

Other Products

Additional Metal Product Offerings

Flat Ground Stock Size Chart	9-2 thru 9-3
Characteristics & Metallurgical	9-4 thru 9-6
Drill Rod	9-7 thru 9-12
Dura-Bar	9-13 thru 9-29
Dura-Bar Tolerances	9-30 thru 9-32
Expanded Metal	9-33 thru 9-42
Perforated Carbon Steel Sheets	9-43 thru 9-44
Safety Grating Products	9-45 thru 9-48
Fiberglass Grating	9-49 thru 9-51
Fully Threaded Steel Bars	9-52
Square Key Stock	9-52
Steel Strapping	9-53
Diamond Case Shafting	9-54 thru 9-55
Seals & Tools for Strapping	9-56 thru 9-57
Shipping Steel Strapping	9-58



WARNING: These products can potentially expose you to chemicals including Nickel, Chromium, Lead, Cobalt, Mercury and Beryllium, which are known to the state of California to cause cancer and/or birth defects or other reproductive harm. For more information, visit www.P65Warnings.ca.gov

Flat Ground Stock Size Chart

Low Carbon • A-2 • A-6 • D-2 • O-1 • O-6 • S-7 • 4142

Other
Products

Alro Steel Metals Guide

Size (inches)	Weight (lbs./inch)
1/16 x	
1/2	0.009
3/4	0.013
1-1/4	0.022
2	0.035
2-1/2	0.044
3	0.053
3-1/2	0.062
4	0.071
5	0.089
6	0.106
8	0.142
10	0.177
12	0.213
3/32 x	
1/2	0.013
3/4	0.020
1	0.027
1-1/4	0.033
1-1/2	0.040
2	0.053
2-1/2	0.066
3	0.080
3-1/2	0.093
4	0.106
5	0.133
6	0.159
8	0.213
10	0.266
12	0.319
1/8 x	
1/2	0.018
3/4	0.027
1	0.035
1-1/4	0.044
1-1/2	0.053
2	0.071
2-1/2	0.089
3	0.106
3-1/2	0.124
4	0.142
5	0.177
6	0.213
8	0.283
10	0.354
12	0.425

Size (inches)	Weight (lbs./inch)
5/32 x	
1/2	0.022
3/4	0.033
1	0.044
1-1/4	0.055
1-1/2	0.066
2	0.089
2-1/2	0.111
3	0.133
3-1/2	0.155
4	0.177
5	0.221
6	0.266
8	0.354
10	0.443
12	0.531
3/16 x	
3/16	0.010
1/2	0.027
3/4	0.040
1	0.053
1-1/4	0.066
1-1/2	0.080
2	0.106
2-1/2	0.133
3	0.159
3-1/2	0.186
4	0.213
5	0.266
6	0.319
8	0.425
10	0.531
12	0.638
1/4 x	
1/4	0.018
1/2	0.035
3/4	0.053
1	0.071
1-1/4	0.089
1-1/2	0.106
2	0.142
2-1/2	0.177
3	0.213
3-1/2	0.248
4	0.283
5	0.354

Size (inches)	Weight (lbs./inch)
1/4 x	
6	0.425
8	0.567
10	0.708
12	0.850
5/16 x	
5/16	0.028
1/2	0.044
3/4	0.066
1	0.089
1-1/4	0.111
1-1/2	0.133
2	0.177
2-1/2	0.221
3	0.266
3-1/2	0.310
4	0.354
5	0.443
6	0.531
7	0.620
8	0.708
9	0.797
10	0.885
12	1.063
3/8 x	
3/8	0.040
1/2	0.053
3/4	0.080
1	0.106
1-1/4	0.133
1-1/2	0.159
2	0.213
2-1/2	0.266
3	0.319
3-1/2	0.372
4	0.425
5	0.531
6	0.638
7	0.744
8	0.850
9	0.956
10	1.063
12	1.275
7/16 x	
7/16	0.054

Please refer to pages 9-5 thru 9-6 for metallurgical data.

Available in 24" lengths.

Continued on next page



Flat Ground Stock Size Chart

Low Carbon • A-2 • A-6 • D-2 • O-1 • O-6 • S-7 • 4142

Size (inches)	Weight (lbs./inch)
1/2 x	
1/2	0.071
3/4	0.106
1	0.142
1-1/4	0.177
1-1/2	0.213
2	0.283
2-1/2	0.354
3	0.425
3-1/2	0.496
4	0.567
5	0.708
6	0.850
7	0.992
8	1.133
9	1.275
10	1.417
12	1.700
5/8 x	
5/8	0.111
3/4	0.133
1	0.177
1-1/4	0.221
1-1/2	0.266
2	0.354
2-1/2	0.443
3	0.531
3-1/2	0.620
4	0.708
5	0.885
6	1.063
7	1.240
8	1.417
9	1.594
10	1.771
12	2.125
3/4 x	
3/4	0.159
1	0.213
1-1/4	0.266
1-1/2	0.319
2	0.425
2-1/2	0.531

Size (inches)	Weight (lbs./inch)
3/4 x	
3	0.638
3-1/2	0.744
4	0.850
5	1.063
6	1.275
7	1.488
8	1.700
9	1.913
10	2.125
12	2.550
7/8 x	
7/8	0.217
1	0.248
1-1/4	0.310
1-1/2	0.372
2	0.496
2-1/2	0.620
3	0.744
3-1/2	0.868
4	0.992
5	1.240
6	1.488
7	1.735
8	1.983
9	2.231
10	2.479
12	2.975
1 x	
1	0.283
1-1/4	0.354
1-1/2	0.425
2	0.567
2-1/2	0.708
3	0.850
3-1/2	0.992
4	1.133
5	1.417
6	1.700
7	1.983
8	2.267
9	2.550
10	2.833
12	3.400

Size (inches)	Weight (lbs./inch)
1-1/8 x	
1-1/8	0.359
1-1/4 x	
1-1/4	0.443
1-1/2	0.531
2	0.708
2-1/2	0.885
3	1.063
3-1/2	1.240
4	1.417
5	1.771
6	2.125
7	2.479
8	2.833
9	3.188
10	3.542
12	4.250
14	4.958
16	5.667
1-1/2 x	
1-1/2	0.638
2	0.850
2-1/2	1.063
3	1.275
3-1/2	1.488
4	1.700
5	2.125
6	2.550
7	2.975
8	3.400
9	3.825
10	4.250
12	5.100
14	5.950
16	6.800
1-7/8x	
1-7/8	0.996
2-1/4x	
2-1/4	1.434
2-3/8 x	
2-3/8	1.598
2-1/2 x	
2-1/2	1.771

Other
Products

Alro Steel Metals Guide

Please refer to pages 9-5 thru 9-6 for metallurgical data.

Available in 24" lengths.

Characteristics

AISI / SAE 01 Flat Ground Stock

01 Flat Ground Stock is an electric furnace melt oil-hardening tool steel supplied with a fully spheroidized structure. A non-shrinking general-purpose tool steel, it has excellent abrasion resistance, toughness and machinability characteristics.

AISI / SAE A2 Flat Ground Stock

A2 Flat Ground Stock is made from fine grain, electric furnace air-hardening, 5% chrome tool steel. It is a superior quality steel which has excellent wear and abrasion resistance properties. A2 is furnished with a fully spheroidized structure and is 100% free of decarb and other surface imperfections.

AISI / SAE D2 Flat Ground Stock

D2 Flat Ground Stock is a fine quality, air-hardening, electric furnace melt tool steel. The combination of superior abrasion resistance and toughness found in D2 results from its high carbon and high chromium analysis. D2 is an extraordinary tool steel that can be specified for the most demanding application. It is, of course, supplied in the full spheroidized condition, 100% free of decarb and other surface imperfections.

