sub>	AREA ① sq. in.	WEIGHT PER FOOT ② lb.
3/4	1/8	1/8	3/32	0.171	0.201
3/4	3/16	1/8	3/32	0.246	0.289
1	3/32	1/8	3/32	0.179	0.211
1	1/8	1/8	3/32	0.234	0.275
1	3/16	1/8	3/32	0.340	0.400
1	1/4	1/8	3/32	0.437	0.514
1 1/4	1/8	3/16	1/8	0.292	0.343
1 1/4	3/16	3/16	1/8	0.434	0.510
1 1/4	1/4	3/16	1/8	0.558	0.656
1 1/2	1/8	3/16	1/8	0.360	0.432
1 1/2	3/16	3/16	1/8	0.529	0.619
1 1/2	1/4	3/16	1/8	0.688	0.809
1 3/4	1/8	3/16	1/8	0.423	0.497
1 3/4	3/16	3/16	1/8	0.622	0.731
1 3/4	1/4	3/16	1/8	0.813	0.956
1 3/4	5/16	3/16	1/8	0.996	1.171
2	1/8	1/4	1/8	0.491	0.577
2	3/16	1/4	1/8	0.723	0.850
2	1/4	1/4	1/8	0.944	1.110
2	5/16	1/4	1/8	1.160	1.364
2	3/8	1/4	1/8	1.366	1.606
2 1/2	1/8	1/4	1/8	0.616	0.724
2 1/2	3/16	1/4	1/8	0.910	1.070
2 1/2	1/4	1/4	1/8	1.194	1.404
2 1/2	3/16	1/4	1/8	1.470	1.729
2 1/2	3/8	1/4	1/8	1.714	2.047
3	3/16	5/16	1/4	1.084	1.275
3	1/4	5/16	1/4	1.432	1.684
3	3/16	3/8	1/4	1.770	2.082
3	3/8	5/16	1/4	2.104	2.474
3	7/16	5/16	1/4	2.428	2.855
3	1/2	5/16	1/4	2.744	3.227
3 1/2	1/4	3/8	1/4	1.691	1.989
3 1/2	5/16	3/8	1/4	2.093	2.461
3 1/2	3/8	3/8	1/4	2.488	2.926
3 1/2	1/2	3/8	1/4	3.253	3.826
4	1/4	3/8	1/4	1.941	2.283
4	5/16	3/8	1/4	2.406	2.829
4	3/8	3/8	1/4	2.862	3.366
4	7/16	3/8	1/4	3.310	3.893
4	1/2	3/8	1/4	3.753	4.414
4	9/16	3/8	1/4	4.187	4.924
4	5/8	3/8	1/4	4.613	5.425
4	11/16	3/8	1/4	5.032	5.918
4	3/4	3/8	1/4	5.441	6.399
5	3/8	1/2	3/8	3.603	4.237
5	7/16	1/2	3/8	4.177	4.912
5	1/2	1/2	3/8	4.743	5.578
5	5/8	1/2	3/8	5.853	6.883
6	3/8	1/2	3/8	4.353	5.119
6	7/16	1/2	3/8	5.052	5.941
6	1/2	1/2	3/8	5.743	6.754
6	5/8	1/2	3/8	7.102	8.352
8	1/2	5/8	3/8	7.773	9.141
8	3/4	5/8	3/8	11.461	13.478
8	1	5/8	3/8	15.023	17.667

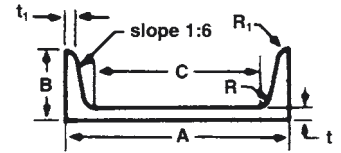
For all numbered footnotes, see page KA-SH-AA8-1.09



