



**Steel Services, Inc.**

*"Serving Our Customers  
Since 1946"*

Reference Book

# STEEL SERVICES, INC.

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# Steel Services Inc. Reference Book



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**8th Edition - 2007**

## **CHECK US OUT ON THE WEB!**

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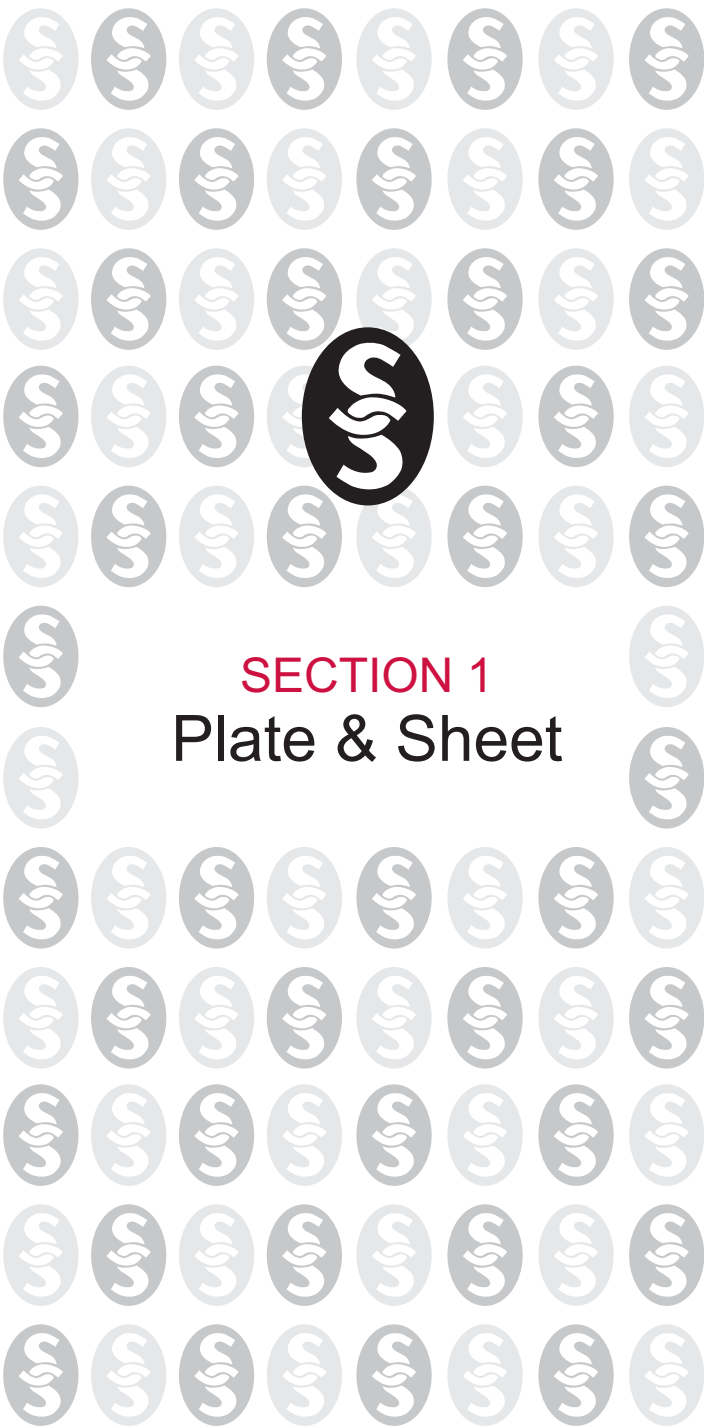






# SECTION 1

## Plate & Sheet



## **Metal Processing Services**

Each Steel Services location has invested in cutting and metalworking equipment designed to furnish you with precision pieces and parts ready for your final assembly. Below are some of the processes we perform in-house. Additionally, we are able to contract with some of our metal working customers to furnish even more first and second stage processing. Whether you need simple cut to size or more involved subassemblies, Steel Services can deliver.

**PLATE CUTTING:** Steel Services can produce virtually any shape from plate or sheet on our modern CNC equipment. Whether it's carbon, alloy, stainless steel or aluminum we can cut close tolerance parts for your application. If you have a special shape to cut, all we need is your sketch or blueprint with clearly marked dimensions and tolerances. For ordering common shapes over the phone you can refer to the examples on the next page. Pick your part and give our salesperson your dimensions and tolerances.

**PLASMA CUTTING:** Our modern Hi-Definition and conventional plasma cutting machines deliver precise parts. Send us your drawings or we can import your CAD files directly into our CAD/CAM system. We can Hi-Def plasma cut stainless and aluminum plate up to 3/8" thick and carbon plate up to 1/2". Conventional plasma will cut exact parts up to 1-1/4" thick in all three metals.

**BURNING:** State of the art computer controlled oxyfuel multi-torch machines can provide close tolerance shapes to your specs. One piece or hundreds; Steel Services produces simple rings and discs or intricate shapes. We stock and cut plates up to 6" thick.

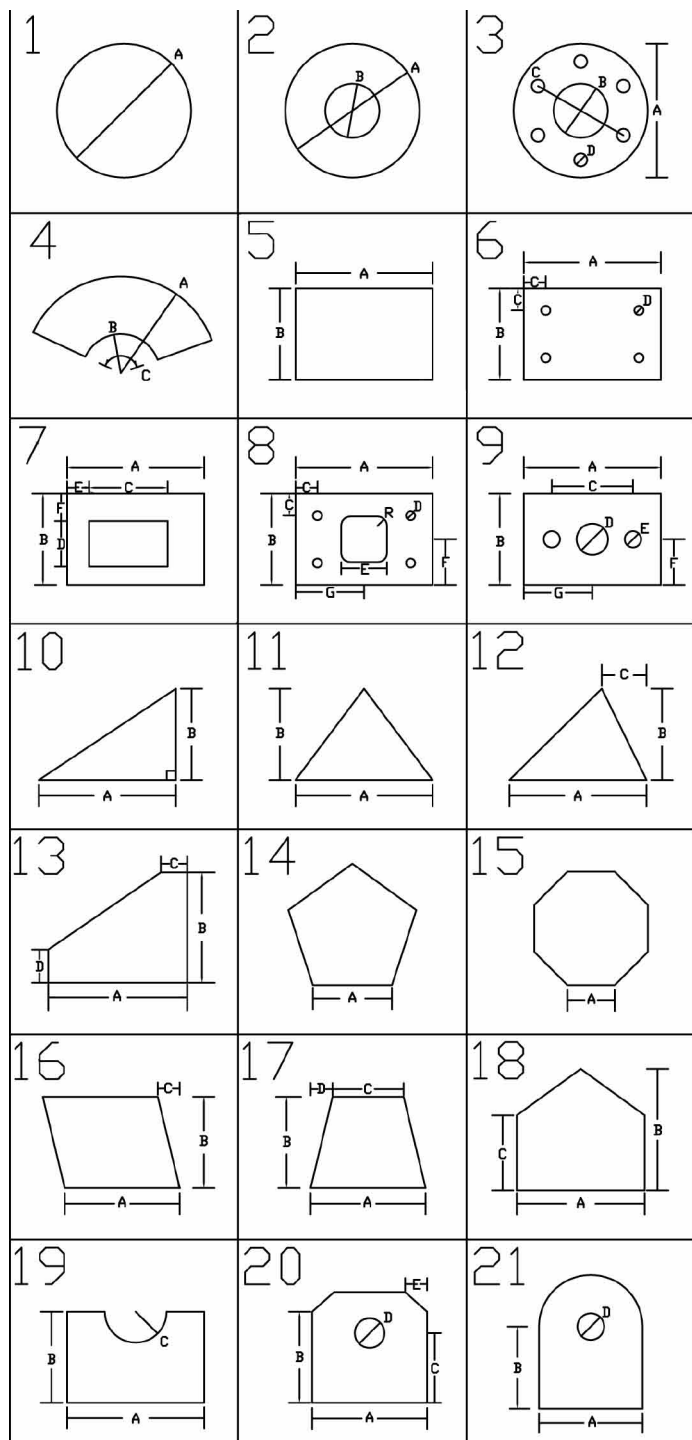
**SAW CUTTING:** We can cut to length everything we carry in stock - and more! Our various band saws are available to cut your requirements, whether simply cutting a piece in half for handling or producing hundreds or thousands of close tolerance parts on one of our automatic feed machines. We also have miter capabilities up to 45°. Our largest saw will handle rectangular loads up to 31.5" x 47.2" with 53' of powered conveyors to feed and discharge material. Send us your requirement; we'll be glad to quote.

**SHEARING:** Steel Services' shears and ironworkers accurately cut everything from light gauge sheets to 1" plates, from narrow strips to 12' wide plates. We also shear flat bars, angles, rounds and rebar to close tolerance. If you don't need a saw or flame cut edge, consider the less expensive sheared edge. Angles to 6 x 6 x ½, rounds to 2" dia. And flats to 12" wide can all be sheared.

**PUNCHING:** Our beefed-up ironworkers can punch holes in material up to 1" thick. Hole diameters from ¼" to 1-½" can be punched in angles, flats, beams or clips. You can save the cost of drilling if the hole diameter is at least the thickness of the material.

**DRILLING:** For the times when a punched hole just won't do - Steel Services can drill clean, precisely located holes ready for your next step. Our radial arm machine will put little holes in plates too thick to punch and holes up to 2" dia. in plates or assemblies up to 9-7/8" thick.

**SPLITTING:** Generally, any beam or channel 4" or deeper can be split into tees or angles. We can split and straighten to your requirements.



**Hot Rolled  
Carbon Steel Plate**

ASTM A36

Used for structural applications, Carbon Steel Plates are produced from ingots made by the continuous cast, the basic-oxygen, or electric furnace processes. This material is readily formed and welded using conventional methods.

**Chemical Requirements  
ASTM A36**

	Carbon Max %	Mn. %	P Max %	S %	Si %
to 3/4 incl	.25	Not Req'd	.04	.05	.40 Max
over 1/4 to 1-1/2 incl	.25	.80/1.20	.04	.05	.40 Max
over 1-1/2 to 2-1/2 incl	.26	.80/1.20	.04	.05	.15/.40
over 2-1/2 to 4 incl	.27	.85/1.20	.04	.05	.15/.40
over 4	.29	.85/1.20	.04	.05	.15/.40

For each reduction of 0.01% below the specified carbon maximum, an increase of 0.06% manganese above the specified maximum will be permitted up to the maximum of 1.35%.

**Physical Properties**

Tensile Strength (PSI)	Yield Strength (PSI)	Elong in 8" %	Elong in 2" %
58/80,000	36,000	20	23

## Weight of Thicknesses of Rolled Carbon Steel Plate

Thickness	Lbs. Per Sq. In.	Lbs. Per Sq. Ft.
3/16	.0532	7.66
1/4	.0709	10.21
5/16	.0886	12.76
3/8	.1064	15.31
7/16	.1241	17.87
1/2	.1418	20.42
9/16	.1595	22.97
5/8	.1773	25.53
3/4	.2127	30.63
7/8	.2481	35.73
1	.2836	40.84
1 1/8	.3190	45.94
1 1/4	.3545	51.05
1 3/8	.3900	56.16
1 1/2	.4254	61.26
1 5/8	.4609	66.37
1 3/4	.4963	71.47
2	.5672	81.68
2 1/4	.6381	91.89
2 3/8	.6736	97.00
2 1/2	.7090	102.10
2 3/4	.7799	112.31
3	.8508	122.52
3 1/4	.9217	132.72
3 1/2	.9926	142.94
3 3/4	1.064	153.15
4	1.134	163.36
4 1/4	1.205	173.57
4 1/2	1.276	183.78
4 3/4	1.347	193.99
5	1.418	204.20
5 1/2	1.560	224.62
6	1.702	245.04

Above weights are based on Metric Density unit of .2836  
(International System of units).

**Hot Rolled Carbon  
Steel Plate**

ASTM A36



Thickness	Lbs. Per Sq. Ft.	Size		Lbs. Per Plate
		A	B	
3/16	7.66	48 x 96		245.03
		48 x 120		306.29
		60 x 120		382.86
		60 x 144		459.60
		60 x 240		765.72
		72 x 144		551.32
		72 x 240		918.86
1/4	10.21	96 x 240		1,225.15
		48 x 96		326.71
		48 x 120		408.38
		48 x 144		490.06
		48 x 240		816.79
		60 x 120		510.48
		60 x 144		612.60
		60 x 240		1,020.96
		72 x 144		735.09
		72 x 240		1,225.15
		84 x 240		1,429.40
		60 x 96		408.38
		96 x 240		1,633.54
96 x 288		1,960.24		
5/16	12.76	120 x 240		2,041.92
		48 x 96		408.32
		60 x 144		918.60
		60 x 180		1,149.00
		72 x 240		1,531.44
		72 x 288		1,837.73
3/8	15.31	96 x 240		2,041.92
		48 x 96		490.06
		48 x 120		612.58
		60 x 120		765.72
		60 x 144		918.60
		60 x 240		1,531.44
		72 x 144		1,102.64
		72 x 240		1,837.73
		72 x 288		2,205.27
1/2	20.42	96 x 240		2,450.30
		96 x 288		2,940.36
		48 x 96		653.41
		48 x 120		816.77
		60 x 120		1,020.96
		60 x 144		1,225.20
		60 x 240		2,041.92
60 x 288		2,450.30		

## Hot Rolled Carbon Steel Plate (con't)

Thickness	Lbs. Per Sq. Ft.	Size		Lbs. Per Plate
		A	B	
1/2		72 x 240		2,450.30
		72 x 288		2,940.36
		84 x 288		3,430.43
		96 x 240		3,267.07
		96 x 288		3,920.49
5/8	25.53	120 x 240		4,083.84
		48 x 96		816.77
		72 x 288		3,675.46
		96 x 240		4,083.84
		96 x 288		4,900.61
3/4	30.63	48 x 96		980.12
		48 x 120		1,225.20
		60 x 240		3,062.88
		60 x 288		3,675.46
		72 x 240		3,675.46
		72 x 288		4,410.55
		96 x 240		4,900.61
7/8	35.74	96 x 288		5,880.73
		96 x 288		6,860.85
		96 x 288		6,860.85
1	40.84	48 x 96		1,306.83
		60 x 240		4,084.00
		72 x 240		4,900.61
		72 x 288		5,880.73
		84 x 288		6,860.85
		96 x 240		6,534.14
		96 x 288		7,840.97
1 1/8	45.95	96 x 240		7,350.91
1 1/4	51.05	48 x 96		1,633.54
		60 x 240		5,105.00
		84 x 288		8,576.06
		96 x 240		8,167.68
		96 x 288		9,801.22
1 3/8	56.16	96 x 288		10,781.34
		96 x 288		10,781.34
1 1/2	61.26	48 x 96		1,960.24
		60 x 240		6,126.00
		96 x 240		9,801.22
		96 x 288		11,761.46
1 5/8	66.37	96 x 240		10,617.98
		96 x 240		11,435.20
1 3/4	71.47	96 x 288		13,721.70
		96 x 288		13,721.70
		96 x 288		13,721.70
2	81.68	48 x 96		2,613.66
		96 x 144		7,840.97
		96 x 120		6,534.40
		96 x 240		13,068.29
2 1/4	91.89	96 x 288		15,681.95
		96 x 288		17,642.19
		96 x 288		17,642.19
2 1/2	102.10	96 x 120		8,168.00
		96 x 144		9,801.22



**Hot Rolled Carbon Steel Plate (con't)**

Thickness	Lbs. Per Sq. Ft.	Size		Lbs. Per Plate
		A	B	
2 3/4	112.31	96	144	10,781.34
3	122.52	96	120	9,801.22
		96	144	11,761.46
3 1/2	142.94	96	144	13,721.70
4	163.36	96	144	15,681.95
4 1/2	183.78	96	144	17,642.19
5	204.20	96	144	19,602.43
6	245.04	96	144	23,522.92

**Dual Certified High Strength Steel Plate**

MIL-S-22698C Grades  
AH36 & DH36, ABS Section 43



Higher strength steel for structural parts of ships, barges and marine equipment.

**Mechanical Properties**

Tensile strength, ksi 71-90

Yield point, min, ksi 51

Chemical requirements

Carbon .18 max., manganese 0.90-1.60, Silicon 0.10-0.50

Killed fine grain practice, Charpy V-Notch test.

Thickness	Lbs. Per Sq. Ft.	Size		Lbs. Per Plate
		A	B	
3/16	7.66	96	240	1,225.26
1/4	10.21	96	240	1,633.55
5/16	12.76	96	240	2,042.04
3/8	15.31	96	240	2,450.30
1/2	20.42	96	240	3,267.07
5/8	25.53	96	240	4,083.84
3/4	30.63	96	300	6,126.00



## Triple Certified Steel Plate

MIL-S-22698C Grades A & B,  
ABS Section 43, ASTM A36

### Mechanical Properties

Tensile strength, ksi 58-71  
Yield point, min, ksi 34

### Chemical requirements

Grade A-carbon, max. .023

Grade B-Carbon, max. 0.21, manganese, 0.80-1.10, Silicon, max 0.35

- a) All grades-carbon of plus 1/6 of manganese shall not exceed 0.40%
- b) Maximum carbon of .26% acceptable for grade A for thickness of 1/2" and under
- c) Grade A over 1/2" shall have a minimum manganese content of not less than 2.5 times the carbon content.
- d) For all grades, upper limit of manganese may be exceeded up to 1.65% provided carbon plus 1/6 of manganese does not exceed 0.40%

Thickness	Lbs. Per Sq. Ft.	Size		Lbs. Per Plate
		A	B	
3/16	7.66	96 x 240		1,225.26
1/4	10.21	96 x 240		1,633.54
		120 x 240		2,042.00
5/16	12.76	96 x 240		2,042.04
3/8	15.32	96 x 240		2,450.30
		96 x 360		3,675.46
		120 x 240		3,062.00
1/2	20.42	96 x 240		3,267.07
		120 x 240		4,084.00
5/8	25.53	96 x 240		4,083.84
3/4	30.63	96 x 240		4,900.61
1	40.84	96 x 240		6,534.14
1 1/4	51.05	96 x 240		8,167.68

Ordinary strength steel for structural parts of ships, barges and marine equipment.



**Pressure Vessel Plate**

ASTM A516 Grade 70

**Mechanical Properties**

Tensile Strength, ksi	70-85
Yield point, ksi	38
Elongation in 8"	17
Elongation in 2"	21

**Chemical requirements**

Carbon .27-.31 (max varies with thickness)  
 Manganese .85-1.20  
 Phosphorus .035  
 Sulphur .04  
 Silicon .15-.30

Thickness	Lbs. Per Sq. Ft.	Size		Lbs. Per Plate
		A	B	
1	40.84	96	x 240	6,534.4
1 1/2	61.26	96	x 240	9,801.6
2	81.68	96	x 240	13,068.8
2 1/4	91.89	96	x 240	14,702.4
2 1/2	102.10	96	x 240	16,336.0

**Steel Plate, High Strength, Low Alloy**  
**ASTM A572 Grade 50**



General purpose high strength low alloy steel designed to offer optimum combinations of strength, weldability, and notch toughness, at economical cost. Used in construction of bridges, buildings, automobiles, truck parts, railroad cars, cargo containers, construction equipment, line pipe and structural tubing, lighting standards and transmission poles.

**Mechanical Properties**

Tensile Strength, ksi	65
Yield Point, ksi	50

**Chemical requirements**

Carbon .23 max., Manganese 1.35 max, Phosphorus .04  
 Sulphur .05, Silicon .04 to 1 1/2, over 1 1/2 0.15/0.40

Thickness	Lbs. Per Sq. Ft.	Size		Lbs. Per Plate
		A	B	
3/8	15.32	96	x 240	2,452.20
1/2	20.42	96	x 240	3,267.07
5/8	25.53	96	x 240	4,084.80
3/4	30.63	96	x 240	4,900.80
1	40.84	96	x 240	6,534.40

**Abrasion Resisting Plate**

AR-235



A hot rolled plate with higher carbon content, this plate is hard and tough with excellent abrasion resistance. It can be machined, drilled, punched and formed within limits.

Applications include conveyors, mixers, dirt and stone moving equipment, dump truck bodies, bucket lips, liner plates, and coal and rock screens.

**Mechanical Properties**

Brinell Hardness 200/250 Typical

Thickness	Lbs. Per Sq. Ft.	Size		Lbs. Per Plate
		A	B	
3/16	7.66	72	240	919.20
1/4	10.21	96	240	1,633.60
3/8	15.32	96	240	2,451.20
1/2	20.42	96	240	3,267.20
3/4	30.63	96	240	4,900.80
1	40.84	96	240	6,534.40

**Abrasion Resisting Plate**

AR 400F



This plate exhibits an excellent combination of hardness, abrasion resistance, formability, weldability, toughness and flatness. They are available in thicknesses from 3/16 to 2 inches. AR-400 F steels are used in the original fabrication, repair and modification of heavy equipment in such applications as truck body liners, chutes, bucket lips, hopper and crusher liners. This plate is designed for through-thickness hardness while maintaining minimum carbon, alloy and carbon equivalent contents to improve weldability. The sulfur content is reduced to a maximum of 0.005% and the steels are calcium treated for inclusion shape control. These factors enhance the cold forming characteristics of the steels.