AISI / SAE S7 Flat Ground Stock

S7 Flat Ground Stock is an excellent air-hardening shock steel that can be and is often used in hot work applications where the tool temperature does not exceed 1000° F. S7 combines the qualities of high strength and good ductility for cold and medium hot work applications.

AISI / SAE C1018 Low Carbon Flat Ground Stock

C1018 Flat Ground Stock is fine-grained, vacuum-degassed carbon steel. It is easily machined, has excellent weldability, and responds uniformly to case hardening. The manganese content provides greater strength and hardness compared to many other carbon steels. It is often used in its natural state for such applications as back-up plate, stripper plates, punch pads, and machine parts. As a case-hardened material, it is used for jigs, fixtures, cams, and patterns.

AISI / SAE 4142 Pre-Hardened Flat Ground Stock

4142 Flat Ground Stock is a modified pre-hardened alloy steel with a Brinell hardness of 261-321 (Rc28-32). It is normalized and tempered in a machinable condition of approximately 85% of a 1.00 carbon steel. It is useful in applications requiring a lower hardness and less wear resistance than a fully heat treated tool steel, but can be flame-hardened where a hardness is desired.

Metallurgical Data - Flat Ground Stock

Chemistry and Specifications

The chemical composition of all Flat Ground Stock falls within ranges that are rigidly controlled and in many cases much tighter than those widely accepted under industry specifications. This insures maximum predictability and consistency in service. The chemical ranges and specifications met are shown below.

Chemical Compositions (%)							
Grade	01	A2	A6	D2	S7	Low Carbon	4142
Carbon	.85-1.00	.95-1.05	.65-.75	1.40-1.60	.45-.55	.15-.20	.38-.46
Manganese	1.00-1.40	1.00 MAX	1.80-2.50	.60 MAX	.20-.80	.60-.90	.70-1.00
Silicon		.50 MAX	.50 MAX	.50 MAX	.60 MAX	.20-1.00	.15-.30
Phosphorus						.050 MAX	.040 MAX
Sulphur						.050 MAX	.040 MAX
Chromium	.40-.60	4.75-5.50	.90-1.20	11.00-13.00	3.00-3.50		.80-1.15
Vanadium	.30 MAX	.15-.50		1.10 MAX	.30 MAX		.030 MIN
Tungsten	.40-.60						
Molybdenum		.90-1.40	.90-1.40	.70-1.20	1.30-1.80		.15-.25
Cobalt				1.00 MAX			
Nickel	.30 MAX	.30 MAX	.30 MAX	.30 MAX			

Other
Products

Tolerances - Flat Ground Stock

Thickness Regular.....	±.001"
Thickness Oversize	+.010/.015"
Width Regular.....	+.000/.005"
Width Oversize	+.010/.015"
Squares Regular.....	±.001"
Squares Oversize	+.010/.015"
Length 18"	+.125/.250"
Length 24"	+.1875/.375"
Length 36"	+.250/.500"
Squareness Edge	.003" per inch of thickness
Squareness End	.004" per inch of width

Alro Steel Metals Guide



Metallurgical Data - Flat Ground Stock

Surface Conditions and Finish

All Flat Ground Stock is 100% free of decarburization on all six sides and can heat treated without further metal removal. Thickness and width are horizontally ground to a maximum finish of 35 R^a. Blanchard ground squares are vertically ground to a maximum finish of 80 R^a.

Physical Properties

Hardness			
Grade	Brinell	Rockwell	Machinability (Compared to 1.0% Carbon Tool Steel)
O1	177-212	R ^b 88-95	85
A2	200-235	R ^b 94-99	65
A6	217-248	R ^b 96-101	85
D2	220-255	R ^b 97-R ^c 25	50
S7	188-223	R ^b 90-97	95
Low Carbon	168 Max	R ^b 85 Max	—
4142	261-321	R ^c 26-34	85

Microstructure

All tool steel analyses (O1, A2, A6, D2, S7) are supplied in the annealed condition. Close control assures complete spheroidization throughout. The low carbon analysis is supplied with pearlitic microstructure.

Cross-Rolling

All Flat Ground Stock is produced from cross-rolled sheet or plate, assuring a more homogeneous structure and finer grain size than any of the other types. Furthermore, the cross-rolling process significantly enhances toughness of the product and increases tensile strength in the transverse direction.

Saw-Cut and Sheared Ends

All ends of Flat Ground Stock are precisely cut and deburred to ensure excellent yields and handling safety. Thicknesses 3/16" and up are cold sawn, while lighter sections are sheared.



Drill Rod

Stock Lengths: 3 foot (*Available in 12 foot lengths)

Size	Dec.	W-1*	O-1*	S-7	A-2*	D-2	M-2	H-13 RC 42/46
69	.0290	●	●					
68	.0300	●	●					
67	.0310	●	●					
1/32	.0312	●	●					
66	.0320	●	●					
65	.0330	●	●					
64	.0350	●	●					
63	.0360	●	●					
62	.0370	●	●					
61	.0380	●	●					
60	.0390	●	●					
59	.0400	●	●					
58	.0410	●	●					
57	.0420	●	●					
56	.0450	●	●					
3/64	.0468	●	●					
55	.0500	●	●					
54	.0550	●	●					
53	.0580	●	●					
1/16	.0625	●	●		●	●	●	●
52	.0630	●	●					
51	.0660	●	●					
50	.0690	●	●					
49	.0720	●	●					
48	.0750	●	●					
47	.0770	●	●					
5/64	.0781	●	●		●	●	●	●
46	.0790	●	●					
45	.0810	●	●					
44	.0850	●	●					
43	.0880	●	●					
42	.0920	●	●					
3/32	.0937	●	●		●	●	●	●
41	.0950	●	●					
40	.0970	●	●					
39	.0990	●	●					
38	.1010	●	●					
37	.1030	●	●					
36	.1060	●	●					
35	.1080	●	●					
7/64	.1093	●	●		●	●	●	●
34	.1100	●	●					
33	.1120	●	●					
32	.1150	●	●					

Size letter and number designations refer to non-standard fractional sizes.
Please refer to page 9-12 for drill rod specifications and tolerances.
Sizes not listed are available upon request.

Continued on next page

Other
Products

Alro Steel Metals Guide



Drill Rod

Stock Lengths: 3 foot (*Available in 12 foot lengths)

Size	Dec.	W-1*	O-1*	S-7	A-2*	D-2	M-2	H-13 RC 42/46
31	.1200	●	●					
1/8	.1250	●	●	●	●	●	●	●
30	.1270	●	●					
29	.1340	●	●					
28	.1390	●	●					
9/64	.1406	●	●		●	●	●	●
27	.1430	●	●					
26	.1460	●	●					
25	.1480	●	●					
24	.1510	●	●					
23	.1530	●	●					
22	.1550	●	●					
5/32	.1562	●	●	●	●	●	●	●
21	.1570	●	●					
20	.1610	●	●					
19	.1640	●	●					
18	.1680	●	●					
11/64	.1718	●	●		●	●	●	●
17	.1720	●	●					
16	.1750	●	●					
15	.1780	●	●					
14	.1800	●	●					
13	.1820	●	●					
12	.1850	●	●					
3/16	.1874	●	●	●	●	●	●	●
11	.1880	●	●					
10	.1910	●	●					
9	.1930	●	●					
8	.1970	●	●					
7	.1990	●	●					
6	.2010	●	●					
13/64	.2031	●	●	●	●	●	●	●
5	.2040	●	●					
4	.2070	●	●					
3	.2120	●	●					
7/32	.2187	●	●	●	●	●	●	●
2	.2190	●	●					
1	.2270	●	●					
A	.2340	●	●					
15/64	.2343	●	●	●	●	●	●	●
B	.2380	●	●					
C	.2420	●	●					
D	.2460	●	●					
1/4	.2500	●	●	●	●	●	●	●

Size letter and number designations refer to non-standard fractional sizes.
Please refer to page 9-12 for drill rod specifications and tolerances.
Sizes not listed are available upon request.