**TABLE 13.6 American Standard Structural Profiles—Unequal Angles ③**

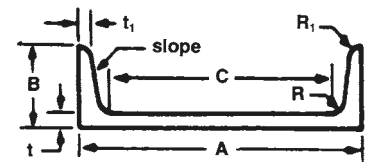
A	B	t	R	R <sub>1</sub>	AREA ①	WEIGHT PER FOOT ② lb.
1¼	¾	3/32	3/32	3/64	0.180	0.212
1¼	1	1/8	1/8	1/16	0.267	0.314
1½	¾	1/8	1/8	1/16	0.267	0.314
1½	¾	3/16	1/8	3/32	0.386	0.454
1½	1	5/32	5/32	5/64	0.368	0.433
1½	1	1/4	3/16	1/8	0.563	0.662
1½	1¼	1/8	3/16	1/8	0.329	0.387
1½	1¼	3/16	3/16	1/8	0.481	0.566
1½	1¼	1/4	3/16	1/8	0.624	0.734
1¾	1¼	1/8	3/16	1/8	0.358	0.421
1¾	1¼	3/16	3/16	1/8	0.528	0.621
1¾	1¼	1/4	3/16	1/8	0.688	0.809
2	1½	1/8	3/16	1/8	0.422	0.496
2	1½	3/16	3/16	1/8	0.622	0.731
2	1½	1/4	3/16	1/8	0.813	0.956
2	1½	3/8	3/16	1/8	1.172	1.378
2½	1½	3/16	1/4	1/8	0.723	0.850
2½	1½	1/4	1/4	1/8	0.944	1.110
2½	1½	5/16	3/16	1/8	1.152	1.355
2½	2	1/8	1/4	1/8	0.554	0.652
2½	2	3/16	1/4	1/8	0.817	0.961
2½	2	1/4	1/4	1/8	1.069	1.257
2½	2	5/16	1/4	1/8	1.314	1.545
2½	2	3/8	1/4	1/8	1.554	1.828
3	2	3/16	5/16	3/16	0.911	1.071
3	2	1/4	5/16	3/16	1.193	1.403
3	2	5/16	5/16	3/16	1.471	1.730
3	2	3/8	5/16	3/16	1.740	2.046
3	2	7/16	5/16	3/16	2.001	2.353
3	2½	1/4	5/16	1/4	1.307	1.537
3	2½	5/16	5/16	1/4	1.614	1.898
3	2½	3/8	5/16	1/4	1.916	2.253
3½	2½	1/4	5/16	1/4	1.432	1.684
3½	2½	5/16	5/16	1/4	1.770	2.082
3½	2½	3/8	5/16	1/4	2.104	2.474
3½	2½	1/2	5/16	1/4	2.744	3.227
3½	3	1/4	3/8	1/4	1.566	1.842
3½	3	5/16	3/8	1/4	1.937	2.278
3½	3	3/8	3/8	1/4	2.300	2.705
3½	3	1/2	3/8	1/4	3.003	3.532
4	3	1/4	3/8	1/4	1.691	1.988
4	3	5/16	3/8	1/4	2.091	2.459
4	3	3/8	3/8	1/4	2.488	2.926
4	3	7/16	3/8	1/4	2.874	3.380
4	3	1/2	3/8	1/4	3.253	3.826
4	3	5/8	3/8	1/4	3.988	4.690
4	3½	3/8	3/8	5/16	2.660	3.128
4	3½	1/2	3/8	5/16	3.488	4.102
5	3	3/8	3/8	5/16	2.848	3.349
5	3	1/2	3/8	5/16	3.738	4.396
5	3½	5/16	7/16	5/16	2.558	3.008
5	3½	3/8	7/16	5/16	3.046	3.582
5	3½	7/16	7/16	5/16	3.527	4.148
5	3½	1/2	7/16	5/16	4.000	4.704
5	3½	5/8	7/16	5/16	4.921	5.787
6	3½	5/16	1/2	5/16	2.878	3.385
6	3½	3/8	1/2	5/16	3.433	4.037
6	3½	1/2	1/2	5/16	4.512	5.306
6	4	3/8	1/2	3/8	3.603	4.237
6	4	7/16	1/2	3/8	4.179	4.915
6	4	1/2	1/2	3/8	4.743	5.578
6	4	9/16	1/2	3/8	5.298	6.230
6	4	5/8	1/2	3/8	5.853	6.883
6	4	3/4	1/2	3/8	6.931	8.151
8	6	5/8	1/2	5/16	8.371	9.844
8	6	11/16	1/2	3/8	9.152	10.763
8	6	3/4	1/2	3/8	9.931	11.679

