



Carbon Resource Guide

WEIGHTS & TYPES

THE PARAGON STEEL PROMISE

To provide higher levels of quality and service to our customers while delivering any product, in any size or specification.

The Paragon Steel Promise began nearly three decades ago and remains at the core of our business today as we deliver quality metal products, in all sizes and specifications, to our valued and growing customer base. The industry has changed and companies have come and gone over the years, but Paragon Steel and our Promise have continued to hold strong. You'll see our full array of products on the pages of this Weight Book. If you can't find what you are looking for here, be sure to ask us about it. We consider it a privilege to find even the rarest of products when required by our customers.

Here's our story...

It was more than 42 years ago when I started my first automotive aftermarket business called Pace Setter Industries. It grew to become the largest muffler manufacturer west of the Mississippi. In addition to business concepts, the one thing I had to become knowledgeable with was steel. We had bought an incredible amount of tubing, aluminized steel and steel coils of all varieties. I found myself frustrated with the vendors on the supply side of steel distribution. To fulfill all of our processes, we needed more than a dozen different types of steel vendors. Since we ran a production line, getting just-in-time vendors was critical to our success.

After 16 years in business, I eventually sold my interest in the muffler company and joined Doug Carpenter, who was a close vendor and friend. Together, we formed Paragon Steel in 1988 in Long Beach. The lessons I learned in my prior business in meeting the needs of manufacturing became the blueprint for our new company. Our sole focus was to provide higher levels of quality and service to our customers. When customers would ask what we could provide, we would respond with, "Whatever you need." We broke the barrier of specialization. For years, steel distributors would only carry one type of commodity, such as structural shapes, or plates, or flat rolled or stainless and aluminum products. At Paragon Steel, we can provide any product, in any size or specification. Our boundaries are endless. There was a time when steel distributors dictated to their customers when deliveries could be made or how many pieces were in a bundle of steel. We looked at that as an old paradigm. Why not

provide delivery when the customer wanted it in the quantities they desired? It sounds simple today, but back in 1988, it was revolutionary thinking.

So now, some 27 years later, we are still evolving. Customer needs have certainly changed. Customers now have technology at their disposal to source online, send out requisitions via e-mail and do not require the face-to-face contact that used to be a fundamental part of developing relationships. As a vendor, it is much harder to foster those relationships, and we find that it is still a vital part of business. At Paragon Steel, we view ourselves as an extension of a customer's purchasing department. If we cannot provide value, then there really would be no reason for us to exist, let alone prosper.

So enough about the past...what about the future? We see a changing landscape. The continuing trend of mergers and consolidation with steel service centers will make companies like ours more unique and special. Bigger companies cannot shift in and out of markets as we can. They become too structured and bureaucratic to provide the levels of service that customers now demand. There is no going back on that. And even though communication has changed and markets have changed, and will continue to change, it still boils down to people doing business with people they can trust. We welcome the opportunity to earn yours.

Jim Stavis
President & CEO

Contents



Our focus and expertise in distribution and processing allow us to take care of all your metal needs—large or small, easy or hard-to-find and always with the higher level of quality and service our customers expect from us.

Bar Sized Shapes

Bar Sized Angles	5
Bar Sized Channels	6
Bar Sized Tees	7

Structural Shapes

Structural Angles	12
Structural Channels	15
Misc. Structural Channels	16
Wide Flange Beams	18
Standard (I) Beams	23
Miscellaneous Beams	24
H Pilings	24

Tubing Products

Ornamental Tubing	28
Square Structural Tubing	30
Rectangular Structural Tubing	31
Round H.R.E.W. Tubing (A513 T1)	34

Pipe Products

Pipe Dimensions & Weights	38
Extra Strong Pipe	38
Double Extra Strong Pipe	39
Light Wall Pipe ~ Bare Uncoated AWWA C-200	40

Plate Products

Hot Rolled ASTM-A36	43
Abrasion Resistant Steel Plates - Grade AR235	44
Abrasion Resistant Steel Plates	46
Medium Carbon Plates	49
High Tensile Plates	50
Pressure Vessel Quality Plate	51
Weights For Plate Products	52
Floor Plate	56

Sheet Products

Hot Rolled ASTM-A1011	61
High Tensile Sheet ASTM A607 Grade 50	62
Cold Rolled Sheet ASTM A1008	64
Weights For Hot & Cold Rolled Sheets	64
AISI Thickness Tolerance H.R. & C.R. Sheet	66
Flat Galvanized Sheet ASTM-A653, G90	67
AISI Thickness For Galv. Sheet	68
Paintable Galvanized Sheet ASTM-A653, G40	68
Weights for Galvanized Sheets	69

Hot Rolled Bar Products

Commercial Quality	72
ASTM-A36	72

Hot Rolled Bar Products (Continued)

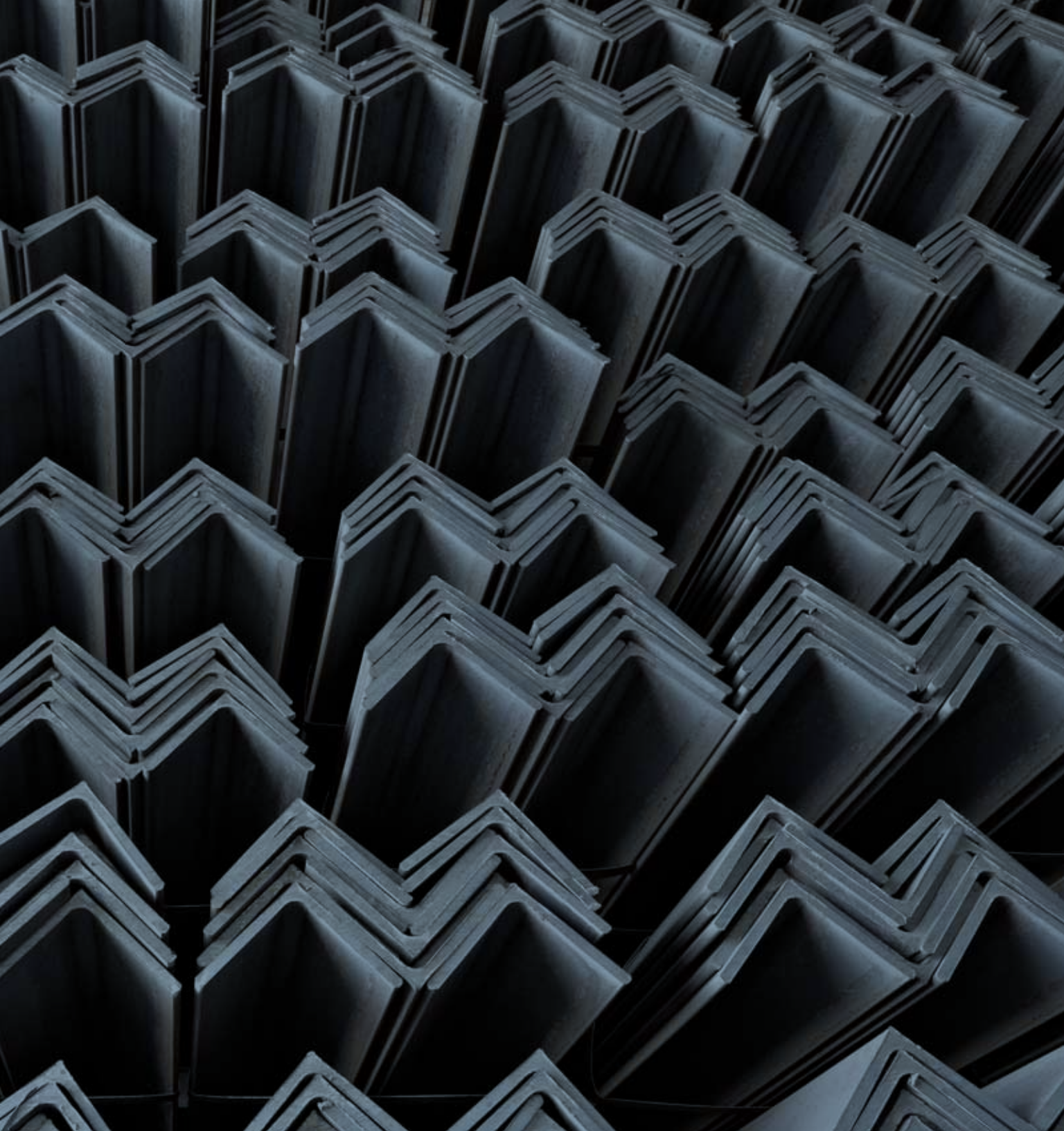
ASTM-A529	74
ASTM-A572 Grade 50	75
C-1040 Hot Rolled Rounds	75
Hot Rolled Medium Carbon C-1055 Bars	77
Hot Rolled Strip	78
Hot Rolled Flats	79
Universal Mill Plates	82
Weights For UM Plates	83
Hot Rolled Squares	84
Hot Rolled Rounds	84
Concrete Reinforcing Bars Weights & Dimensions	85

Expanded Metal & Grating Products

Expanded Metal – Raised	89
Expanded Metal – Flattened	90
Expanded Metal – Grating	90
Expanded Metal Terminology	91
Welded Bar Grating Products	92
Bar Grating Load Table	94

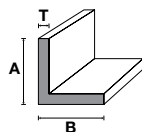
The background of the image is a dense, repeating pattern of stacked steel angles, likely L-shaped or channel sections, arranged in a way that creates a strong sense of depth and texture. The lighting is dramatic, with highlights on the edges of the metal pieces, giving them a three-dimensional appearance. The overall color palette is a range of blues, from deep navy to a slightly lighter, almost white, blue where the highlights are.

BAR SIZED SHAPES



Bar Sized Shapes

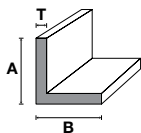
Bar Sized Shapes are those whose greatest dimension is less than three inches, not including length. Most bar sized shapes are made to ASTM A-36. (For information on ASTM A-36, see the section on Structural Shapes.)



Bar Sized Angles

Size						Weight per Foot	Weight Per 20' Bar
A		B		T			
1/2	x	1/2	x	1/8		.380	7.60
5/8	x	5/8	x	1/8		.480	9.60
3/4	x	3/4	x	1/8		.591	11.82
7/8	x	7/8	x	1/8		.701	14.02
1	x	1	x	1/8		.801	16.02
				3/16		1.161	23.22
				1/4		1.491	29.82
1 ¼	x	1 ¼	x	1/8		1.011	20.22
				3/16		1.481	29.62
				1/4		1.922	38.44
1 ½	x	1 ½	x	1/8		1.231	24.62
				3/16		1.802	36.04
				1/4		2.342	46.84
				5/16		2.863	57.26
				3/8		3.353	67.06
1 ¾	x	1 ¾	x	1/8		1.441	28.82
				3/16		2.122	42.44
				1/4		2.773	55.46
2	x	1 ½	x	1/8		1.441	28.82
				3/16		2.122	42.44
				1/4		2.773	55.46
2	x	2	x	1/8		1.652	33.04
				3/16		2.442	48.84
				1/4		3.193	63.86

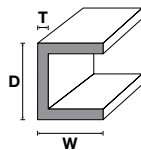
Bar Sized Angles (Continued)



Size						
A		B		T	Weight per Foot	Weight Per 20' Bar
				3/16	3.924	78.48
				3/8	4.704	94.08
2 ½	x	1 ½	x	3/16	2.442	48.84
				1/4	3.193	63.86
2 ½	x	2	x	3/16	2.753	55.06
				1/4	3.623	72.46
				5/16	4.504	90.08
				3/8	5.305	106.10
2 ½	x	2 ½	x	3/16	3.073	61.46
				1/4	4.104	82.08
				5/16	5.005	100.10
				3/8	5.906	118.12
				1/2	7.707	154.14

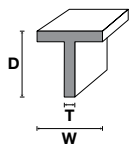
Many bar sized shapes are also available in 30' & 40' lengths.

Bar Sized Channels



Size						
D		W		T	Weight Per Foot	Weight Per 20' Bar
3/4	x	3/8	x	1/8	.56	11.20
1	x	3/8	x	1/8	.68	13.60
1	x	1/2	x	1/8	.82	16.40
1 ¼	x	1/2	x	1/8	1.01	20.20
1 ½	x	1/2	x	1/8	1.12	22.40
1 ½	x	9/16	x	3/16	1.44	28.80
1 ½	x	3/4	x	1/8	1.17	23.40
2	x	1/2	x	1/8	1.43	28.60
2	x	9/16	x	3/16	1.86	37.20
2	x	1	x	1/8	1.59	31.80
2	x	1	x	3/16	2.32	46.40
2 ½	x	5/8	x	3/16	2.27	45.40

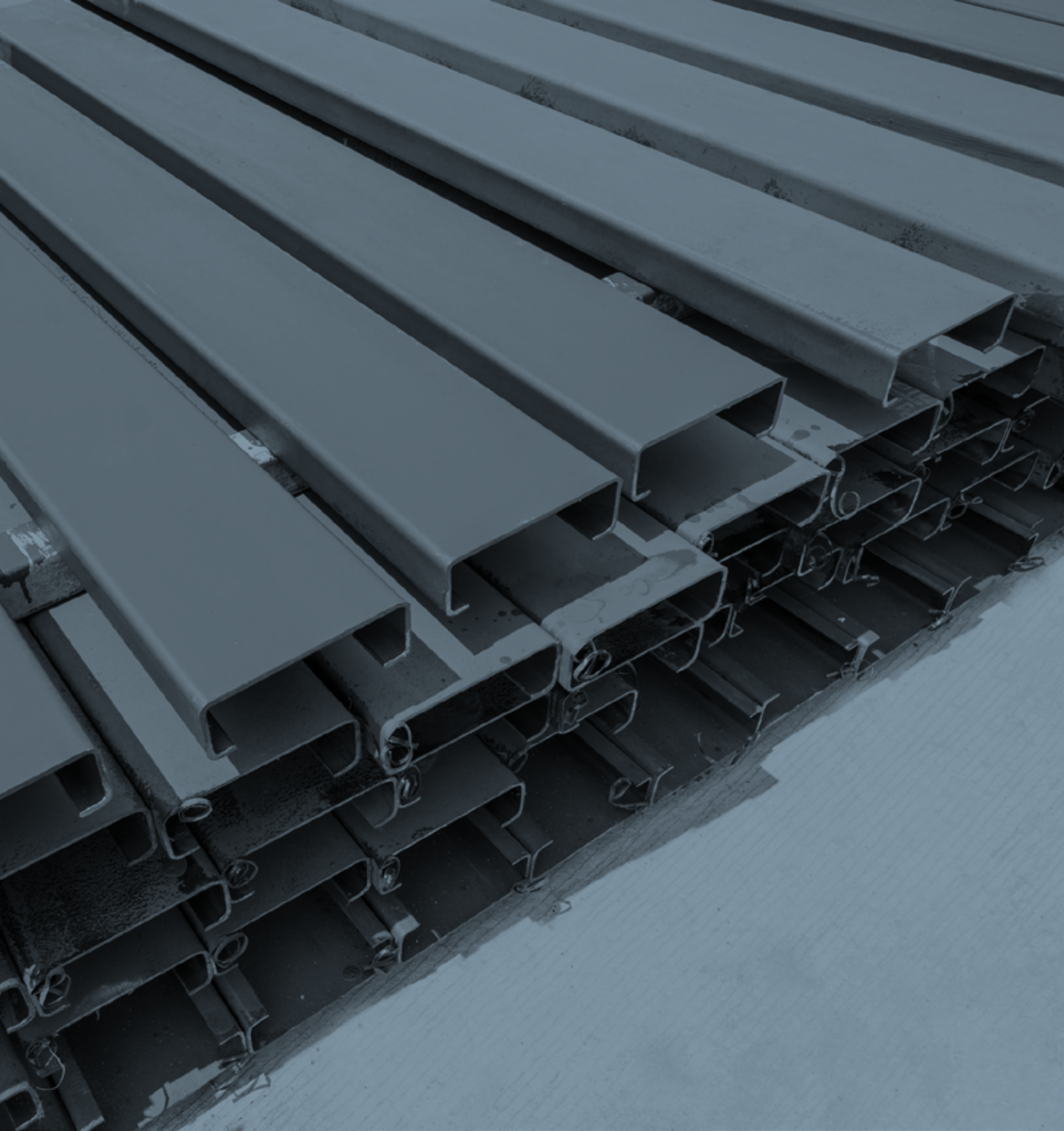
Bar Sized Tees



Size						
D		W		T	Weight Per Foot	Weight Per 20' Bar
3/4	x	3/4	x	1/8	.620	12.24
1	x	1	x	1/8	.851	17.02
1 ¼	x	1 ¼	x	1/8	1.091	21.82
				3/16	1.551	31.02
1 ½	x	1 ½	x	3/16	1.902	38.04
				1/4	2.432	48.64
1 ¾	x	1 ¾	x	3/16	2.262	45.24
2	x	2	x	1/4	3.563	71.26
				5/16	4.304	86.06
2 ½	x	2 ½	x	1/4	4.604	92.08
				5/16	5.505	110.10
				3/8	6.406	128.12



STRUCTURAL SHAPES



Structural Shapes

Structural shapes are those whose greatest dimension, not including length, is three inches or greater.