Thickness	Lbs. Per Sq. Ft.	Size		Lbs. Per Plate
		A	B	
3/16	7.66	96	288	1,470.72
1/4	10.21	96	288	1,960.32
3/8	15.32	96	288	2,941.44
1/2	20.42	96	288	3,920.64
5/8	25.53	96	288	4,901.76
1	40.84	96	288	7,841.28
1 1/2	61.26	96	288	11761.92

**Abrasion Resistant Plate**

AR360/AR400

Heat Treated, Quenched & Tempered



Thickness	Lbs. Per Sq. Ft.	Size		Lbs. Per Plate
		A	B	
1/4	10.21	48 x 96		326.71
			96 x 288	1,960.32
3/8	15.32	48 x 96		490.06
			96 x 288	2,941.44
1/2	20.42	48 x 96		653.41
			96 x 288	3,920.64
5/8	25.53	96 x 288		4,901.76
3/4	30.63	96 x 288		5,880.73
1	40.84	96 x 288		7,840.97
1 1/4	51.05	96 x 288		9,801.22
1 1/2	61.26	96 x 288		11,761.46

**Abrasion Resisting Cladded Wear Plate**

CR-600

Base Plate: ASTM A 36 steel plate

Cladding: Austenitic Steel with a High Chromium Carbide concentration

Hardness: Brinell - 600+

Plate Thickness	Clad Thk	Lbs. Per Sq. Ft.	Size		Lbs. Per Plate
			A	B	
1/4	1/4	21.5	48 x 96		688.0
				60 x 120	1,075.0
3/8	3/8	15.32	48 x 96		1030.4
				60x120	1610.0

**Processing:**

Plasma arc or waterjet cutting required

Can be supplied cut-to-size, formed, rolled, and welded per your drawings

**End Uses:**

- |                          |                     |
|--------------------------|---------------------|
| Chutes                   | Truck Bodies        |
| Sizing Screens           | Bulldozer Blades    |
| Impact & Diverter Plates | Wear Blades         |
| Troughs                  | Drag Plates         |
| Augers & Screw Conveyors | Fans & Fan Housings |
| Hoppers & Bins           | Discharge Chutes    |
| Buckets & Liners         | Digesters           |

**Constructional**

Alloy Steel Plate

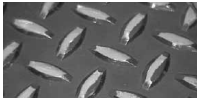
ASTM A514 ("T-1")

ASTM A514 structural quality plates are for general structural applications where its great strength in combination with other desirable properties permits substantial weight reduction, longer service life and greater economy in applications such as heavy construction, earthmoving and mining equipment, truck and hopper body liners, chutes and wear plates.

**Mechanical Properties**

	Tensile Strength (PSI)	Yield Strength (PSI)	Elongation in 2"	Brinell Hardness
3/16" Through 2 1/2" Incl.	110/130,000	100,000 Min.	18%	235/293
Over	110/130,000	90,000 Min. 2 1/2" to 6" Incl.	16%	229/293

Thickness	Lbs. Per Sq. Ft.	Size		Lbs. Per Plate
		A	B	
1/4	10.21	96	240	1,633.60
3/8	15.32	96	240	2,451.20
1/2	20.42	96	240	3,267.20
5/8	25.53	96	240	4,084.80
3/4	30.63	96	240	4,900.80
1	40.84	96	240	6,534.40
1 1/4	51.05	96	240	8,168.00
1 1/2	61.26	96	240	9,801.60
2	81.68	96	240	13,068.80



**Hot Rolled Carbon Steel Floor Plate**

Raised Pattern

Thickness	Lbs. Per Sq. Ft.	Size	Lbs. Per Plate
14 Ga	3.75	48 x 96	120.00
		48 x 120	150.00
1/8	6.16	48 x 96	196.80
		48 x 120	246.00
		60 x 120	307.50
		72 x 120	369.00
3/16	8.71	48 x 96	278.72
		48 x 120	348.40
		48 x 240	696.80
		60 x 120	435.50
		60 x 240	871.00
		72 x 240	1,045.20
1/4	11.26	96 x 240	1,393.60
		48 x 96	360.32
		48 x 120	450.40
		48 x 240	900.80
		60 x 120	563.00
		60 x 240	1,126.00
3/8	16.37	72 x 240	1,351.20
		96 x 240	1,801.60
		48 x 96	523.84
		60 x 240	1,637.00
1/2	21.47	72 x 240	1,964.40
		96 x 240	2,619.20
		48 x 96	687.04
		96 x 240	3,435.20

Note: Thickness refers to body of plate, not including raised pattern.

**Hot Rolled Sheet**

ASTM A569, Commercial Quality



Gauge	Thickness		Size		Lbs. Per Sq. Ft.	Lbs. Per Sheet
	Decimal		A	B		
10 GA	.1345		48 x 96		5.625	180.0
			48 x 120			225.0
			48 x 144			270.0
			60 x 120			281.3
			72 x 120			337.5
			72 x 144			405.0
11 GA	.1196		48 x 96		5.000	160.0
			48 x 120			200.0
			48 x 144			240.0
			60 x 120			250.0
			60 x 144			300.0
			72 x 120			300.0
12 GA	.1046		72 x 144		4.375	360.0
			48 x 96			140.0
			48 x 120			175.0
			60 x 120			218.8
			72 x 120			262.5
			72 x 144			315.0
14 GA	.0747		48 x 96		3.125	100.0
			48 x 120			125.0
			60 x 120			156.3
			60 x 120			156.3
16 GA	.0598		48 x 96		2.500	80.0
			48 x 120			100.0
			60 x 120			125.0

MOST OF THE ABOVE GAUGES AND SIZES ARE ALSO AVAILABLE IN PICKLED AND OILED IN 5,000# QUANTITIES. IDEAL MATERIAL FOR LASERS.

**Cold Rolled Sheet**

ASTM A366

Commercial Quality, Oiled



Gauge	Thickness		Size		Lbs. Per Sq. Ft.	Est. Lbs. Per Sheet
	Decimal		A	B		
16 GA	.0598		48 x 96		2.500	80.0
			48 x 120			100.0
18 GA	.0478		48 x 96		2.000	64.0
			48 x 120			80.0
20 GA	.0359		48 x 96		1.500	48.0
			48 x 120			60.0
22 GA	.0299		48 x 96		1.250	40.0
			48 x 120			50.0





**Galvanized Sheet**

ASTM A526 (14 ga. and heavier,  
Commercial Quality)

ASTM A527 (16 ga. and lighter,  
Lock-forming Quality)

Est. Lbs include the weight  
of the Zinc

Galvanized sheets are continuously hot-dipped with a protective coating of zinc. Coating is G90 (1.25 oz per square foot).

Galvanized sheets can be formed, rolled or otherwise fabricated at room temperature without disrupting their protective qualities.

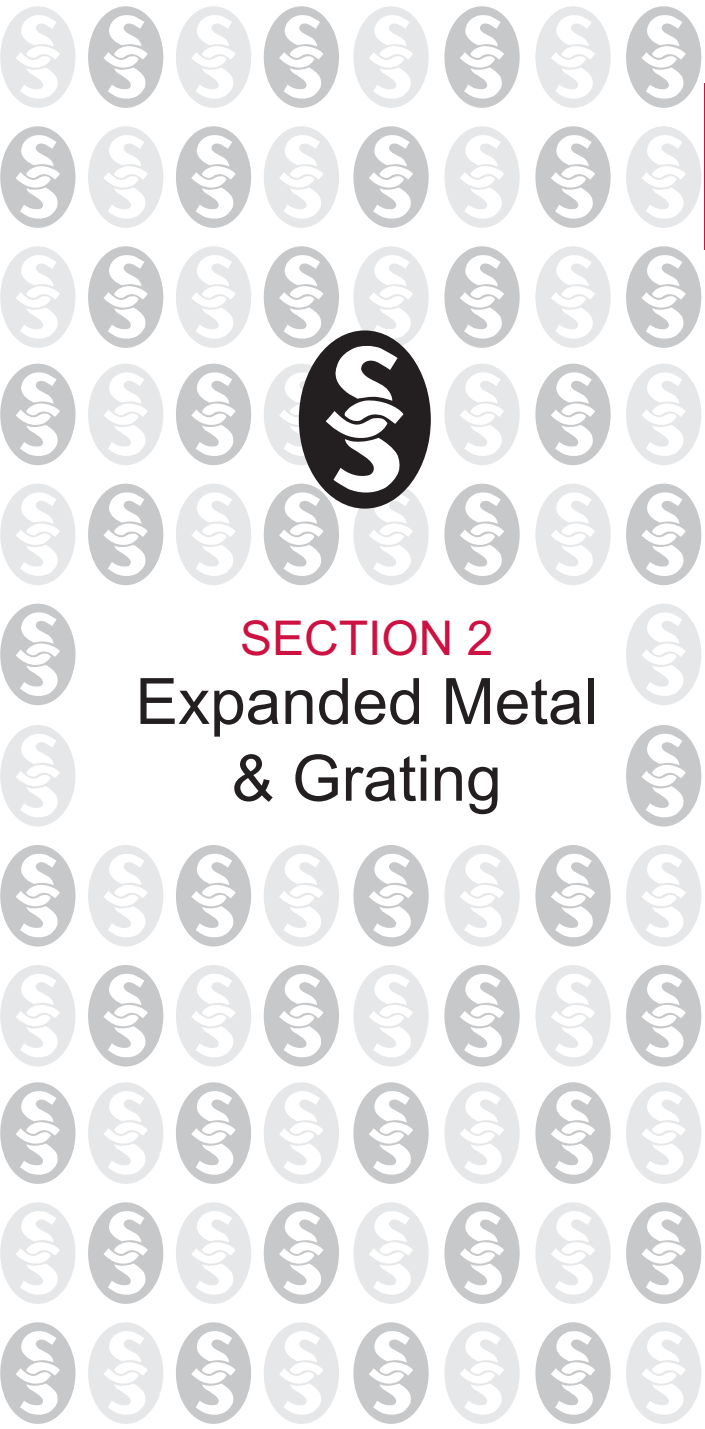
Applications include heating and ventilation ducts, roof flashing, electrical boxes, and many general maintenance applications.

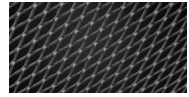
Gauge	Size		Lbs. Per Sq. Ft.	Lbs. Per Sheet
	A	B		
10 GA	48 x	96	5.781	185.0
	48 x	120		231.2
	60 x	120		289.0
11 GA	48 x	96	5.250	168.0
12 GA	48 x	96	4.531	145.0
	48 x	120		181.2
	60 x	120		225.0
14 GA	48 x	96	3.281	105.0
	48 x	120		131.2
16 GA	48 x	96	2.656	85.0
18 GA	48 x	120	2.156	106.2
	48 x	96		69.0
20 GA	48 x	120	1.656	86.2
	48 x	96		53.0
22 GA	48 x	120	1.406	66.2
	48 x	96		45.0
24 GA	48 x	120	1.156	56.2
	48 x	96		37.0
26 GA	48 x	120	.906	46.2
	48 x	96		29.0
				36.2





SECTION 2  
Expanded Metal  
& Grating

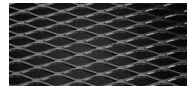


**Expanded Metal**Carbon Steel  
Standard (Raised)

Size Designation*	Sheet Size	Est. Lbs. Per Sq. Ft.	Approx. Size of Opening in Inches
1/4 x #18	48 x 96	1.14	.145 x .718
1/2 x #16	48 x 96	.86	.375 x .938
x #13	48 x 96	1.47	.312 x .938
3/4 x #16	48 x 96	.54	.813 x 1.750
x #13	48 x 96	.80	.750 x 1.688
	48 x 120		
	60 x 120		
x #9	48 x 96	1.80	.688 x 1.562
	48 x 120		
	60 x 120		
1 1/2 x #13	48 x 96	.60	1.188 x 2.500
	60 x 120		
x #9	48 x 96	1.20	1.125 x 2.375
x #6	48 x 96	2.50	1.000 x 2.313

NOTE: Stock sizes only shown above. Other sizes available from factory stock.

\*The first number represents the nominal width of diamond in inches measured from center to center of bonds, and the second number represents the approximate gage of sheet or plate before expanding.

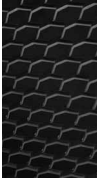
**Flattened Expanded Metal**

Size Designation*	Sheet Size	Est. Lbs. Per Sq. Ft.	Approx. Size of Opening in Inches
1/4 x #18	48 x 96	1.08	.118 x .715
1/2 x #16	48 x 96	.82	.312 x 1.000
x #13	48 x 96	1.40	.265 x 1.000
3/4 x #16	48 x 96	.51	.750 x 1.750
x #13	48 x 96	.75	.688 x 1.781
	48 x 120		
x #9	48 x 96	1.71	.563 x 1.688
	48 x 120		
	60 x 120		
	72 x 144		
1 1/2 x #13	48 x 96	.57	1.062 x 2.750
x #9	48 x 96	1.14	1.000 x 2.563

NOTE: Stock sizes only shown above. Other sizes available from factory stock.

\*The first number represents the nominal width of diamond in inches measured from center to center of bonds, and the second number represents the approximate gage of sheet or plate before expanding.

Expanded Metal Grating



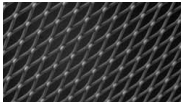
Carbon Steel — Regular

Style	Weight In Lbs.		Standard Sizes in Ft.	Size of Openings In Inches		Center to Center of Bond In Inches		Size of Strands In Inches		Percent Open Area	Overall Thickness In Inches	
	Plain	Galv		Width-Length	Width-Length	Width-Length	Width-Thickness					
3 lb.	300	320	4-6	8-10	.938	3.438	1.333	5.33	.261	.183	73	.500
3.14 lb.	314	334	4-6	8-10	1.625	4.875	2.000	6.00	.308	.250	74	.562
4 lb.	400	430	4-5-6	8-10	.938	3.438	1.333	5.33	.297	.215	65	.625
4.27 lb.	427	457	4-6	8-10	1.000	2.875	1.412	4.00	.297	.250	58	.625
5 lb.	500	550	4-5-6	8-10	.813	3.375	1.333	5.33	.327	.250	52	.625
6.25 lb.	625	685	4-6	8	.813	3.375	1.412	5.33	.347	.312	55	.750
7 lb.	700	750	4-6	8	.813	3.375	1.412	5.33	.338	.312	60	.750

Carbon Steel — Long Length SWD

3 lb.	300	320	10	2-21/2-3	.938	3.438	1.333	5.33	.261	.183	73	.500
3.14 lb.	314	334	10	2-21/2-3	1.625	4.875	2.000	6.00	.308	.250	74	.562
4 lb.	400	430	10	2-21/2-3	.938	3.438	1.330	5.33	.297	.215	65	.625
4.27 lb.	427	457	10	2-21/2-3	1.000	2.875	1.412	4.00	.297	.250	58	.625
5 lb.	500	550	10	2-21/2-3	.813	3.375	1.333	5.33	.327	.250	52	.625

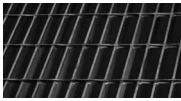
Expanded Metal & Grating



### **Stainless Steel Expanded Metal**

T304 Flattened

Size Designation	Sheet Size	Est. Lbs. Per Sq. Ft.	Approx. Size of Opening In Inches
1/2 x #18	48 x 96	0.69	.313 x 1.000
x #16	48 x 96	0.86	.313 x 1.000
x #13	48 x 96	1.78	.250 x 1.000
3/4 x #13	48 x 96	0.87	.625 x 1.750
x #9	48 x 96	1.95	.563 x 1.688



### **Galvanized or Painted Black Welded Steel Bar Grating Plain or Serrated**

13 $\frac{1}{4}$ " x 4" Center to Center

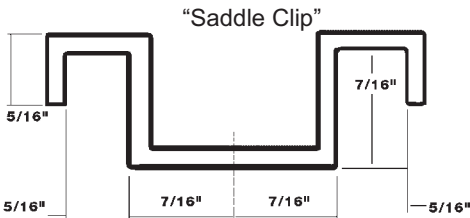
1/8" or 3/16" Bearing Bars

Possible Stock Lengths 20 Ft. and 24 Ft.

Bearing Bar Size	Width in Ft.	Lbs. Per Sq. Ft.
1 x 1/8	2 & 3	5.1
x 3/16	2 & 3	7.3
1 1/4 x 3/16	2 & 3	8.9
1 1/2 x 1/8	2 & 3	7.3
x 3/16	2 & 3	10.6

NOTE: Stocked sizes shown above. Other sizes and grating cut to your drawing are available.

### **Fastener, Bar Grating**



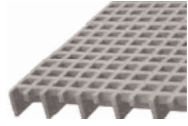
Heavy-duty steel Hold-Down Clip. Use with 3/8" square shank carriage bolts, nuts and washers obtained locally.

**Fiberglass Bar Grating**

Molded, Yellow or Gray fire Retardant

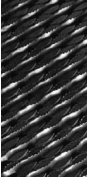
Square openings

Grit surface for maximum slip resistance



<u>Bearing bar size</u>	<u>Panel Size in Inches</u>	<u>Lbs. per Panel</u>
1-1/2 x 5/16	48 x 144	252.0

Many other sizes are available by special order.



### Safety Grating (Weights are Approx., Per Lineal Foot)

Type	Channel Height	2 Diamond 4 3/4" Wide		3 Diamond 7" Wide		4 Diamond 9 1/2" Wide		5 Diamond 11 3/4" Wide		8 Diamond 18 3/4" Wide	
		Catalog Number	Weight Per LF	Catalog Number	Weight Per LF	Catalog Number	Weight Per LF	Catalog Number	Weight Per LF	Catalog Number	Weight Per LF
14 Gauge	1 1/2"	21514	2.3	31514	3.0	41514	3.6	51514	4.2	81514	6.1
Galvanized Steel	2"	22014	2.6	32014	3.2	42014	3.8	52014	4.4	82014	6.3
	2 1/2"	22514	2.8	32514	3.5	42514	4.1	52514	4.7	82514	6.6
12 Gauge	1 1/2"	21512	3.2	31512	4.1	42512	5.0	51512	5.9	81512	8.5
Galvanized Steel	2"	22012	3.6	32012	4.5	42012	5.4	52012	6.2	82012	8.9
	2 1/2"	22512	4.0	32512	4.9	42512	5.7	52512	6.6	82512	9.2
.080" Aluminum	2"	22012-A	.92	32012-A	1.2	42012-A	1.37	52012-A	1.6	82012-A	2.2
16 Gauge	2" Type 304					42016-S	3.2	52016-S	3.7		
Stainless Steel	Type 316 L					42016-SL	3.2	52016-SL	3.7		

### Safety Grating (Weights are Approx., Per Lineal Foot)

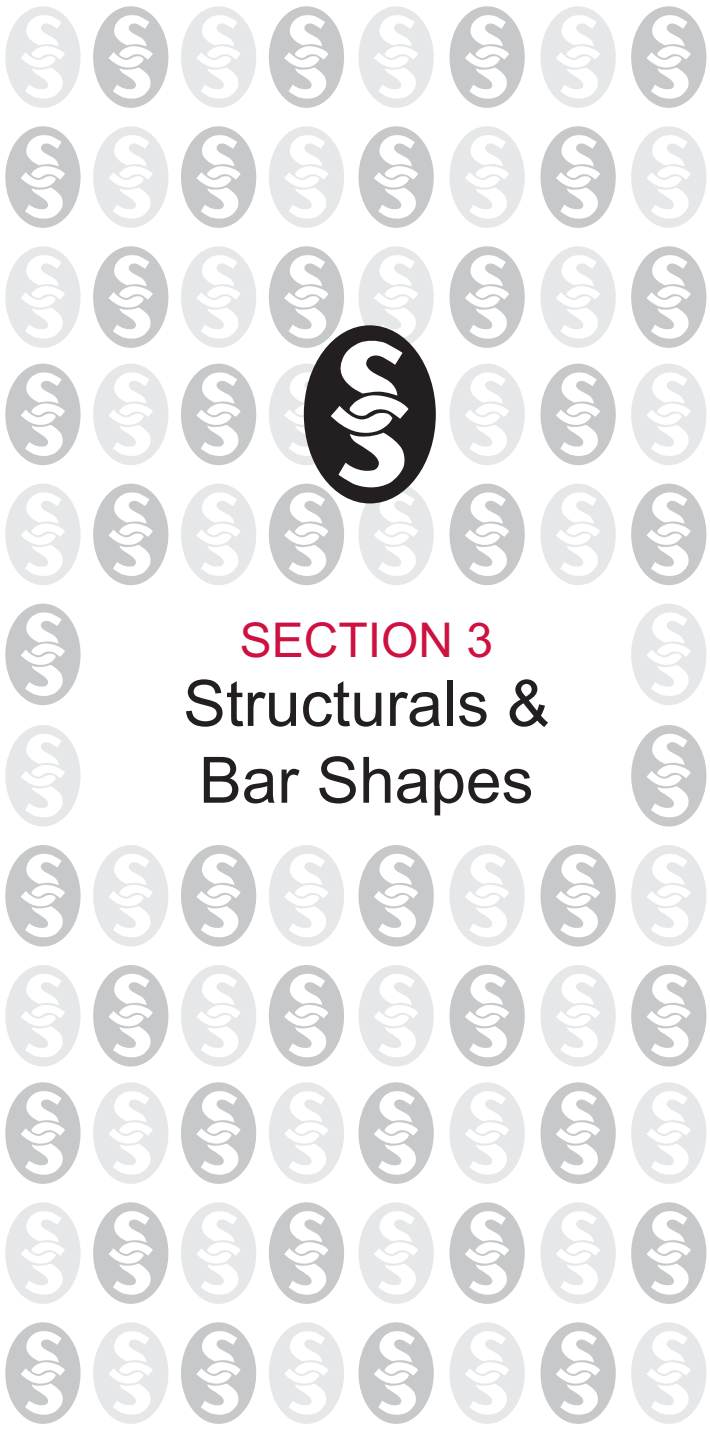
Type	Galvanized Steel	Channel Heights	10 Diamond, 24" Wide	
			Catalog Number	Weight Per LF
14 Gauge Regular		2"	102014	7.4
14 Gauge Walkway		4 1/2"	104514U	8.9
12 Gauge Regular		2"	102012	10.4
12 Gauge Walkway		4 1/2"	104512U	12.5

NOTES: 1. Standard lengths are 12', tolerance: - 0", +1/2". 2. Safety Grating products are also available in black steel or with a non-serrated surface. For prices on these products, consult Steel Services. 3. For span recommendations/limitations on Aluminum, consult Steel Services.

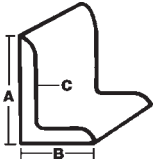




# SECTION 3 Structurals & Bar Shapes



When the greatest dimension of a steel shape is less than 3", it is classified a "Bar Shape". When at least one dimension is 3" or greater, it is classified a "Structural Shape".



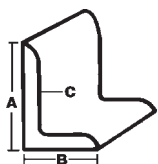
### Bar Angles

ASTM A36

Stock Lengths

20 Ft. and 40 Ft.

Size in Inches			Lbs.	Lbs.
A	B	C	Per Ft.	Per 20'
1/2	x 1/2	x 1/8	.38	7.60
3/4	x 3/4	x 1/8	.59	11.80
1	x 1	x 1/8	.80	16.00
		x 3/16	1.16	23.20
		x 1/4	1.49	29.80
1 1/4	x 1 1/4	x 1/8	1.01	20.20
		x 3/16	1.48	29.60
		x 1/4	1.92	38.40
1 1/2	x 1 1/2	x 1/8	1.23	24.60
		x 3/16	1.80	36.00
		x 1/4	2.34	46.80
1 3/4	x 1 3/4	x 3/16	2.12	42.40
		x 1/4	2.77	55.40
2	x 1 1/2	x 1/8	1.44	28.80
		x 3/16	2.12	42.40
		x 1/4	2.77	55.40
2	x 2	x 1/8	1.65	33.00
		x 3/16	2.44	48.80
		x 1/4	3.19	63.80
		x 5/16	3.92	78.40
		x 3/8	4.70	94.00
2 1/2	x 2	x 3/16	2.75	55.00
		x 1/4	3.62	72.40
2 1/2	x 2 1/2	x 3/16	3.07	61.40
		x 1/4	4.10	82.00
		x 5/16	5.00	100.00
		x 3/8	5.90	118.00
		x 1/2	7.70	154.00



## Structural Angles

ASTM A36  
Stock Lengths  
20 Ft. and 40 Ft.