Continued on next page



Drill Rod

Stock Lengths: 3 foot (*Available in 12 foot lengths)

Size	Dec.	W-1*	O-1*	S-7	A-2*	D-2	M-2	H-13 RC 42/46
E	.2500	●	●					
F	.2570	●	●					
G	.2610	●	●					
17/64	.2656	●	●		●	●	●	●
H	.2660	●	●					
I	.2720	●	●					
J	.2770	●	●					
K	.2810	●	●					
9/32	.2812	●	●	●	●	●	●	●
L	.2900	●	●					
M	.2950	●	●					
19/64	.2968	●	●		●	●	●	●
N	.3020	●	●					
5/16	.3125	●	●	●	●	●	●	●
O	.3160	●	●					
P	.3230	●	●					
21/64	.3281	●	●		●	●	●	●
Q	.3320	●	●					
R	.3390	●	●					
11/32	.3437	●	●	●	●	●	●	●
S	.3480	●	●					
T	.3580	●	●					
23/64	.3593	●	●		●	●	●	●
U	.3680	●	●					
3/8	.3750	●	●	●	●	●	●	●
V	.3770	●	●					
W	.3860	●	●					
25/64	.3906	●	●		●	●	●	●
X	.3970	●	●					
Y	.4040	●	●					
13/32	.4062	●	●		●	●	●	●
Z	.4130	●	●					
27/64	.4218	●	●		●	●	●	●
7/16	.4375	●	●	●	●	●	●	●
29/64	.4531	●	●		●	●	●	●
15/32	.4687	●	●		●	●	●	●
31/64	.4843	●	●		●	●	●	●
1/2	.5000	●	●	●	●	●	●	●
33/64	.5156	●	●					
17/32	.5312	●	●	●	●	●	●	●
35/64	.5468	●	●					
9/16	.5625	●	●	●	●	●	●	●
37/64	.5781	●	●					
19/32	.5937	●	●		●	●	●	●

Size letter and number designations refer to non-standard fractional sizes.
Please refer to page 9-12 for drill rod specifications and tolerances.
Sizes not listed are available upon request.

Other
Products

Alro Steel Metals Guide

Continued on next page



Drill Rod

Stock Lengths: 3 foot (*Available in 12 foot lengths)

Size	Dec.	W-1*	O-1*	S-7	A-2*	D-2	M-2	H-13 RC 42/46
39/64	.6093	●	●					
5/8	.6250	●	●	●	●	●	●	●
41/64	.6406	●	●					
21/32	.6562	●	●	●	●	●	●	●
43/64	.6718	●	●					
11/16	.6875	●	●	●	●	●	●	●
45/64	.7031	●	●					
23/32	.7187	●	●	●	●	●	●	●
47/64	.7343	●	●					
3/4	.7500	●	●	●	●	●	●	●
49/64	.7656	●	●					
25/32	.7812	●	●					
51/64	.7968	●	●					
13/16	.8125	●	●	●	●	●	●	●
53/64	.8281	●	●					
27/32	.8437	●	●					
55/64	.8593	●	●					
7/8	.8750	●	●	●	●	●	●	●
57/64	.8906	●	●					
29/32	.9062	●	●					
59/64	.9281	●	●					
15/16	.9375	●	●		●	●	●	●
61/64	.9531	●	●					
31/32	.9687	●	●					
63/64	.9843	●	●					
1	1.0000	●	●	●	●	●	●	●
1-1/64	1.0156	●	●					
1-1/32	1.0312	●	●					
1-3/64	1.0468	●	●					
1-1/16	1.0625	●	●		●			
1-5/64	1.0781	●	●					
1-3/32	1.0937	●	●					
1-7/64	1.1093	●	●					
1-1/8	1.1250	●	●	●	●	●	●	●
1-9/64	1.1406	●	●					
1-5/32	1.1562	●	●					
1-11/64	1.1718	●	●					
1-3/16	1.1875	●	●				●	
1-13/64	1.2031	●	●					
1-7/32	1.2187	●	●					
1-15/64	1.2343	●	●					
1-1/4	1.2500	●	●	●	●	●	●	●

Please refer to page 9-12 for drill rod specifications and tolerances.
Sizes not listed are available upon request.

Continued on next page



Drill Rod

Stock Lengths: 3 foot (*Available in 12 foot lengths)

Size	Dec.	W-1*	O-1*	S-7	A-2*	D-2	M-2	H-13 RC 42/46
1-17/64	1.2656	●	●					
1-9/32	1.2812	●	●					
1-19/64	1.2968	●	●					
1-5/16	1.3125	●	●				●	
1-21/64	1.3281	●	●					
1-11/32	1.3437	●	●					
1-23/64	1.3593	●	●					
1-3/8	1.3750	●	●	●	●	●		●
1-25/64	1.3906	●	●					
1-13/32	1.4062	●	●					
1-27/64	1.4218	●	●					
1-7/16	1.4375	●	●					
1-29/64	1.4531	●	●					
1-15/32	1.4687	●	●					
1-31/64	1.4843	●	●					
1-1/2	1.5000	●	●	●	●	●		●
1-9/16	1.5625	●	●					
1-5/8	1.6250	●	●					●
1-11/16	1.6875	●	●					
1-3/4	1.7500	●	●					●
1-13/16	1.8125	●	●					
1-7/8	1.8750	●	●					
1-15/16	1.9375	●	●					
2	2.0000	●	●					●

Please refer to page 9-12 for drill rod specifications and tolerances.
Sizes not listed are available upon request.

Other
Products



Drill Rod Specifications

Fine Standard Tolerances

Dimensional Tolerances			
	Standard* Tolerance (section)	Concentricity Max T.I.R.	Standard Tolerance (length)
Round Drill Rod			
3.000" to .500"	±.001"	.005"	+1/8", -.0
.499" thru .125" dia.	±.0005"	.005"	+1/8", -.0
.124" and smaller dia.	±.0003"	.005"	+1/8", -.0
Flat and Square Drill Rod			
1.000" thru .750" (largest dim.)	±.0015"		+1/8", -.0
.749" thru .250" (largest dim.)	±.001"		+1/8", -.0
.249" and smaller	±.0005"		+1/8", -.0

*Closer tolerances than standard can be produced upon inquiry.

Closely-controlled Chemical Compositions

Uniform machining properties and consistent response to heat treatment are obtained through careful control of chemical analysis.

Chemical Compositions (%)							
Grade	W1	O1	A2	S7	D2	H13	M2
Carbon	.95-1.05	.85-1.00	.95-1.05	.45-.55	1.40-1.60	.32-.45	.78-.88
Manganese	.30-.40	1.00-1.40	1.00 max	.20-.80	.60 max	.20-.50	.15-.85
Silicon	.10-.25	.50 max	.50 max	.20-1.00	.60 max	.80-1.20	.20-.45
Phosphorus	.025 max						
Sulphur	.025 max						
Chromium	.15 max	.40-.60	4.75-5.50	3.00-3.50	11.00-13.00	4.75-5.50	3.75-4.50
Vanadium	.10 max	.30 max	.15-.50	.30 max	1.10 max	.80-1.20	1.75-2.20
Tungsten	.15 max	.40-.60					
Molybdenum	.10 max		.90-1.40	1.30-1.80	.70-1.20	1.10-1.75	4.50-5.50
Cobalt					1.00 max		
Nickel		.30 max	.30 max		.30 max	.30 max	.30 max



Dura-Bar®

Continuous Cast Iron Bars

Dura-Bar® is a family of engineered cast iron bar products designed to offer the best combination of machinability, sliding wear resistance, heat treat response, noise and vibration damping and guaranteed mechanical properties when compared to most other as-rolled ferrous materials. Dura-Bar® can often be used to replace castings, some carbon steels, bearing bronze at times and extruded aluminum materials. Due to its outstanding milling and drilling characteristics, heavily machined components are usually excellent candidates for Dura-Bar® products to help reduce manufacturing costs. A full range of metallurgical, engineering, heat treating and machining data can be provided from Alro product specialists upon request.