Applications

ASTM A36 is utilized in riveted, bolted or welded construction in a wide variety of products such as bridges and buildings.

ASTM A572 Grade 50 (high strength, low alloy) structurals are intended for use in riveted or welded fabrication of bridges, buildings and other critical structures where greater strength is required. High strength, low alloy shapes provide excellent strength to weight ratios and in some cases improves resistance to atmospheric corrosion.

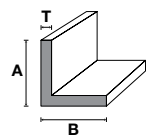
ASTM A992 wide flange beams are dual specification meeting the requirements of ASTM A36 and of ASTM A572 Grade 50.

Weldability

When any grade of steel is used in welded construction, procedures must be suitable for the steel and the intended service.

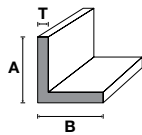
ASTM A36 steel presents no welding problems when using all welding processes. The quality of the welds is generally extremely high for both welds and joints. Welding rod specifications are dependent on welding condition such as the thickness of the sections to be welded, service requirements and design. High strength, low alloy grades such as A572 Grade 50 are weldable with welding techniques suitable for the grade and intended service application.

Structural Angles



Size						
A		B		T	Weight Per Foot	Weigth Per 40' Bar
3	x	2	x	3/16	3.073	122.92
				1/4	4.104	164.16
				5/16	5.005	200.20
				3/8	5.906	236.24
				1/2	7.707	308.28
3	x	2 ½	x	3/16	3.393	135.72
				1/4	4.504	180.16
				5/16	5.605	224.20
				3/8	6.606	264.24
				1/2	8.508	340.32
3	x	3	x	3/16	3.714	148.56
				1/4	4.905	196.20
				5/16	6.106	244.24
				3/8	7.207	288.28
				1/2	9.409	376.36
3 ½		2 ½	x	3/16	3.393	135.72
				1/4	4.905	196.20
				5/16	6.106	244.24
				3/8	7.207	288.28
				1/2	9.409	376.36
3 ½	x	3	x	1/4	5.405	216.20
				5/16	6.606	264.24
				3/8	7.907	316.28
				1/2	10.210	408.40
3 ½	x	3 ½	x	1/4	5.805	232.20
				5/16	7.207	288.28
				3/8	8.805	340.32
				1/2	11.110	444.40
4	x	3	x	1/4	5.805	232.20
				5/16	7.207	288.28
				3/8	8.508	340.32

Structural Angles (Continued)



Size					Weight Per Foot	Weighth Per 40' Bar
A		B		T		
				1/2	11.110	444.40
				5/8	13.613	544.52
4	x	3 1/2	x	1/4	6.206	248.24
				5/16	7.707	308.28
				3/8	9.109	364.36
				1/2	11.911	476.44
4	x	4	x	1/4	6.606	264.24
				5/16	8.208	328.32
				3/8	9.809	392.36
				1/2	12.812	512.48
				5/8	15.715	628.60
				3/4	18.517	740.68
5	x	3	x	1/4	6.606	264.24
				5/16	8.208	328.32
				3/8	9.809	392.36
				1/2	12.812	512.48
				5/8	15.715	628.60
5	x	3 1/2	x	1/4	7.007	280.28
				5/16	8.708	348.32
				3/8	10.410	416.40
				1/2	13.613	544.52
				5/8	16.816	672.64
				3/4	19.810	792.76
5	x	5	x	5/16	10.310	412.40
				3/8	12.312	492.48
				7/16	14.313	572.52
				1/2	16.215	648.60
				5/8	20.019	800.76
				3/4	23.622	944.88
6	x	3 1/2	x	1/4	7.907	316.28
				5/16	9.809	392.36

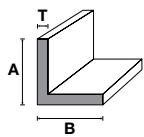
Please Note: Most Structural Angles are stocked in 20', 30' and 40' lengths.

Structural Angles (Continued)

Size						
D		W		T	Weight Per Foot	Weight Per 40' Bar
6	x	3 1/2	x	3/8	11.711	468.44
				1/2	15.314	612.56
				5/8	19.018	760.72
6	x	4	x	5/16	10.310	412.40
				3/8	12.312	492.48
				7/16	14.313	572.52
				1/2	16.215	648.60
				5/8	20.019	800.76
				3/4	23.622	944.88
6	x	6	x	1/4	9.989	399.56
				5/16	12.512	500.48
				3/8	14.914	596.56
				7/16	17.216	688.64
				1/2	19.618	784.72
				5/8	24.223	968.92
				3/4	28.727	1149.08
7	x	4	x	1	37.435	1497.40
				3/8	13.613	544.52
				7/16	15.815	632.60
				1/2	17.917	716.68
				5/8	22.121	884.84
8	x	4	x	3/4	26.225	1049.00
				1/2	19.618	784.72
				3/4	28.727	1149.08
				1	37.435	1497.40
8	x	6	x	1/2	23.022	920.88
				5/8	28.527	1141.08
				3/4	33.832	1353.28
				1	44.242	1769.68
8	x	8	x	1/2	26.425	1057.00
				5/8	32.731	1309.24

Please Note: Most Structural Angles are stocked in 20', 30' and 40' lengths.

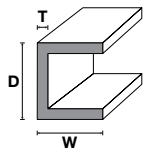
Structural Angles (Continued)



Size					
D		W		T	Weight Per Foot
				3/4	1557.48
				1	2041.92
9	x	4	x	1/2	852.80
				3/4	1252.00

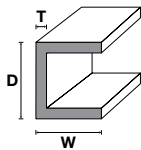
Please Note: Most Structural Angles are stocked in 20', 30', and 40' lengths.

Structural Channels



Size				
D	Lbs./ Foot	W	T	Weight Per 40' Bar
3	3.5	1.375	.135	140
	4.1	1.410	.170	164
	5.0	1.498	.258	200
	6.0	1.596	.356	240
4	4.5	1.560	.140	180
	5.4	1.580	.180	216
	6.25	1.647	.247	250
	7.25	1.720	.320	290
5	6.7	1.750	.190	268
	9.0	1.885	.325	360
	10.5	2.034	.314	420
6	8.2	1.920	.200	328
	10.5	2.034	.314	420
	13.0	2.157	.437	520
	14.75	2.299	.419	590
7	9.8	2.090	.210	392
	12.25	2.194	.314	490
	14.75	2.299	.419	590
	18.75	2.527	.487	750
8	11.50	2.260	.220	460
9	13.4	2.430	.230	536

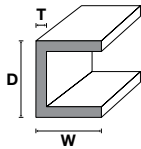
Structural Channels (Continued)



Size				
D	Lbs./ Foot	W	T	Weight Per 40' Bar
9	15.0	2.485	.285	600
	20.0	2.648	.448	800
10	15.3	2.600	.240	612
	20.0	2.739	.379	800
	25.0	2.886	.526	1000
	30.0	3.033	.673	1200
12	20.7	2.940	.280	828
	25.0	3.047	.387	1000
	30.0	3.107	.510	1200
15	33.9	3.400	.400	1356
	40.0	3.520	.520	1600
	50.0	3.716	.716	2000

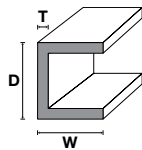
Please Note: Most Structural Channels are available in 20', 30', 40', 50' and 60' lengths.

Misc. Structural Channels



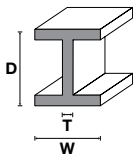
Size				
D	Lbs./ Foot	W	T	Weight Per 40' Bar
3	7.1	1.938	.312	284
4	13.8	2.500	.500	552
6	6.5	1.875	.125	260
	7.0	1.875	.188	280
	12.0	2.500	.313	480
	15.1	2.940	.313	604
	15.3	3.500	.340	612
	16.3	3.000	.375	652
	18.0	3.500	.375	720
7	19.1	3.450	.350	764
	22.7	3.603	.503	908

Misc. Structural Channels (Continued)



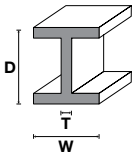
Size				
D	Lbs./ Foot	W	T	Weight Per 40' Bar
8	6.6	1.750	.125	264
	8.5	1.875	.188	340
	18.7	2.978	.353	748
	20.0	3.025	.400	800
	21.4	3.450	.375	856
	22.8	3.500	.425	912
10	6.5	1.125	.150	260
	8.4	1.500	.170	336
	22.0	3.315	.290	880
	25.0	3.405	.380	1000
	28.5	3.950	.425	1140
	33.6	4.100	.575	1244
12	41.1	4.321	.796	1644
	10.6	1.500	.190	424
	31.0	3.670	.370	1240
	35.0	3.767	.467	1400
	40.0	3.890	.590	1600
	45.0	4.012	.712	1800
13	50.0	4.135	.835	2000
	31.8	4.000	.375	1272
	50.0	4.412	.787	2000
18	42.7	3.950	.450	1708
	45.8	4.000	.500	1832
	51.9	4.100	.600	2076
	58.0	4.200	.700	2320

Wide Flange Beams



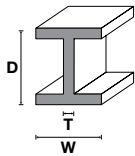
Size						Size				
Lbs/Ft			D	W	T	Lbs/F		D	W	T
4	x	13	4.16	4.060	.280		45	10.10	8.020	.350
5	x	16	5.01	5.000	.240	10	x	49	9.98	10.000
		19	5.15	5.030	.270		54	10.09	10.030	.370
6	x	9	5.90	3.940	.170		60	10.22	10.080	.420
		12	6.03	4.000	.230		68	10.40	10.130	.470
		16	6.28	4.030	.260		77	10.60	10.190	.530
6	x	15	5.99	5.990	.230		88	10.84	10.265	.605
		20	6.20	6.020	.260		100	11.10	10.340	.680
		25	6.38	6.080	.320	10	x	112	11.36	10.415
8	x	10	7.89	3.940	.180	12	x	14	11.91	3.970
		13	7.99	4.000	.240		16	11.99	3.990	.220
		15	8.12	4.015	.250		19	12.16	4.0005	.235
8	x	18	8.14	5.250	.230		22	12.31	4.030	.260
		21	8.28	5.270	.250	12	x	26	12.22	6.490
8	x	24	7.93	6.495	.245		30	12.34	6.520	.260
		28	8.06	6.535	.285		35	12.50	6.560	.300
8	x	31	8.00	7.995	.285	12	x	40	11.94	8.005
		35	8.12	8.020	.310		45	12.06	8.045	.335
		40	8.25	8.070	.360		50	12.19	8.080	.370
		48	8.50	8.110	.400	12	x	53	12.06	9.995
		58	8.75	8.220	.510		58	12.19	10.010	.360
		67	9.00	8.280	.570	12	x	65	12.12	12.000
10	x	12	9.87	3.960	.190		72	12.25	12.040	.430
		15	9.99	4.000	.230		79	12.38	12.080	.470
		17	10.11	4.010	.240		87	12.53	12.125	.515
		19	10.24	4.020	.250		96	12.71	12.160	.550
10	x	22	10.17	5.750	.240		106	12.89	12.220	.610
		26	10.33	5.770	.260		120	13.12	12.320	.710
		30	10.47	5.810	.300		136	13.41	12.400	.790
10	x	33	9.73	7.960	.290		152	13.71	12.480	.870
		39	9.92	7.985	.315		170	14.03	12.570	.960

Wide Flange Beams (Continued)



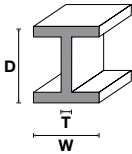
Size					Size						
Lbs/Ft		D	W	T	Lbs/F		D	W	T		
190		14.38	12.670	1.060	283		16.74	16.110	1.290		
210		14.71	12.790	1.180	311		17.12	16.230	1.410		
230		15.05	12.895	1.285	342		17.54	16.360	1.540		
12	x	252	15.41	13.005	1.395	370		17.92	16.475	1.655	
279		15.85	13.140	1.530	398		18.29	16.590	1.770		
305		16.32	13.235	1.625	426		18.67	16.695	1.875		
336		16.82	13.385	1.775	455		19.02	16.835	2.015		
14	x	22	13.74	5.000	.230	14	x	500	19.60	17.010	2.190
26		13.91	5.025	.255	550		20.24	17.200	2.380		
14	x	30	13.84	6.730	.270	605		20.92	17.415	2.595	
34		13.98	6.745	.285	665		21.64	17.650	2.830		
38		14.10	6.770	.310	730		22.42	17.890	3.070		
14	x	43	13.66	7.995	.305	16	x	26	15.69	5.525	.275
48		13.79	8.030	.340	31		15.88	5.500	.250		
53		13.92	8.060	.370	16	x	36	15.86	6.985	.295	
14	x	61	13.89	9.995	.375	40		16.01	6.995	.305	
68		14.04	10.035	.415	45		16.13	7.035	.345		
74		14.17	10.070	.450	50		16.26	7.070	.380		
82		14.31	10.130	.510	57		16.43	7.120	.430		
14	x	90	14.02	14.520	.440	16	x	67	16.35	10.235	.395
99		14.16	14.565	.485	77		16.52	10.295	.455		
109		14.32	14.605	.525	89		16.75	10.365	.525		
120		14.48	14.670	.590	100		16.97	10.425	.585		
132		14.66	14.725	.645	35		17.70	6.000	.300		
14	x	145	14.78	15.500	.680	18	x	40	17.90	6.015	.315
159		14.98	15.565	.745	46		18.06	6.060	.360		
176		15.22	15.650	.830	18	x	50	17.99	7.495	.355	
193		15.48	15.710	.890	55		18.11	7.530	.390		
211		15.72	15.800	.980	60		18.24	7.555	.415		
14	x	233	16.04	15.890	1.070	65		18.35	7.590	.450	
257		16.38	15.995	1.175	71		18.47	7.635	.495		

Wide Flange Beams (Continued)



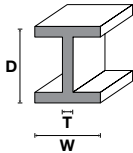
Size						Size					
Lbs/Ft			D	W	T	Lbs/F			D	W	T
18	x	76	18.21	11.035	.425	223			23.35	12.675	1.000
		86	18.39	11.090	.480	21	x	248	23.74	12.775	1.100
		97	18.59	11.145	.535	275			24.13	12.890	1.220
		106	18.73	11.200	.590	300			24.53	12.990	1.320
18	x	119	18.97	11.265	.655	333			25.00	13.130	1.460
		130	19.25	11.160	.670	364			25.47	13.265	1.590
		143	19.49	11.220	.730	402			26.02	13.405	1.730
		185	19.72	11.300	.810	24	x	55	23.57	7.005	.395
		175	20.04	11.375	.890	62			23.74	7.040	.430
		192	20.35	11.455	.960	68			23.73	8.965	.415
		211	20.67	11.555	1.060	76			23.92	8.990	.440
		234	21.06	11.650	1.160	24	x	84	24.10	9.020	.470
		258	21.46	11.770	1.280	94			24.31	9.065	.515
		283	21.85	11.890	1.400	103			24.53	9.000	.550
		311	22.32	12.005	1.520	24	x	104	24.06	12.750	.500
21	x	44	20.66	6.500	.405	117			24.26	12.800	.550
		50	20.83	6.530	.380	131			24.48	12.855	.605
		57	21.06	6.555	.350	146			24.74	12.900	.650
21	x	62	20.99	8.240	.400	162			25.00	12.955	.705
		68	21.13	8.270	.430	176			25.24	12.890	.750
		73	21.24	8.295	.455	24	x	192	25.47	12.950	.810
		83	21.43	8.355	.515	207			25.71	13.010	.870
		93	21.62	8.420	.580	229			26.02	13.110	.960
21	x	101	21.36	12.290	.500	250			26.34	13.185	1.040
		111	21.51	12.340	.550	279			26.73	13.305	1.160
		122	21.68	12.390	.600	306			27.13	13.405	1.260
		132	21.85	12.440	.650	335			27.52	13.520	1.380
		147	22.06	12.510	.720	370			27.99	13.660	1.520
		166	22.48	12.420	.750	408			28.54	13.800	1.650
		182	22.72	12.500	.830	450			29.09	13.955	1.810
		201	23.03	12.575	.910	492			29.65	14.115	1.970

Wide Flange Beams (Continued)



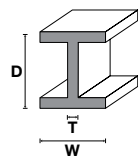
Size						Size							
Lbs/Ft			D	W	T	Lbs/Ft			D	W	T		
27	x	84	26.71	9.960	.460			261	31.61	15.155	.930		
		94	26.92	9.990	.490			292	32.01	15.255	1.020		
		102	27.09	10.015	.515			326	32.40	15.370	1.140		
		114	27.29	10.070	.570			357	32.80	15.470	1.240		
		129	27.63	10.010	.610			391	33.19	15.590	1.360		
		146	27.38	13.965	.605			433	33.66	15.725	1.500		
		161	27.59	14.020	.660			477	34.21	15.865	1.630		
		178	27.81	14.085	.725			526	34.76	16.020	1.790		
		194	28.11	14.035	.750			581	35.39	16.200	1.970		
27	x	217	28.43	14.115	.830	33	x	118	32.86	11.480	.550		
		235	28.66	14.190	.910					130	33.09	11.510	.580
		258	28.96	14.270	.980			33	x	141	33.30	11.535	.605
		281	29.29	14.350	1.060					152	33.49	11.565	.635
		307	29.61	14.445	1.160					169	33.82	11.500	.670
		336	30.00	14.545	1.260			201	33.68	15.745	.715		
		368	30.39	14.665	1.380			221	33.96	15.805	.775		
		407	30.87	14.800	1.520			241	34.18	15.860	.830		
		448	31.42	14.940	1.650	33	x	263	34.53	15.805	.870		
494	31.97	15.095	1.810					291	34.84	15.905	.960		
539	32.52	15.260	1.970					318	35.16	15.985	1.040		
30	x	90	29.53	10.400	.470			354	35.55	16.100	1.160		
		99	29.65	10.450	.520			387	35.95	16.200	1.260		
		108	29.83	10.475	.545			424	36.34	16.315	1.380		
		116	30.01	10.495	.565			468	36.81	16.455	1.520		
		124	30.17	10.515	.585			515	37.36	16.590	1.650		
		132	30.31	10.545	.615			567	37.91	16.750	1.810		
		148	30.67	10.480	.650			619	38.47	16.910	1.970		
		30	x	173	30.44	14.985	.655	36	x	135	35.55	11.95	.600
				191	30.68	15.040	.710					150	35.85
211	30.94			15.105	.755					160	36.01	12.00	.650
235	31.30			15.055	.830					170	36.17	12.030	.680