Size in Inches			Lbs. Per Ft.	Lbs. Per 40'
A	B	C		
3	x 2	x 3/16	3.1	124.0
		x 1/4	4.1	164.0
		x 5/16	5.0	200.0
		x 3/8	5.9	236.0
		x 1/2	7.7	308.0
3	x 2 1/2	x 1/4	4.5	180.0
		x 5/16	5.6	224.0
		x 3/8	6.6	264.0
3	x 3	x 3/16	3.71	148.4
		x 1/4	4.9	196.0
		x 5/16	6.1	244.0
		x 3/8	7.2	288.0
		x 1/2	9.4	376.0
3 1/2	x 2 1/2	x 1/4	4.9	196.0
		x 5/16	6.1	244.0
		x 3/8	7.2	288.0
3 1/2	x 3	x 1/2	9.4	376.0
		x 1/4	5.4	216.0
		x 5/16	6.6	264.0
		x 3/8	7.9	316.0
		x 1/2	10.2	408.0
3 1/2	x 3 1/2	x 1/4	5.8	232.0
		x 5/16	7.2	288.0
		x 3/8	8.5	340.0
4	x 3	x 1/2	11.1	444.0
		x 1/4	5.8	232.0
		x 5/16	7.2	288.0
		x 3/8	8.5	340.0
		x 1/2	11.1	444.0
4	x 3 1/2	x 1/4	6.2	248.0
		x 5/16	7.7	308.0
		x 3/8	9.1	364.0
		x 1/2	11.9	476.0
		x 3/4	15.7	628.0
4	x 4	x 1/4	6.6	264.0
		x 5/16	8.2	328.0
		x 3/8	9.8	392.0
		x 1/2	12.8	512.0
		x 5/8	15.7	628.0
5	x 3	x 3/4	18.5	740.0
		x 1/4	6.6	264.0
		x 5/16	8.2	328.0
5	x 3	x 3/8	9.8	392.0
		x 1/2	12.8	512.0

## Structural Angles (con't)

Size in Inches			Lbs.	Lbs.
A	B	C	Per Ft.	Per 40'
5	x 3 1/2	x 1/4	7.0	280.0
		x 5/16	8.7	348.0
		x 3/8	10.4	416.0
		x 1/2	13.6	544.0
		x 5/8	16.8	672.0
		x 3/4	19.8	792.0
5	x 5	x 5/16	10.3	412.0
		x 3/8	12.3	492.0
		x 1/2	16.2	648.0
		x 5/8	20.0	800.0
		x 3/4	23.6	944.0
6	x 3 1/2	x 5/16	9.8	392.0
		x 3/8	11.7	468.0
		x 1/2	15.3	612.0
6	x 4	x 5/16	10.3	412.0
		x 3/8	12.3	492.0
		x 1/2	16.2	648.0
		x 5/8	20.0	800.0
		x 3/4	23.6	944.0
6	x 6	x 3/8	14.9	596.0
		x 1/2	19.6	784.0
		x 5/8	24.2	968.0
		x 3/4	28.7	1,148.0
		x 7/8	33.1	1,324.0
		x 1	37.4	1,496.0
		x 3/8	13.6	544.0
7	x 4	x 1/2	17.9	716.0
		x 5/8	22.1	884.0
		x 3/4	26.2	1,048.0
		x 1/2	19.6	784.0
		x 3/4	28.7	1,148.0
8	x 4	x 1/2	23.0	920.0
		x 3/4	33.8	1,352.0
		x 1	44.2	1,768.0
8	x 8	x 1/2	26.4	1,056.0
		x 5/8	32.7	1,308.0
		x 3/4	38.9	1,556.0
		x 7/8	45.0	1,800.0
		x 1	51.0	2,040.0



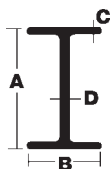
## American Standard Beams

ASTM A36

Stock Lengths 20 Ft. and 40 Ft.

Size		Lbs. Per Ft.	Depth B	Web Thickness D
3	x	5.7	2.330	.170
	x	7.5	2.509	.349
4	x	7.7	2.663	.193
	x	9.5	2.796	.326
5	x	10.0	3.004	.214
6	x	12.5	3.332	.232
	x	17.25	3.565	.465
7	x	15.3	3.662	.252
8	x	18.4	4.001	.271
	x	23.0	4.171	.441
10	x	25.4	4.661	.311
10	x	35.0	4.944	.594
12	x	31.8	5.000	.350
	x	40.8	5.252	.462

Structurals & Bar Shapes



## Wide Flange Beams

ASTM A992, A572 GR 50, A36

Stock Lengths 20 Ft., 40 Ft., 45 Ft., 50 Ft. and 60 Ft.

Thickness		Lbs. Per Ft.	Depth A	Flange Width B	Flange Thickness C	Web D
4	x	13	4.16	4.060	.345	.280
5	x	16	5.01	5.000	.360	.240
	x	19	5.15	5.030	.430	.270
6	x	9	5.90	3.940	.215	.170
	x	12	6.03	4.000	.280	.230
	x	15	5.99	5.990	.260	.230
	x	16	6.28	4.030	.405	.260
	x	20	6.20	6.020	.365	.260
	x	25	6.38	6.080	.455	.320
8	x	10	7.89	3.940	.205	.170
	x	13	7.99	4.000	.255	.230
	x	15	8.11	4.015	.315	.245
	x	18	8.14	5.250	.330	.230
	x	21	8.28	5.270	.400	.250
	x	24	7.93	6.495	.400	.245
	x	28	8.06	6.535	.465	.285
	x	31	8.00	7.995	.435	.285
	x	35	8.12	8.020	.495	.310

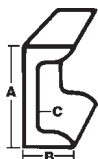
**Wide Flange Beams (con't)**

Size		Lbs. Per Ft.	Depth A	Flange Width B	Flange Thickness C	Web Thickness D
8	x	40	8.25	8.070	.560	.360
	x	48	8.50	8.110	.685	.400
10	x	12	9.87	3.960	.210	.190
	x	15	9.99	4.000	.270	.230
	x	17	10.11	4.010	.330	.240
	x	19	10.24	4.020	.395	.250
	x	22	10.17	5.750	.360	.240
	x	26	10.33	5.770	.440	.260
12	x	30	10.47	5.810	.510	.300
	x	33	9.73	7.960	.435	.290
	x	39	9.92	7.985	.530	.315
	x	45	10.10	8.020	.620	.350
	x	49	9.98	10.000	.560	.340
	x	54	10.09	10.030	.615	.370
	x	14	11.91	3.970	.225	.200
	x	16	11.99	3.990	.265	.220
	x	19	12.16	4.005	.350	.235
	x	22	12.31	4.030	.425	.260
14	x	26	12.22	6.490	.380	.230
	x	30	12.34	6.520	.440	.260
	x	35	12.50	6.560	.520	.300
	x	40	11.94	8.005	.515	.295
	x	45	12.06	8.045	.575	.335
	x	50	12.19	8.080	.640	.370
	x	53	12.06	9.995	.575	.345
	x	58	12.19	10.010	.640	.360
16	x	65	12.12	12.000	.605	.390
	x	22	13.74	5.000	.335	.230
	x	26	13.91	5.025	.420	.255
	x	30	13.84	6.730	.385	.270
	x	34	13.98	6.745	.455	.285
	x	38	14.10	6.770	.515	.310
	x	43	13.66	7.995	.530	.305
	x	48	13.79	8.030	.595	.340
18	x	53	13.92	8.060	.660	.370
	x	26	15.69	5.500	.345	.250
	x	31	15.88	5.525	.440	.275
	x	36	15.86	6.985	.430	.295
	x	40	16.01	6.995	.505	.305
	x	45	16.13	7.035	.565	.345
	x	50	16.26	7.070	.630	.380
18	x	57	16.43	7.120	.715	.430
	x	35	17.70	6.000	.425	.300
	x	40	17.90	6.015	.525	.315
	x	46	18.06	6.060	.605	.360
	x	50	17.99	7.495	.570	.355

## Wide Flange Beams (con't)

Thickness Size		Lbs.	Depth	Flange Width	Flange Thickness	Web
		Per Ft.	A	B	C	D
18	x	60	18.24	7.555	.695	.415
21	x	44	20.66	6.500	.450	.350
	x	50	20.83	6.530	.535	.380
	x	62	20.99	8.240	.615	.400
24	x	55	23.57	7.005	.505	.395
	x	60	23.73	8.965	.585	.415
	x	84	24.10	9.020	.770	.470

Structurals &  
Bar Shapes



## Bar Channels

ASTM A36  
Stock Lengths 20 Ft.

Size in Inches			Lbs. Per Ft.	Lbs. Per 20'
A	B	C		
1	x 1/2	x 1/8	.84	16.80
1 1/4	x 1/2	x 1/8	1.01	20.20
1 1/2	x 1/2	x 1/8	1.12	22.40
2	x 1/2	x 1/8	1.43	28.60
	x 1	x 1/8	1.59	31.80
	x 1	x 3/16	2.32	46.40



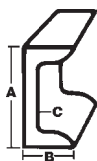
## Miscellaneous Channels

ASTM A36  
Stock Lengths 40 Ft.

Size A	Lbs. Per Ft.	Web Thickness C	Flange Width B
4	x 13.8	.500	2.500
6	x 12	.310	2.497
	x 15.3	.340	3.500
	x 16.3	.375	3.000
	x 18	.379	3.504
8	x 8.5	.179	1.874
	x 18.7	.353	2.978
	x 20	.400	3.025
	x 21.4	.375	3.450
	x 22.8	.427	3.502
10	x 6.5	.152	1.127
	x 8.4	.170	1.500

## Miscellaneous Channels (con't)

Size A	Lbs. Per Ft.	Web Thickness C	Flange Width B
10 x	22	.290	3.315
12 x	10.6	.190	1.500
	30.9	.450	3.450
	35	.467	3.767
	40	.590	3.890
18 x	42.7	.450	3.950



## Structural Channels

ASTM A36

Stock Lengths 20 Ft.  
and 40 Ft.

Size A	Lbs. Per Ft.	Web Thickness C	Flange Width B
3 x	4.1	.170	1.410
	5	.258	1.498
	6	.356	1.596
4 x	5.4	.184	1.584
	7.25	.321	1.721
5 x	6.7	.190	1.750
	9	.325	1.885
6 x	8.2	.200	1.920
	10.5	.314	2.034
	13	.437	2.157
7 x	9.8	.210	2.090
	12.25	.314	2.194
	14.75	.419	2.299
8 x	11.5	.220	2.260
	13.75	.303	2.343
	18.75	.487	2.527
9 x	13.4	.233	2.433
	15	.285	2.485
10 x	15.3	.240	2.600
	20	.379	2.739
	25	.526	2.886
	30	.673	3.033
12 x	20.7	.282	2.942
	25	.387	3.047
	30	.510	3.170
15 x	33.9	.400	3.400
	40	.520	3.520
	50	.716	3.716





## Hot Rolled Bar Size Tees

ASTM A36  
Stock Lengths 20 Ft.

Size in			Lbs.	Lbs.
B	D	T	Per Ft.	Per 20'
1 1/4	x1 1/4	x3/16	1.55	31.00
1 1/2	x1 1/2	x3/16	1.90	38.00
2	x 2	x 1/4	3.62	72.40

Structurals & Bar Shapes

## Split Structural Tees & Angles

ASTM A-36, A 992

Generally, any beam or channel 4" or deeper can be split and straightened to your requirements



Plate & Sheet

Expanded Metal  
& Grating

Structurals &  
Bar Shapes

**HR Bars &  
Reinforcing**

Cold Finished  
Bars

Tube & Pipe

Galvanized

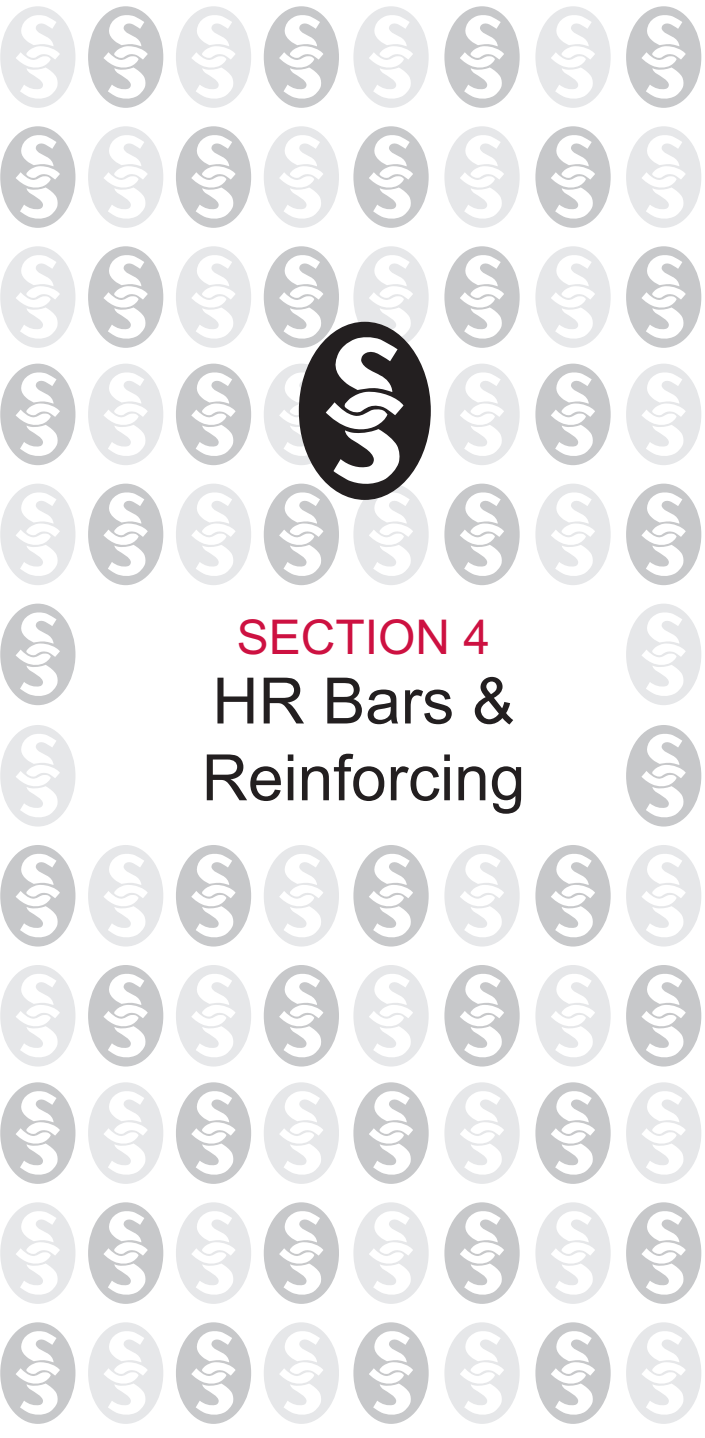
Stainless Steel

Aluminum

Misc. Weights & Data



# SECTION 4 HR Bars & Reinforcing



**General Information on Hot Rolled  
Carbon Steel Bars**

ASTM A36

**Chemical Requirements**

Thickness or Diameter	C	Mn	P	S	Si
	Max		Max	Max	Max
All Shapes	.26	...	.04	.05	.40
Bars to 3/4" incl.	.26	...	.04	.05	.40
Bars over 3/4" to 1 1/2" incl.	.27	.60/.90	.04	.05	.40
Bars over 1 1/2 to 4" incl.	.28	.60/.90	.04	.05	.40
Bars over 4"	.29	.60/.90	.04	.05	.40

**Tensile Requirements**

	Bars	Shapes
Yield point, min, ksi	36	36
Tensile, ksi	58-80	58-80
Elongation 8 In, min, %	20	20
Elongation 2 In, min, %	23	21



## Hot Rolled Strip

Commercial Quality  
Stock Lengths 20 Ft.

Size in Inches	Lbs. Per Ft.	Lbs. Per 20'
1/8 x 1/2	.2125	4.250
x 3/4	.3188	6.376
x 1	.4250	8.500
x 1 1/4	.5313	10.626
x 1 1/2	.6375	12.750
x 2	.8500	17.000
x 2 1/2	1.0630	21.260
x 3	1.2750	25.500
x 4	1.7000	34.000
x 5	2.1250	42.500
x 6	2.5500	51.000
3/16 x 1/2	.3188	6.376
x 3/4	.4781	9.562
x 1	.6375	12.750
x 1 1/4	.7969	15.938
x 1 1/2	.9563	19.126
x 2	1.2750	25.500
x 2 1/2	1.5940	31.880
x 3	1.9130	38.260
x 4	2.5500	51.000
x 5	3.1880	63.760
x 6	3.8250	76.500

HR Bars &  
Reinforcing

## Hot Rolled Flat Bars

ASTM A36, Square Edge

Stock Lengths 20 Ft.



Size in Inches	Lbs. Per Ft.	Lbs. Per 20'
1/4 x 1/2	.4250	8.50
x 3/4	.6375	12.75
x 1	.850	17.00
x 1 1/4	1.063	21.26
x 1 1/2	1.275	25.50
x 1 3/4	1.488	29.76
x 2	1.700	34.00
x 2 1/2	2.125	42.50
x 3	2.550	51.00
x 3 1/2	2.975	59.50
x 4	3.400	68.00
x 4 1/2	3.825	76.50
x 5	4.250	85.00
x 6	5.100	102.00
x 7	5.950	119.00
x 8	6.800	136.00
x 9	7.660	153.20
x 10	8.510	170.20
x 11	9.360	187.18
x 12	10.210	204.20
5/16 x 1 1/2	1.594	31.88
x 2	2.125	42.50
x 2 1/2	2.656	53.12
x 3	3.188	63.76
x 4	4.250	85.00
x 4 1/2	4.781	95.62
3/8 x 3/4	.956	19.13
x 1	1.275	25.50
x 1 1/4	1.594	31.88
x 1 1/2	1.913	38.26
x 1 3/4	2.231	44.62
x 2	2.550	51.00
x 2 1/2	3.188	63.76
x 3	3.825	76.50
x 3 1/2	4.463	89.26
x 4	5.100	102.00
x 4 1/2	5.738	114.76
x 5	6.375	127.50
x 6	7.650	153.00
x 7	8.925	178.50
x 8	10.200	204.00
x 9	11.490	229.80
x 10	12.770	255.40
x 11	14.040	280.80
x 12	15.320	360.40
1/2 x 3/4	1.275	25.50

## Hot Rolled Flat Bars (con't)

Size in Inches	Lbs. Per Ft.	Lbs. Per 20'
1/2 x 1	1.700	34.00
x 1 1/4	2.125	42.50
x 1 1/2	2.550	51.00
x 1 3/4	2.975	59.50
x 2	3.400	68.00
x 2 1/2	4.250	85.00
x 3	5.100	102.0
x 3 1/2	5.950	119.0
x 4	6.800	136.0
x 4 1/2	7.650	153.0
x 5	8.500	170.0
x 6	10.200	204.0
x 7	11.900	238.0
x 8	13.600	272.0
x 9	15.320	306.4
x 10	17.020	340.4
x 11	18.720	374.4
x 12	20.420	408.4
5/8 x 1	2.125	42.5
x 1 1/2	3.188	63.8
x 2	4.250	85.0
x 2 1/2	5.313	106.3
x 3	6.375	127.5
x 4	8.500	170.0
x 5	10.630	212.0
x 6	12.750	255.0
x 7	14.880	297.0
x 8	17.000	340.0
x 9	15.320	306.4
x 10	17.020	340.4
x 12	20.420	408.4
3/4 x 1	2.550	51.0
x 1 1/2	3.825	76.5
x 2	5.100	102.0
x 2 1/2	6.375	127.0
x 3	7.650	153.0
x 3 1/2	8.925	178.5
x 4	10.200	204.0
x 5	12.700	255.0
x 6	15.300	306.0
x 7	17.800	357.0
x 8	20.400	408.0
x 9	22.970	459.4
x 10	25.530	510.6
x 11	28.080	561.6
x 12	30.630	612.6
1 x 2	6.800	136.0

## Hot Rolled Flat Bars (con't)

Size in Inches	Lbs. Per Ft.	Lbs. Per 20'
1 x 2 1/2	8.500	170.0
x 3	10.200	204.0
x 4	13.60	272.0
x 5	17.00	340.0
x 6	20.40	408.0
x 7	23.80	476.0
x 8	27.20	544.0
x 10	34.03	680.6
x 12	40.84	816.8
1 1/4 x 3	12.75	255.0
x 4	17.00	340.0
1 1/2 x 3	15.30	306.0
x 4	20.40	408.0
x 6	30.60	612.0
x 8	40.80	816.0
2 x 3	20.40	408.0
x 4	27.20	544.0

## Alloy Flat Bars

360 Brinnell  
Stock Lengths 20 Ft.



Size in Inches	Lbs. Per Ft.	Lbs. Per 20'
1/2 x 2	3.400	68.0
x 4	6.800	136.0
x 6	10.20	204.0
x 8	13.60	272.0
3/4 x 4	10.20	204.0
x 6	15.30	306.0
x 8	20.40	408.0
1 x 2	6.80	136.0
x 4	13.60	272.0
x 6	20.40	408.0

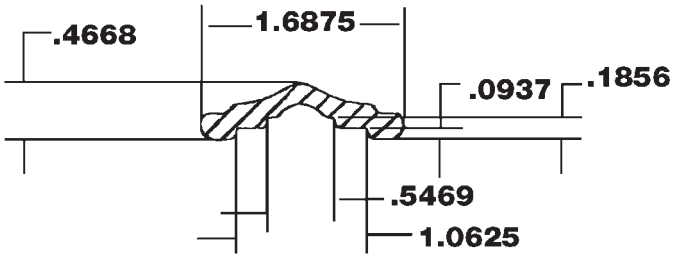


## Top Rail Moulding (Cover Rail)

Stock Lengths 20 Ft.

Steel Services stocks style 1633L.