Cast Irons are not typically referenced by chemistry rather mechanical properties, specifically strength and hardness. The primary difference in these types is the shape and distribution of graphite in their microstructure.

Dura-Bar® offers a zero defect guarantee plus the inherent benefits of cast iron such as:

- Improved machinability
- Decreased Downtime For Tooling Changes
- Lower Tool Cost
- Reduced Scrap By Using Defect-Free Material



Dura-Bar®

Grade G2/GX (Gray Iron)

G2 is a pearlitic gray iron containing Type A graphite. Gray iron bars made to this specification will have optimal strength, wear and hardness when compared to the other gray iron grades. This material is well suited for applications requiring high resistance to wear and response to heat treatment. This specification is similar to ASTM A48 Class 40.

Typical Applications

Typical applications for G2 are listed below. They are classified by industry.

Fluid Power:	Cylinder Blocks, Glands, Manifolds, Pistons, Spools, Valves.
Machinery:	Bushings, Gears, Gibs, Pulleys, Rams, Sheaves, Side Frames, Slides, Ways, Spindles, Housings.
Transportation:	Cylinder Liners, Gears, Lash Adjusters, Shock Absorber Pistons, Valve Guides, Valve Seat Inserts, Brake Rotors.
Pump and Compressor:	Liners, Pistons, Rollers, Rotors, Seals.
Oil and Gas:	Bridge Plugs, Cement Plugs, Cones, Mandrels, Retainers, Slips.
Miscellaneous:	Aluminum Mold Plates, Bushings, Cams, Chain Sheaves, Core Boxes, Dies, Gears, Pattern Plates, Pulleys, Wheels

Typical Analysis	Grade G2/GX
Carbon	2.60 - 3.75%
Silicon	1.80 - 3.00%
Manganese	0.60 - 0.95%
Sulphur	0.07% MAX
Phosphorus	0.12%
Other	
Mechanical Properties	
Brinell Hardness	183 - 301
Tensile—PSI	40,000*
Yield—PSI	-
Elongation in 2"—%	-

**The tensile data does not indicate a minimum but rather typical expected tensile strength.*

Heat Treat Response: 50 Rc on outside.

Dura-Bar G2 can be hardened by fast methods, such as flame and induction hardening, in addition to conventional quench and temper methods.

Dura-Bar G2 can be oil quench hardened from 1600° F (885° C) to a minimum hardness of Rockwell C 50 on the outside of the bar. Inside diameter hardness will be less than Rockwell C 50.



Dura-Bar®

Grade 65-45-12 (4512X)

Dura-Bar® 65-45-12 ductile iron contains nodular graphite in a matrix of ferrite with small amounts of pearlite. Because of its unmatched combination of machinability, mechanical properties and heat treat response, Grade 65-45-12 is the most often chosen material of all the Dura-Bar® iron types. The ferritic structure produces the most machinable ferrous grade of material available anywhere in combination with good surface finishes, optimal impact strengths, fatigue properties, electrical conductivity and high magnetic permeability.

This iron has approximately the same tensile and yield strengths as AISI 1020 steel in the as-rolled condition. This specification conforms to ASTM A536 grade 65-45-12.

Typical Applications

Typical applications for 65-45-12 are listed below. They are classified by industry.

Fluid Power:	Cylinder Blocks, End Caps, Gear Rack Housings, Gerotors, Manifolds, Pistons, Glands, Rotors, Valves.
Machinery:	Bushings, Chuck Bodies, Die Blocks, Gears, Journals, Pulleys, Rotary Tables, Side Frames, Spindle Housings, Tie Rod Nuts, Flywheels, Rams.
Transportation:	Rail Spacers, Sprockets.
Pump and Compressor:	Gears, Housings, Pistons, Rotary Screws.
Glass Mold:	Blank Molds, Plungers.

Typical Analysis	Grade 65-45-12
Carbon	3.50 - 3.90%
Silicon	2.25 - 3.00%
Manganese	0.15 - 0.35%
Sulphur	0.025% MAX.
Phosphorus	0.05%
Other	
Mechanical Properties	
Brinell Hardness	131 - 217
Tensile-PSI (min)	65,000
Yield-PSI (min)	45,000
Elongation in 2"-%	12%*

**In bars under 2" diameter, elongation will be 9% minimum*

Heat Treat Response: Rc 50

Dura-Bar 65-45-12 can be oil quench hardened from 1600° F (885° C) to Rockwell C 50 minimum on the outside of the bar. Hardness in the core will be less than the hardness on the outside surfaces. Typical Jominy end quench test data can be provided upon request.

This grade also responds well to surface hardening methods such as flame or induction heat treating. It is well suited for austempering because of the low residual alloy content, and the highly ferritic matrix provides predictable growth with minimal heat-distortion.

Dura-Bar®

Grade 80-55-06 (5506X)

Dura-Bar® 80-55-06 ductile iron will contain nodular graphite in a matrix of ferrite and pearlite. The pearlite/ferrite structure provides higher wear resistance and strength when compared to a ferritic grade of ductile iron. This material will be readily machinable with good surface finishes. Tensile and yield strengths will be similar to AISI 1040 steel in the as-rolled condition. This grade conforms to ASTM A536 grade 80-55-06.

Typical Applications

Typical applications for 80-55-06 are listed below. They are classified by industry.

Fluid Power:	Cylinder Blocks, Gerotors, Manifolds, Pistons, Glands, Rotors, Valve Bodies.
Machinery:	Bushings, Chain Sheave Rollers, Chuck Bodies, Die Blocks, Gears, Gear Racks, Pulleys, Press Rams, Rotary Tables Tie Rod Nuts, Guide Ways, Barrel Rollers (cement truck), Flywheels, Pile Drivers, Pulleys, Rams.
Transportation:	Pulleys, Gears, Rail Spacers.
Pump and Compressor:	Gears, Housings, Liners, Pistons, Rotary Screws.
Steel Mill:	Guide Rolls, Pinch Rolls, Runout Table Rolls.
Miscellaneous:	Disamatic Pouring Rails, Dies, Pattern Plates, Core Boxes, Grinding Rolls, Mill Liners.

Typical Analysis	Grade 80-55-06
Carbon	3.50 - 3.90%
Silicon	2.25 - 3.00%
Manganese	0.15 - 0.35%
Sulphur	.0025% max.
Phosphorus	0.05%
Other	
Mechanical Properties	
Brinell Hardness	187 - 269
Tensile-PSI (min.)	80,000
Yield-PSI (min.)	55,000
Elongation (min.)	6%*

**In bars under 1-1/2" diameter, elongation will be 4% minimum*

Heat Treat Response

Dura-Bar 80-55-06 can be oil quench hardened from 1600° (885° C) to a minimum hardness of Rockwell C 50 on the outside of the bar. The inside diameter hardness will be less than Rockwell C 50. Lower quench hardness on the inside diameters are a result of larger graphite nodules and not a loss of matrix hardness.

Typical Jominy end quench test can be provided upon request.