Wide Flange Beams (Continued)



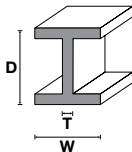
Size					Size			
Lbs/Ft		D	W	T	Lbs/Ft	D	W	T
36	x	182	36.33	12.075		396	41.65	12.380
		194	36.49	12.115		437	42.13	12.520
		210	36.69	12.180		475	42.60	12.660
		232	37.12	12.120	40	x	520	43.15
		256	37.43	12.215		561	43.62	12.930
		230	35.90	16.470		174	38.20	15.750
		245	36.08	16.510		199	38.67	15.750
		260	36.26	16.550		215	38.98	15.750
		280	36.52	16.595		249	39.38	15.750
		300	36.74	16.655		277	39.69	15.830
		328	37.09	16.630		297	39.84	15.825
		359	37.40	16.730	40	x	324	40.16
		393	37.80	16.830		362	40.55	16.020
		439	38.26	16.965		397	40.95	16.120
		485	38.74	17.105		436	41.34	16.24
		527	39.21	17.220		480	41.81	16.36
		588	39.84	17.400	40	x	531	42.34
		650	40.47	17.575		593	42.99	16.69
		720	41.19	17.775		655	43.62	16.87
		798	41.97	17.990	40	x	192	38.20
40	x	848	42.45	18.130		221	38.67	17.71
		149	38.20	11.81		244	39.06	17.71
		167	38.59	11.81		268	39.37	17.75
		183	38.98	11.81		298	39.69	17.83
		211	39.37	11.81		360	40.00	17.91
		235	39.69	11.89	44	x	198	42.91
		264	40.00	11.93		224	43.31	11.81
		294	40.39	12.025		248	43.62	11.81
		327	40.79	12.145		285	44.02	11.81
		359	41.18	12.260				

Standard (I) Beams



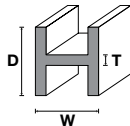
Size				
D	Lbs./Foot	W	T	Weight Per 40' Bar
3	5.70	2.330	.170	228
	7.50	2.509	.349	300
4	7.70	2.660	.190	308
	9.50	2.796	.326	380
5	10.00	3.000	.210	400
	14.75	3.284	.494	590
6	12.50	3.330	.230	500
	17.25	3.565	.465	690
7	15.30	3.660	.250	612
	20.00	3.860	.450	800
8	18.40	4.000	.270	736
	23.00	4.171	.441	920
10	25.40	4.660	.310	1016
	35.00	4.944	.594	1400
12	31.80	5.000	.350	1272
	35.00	5.078	.428	1400
	40.80	5.250	.460	1632
	50.00	5.477	.687	2000
15	42.90	5.500	.410	1716
	50.00	5.640	.550	2000
18	54.70	6.000	.460	2188
	70.00	6.251	.711	2800
20	66.00	6.255	.505	2640
	75.00	6.391	.635	3000
	86.00	7.060	.660	3440
	96.00	7.200	.800	3840
24	80.00	7.000	.500	3200
	90.00	7.125	.625	3600
	100.00	7.245	.745	4000

Miscellaneous Beams



Size				
D	Lbs./Foot	W	T	Weight Per 40' Bar
4	3.2	2.25	.092	128
4	3.45	2.25	.112	138
4	4.08	2.25	.115	163
5	18.9	5.003	.316	756
6	4.4	1.844	.114	176
8	6.5	2.281	.135	260
10	7.5	2.688	.130	300
10	8.0	2.690	.141	320
10	9.0	2.690	.157	360
12	10.8	3.065	.160	432
12	11.8	3.065	.177	472

H Pilings



Size				
D	Lbs./Foot	W	T	Wiegth Per 40' Bar
8	36.0	8.155	.445	1440
10	42.0	10.075	.415	1680
10	57.0	10.225	.565	2280
12	53.0	12.045	.435	2120
12	63.0	12.125	.515	2520
13	60.0	12.900	.460	2400
13	73.0	13.005	.565	2920
14	73.0	14.585	.505	2920
14	89.0	14.695	.615	3560



TUBING PRODUCTS



Tubing Products

The steel for square and rectangular structural tubing is made by a basic steelmaking process. The flat strip is cold formed into the final shape and electric resistance welded. Square and rectangular structural tubing is manufactured to the chemical and mechanical requirements of ASTM A-500 Grade A, ASTM A-500 Grade B or ASTM A-500 Grade C. Some ornamental sizes of square and rectangular tubing are made to the chemical requirements of ASTM A-513.

Analysis (Ladle)

	Carbon	Phophorus	Sulphur	Manganese
A-500 A/B	.26 Max.	.04 Max.	.05 Max.	-----
A-500 C	.23 Max.	.035 Max.	.035 Max.	1.35 Max.
A-513	.15-.25	.035 Max.	.035 Max.	.30-.60

Applications

Hollow Structural Tubing offers maximum strength and compactness with low cost design features for general building construction. These carbon steel square and rectangular section can be used as columns, posts or spandrel beams, and in complete load bearing panels, window walls and entry structures.

Mechanical Properties

	Tensile Strength (P.S.I.)	Yield Point (P.S.I.)	Elongation Precent in 2"
Grade A	45,000 Min.	39,000 Min.	25 Min.
Grade B	58,000 Min.	46,000 Min.	23 Min.
Grade C	62,000 Min.	50,000 Min.	21 Min.
A-513	N.A.	N.A.	N.A.

Workability & Weldability

Hollow Structural Tubing can be subjected to the usual fabricating operations. The ductility of tubing products is good. It bends well, flattens, cuts, punches, flares and flanges easily and can be welded by the commonly employed techniques and practices.

Availability of Lengths

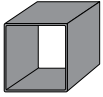
Ornamental Tubing is generally available in 20' and 24' lengths. Structural Tubing is generally available in 20', 24', 30', 32', 34', 40' and 48' lengths. Call for availability of particular sizes and lengths.

Ornamental Tubing



Outside Dims.				Wall Thickness	Wt./ Foot	Outside Dims.				Wall Thickness	Wt./ Foot
1/2	x	1/2	x	.049	.301					.083	1.036
				.065	.385					.095	1.170
5/8	x	5/8	x	.049	.367					.120	1.437
				.065	.495	1 1/4	x	1 1/4	x	.049	.793
3/4	x	3/4	x	.049	.467					.065	1.049
				.065	.607					.075	1.200
				.075	.690					.083	1.318
				.083	.753					.095	1.493
				.095	.840					.120	1.846
				.120	1.029	1 1/2	x	1 1/2	x	.049	.957
1	x	1	x	.049	.630					.065	1.270
				.065	.828					.075	1.455
				.075	.945					.083	1.602

Ornamental Tubing (Continued)



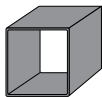
Outside Dims.				Wall Thickness	Wt./ Foot	Outside Dims.				Wall Thickness	Wt./ Foot
				.095	1.817					.083	1.602
				.120	2.254					.095	1.817
1 ¾	x	1 ¾	x	.065	1.491					.120	2.254
				.083	1.884	2	x	1 ½	x	.065	1.491
				.095	2.140					.075	1.744
				.120	2.663					.095	2.140
2	x	2	x	.065	1.713					.120	2.663
				.075	1.966	2 ½	x	1	x	.120	2.663
				.083	2.166	2 ½	x	1 ½	x	.065	1.692
				.095	2.463					.075	1.945
				.120	2.940					.095	2.442
1	x	1/2	x	.065	.607					.120	2.940
				.075	.679	3	x	1	x	.065	1.711
1 ½	x	1/2	x	.065	.824					.075	1.945
1 ½	x	3/4	x	.065	.938					.083	2.166
				.075	1.072					.095	2.442
				.083	1.176					.120	2.947
				.120	1.640	3	x	1 ½	x	.065	1.932
1 ½	x	1	x	.049	.793					.083	2.448
				.065	1.049					.120	.479
				.075	1.200	3	x	2	x	.083	2.756
				.083	1.318					.120	3.890
				.095	1.440	4	x	1 ½	x	.120	4.292
				.120	1.846	4	x	2	x	.083	3.296
2	x	1	x	.065	1.270					.095	3.757
				.075	1.455					.120	4.700

Square Structural Tubing



Outside Dims.						Wall Thickness	Wt./ Foot	Outside Dims.						Wall Thickness	Wt./ Foot
1 ¼	x	1 ¼	x	.188	2.40									.375	19.82
1 ½	x	1 ½	x	.188	3.23			5	x	5	x	.120	7.84		
				.250	3.70							.188	11.97		
2	x	2	x	.188	4.32							.250	15.62		
				.250	5.41							.313	19.08		
				.313	6.32							.375	22.37		
2 ½	x	2 ½	x	.095	3.03							.500	28.43		
				.120	3.89			6	x	6	x	.188	14.53		
				.188	5.59							.250	19.02		
				.250	7.11							.313	23.34		
				.313	8.45							.375	27.48		
3	x	3	x	.120	4.70							.500	35.24		
				.188	6.87							.625	42.30		
				.250	8.81			7	x	7	x	.188	17.08		
				.313	10.58							.250	22.42		
				.375	11.75							.313	27.59		
3 ½	x	3 ½	x	.120	5.52							.375	32.58		
				.188	8.15							.500	42.05		
				.250	10.51							.625	50.76		
				.313	12.70			8	x	8	x	.188	25.82		
				.375	14.71							.313	31.84		
4	x	4	x	.120	6.34							.375	37.69		
				.188	9.42							.500	48.85		
				.250	12.21							.625	59.32		
				.313	14.83			9	x	9	x	.250	29.23		
				.375	17.27							.313	36.10		
				.500	21.63							.375	42.79		
4 ½	x	4 ½	x	.120	7.31							.500	55.66		
				.188	10.70							.625	67.82		
4 ½	x	4 ½	x	.250	13..91			10	x	10	x	.188	24.75		
				.313	16.98							.250	32.63		

Square Structural Tubing (Continued)



Outside Dims.				Wall Thickness	Wt./ Foot	Outside Dims.				Wall Thickness	Wt./ Foot
10	x	10	x	.313	40.35	14	x	14	x	.313	57.36
				.375	47.90					.375	68.31
				.500	62.46					.500	89.68
				.625	76.33					.625	110.23
12	x	12	x	.250	39.43	16	x	16	x	.313	65.87
				.313	48.86					.375	78.52
				.375	58.10					.500	103.30
				.500	76.07					.625	127.34
				.625	93.34						

Rectangular Structural Tubing



Outside Dims.				Wall Thickness	Wt./ Foot	Outside Dims.				Wall Thickness	Wt./ Foot
2 ½	x	1 ½	x	.188	4.32					.313	12.70
				.250	5.41					3.75	14.71
3	x	1 ½	x	.188	4.96	5	x	2	x	.120	5.52
3	x	2	x	.188	5.59					.188	8.15
				.250	7.11					.250	10.51
				.313	8.45					.313	12.70
3 ½	x	1 ½	x	.188	5.59	5	x	3	x	.120	6.34
3 ½	x	2 ½	x	.188	7.05					.188	9.42
				.250	8.81					.250	12.21
4	x	1 ½	x	.188	6.21					.313	14.83
4	x	2	x	.188	6.87					.375	17.27
				.250	8.81					.500	21.63
				.313	10.58	5	x	4	x	.120	7.15
4	x	2 ½	x	.120	5.11					.188	10.70
4	x	3	x	.120	5.52					.250	13.91
				.188	8.15					.313	16.96
				.250	10.51					.375	19.82

Rectangular Structural Tubing (Continued)



Outside Dims.						Wall Thickness	Wt./ Foot	Outside Dims.						Wall Thickness	Wt./ Foot
6	x	2	x	.120	6.34			8	x	2	x	.188	11.97		
				.188	9.42							.250	15.62		
6	x	2	x	.250	12.21							.313	19.08		
				.313	14.83							.375	22.37		
				.375	17.27			8	x	3	x	.188	13.25		
6	x	3	x	.120	7.16							.250	17.32		
				.188	10.70							.313	21.21		
				.250	13.91							.375	24.93		
				.313	16.96							.500	31.84		
				.375	19.82			8	x	4	x	.188	14.53		
				.500	25.00							.250	19.02		
6	x	4	x	.120	7.97							.313	23.34		
				.188	11.97							.375	27.48		
				.250	15.62							.500	35.24		
				.313	19.08			8	x	6	x	.188	17.08		
				.375	22.37							.250	22.42		
				.500	28.43							.313	27.59		
7	x	3	x	.188	11.97							.375	32.58		
				.250	15.62							.500	42.05		
				.313	19.08							.625	50.81		
				.375	22.37			10	x	2	x	.188	14.53		
7	x	4	x	.188	13.25							.250	19.20		
				.250	17.32							.313	23.34		
				.313	21.21			10	x	3	x	.188	15.80		
				.375	24.93							.250	20.72		
				.500	31.83			10	x	4	x	.188	17.08		
7	x	5	x	.188	14.53							.250	22.42		
				.250	19.02							.313	27.59		
				.313	23.34							.375	32.58		
				.375	27.48							.500	42.05		
				.500	35.24							.625	50.77		

Rectangular Structural Tubing (Continued)



Outside Dims.						Wall Thickness	Wt./ Foot	Outside Dims.						Wall Thicknes	Wt./ Foot
10	x	5	x	.188	18.35			12	x	8	x	.250	32.63		
				.250	24.12							.313	40.35		
				.313	29.72							.375	47.90		
				.375	35.14							.500	63.97		
10	x	6	x	.188	19.62							.625	76.33		
				.250	25.82			12	x	10	x	.250	36.03		
				.313	31.84							.313	44.60		
				.375	37.69							.375	53.00		
				.500	48.85							.500	69.27		
				.625	59.32			14	x	4	x	.250	29.23		
10	x	8	x	.188	22.18							.313	36.10		
				.250	29.23							.375	42.79		
				.313	36.10							.500	55.66		
				.375	42.79			14	x	6	x	.250	32.63		
				.500	55.66							.313	40.35		
12	x	2	x	.188	17.08							.375	47.90		
				.250	22.42							.500	62.46		
12	x	3	x	.188	18.35			14	x	10	x	.313	48.86		
				.250	24.12							.375	58.10		
				.313	29.72							.500	76.07		
12	x	4	x	.188	19.63							.625	93.25		
				.250	25.82			16	x	4	x	.313	40.35		
				.313	31.84							.375	47.90		
				.375	37.69							.500	62.46		
12	x	4	x	.500	48.85			16	x	8	x	.250	40.84		
				.625	59.32							.313	48.86		
12	x	6	x	.188	22.18							.375	58.10		
				.250	29.23							.500	76.07		
				.313	36.10			16	x	12	x	.313	57.36		
				.375	42.79							.375	68.31		
				.500	55.66							.500	89.68		

Rectangular Structural Tubing (Continued)



Outside Dims.				Wall Thickness	Wt./ Foot	Outside Dims.				Wall Thickness	Wt./ Foot
18	x	6	x	.250	39.43	20	x	8	x	.313	57.36
				.313	48.86					.375	68.31
				.375	58.10					.500	89.68
				.500	76.07	20	x	12	x	.313	65.87
20	x	4	x	.313	48.86					.375	78.52
				.375	58.10					.500	103.30
				.500	76.06						

Round H.R.E.W. Tubing (A513 T1)



Outside Dims.			Wt./ Foot	Wt./ 20'	Outside Dims.			Wt./ Foot	Wt./ 20'
1/2	x	.049	.236	4.72	1 ¼	x	.095	1.17	23.40
		.065	.302	6.04			.120	1.45	29.00
5/8	x	.049	.301	6.02	1 ½	x	.065	.966	19.92
		.065	.398	7.78			.083	1.26	25.20
		.083	.481	9.62			.095	1.43	28.60
3/4	x	.049	.367	7.34			.120	1.77	35.40
		.065	.476	9.52	1 ¾	x	.065	1.17	23.40
		.083	.591	11.82			.083	1.48	29.56
		.095	.665	13.30			.095	1.68	33.60
7/8	x	.049	.432	8.646			.120	2.09	41.80
		.065	.562	11.24	2	x	.065	1.34	26.80
		.083	.702	14.04			.083	1.70	34.00
1	x	.049	.498	9.96			.095	1.99	39.80
		.065	.649	12.98			.120	2.41	48.20
		.075	.741	14.82	2 ½	x	.049	1.28	25.60
		.083	.813	16.26			.065	1.69	33.80
		.095	.918	18.36			.083	2.14	42.80
		.120	1.13	22.60			.120	3.05	61.00
1 ¼	x	.049	.629	12.58	3	x	.065	2.04	40.80
		.065	.823	16.46			.095	2.95	59.00
		.083	1.03	20.60			.120	3.69	73.80

PIPE PRODUCTS





Pipe Products

Standard, Continuous Weld, Electric Weld or Seamless

This pipe is generally available with Plain Ends, which are square cut, Threaded and Coupled and with Beveled Ends.