For all numbered footnotes, see page KA-SH-AA8-1.09



**TABLE 13.7 Channels, American Standard ③**

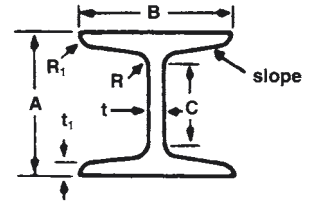
A	B	C	t	t <sub>1</sub>	R	R <sub>1</sub>	AREA ① sq. in.	WEIGHT PER FOOT ② lb.
3	1.410	1¾	0.170	0.170	0.270	0.100	1.205	1.417
3	1.498	1¾	0.258	0.170	0.270	0.100	1.470	1.729
3	1.596	1¾	0.356	0.170	0.270	0.100	1.764	2.074
4	1.580	2¾	0.180	0.180	0.280	0.110	1.570	1.846
4	1.647	2¾	0.247	0.180	0.280	0.110	1.838	2.161
4	1.720	2¾	0.320	0.180	0.280	0.110	2.129	2.504
5	1.750	3¾	0.190	0.190	0.290	0.110	1.969	2.316
5	1.885	3¾	0.325	0.190	0.290	0.110	2.643	3.108
5	2.032	3¾	0.472	0.190	0.290	0.110	3.380	3.975
6	1.920	4½	0.200	0.200	0.300	0.120	2.403	2.826
6	1.945	4½	0.225	0.200	0.300	0.120	2.553	3.002
6	2.034	4½	0.314	0.200	0.300	0.120	3.088	3.631
6	2.157	4½	0.437	0.200	0.300	0.120	3.825	4.498
7	2.110	5½	0.230	0.210	0.310	0.130	3.011	3.541
7	2.194	5½	0.314	0.210	0.310	0.130	3.599	4.232
7	2.299	5½	0.419	0.210	0.310	0.130	4.334	5.097
8	2.290	6¼	0.250	0.220	0.320	0.130	3.616	4.252
8	2.343	6¼	0.303	0.220	0.320	0.130	4.040	4.751
8	2.435	6¼	0.395	0.220	0.320	0.130	4.776	5.617
8	2.527	6¼	0.487	0.220	0.320	0.130	5.514	6.484
9	2.430	7¼	0.230	0.230	0.330	0.140	3.915	4.604
9	2.648	7¼	0.448	0.230	0.330	0.140	5.877	6.911
10	2.600	8¼	0.240	0.240	0.340	0.140	4.488	5.278
10	2.886	8¼	0.526	0.240	0.340	0.140	7.348	8.641
12	2.960	10	0.300	0.280	0.380	0.170	6.302	7.411
12	3.047	10	0.387	0.280	0.380	0.170	7.346	8.639
12	3.170	10	0.510	0.280	0.380	0.170	8.822	10.374
15	3.400	12⅜	0.400	0.400	0.500	0.240	9.956	11.708
15	3.716	12⅜	0.716	0.400	0.500	0.240	14.696	17.282