Dura-Bar® Rounds

Grades: **G2/GX • 80-55-06 • 65-45-12**

Stock Lengths: 12 foot

Nominal Diameter (Inches)	Weight (lbs./foot)		Gray Iron		Ductile Iron			
			Grade G2/GX		Grade 80-55-06		Grade 65-45-12	
	A/C	C/F	A/C	C/F	A/C	C/F	A/C	C/F
5/8	1.2	1.0	●	●				
3/4	1.7	1.4	●	●				
7/8	2.3	1.9	●	●				
1	2.9	2.5	●	●				
1-1/8	3.6	3.1	●	●				
1-1/4	4.4	3.9	●	●	●		●	
1-3/8	5.2	4.7	●	●	●			
1-1/2	6.2	5.6	●	●	●		●	
1-5/8	7.2	6.5	●	●	●			
1-3/4	8.3	7.6	●	●	●		●	
1-7/8	9.4	8.7	●	●				
2	10.7	9.9	●	●	●	●	●	●
2-1/8	12.2	11.1	●	●	●			
2-1/4	13.7	12.5	●	●	●		●	●
2-3/8	15.1	13.9	●	●		●		
2-1/2	16.7	15.4	●	●	●		●	●
2-5/8	18.3	17.0	●	●	●	●	●	●
2-3/4	20.0	18.6	●	●	●		●	
2-7/8	21.8	20.3	●	●				
3	23.7	22.1	●	●	●	●	●	●
3-1/8	25.9	24.0	●	●			●	
3-1/4	27.9	26.0	●	●	●		●	
3-3/8	30.0	28.0	●	●			●	
3-1/2	32.2	30.0	●	●	●		●	
3-5/8	34.5	32.3	●	●			●	
3-3/4	36.8	34.6	●	●	●	●	●	
4	41.7	39.3	●	●	●		●	●
4-1/8	44.6	41.8					●	
4-1/4	47.2	44.4	●		●		●	
4-3/8	50.0	47.0					●	
4-1/2	52.8	49.8	●		●		●	
4-5/8	55.6	52.5			●		●	
4-3/4	58.6	55.4	●		●		●	
5	64.7	61.4	●		●		●	
5-1/4	71.6	67.7	●		●		●	

NOTE: A/C refers to As-Cast
C/F refers to Cold Finished
C/G refers to Centerless Ground
C/T refers to Centerless Turned

Other
Products

Alro Steel Metals Guide

Continued on next page



Dura-Bar® Rounds

Grades: G2/GX • 80-55-06 • 65-45-12

Stock Lengths: 12 foot

Nominal Diameter (inches)	Weight (lbs./foot)		Gray Iron		Ductile Iron			
			Grade G2		Grade 80-55-06		Grade 65-45-12	
	A/C	C/F	A/C	C/F	A/C	C/F	A/C	C/F
5-1/2	78.4	74.3	●		●		●	
5-3/4	85.4	81.2	●		●		●	
6	92.8	88.4	●		●		●	
6-1/4	101.0		●		●		●	
6-1/2	109.0		●		●		●	
6-3/4	117.3		●		●		●	
7	126.0		●		●		●	
7-1/4	135.6		●		●		●	
7-1/2	144.9		●		●		●	
7-3/4	154.5		●		●		●	
8	164.4		●		●		●	
8-1/4	175.6		●		●		●	
8-1/2	186.2		●		●		●	
8-3/4	197.0		●		●		●	
9	208.1		●		●		●	
9-1/4	221.3		●		●		●	
9-1/2	233.1		●		●		●	
10	257.7		●		●		●	
10-1/4	277.9		●		●		●	
10-1/2	291.1		●		●		●	
11	318.5		●		●		●	
11-1/2	357.7		●		●		●	
12	387.9		●		●		●	
12-1/2	419.4		●		●		●	
13	452.0		●		●		●	
14	521.1		●		●		●	
15	595.0		●		●		●	
16	673.8		●		●		●	
17	773.1		●		●		●	
18	862.6		●		●		●	
19	957.0		●		●		●	
20	1056.3		●		●		●	
21	1093.5		●		●		●	
22	1199.5		●		●		●	
23	1310.4		●		●		●	
24	1426.2		●				●	
25	1546.9		●				●	

NOTE: A/C refers to As-Cast
C/F refers to Cold Finished
C/G refers to Centerless Ground
C/T refers to Centerless Turned

Other
Products

Alro Steel Metals Guide



As-Cast Size (inches)	Length (inches)	Max. Finish Size (inches)	Weight (lbs./foot)
1.500 X 2.250	69	1.300 X 3.070	10.910
1.500 X 3.250	69	1.300 X 3.300	15.720
1.750 X 3.250	69	1.570 X 3.070	18.150
2.150 X 2.930	74	1.970 X 2.750	20.040
2.250 X 3.250	72	2.070 X 3.070	23.200
2.250 X 3.750	72	2.070 X 3.570	26.710
2.250 X 4.250	72	2.070 X 4.070	30.220
2.500 X 4.250	69	2.320 X 4.070	33.500
2.550 X 2.930	74	2.350 X 2.730	23.780
2.750 X 3.000	72	2.550 X 2.800	26.200
2.750 X 3.250	72	2.550 X 3.050	28.340
2.750 X 4.250	72	2.550 X 4.050	36.910
3.250 X 4.250	72	3.050 X 4.050	43.490
3.250 X 4.750	72	3.050 X 4.550	48.540
3.250 X 5.250	72	3.050 X 5.050	53.590
3.250 X 5.750	72	3.050 X 5.550	58.640
3.250 X 6.250	72	3.050 X 6.050	63.690
3.500 X 4.550	73	3.300 X 4.350	50.040
3.750 X 4.250	72	3.550 X 4.050	50.070
3.750 X 4.750	72	3.550 X 4.550	55.880
4.250 X 5.250	72	4.026 X 5.026	71.200
4.250 X 5.750	72	4.026 X 5.526	77.900
4.250 X 6.250	72	4.026 X 6.026	84.590
4.250 X 6.750	72	4.026 X 6.526	91.290
4.250 X 7.250	72	4.026 X 7.026	97.990
4.250 X 8.250	72	4.026 X 8.026	109.400
4.710 X 4.710	74	4.486 X 4.486	70.670
4.750 X 6.250	72	4.526 X 6.026	94.240

NOTE: Pounds per foot are based on As-Cast size.

Continued on next page

Other
Products

Alro Steel Metals Guide

Grade 65-45-12 (4512X) Flats (Ductile Iron)

As-Cast Size (inches)	Length (inches)	Max. Finish Size (inches)	Weight (lbs./foot)
5.000 X 6.500	72	4.776 X 6.276	102.990
5.250 X 6.250	72	5.026 X 6.026	103.890
5.250 X 7.250	72	5.026 X 7.026	120.340
5.250 X 8.250	72	5.026 X 8.026	136.800
5.780 X 8.150	60	5.556 X 7.926	148.460
6.080 X 9.040	77	5.830 X 8.790	173.370
6.250 X 7.250	72	6.000 X 7.000	143.110
6.250 X 8.250	72	6.000 X 8.000	162.660
7.250 X 8.250	72	7.000 X 8.000	188.100
7.250 X 10.250	72	7.000 X 10.000	233.320
7.250 X 11.875	72	7.000 X 11.625	268.600
7.680 X 9.180	79	7.430 X 8.930	221.290
8.000 X 21.000	72	7.500 X 20.500	533.350
8.250 X 12.250	72	8.000 X 12.000	316.220
8.750 X 9.250	72	8.374 X 8.874	255.520
8.750 X 10.750	73	8.374 X 10.374	296.490
9.300 X 11.500	79	8.924 X 11.124	336.480
10.250 X 12.250	72	9.874 X 11.874	394.110
10.340 X 13.540	79	9.964 X 13.164	439.020
12.100 X 12.400	74	11.600 X 11.900	472.390
12.540 X 14.540	72	12.040 X 14.040	572.750
13.250 X 15.250	86	12.250 X 14.250	633.860
14.000 X 21.000	54	13.500 X 20.500	919.200
15.500 X 17.500	75	14.500 X 16.500	864.260
18.500 X 22.000	52	18.000 X 21.500	1295.910

NOTE: Pounds per foot are based on As-Cast size.