Scope

Covers black and hot dipped galvanized, welded and seamless in nominal pipe sizes 1/8 through 26 inches with average nominal wall thickness as given in the following pages. Pipe ordered to this specification is intended for mechanical and pressure applications and is also acceptable for ordinary uses in steam, water, gas and air lines. It is suitable for welding and for some forming operations.

Manufacture

The weld seam of electric-resistance welded pipe in Grade B shall be heat treated after welding to a minimum of 1000° (540°C) so that no untempered martensite remains, or otherwise processed in such a manner that no untempered martensite remains.

Strength Requirements

Seamless Or Electric Weld	Tensile Strength (P.S.I.)	Yield Strength (P.S.I.)
A53 Grade A	48,000 Min.	30,000 Min.
A53 Grade B	60,000 Min.	35,000 Min.
Open Hearth, Basic Oxygen, Or Electric Furnace Buttweld	Tensile Strength (P.S.I.)	Yield Strength (P.S.I.)
A53 Grade A	45,000 Min.	25,000 Min.

Pipe Dimensions & Weights



Size (In.)	O.D. (In.)	I.D. (In.)	Wall Thick.	Pipe Sched.	Num. Threads	P.E.	Wt./ Ft. T & C
1/8	.405	.269	.068	40	27	.24	.24
1/4	.540	.364	.088	40	18	.42	.42
3/8	.675	.493	.091	40	18	.57	.57
1/2	.840	.622	.109	40	14	.85	.85
3/4	1.050	.824	.113	40	14	1.13	1.13
1	1.315	1.049	.133	40	11 ½	1.68	1.68
1 ¼	1.660	1.380	.140	40	11 ½	2.27	2.28
1 ½	1.900	1.610	.145	40	11 ½	2.72	2.73
2	2.375	2.067	.154	40	11 ½	3.65	3.68
2 ½	2.875	2.469	.203	40	8	5.79	5.82
3	3.500	3.068	.216	40	8	7.58	7.62
3 ½	4.000	3.548	.226	40	8	9.11	9.20
4	4.500	4.026	.237	40	8	10.79	10.89
5	5.563	5.047	.258	40	8	14.62	14.81
6	6.625	6.605	.280	40	8	18.97	19.18
8	8.625	8.071	.277	30	8	24.70	25.55
8	8.625	7.981	.322	40	8	28.55	29.35
10	10.750	10.136	.307	30	8	34.24	35.75
10	10.750	10.020	.365	40	8	40.48	41.85
12	12.750	12.090	.330	30	8	43.77	45.45
12	12.750	12.00	.376	Std.	8	49.56	51.15

Note: Many Structural Sizes are available in 21', 24', 30', 34', & 40' lengths. All weights and dimensions are nominal. Permissible variation in weight is 5% above or below.

Extra Strong Pipe



Size (In.)	O.D. (In.)	I.D. (In.)	Wall Thick.	Wt./Ft. P.E.
1/8	.405	.215	.095	.31
1/4	.540	.302	.119	.54
3/8	.675	.423	.126	.74
1/2	.840	.546	.147	1.09
3/4	1.050	.742	.154	1.47

Extra Strong Pipe (Continued)



Size (In.)	O.D. (In.)	I.D. (In.)	Wall Thick.	Wt./Ft. P.E.
1	1.315	.957	.179	2.17
1 ¼	1.660	1.278	.191	3.00
1 ½	1.900	1.500	.200	3.63
2	2.375	1.939	.218	5.04
2 ½	2.875	2.323	.276	7.66
3	3.500	2.900	.300	10.25
3 ½	4.000	3.364	.318	12.51
4	4.500	3.826	.337	14.98
5	5.563	4.813	.375	20.78
6	6.625	5.761	.432	28.57
8	8.625	7.625	.500	43.39
10	10.750	9.750	.500	54.74
12	12.750	11.750	.500	65.42

Double Extra Strong Pipe



Size (In.)	O.D. (In.)	I.D. (In.)	Wall Thick.	Wt./Ft. P.E.
1/2	.840	.252	.294	-----
3/4	1.050	.434	.308	2.44
1	1.315	.599	.358	3.66
1 ¼	1.660	.896	.382	5.21
1 ½	1.900	1.100	.400	6.41
2	2.375	1.503	.436	9.03
2 ½	2.875	1.771	.552	13.70
3	3.500	2.300	.600	18.58
4	4.500	3.152	.674	27.54
5	5.563	4.063	.750	38.55
6	6.625	4.897	.864	53.16
8	8.625	6.875	.875	72.42

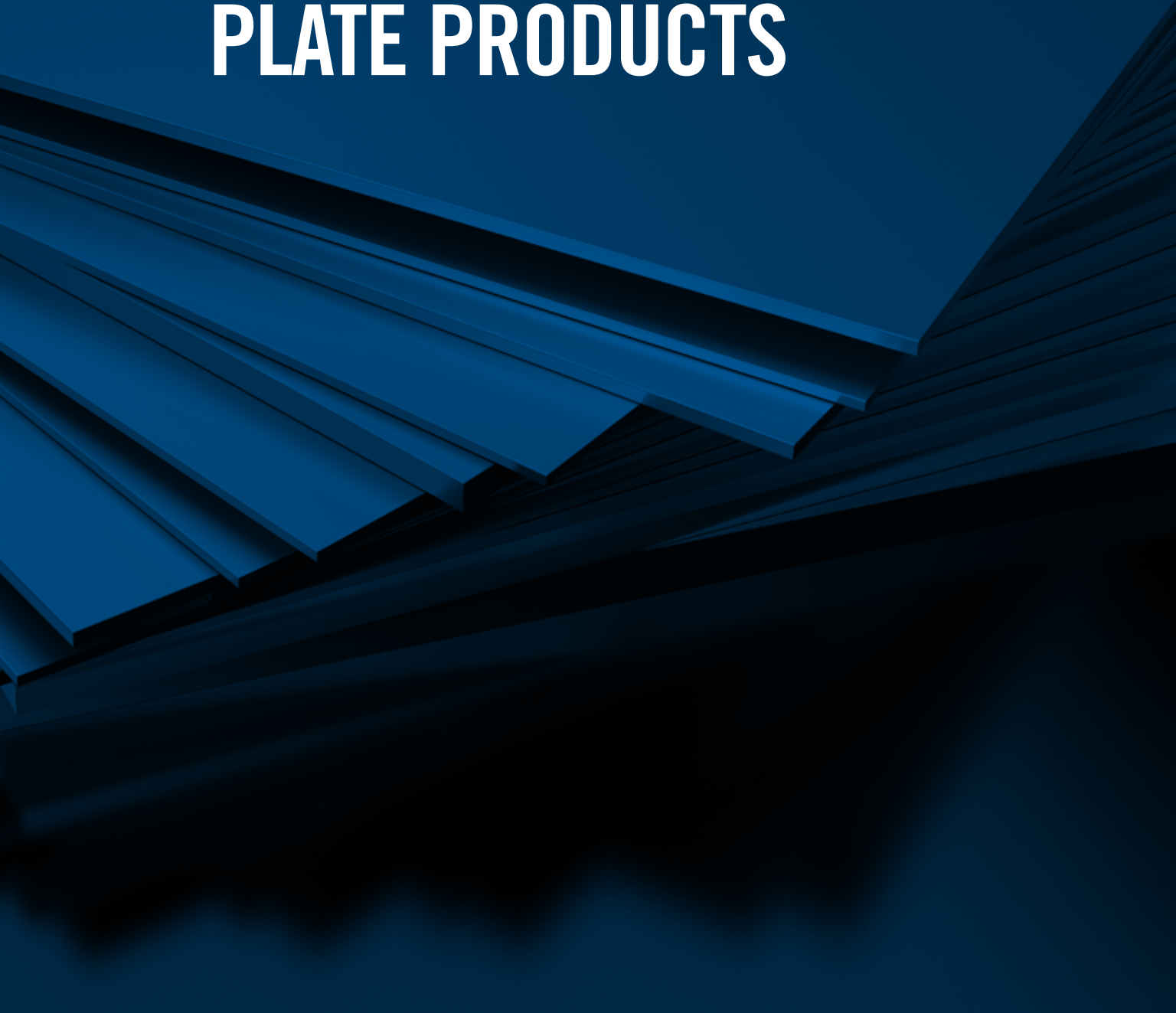
Above Grades: Continuous Weld, Electric Weld or Seamless - Specification A53A or A53B.

Light Wall Pipe ~ Bare Uncoated AWWA C-200



Straight Seam				Spiral Seam			
OD	S.W. Ga	Wall	Wt./ Foot	OD	S.W. Ga	Wall	Wt./ Foot
4	14	.075	3.21		10	.135	26.31
	12	.105	5.03		7	.180	35.67
	10	.135	6.43	8	14	.075	6.48
4½	14	.075	3.62		12	.105	9.04
	12	.105	6.75		10	.135	11.58
	10	.135	8.64	8 5⁄8	12	.105	9.71
6	14	.075	4.85	10	12	.105	11.33
	12	.105	6.75		10	.135	14.53
	10	.135	8.64	10 ¾	12	.105	12.19
6 5⁄8	12	.105	7.47	12	12	.105	13.62
8	14	.075	6.48		10	.135	17.47
	12	.105	9.04	12 ¾	12	.105	14.48
	10	.135	11.58	14	12	.105	15.92
8 5⁄8	12	.105	9.76		10	.135	20.42
10	12	.105	11.33	16	12	.105	18.21
	10	.135	14.53		10	.135	23.36
10 ¾	12	.105	12.19		7	.180	31.67
12	12	.105	13.62	18	12	.105	20.50
	10	.135	17.47		10	.135	26.31
	12 ¾	12	.105	14.48		7	.180
14	12	.105	15.92	20	10	.135	29.25
	10	.135	20.42		7	.180	39.68
16	12	.105	18.21	22	10	.135	32.20
	10	.135	23.36		7	.180	43.69
	7	.180	31.67	24	10	.135	35.1
18	12	.105	20.50				

PLATE PRODUCTS



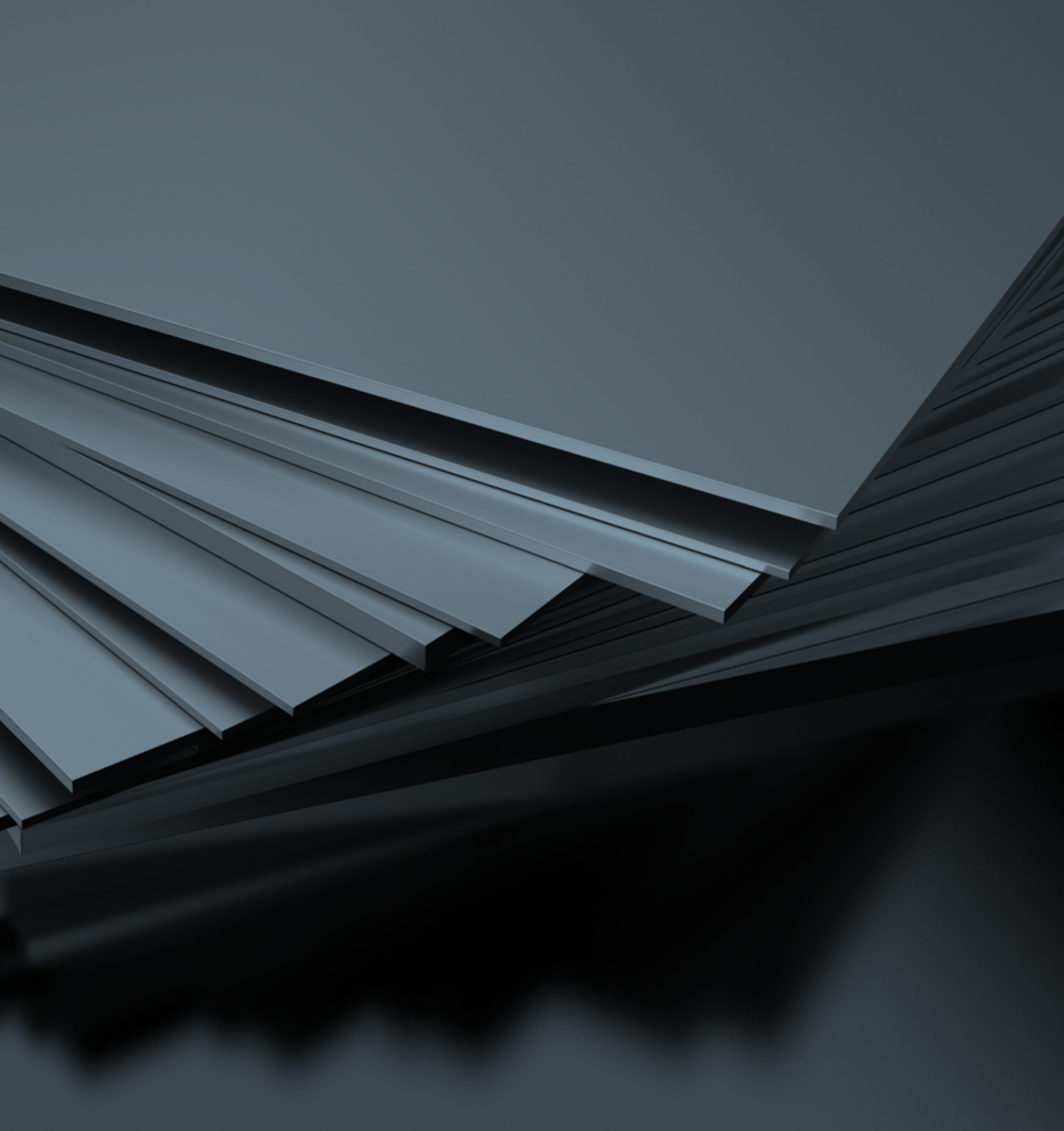
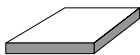


Plate Products



Hot Rolled ASTM-A36

Hot rolled plates made to ASTM-A36 are intended for use in structural applications. Plates ½" and under are normally sheared, while heavier plates are flame cut. Flame cutting is necessary when plate thickness exceeds mill shearing limits.

Analysis

Thickness	Carbon	Manganese	Phosphorus	Sulphur	Silicon
To ¾"	.25 Max.	.80/1.20	.04 Max.	.05 Max.	-----
¾ - 1 ½"	.25 Max.	.80/1.20	.04 Max.	.05 Max.	----
1 ½ - 2 ½"	.26 Max.	.80/1.20	.04 Max.	.05 Max.	.15/.30
2 ½ -4"	.27 Max.	.80/1.20	.04 Max.	.05 Max.	.15/.30
4" & Up	.29 Max.	.80/1.20	.04 Max.	.05 Max.	.15/.30

Applications

Carbon steel plates have so many and such varied uses that a comprehensive list of plate application would be impossible in these pages, however, a few uses are: tank, tubes, truck frames, railroad cars and many structural uses, such as: base plates, girders, etc.

Mechanical Properties

Tensile Strength (P.S.I.)	Yield Point (P.S.I.)	Elongation In 8 Inches
58,000 - 80,000	36,000 Minimum*	20%

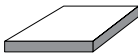
*Yield Point 32,000 P.S.I. for plates over 8 inches thick.

Mechinability

This grade is satisfactory for ordinary machining or drilling but it is not considered a free machining grade.

Weldability

These grades present no problems when using all welding processes. The quality is generally high for both welds and joints. Welding rod specification are dependent on conditions such as the thickness of the section to be welded, service requirements and design.



Abrasion Resistant Plates-Grade AR235

Grade AR235

“As Rolled” Abrasion Resistant Steel, also called A-R Steel, was developed to meet the many demands for a low cost abrasion resisting steel for the materials handling industry.

Analysis

Carbon	Manganese	Phosphorus	Sulphur	Silicon
.35 - .50	1.50 - 2.00	.05 Max.	.055 Max.	.15 - .35

Applications

In general, any member of a steel structure requiring material with exceptional resistance to abrasion, by either wet or dry materials is considered a suitable application of A-R steel. Unusually long life has been obtained by using A-R in a variety of parts

including wear plates, conveyor chutes, dredge pipes, screens, mixer drums, buckets and liner plates. Other applications include scrap metal baling machines, grave crushers, hoppers, farm implements, railroad cars and grader, mixer and scraper blades.

Typical Mechanical Properties

Tensile Strength (P.S.I.)	Yield Point (P.S.I.)	Elongation In 8 Inches	Reduction Of Area	Brinell Hardness
115,000	70,000	16%	35%	235

Shearing

A-R Steel has a higher hardness than structural carbon steel and shearing must be done with care. To ensure proper safety and the structural integrity of the finished product, we will assist you with heat number and source-mill information so that you can obtain accurate information from the producing mill prior to any attempt to shear this material.