**TABLE 13.8 Channels, American Standard Shipbuilding and Carbuilding**

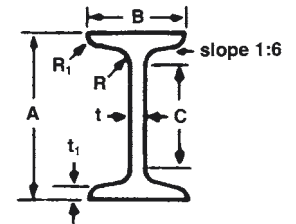
A	B	C	t	t <sub>1</sub>	R	R <sub>1</sub>	SLOPE	AREA ① sq. in.	WEIGHT PER FOOT ② lb.
3	2	1¾	0.250	0.250	0.250	0	1:12.1	1.900	2.234
3	2	1⅞	0.375	0.375	0.188	0.375	0	2.298	2.702
4	2½	2⅝	0.318	0.313	0.375	0.125	1:34.9	2.825	3.322
5	2⅞	3	0.438	0.438	0.250	0.094	1:9.8	4.950	5.821
6	3	4½	0.500	0.375	0.375	0.250	0	4.909	5.773
6	3½	4	0.375	0.412	0.480	0.420	1:49.6	5.044	5.932
8	3	5¼	0.380	0.380	0.550	0.220	1:14.43	5.600	6.586
8	3½	5¼	0.425	0.471	0.525	0.375	1:28.5	6.682	7.858
10	3½	7½	0.375	0.375	0.625	0.188	1:9	7.298	8.581
10	3⅞	7½	0.438	0.375	0.625	0.188	1:9	7.928	9.323
10	3⅞	7½	0.500	0.375	0.625	0.188	1:9	8.548	10.052

For all numbered footnotes, see page KA-SH-AA8-1.09



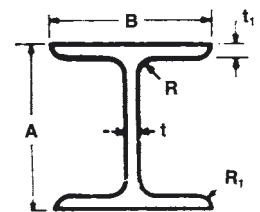
**TABLE 13.9 H-Beams, American Standard**

A	B	C	t	t <sub>1</sub>	R	R <sub>1</sub>	SLOPE	AREA ① sq. in.	WEIGHT PER FOOT ② lb
4	4	2 <sup>3</sup> / <sub>8</sub>	0.313	0.290	0.313	0.145	1:11.3	4.046	4.758
5	5	3 <sup>3</sup> / <sub>8</sub>	0.313	0.330	0.313	0.165	1:13.6	5.522	6.494
6	5.938	4 <sup>3</sup> / <sub>8</sub>	0.250	0.360	0.313	0.180	1:15.6	6.678	7.853
8	7.938	6 <sup>1</sup> / <sub>4</sub>	0.313	0.358	0.313	0.179	1:18.9	9.554	11.236
8	8.125	6 <sup>1</sup> / <sub>4</sub>	0.500	0.358	0.313	0.179	1:18.9	11.050	12.995



**TABLE 13.10 I-Beams, ③ American Standard**

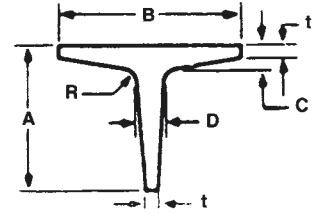
A	B	C	t	t <sub>1</sub>	R	R <sub>1</sub>	AREA ① sq. in.	WEIGHT PER FOOT ② lb.
3	2.330	1 <sup>3</sup> / <sub>4</sub>	0.170	0.170	0.270	0.100	1.669	1.963
3	2.509	1 <sup>3</sup> / <sub>4</sub>	0.349	0.170	0.270	0.100	2.203	2.591
4	2.660	2 <sup>3</sup> / <sub>4</sub>	0.190	0.190	0.290	0.110	2.249	2.644
4	2.796	2 <sup>3</sup> / <sub>4</sub>	0.326	0.190	0.290	0.110	2.792	3.283
5	3	3 <sup>1</sup> / <sub>2</sub>	0.210	0.210	0.310	0.130	2.917	3.430
5	3.284	3 <sup>1</sup> / <sub>2</sub>	0.494	0.210	0.310	0.130	4.337	5.100
6	3.330	4 <sup>1</sup> / <sub>2</sub>	0.230	0.230	0.330	0.140	3.658	4.302
6	3.443	4 <sup>1</sup> / <sub>2</sub>	0.343	0.230	0.330	0.140	4.336	5.099
7	3.755	5 <sup>1</sup> / <sub>4</sub>	0.345	0.250	0.350	0.150	5.147	6.053
8	4	6 <sup>1</sup> / <sub>4</sub>	0.270	0.260	0.370	0.160	5.398	6.348
8	4.262	6 <sup>1</sup> / <sub>4</sub>	0.532	0.270	0.370	0.160	7.494	8.813
10	4.660	8	0.310	0.310	0.410	0.190	7.452	8.764
12	5	9 <sup>3</sup> / <sub>4</sub>	0.350	0.350	0.410	0.210	9.349	10.994