Other
Products



Dura-Bar®

Grade G2/GX Flats (Gray Iron)

Stock Lengths: 6 foot

Type/ Grade	As-Cast Size (inches)	Max. Finish Size (inches)	Weight (lbs./foot)
GX	0.75 X 1.50	0.550 X 1.300	3.90
GX	1.25 X 2.25	1.070 X 2.070	9.30
GX	1.25 X 3.25	1.050 X 3.050	13.45
GX	1.25 X 4.25	1.000 X 4.000	17.80
GX	1.25 X 5.25	1.000 X 5.000	21.85
GX	1.25 X 6.25	0.874 X 5.874	30.50
GX	1.25 X 10.25	0.874 X 9.874	51.25
GX	1.50 X 2.25	1.320 X 2.070	11.12
GX	1.50 X 4.25	1.300 X 4.050	20.87
GX	1.50 X 5.25	1.250 X 5.000	26.01
GX	1.50 X 6.25	1.250 X 6.000	30.88
GX	1.50 X 10.25	1.124 X 9.874	57.49
GX	1.75 X 4.25	1.550 X 4.050	24.22
GX	1.75 X 6.25	1.500 X 6.000	38.46
GX	2.00 X 2.50	1.820 X 2.320	16.29
GX	2.25 X 3.25	2.070 X 3.070	23.65
GX	2.25 X 4.25	2.070 X 4.070	30.81
GX	2.25 X 5.25	2.050 X 5.050	38.10
GX	2.25 X 6.25	2.050 X 6.050	45.28
GX	2.50 X 3.25	2.320 X 3.070	26.22
GX	2.50 X 4.25	2.320 X 4.070	34.16
GX	2.50 X 6.25	2.300 X 6.050	50.19
GX	2.50 X 8.25	2.250 X 8.000	70.04
G2	2.75 X 3.50	2.550 X 3.300	31.08
G2	2.75 X 4.25	2.550 X 4.050	37.64
G2	3.25 X 4.25	3.050 X 4.050	44.34
G2	3.25 X 6.25	3.050 X 6.050	64.94
G2	3.25 X 7.25	2.875 X 6.874	79.12
G2	4.25 X 4.50	4.026 X 4.276	62.35
G2	4.25 X 5.25	4.026 X 5.026	72.59
G2	4.25 X 6.25	4.026 X 6.026	86.25
G2	5.25 X 6.25	5.026 X 6.026	105.93
G2	8.00 X 21.00	7.500 X 20.500	543.81
G2	14.000 X 21.000	13.500 X 20.500	917.30

Note: Pounds per foot are based on "As-Cast" size.

Other
Products

Alro Steel Metals Guide



Dura-Bar®

Grade G2/GX Squares (Gray Iron)

Type/ Grade	As-Cast Size (inches)			Length (inches)	Max. Finish Size (inches)			Weight (lbs./foot)
GX	1.50	X	1.50	72	1.320	X	1.320	7.50
GX	2.25	X	2.25	72	2.070	X	2.070	16.49
GX	2.50	X	2.50	72	2.320	X	2.320	20.27
G2	3.00	X	3.00	72	2.800	X	2.800	29.09
G2	3.25	X	3.25	72	3.050	X	3.050	34.05
G2	4.25	X	4.25	72	4.026	X	4.026	58.94
G2	5.25	X	5.25	72	5.026	X	5.026	89.15
G2	6.25	X	6.25	72	6.000	X	6.000	125.99
G2	7.25	X	7.25	72	7.000	X	7.000	168.73
G2	8.25	X	8.25	72	8.000	X	8.000	217.72
G2	9.25	X	9.25	72	8.874	X	8.874	275.10
G2	10.25	X	10.25	72	9.874	X	9.874	336.78
G2	12.25	X	12.25	72	11.750	X	11.750	481.68

Dura-Bar®

Grade 65-45-12 (4512X) Squares (Ductile Iron)

As-Cast Size (inches)			Length (inches)	Max. Finish Size (inches)			Weight (lbs./foot)
2.25	X	2.25	72	2.070	X	2.070	16.17
2.75	X	2.75	72	2.550	X	2.550	24.06
3.25	X	3.25	72	3.050	X	3.050	33.39
3.75	X	3.75	72	3.550	X	3.550	44.26
4.25	X	4.25	72	4.026	X	4.026	57.80
5.25	X	5.25	72	5.026	X	5.026	87.43
6.18	X	6.18	74	5.930	X	5.930	123.56
6.25	X	6.25	72	6.000	X	6.000	123.56
6.68	X	6.68	74	6.430	X	6.430	140.84
7.25	X	7.25	72	7.000	X	7.000	165.49
8.25	X	8.25	72	8.000	X	8.000	213.54
9.375	X	9.375	72	9.000	X	9.000	277.04
10.375	X	10.375	72	10.000	X	10.000	338.30



Dura-Bar® Tubing

As-Cast Size OD x ID (inches)	Tube Length (inches)	Weight (lbs./foot)	Gray Iron Grade G2	Ductile Iron 65-45-12 80-55-06
3.500 X 1.500	72	28.4	●	●
4.000 X 2.000	72	34.2	●	●
4.500 X 1.500	72	48.9	●	●
4.500 X 2.500	72	40.4	●	●
5.000 X 2.000	72	57.2	●	●
5.000 X 3.000	72	46.2	●	●
5.500 X 2.500	72	66.0	●	●
5.500 X 3.500	72	52.5	●	●
6.000 X 3.000	72	74.3	●	●
6.000 X 4.000	72	58.4	●	●
6.500 X 2.500	72	96.6	●	●
6.500 X 3.500	72	83.1	●	●
6.500 X 4.500	72	64.8	●	●
7.000 X 3.000	72	107.4	●	●
7.000 X 4.000	72	91.5	●	●
7.000 X 5.000	72	70.7	●	●
7.500 X 2.500	72	132.5	●	●
7.500 X 3.500	72	119.0	●	●
7.500 X 4.500	72	100.7	●	●
7.500 X 5.500	72	77.4	●	●
8.000 X 3.000	72	145.8	●	●
8.000 X 5.000	72	109.1	●	●
8.000 X 6.000	72	83.4	●	●
8.500 X 5.500	72	118.6	●	●
9.000 X 4.000	72	173.7	●	●
9.000 X 7.000	72	96.5	●	●

Other
Products

Alro Steel Metals Guide



Dura-Bar® Plate

2 Sides Milled, Stress Relieved

Size (inches)	Length (inches)	Grade	Finish
7.750 X 20.50	72	4512X	2 sides milled
7.750 X 20.50	72	5506X	2 sides milled
7.750 X 20.50	72	G2	2 sides milled
13.750 X 20.50	72	4512X	2 sides milled
13.750 X 20.50	72	5506X	2 sides milled
13.750 X 20.50	72	G2	2 sides milled

Dura-Bar® Plate

4 Sides Milled, Stress Relieved

Size (inches)	Length (inches)	Grade	Finish
7.50 X 20.50	72	4512X	4 sides milled
7.50 X 20.50	72	5506X	4 sides milled
7.50 X 20.50	72	G2	4 sides milled
13.50 X 20.50	72	4512X	4 sides milled
13.50 X 20.50	72	5506X	4 sides milled
13.50 X 20.50	72	G2	4 sides milled

Other
Products

Grade 65-45-12 (4512X) (Ductile Iron)
Precision Duplex Milled Rectangles, 4 Sides