Flame Cutting

Flame cutting A-R plate produces a brittle edge due to the quenching effect of the plate. In many application this is of little or no consequence. In applications where flame cut parts must be formed, however, specific procedures must be followed when cutting the parts to ensure the safety of workers and the integrity of the parts. To ensure proper safety and the structural integrity of the finished product, we will assist you with heat number and source-mill information so that you can obtain accurate information from the producing mill prior to any attempt to flame cut parts that must later be formed.

Drilling & Machinability

This steel can be drilled and machined satisfactorily with standard equipment. However, machine speeds and feeds must be reduced. High speed drills are necessary and should be kept cool with drilling compounds such as soluble oil or turpentine. For drilling this steel, the clearance rake of the drills should be less than that for steels of lower hardness.

Weldability

Abrasion Resistant Steel may be welded with proper precautions. Preheating is recommended and after welding it is good practice to stress relieve or normalize. To normalize, heat to 1650°F and allow to cool slowly in air. Normalizing is sometimes omitted when the welded part is not subject to severe vibration and stress. However, normalizing will prevent cracks, give uniform structure and will not reduce the abrasive-resisting qualities. The grade of welding rod to be used depends upon the thickness of section, designs, service, requirements, etc. To ensure proper safety and the structural integrity of the finished product, we will assist you with heat number and source-mill information so that you can obtain accurate information from the producing mill prior to welding this material.

Punching

A-R Steel can be punched successfully in thicknesses up to 1/2" at temperatures no lower than room temperature, but more power is required than for an equal thickness of mild structural steel. The possibility of fine cracks in the material around the hole makes it advisable to ream after punching. When holes are close together, as in the case of perforated screens, it is necessary to preheat before punching or to resort to drilling. If these precautions are not taken, it is possible that cracks may occur and may extend from one hole to the next. To ensure proper safety and the structural integrity of the finished product, we will assist you with heat number and source-mill information so that you can obtain accurate information from the producing mill prior to punching this materials.



Abrasion Resistant Steel Plates

High Brinell or Wear Plates are made from heat treated, high strength, abrasion resisting steels.

Analysis

Because these plates are made to a specific hardness range rather than to a specific ASTM grade, there is a wide range of chemistries found in these steels depending on the mill of origin.

Applications

This steel is used in application requiring high strength and high wear resistance. Good candidates for these steels are mining, earth moving equipments, loader buckets, cutting edges, chutes, slurry pipe, ore bins and similar uses.

Typical Mechanical Properties

Grade	Tensile Strength (P.S.I.)	Yield Point (P.S.I.)	Elongation Percent In 2"	Brinell Hardness
AR360	130,000	160,000	15	360
AR400	145,000	180,000	14	400
AR500	190,000	230,000	14	500

Fabrication

Due to the proprietary nature of High Brinell plate, procedures for welding, drilling and forming are specific to each mill's product and can be provided upon request.

Heat treated constructional alloy steels are low-carbon alloy steel with a level of strength substantially higher than that of the high-strength low alloy grades. This higher strength is obtained by heat treating, water quenching and tempering. The alloying elements and

amount of the alloy content vary among the grades depending upon the section thickness and desired properties. Their general weldability is improved by the lower carbon content.

The range of hardness for ASTM A-514 is Brinell 235 – 239. This range is sometimes referred to as “Regular Quality.” If you have specific hardness requirements, please contact our sales office.

Typical Analysis of A514

Carbon	Manganese	Phosphorus	Sulphur	Silicon
.12 - .21	.70 - 1.00	.035 Max.	.040 Max.	.20 - .35
Chromium	Molybdenum	Vanadium	Titanium	Boron
.40 - .0065	.15 - .25	.03 - .08	.01 - .03	.0005 - .005

Mechanical Properties For Regular Quality

Tensile Strenght (P.S.I.)	Yeild Point (P.S.I.)	Elongation In 2"	Reduction of Area (Min. %)	
			3/4 Inch and Under	Over 3/4 Inch
110 to 130,000	100,000 Min.	18% Min.	40%	50%

Applications

Regular Quality is used in general structural applications where its greater strength permits reduction in weight by using smaller cross-sectional areas. It is for welded construction where procedures are suitable to maintain the properties of the plate.

321 and 360 Minimum Brinell Quality are for applications where higher hardness and strength in conjunction with increased resistance to impact abrasion are important.

Forming

Regular Quality can be cold-formed readily, provided sufficient power is available and allowance is made for greater spring back than with mild steel.

Warm forming may be done at temperatures below 1100°F without destroying the mechanical properties or toughness. Hot forming may be done at 1600-1800°F, but the formed part must be heat-treated to restore its original properties. To ensure proper safety and the structural integrity of the finished product we will assist you with heat number and source-mill information so that you can obtain accurate information from the producing mill prior to any attempt to form this material.

Thicknes of Material	Minimum radius
Up to 1" inclusive	Two Times Thickness
Over 1 inch to 2" inclusive	Three Times Thickness

Machinability

The cutting speed of Regular Quality is 65 surface feet per minute or approximately 40% of 1212.

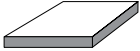
Weldability

Similar techniques to those used in structural carbon steels apply but precautions must be used. Hydrogen must be kept out of the welding operation. Large sections or those under high restraint should be preheated to temperatures not exceeding 400°F.

Heat Treating

Stress relieving may be performed by heating at temperatures up to 1100°F. If Regular Quality material is heated over 1100°G, it must be heat treated again to restore the original strength.

Austenize	Quench	Temper
1650° F to 1700° F	Agitated Water	1150° F to 1250° F



Medium Carbon Plates

C-1045 and C-1055

Analysis

	Carbon	Manganese	Phosphorus	Sulphur
C-1045	.43 - .50	.60 - .90	.04 Max.	.05 Max.
C-1055	.50 - .60	.60 - .90	.04 Max.	.05 Max.

Applications

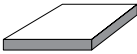
Medium carbon steel plates are generally used in parts for heavy construction, farm and industrial equipment for non-abrasive wearing parts.

Machinability

This grade is satisfactory for ordinary machining or drilling but is not considered a free machining grade.

Weldability

This quality presents no welding problems when using all welding processes. Welding rod specifications are dependent on welding conditions such as thickness, service requirements and design.



High Tensile Plates

ASTM A572 Grade 50

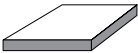
High Tensile Plates are tolled by various steel mills. These plates are high strength low alloy, intended primarily for weight reduction, or longer life, by means of greater strength.

Analysis (Typical)

	Carbon	Mn	P	Sulphur	Silicon	Cb
Gr. 50	.21 Max.	1.35 Max	.04 Max	.05 Max	.30 Max	.01 Min

Mechanical Properties (Typical)

	Tensile Strength (P.S.I.)	Yeild Point (P.S.I.)	Elongation In 2"
Gr. 50	65,000	50,000	Min. 23%



Pressure Vessel Quality Plate

A516 Grade 70

Availability of this material is limited. Check for availability.

Analysis (Typical)

	Carbon	Mn	Phosporus	Sulphur	Silicon
A516 Gr. 70	.28 Max	.90 Max	.35 Max	.04 Max	.20

Mechanical Properties

	Tensile Strength (P.S.I.)	Yield Point (P.S.I.)	Elongation In 8"
A516 Gr. 70	70,000 - 90,000	38,000 Min.	17%

Applications

A516/70 is a carbon steel plate for boilers for stationary service and other pressure vessels. The maximum thickness under this specification is 6".

Weldability

These grades present no problems when using all welding processes. Welding quality is generally very high. Welding rod specifications depend on conditions such as thickness of section, service requirements and design.

Weights For Plate Products

Weight Per Plate				Weight Per Plate				Weight Per Plate			
3/16 Inch				48	x	288	980.2	60	x	288	1531.2
7.66 Lbs. / Sq. Ft.				60	x	96	408.4	72	x	120	756.6
48	x	96	245.1			120	510.5			144	918.7
		120	306.4			144	612.6			240	1531.2
		144	367.7			240	1021.0			288	1837.4
		240	612.8			288	1225.2			360	2296.8
		288	735.4	72	x	96	490.1	84	x	240	1786.4
60	x	96	306.4			120	612.6			360	2679.6
		120	383.0			144	735.1	96	x	120	1020.8
		144	459.6			240	1225.2			144	1225.0
		240	766.0			288	1470.2			240	2041.6
		288	919.2			360	1837.6			288	2449.9
72	x	120	459.6	84	x	240	1429.4			360	3062.4
		144	551.5			360	2144.1	120	x	240	2552.0
		240	919.2	96	x	96	653.4			360	3828.0
		288	1103.0			120	816.8	3/8 Inch			
		360	1378.8			144	980.2	15.31 Lbs. / Sq. Ft.			
84	x	240	1072.4			240	1633.6	48	x	96	489.9
		360	1608.6			288	1960.3			120	612.4
96	x	120	612.8			360	2450.4			144	734.9
		144	735.4	120	x	240	2042.0			240	1224.8
		240	1225.6			360	3063.0			288	1469.8
		288	1470.7	5/16 Inch				60	x	96	612.4
		360	1838.4	12.76 Lbs. / Sq. Ft.						120	765.5
120	x	240	1532.0	48	x	96	408.3			144	918.6
		360	2298.0			120	510.4			240	1531.0
1/4 Inch						144	612.5			288	1837.20
10.21 Lbs. / Sq. Ft.						240	1020.8	72	x	120	918.6
48	x	96	326.7	60	x	96	510.4			144	1102.5
		120	408.4			120	638.0			240	1837.2
		144	490.1			144	756.6			288	2204.6
		240	816.8			240	1276.0			360	2755.8

Weights For Plate Products (Continued)



Weight Per Plate				Weight Per Plate				Weight Per Plate			
3/8 Inch				288		3430.6		120	x	240	5104.0
15.31 Lbs. / Sq. Ft.				360		4288.2				360	7656.0
84	x	240	2143.4	96	x	120	1633.6	3/4 Inch			
		360	3215.1			144	1960.3	30.63 Lbs. / Sq. Ft.			
96	x	120	1224.8			240	3267.2	48	x	96	980.2
		144	1469.8			288	3920.6			120	1225.2
		240	2449.6			360	4900.8			144	1470.2
		288	2939.5	120	x	240	4084.0			240	2450.4
		360	3674.4			360	6126.0	60	x	96	1225.2
120	x	240	3062.0	5/8 Inch						120	1531.5
		360	4593.0			25.52 Lbs. / Sq. Ft.				144	1837.8
7/16 Inch				48	x	96	816.6			240	3063.0
17.87 Lbs. / Sq. Ft.						120	1020.8			288	3675.6
96	x	240	2859.2			144	1225.0	72	x	120	1837.8
1/2 Inch						240	2041.6			144	2205.4
		20.42 Lbs. / Sq. Ft.				288	3062.4			240	3675.6
48	x	96	653.4	60	x	96	1020.8			288	4410.7
		120	816.8			144	1531.2			360	7351.2
		144	980.2			240	2552.0	84	x	240	4288.2
		240	1633.6			288	3062.4			360	6432.2
		288	1960.3	72	x	120	1531.2	96	x	120	2450.4
60	x	96	816.8			144	1837.4			240	4900.8
		120	1021.0			240	3062.4			288	5881.0
		144	1225.2			288	3674.9			360	7351.2
		240	2042.0			360	4593.6	120	x	240	6126.0
		288	2450.4	84	x	240	3572.8			360	9189.0
72	x	120	1225.2			360	5359.2	7/8 Inch			
		144	1470.2	96	x	120	2041.6	35.73 Lbs. / Sq. Ft.			
		240	2450.4			144	2449.9	48	x	96	1143.4
		288	2940.5			240	4083.2			120	1492.2
		360	3675.6			288	4899.8			144	1715.0
84	x	240	2858.8			360	6124.8			240	2858.4

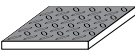
Weights For Plate Products (Continued)

Weight per Plate				Weight Per Plate				Weight Per Plate			
7/8 Inch (Cont.)				288 4900.8				192 4900.8			
60	x	96	1429.2	72	x	120	2450.4	240		6126.0	
		120	1786.5			144	2940.5	360		9189.0	
		144	2143.8			240	4900.8	84	x	240	7147.0
		240	3573.0			288	5881.0	360		10720.5	
		288	4287.6			360	7351.2	96	x	120	4084.0
		360	5395.5	84	x	240	5717.6	144		4900.8	
72	x	120	2143.8			360	8576.4	192		6534.4	
		144	2572.6	96	x	120	3267.2	240		8168.0	
		240	4287.6			144	3920.6	360		12252.0	
		288	5145.1			240	6534.4	1 3/8 Inch			
		360	6431.4			288	7841.3	56.15 Lbs. / Sq. Ft.			
84	x	240	5002.2			360	9801.6	96	x	240	8984.0
		360	7503.3	120	x	240	8168.0	1 1/2 Inch			
96	x	120	2858.4			360	12252.0	61.26 Lbs. / Sq. Ft.			
		144	3430.1	1 1/8 Inch				48	x	96	1960.3
		240	5716.8	45.95 Lbs. / Sq. Ft.				120		2450.4	
		288	6860.2	96	x	240	7352.0	144		2940.5	
		360	8575.2	1 1/4 Inch				192		3920.6	
120	x	240	7146.0	51.05 Lbs. / Sq. Ft.				240		4900.8	
		360	10719.0	48	x	96	1633.6	96		2450.4	
1 Inch				120		2042.0	60		x	120	3063.0
40.84 Lbs. / Sq. Ft.				144		2450.4	144		3675.6		
48	x	96	1306.9	192		3267.2	192		4900.8		
		120	1633.6	240		4084.0	240		6126.0		
		144	1960.3	60	x	96	2042.0	72	x	120	3675.6
		240	3267.2	120		2552.5	144		4410.7		
		288	3920.6	144		3063.0	192		5881.0		
60	x	96	1633.6	192		4084.0	240		4410.7		
		120	2042.0	240		5105.0	360		11026.8		
		144	2940.5	72	x	120	3063.0	84	x	240	8576.4
		240	4084.0	144		3675.6	360		12864.6		

Weights For Plate Products (Continued)



Weight Per Plate				Weight Per Plate				Weight Per Plate			
1 1/2 Inch (Cont.)				240 8576.4				2 1/2 Inch			
96	x	120	4900.8	360 12864.6				102.1 Lbs. / Sq. Ft.			
144 5881.0				84	x	240	10005.8	60	x	240	10210.0
192 7841.3				360 15008.7				72	x	240	12252.0
240 9801.6				96	x	120	5717.6	96	x	240	16336.0
1 5/8 Inch				144 6861.1				2 3/4 Inch			
66.36 Lbs. / Sq. Ft.				192 9148.2				112.3 Lbs. / Sq. Ft.			
96	x	240	10617.6	240 11435.2				3 Inch			
1 3/4 Inch				1 7/8 Inch				122.5 Lbs. / Sq. Ft.			
71.47 Lbs./ Sq. Ft.				76.57 Lbs. / Sq. Ft.				3 1/2 Inch			
48	x	96	2287.0	96	x	240	12251.2	142.9 Lbs. / Sq. Ft.			
120 2858.8				2 Inch				4 Inch			
144 3430.6				81.68 Lbs. / Sq. Ft.				163.36 Lbs. / Sq. Ft.			
192 4575.1				60	x	240	8168.0	4 1/2 Inch			
240 5717.6				72	x	240	9801.6	183.8 Lbs. / Sq. Ft.			
60	x	96	2858.8	84	x	240	11435.2	5 Inch			
120 3573.5				96	x	240	13068.8	204.2 Lbs. / Sq. Ft.			
144 4288.2				2 1/4 Inch				6 Inch			
192 5717.6				91.89 Lbs. / Sq. Ft.				245.0 Lbs. / Sq. Ft.			
240 7147.0				60	x	240	9189.0	8 Inch			
72	x	120	4288.2	72	x	240	11026.8	326.7 Lbs. / Sq. Ft.			
144 5145.8				84	x	240	12864.6				
192 6861.1				96	x	240	14702.4				



Floor Plate

Floor Plate is made of rolled carbon steel that has great structural strength and long wearing qualities. The practical safety tread pattern provides 4-way traction, easy cleaning, and drainage.

Analysis

Carbon	Manganese	Phosphorus	Sulphur
.10 - .25	.30 - .70	.50 Approximately	.05 Approximately

Typical Mechanical Properties

Ordinarily floor plates are not stress-carrying pieces, but typical physical properties are:

Tensile Strength (P.S.I.)	Yield Point (P.S.I.)	Elongation In 8 Inches
60,000	33,000	22%

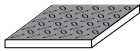
Applications

Diamond Floor Plate is extensively used in safety floors, step treads, walkways, truck beds, truck bumpers, conveyors, cover plates, running boards, can floors and truck tail gates.

Weldability

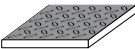
This material presents no welding problems when using all welding processes. The quality of the welds is generally extremely high for both welds and joints. Welding rod specifications are dependent on welding conditions such as the thickness of the sections to be welded, service requirements and design.