Size	Lbs. Per Ft.	Lbs. Per 20'
1633L	1.25	24.92



(Designed to Fit Over 1" Bar Channel)

## Hot Rolled Rounds

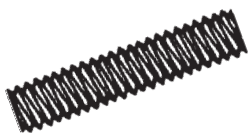
ASTM A36

Stock Lengths 20 Ft.



Size in Inches	Lbs. Per Ft.	Lbs. Per 20'
1/4*	.1669	3.338
5/16*	.2608	5.216
3/8*	.3755	7.510
1/2	.6676	13.35
5/8	1.043	20.86
3/4	1.502	30.04
7/8	2.045	40.90
1	2.670	53.40
1 1/8	3.380	67.60
1 1/4	4.173	83.46
1 3/8	5.049	101.0
1 1/2	6.008	120.2
1 3/4	8.178	163.6
1 7/8	9.388	187.8
2	10.60	213.6
2 1/2	16.60	333.8
3	24.03	480.6
4	42.73	854.6

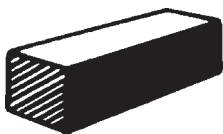
\*Stocked as C.Q. only



### Threaded Steel Rounds

Low Carbon, Starting Material A36  
 Roll Threaded-Class 1A Fit  
 Stock Lengths 6 Ft. and 12 Ft.

Size in Inches	Threads Per Inch	Lbs. Per Ft.	Lbs. Per 6'
1/4	20	.118	.708
5/16	18	.197	1.182
3/8	16	.284	1.704
1/2	13	.515	3.090
5/8	11	.825	4.950
3/4	10	1.215	7.290
7/8	9	1.675	10.050
1	8	2.190	13.140
1 1/8	7	2.750	16.500
1 1/4	7	3.500	21.000



### Hot Rolled Squares

ASTM A36  
 Stock Lengths 20 Ft.

Size in Inches	Lbs. Per Ft.	Lbs. Per 20'
3/8	.4781	9.562
1/2	.8500	17.00
5/8	1.328	26.56
3/4	1.913	38.26
1	3.400	68.00
1 1/4	5.313	106.3
1 1/2	7.650	153.0
2	13.60	272.0

## Reinforcing Bars (Deformed)

ASTM A615 Grade 40 and Grade 60  
 [ASTM A615M Metric Grade 300  
 and Grade 420] Stock Length 20 Ft.



Our suppliers have begun a “*soft conversion*” to the metric system of concrete reinforcing steel bar (rebar) specifications.

These bars are IDENTICAL in SIZE, LENGTH, WEIGHT, BILLING NUMBERS, and STRENGTH to the inch-pound sizes they replace; only the bar size and grade mark have changed.

Inch Pound Bar Size	Diameter (in.)	Metric Bar Size	Diameter (mm)	Lbs. Per Ft.	Lbs. Per 20'
#3	0.375 (3/8)	#10	9.5	.376	7.52
#4	0.500 (1/2)	#13	12.7	.668	13.36
#5	0.625 (5/8)	#16	15.9	1.043	20.86
#6	0.750 (3/4)	#19	19.1	1.502	30.04
#7	0.875 (7/8)	#22	22.2	2.044	40.88
#8	1.000 (1)	#25	25.4	2.670	53.4
#9	1.128	#29	28.7	3.400	68.0
#10	1.270	#32	32.3	4.303	86.06
#11	1.410	#36	35.8	5.313	106.26
#14	1.693	#43	43.0	7.65	153.0
#18	2.257	#57	57.3	13.60	272.0

HR Bars & Reinforcing

**GRADE 40 > BECOMES > GRADE 300**  
**GRADE 60 > BECOMES > GRADE 420**

Grade 40 [Metric Grade 300] is limited to sizes #3 through #6 [Metric #10 through #19].

Steel reinforcing bars help maintain integrity of concrete and stops cracking. Small lugs protrude from surface of rebar which inhibit longitudinal movement in surrounding concrete. Deformed billet steel rebars substantially stabilize concrete pouring of any size.

Mechanical Properties	Tensile Strength (PSI)	Yield Strength (PSI)
Grade 40 [Metric Grade 300]	70,000 Min.	40,000 Min.
Grade 60 [Metric Grade 420]	90,000 Min.	60,000 Min.

**Concrete Reinforcement Wire Mesh**

Welded Wire Fabric ASTM A185

Style	Size	Lbs. Per Roll/Sheet
6 x 6 #10 Ga. W 1.4/W 1.4	5' x 150' Roll	158
	5' x 10' Sheet	10
6 x 6 #8 Ga. W 2.1/W 2.1	5' x 150' Roll	225
	5' x 10' Sheet	15
6 x 6 #6 Ga. W 2.9/W 2.9	5' x 150' Roll	315
	5' x 10' Sheet	21
6 x 6 #4 Ga. W 4/W 4	5' x 150' Roll	435
	5' x 10' Sheet	29

NOTE: 96" x 240" sheets available in above sizes.

**Advantages of concrete remesh:**

- 1 - Provides reinforcing and crack control for concrete slabs.
- 2 - Light gauge wire, available in either rolls or mats, is easy to handle and is ideal for sidewalks, driveways, patios, and many residential and commercial applications.
- 3 - Heavier gauges in stock for building pads, foundations for heavy machinery, or any application where crack control in concrete is critical.
- 4 - Wire mesh rolls and sheets save time and labor at the job site.

Plate & Sheet

Expanded Metal  
& Grating

Structurals &  
Bar Shapes

HR Bars &  
Reinforcing

Cold Finished  
Bars

Tube & Pipe

Galvanized

Stainless Steel

Aluminum

Misc. Weights & Data



SECTION 5  
Cold Finished  
Bars



**General Information on Cold Finished**

Manufacturing Tolerance  
C1018, ASTM A108

**Chemical Analysis**

Carbon	Manganese	Phosphorus	Sulphur
.15/.20	.60/.90	.04 Max.	.05 Max.

**Mechanical Properties** (The following values are average and should be considered as representative of the grade).

Tensile Strength (PSI)	Yield Strength (PSI)	Elongation in 2"	Reduction of Area	Brinell
58,000 Min.	32,000 Min.	25%	50%	166

Hardness

**Flats**

Size	Tolerance
To 3/4" Incl.	---.003"
Over 3/4" to 1 1/2" Incl.	---.004"
Over 1 1/2" to 3" Incl.	---.005"
Over 3" to 4" Incl.	---.006"
Over 4" to 6" Incl.	---.008"
Over 6"	---.013"

The tolerance on flats applies to thickness as well as width.

**Squares and Hexagons**

Size	Tolerance
Up to 3/4" Incl.	---.002"
Over 3/4" to 1 1/2" Incl.	---.003"
Over 1 1/2" to 2 1/2" Incl.	---.004"
Over 2 1/2" to 4" Incl. (sq.)	---.006"
Over 2 1/2" to 3" Incl. (hex.)	---.005"

**Rounds**

Size	Undersize Variation*
1 1/2" or Under	---.002"
Over 1 1/2" to 2 1/2" Incl.	---.003"
Over 2 1/2" to 4" Incl.	---.004"
Over 4" to 6" Incl.	---.005"
Over 6" to 6 1/2"	---.006"

\*Max. of carbon range .28% or less

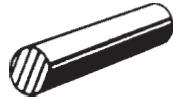
**Turned, Ground and Polished Rounds  
Cold Drawn, Ground and Polished Rounds**

Size Range in Inches	Undersize Variations in Inches	
	Turned, Ground and Polished Rounds	Cold Drawn, Ground and Polished Rounds
1 1/2 and under	.001	.001
Over 1 1/2 to less than 2 1/2	.0015	.0015
2 1/2 to 3, incl.	.002	.002
Over 3 to 4, incl.	.003	.003
Over 4 to 6, incl.	.004	---
Over 6 .005	---	---

Cold Finished Bars

## Cold Finished Rounds

AISI C-1018, C-1144, C-1117, C-1045,  
C-12L14, C-1045TG&P ASTM A108  
Stock Lengths 20 Ft.



Size in Inches	Lbs. Per Ft.	Lbs. Per 20'
1/8	.0417	.83
3/16	.0939	1.88
1/4	.1669	3.34
5/16	.2608	5.22
3/8	.3755	7.51
7/16	.5111	10.22
1/2	.6676	13.35
9/16	.8449	16.90
5/8	1.043	20.86
11/16	1.262	25.24
3/4	1.502	30.04
13/16	1.763	35.26
7/8	2.045	40.90
15/16	2.347	46.94
1	2.670	53.40
1 1/16	3.015	60.30
1 1/8	3.380	67.60
1 3/16	3.766	75.32
1 1/4	4.173	83.46
1 5/16	4.600	92.00
1 3/8	5.049	100.98
1 7/16	5.518	110.36
1 1/2	6.008	120.16
1 9/16	6.520	130.40
1 5/8	7.052	141.04
1 11/16	7.604	152.08
1 3/4	8.178	163.56
1 15/16	10.02	200.40
2	10.68	213.60
2 3/16	12.78	255.60
2 1/4	13.52	270.40
2 3/8	15.06	301.20
2 7/16	15.87	317.40
2 1/2	16.69	333.80
2 11/16	19.29	385.80
2 3/4	20.19	403.80
2 15/16	23.04	460.80
3	24.03	480.60
3 1/4	28.21	564.20
3 7/16	31.55	631.00
3 1/2	32.71	654.20
3 15/16	41.40	828.00
4	42.73	854.60
4 15/16	65.10	1,302.00
5	66.76	1,335.20
6	96.13	1,922.60





**Cold Finished Flats**

AISI C-1018, ASTM A108

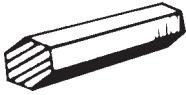
Stock Lengths 12 Ft.

Size in Inches	Lbs. Per Ft.	Lbs. Per 12'		
1/8	x 3/8	.1594	1.913	
	x 1/2	.2125	2.550	
	x 5/8	.2656	3.187	
	x 3/4	.3188	3.826	
	x 1	.4250	5.100	
3/16	x 1 1/2	.6375	7.650	
	x 2	.8500	10.200	
	x 3/8	.2391	2.869	
	x 1/2	.3188	3.826	
	x 3/4	.4781	5.737	
	x 1	.6375	7.650	
	x 1 1/4	.7969	9.563	
	x 1 3/8	.8766	10.519	
	x 1 1/2	.9563	11.476	
	x 2	1.2750	15.300	
1/4	x 2 1/2	1.5940	19.128	
	x 3	1.9130	22.956	
	x 1/2	.4250	5.100	
	x 3/4	.6375	7.650	
	x 1	.8500	10.200	
	x 1 1/4	1.063	12.756	
	x 1 1/2	1.275	15.300	
	x 2	1.700	20.400	
	x 2 1/2	2.125	25.500	
	x 3	2.550	30.600	
5/16	x 4	3.400	40.800	
	x 5	4.250	51.000	
	x 6	5.100	61.200	
	x 8	6.800	81.600	
	x 1/2	.531	6.376	
	x 3/4	.7969	9.563	
	3/8	x 1/2	.6375	7.650
		x 1	1.275	15.30
x 1 1/4		1.594	19.13	
x 1 1/2		1.913	22.96	
x 2		2.550	30.60	
x 3		3.825	45.90	
x 4		5.100	61.20	
x 5		6.375	76.50	
x 6		7.650	91.80	
1/2		x 5/8	1.063	12.76
	x 3/4	1.275	15.30	
	x 1	1.700	20.40	
	x 1 1/4	2.125	25.50	

Cold Finished Bars

## Cold Finished Flats (con't)

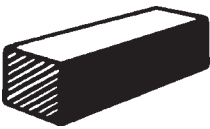
Size in Inches		Lbs. Per Ft.	Lbs. Per 12'
1/2	x 1 1/2	2.550	30.60
	x 2	3.400	40.80
	x 2 1/2	4.250	51.00
	x 3	5.100	61.20
	x 4	6.800	81.60
	x 5	8.500	102.00
	x 6	10.200	122.40
5/8	x 8	13.600	163.20
	x 3/4	1.594	19.13
	x 1	2.125	25.50
3/4	x 2	4.250	51.00
	x 1	2.550	30.60
	x 1 1/4	3.188	38.26
	x 1 1/2	3.825	45.90
	x 2	5.100	61.20
	x 2 1/2	6.375	76.50
	x 3	7.650	91.80
1	x 4	10.200	122.40
	x 5	12.750	153.00
	x 6	15.300	183.60
	x 1 1/4	4.250	51.00
	x 1 1/2	5.100	61.20
	x 2	6.800	81.60
	x 2 1/2	8.500	102.00
1 1/4	x 3	10.200	122.40
	x 4	13.600	163.20
	x 4 1/2	15.300	183.60
	x 5	17.000	204.00
	x 6	20.400	244.80
	x 8	27.200	326.40
	x 2	8.500	102.00
1 1/2	x 2	10.200	122.40
	x 3	15.300	183.60
	x 4	20.400	244.80
2	x 2 1/2	17.00	204.0
	x 3	20.40	244.8
	x 4	27.20	326.4
	x 6	40.80	489.6



**Cold Finished Hexagons**

MBQ, Stock Lengths 12 Ft.

Size in Inches	Lbs. Per Ft.	Lbs. Per 12'
5/8	1.150	13.80
11/16	1.392	16.70
3/4	1.656	19.87
1	2.944	35.33
1 1/4	4.601	55.21
2	11.780	141.36



**Cold Finished Squares**

AISI C-1018, ASTM A108

Stock Lengths 12 Ft.

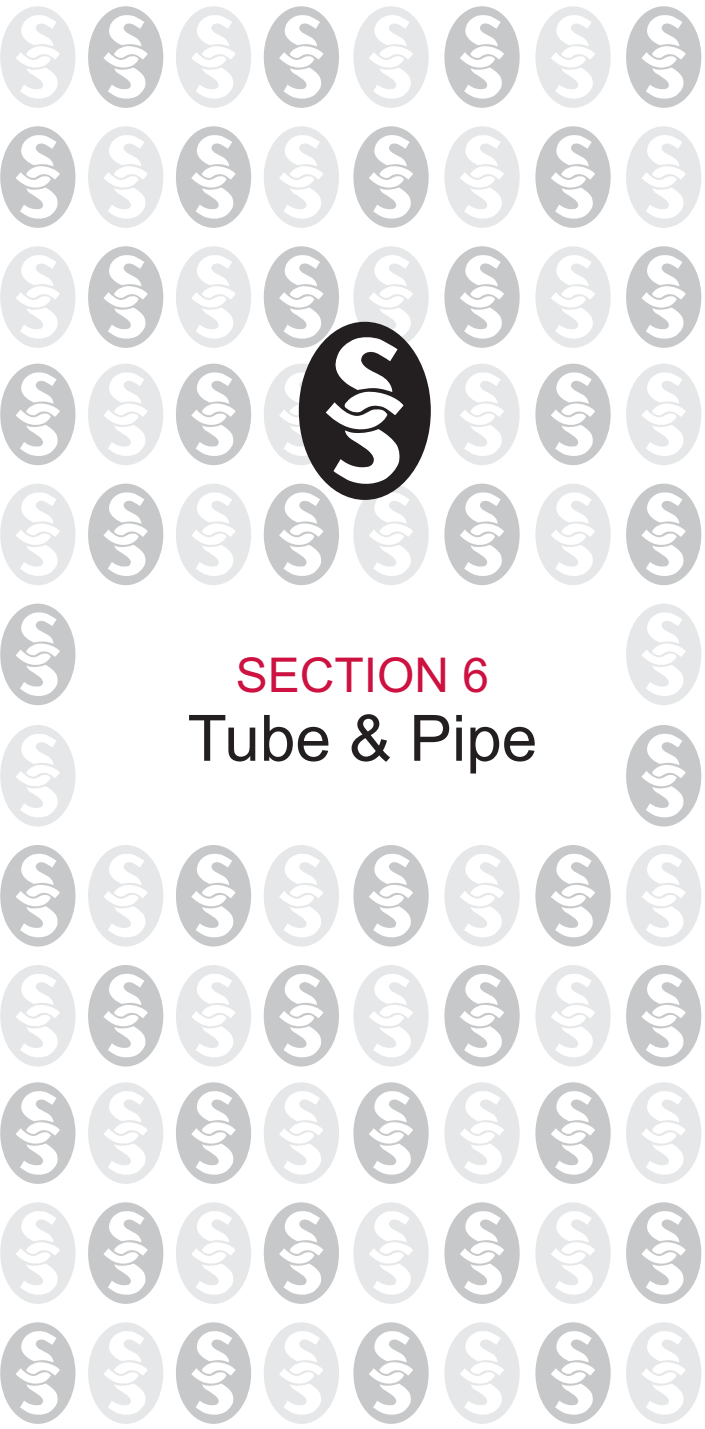
Size in Inches	Lbs. Per Ft.	Lbs. Per 12'
1/8	.0531	.637
3/16	.1195	1.434
1/4	.2125	2.550
5/16	.3320	3.984
3/8	.4781	5.737
7/16	.6508	7.810
1/2	.8500	10.20
9/16	1.076	12.91
5/8	1.328	15.94
11/16	1.607	19.28
3/4	1.913	22.96
7/8	2.603	31.24
1	3.400	40.80
1 1/8	4.303	51.64
1 1/4	5.313	63.76
1 1/2	7.650	91.80
1 3/4	10.41	124.9
2	13.60	163.2
3	30.60	367.2
3 1/2	41.65	499.8
4	54.40	652.8

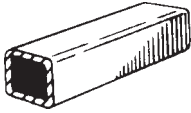
Cold Finished Bars





# SECTION 6 Tube & Pipe





## Square Tubing

ASTM A500 & A513 Flash In  
Possible Stock Lengths 20 Ft., 24 Ft.  
and 40 Ft.

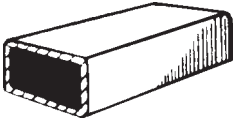
Sizes 2" and smaller with wall thicknesses less than .120 are manufactured to ASTM A-513. Sizes 2" and larger with wall thicknesses of .120 and thicker are manufactured to ASTM A-500.

Size in Inches	Gauge	Wall Thickness	Lbs. Per Ft.
1/2	16	.065	.3850
3/4	16	.065	.6055
	14	.083	.7530
1	16	.065	.8265
	15	.072	.909
	12	.109	1.321
1 1/4	11	.120	1.436
	14	.083	1.317
1 1/2	11	.120	1.844
	14	.083	1.599
	11	.120	2.252
1 3/4	3/16	.188	3.230
	1/4	.250	4.000
	11	.120	2.660
	14	.083	2.164
2	11	.120	3.068
	3/16	.188	4.32
	1/4	.250	5.41
2 1/2	11	.120	3.90
	3/16	.188	5.59
	1/4	.250	7.11
3	11	.120	4.75
	3/16	.188	6.87
	1/4	.250	8.81
3 1/2	3/8	.375	11.74
	3/16	.188	8.15
	1/4	.250	10.51
4	11	.120	6.46
	3/16	.188	9.42
	1/4	.250	12.21
	5/16	.313	14.83
	3/8	.375	17.27
5	1/2	.500	21.63
	3/16	.188	11.97
	1/4	.250	15.62
6	5/16	.313	19.08
	3/8	.375	22.37
	3/16	.188	14.53
	1/4	.250	19.02
	5/16	.313	23.34

**Square Tubing (con't)**

Size in Inches	Gauge	Wall Thickness	Lbs. Per Ft.
6	3/8	.375	27.48
	1/2	.500	35.24
7	3/16	.188	17.08
	1/4	.250	22.42
	5/16	.313	27.59
	3/8	.375	32.58
8	1/2	.500	42.05
	3/16	.188	19.63
	1/4	.250	25.82
	5/16	.313	31.84
	3/8	.375	37.69
	1/2	.500	48.85
10	5/8	.625	59.32
	3/16	.188	24.73
	1/4	.250	32.63
	5/16	.313	40.35
	3/8	.375	47.90
	1/2	.500	62.46
12	5/8	.625	76.33
	1/4	.250	39.43
	5/16	.313	48.86
	3/8	.375	58.10
14	1/2	.500	76.07
	5/16	.313	57.36
	3/8	.375	68.31
16	1/2	.500	89.68
	5/16	.313	65.87
	3/8	.375	78.52
	1/2	.500	103.50

Tube & Pipe



## Rectangular Tubing

ASTM A500 Grade B

Possible Stock Lengths 20 Ft., 24 Ft.  
and 40 Ft.

\* Stocked in ASTM A-513

Size in Inches		Gauge	Wall Thickness	Lbs. Per Ft.
2	x 1*	14	.083	1.600
		11	.120	2.252
2	x 1 1/2*	11	.120	2.660
		11	.120	3.068
2 1/2	x 1 1/2*	11	.120	3.068
		3/16	.188	4.320
3	x 1	11	.120	3.068
		14	.083	2.446
3	x 1 1/2	11	.120	3.476
		3/16	.188	5.97
		11	.120	3.90
3	x 2	3/16	.188	5.59
		1/4	.250	7.11
		11	.120	4.75
4	x 2	3/16	.188	6.87
		1/4	.250	8.81
		11	.120	5.61
4	x 3	3/16	.188	8.15
		1/4	.250	10.51
		3/16	.188	8.15
5	x 2	1/4	.250	10.51
		3/16	.188	9.42
5	x 3	1/4	.250	12.21
		3/16	.188	9.42
6	x 2	1/4	.250	12.21
		3/16	.188	10.70
6	x 3	1/4	.250	13.91
		3/8	.375	19.82
		1/4	.250	15.62
6	x 4	5/16	.313	19.08
		3/8	.375	22.37
		1/2	.500	28.43
7	x 4	3/16	.188	14.53
		1/4	.250	19.02
7	x 5	3/16	.188	14.53
		1/4	.250	19.02
		5/16	.313	23.34
8	x 2	3/8	.375	27.48
		1/2	.500	35.24
		3/16	.188	11.97
		1/4	.250	15.62



**Rectangular Tubing (con't)**

Size in Inches	Gauge	Wall Thickness	Lbs. Per Ft.
8 x 3	3/16	.188	13.25
	1/4	.250	17.32
	3/8	.375	24.93
8 x 4	3/16	.188	14.53
	1/4	.250	19.02
	5/16	.313	23.34
	3/8	.375	27.48
	1/2	.500	35.24
8 x 6	3/16	.188	17.08
	1/4	.250	22.42
	5/16	.313	27.59
	3/8	.375	32.58
	1/2	.500	42.05
10 x 2	3/16	.188	14.53
10 x 4	1/4	.250	19.02
	3/16	.188	17.08
	1/4	.250	22.42
10 x 6	5/16	.313	27.59
	3/8	.375	32.58
	1/2	.500	42.05
	1/4	.250	25.82
	5/16	.313	31.84
10 x 8	3/8	.375	37.69
	1/2	.500	48.85
	1/4	.250	29.23
12 x 4	3/8	.375	42.79
	1/2	.500	55.66
	3/16	.188	19.63
	1/4	.250	25.82
	5/16	.313	31.84
12 x 6	3/8	.375	37.69
	1/2	.500	48.85
	1/4	.250	29.23
	5/16	.313	36.10
	3/8	.375	42.79
12 x 8	1/2	.500	55.66
	1/4	.250	32.63
	5/16	.313	40.35
	3/8	.375	47.90
	1/2	.500	62.46
	5/8	.625	76.33

Tube & Pipe



### Standard Black Pipe, Plain End, Bare Uncoated

Schedule 40, Structural Grade B

ASTM A53 or A500

Stock Lengths 21 Ft. and 42 Ft.