Size (inches)			Length (inches)	Weight (lbs./foot)
1.530	X	2.780	72	13.27
1.500	X	3.000	72	14.20
1.600	X	2.000	72	9.98
1.750	X	2.440	72	13.32
1.750	X	2.750	72	15.02
2.000	X	2.500	72	16.00
2.000	X	2.500	72	15.60
2.000	X	3.000	72	18.88
2.000	X	4.000	72	24.96
2.000	X	6.000	72	37.44
2.030	X	2.530	72	15.70
2.030	X	3.030	72	19.20
2.030	X	4.030	72	25.52
2.050	X	2.800	72	17.90
2.250	X	4.000	72	28.08
2.250	X	4.000	72	28.90
2.440	X	5.000	72	38.06
2.500	X	3.000	72	23.40
2.500	X	3.250	72	25.35
2.500	X	4.000	72	31.20
2.500	X	4.500	72	35.10
2.500	X	5.000	72	39.00
2.500	X	6.000	72	48.00
2.530	X	2.780	72	21.94
2.530	X	4.030	72	31.81
2.530	X	4.280	72	33.79
2.530	X	4.530	72	35.76
2.530	X	4.750	72	37.50
2.660	X	3.500	72	29.05
2.850	X	3.650	72	32.46
3.000	X	4.000	72	37.44
3.000	X	5.000	72	48.00
3.000	X	5.000	72	46.80

Continued on next page

Other
Products

Alro Steel Metals Guide



Grade 65-45-12 (4512X) (Ductile Iron)
Precision Duplex Milled Rectangles, 4 Sides

Other
Products

Alro Steel Metals Guide

Size (inches)			Length (inches)	Weight (lbs./foot)
3.000	X	5.130	72	48.02
3.030	X	3.530	72	32.70
3.030	X	4.030	72	37.40
3.030	X	4.530	72	42.00
3.030	X	5.030	72	47.55
3.030	X	5.130	72	48.50
3.030	X	5.530	72	52.28
3.030	X	6.030	72	57.01
3.250	X	5.400	72	54.76
3.400	X	3.500	72	37.13
3.500	X	4.000	72	43.68
3.500	X	4.500	72	49.14
3.500	X	5.630	72	61.48
3.500	X	6.000	72	67.00
3.500	X	6.000	72	65.52
3.500	X	6.250	72	68.25
3.500	X	8.000	72	87.36
3.530	X	4.030	72	44.39
3.530	X	4.530	72	49.58
3.530	X	5.030	72	55.40
3.630	X	6.030	72	72.06
3.750	X	4.500	72	52.65
4.000	X	5.000	72	62.40
4.000	X	5.000	72	68.60
4.000	X	5.500	72	68.64
4.000	X	6.000	72	74.88
4.030	X	4.530	72	56.96
4.030	X	5.030	72	63.25
4.030	X	5.530	72	69.53
4.030	X	6.030	72	74.40
4.030	X	7.030	72	88.39
4.250	X	5.750	72	78.33

Continued on next page



Grade 65-45-12 (4512X) (Ductile Iron)
Precision Duplex Milled Rectangles, 4 Sides

Size (inches)			Length (inches)	Weight (lbs./foot)
4.500	X	5.000	72	70.20
4.500	X	7.130	72	100.10
4.500	X	7.250	72	101.79
4.530	X	6.030	72	83.60
4.530	X	8.030	72	113.49
4.590	X	8.100	72	115.99
4.700	X	5.300	72	77.72
5.000	X	5.000	72	78.00
5.000	X	6.000	72	93.60
5.000	X	7.000	72	109.20
5.000	X	7.630	72	119.03
5.000	X	8.500	72	132.60
5.030	X	5.030	72	77.40
5.030	X	5.800	72	91.02
5.030	X	6.030	72	94.63
5.030	X	7.030	72	110.33
5.030	X	8.030	72	126.02
5.030	X	9.530	72	149.56
5.510	X	7.880	72	135.47
5.700	X	10.750	72	191.18
6.000	X	7.000	72	131.04
6.020	X	14.000	72	262.95
6.030	X	7.030	72	132.25
6.030	X	7.530	72	141.67
6.030	X	8.030	72	151.07
6.030	X	9.780	72	184.00
6.030	X	10.000	74	202.80
6.414	X	7.738	72	154.85
6.500	X	7.000	72	162.24
6.500	X	8.000	72	166.00
6.500	X	9.750	72	197.73

Continued on next page

Other
Products

Alro Steel Metals Guide



Grade 65-45-12 (4512X) (Ductile Iron)
Precision Duplex Milled Rectangles, 4 Sides

Size (inches)			Length (inches)	Weight (lbs./foot)
6.530	X	8.030	72	163.60
6.750	X	10.500	72	227.00
6.920	X	8.690	79	187.62
7.000	X	8.000	72	174.72
7.030	X	8.030	72	176.13
7.030	X	9.030	72	198.06
7.030	X	10.030	72	219.99
7.130	X	9.750	72	216.90
7.530	X	8.030	72	188.65
7.530	X	11.250	72	264.30
8.000	X	10.000	72	249.60
8.050	X	10.050	72	252.42
8.130	X	10.000	72	253.66
8.160	X	10.780	72	274.45
8.180	X	8.900	72	227.14
8.180	X	10.000	72	255.22
8.188	X	9.000	72	229.91
8.188	X	10.000	72	255.47
8.500	X	12.630	72	334.95
8.690	X	13.100	72	355.18
8.750	X	12.630	60	344.80
9.030	X	11.030	79	310.78
9.500	X	14.000	79	414.96
10.050	X	13.050	79	409.20
11.030	X	12.030	74	414.00
12.040	X	14.040	72	527.41
13.500	X	20.500	54	863.46
13.830	X	14.430	82	622.65
15.290	X	17.040	75	812.89

Other
Products



Grade 65-45-12 (4512X) (Ductile Iron) Precision Duplex Milled Squares, 4 Sides

Size (inches)			Length (inches)	Weight (lbs./foot)
1.75	X	1.75	72	9.56
1.75	X	1.75	73.5	9.45
1.78	X	1.78	72	9.70
2.00	X	2.00	72	12.48
2.00	X	2.00	72	12.60
2.03	X	2.03	72	12.60
2.03	X	2.03	72	12.86
2.05	X	2.05	72	17.91
2.50	X	2.50	72	19.50
2.50	X	2.50	72	19.52
2.53	X	2.53	72	19.60
2.78	X	2.78	72	24.11
3.00	X	3.00	72	25.10
3.03	X	3.03	72	28.10
3.50	X	3.50	72	38.22
3.53	X	3.53	72	38.10
3.75	X	3.75	72	43.88
3.78	X	3.78	72	44.58
4.00	X	4.00	72	49.92
4.00	X	4.00	72	48.80
4.03	X	4.03	72	49.70
4.50	X	4.50	72	63.18
4.53	X	4.53	72	64.03
4.88	X	4.88	72	74.30
5.06	X	5.06	72	79.88
6.00	X	6.00	72	112.32
6.03	X	6.03	72	113.45
6.53	X	6.53	74	133.04
7.03	X	7.03	72	154.19
7.53	X	7.53	72	176.91
8.00	X	8.00	72	199.68
8.03	X	8.03	72	201.18
8.50	X	8.50	72	225.42
9.05	X	9.05	72	255.54
9.50	X	9.50	72	281.58
10.00	X	10.00	72	312.00
10.03	X	10.03	72	313.88
11.05	X	11.05	74	380.96
12.03	X	12.03	74	451.53
18.00	X	18.00	35	1010.88

Other
Products

Alro Steel Metals Guide



Dura-Bar® Tolerances

This section lists Dura-Bar dimensional tolerances. Metallurgical tolerances and mechanical properties are listed under each metal grade in the specification section. Customer specifications may be written from the information contained in this section. If tighter tolerances or additional testing are required for a special make item, a specific customer specification may be written.