Floor Plate



Weight Per Plate				Weight Per Plate				Weight Per Plate			
16 Ga.				288 710.4				120 552.4			
3.00 Lbs. / Sq. Ft.				72	x	240	738.0	240 1104.8			
36	x	96	72.0	288 885.6				288 1325.8			
120 90.0				3/16 Inch				60	x	120	690.5
144 108.0				8.71 Lbs. / Sq. Ft.				240 1381.0			
48	x	96	96.0	48	x	96	278.7	288 1657.2			
120 120.0				120 348.4				72	x	240	1657.2
192 192.0				240 696.8				288 1988.6			
240 240.0				60	x	96	348.4	96	x	240	2209.6
14 Ga.				120 435.5				288 2651.5			
3.75 Lbs. / Sq. Ft.				240 871.0				3/8 Inch			
48	x	96	120.0	288 1045.2				16.37 Lbs. / Sq. Ft.			
120 150.0				72	x	240	1045.2	48	x	96	523.8
192 240.0				288 1254.2				120 654.8			
240 300.0				84	x	240	1219.4	240 1309.6			
12 Ga.				288 1463.3				48	x	288	1571.5
5.25 Lbs. / Sq. Ft.				1/4 Inch				60	x	240	1637.0
48	x	96	168.0	11.26 Lbs. / Sq.Ft.				288 1964.4			
120 210.0				48	x	96	360.3	72	x	240	1964.4
192 336.0				120 450.4				288 2357.3			
240 420.0				240 900.8				96	x	240	2619.2
60	x	120	262.5	288 1081.0				288 3143.0			
240 525.0				60	x	120	563.0	1/2 Inch			
1/8 Inch				240 1126.0				21.47 Lbs. / Sq. Ft.			
6.15 Lbs. / Sq. Ft.				288 1251.2				48	x	96	687.0
36	x	120	184.5	72	x	240	1351.2	120 858.8			
48	x	96	196.8	288 1621.4				240 1717.6			
120 246.0				96	x	240	1801.6	288 2061.1			
240 492.0				288 2161.9				60	x	240	2147.0
288 590.4				5/16 Inch				288 2576.4			
60	x	120	307.5	13.81 Lbs. / Sq. Ft.				72	x	240	2576.4
240 615.0				48	x	96	441.9	288 3091.7			

Floor Plate (Continued)



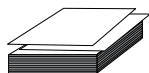
Weight Per Plate				Weight Per Plate				Weight Per Plate			
1/2 Inch (Cont.)				60	x	240	2658.0	60	x	240	3168.0
96	x	240	3435.2	72	x	240	3189.6	72	x	240	3801.6
		288	4122.2	96	x	240	4252.8	96	x	240	5068.8
5/8 Inch				3/4 Inch				96	x	288	6082.6
26.58 Lbs. / Sq. Ft.				31.68 Lbs. / Sq. Ft.							
45	x	240	2126.4	48	x	240	2534.4				



SHEET PRODUCTS



Sheet Products



Hot Rolled ASTM-A1011

A low carbon, open-hearth steel generally produces from capped, rimmed or semi-killed steel. Our sheets are prime Commercial Quality.

Commercial Quality is suitable for all ordinary purposes where the presence of oxide on the surface is not objectionable. Sheets of this quality may be suitable for bending and moderate forming; however, they are not guaranteed against breakage except that caused by piped steel (material with tubular voids). Commercial Quality sheets should be capable of withstanding standard test bends, i.e., being bent flat on itself in any direction at room temperature.

Analysis

Carbon	Manganese	Phosphorus	Sulphur
.15 Max.	.30 - .60	.04 Max.	.05 Max.

Weldability

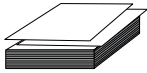
This quality of sheet presents no welding problems, when using all welding processes. Welding quality is generally extremely high for welds and joints. Welding rod specifications are dependent on welding conditions such as thickness of section, service requirements and design to names a few of the probable welding conditions.

Applications

Commercial Quality sheets have good ductility. They are easy to fabricate and are used for a wide variety of purposes, such as barrels and drums, lockers, cabinets, doors, blower and ventilating systems, bins, partitions, chutes, steel jackets and agricultural equipment.

Typical Mechanical Properties

Tensile Strength (P.S.I.)	Yield Point (P.S.I.)	Elongation In 8"	Reduction Of Area
55,000	30,000	30%	55%



High Tensile Sheet ASTM A607 GRADE 50

High Strength/Low Alloy sheets (sometimes referred to as High Tensile sheets) are rolled by various steel mills and are generally stocked in Grade 50.

Analysis

Carbon	Manganese	Phosphorus	Sulphur	Columbium	Vanadium
.23 Max.	1.35 Max	.04 Max	.05 Max	.01 Min.	.01 Min.

Applications

This material is extensively used in industrial and domestic air conditioning equipment, farm buildings, farm elevators, farm wagons, fertilizer wagons, hay balers, potato planter hoppers, tractors, bins, blowers, booms, bridge parts, bulldozers, concrete forms, conveyors, earth-moving equipment, filing cabinet parts, floor plates, door frames, furnace parts, barges, boats, dredges, material handling equipment, pole line hardware, lamp and sign posts, pump parts, road machinery, scraper parts, tanks, trailers, transformer shells, truck, wheelbarrows and worms.

Mechanical Properties

	Tensile Strength (P.S.I.)	Yield Point (P.S.I.)	Elongation In 2"
All Grades - Gr 50	65,000 Min.	50,000 Min.	22% Min.

Forming

High Tensile Sheet may be hot or cold formed. To ensure proper safety and the structural integrity of the finished product, we will assist you with heat number and source-mill information so that you can obtain accurate information from the producing mill prior to any attempt to form this material.

For cold forming, a greater force is required to produce a permanent set because of the higher yield point than carbon steel. It is suggested for cold forming that the inside radius of the bend should be at least equal to the thickness of the material for sheet and strip up to 1/16" inclusive; at least twice the thickness of the material over 1/16" to 1/4" inclusive; and three times the thickness for material over 1/4" to 1/2" inclusive.

Punching & Shearing

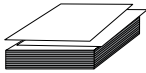
Shearing may require tighter and more secure clamping if a clamp hold down is used because the metal tends to pull more than structural carbon steel. Punching requires up to 20% greater force than for equal thicknesses of ASTM-A569 material.

Gas Cutting

No special precautions need be taken beyond those required for structural steels, and the heat effects and cutting speeds are similar for both grades. This material can be plasma-cut with minimal warpage.

Weldability

High Tensile is readily welded by all the usual methods, i.e., shielded metal arc, submerged arc and electrical resistance, including spot welding. An important advantage in welded structures is the fact that this material experiences an increase in the yield and tensile strength with practically no decrease in elongation when stress-relieved.



Cold Rolled Sheet ASTM A1008

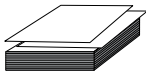
Specification: Commercial Quality

Sheets of this quality should be suitable for bending and moderate forming; however, they are not guaranteed against breakage except that caused by piped steel (material with tubular voids). Sheets of Commercial Quality should be capable of withstanding a standard bend test, i.e., being bent flat on itself in any direction at room temperature.

Cold Rolled Sheets are from continuous mill production from low-carbon open-hearth timed, texture or capped steel with a carbon maximum of 0.15.

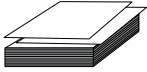
Applications

The dull surface texture is suitable for paints, lacquers and enamels. Cabinets, appliances, auto body parts, furniture, file cases and desks, partitions and doors are some applications for Cold Rolled Sheets.



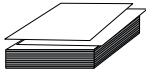
Weights For H.R. & C.R. Sheets

Weight Per Plate				Weight Per Plate				Weight Per Plate			
26 Ga. (.0179)				22 Ga. (.0299)				18 Ga. (.0478)			
36	x	96	18.02	36	x	96	30.02	36	x	96	48.29
		120	22.53			120	37.53			120	60.36
48	x	96	24.03	48	x	96	40.03	48	x	96	64.38
		120	30.04			120	50.04			120	80.48
24 Ga. (.0239)				20 Ga. (.0359)				16 Ga. (.0598)			
36	x	96	24.02	36	x	96	36.02	36	x	96	60.00
		120	30.03			120	45.03			120	75.00
48	x	96	32.03	48	x	96	48.03	48	x	96	80.06
		120	40.04			120	60.04			120	100.00



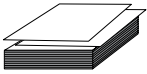
Weights For H.R. & C.R. Sheets (Continued)

Weight Per Plate				Weight Per Plate				Weight Per Plate			
16 Ga. (.0598)				240 350.32				144 270.24			
48	x	144	120.01	60	x	96	175.16	240 450.40			
240 200.02				120 218.95				60	x	96	225.20
60	x	96	100.00	144 262.74				120 281.50			
120 125.01				72	x	120	262.74	144 337.80			
144 150.01				144 315.29				192 450.40			
				11 Ga. (.1196)							
14 Ga. (.0747)				36	x	96	120.12	240 563.00			
36	x	96	75.07	120 150.15				72	x	96	270.24
120 93.84				48	x	96	160.16	120 337.80			
48	x	96	100.10	120 200.20				144 405.36			
120 125.12				144 240.24				192 540.48			
144 150.14				240 400.40				240 675.60			
240 250.24				60	x	96	200.20	7 Ga. (.1793)			
60	x	96	125.12	120 250.25				36	x	96	180.17
120 156.40				144 300.30				120 225.21			
240 312.80				240 500.50				48	x	96	240.22
72	x	120	187.68	72	x	96	240.24	120 300.28			
144 225.22				120 300.30				144 360.34			
240 375.36				144 360.36				240 600.56			
12 G. (.1046)				240 600.60				60	x	96	300.28
36	x	96	105.10	10 Ga. (.1345)				120 375.35			
120 131.37				36	x	96	135.12	144 450.42			
48	x	96	140.13	120 168.90				240 750.70			
120 175.16				48	x	96	180.16	72	x	120	450.42
144 210.19				120 225.20				144 540.50			



AISI Thickness Tolerance H.R. & C.R. Sheet

Thickness In Inches				
Gage Number	Decimal Equivalent	Tol. Range H.R. & P.O.	Tol. Range C.R. Sheet	Pounds Per Sq. Foot
7	.1793	.1873 .1713	.0883 .1703	7.507
10	.1345	.1425 .1265	.1405 .1285	5.630
11	.1196	.1276 .1116	.1256 .1136	5.005
12	.1046	.1126 .0966	.1106 .0986	4.379
13	.0897	.0967 .0827	.0947 .0847	3.75
14	.0747	.0814 .0677	.0797 .0697	3.128
16	.0598	.0658 .0538	.0648 .0548	2.502
18	.0478	.0528 .0428	.0518 .0438	2.102
20	.0359	----	.0389 .0329	1.501
22	.0299	----	.0329 .0269	1.261
24	.0239	----	.0269 .0209	1.001
26	.0179	----	.0199 .0159	.751



Flat Galvanized Sheet ASTM-A653, G90

Specifications

Flat Galvanized Sheets .071 (14 gauge) and lighter are ASTM A653, Lock Forming Quality (LFQ). Sheets heavier than .071 to .124 (11 gauge) are A653 Commercial Quality. Sheets heavier than .124 to .130 (10 gauge) are Commercial Quality.

Commercial Quality

Flat Galvanized Sheets are from low-carbon open-hearth steel. They are flat, have closely guarded shearing tolerances, and are ductile and soft.

These sheets are produced by passing the base sheets through a bath of molten zinc, which, after controlled cooling, gives a clean, bright, uniform spangle.

Stamping, cold drawing, double seaming and brake or toll forming will not impair the protective quality of these sheets.

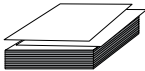
Analysis

Carbon	Manganese	Phosphorus	Sulphur
.15 Max.	.30 - .60	.04 Max.	.05 Max.

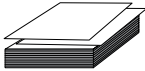
Applications

Flat Galvanized Sheets are used as the prime general sheet metal for hearing, cooling, joist hangers and sign work if the sheets are primed before painting.

AISI Thickness Tolerance For Galv. Sheet



Ga.	Dec. Equiv.	Tolerance Range			Ga.	Dec. Equiv.	Tolerance Range		
10	.1382	.1472	To	.1292	20	.0396	.0436	To	.0356
11	.1233	.1323	To	.1143	22	.0336	.0376	To	.0296
12	.1084	.1174	To	.0994	24	.0276	.0316	To	.0236
14	.0785	.0865	To	.0705	26	.0217	.0247	To	.0187
16	.0635	.0695	To	.0575	28	.0187	.0217	To	.0157
18	.0516	.0566	To	.1466	30	.0157	.0187	To	.0127



Paintable Galvanized Sheet ASTM-A653, G40

A516 Grade 70

Printable Galvanized Sheet, sometimes called Paint Bond or Wiped Galvanized, has a surface coating that makes priming unnecessary.

Specifications

Printable Galvanized Sheets .071 (14 ga.) and lighter are ASTM A653 lock forming quality (LFQ).

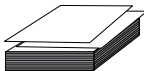
Applications

Paintable Galvanized Sheets are used in applications where paint, enamels and lacquers will be used or where float stretcher-leveled sheets are needed. These sheets can be drawn, stamped, formed and sheared without cracking, peeling or flaking.

Office furniture, cabinets of all types, appliances sheets, truck and trailer bodies, lighting fixtures, signs, air conditioning and refrigeration equipment are some applications for Paintable Galvanized Sheet.

Chemical Composition (Typical)

Carbon	Manganese	Phosphorus	Sulphur
.15 Max.	.30 - .60	.05 Max.	.05 Max.

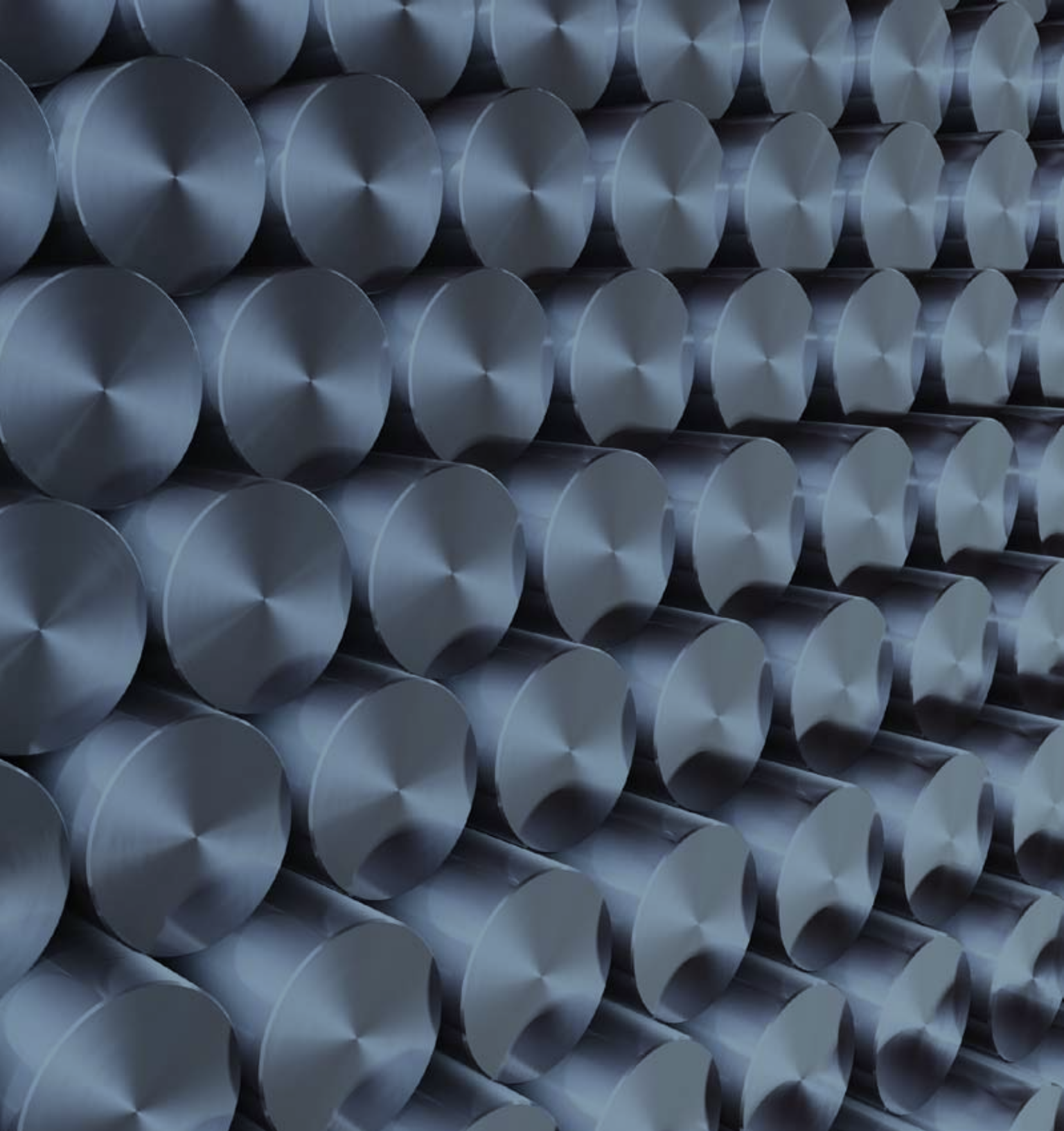


Weights For Galvanized Sheets

Size In Inches				Weight per Sheet	Size In Inches				Weight per Sheet	Size In Inches				Weight per Sheet
10 Ga. (.138)					18 Ga. (.052)					26 Ga. (.022)				
Wt./ Sq. Ft.				5.786	Wt./ Sq. Ft.				2.158	Wt./ Sq. Ft.				.907
48	x	96		185.15	48	x	96		69.06	48	x	96		29.02
		120		231.44			120		86.32			120		36.28
12 Ga. (.109)					20 Ga. (.040)					28 Ga. (.019)				
Wt. / Sq. Ft.				4.535	Wt./ Sq. Ft.				1.658	Wt./ Sq. Ft.				.782
48	x	96		145.12	48	x	96		53.06	36	x	96		18.77
		120		181.40			120		66.32			120		23.46
14 Ga. (.079)					22 Ga. (.034)					30 Ga. (.016)				
Wt./ Sq. Ft.				3.284	Wt./ Sq. Ft.				1.407	Wt./ Sq. Ft.				.657
48	x	96		105.09	48	x	96		45.02	36	x	96		15.77
		120		131.36			120		56.28					
16 Ga. (.064)					24 Ga. (.028)									
Wt. / Sq. Ft.				2.658	Wt./ Sq. Ft.				1.157					
48	x	96		85.06	48	x	96		37.02					
		120		106.32			120		46.28					

The background of the image consists of a dense, repeating pattern of circular cross-sections of hot-rolled steel bars. These circles are arranged in a staggered, brick-like pattern, creating a sense of depth and texture. The entire image is overlaid with a solid, medium-blue color, which serves as a backdrop for the white text.