Nominal Size	O.D.	I.D.	Wall Thickness	Lbs. Per Ft.	Lbs. Per 21'
1/2	.840	.622	.109	.85	17.85
3/4	1.050	.824	.113	1.13	23.73
1	1.315	1.049	.133	1.68	35.28
1 1/4	1.660	1.380	.140	2.27	47.67
1 1/2	1.900	1.610	.145	2.72	57.12
2	2.375	2.067	.154	3.65	76.65
2 1/2	2.875	2.469	.203	5.79	121.59
3	3.500	3.068	.216	7.71	161.91
3 1/2	4.000	3.548	.226	8.88	186.48
4	4.500	4.026	.237	10.79	226.59
5	5.563	5.047	.258	14.62	307.02
6	6.625	6.065	.280	18.97	398.37
8	8.625	7.961	.322	28.55	599.55



### Standard Black Pipe, Plain End

Schedule 80, Structural Grade

ASTM A500, Stock Length 21 Ft.

Nominal Size	O.D.	I.D.	Wall Thickness	Lbs. Per Ft.	Lbs. Per 21'
1/2	.840	.546	.147	1.09	22.89
3/4	1.050	.742	.154	1.47	30.87
1	1.315	.957	.179	2.17	45.57
1 1/4	1.660	1.278	.191	3.00	63.00
1 1/2	1.900	1.500	.200	3.63	76.23
2	2.375	1.939	.218	5.02	105.42
2 1/2	2.875	2.323	.276	7.66	160.86
3	3.500	2.900	.300	10.25	215.25
4	4.500	3.826	.337	14.98	314.58
5	5.563	4.813	.375	20.78	436.38
6	6.625	5.761	.432	28.57	599.97
8	8.625	7.625	.500	43.39	911.19

Plate & Sheet

Expanded Metal  
& Grating

Structurals &  
Bar Shapes

HR Bars &  
Reinforcing

Cold Finished  
Bars

Tube & Pipe

**Galvanized**

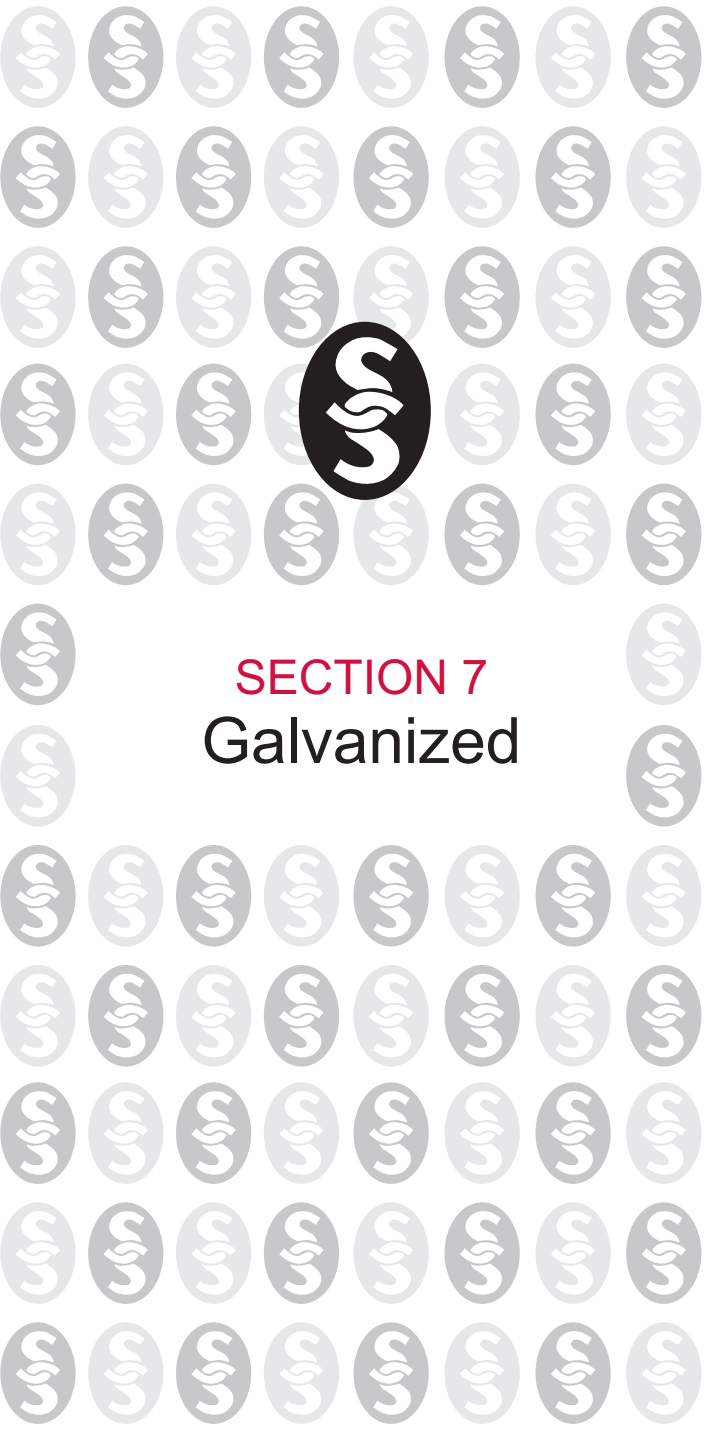
Stainless Steel

Aluminum

Misc. Weights & Data



# SECTION 7 Galvanized



**Products in this section are normally stocked. Most products in this catalog can be sent out per your requirement.**

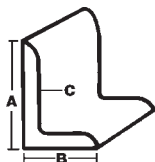
### **General Information on Hot Dip Galvanized Steel**

Hot dip galvanizing is the process of applying a zinc coating to iron and steel by immersing the material in a bath consisting primarily of molten zinc.

There are three basic elements in the galvanizing process:

1. **Surface Preparation** — This process consists of hot alkali solution to remove organic contaminants like dirt, paint markings, grease, and oil from metal surfaces. Next the material is pickled by dipping it in a diluted solution of hot sulfuric acid or ambient temperature hydrochloric acid. The material is then fluxed by dipping it in an aqueous solution of zinc ammonium chloride.
2. **Galvanizing** — This is the complete immersion of the material in a bath of at least 98% pure molten zinc until it reaches bath temperature of 850 degrees fahrenheit. It is then slowly withdrawn and the excess galvanizing is removed.
3. **Inspection** — This consists of visual checks for appearance and a variety of simple laboratory tests for thickness, uniformity and adherence of coating.

Galvanizing is used in a variety of applications such as: bridges, highways, power generation, transportation, water and waste treatment, buildings, agriculture and food processing, petrochemical and chemical, pulp and paper, and original equipment manufacturing.

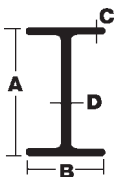


**Galvanized Angles**

A36 Hot Rolled, Hot Dipped  
 Stock Lengths 20 Ft.  
 Est. Lbs include Wgt of Zinc

Size in Inches			Est. Lbs.	Est. Lbs.
A	B	C	Per Ft.	Per 20'
3/4	x 3/4	x 1/8	.620	12.40
1	x 1	x 1/8	.840	16.80
		x 3/16	1.218	24.36
		x 1/4	1.565	31.29
1 1/4	x 1 1/4	x 1/8	1.061	21.21
		x 3/16	1.554	31.08
		x 1/4	2.016	40.32
1 1/2	x 1 1/2	x 1/8	1.292	25.83
		x 3/16	1.890	37.80
		x 1/4	2.457	49.14
2	x 2	x 1/8	1.733	34.65
		x 3/16	2.562	51.24
		x 1/4	3.350	66.99
		x 3/8	4.935	98.70
2 1/2	x 2 1/2	x 1/4	4.305	86.10
3	x 3	X 3/16	3.896	77.92
		x 1/4	5.145	102.9
3	x 3	x 3/8	7.56	151.2
4	x 4	x 1/4	6.93	138.6
		x 5/16	8.61	172.2
		x 3/8	10.29	205.8

Galvanized



**Galvanized American Standard Beams**

A36 Hot Rolled, Hot Dipped  
 Stock Lengths 20 Ft.  
 Galvanizing adds approximately 5%  
 to the Lbs per foot shown

Size	Lbs.	Depth	Flange Thickness	Web
Thickness	Per Ft.	B	C	D
3	x 5.7	2.330	.260	.170
4	x 7.7	2.663	.293	.193
6	x 12.5	3.332	.359	.232
8	x 18.4	4.001	.425	.271



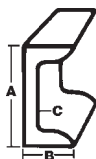
## Galvanized Wide Flange Beams

A36 Hot Rolled, Hot Dipped

Stock Lengths 20 Ft.

Galvanizing adds approximately 5%  
to the Lbs per foot shown

Size	Lbs. Per Ft.	Depth A	Flange Width B	Flange Thickness C	Web Thickness D
4 x 13	4.16	4.060	.345	.280	
6 x 15	5.99	5.990	.260	.230	
6 x 20	6.20	6.020	.365	.260	
8 x 18	8.14	5.250	.330	.230	
12 x 26	12.22	6.490	.380	.230	



## Galvanized Channels

A36 Hot Rolled, Hot Dipped

Stock Lengths 20 Ft.

Galvanizing adds approximately 5%  
to the Lbs per foot shown

Size	Lbs. Per Ft.	Lbs. Per 20'
2 x 1 x 3/16	2.436	48.72
3 x 4.1#	4.305	86.1
4 x 5.4#	5.67	113.4
6 x 8.2#	8.61	172.2
8 x 11.5#	12.075	241.5
10 x 15.3#	16.065	321.3

## Galvanized Tees

A36 Hot Rolled, Hot Dipped

Stock Lengths 20 Ft.

Est. Lbs include the weight of the Zinc



Size in Inches			Lbs. Per Ft.	Lbs. Per 20'
B	D	T		
2	x 2	x 1/4	3.801	76.02

## Galvanized Plate

A36 Hot Rolled, Hot Dipped  
Est. Lbs include the weight  
of the Zinc



Thickness	Lbs. Per Sq. Ft.	Size		Lbs. Per Plate
		A	B	
3/16	8.043	48 x	120	321.72
1/4	10.721	48 x	120	428.84
1	42.882	48 x	96	1,372.22

## Galvanized Sheet

ASTM A526 (14 ga. and heavier,  
Commercial Quality)

ASTM A527 (16 ga. and lighter,  
Lock-forming Quality)

Est. Lbs include the weight of the Zinc



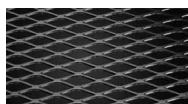
Galvanized sheets are continuously hot-dipped with a protective coating of zinc. Coating is G90 (1.25 oz per square foot).

Galvanized sheets can be formed, rolled or otherwise fabricated at room temperature without disrupting their protective qualities.

Applications include heating and ventilation ducts, roof flashing, electrical boxes, and many general maintenance applications.

Gauge	Size		Lbs. Per Sq. Ft.	Lbs. Per Sheet
	A	B		
10 GA	48 x	96	5.781	185.0
	48 x	120		231.2
	60 x	120		289.0
11 GA	48 x	96	5.250	168.0
12 GA	48 x	96	4.531	145.0
	48 x	120		181.2
	60 x	120		225.0
14 GA	48 x	96	3.281	105.0
	48 x	120		131.2
16 GA	48 x	96	2.656	85.0
	48 x	120		106.2
18 GA	48 x	96	2.156	69.0
	48 x	120		86.2
20 GA	48 x	96	1.656	53.0
	48 x	120		66.2
22 GA	48 x	96	1.406	45.0
	48 x	120		56.2
24 GA	48 x	96	1.156	37.0
	48 x	120		46.2
26 GA	48 x	96	.906	29.0
	48 x	120		36.2

Galvanized



## Galvanized Expanded Metal

Hot Rolled, Hot Dipped  
Flattened and Standard (Raised)  
Est. Lbs include the weight of the Zinc

Size Designation	Sheet Size	Est. Lbs. Per Sq. Ft.	Approx. Size of Opening in Inches
1/2 x #16	48 x 96	.903	.375 x .938
x #13	48 x 96	1.5435	.312 x .938
	48 x 120		
3/4 x #13	48 x 96	.84	.750 x 1.688
x # 9	48 x 96	1.89	.688 x 1.562



## Galvanized Strip

CQ Hot Rolled, Hot Dipped  
Stock Lengths 20 Ft.  
Est. Lbs include the weight of the Zinc

Size in Inches	Lbs. Per Ft.	Lbs. Per 20'
1/8 x 1	.4505	9.010
x 1 1/2	.6758	13.516
x 2	.901	18.020
3/16 x 1	.6758	13.516
x 1 1/4	.8447	16.894
x 1 1/2	1.0136	20.274
x 2	1.352	27.030
x 3	2.028	40.556
x 4	2.703	54.060



## Galvanized Flat Bars

A36 Hot Rolled, Hot Dipped  
Stock Lengths 20 Ft.  
Est. Lbs include the weight of the Zinc

Size in Inches	Lbs. Per Ft.	Lbs. Per 20'
1/4 x 1	.8925	17.85
x 1 1/4	1.1162	22.32
x 1 1/2	1.3388	26.78
x 2	1.785	35.70
x 3	2.6775	53.55
x 4	3.57	71.40
x 6	5.355	107.10
3/8 x 1	1.3388	26.78
x 1 1/4	1.6737	33.47
x 1 1/2	2.0087	40.17



**Galvanized Flat Bars (con't)**

Size in Inches		Lbs. Per Ft.	Lbs. Per 20'
3/8	x 2	2.6775	53.55
	x 3	4.0163	80.33
	x 4	5.355	107.10
1/2	x 3	5.355	107.10
	x 6	10.71	214.20

**Galvanized Rounds**

A36 Hot Rolled, Hot Dipped  
Stock Lengths 20 Ft.

Est. Lbs include the weight  
of the Zinc

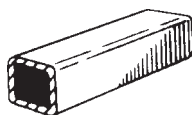


Size in Inches		Lbs. Per Ft.	Lbs. Per 20'
3/8*		.3943	7.89
1/2		.7010	14.02
5/8		1.0952	21.90
3/4		1.5771	31.54

\* Stocked as C.Q. only

**Galvanized Square Tubing**

Hot Rolled, Hot Dipped  
Stock Lengths 20 Ft. and 24 Ft.  
Est. Lbs include the weight of the Zinc



Size in Inches	Wall Thickness	Length	Lbs. Per Ft.	Lbs. Per 20'
1	.120	24	1.51	30.2
1 1/2	.120	24	2.36	47.2
2	.120	24	3.22	64.4
2	.250	20	5.68	113.6

**Galvanized Pipe, Threaded and Coupled**

ASTM A53 Tested, Schedule 40

Stock Lengths 21 Ft.

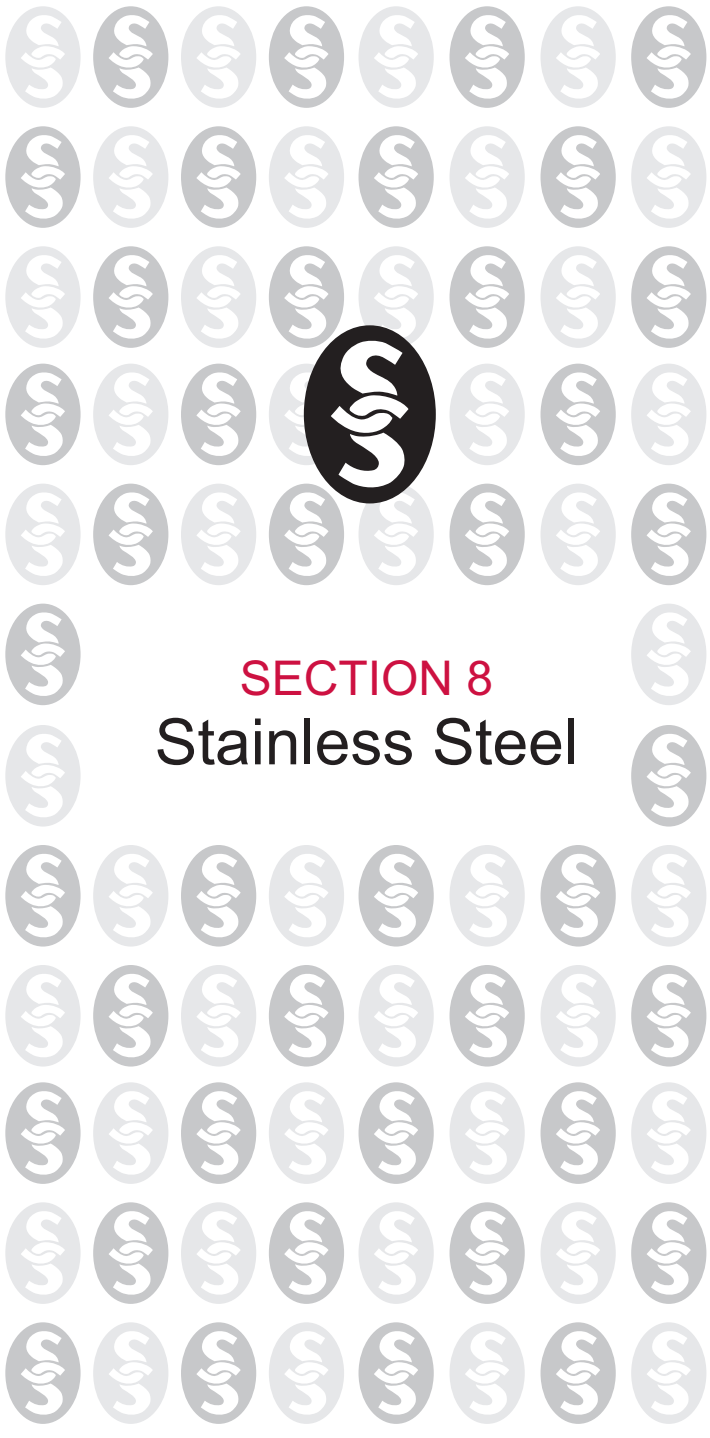
Est. Lbs include the weight of the Zinc

Nominal Size	O.D.	I.D.	Wall Thickness	Lbs. Per Ft.	Lbs. Per 21'
1/2	.840	.622	.109	.8925	18.74
3/4	1.050	.824	.113	1.1865	24.91
1	1.315	1.049	.133	1.7640	37.04
1 1/4	1.660	1.380	.140	2.3835	50.05
1 1/2	1.900	1.610	.145	2.8560	59.98
2	2.375	2.067	.154	3.8325	80.48
2 1/2	2.875	2.469	.203	6.0795	127.67
3	3.500	3.068	.216	7.9590	167.14
4	4.500	4.026	.237	11.3295	237.92



# SECTION 8

## Stainless Steel



## General Information on Stainless Steel

### Standard Finishes of Stainless Steel

#### Flat-Rolled Products

Surface finishes on stainless steel sheets, strip, and plates are generally selected for appearance, although degree and extent of forming and welding should be taken into consideration. Where forming is severe, or much welding is done, it is often more economical to use a cold rolled finish and then polish.

#### Unpolished Finishes

**No. 1 Finish.** Hot rolled, annealed and descaled. Produced by hot rolling followed by annealing and descaling. Generally used in industrial applications, such as for heat or corrosion resistance, where smoothness of finish is not of particular importance.

**No. 2D Finish.** A dull cold rolled finish produced by cold rolling, annealing, and descaling. The dull finish may result from the descaling or pickling operation or may be developed by a final light cold roll pass on dull rolls. The dull finish is favorable for the retention of lubricants on the surface in deep drawing operations.

This finish is generally used in forming deep drawn articles which may be polished after fabrication.

**No. 2B Finish.** A bright cold rolled finish commonly produced in the same manner as No. 2D, except that the annealed and descaled sheet receives a final light cold rolled pass on polished rolls. This is a general purposes cold rolled finish. It is commonly used for all but exceptionally difficult deep drawing applications.

This is more readily polished than No. 1 or No. 2D Finish.

#### Polished Finishes\*

Sheets can be produced with one or two sides polished. When polished on one side only, the other side may be rough ground in order to obtain the necessary flatness.

**No. 3 Finish** is a polished finish obtained with abrasives approximately 100 mesh, and which may or may not be additionally polished during fabrication.

**No. 4 Finish** is a general purpose polished finish widely used for restaurant equipment, kitchen equipment, store fronts, dairy equipment, etc. Following initial grinding with coarser abrasives, sheets are generally finished last with abrasives approximately 120 to 150 mesh.

**No. 6 Finish** is a dull satin finish having lower reflectivity than No. 4 Finish. It is produced by Tampico brushing No. 4 Finish sheets in a medium of abrasive and oil. It is used for architectural applications and ornamentation where a high luster is undesirable; it is also used effectively to contrast with brighter finishes.

**No. 7 Finish** has a high degree of reflectivity. It is produced by buffing of finely ground surface, but the grit lines are not removed. It is chiefly used for architectural and ornamental purposes.

**No. 8 Finish** is the most reflective finish that is commonly produced. It is obtained by polishing with successively finer abrasives and buffing extensively with very fine buffing rouges. The surface is essentially free of grit lines from preliminary grinding operations. This finish is most widely used for press plates, as well as for small mirrors and reflectors.

\*Standard stock polished finish is between 100-180 Grit (#3 to #4).

### Type 303

C	Mn	P	S	Si	Cr	Ni
0.15	2.00	0.20	0.15	1.00	<u>17.00</u>	<u>8.00</u>
Max.	Max.	Max.	Min.	Max.	19.00	10.00

**Type 303** is a chromium-nickel stainless steel modified by the addition of selenium or sulphur, as well as phosphorous, to improve machinability and non-seizing properties. It is the most readily machinable of all the chromium-nickel grades and has good corrosion resistance. It is non-magnetic in the annealed condition and non hardenable by heat treatment. Tensile strength can be increased by cold working.