**TABLE 13.11 Wide Flange Beams, ③ American Standard**

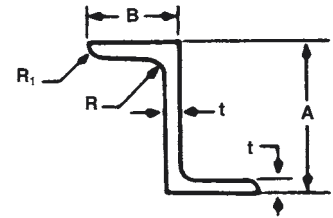
A	B	t	t <sub>1</sub>	R	R <sub>1</sub>	AREA ① sq. in.	WEIGHT PER FOOT ② lb.
6.000	4.000	0.230	0.279	0.250	..	3.538	4.161
6.000	6.000	0.240	0.269	0.250	..	4.593	5.401
8.000	5.250	0.230	0.308	0.320	..	5.020	5.904
8.000	6.500	0.245	0.398	0.400	..	7.076	8.321
8.000	8.000	0.288	0.433	0.400	..	9.120	10.725
9.750	7.964	0.292	0.433	0.500	..	9.706	11.414
9.900	5.750	0.240	0.340	0.312	0.031	6.205	7.297
11.940	8.000	0.294	0.516	0.600	..	11.772	13.844
12.060	10.000	0.345	0.576	0.600	..	15.593	18.337

For all numbered footnotes, see page KA-SH-AA8-1.09



**TABLE 13.12 Tees,<sup>③</sup> American Standard**

A	B	C	D	t	R	AREA <sup>①</sup> sq. in.	WEIGHT PER FOOT <sup>②</sup> lb.
2	2	0.312	0.312	0.250	0.240	1.071	1.259
2¼	2¼	0.312	0.312	0.250	0.250	1.208	1.421
2½	2½	0.375	0.375	0.312	0.250	1.626	1.912
3	3	0.438	0.438	0.375	0.312	2.310	2.717
4	4	0.438	0.438	0.375	0.500	3.183	3.743



**TABLE 13.13 Zees,<sup>③</sup> American Standard**

A	B	t	R	R <sub>1</sub>	AREA <sup>①</sup> sq. in.	WEIGHT PER FOOT lb.
3	2 <sup>11</sup> / <sub>16</sub>	0.250	0.312	0.250	1.984	2.333
3	2 <sup>11</sup> / <sub>16</sub>	0.375	0.312	0.250	2.875	3.381
4	3 <sup>1</sup> / <sub>16</sub>	0.250	0.312	0.250	2.422	2.848
4 <sup>1</sup> / <sub>16</sub>	3 <sup>1</sup> / <sub>8</sub>	0.312	0.312	0.250	3.040	3.575
4 <sup>1</sup> / <sub>4</sub>	3 <sup>3</sup> / <sub>16</sub>	0.375	0.312	0.250	3.672	4.318
5	3 <sup>1</sup> / <sub>4</sub>	0.500	0.312	0.250	5.265	6.192
5 <sup>1</sup> / <sub>16</sub>	3 <sup>7</sup> / <sub>16</sub>	0.375	0.312	0.250	4.093	4.813

**Footnotes for Tables 13.5 through 13.13**

① Areas listed are based on nominal dimensions.

② Weights are based on nominal dimensions and a density of 0.098 pound per cubic inch, which is the density of alloy 6061.

③ Users are encouraged to ascertain current availability of particular structural profiles through inquiries to their suppliers.