HOT ROLLED BAR PRODUCTS



Hot Rolled Bar Products

Commercial Quality

Commercial Quality bars are typically produced in grades C1008, C1020 and A569 by a variety of steelmaking methods and tested to chemical specifications. Commercial Quality bars are not subject to mechanical property tests. Typical properties are given for reference only. Mill size tolerances apply to all Commercial Quality bars.

Applications

Commercial Quality bars are used in many applications. Among them are structural uses involving moderate cold bending or hot forming, welding, punching and the production, if non-critical parts of buildings, bridges, railway equipment, agricultural equipment and implements and general machinery.

ASTM-A36

Hot rolled, ASTM-A36 bars are produced by steelmaking methods that result in a sound product throughout the cross-section and are tested to both chemical and physical specifications. ASTM-A36 material is suitable for most construction purposes, including riveted, bolted and welded structures. Material that is made to ASTM-A36 is suitable for mild hot and cold forming. Most hot rolled flats, rounds and squares are available in ASTM-A36.

Analysis

Carbon (Max.)	Manganese	Phosphorus (Max.)	Sulphur (Max.)
.26 - .29	.60 - .90	.04	.05

Mechanical Properties

Tensile Strength (P.S.I.)	Yeild Point (P.S.I.)	Elongation In 2"	Brinell Hardness (BHN)
58,000 - 65,000	36,000 Min.	23%	137

Weldability

Hot rolled A36 bars present no welding problems when using all welding processes. The quality of welds is generally extremely high for both welds and joints. Welding rod specifications are dependent on welding conditions such as the thickness of the sections to be welded, service requirements and design.

ASTM-A529

Hot rolled ASTM-A529 bars are produced in two grades, Grade 42 with a 42,000 minimum yield and Grade 50 with a 50,000 minimum yield. This is a carbon-manganese material designed for structural purposes such as riveted, bolted and welded construction.

Analysis

	Carbon (Max.)	Manganese (Max.)	Phosphorus (Max.)	Sulphur (Max.)	Silicon (Max.)
Gr. 42	.27	1.20	.04	.05	----
Gr. 50	.27	1.35	.04	.05	.40

Mechanical Properties

	Tensile (Min PSI)	Tensile (Max. PSI)	Yield (Min. PSI)	Elongation In 2 Inches
Gr. 42	60,000	85,000	42,000	22%
Gr. 50	70,000	100,000	50,000	21%

ASTM-A572 Grade 50

High Tensile bars are rolled by various steel mills. They are a high strength low alloy material, intended primarily for weight reduction, or longer life, by means of greater strength.

Analysis (Typical)

	Carbon	Mn	P	Sulphur	Silicon	Cb
Gr. 50	.21 Max	1.35 Max	.04 Max	.05 Max	.30 Max	.01 Min

Mechanical Properties (Typical)

	Tensile strength (PSI)	Yield Point (PSI)	Elongation In 2 Inches
Gr. 50	65,000 Min	50,000	Min 23%

C-1040 Hot Rolled Rounds

Special Quality

These Special Quality rounds are medium-carbon open-hearth steel. Special controls are exercised in their production for chemical compositions, heating, rolling and surface preparation.

Analysis

Carbon	Manganese	Phosphorus	Sulphur
.37 - .44	.69 - .90	.04 Max.	.05 Max.

Applications

The C-1040 rounds are frequently used for axles, forming dies, gears, ordinary shafts, pinions, rock screens, stud bolts, tool shanks and other similar machinery parts where greater strength is required than can be obtained from carbon steels.

Typical Mechanical Properties (1" Round Bars)

Tensile Str. (PSI)	Yield Point (PSI)	Elongation In 2"	% Reduction of Area	Brinell Hardness	Reduced Hardness
91,000	58,000	27%	50	201	B 94

Machinability

Machinability is rated at 63%.

Weldability

High carbon content makes 1040 steel a little more difficult to weld. Thin sections do not require preheating. Joints of 1/2" to 3/4" should be preheated. A low-alloy filler is recommended to develop equivalent strength in a weld as well as stress relieving. Welding rod grade is dependent upon design, service requirements and thickness of sections.

Hot Rolled Medium Carbon C-1055 Bars

Hot Rolled Medium Carbon steel is an open-hearth steel of fine grain size. Special production controls are used for chemical composition, rolling, heating, surface preparation, etc. The result is a quality product suitable for applications involving forging, flame or induction hardening, heat treating and machining.

Analysis

Carbon	Manganese	Phosphorus	Sulphur
.50 - .60	.60 - .90	.040 Max	.050 Max

Applications

This steel is used in the maintenance and manufacture of plows, and various other agricultural implements such as discs, harrows, ditchers, subsoilers, cultivators and furrowers. Medium Carbon steel is also used in the maintenance and manufacture of construction machinery such as tractors, bulldozers, scrapers, shovels, concrete mixers, etc.

Typical Mechanical Properties

Tensile Strength (P.S.I.)	Yield Point (P.S.I.)
112,000 - 132,000	60,000 - 81,000

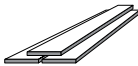
Machinability

This grade is generally machined in the as-rolled condition without difficulty. Cutting speed is approximately 85 surface feet per minute.

Weldability

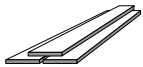
Plow steel may be welded with necessary precautions. With thin sections and a flexible design, arc or gas welding may be used without preheating the material. However, in joints over ½" to ¾" thick, preheating is necessary. A low-alloy filler is recommended to develop equivalent strength in a weld. Welding rod grade depends on design, service requirements and thickness of grade.

Hot Rolled Strip



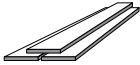
Size In Inches				Weight Per Foot	Weight Per 20'	Size In Inches				Weight Per Foot	Weight Per 20'
1/8	x	1/2		0.213	4.26	3/16	x	1/2		0.319	6.38
		5/8		0.266	5.32			5/8		0.398	7.96
		3/4		0.319	6.38			3/4		0.478	9.56
		7/8		0.372	7.44			7/8		0.559	11.18
		1		0.425	8.50			1		0.639	12.78
		1 1/8		0.478	9.56			1 1/8		0.718	14.36
		1 1/4		0.531	10.62			1 1/4		0.798	15.96
		1 1/2		0.639	12.78			1 1/2		0.957	19.14
		1 3/4		0.745	14.90			1 3/4		1.117	22.34
		2		0.851	17.02			2		1.276	25.52
		2 1/4		0.957	19.14			2 1/4		1.435	28.70
		2 1/2		1.064	21.28			2 1/2		1.596	31.92
		2 3/4		1.170	23.40			2 3/4		1.755	35.10
		3		1.276	25.52			3		1.915	38.30
		3 1/2		1.489	29.78			3 1/2		2.233	44.66
		4		1.702	34.04			4		2.552	51.04
		4 1/2		1.915	38.30			4 1/2		2.872	57.44
		5		2.127	42.54			5		3.191	63.82
		6		2.552	51.04			6		3.829	76.58
		8		3.403	68.06			8		5.105	102.10
		10		4.254	85.08			10		6.381	127.62
		12		5.105	102.10			12		7.657	153.14

Hot Rolled Flats



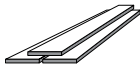
Size In Inches				Weight Per Foot	Weight Per 20'	Size In Inches				Weight Per Foot	Weight Per 20'
1/4	x	1/2		.425	8.50	5/16	x	2 1/4		2.393	47.86
		5/8		.531	10.62			2 1/2		2.658	53.16
		3/4		.639	12.78			2 3/4		2.925	58.50
		7/8		.745	14.90			3		3.191	63.82
		1		.851	17.02			3 1/2		3.723	74.46
		1 1/4		1.064	21.28			4		4.254	85.08
		1 1/2		1.276	25.52			4 1/2		4.785	95.70
		1 3/4		1.489	29.78			5		5.318	106.36
		2		1.702	34.04			5 1/2		5.850	117.00
		2 1/4		1.915	38.30			6		6.381	127.62
		2 1/2		2.127	42.54			7		7.445	148.90
		2 3/4		2.340	46.80			8		8.508	170.16
		3		2.552	51.04	3/8	x	12		.639	12.78
		3 1/4		2.766	55.32			5/8		.798	15.96
		3 1/2		2.978	59.56			3/4		.957	19.14
		4		3.403	68.06			7/8		1.117	22.34
		4 1/2		3.829	76.58			1		1.276	25.52
		5		4.254	85.08			1 1/4		1.596	31.92
		5 1/2		4.679	93.58			1 1/2		1.915	38.30
		6		5.105	102.10			1 3/4		2.233	44.66
		7		5.956	119.12			2		2.552	51.04
		8		6.806	136.12			2 1/4		2.872	57.44
5/16	x	1/2		.531	10.62			2 1/2		3.191	63.82
		5/8		.665	13.30			2 3/4		3.509	70.18
		3/4		.798	15.96			3		3.829	76.58
		7/8		.931	18.62			3 1/4		4.148	82.96
		1		1.064	21.28			3 1/2		4.467	89.34
		1 1/4		1.329	26.58			4		5.105	102.10
		1 1/2		1.594	31.88			4 1/2		5.743	114.86
		1 3/4		1.861	37.22			5		6.381	127.62
		2		2.127	42.54			5 1/2		7.020	140.40

Hot Rolled Flats (Continued)

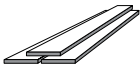


Size In Inches			Weight Per Foot	Weight Per 20'	Size In Inches			Weight Per Foot	Weight Per 20'
3/8	x	6	7.657	153.14	3			6.381	127.62
		7	8.933	178.66	3 1/4			6.913	138.26
		8	10.210	204.20	3 1/2			7.445	148.90
1/2	x	3/4	1.276	25.52	4			8.508	170.16
		7/8	1.489	29.78	4 1/2			9.572	191.44
		1	1.702	34.04	5			10.640	212.80
		1 1/4	2.127	42.54	5 1/2			11.699	233.98
		1 1/2	2.552	51.04	6			12.762	255.24
		1 3/4	2.978	59.56	7			14.894	297.88
		2	3.403	68.06	8			17.016	340.32
		2 1/4	3.829	76.58	3/4	x	1	2.552	51.04
		2 1/2	4.254	85.08			1 1/4	3.191	63.82
		2 3/4	4.679	93.58			1 1/2	3.829	76.58
		3	5.105	102.10			1 3/4	4.467	89.34
		3 1/4	5.530	110.60			2	5.105	102.10
		3 1/2	5.956	119.12			2 1/4	5.743	114.86
		4	6.806	136.12			2 1/2	6.381	127.62
		4 1/2	7.657	153.14			2 3/4	7.020	140.40
5	8.508	170.16	3	7.657			153.14		
5 1/2	9.359	187.18	3 1/2	8.933			178.66		
6	10.210	204.20	4	10.210			204.20		
7	11.911	238.22	4 1/2	11.491			229.82		
8	13.613	272.26	5	12.762			255.24		
5/8	x	1	2.127	42.54			5 1/2		
		1 1/4	2.658	53.16	6			15.134	306.28
		1 1/2	3.191	63.82	7			17.867	357.34
		1 3/4	3.723	74.46	8			20.419	408.30
		2	4.254	85.08	7/8	x	1	2.978	59.56
		2 1/4	4.785	95.70			1 1/4	3.723	74.46
		2 1/2	5.318	106.36			1 1/2	4.467	89.34
		2 3/4	5.850	117.00			2	5.956	119.12

Hot Rolled Flats (Continued)



Size In Inches			Weight Per Foot	Weight Per 20'	Size In Inches			Weight Per Foot	Weight Per 20'
2 1/2			7.445	148.90	2 1/4			9.572	191.44
3			8.933	178.66	2 1/2			10.640	212.80
3 1/2			10.420	208.40	3			12.762	255.24
4			11.911	238.22	3 1/2			14.894	297.88
4 1/2			13.403	268.06	4			17.816	340.32
5			14.894	297.88	1 1/4	x	4 1/2	19.148	382.96
6			17.867	357.34			5	21.270	425.40
7			20.830	416.60	6			25.524	510.48
8			23.822	476.44	7			29.778	595.56
1	x	1 1/4	4.254	85.08	8			34.032	680.64
		1 1/2	5.105	102.10	1 1/2	x	2	10.210	204.20
		1 3/4	5.956	119.12			2 1/2		
		2	6.806	136.12	3			15.314	306.20
		2 1/4	7.657	153.14	3 1/2			17.867	357.34
		2 1/2	8.508	170.16	4			20.419	408.38
		2 3/4	9.359	187.18	4 1/2			22.972	459.44
		3	10.210	204.20	5			25.524	510.48
		3 1/4	11.060	221.20	6			30.629	612.58
		3 1/2	11.911	238.22	7			35.734	714.68
		4	13.613	272.26	8			40.834	816.76
		4 1/2	15.314	306.28	2	x	2 1/2	17.016	340.32
		5	17.016	340.32			3	20.419	408.38
		5 1/2	18.718	374.36	3 1/2			23.822	476.44
		6	20.419	408.38	4			27.226	544.52
		7	23.822	476.44	4 1/2			30.629	612.58
		8	27.226	544.52	5			34.032	680.64
1 1/4	x	1 1/2	6.381	127.62	6			40.838	816.76
		1 3/4	7.445	148.90	7			47.600	952.00
		2	8.508	170.16	8			54.451	1089.02



Universal Mill Plates

Specifications: ASTM A-36 & A529 Gr: 50

Universal Mill Plates (U.M. Plates) are defined as flat steel over 8 inches wide and ¼ inch or more in thickness. Universal Mill Plates are rolled between both horizontal and vertical rolls, producing straight, almost perfectly parallel rolled edges.

Analysis

	Carbon	Manganese	Phosphorus	Sulphur
A-36	.24 Max.	.80 - 1.20	.04 Max.	.05 Max.
A-529 GR.50	.27 Max.	1.35 Max.	.04 Max.	.05 Max.

Applications

These plates are used for base plates, cover plates and a wide variety of uses where long narrow plates are desired and the appearance of specification require a finished edge. UM Plates are not recommended for lengthwise bending or breaking, such as formed channels.

Specified Mechanical Properties

	Tensile Strength (P.S.I.)	Yield Strength (P.S.I.)	Elongation In 8 Inches
A-36	58,000 - 80,000	36,000 Min.	20%
A-529 Gr. 50	70,000 - 100,000	50,000 Min.	18%

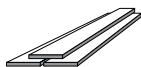
Machinability

This is not considered a free machining grade, although it is satisfactory for moderate machining operations.

Weldability

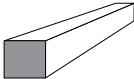
This material presents no welding problems, when using all welding processes. Welding quality is generally extremely high. Welding rod specifications are dependent on welding conditions such as thickness of section, service requirements and design.