**Applications**—Used almost exclusively for parts requiring machining, grinding or polishing where good corrosion resistance is also required. It is non-seizing and non-galling properties make it ideal for moving parts. Being an austenitic steel, it is useful where low magnetic permeability is desired.

## Type 304

C	Mn	P	S	Si	Cr	Ni
0.08	2.00	0.045	0.030	0.75	<u>18.00</u>	<u>8.00</u>
Max.	Max.	Max.	Max.	Max.	20.00	10.50

**Type 304** is the basic chromium-nickel stainless steel. It combines excellent mechanical properties with excellent resistance to many corrosive agents encountered in domestic and industrial use. It is non-magnetic in the annealed condition and not hardened by heat treatment. Both hardness and tensile strength can be increased by cold working. The analysis of Type 304 is similar to that of Type 302, except that Type 304 is modified by lowered carbon content. This provides good resistance to corrosion in welded construction where subsequent heat treatment is not practicable.

**Applications**—Used where corrosion resistance and good mechanical properties are primary requirements. These grades are widely accepted in such industries as dairy, beverage and other food products where the highest degree of sanitation and cleanliness is of prime importance. Parts for handling acetic, nitric and citric acids, organic and inorganic chemicals, dyestuffs, crude and refined oils, etc., are fabricated from this material. Because of its lack of magnetism it is highly desirable for instruments. It is also widely used for architectural trim. Type 304, as noted above, finds particular use in applications requiring welding.

## Type 304 L (ELC)

C	Mn	P	S	Si	Cr	Ni
0.030	2.00	0.045	0.030	0.75	<u>18.00</u>	<u>8.00</u>
Max.	Max.	Max.	Max.	Max.	20.00	12.00

**Type 304 L (or ELC)** is a very low carbon chromium nickel steel with corrosion resistance similar to T 304, but with superior resistance to intergranular corrosion following welding or stress relieving. The range of carbon content is controlled to the level of .03 maximum. This limits the formation of harmful carbides to a great extent. Post-weld annealing isn't necessary in most cases.

**Applications**—Any fabricating applications where annealing after welding is impractical, or where the specifications are very exact regarding intergranular corrosion, otherwise used in same types of equipment as 304.

## Type 316

C	Mn	P	S	Si	Cr	Ni	Mo
0.08	2.00	0.045	0.030	0.75	<u>16.00</u>	<u>10.00</u>	<u>2.00</u>
Max.	Max.	Max.	Max.	Max.	18.00	14.00	3.00

**Type 316** is a chromium-nickel stainless steel modified by the addition of molybdenum, which greatly increases its corrosion resistance as well as its mechanical properties at elevated temperatures. It is non-magnetic in the annealed condition and not hardenable by heat treatment. It is an outstanding stainless steel suitable for a large number of applications.

**Applications**—Widely used in the paper, textile and chemical industries, where parts are subjected to the corrosive effects of salts and reducing acids. Also used in the manufacture of pharmaceuticals in order to avoid excessive metallic contamination. Since Type 316 possesses the highest creep and tensile strength at elevated temperatures of any of the more commonly used stainless steels, it finds extensive use where the combination of high strength and good corrosion resistance at elevated temperatures is required. In aircraft applications, Type 316 is used for parts requiring good corrosion resistance and low magnetic permeability.

## Type 316 L (ELC)

C	Mn	P	S	Si	Cr	Ni	Mo
0.030	2.00	0.045	0.030	0.75	<u>16.00</u>	<u>10.00</u>	<u>2.00</u>
Max.	Max.	Max.	Max.	Max.	18.00	14.00	3.00

**Type 316L** is very low carbon grade with general corrosion resistance similar to Type 316, but with superior resistance to intergranular corrosion during welding or stress relieving. This precludes any harmful carbide precipitation in the 800 to 1500 F range, such as might otherwise occur in welding heavy sections.

**Applications**—Same as those for Type 316. All other physical characteristics and applications are similar or equivalent to regular Type 316.



### Stainless Steel Sheet

T304 2B Finish, ASTM A240

T304 Polished

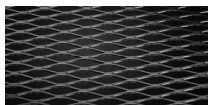
T316 & T316L (L=Low Carbon)

2B Finish

Cold rolled and annealed, QQ-S-766, ASTM A-240. MIL-S-5059

\*Also stocked in #4 Finish (polished).

Gauge Thickness	Size A B	Lbs. Per Sq. Ft.	Lbs. Per Sheet
10	48 x 96	5.670	181.44
	48 x 120*		226.80
	60 x 120		283.50
11	48 x 96	5.040	161.28
	48 x 120		201.60
	60 x 120		220.50
12	48 x 96	4.410	141.12
	48 x 120		176.40
	60 x 120		220.50
14	48 x 96*	3.150	100.80
	48 x 120*		126.00
	60 x 120		157.50
16	48 x 96*	2.520	80.64
	48 x 120*		100.80
	60 x 120		126.00
18	48 x 96*	2.016	64.51
	48 x 120*		80.64
	60 x 120		100.80
20	48 x 96	1.512	48.38
	48 x 120		60.48
	60 x 120		75.60
22	48 x 96	1.260	40.32
	48 x 120		50.40
	60 x 120		63.00
24	48 x 96*	1.008	32.26
	48 x 120		40.32
	60 x 120		50.40
26	48 x 96	.756	24.19
	48 x 120		30.24
	60 x 120		37.80



### Stainless Steel Expanded Metal

T304 Flattened

Size Designation	Sheet Size	Est. Lbs. Per Sq. Ft.	Approx. Size of Opening In Inches
1/2 x #18	48 x 96	0.69	.313 x 1.000
	48 x 96	0.86	.313 x 1.000
	48 x 96	1.78	.250 x 1.000
3/4 x #13	48 x 96	0.87	.625 x 1.750
	48 x 96	1.95	.563 x 1.688

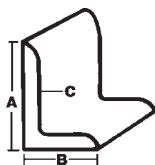




## Stainless Steel Plate

T304 & T316 & T316L  
(L= Low Carbon)  
HRA&P, ASTM A240

Thickness	Lbs. Per Sq. Ft.	Size		Lbs. Per Sheet
		A	B	
3/16	8.579	48 x	96	274.53
		48 x	120	343.16
1/4	11.162	48 x	96	357.18
		48 x	120	446.48
3/8	16.496	48 x	96	527.87
		48 x	120	659.84
1/2	21.663	48 x	96	693.22
		48 x	120	866.52
5/8	26.831	48 x	96	858.59
3/4	32.123	48 x	96	1,027.94
1	42.665	48 x	120	1,706.60
1 1/2	63.34	48 x	120	2,533.60



## Stainless Steel Angles

T304, HRA&P, ASTM A276,  
Stock Lengths  
20/25 Ft. Random

Size in Inches			Lbs. Per Ft.	Lbs. Per 20'
A	B	C		
3/4	x 3/4	x 1/8	.59	11.80
		x 1/4	.80	16.00
1	x 1	x 1/8	1.16	23.20
		x 3/16	1.49	29.80
		x 1/4	1.01	20.20
1 1/4	x 1 1/4	x 1/8	1.48	29.60
		x 3/16	1.92	38.40
		x 1/4	1.23	24.60
1 1/2	x 1 1/2	x 1/8	1.80	36.00
		x 3/16	2.34	46.80
		x 1/4	1.65	33.00
2	x 2	x 1/8	2.44	48.80
		x 3/16	3.19	63.80
		x 1/4	4.70	94.00
2 1/2	x 2 1/2	x 3/8	3.07	61.40
		x 3/16	4.10	82.00
		x 1/4	5.90	118.00
3	x 3	x 3/8	4.90	98.00
		x 1/4	7.20	144.00
4	x 4	x 3/8	6.60	132.00
		x 1/4	9.80	196.00

Stainless Steel

## Stainless Steel Plate Cut Bar

ASTM A240, T304 HRA&amp;P

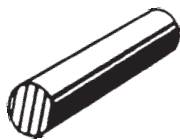
Stock Lengths 12/14 Ft. Random



Size in Inches			Lbs. Per Ft.	Lbs. Per 12'	
1/8	x	1/2	.213	2.56	
	x	3/4	.319	3.83	
	x	1	.425	5.10	
	x	1 1/4	.531	6.37	
	x	1 1/2	.638	7.66	
	x	2	.850	10.20	
	x	3	1.280	15.36	
	x	4	1.689	20.26	
3/16	x	1/2	.318	3.82	
	x	3/4	.478	5.74	
	x	1	.638	7.66	
	x	1 1/4	.797	9.56	
	x	1 1/2	.957	11.48	
	x	2	1.280	15.36	
	x	2 1/2	1.590	19.08	
	x	3	1.910	22.92	
1/4	x	4	2.560	30.72	
	x	1/2	.425	5.10	
	x	3/4	.638	7.66	
	x	1	.850	10.20	
	x	1 1/4	1.060	12.72	
	x	1 1/2	1.280	15.36	
	x	2	1.700	20.40	
	x	2 1/2	2.130	25.56	
5/16	x	3	2.550	30.60	
	x	4	3.400	40.80	
	x	6	5.100	61.20	
	x	3	3.190	38.28	
	3/8	x	1/2	.638	7.66
		x	1	1.280	15.36
		x	1 1/2	1.910	22.92
		x	2	2.550	30.60
x		2 1/2	3.190	38.28	
x		3	3.830	45.96	
x		3 1/2	4.470	53.64	
x		4	5.100	61.20	
1/2	x	6	7.650	91.80	
	x	1	1.700	20.40	
	x	1 1/2	2.550	30.60	
	x	2	3.400	40.80	
	x	2 1/2	4.250	51.00	
	x	3	5.100	61.20	
	x	4	6.800	81.60	
	x	6	10.200	122.40	
x	8	13.600	163.20		

**Stainless Steel Rounds**

ASTM A276, T304 and T316  
Stock Lengths 12/14 Ft. Random



Size in Inches	Lbs. Per Ft.	Lbs. Per 12'
1/8	.042	.50
3/16	.094	1.13
1/4	.167	2.00
5/16	.261	3.13
3/8	.376	4.51
7/16	.511	6.13
1/2	.668	8.02
5/8	1.043	12.52
3/4	1.502	18.02
7/8	2.044	24.53
1	2.670	32.04
1 1/8	3.380	40.56
1 1/4	4.172	50.06
1 3/8	5.049	60.59
1 1/2	6.008	72.10
1 5/8	7.051	84.61
1 3/4	8.178	98.14
1 7/8	9.388	112.66
2	10.681	128.17
2 3/4	20.195	242.34
3	24.033	288.40
3 1/2	32.712	392.54

Annealed, cold drawn, centerless ground or smooth turned.

**Stainless Steel Rounds**

ASTM A276, T303  
Stock Lengths 10/12 Ft. Random



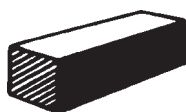
Size in Inches	Lbs. Per Ft.	Lbs. Per 12'
3/4	1.502	18.02
1	2.670	32.04
1 1/8	3.380	40.56
1 3/16	3.766	45.19
1 1/4	4.172	50.06
1 3/8	5.049	60.59
1 7/16	5.518	66.22
1 1/2	6.008	72.10
1 3/4	8.178	98.14
2	10.681	128.17

Annealed, cold drawn, centerless ground, or smooth turned.

## Stainless Steel Squares

T303, T304, T316

Stock Lengths 10/12 Ft. Random



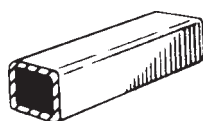
Size in Inches	Lbs. Per Ft.	Lbs. Per 12'
1/4	.213	2.56
3/8	.478	5.74
1/2	.850	10.20
5/8	1.328	15.96
3/4	1.913	22.92
1	3.400	40.80
1 1/2	7.650	91.80

## Stainless Steel Square Tubing

Polished and Paper Sleeved

T304, ASTM A554

Stock Lengths 18/20 Ft. Random



Size in Inches	Gauge	Wall Thickness	Lbs. Per Ft.	Lbs. Per 20'
3/4	16	.065	.6055	12.11
	16	.065	.8264	16.53
1	12	.109	1.3208	26.42
1 1/4	16	.065	1.0474	20.95
	12	.109	1.6914	33.83
1 1/2	16	.065	1.2685	25.37
	12	.109	2.0620	41.24
2	16	.065	1.7103	34.21
	12	.109	2.8029	56.06
3	7	.180	4.4555	89.11
	11	.120	4.7002	94.00



## Stainless Steel Pipes

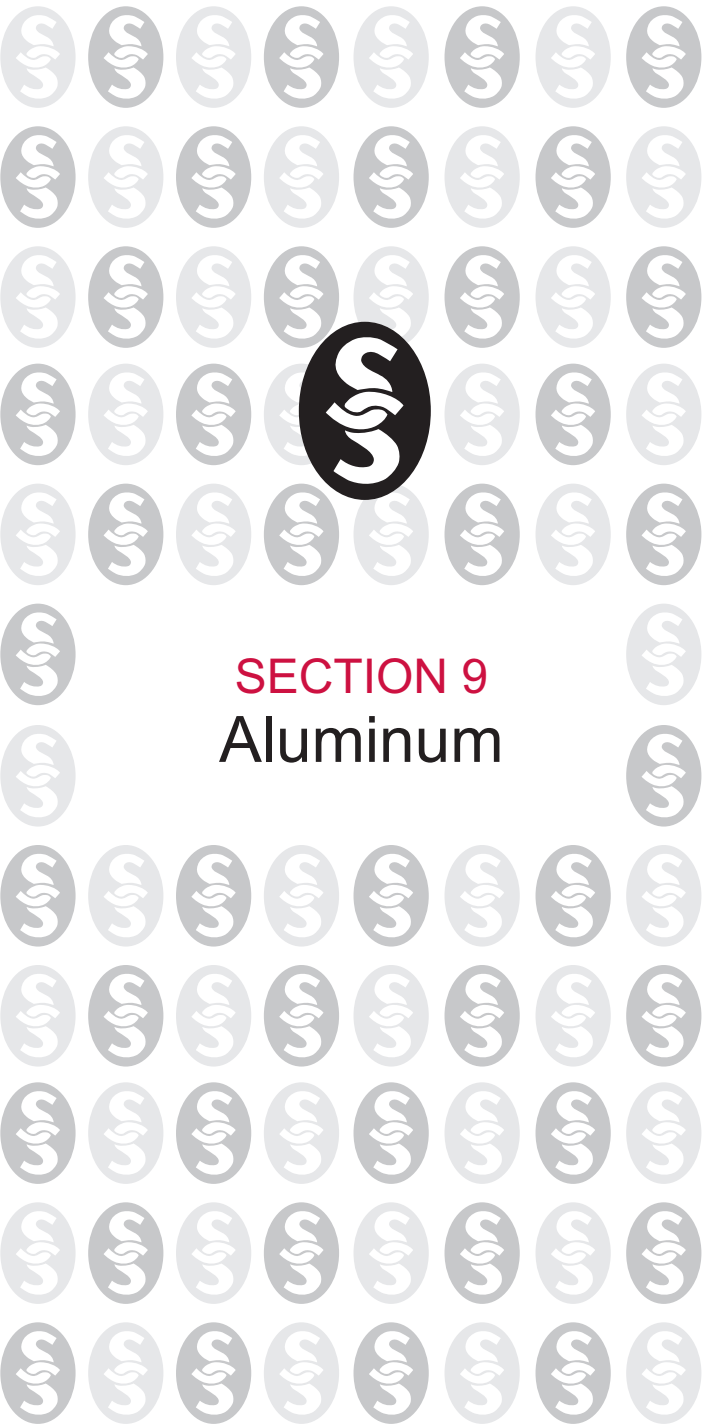
ASTM A312, Schedule 40, T304

Stock Lengths 20 Ft.

Size In Inches	O.D.	I.D.	Wall Thickness	Lbs. Per Ft.	Lbs. Per 20'
3/8	.675	.493	.091	.568	11.36
1/2	.840	.622	.109	.851	17.02
3/4	1.050	.824	.113	1.131	22.62
1	1.315	1.049	.133	1.680	33.60
1 1/4	1.660	1.380	.140	2.273	45.40
1 1/2	1.900	1.610	.145	2.718	54.40
2	2.375	2.067	.154	3.653	73.06
3	3.500	3.068	.216	7.576	151.52
4	4.500	4.026	.237	10.790	215.80
6	6.625	6.065	.280	18.970	379.40



## SECTION 9 Aluminum



## General Information on Aluminum Alloys

In high-purity form aluminum is soft and ductile. Most commercial uses, however, require greater strength than pure aluminum affords. This is achieved by the addition of other elements to produce various alloys, which singly or in combination impart strength to the metal. Further strengthening is possible by means which classify the alloys roughly into two categories, non-heat-treatable and heat-treatable.

**Non-Heat-Treatable Alloys**—The initial strength of alloys in this group depends upon the hardening effect of elements such as manganese, silicon, iron and magnesium, singly or in various combinations. The non-heat-treatable alloys are usually designated, therefore, in the 1000, 3000, 4000, or 5000 series. Since these alloys are work-hardenable, further strengthening is made possible by various degrees of cold working, denoted by the “H” series of tempers. Alloys containing appreciable amounts of magnesium when supplied in strain-hardened tempers are usually given a final elevated-temperature treatment called stabilizing to insure stability of properties.

**Heat-Treatable Alloys**—The initial strength of alloys in this group is enhanced by the addition of alloying elements such as copper, magnesium, zinc, and silicon. Since these elements singly or in various combinations show increasing solid solubility in aluminum with increasing temperature, it is possible to subject them to thermal treatments which will impart pronounced strengthening.

The first step, called heat treatment or solution heat treatment, is an elevated-temperature process designed to put the soluble element or elements in solid solution. This is followed by rapid quenching, usually in water, which momentarily “freezes” the structure and for a short time renders the alloy very workable. It is at this stage that some fabricators retain this more workable structure by storing the alloys at below freezing temperatures until they are ready to form them. At room or elevated temperatures the alloys are not stable after quenching, however, and precipitation of the constituents from the super-saturated solution begins. After a period of several days at room temperature, termed aging or room-temperature precipitation, the alloy is considerably stronger. Many alloys approach a stable condition at room temperature, but some alloys, particularly those containing magnesium and silicon or magnesium and zinc, continue to age-harden for long periods of time at room temperature.

## Effect of Alloying Elements

**1000 Series**—Aluminum of 99 percent or higher purity has many applications, especially in the electrical and chemical fields. These alloys are characterized by excellent corrosion resistance, high thermal and electrical conductivity, low mechanical properties and excellent workability. Moderate increases in strength may be obtained by strain-hardening. Iron and silicon are the major impurities.

**2000 Series**—Copper is the principal alloying element in this group. These alloys require solution heat-treatment to obtain optimum properties; in the heat treated condition mechanical properties are similar to, and sometimes exceed, those of mild steel. In some instances artificial aging is employed to further increase the mechanical properties. This treatment materially increases yield strength, with attendant loss in elongation; its effect on tensile (ultimate) strength is not as great. The alloys in the 2000 series do not have as good corrosion resistance as most other aluminum alloys and under certain conditions they may be subject to intergranular corrosion. Therefore, these alloys in the form of sheet are usually clad with a high-purity alloy or a magnesium-silicon alloy of the 6000 series which provides galvanic protection to the core material and thus greatly increases resistance to corrosion. Alloy 2024 is perhaps the best known and most widely used aircraft alloy.

**3000 Series**—Manganese is the major alloying element of alloys in this group, which are generally non-heat-treatable. Because only a limited percentage of manganese, up to about 1.5 percent, can be effectively added to aluminum, it is used as a major element in only a few instances. One of these, however, is the popular 3003, which is widely used as a general-purpose alloy for moderate-strength applications requiring good workability.

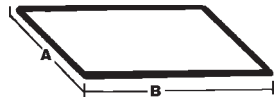
**5000 series**—Magnesium is one of the most effective and widely used alloying elements for aluminum. When it is used as the major alloying element or with manganese, the result is a moderate to high strength non-heat-treatable alloy. Magnesium is considerably more effective than manganese as a hardener, about 0.8 percent magnesium being equal to 1.25 percent manganese, and it can be added in considerably higher quantities. Alloys in this series possess good welding characteristics and good resistance to corrosion in marine atmosphere. However, certain limitations should be placed on the amount of cold work and the safe operating temperatures permissibly for the higher magnesium content alloys (over about 3 1/2 percent for operating temperatures above about 150 F (66 C) to avoid susceptibility to stress corrosion.

**6000 Series**—Alloys in this group contain silicon and magnesium in approximate proportions to form magnesium silicide, thus making them heat-treatable. Major alloy in this series is 6061, one of the most versatile of the heat-treatable alloys. Though less strong than most of the 2000 or 7000 alloys, the magnesium-silicon (or magnesium-silicide) alloys possess good formability and corrosion resistance, with medium strength. Alloys in this heat-treatable group may be formed in the T4 temper (solution heat-treated but not artificially aged) and then reach full T6 properties by artificial aging.



## Aluminum Flat Sheets

3003-H14, Federal Specification  
 QQ-A-250/2 (1)  
 Mill Finish



Thickness	Est. Lbs. Per Sq. Ft.	Size		Est. Lbs. Per Sheet
		A	B	
.020	.285	36	x 96	6.84
		36	x 120	8.55
		48	x 96	9.12
.025	.356	48	x 120	11.40
		48	x 144	13.68
		36	x 96	8.54
		36	x 120	10.68
		48	x 96	11.39
.032	.456	48	x 120	14.24
		48	x 144	17.09
		36	x 96	10.94
		36	x 120	13.68
		48	x 96	14.59
.040	.570	48	x 120	18.24
		48	x 144	21.89
		60	x 120	22.80
		60	x 144	27.36
		36	x 96	13.68
.050	.713	36	x 120	17.10
		48	x 96	18.24
		48	x 120	22.80
		48	x 144	27.36
		60	x 120	28.50
		60	x 144	34.20
.063	.898	36	x 96	17.11
		36	x 120	21.39
		48	x 96	22.82
		48	x 120	28.52
		48	x 144	34.22
		60	x 120	35.65
.080	1.139	60	x 144	42.78
		36	x 96	21.55
		36	x 120	26.94
		48	x 96	28.74
		48	x 120	35.92
		48	x 144	43.10
.080	1.139	60	x 120	44.90
		60	x 144	53.88
		36	x 96	27.34
		36	x 120	34.17
		48	x 96	36.45
		48	x 120	45.56
.080	1.139	48	x 144	54.67
		60	x 120	56.95
		60	x 120	56.95

Aluminum

## Aluminum Flat Sheets (con't)

Thickness	Est. Lbs. Per Sq. Ft.	Size		Est. Lbs. Per Sheet
		A	B	
.080	1.287	60	x 144	68.34
		36	x 96	30.89
		36	x 120	38.61
		48	x 96	41.18
		48	x 120	51.48
.100	1.426	48	x 144	61.78
		60	x 120	64.35
		60	x 144	77.22
		36	x 96	34.22
		36	x 120	42.78
		48	x 96	45.63
		48	x 120	57.04
.125	1.782	48	x 144	68.45
		60	x 120	71.30
		60	x 144	85.56
		36	x 96	42.77
		36	x 120	53.46
		48	x 96	57.02
		48	x 120	71.28
.190	2.713	48	x 144	85.54
		60	x 120	89.10
		60	x 144	106.92
		36	x 96	65.11
		36	x 120	81.39
		48	x 96	86.82
		48	x 120	108.52
48	x 144	130.22		
		60	x 120	135.65
		60	x 144	162.78

(1) Standard stock sheets meet all requirements of the referenced Federal Specification with the exception of stenciling.