Weights For UM Plates



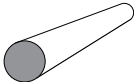
Size In Inches					Wt. Per Foot	Wt. Per 20 Ft.	Size In Inches					Wt. Per Foot	Wt. Per 20 Ft.			
1/4	x	9	7.66	153.1	1/2	x	11	18.72	374.4	5/8	x	9	19.15	383.0		
		10	8.51	170.2			12	20.42	408.4			10	21.27	425.4		
		11	9.36	187.2			14	23.82	476.5			12	25.52	510.5		
		12	10.21	204.2			14	29.77	595.5							
5/16	x	9	9.57	191.4	3/4	x	9	22.97	459.4	1	x	9	30.63	612.6		
		10	10.64	212.8			10	25.52	510.5			12	34.03	680.6		
		12	12.76	255.2			14	29.77	595.5			14	40.84	816.8		
		14	14.89	297.7			12	40.84	816.8			14	47.65	952.9		
3/8	x	9	11.49	229.8	1/2	x	9	15.31	306.3							
		10	12.76	255.2			10	17.02	340.4							
		11	14.03	280.6												
		12	15.31	306.3												
1/2	x	9	15.31	306.3												
		10	17.02	340.4												

Hot Rolled Squares



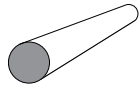
Size In Inches	Wt. Per Foot	Wt. Per 20 Ft.	Size In Inches	Wt. Per Foot	Wt. Per 20 Ft.
1/4	.213	4.26	1 5/8	8.986	179.72
5/16	.332	6.64	1 3/4	10.423	208.46
3/8	.478	9.56	2	13.310	266.20
7/16	.652	13.04	2 1/8	15.367	307.34
1/2	.851	17.02	2 1/4	17.229	344.58
5/8	1.329	26.58	2 1/2	21.270	425.40
3/4	1.915	38.30	2 3/4	25.737	514.74
7/8	2.605	52.10	3	30.629	612.58
1	3.403	68.06	3 1/4	35.944	718.88
1 1/8	4.307	86.14	3 1/2	41.689	833.78
1 1/4	5.318	106.36	4	54.451	1089.02
1 3/8	6.434	128.68	4 1/2	68.915	1378.30
1 1/2	7.567	153.14	5	85.080	1701.60

Hot Rolled Rounds



Size In Inches	Wt. Per Foot	Wt. Per 20 Ft.	Size In Inches	Wt. Per Foot	Wt. Per 20 Ft.
3/16	.094	1.88	1 1/2	6.014	120.28
1/4	.167	3.34	1 5/8	7.058	141.16
5/16	.261	5.22	1 3/4	8.186	163.72
3/8	.376	7.52	1 7/8	9.397	187.94
7/16	.511	10.22	2	10.690	213.80
1/2	.669	13.38	2 1/8	12.071	241.42
9/16	.846	16.92	2 1/4	13.533	270.66
5/8	1.044	20.88	2 5/16	14.293	285.86
3/4	1.503	30.06	2 3/8	15.074	301.48
7/8	2.046	40.92	2 1/2	16.706	334.12
1	2.673	53.46	2 5/8	18.417	368.34
1 1/8	3.382	67.64	2 3/4	20.219	404.38
1 1/4	4.177	83.54	2 7/8	22.091	441.82
1 3/8	5.054	101.08	3	24.053	481.06

Hot Rolled Rounds (Continued)



Size In Inches	Wt. Per Foot	Wt. Per 20 Ft.	Size In Inches	Wt. Per Foot	Wt. Per 20 Ft.
3 1/4	28.237	564.74	6 1/4	104.398	2087.96
3 3/8	30.449	608.98	6 1/2	112.926	2258.52
3 1/2	32.741	654.82	6 3/4	121.785	2435.70
3 5/8	35.123	702.46	7	130.973	2619.46
3 3/4	37.585	751.70	7 1/4	140.492	2809.84
3 7/8	40.138	802.76	7 1/2	150.352	3007.04
4	42.770	855.40	7 3/4	160.541	3210.82
4 1/4	48.275	965.50	8	171.061	3421.22
4 1/2	54.131	1082.62	8 1/4	181.921	3638.42
4 3/4	60.307	1206.14	8 1/2	193.112	3862.24
5	66.823	1336.46	8 3/4	204.643	4092.86
5 1/4	73.669	1473.38	9	216.504	4330.08
5 1/2	80.856	1617.12	9 1/4	228.695	4573.90
5 3/4	88.373	1767.46	9 1/2	241.227	4824.54
6	96.221	1924.42	10	267.342	5346.84

Concrete Reinforcing Bars Weights & Dimensions

Bar Number (Metric)	Weight Per Ft.	Nominal Diameter	Nominal Dec. Diam.	Cross Section Area (In ²)	Perimeter In Inches
3 (10)	.376	3/8	0.375	0.11	1.178
4 (13)	.669	1/2	0.500	0.20	1.571
5 (16)	1.044	5/8	0.625	0.31	1.963
6 (19)	1.503	3/4	0.750	0.44	2.356
7 (22)	2.046	7/8	0.875	0.60	2.749
8 (25)	2.673	1	1.00	0.79	3.142
9 (29)	3.403	1 1/8	1.128	1.00	3.544
10 (32)	4.307	1 1/4	1.270	1.27	3.990
11 (36)	5.318	1 3/8	1.410	1.56	4.430
14 (43)	7.650	1 5/8	1.693	2.25	5.320
18	13.600	2 1/4	2.257	4.00	7.090

The background of the image is a close-up, blue-tinted photograph of expanded metal grating. The grating consists of a grid of rectangular openings, with the metal bars forming the grid lines. The lighting is even, highlighting the texture and structure of the metal.

EXPANDED METAL & GRATING PRODUCTS



Expanded Metal & Grating Products

Expanded Metal, Expanded metal Grating, Bar Grating, PDM Stair Treads and Diamond Grip are all products that have openings in their horizontal surfaces, which increase friction for safer climbing and standing, and allow dirt, oil, etc. to fall through. This provides a certain amount of self cleaning.

Expanded Metal - Raised

Style Designation	Stock Sizes	Center to Center of Bonds		Thickness of Strand	Weight in Pounds Per Square Foot	
		Width	Length		Plain	Galv.
1/4 - No. 18	48 x 96	.255	1.00	.048	1.14	1.71
1/2 - No.18	48 x 96	.500	1.20	.048	.70	.85
1/2 - No. 16	48 x 96	.500	1.20	.060	.86	.97
1/2 - No. 13	48 x 96	.500	1.20	.092	1.47	1.73
3/4 - No. 16	48 x 96	.923	2.00	.060	.54	.65
3/4 - No. 13	48 x 96	.923	2.00	.092	.80	.92
3/4 - No. 10	48 x 96	.923	2.00	.092	1.20	1.36
3/4 - No. 9	48 x 96	.923	2.00	.134	1.80	1.95
1 - No. 16	48 x 96	1.090	2.40	.060	.44	.51
1 1/2 - No. 16	48 x 96	1.330	3.00	.060	.400	.48
1 1/2 - No. 13	48 x 96	1.330	3.00	.092	.60	.68
1 1/2 - No. 10	48 x 96	1.330	3.00	.092	.79	.89
1 1/2 - No. 9	48 x 96	1.330	3.00	.134	1.20	1.31
1 1/2 - No. 6	48 x 96	1.330	3.00	.198	2.50	2.73
2 - No. 9	48 x 96	1.850	4.00	.134	.90	1.02

Expanded Metal - Flattened

		Center to Center of Bonds		Weight in Pounds Per Square Foot		
Style Designation	Stock Sizes	Width	Length	Thickness of Strand	Plain	Galv.
1/4 - No. 20	48 x 96	.255	1.03	.030	.83	1.24
1/4 - No. 18	48 x 96	.255	1.03	.040	1.11	1.65
1/2 - No. 20	48 x 96	.500	1.26	.029	.40	.51
1/2 - No. 18	48 x 96	.500	1.26	.039	.66	.88
1/2 - No. 16	48 x 96	.500	1.26	.050	.82	1.00
1/2 - No. 13	48 x 96	.500	1.26	.070	1.40	1.62
3/4 - No. 16	48 x 96	.923	2.10	.048	.51	.61
3/4 - No. 14	48 x 96	.923	2.12	.061	.63	.75
3/4 - No. 13	48 x 96	.923	2.10	.070	.76	.86
3/4 - No. 9	48 x 96	.923	2.12	.120	1.71	1.86
3/4 - No. 9	48 x 120	.923	2.12	.120	1.71	1.86
3/4 - No. 9	48 x 144	.923	2.12	.120	1.71	1.86
1 - No. 16	48 x 96	1.090	2.56	.048	.41	.50
1 1/2 - No. 13	48 x 96	1.330	3.20	.070	.57	.68
1 1/2 - No. 9	48 x 96	1.330	3.20	.110	1.11	1.28

Expanded Metal - Grating

		Center to Center of Bonds		Weight in Pounds Per Square Foot	
Style Designation	Stock Sizes	Width	Length	Plain	Galv.
3.0 Lb Catwalk	120 x 24	1.33	5.33	3.00	3.20
3.0 Lb. Grating	48 x 96	1.33	5.33	3.00	3.20
3.0 Lb Grating	48 x 120	1.33	5.33	3.00	3.20
3.14 Lb Skywalk	48 x 96	2.00	6.00	3.14	3.34
3.14 Lb Skwalk	48 x 120	2.00	6.00	3.14	3.34
4.0 Lb Grating	48 x 96	1.33	5.33	4.00	4.30
4.0 Lb Grating	48 x 120	1.33	5.33	4.00	4.30
4.27 Lb Walkway	48 x 96	1.41	4.00	4.27	4.57
5.0 Lb Grating	48 x 96	1.33	5.33	5.00	5.50
5.0 Lb Grating	48 x 120	1.33	5.33	5.00	5.50
6.25 Lb Grating	48 x 96	1.41	5.33	6.25	6.85

Expanded Metal Terminology

Material Terminology

Expanded Metal (also called raised or regular expanded metal) is metal sheet that is simultaneously slit and stretched into a rigid, open mesh. It is available in carbon, stainless and galvanized steel, and in aluminum.

Flattened Expanded Metal is made by passing expanded metal through a rolling mill to flatten it. This process reduces the thickness slightly and provides a smooth, flat surface.

Expanded Metal Grating is made from thicker sheet or plate, by a process similar to that which produces expanded metal. Expanded metal grating is often used for catwalks and platform applications where self cleaning and good footing are required.

Decorative Expanded Metal is manufactured so that the open areas have unique, decorative shapes.

Expanded Metal Stair Treads use expanded metal grating for the horizontal surfaces, flat bar for the vertical surfaces and angles at the corners.

The **Bond** is the point where adjacent Strands intersect. The bond is always twice the width of the strand.

C.S.F. (100 Square Feet) is the unit of measure that is used to weigh and price expanded metal.

Camber is a slight bow, which can occur during manufacturing and results in an out-of-square-condition.

Deburring is a process whereby most expanded metal is passed through rotary steel brushes to remove burrs and rough edges. Expanded metal grating and very light expanded metal are generally not deburred.

The **Diamond** is the diamond-shaped open area formed by the Strands and bonds (also referred to as the **Opening**).

F.X.M. is the commonly used abbreviation for Flattened Expanded Metal.

L.W.D. or **L.W.O.** refers to the Long Way of the Diamond or Long Way of the Opening. This is used to make it clear that you are measuring in a direction that is parallel to the largest dimension of the diamond.

Mesh is the nominal distance, expressed in inches, from the center of one bond to the center of an adjacent bond measured across the S.W.D.

The **Opening Size** is the area enclosed by the Strands and bonds.

The **Overall Thickness** is the finished thickness of the sheet, which often determines the selection of framing components.

The **Percent of Open Area** is used by designers to calculate the degree to which light and air can pass through a piece of expanded metal.

The **Pitch** is the measurement from a point on one diamond to the same point on an adjacent diamond.

R.X.M. is the commonly used abbreviation from Raised Expanded Metal.

S.W.D. or **S.W.O.** refers to the Short Way of the Diamond or the Short Way of the Opening. This is used to make it clear that you are measuring in a direction that is parallel to the smallest dimension of the diamond.

The **Strand** is the single metal strip that forms the border of the diamond, or opening. The strand has thickness (the thickness of the sheet) and width.

Welded Bar Grating Products

Welded Bar Grating is a manufactured product which has a multitude of uses. For instance, it is used to cover trenches in pavements, to make self-cleaning stair treads and to construct platforms around equipment.

There are a number of questions that you will need to answer when ordering Welded Bar Grating:

1. What material? Most Welded Bar Grating is made from carbon steel but it is also available in Stainless Steel and Aluminum. A similar product is made from fiberglass for use in highly corrosive applications.

2. Which way do the bearing bars run? For greatest strength the bearing bars will usually run the short way of the span. (If you had a trench that was 10"x 120" the bearing bars would normally span the 10" dimension of your trench. See the illustration of bearing and cross bars on the next page).

3. What is the size of the area that you need to cover? Give the size in inches and remember to allow for clearance. If you are putting grating into a 10" wide trench, a 10" wide piece of grating will not fit. You would want to order your grating somewhat narrower, say 9 3/4" or 9 7/8" in width in order to clear.

4. Are the pieces to be banded? Banding is used to close the spaces between the bearing bars. This makes for a more finished look, keeps the ends from being bent out of shape and reduces the change of injury from the exposed ends of the bearing bars when the pieces have to be handled.

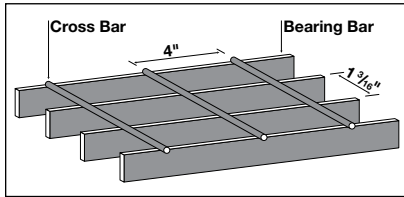
5. Are the pieces to be painted or galvanized? When special ordering you may specify that the grating be painted or galvanized by the manufacturer.

6. Are the bearing bars to be serrated or smooth? When special ordering you may specify that the top edge of the bearing bars be cut in such a manner that a series of bumps will provide greater friction.

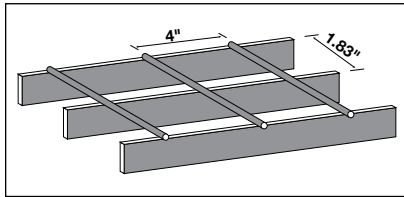
Remember that while Welded Bar Grating is available in custom sizes, you will want to work from standard 3' x 24' panels whenever possible. (4' wide panels may be special ordered). This means that in the example of a 10"x 120" trench used above it would take 3 pieces 10" by 36" and 1 piece 10" x 12" to cover the trench with bearing bars running the short way of the span.

While it might seem easier to cover the area with one piece, you would have to run the bearing bars the 10' way to cover the trench with one piece. The 10' span would be very weak. Remember also, that you may occasionally have to remove the grating to clean your trench and one man can handle three-foot long pieces more easily than he can handle a ten foot long piece.

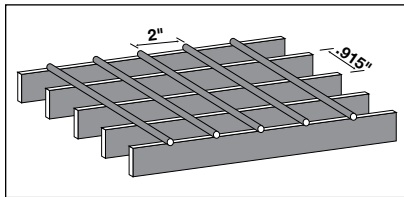
Types & Spacings of Welded Bar Grating



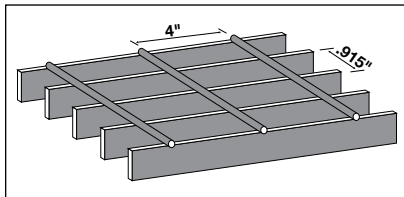
Standard welded spacing pattern according to Federal specification RRG-661c. Bearing bars on 1 3/16" centers. Cross bars on 4" centers. Most commonly used pattern.



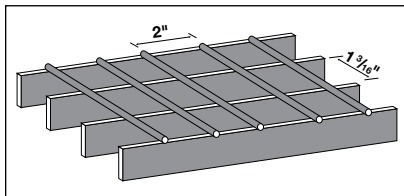
Cross bars on 4" centers. Bearing bar spacing opened up on 1.83" centers. This grating is used for maximum light and air circulation.



Cross bars on 2" centers with bearing bars on .915" centers. Ideal for sidewalks. Accommodates bicycle traffic.



Bearing bars on .915" centers. Cross bars on 4" centers. Used where heavy loads are applied and depth is restricted.



Cross bar spacing narrowed to 2" centers. Bearing bars on 1 3/16" centers. Increased surface contact for long life under heavy traffic.

Bar Grating Load Table

		U= Uniform Load	D= Deflection	C= Concentrted Load		
Bearing Bar Size In Inches		Span				
		2'0"	2'6"	3'0"	3'6"	4'0"
3/16 x 3/4	U	575	370	259	186	144
	D	.093	.152	.218	.294	.373
	C	579	463	388	330	289
	D	.077	.120	.173	.235	.310
1/8 x 1	U	688	440	304	225	172
	D	.073	.110	.160	.219	.286
	C	688	549	459	391	343
	D	.059	.091	.129	.175	.232
3/16 x 1	U	1030	659	460	335	256
	D	.073	.112	.160	.219	.287
	C	1029	822	687	588	513
	D	.058	.090	.129	.176	.230
1/8 x 1 1/4	U	1072	688	475	351	269
	D	.059	.090	.175	.233	.290
	C	1074	859	714	610	538
	D	.048	.073	.104	.142	.180
3/16 x 1 1/4	U	1610	1029	714	528	401
	D	.059	.090	.128	.174	.230
	C	1610	1283	1074	919	801
	D	.048	.073	.105	.141	.180
1/8 x 1 1/2	U	1541	988	687	501	387
	D	.045	.074	.106	.148	.193
	C	1542	1237	1030	884	723
	D	.038	.058	.086	.116	.155
3/16 x 1 1/2	U	2320	1484	1032	75	580
	D	.047	.076	.107	.148	.193
	C	2320	1858	1548	1325	1160
	D	.038	.060	.088	.088	.154
3/16 x 1 3/4	U	3140	2018	1401	1030	788
	D	.041	.062	.093	.126	.164
	C	3150	2522	2100	1803	1573
	D	.031	.053	.075	.100	.134
3/16 x 2	U	4118	2633	1830	1346	1029
	D	.038	.058	.080	.112	.140
	C	4118	3293	2748	2350	2059
	D	.029	.047	.062	.089	.116
3/16 x 2 1/4	U	5210	3330	2310	1670	1301
	D	.033	.050	.073	.099	.128
	C	5210	4169	3475	2913	2604
	D	.028	.040	.058	.080	.103





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