## Aluminum Flat Sheets

5052-H32, Federal Specification  
 QQ-A-250/8 (1) Mill Finish

Thickness	Est. Lbs. Per Sq. Ft.	Size		Est. Lbs. Per Sheet
		A	B	
.050	.698	48	x 120	27.92
.063	.880	48	x 120	35.20
.080	1.117	48	x 96	35.74
.090	1.257	48	x 120	50.28
.125	1.746	48	x 144	83.81
.190	2.654	48	x 144	127.39

(1) Standard stock sheets meet all requirements of the referenced Federal Specification with the exception of stenciling.

**Bare Aluminum Flat Sheets**

6061-T6, Federal Specification  
 QQ-A-250/11 (1)  
 Mill Finish



Thickness	Est. Lbs. Per Sq. Ft.	Size A	B	Est. Lbs. Per Sheet
.032	.452	48 x	144	21.70
.040	.565	48 x	144	27.12
.050	.706	48 x	144	33.89
.063	.889	60 x	144	42.36
		48 x	144	42.67
		60 x	144	53.34
.071	1.002	48 x	144	48.10
.080	1.129	48 x	144	54.19
		60 x	144	67.74
		48 x	144	60.96
.090	1.270	60 x	144	76.20
		48 x	144	67.73
		48 x	96	56.45
.125	1.764	48 x	144	84.67
		60 x	144	105.84
		48 x	144	108.38
.160	2.258	48 x	144	128.69
		48 x	144	160.86
		60 x	144	193.03
.190	2.681	72 x	144	

(1) Standard stock sheets meet all requirements of the referenced Federal Specification, however certain sizes may not be stenciled.



## Aluminum Diamond Floor Plates

6061-T6

Thickness	Est. Lbs. Per Sq. Ft.	Size	Est. Lbs. Per Plate
.100	1.570	48 x 192	100.48
.125	1.905	48 x 192	121.92
		60 x 192	152.40
.188	2.820	48 x 192	180.48
		60 x 192	225.60
.250	3.700	48 x 192	236.80
		60 x 192	296.00
.375	5.490	48 x 192	351.36
		60 x 192	439.20
.500	7.270	48 x 192	465.28

## Bare Aluminum Plates

606T-T6 Federal Specification  
QQ-A-250/11, Mill Finish



Thickness	Est. Lbs. Per Sq. Ft.	Size	Est. Lbs. Per Plate
3/16	2.685	48 x 96	85.92
		48 x 120	107.40
		48 x 144	128.88
1/4	3.660	48 x 96	117.12
		48 x 144	175.68
3/8	5.440	48 x 96	174.08
		48 x 144	261.12
1/2	7.250	48 x 96	232.00
		48 x 144	348.00

Many other grades and sizes of aluminum plates are readily available, please inquire.



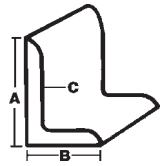
## Aluminum Diamond Floor Plates

Bright Finish 3003

Thickness	Est. Lbs. Per Sq. Ft.	Size	Est. Lbs. Per Plate
.080	1.283	48 x 192	82.11
.084	1.340	48 x 192	85.76
.090	1.426	48 x 192	91.26
.100	1.568	48 x 192	100.35
.125	1.925	48 x 144	92.40
		48 x 192	123.20
.188	2.823	48 x 192	180.67

## Aluminum Structural Angles

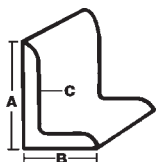
6061-T6, Federal Specification  
 QQ-A-200/16  
 Equal Leg, Stock Lengths 25 Ft.



Size in Inches			Est. Lbs. Per Ft.	Est. Lbs. Per 25'
A	B	C		
3/4	x 3/4	x 1/8	.201	5.03
		x 1/8	.275	6.88
		x 3/16	.400	10.00
1 1/4	x 1 1/4	x 1/4	.514	12.85
		x 1/8	.343	8.58
		x 3/16	.510	12.75
1 1/2	x 1 1/2	x 1/4	.656	16.40
		x 1/8	.423	10.58
		x 3/16	.619	15.48
1 3/4	x 1 3/4	x 1/4	.809	20.23
		x 3/8	1.176	29.40
		x 1/8	.497	12.43
		x 3/16	.731	18.28
		x 1/4	.956	23.90
		x 5/16	1.171	29.28
2	x 2	x 3/8	1.378	34.45
		x 1/8	.577	14.43
		x 3/16	.850	21.25
		x 1/4	1.110	27.75
		x 5/16	1.364	34.10
		x 3/8	1.606	40.15
2 1/2	x 2 1/2	x 1/8	.724	18.10
		x 3/16	1.070	26.75
		x 1/4	1.404	35.10
		x 5/16	1.729	43.23
		x 3/8	2.047	51.18
		x 3/16	1.275	31.88
3	x 3	x 1/4	1.684	42.10
		x 5/16	2.082	52.05
		x 3/8	2.474	61.85
3 1/2	x 3 1/2	x 1/2	3.227	80.68
		x 1/4	1.989	49.73
		x 5/16	2.461	61.53
		x 3/8	2.926	73.15
		x 1/2	3.826	95.65
		x 1/4	2.283	57.08
4	x 4	x 5/16	2.829	70.73
		x 3/8	3.366	84.15
		x 1/2	4.414	110.35
5	x 5	x 5/8	5.425	135.63
		x 3/8	4.237	105.93
		x 1/2	5.578	139.45

### Aluminum Structural Angles (con't)

Size in Inches			Est. Lbs.	Est. Lbs.
A	B	C	Per Ft.	Per 25'
6	x 6	x 3/8	5.119	127.98
		x 1/2	6.754	168.85
8	x 8	x 5/8	8.352	208.80
		x 1/2	9.141	228.53
		x 3/4	13.478	336.95



### Aluminum Structural Angles

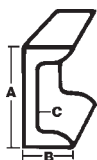
6061-T6

Federal Specification QQ-A-200/16  
Unequal Leg, Stock Lengths 25 Ft.

Size in Inches			Est. Lbs.	Est. Lbs.
A	B	C	Per Ft.	Per 25'
1	x 3/4	x 1/8	.238	5.95
1 1/4	x 3/4	x 1/8	.272	6.80
1 1/4	x 1	x 1/8	.314	7.85
1 1/2	x 3/4	x 1/8	.314	7.85
1 1/2	x 1	x 3/16	.454	11.35
		x 1/8	.347	8.68
1 1/2	x 1 1/4	x 1/4	.662	16.55
		x 1/8	.387	9.68
1 3/4	x 1 1/4	x 3/16	.566	14.15
		x 1/4	.734	18.35
		x 1/8	.421	10.53
2	x 1 1/2	x 3/16	.621	15.53
		x 1/4	.809	20.23
		x 1/8	.431	10.78
2	x 2	x 1/8	.496	12.40
		x 3/16	.731	18.28
		x 1/4	.956	23.90
		x 3/8	1.378	34.45
2 1/2	x 1 1/4	x 3/16	.797	19.93
2 1/2	x 1 1/2	x 1/8	.577	14.43
		x 3/16	.850	21.25
		x 1/4	1.110	27.75
2 1/2	x 2	x 1/8	.652	16.30
		x 3/16	.961	24.03
		x 1/4	1.257	31.43
3	x 2 1/2	x 3/8	1.828	45.70
		x 3/16	1.071	26.78
		x 1/4	1.403	35.08
3	x 3	x 3/8	2.046	51.15
		x 1/4	1.537	38.43
		x 3/8	2.253	56.33

## Aluminum Structural Angles (con't)

Size in Inches			Est. Lbs. Per Ft.	Est. Lbs. Per 25'	
A	B	C			
3 1/2	x 2 1/2	x 1/4	1.684	42.10	
		x 3/8	2.474	61.85	
		x 1/2	3.227	80.68	
3 1/2	x 3	x 1/4	1.842	46.05	
		x 3/8	2.705	67.63	
		x 1/2	3.532	88.30	
4	x 2 1/2	x 1/4	1.856	46.40	
4		x 3	1.988	49.70	
4	x 3 1/2	x 3/8	2.926	73.15	
		x 1/2	3.826	95.65	
		x 3/8	3.128	78.20	
4	x 3 1/2	x 1/2	4.102	102.55	
		5	x 3	3.349	83.73
			x 1/2	4.396	109.90
5	x 3 1/2	x 3/8	3.582	89.55	
		x 1/2	4.704	117.60	
		6	x 3 1/2	x 5/16	3.385
x 3/8	4.037			100.93	
6	x 4	x 1/2	5.306	132.65	
		x 3/8	4.237	105.93	
		x 1/2	5.578	139.45	
8	x 6	x 1/2	7.952	198.80	
		x 3/4	11.679	291.98	



## Aluminum Structural Channels

6061-T6

Federal Specification QQ-A-200/16

American Standard,

Stock Lengths 25 Ft.

Size in Inches			Est. Lbs.	Est. Lbs.
A	B	C	Per Ft.	Per 25'
3	x 1.410	x .170	1.417	35.43
3	x 1.498	x .258	1.729	43.23
3	x 1.596	x .356	2.074	51.85
4	x 1.580	x .180	1.846	46.15
4	x 1.647	x .247	2.161	54.03
4	x 1.720	x .320	2.504	62.60
5	x 1.750	x .190	2.316	57.90
5	x 1.885	x .325	3.108	77.70
5	x 2.032	x .472	3.975	99.38
6	x 1.920	x .200	2.826	70.65
6	x 1.945	x .225	3.002	75.05
6	x 2.034	x .314	3.631	90.78
6	x 2.157	x .437	4.498	112.45
7	x 2.110	x .230	3.541	88.53
7	x 2.194	x .314	4.232	105.80
8	x 2.290	x .250	4.252	106.30
8	x 2.343	x .303	4.751	118.78
8	x 2.435	x .395	5.617	140.43
8	x 2.527	x .487	6.484	162.10
9	x 2.430	x .230	4.604	115.10
9	x 2.648	x .448	6.911	172.78
10	x 2.600	x .240	5.278	131.95
10	x 2.739	x .379	6.915	172.88
10	x 2.886	x .526	8.641	216.03
12	x 2.960	x .300	7.411	185.28
12	x 3.047	x .387	8.639	215.98
12	x 3.170	x .510	10.374	259.35
15	x 3.400	x .400	11.708	292.70
15	x 3.716	x .716	17.282	432.05





## Aluminum Rectangular Bars

6061-T6

Federal Specification QQ-A-200/8

Extruded, Stock Lengths 12 Ft.

Size in Inches			Est. Lbs. Per Ft.	Est. Lbs. Per 12'
1/8	x	1/2	.074	0.89
	x	5/8	.092	1.10
	x	3/4	.110	1.32
	x	1	.147	1.76
	x	1 1/4	.184	2.21
	x	1 1/2	.221	2.65
	x	1 3/4	.257	3.08
	x	2	.294	3.53
	x	2 1/2	.368	4.42
3/16	x	3/4	.165	1.98
	x	1	.221	2.65
	x	1 1/4	.276	3.31
	x	1 1/2	.331	3.97
1/4	x	2	.441	5.29
	x	3	.662	7.94
	x	1/2	.147	1.76
	x	3/4	.221	2.65
	x	1	.294	3.53
	x	1 1/4	.368	4.42
	x	1 1/2	.441	5.29
	x	1 3/4	.515	6.18
	x	2	.588	7.06
5/16	x	2 1/2	.735	8.82
	x	3	.882	10.50
	x	3 1/2	1.029	12.35
	x	4	1.176	14.11
	x	5	1.470	17.64
	x	6	1.764	21.17
	x	3/4	.276	3.31
	x	1	.368	4.42
	x	1 1/4	.459	5.51
3/8	x	1 1/2	.551	6.61
	x	2	.713	8.56
	x	1/2	.221	2.65
	x	3/4	.331	3.97
	x	1	.441	5.29
	x	1 1/4	.551	6.61
	x	1 1/2	.661	7.93
	x	2	.882	10.58
	x	2 1/2	1.103	13.24
x	3	1.323	15.88	

## Aluminum Rectangular Bars (con't)

Size in Inches	Est. Lbs. Per Ft.	Est. Lbs. Per 12'
3/8 x 4	1.764	21.17
x 6	2.646	31.75
1/2 x 3/4	.441	5.29
x 1	.588	7.06
x 1 1/4	.735	8.82
x 1 1/2	.882	10.58
x 1 3/4	1.029	12.35
x 2	1.176	14.11
x 2 1/2	1.470	17.64
x 3	1.764	21.17
x 4	2.352	28.22
x 5	2.940	35.28
x 6	3.528	42.34
5/8 x 3/4	.551	6.61
x 1	.735	8.82
x 1 1/4	.919	11.03
x 1 1/2	1.103	13.24
x 2	1.470	17.64
x 3	2.205	26.46
3/4 x 1	.882	10.58
x 1 1/4	1.103	13.24
x 1 1/2	1.323	15.88
x 2	1.764	21.17
x 2 1/2	2.205	26.46
x 3	2.646	31.75
x 3 1/2	3.087	37.04
x 4	3.528	42.34
x 5	4.410	52.92
x 6	5.292	63.50
1 x 1 1/4	1.470	17.64
x 1 1/2	1.764	21.17
x 2	2.352	28.22
x 2 1/2	2.940	35.28
x 3	3.528	42.34
x 4	4.704	56.45
x 6	7.056	84.67
1 1/4 x 1 1/2	2.205	26.46
x 2	2.940	35.28
x 2 1/2	3.675	44.10
x 3	4.410	52.92
x 4	5.880	70.56
1 1/2 x 2	3.528	42.34
x 2 1/2	4.410	52.92
x 3	5.292	63.50
x 4	7.056	84.67
x 6	10.584	127.01

## Aluminum Rectangular Bars (con't)

Size in Inches			Est. Lbs. Per Ft.	Est. Lbs. Per 12'
2	x	2 1/2	5.880	70.56
	x	3	7.056	84.67
	x	4	9.408	112.90
3	x	4	14.112	169.34
	x	5	17.640	211.68



## Aluminum Rounds

6061-T6, Federal Specification QQ-A-225/8,  
Cold Finished  
Federal Specification QQ-A-200/8  
Extruded, Stock Lengths 12 Ft.

Size in Inches			Est. Lbs. Per Ft.	Est. Lbs. Per 12'
1/8			.014	.17
3/16			.033	.39
1/4			.058	.70
5/16			.090	1.08
3/8			.130	1.56
7/16			.177	2.12
1/2			.231	2.77
9/16			.292	3.50
5/8			.361	4.33
3/4			.520	6.24
7/8			.707	8.48
1			.924	11.09
1 1/8			1.169	14.03
1 1/4			1.443	17.32
1 5/16			1.591	19.09
1 3/8			1.746	20.95
1 7/16			1.909	22.91
1 1/2			2.078	24.94
1 5/8			2.439	29.27
1 3/4			2.829	33.95
1 13/16			3.034	36.41
1 7/8			3.247	38.96
2			3.695	44.34
2 1/8			4.171	50.05
2 1/4			4.676	56.11
2 1/2			5.773	69.28
2 5/8			6.364	76.37
2 3/4			6.985	83.82
3			8.313	99.76
3 1/4			9.776	117.31
3 1/2			11.315	135.78

**Aluminum Rounds (con't)**

Size in Inches	Est. Lbs. Per Ft.	Est. Lbs. Per 12'
3 5/8	12.152	145.82
3 3/4	12.989	155.87
4	14.778	177.34
4 1/4	16.683	200.20
4 1/2	18.704	244.45
5	23.070	276.84
5 1/2	27.940	335.28
6	33.251	399.01
6 1/2	39.023	468.28
7	45.258	543.10
7 1/2	51.954	623.45
8	59.112	709.34
9	74.814	897.77
10	92.363	1,108.36

**Aluminum Square Tubing**

6063-T52 Extruded

Stock lengths: 21' 1" and 24'

Size in Inches	Average Wall in Inches	Lbs. per Foot
3/4	.125	0.368
1	.062	0.280
1	.125	0.516
1-1/4	.125	0.676
1-1/2	.063	0.430
1-1/2	.125	0.810
2	.094	0.851
2	.125	1.103
3	.125	1.691
3	.188	2.540
4	.188	3.440
4 *	.250	4.410

\* 6061 -T6

## Aluminum Rectangular Tubing

6063-T52 Extruded

Stock lengths: 21' 1" and 24'

Size in Inches		Average Wall in Inches	Lbs. per Foot
2	x 1	.125	0.809
2	x 1-1/2	.125	0.956
3	x 1-1/2	.125	1.237
4	x 2	.125	1.724

## Aluminum Pipe

6063-T52 &amp; 6061-T6

Stock lengths: 20

Nom.							
Pipe size in Inches	O.D. in Inches	I.D. in Inches	Avg. Wall Thickness	Lbs. per Foot		6063-T52	6061-T6

### SCHEDULE 40

3/4	1.050	.824	.113	0.391	X		
1	1.315	1.049	.133	1.315	X		X
1-1/4	1.660	1.380	.140	0.786	X		X
1-1/2	1.900	1.610	.145	0.940	X		X
2	2.375	2.067	.154	1.264	X		X
2-1/2	2.875	2.469	.203	2.004	X		
6	6.625	6.065	.280	6.654			X

### SCHEDULE 80

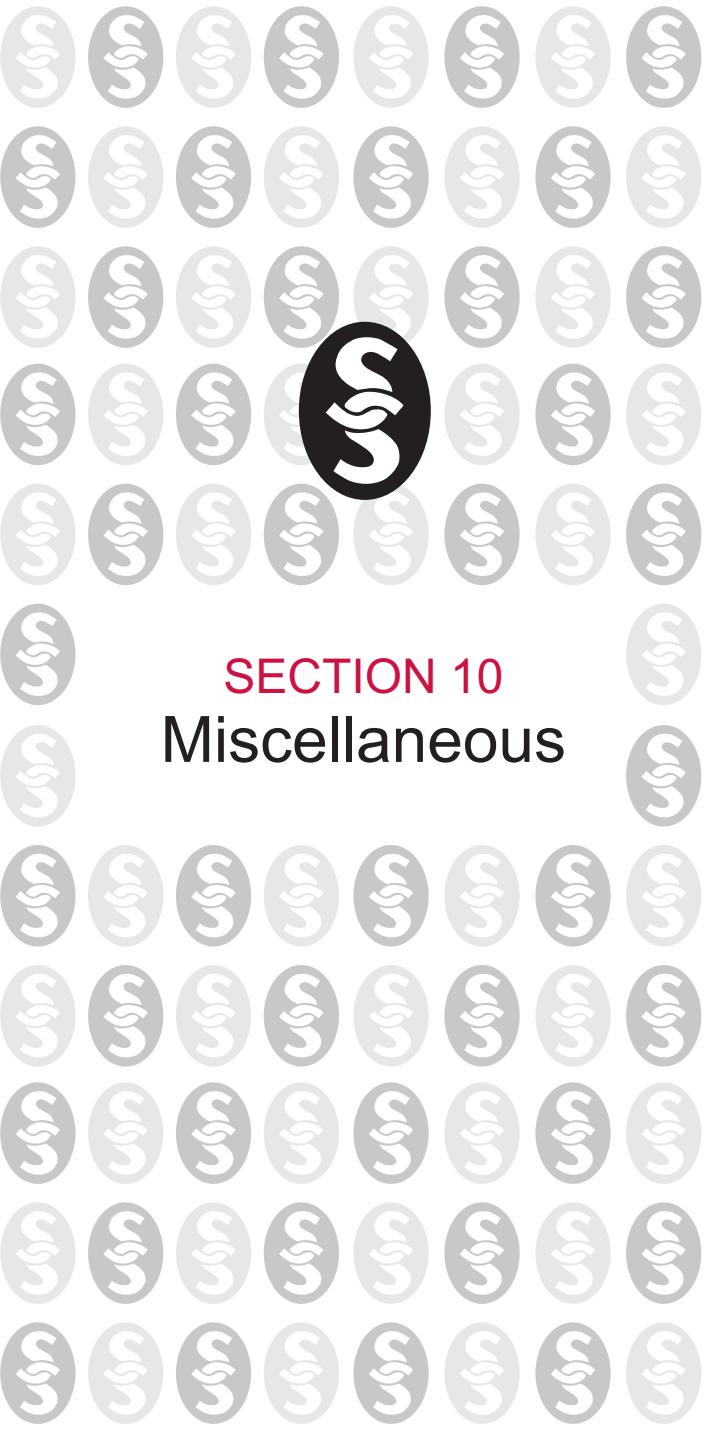
1-1/2	1.900	1.500	.200	1.256	X		
2-1/2	2.875	2.323	.276	2.650			X





# SECTION 10

## Miscellaneous





### Brass Rounds

ASTM B16 Alloy 360 and

ASTM B21 Alloy 464

Free Cutting, Stock Lengths 12 Ft.

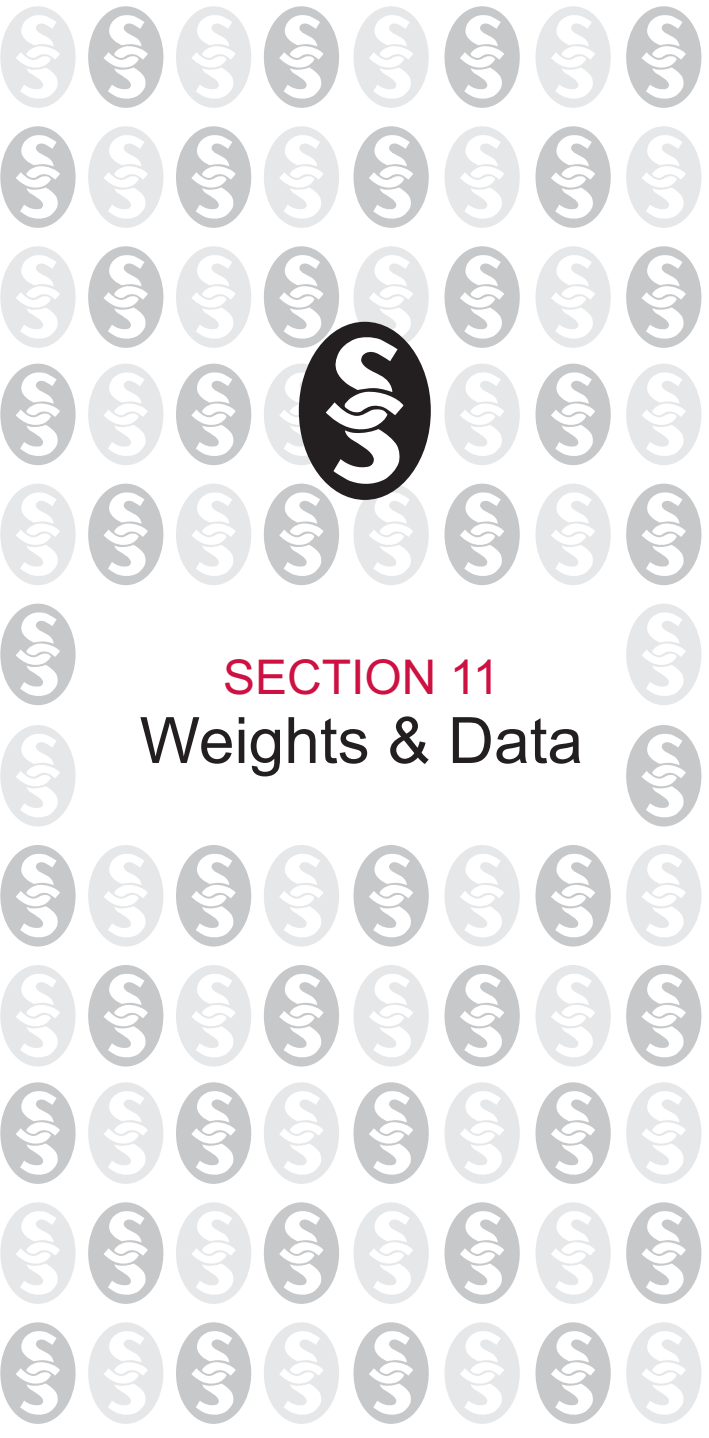
Size in Inches	Lbs. Per Ft.	Lbs. Per 12'
1/4	.1808	2.170
5/16	.2826	3.391
3/8	.4069	4.883
1/2	.7234	8.681
5/8	1.130	13.56
3/4	1.628	19.54
7/8	2.215	26.58
1	2.893	34.72
1 1/4	4.521	54.25
1 1/2	6.510	78.12
2	11.57	138.8





# SECTION 11

## Weights & Data



## Typical Mechanical Properties of Standard Steels

These properties are approximate and are listed here only as a guide to what may be expected from the grades given.

AISI or SAE No.	Condition	Tensile Strength KSI	Yield Strength KSI	Elong in 2" %	Reduction of Area %	Brinell
1008	HR	42/52	21/31	25/35	50/60	95/120
	CD	50/65	40/55	20/30	40/50	110/140
1018	HR	55/70	35/50	30/40	55/65	120/140
	CD	70/85	60/75	18/25	45/55	150/180
1020	HR	55/70	35/50	30/40	55/65	120/140
1045	HR	90/105	55/65	15/20	33/45	190/220
	CD	90/110	75/90	12/20	30/45	195/230
1095	HR	130/150	75/95	7/17	10/25	260/300
1117	HR	65/75	40/50	25/35	55/65	130/155
	CD	80/90	65/80	15/20	45/55	150/190

**Gage Decimals**

For accuracy, specify by decimal-not by gage

Non-Ferrous Brown & Sharp			Steel Sheets (Uncoated) Manufacturers Std.		GAGE NUMBER
WEIGHT Lbs. Per Sq. Ft. 1100 606 ALUMINUM	Gage Decimal	WEIGHT Lbs. Per Sq. Ft. Alloy 260 BRASS	Gage Decimal	WEIGHT Lbs. Per Sq. Ft. Sheet STEEL	
.5800					000000
.5165					00000
.4600					0000
.4096					000
.3648					00
.3249					0
.2893					1
.2576					2
.2294			.2391	10.11	3
.2043			.2242	9.375	4
.1819			.2092	8.750	5
2.286	.1620	7.185	.1943	8.125	6
2.036	.1443	6.400	.1793	7.500	7
1.813	.1285	5.699	.1644	6.875	8
1.614	.1144	5.074	.1495	6.250	9
1.438	.1019	4.520	.1345	5.625	10
1.280	.0907	4.023	.1196	5.000	11
1.140	.0808	3.584	.1046	4.375	12
1.016	.0720	3.193	.0897	3.750	13
.905	.0641	2.843	.0747	3.125	14
.806	.0571	2.532	.0673	2.813	15
.717	.0508	2.253	.0598	2.500	16
.639	.0453	2.009	.0538	2.250	17
.569	.0403	1.787	.0478	2.000	18
.507	.0359	1.592	.0418	1.750	19
.452	.0320	1.419	.0359	1.500	20
.402	.0285	1.264	.0329	1.375	21
.357	.0253	1.122	.0299	1.250	22
.319	.0226	1.002	.0269	1.125	23
.284	.0201	.892	.0239	1.000	24
.253	.0179	.794	.0209	.875	25
.224	.0159	.705	.0179	.750	26
.200	.0142	.630	.0164	.688	27
.178	.0126	.559	.0149	.625	28
.160	.0113	.501	.0135	.563	29
.141	.0100	.444	.0120	.500	30
.126	.0089	.395	.0105	.438	31
.113	.0080	.355	.0097	.406	32
.100	.0071	.315	.0090	.375	33
.089	.0063	.279	.0082	.344	34
	.0056	.248	.0075	.131	35
	.0050	.222	.0067	.281	36
	.0045	.200	.0064	.266	37
	.0040	.177	.0060	.250	38

## Gage Decimals

For accuracy, specify by decimal-not by gage

GAGE NUMBER	Strip & Tubing Birmingham or Stubs		Basic Steel Wire	
	Gage Decimal	WEIGHT Lbs. Per Sq. Ft. Steel STRIP	Gage Decimal	WEIGHT Lbs. Per Sq. Ft. Steel WIRE
000000			.4615	56.87
00000	.500	20.40	.4305	49.48
0000	.454	18.52	.3938	41.41
000	.425	17.34	.3625	35.09
00	.380	15.50	.3310	29.25
0	.340	13.87	.3065	25.08
1	.300	12.24	.2830	21.38
2	.284	11.59	.2625	18.40
3	.259	10.57	.2437	15.86
4	.238	9.710	.2253	13.55
5	.220	8.975	.2070	11.44
6	.203	8.281	.1920	9.84
7	.180	7.343	.1770	8.36
8	.165	6.731	.1620	7.01
9	.148	6.038	.1483	5.87
10	.134	5.467	.1350	4.87
11	.120	4.895	.1205	3.88
12	.109	4.447	.1055	2.97
13	.095	3.876	.0915	2.24
14	.083	3.386	.0800	1.71
15	.072	2.937	.0720	1.38
16	.065	2.652	.0625	1.04
17	.058	2.366	.0540	.78
18	.049	1.999	.0475	.60
19	.042	1.713	.0410	.45
20	.035	1.428	.0348	.32
21	.032	1.305	.0317	.27
22	.028	1.142	.0286	.22
23	.025	1.020	.0258	.18
24	.022	.898	.0230	.14
25	.020	.816	.0204	.11
26	.018	.734	.0181	.09
27	.016	.653	.0173	.08
28	.014	.571	.0162	.07
29	.013	.530	.0150	.06
30	.012	.490	.0140	.052
31	.010	.408	.0132	.047
32	.009	.367	.0128	.044
33	.008	.326	.0118	.037
34	.007	.286	.0104	.029
35	.005	.204	.0095	.024
36	.004	.163	.0090	.022
37			.0085	.019
38			.0080	.017

Dimensions and Weights for Plain End Pipe

Pipe Size In Nominal (Outside Diameter)	Weight Classification																																											
	STD		X.S.		X.X.S.		10		20		30		40		60		80		100		120		140		160																			
	Wall Wt.	Wt./Ft.	Wall Wt.	Wt./Ft.	Wall Wt.	Wt./Ft.	Wall Wt.	Wt./Ft.	Wall Wt.	Wt./Ft.	Wall Wt.	Wt./Ft.	Wall Wt.	Wt./Ft.	Wall Wt.	Wt./Ft.	Wall Wt.	Wt./Ft.	Wall Wt.	Wt./Ft.	Wall Wt.	Wt./Ft.	Wall Wt.	Wt./Ft.	Wall Wt.	Wt./Ft.	Wall Wt.	Wt./Ft.																
1/8 (0.405)	.068	.24	.095	.31	..	..	..	..	..	..	..	..	..	.068	.24	..	..	.095	.31	..	..	..	..	..	..	..	..	..																
1/4 (0.540)	.088	.42	.119	.54	..	..	..	..	..	..	..	..	..	.088	.42	..	..	.119	.54	..	..	..	..	..	..	..	..	..																
3/8 (0.675)	.091	.57	.126	.74	..	..	..	..	..	..	..	..	..	.091	.57	..	..	.126	.74	..	..	..	..	..	..	..	..	..																
1/2 (0.840)	.109	.85	.147	1.09	2.94	1.71	..	..	..	..	..	..	..	.109	.85	..	..	.147	1.09	..	..	..	..	..	..	..	..	.188	1.31															
3/4 (1.050)	.113	1.13	.154	1.47	.308	2.44	..	..	..	..	..	..	..	.113	1.13	..	..	.154	1.47	..	..	..	..	..	..	..	..	.219	1.94															
1 (1.315)	.133	1.68	.179	2.17	.358	3.66	..	..	..	..	..	..	..	.133	1.68	..	..	.179	2.17	..	..	..	..	..	..	..	..	.250	2.84															
1 1/4 (1.660)	.140	2.27	.191	3.00	.382	5.21	..	..	..	..	..	..	..	.140	2.27	..	..	.191	3.00	..	..	..	..	..	..	..	..	.250	3.76															
1 1/2 (1.900)	.145	2.72	.200	3.63	.400	6.41	..	..	..	..	..	..	..	.145	2.72	..	..	.200	3.63	..	..	..	..	..	..	..	..	.281	4.86															
2 (2.375)	.154	3.65	.218	5.02	.436	9.03	..	..	..	..	..	..	..	.154	3.65	..	..	.218	5.02	..	..	..	..	..	..	..	..	.344	7.45															
2 1/2 (2.875)	.203	5.79	.276	7.66	.552	13.69	..	..	..	..	..	..	..	.203	5.79	..	..	.276	7.66	..	..	..	..	..	..	..	..	.375	10.01															
3 (3.500)	.216	7.58	.300	10.25	.600	18.58	..	..	..	..	..	..	..	.216	7.58	..	..	.300	10.25	..	..	..	..	..	..	..	..	.438	14.32															
3 1/2 (4.000)	.226	9.11	.318	12.50	..	..	..	..	..	..	..	..	..	.226	9.11	..	..	.318	12.50	..	..	..	..	..	..	..	..	..	..															
4 (4.500)	.237	10.79	.337	14.98	.674	27.54	..	..	..	..	..	..	..	.237	10.79	..	..	.337	14.98	..	..	.438	19.00	..	..	..	..	.531	22.51															
5 (5.563)	.258	14.62	.375	20.78	.750	38.55	..	..	..	..	..	..	..	.258	14.62	..	..	.375	20.78	..	..	.500	27.04	..	..	..	..	.625	32.96															
6 (6.625)	.280	18.97	.432	28.57	.864	53.16	..	..	..	..	..	..	..	.280	18.97	..	..	.432	28.57	..	..	.562	36.39	..	..	..	..	.719	45.35															
8 (8.625)	.322	28.55	.500	43.39	.875	72.42	..	..	.250	22.36	.277	24.70	.322	28.55	.406	35.64	.500	43.39	.594	50.95	.719	60.71	.812	67.76	.906	74.69	1.000	104.13	1.125	115.64														
10 (10.750)	.365	40.48	.500	54.74	1.000	104.13	..	..	.250	28.04	.307	34.24	.365	40.48	.500	54.74	.594	64.43	.719	77.03	.844	89.29	1.000	104.13	1.125	115.64	1.250	139.67	1.312	160.27														
12 (12.750)	.375	49.56	.500	65.42	1.000	125.49	..	..	.250	33.38	.330	43.77	.406	53.52	.562	73.15	.688	88.63	.844	107.32	1.000	125.49	1.125	139.67	1.250	160.27	1.375	185.11	1.438	223.64	1.562	274.22	1.781	308.50										
14 (14.000)	.375	54.57	.500	72.09	..	..	.210	30.93	.312	45.61	.375	54.57	..	..	.594	85.05	.750	106.13	.938	130.85	1.094	150.79	1.250	170.21	1.406	189.11	1.562	245.25	1.688	298.58	1.812	367.39	1.938	483.12	2.062	645.42								
16 (16.000)	.375	62.58	.500	82.77	..	..	.250	42.05	.312	52.27	.375	62.58	.500	82.77	.656	107.50	.844	136.61	1.031	164.82	1.219	192.43	1.438	223.64	1.594	245.25	1.781	308.50	1.938	483.12	2.062	645.42	2.188	812.51	2.312	1041.3	2.438	1396.7						
18 (18.000)	.375	70.59	.500	93.45	..	..	.250	47.39	.312	58.94	.438	82.15	.562	104.67	.750	138.17	.938	170.92	1.156	207.96	1.375	244.14	1.562	274.22	1.781	308.50	1.938	483.12	2.062	645.42	2.188	812.51	2.312	1041.3	2.438	1396.7								
20 (20.000)	.375	78.60	.500	104.13	..	..	.250	52.73	.375	78.60	.500	104.13	.594	23.11	.812	166.40	1.031	208.87	1.281	256.10	1.500	296.37	1.750	341.09	1.969	379.17	2.188	545.06	2.312	745.01	2.438	1001.3	2.562	1396.7	2.688	1851.1	2.812	2452.5						
22 (22.000)	.375	86.61	.500	114.81	..	..	.250	58.07	.375	86.61	.500	114.81	..	..	.875	197.41	1.125	250.81	1.375	302.88	1.625	353.61	1.875	403.00	2.125	451.06	2.312	545.06	2.438	745.01	2.562	1001.3	2.688	1396.7	2.812	1851.1	2.938	2452.5						
24 (24.000)	.375	94.62	.500	125.49	..	..	.250	63.41	.375	94.62	.562	104.68	.688	171.29	.969	238.35	1.219	296.58	1.531	367.39	1.812	429.39	2.062	483.12	2.344	542.13	2.562	745.01	2.688	1001.3	2.812	1396.7	2.938	1851.1	3.062	2452.5	3.188	3085.0	3.312	3967.3	3.438	5001.3	3.562	6454.2

## Formula for Weights and Measures

**To find the circumference of a circle:**

Multiply the radius by 6.2832, or

Multiply the diameter by 3.1416, or

Multiply the square root of the area by 3.5449

**To find the radius of a circle:**

Multiply the diameter by .500, or

Multiply the circumference by .15915, or

Multiply the square root of the area by .56419

**To find the diameter of a circle:**

Multiply the radius by 2.000, or

Multiply the circumference by .31831, or

Multiply the square root of the area by 1.1284

**To find the area of a circle:**

Multiply the square of the radius by 3.1416, or

Multiply the square of the diameter by .7854, or

Multiply the square of the circumference by .07958

**To find the area of a hexagon:**

Multiply the square of the distance across by .86603, or

Multiply the area of the inscribed circle by 1.1027

**To find the area of an octagon:**

Multiply the square of the distance across by .82843, or

Multiply the area of the inscribed circle by 1.0548

**To find the area of a rectangle:**

Multiply the length by the width

**To find the area of a triangle:**

Multiply the base by one-half the perpendicular height

### Metric System Recommended Unit Prefixes

Multiples and Submultiples	Prefixes	Symbols
$10^6$	mega	m
$10^3$	kilo	k
$10^2$	hecto	h
10	deka	da
	meter/gram/liter	
$10^{-1}$	deci	d
$10^{-2}$	centi	c
$10^{-3}$	milli	m

length = meter(m)    weight = gram(g)    volume = liter(l)

### Conversion Factors

Centimeter = 0.0328084 foot; 0.393701 inch

Foot = 0.3048 meter

Gallon = 0.1336816 cubic foot; 231 cubic inches;  
0.0037854 cubic meter; 3.785306 liters

Gram = 0.00220462 pound

Inch = 2.54 centimeters

Kilogram = 2.204623 pounds

Kilometer = 0.621371 mile

Liter = 0.264179 gallon

Meter = 1.093613 yards; 3.280840 feet; 39.37008 inches

Mile = 1.609344 kilometers

Ounce = 28.349523 grams

Pound = 0.453592 kilogram

Square Centimeter = 0.155 square inch

Square Foot = 0.09290304 square meter

Square Inch = 645.16 square millimeters

Square Meter = 10.763910 square feet

Square Yard = 0.836127 square meter

Ton (Short) = 907.18474 kilograms

Yard = 0.9144 meter

## Decimal Equivalent Sheet Metal Gauges

(Nominal Gauge)

Gauge	United States Standard (Revised)	United States Standard	Brown and Sharpe	
	Cold Rolled Hot Rolled Steel Sheet	Stainless Steel	Aluminum Brass Bronze	Thickness Equivalent Galv. Sheet
30	.0120	.0125	.0100	.0157
29	.0135	.0140	.0113	.0172
28	.0149	.0156	.0126	.0187
27	.0164	.0171	.0142	.0202
26	.0179	.0187	.0159	.0217
25	.0209	.0218	.0179	.0247
24	.0239	.0250	.0201	.0276
23	.0269	.0281	.0226	.0306
22	.0299	.0312	.0253	.0336
21	.0329	.0343	.0285	.0366
20	.0359	.0375	.0320	.0396
19	.0418	.0437	.0359	.0456
18	.0478	.0500	.0403	.0516
17	.0538	.0562	.0453	.0575
16	.0598	.0625	.0508	.0635
15	.0673	.0703	.0571	.0710
14	.0747	.0781	.0641	.0785
13	.0897	.0937	.0720	.0934
12	.1046	.1093	.0808	.1084
11	.1196	.1250	.0907	.1233
10	.1345	.1406	.1019	.1382
7	.1793	.1875	.1443	
3	.2391	.2500	.2294	



## Fractional, Decimal and Metric

Parts of an Inch

Inches	Inches	Millimeters	Inches	Inches	Millimeters
1/64	= 0.015625	= 0.39687	33/64	= 0.515625	= 13.09676
1/32	= 0.031250	= 0.70374	17/32	= 0.531250	= 13.49363
3/64	= 0.046875	= 1.19061	35/64	= 0.546875	= 13.89050
1/16	= 0.062500	= 1.58749	9/16	= 0.562500	= 14.28737
5/64	= 0.078125	= 1.98436	37/64	= 0.578125	= 14.68424
3/32	= 0.093750	= 2.38123	19/32	= 0.593750	= 15.08111
7/64	= 0.109375	= 2.77810	39/64	= 0.609375	= 15.47798
1/8	= 0.125000	= 3.17497	5/8	= 0.625000	= 15.87486
9/64	= 0.140625	= 3.57184	41/64	= 0.640625	= 16.27173
5/32	= 0.156250	= 3.96871	21/32	= 0.656250	= 16.66860
11/64	= 0.171875	= 4.36559	43/64	= 0.671875	= 17.06547
3/16	= 0.187500	= 4.76246	11/16	= 0.687500	= 17.46234
13/64	= 0.203125	= 5.15933	45/64	= 0.703125	= 17.85921
7/32	= 0.218750	= 5.55620	23/32	= 0.718750	= 18.25608
15/64	= 0.234375	= 5.95307	47/64	= 0.734375	= 18.65296
1/4	= 0.250000	= 6.34994	3/4	= 0.750000	= 19.04983
17/64	= 0.265625	= 6.74681	49/64	= 0.765625	= 19.44670
9/32	= 0.281250	= 7.14369	25/32	= 0.781250	= 19.84357
19/64	= 0.296875	= 7.54056	51/64	= 0.796875	= 20.24044
5/16	= 0.312500	= 7.93743	13/16	= 0.812500	= 20.63731
21/64	= 0.328125	= 8.33430	53/64	= 0.828125	= 21.03418
11/32	= 0.343750	= 8.73117	27/32	= 0.843750	= 21.43106
23/64	= 0.359375	= 9.12804	55/64	= 0.859375	= 21.82793
3/8	= 0.375000	= 9.52491	7/8	= 0.875000	= 22.22480
25/64	= 0.390625	= 9.92179	57/64	= 0.890625	= 22.62167
13/32	= 0.406250	= 10.31866	29/32	= 0.906250	= 23.01854
27/64	= 0.421875	= 10.71553	59/64	= 0.921875	= 23.41541
7/16	= 0.437500	= 11.11240	15/16	= 0.937500	= 23.81228
29/64	= 0.453125	= 11.50927	61/64	= 0.953125	= 24.20916
15/32	= 0.468750	= 11.90614	31/32	= 0.968750	= 24.60603
31/64	= 0.484375	= 12.30301	63/64	= 0.984375	= 25.00290
1/2	= 0.500000	= 12.69989	1	= 1.000000	= 25.39977

## Decimal Inch Equivalents of Millimeters

Milli- meters	Dec. of an Inch	Milli- meters	Dec. of an Inch	Milli- meters	Dec. of an Inch
1	0.03937	10	0.39370	19	0.74803
2	0.07874	11	0.43307	20	0.78740
3	0.11811	12	0.47244	21	0.82677
4	0.15748	13	0.51181	22	0.86614
5	0.19685	14	0.55118	23	0.90551
6	0.23622	15	0.59055	24	0.94488
7	0.27559	16	0.62992	25	0.98425
8	0.31496	17	0.66929	25.4	1.00000
9	0.35433	18	0.70866		