Dura-Bar® Rounds

Round bars are made with sufficient stock on the outside diameter to guarantee clean-up at the nominal dimensions. Stock allowances and allowable deviations for round bars are listed in Table 1.

Nominal Diameter Bar Size (inches)	Stock Allowance		Stock Allowance Variation (+/-) All Metal Specs (inches)
	Gray Iron (inches)	Ductile Iron (inches)	
00.750 - 01.250	0.085	0.088	0.017
01.251 - 02.000	0.090	0.095	0.024
02.001 - 03.000	0.110	0.118	0.030
03.001 - 04.000	0.125	0.136	0.038
04.001 - 05.000	0.140	0.154	0.048
05.001 - 06.000	0.155	0.172	0.055
06.001 - 07.000	0.170	0.190	0.062
07.001 - 08.000	0.190	0.213	0.085
08.001 - 09.000	0.216	0.242	0.108
09.001 - 10.000	0.254	0.283	0.129
10.001 - 11.000	0.400	0.432	0.150
11.001 - 16.000	0.582	0.623	0.206
16.001 - 18.000	0.762	0.815	0.262
18.001 - 20.000	0.762	0.819	0.262

Cold Finish

Cold finish centerless turning tolerances are listed in the table below.

Nominal Length (inches)	Bar Diameter (inches)	Cold Finish Tolerance* (inches)
72	0.750 - 4.00	+0.010/-0.000
72	4.001 - 6.00	+0.015/-0.000
144	0.750 - 3.00	+0.010/-0.000
144	3.001 - 4.00	+0.015/-0.000

* Centerless turning tolerance is +0.003"/+0.008".



Dura-Bar® Tolerances

Dura-Bar® Flat Bars

Dura-Bar flats are made to the actual dimensions. Clean-up stock must be considered when ordering. Minimum clean-up stock allowances are shown in the table below.

Height (inches)	Ratio (Width:Height) - (inches)				
	0.000 thru 1.999	2.000 thru 2.999	3.000 thru 4.999	5.000 thru 7.999	8.000 and up
00.750 - 01.500	0.090	0.100	0.125	0.188	0.188
01.501 - 02.500	0.090	0.100	0.125	0.125	0.188
02.501 - 04.000	0.100	0.188	0.250	0.250	-
04.001 - 06.000	0.112	0.188	0.250	-	-
06.001 - 08.500	0.125	0.250	0.250	-	-
08.501 - 11.500	0.188	0.250	-	-	-
11.501 - 14.125	0.250	-	-	-	-
14.126 - 20.000	0.500	-	-	-	-

Note: Clean-up stock for special shapes is based on the maximum width and the maximum height of the cross section.

Dimension in the vertical center of flats and shapes may be larger than the vertical ends. Allowable swell is based on the dimension of the bar according to the data in the table below.

Height (inches)	Ratio (Width:Height) - (inches)				
	0.000 thru 1.999	2.000 thru 2.999	3.000 thru 4.999	5.000 thru 7.999	8.000 and up
00.750 - 01.500	-	-	-	0.350	0.460
01.501 - 02.500	-	-	0.262	0.370	0.485
02.501 - 04.000	-	0.189	0.282	0.395	-
04.001 - 06.000	0.143	0.209	0.307	-	-
06.001 - 08.500	0.153	0.234	0.337	-	-
08.501 - 11.500	0.163	0.254	-	-	-
11.501 - 14.125	0.173	-	-	-	-
14.126 - 18.000	0.250	-	-	-	-
18.001 - 20.000	0.500	-	-	-	-

Note: Swell allowance for special shapes is based on the maximum width and the maximum height of the cross section.

Other
Products

Alro Steel Metals Guide



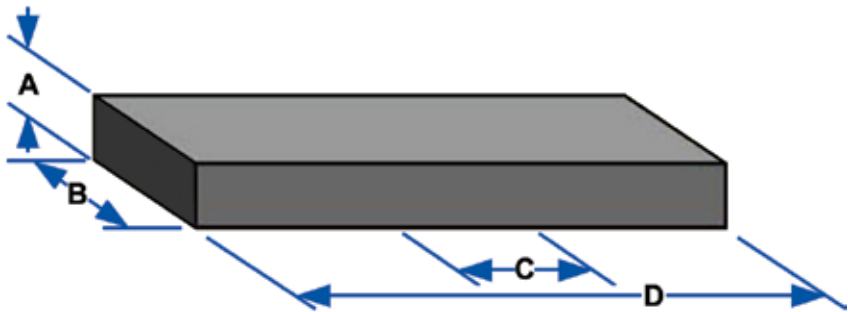
Dura-Bar® Tolerances

Standard Lengths

Continuous cast bars are notched and broken off on the production line in standard lengths of 6 feet and 12 feet. (Larger bars will be shorter because of their weight.) Stock is added on to the break-off length in order to guarantee the nominal length. The stock allowance for bar lengths is shown in the table below.

Nominal Bar Diameter (inches)	Tolerance on Standard Lengths		Non-Standard Length (inches)
	6-Foot Bars (inches)	12-Foot Bars (inches)	
00.625 - 03.999	72 - 74.5	144 - 147	Nominal +3
04.000 - 09.999	72 - 75.5	144 - 148	Nominal +4
10.000 - 18.000	72 - 76.0	144 - 149	Nominal +5
19.000	57 - 60.5	-	Nominal +5
20.000	54 - 57.5	-	Nominal +5

Duplex Milled Tolerances



- Standard Milled Tolerances are $+.005"/-.000"$ on Height "A"/Width "B". Tolerances produced to $+.010/-000$ on Height "A" and Width "B" are available upon request
- Maximum Milled Length "D" up to 84"
- Milled Height/Width "A&B" 1.25"-25.00" Square
- Square, Parallel and Flat Within 0.010" in any 6.000" section (C)



Expanded Metal

Terminology

Style Designation

A combination of numbers, letters, and abbreviations permitting proper specifications of dimension, gauge, style, and weight. In expanded metal products, the first number designates nominal dimension, short way of design. The second number completes the designation and may specify the gauge of metal, weight per 100 square feet, or may have some other significance. Grating products are designated by weight of finished product per square foot.

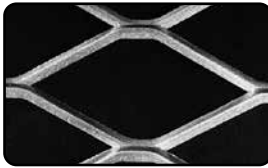
Standard Expanded Metal

Standard expanded metal as it comes from the press. The strands and bonds are set at a uniform angle to the plane on the sheet. This gives added strength and rigidity, as well as skid-resistant surface. Standard expanded metal is abbreviated XM.

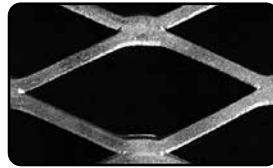
Flattened Metal

Flattened expanded metal is manufactured by passing the standard expanded sheet through a cold roll reducing mill. Flattened expanded metal turns the strands and bonds down to provide a flattened surface, reducing the thickness (gauge) and elongating the pattern. Thickness may vary plus or minus 10% from published dimensions.

Standard Expanded Metal



Flattened Expanded Metal



Grating

Grating is a standard expanded metal pattern produced from heavier gauge low carbon steel plates. Strands and the openings of grating are considerably larger than other meshes. It is ideal for use wherever a strong, durable, lightweight surface is needed. Although used primarily for pedestrian traffic, grating can accommodate heavier loads if properly supported.

DESIGN SIZE

Actual dimensions SWD and LWD. Measured from a point to a corresponding point on the design shown.

SWD

Nominal dimension Short Way of Design

SWO

Short Way of Opening

LWD

Nominal dimension Long Way of Design

LWO

Long Way of Opening

STRANDS

The sides of the expanded metal design.

STRAND THICKNESS

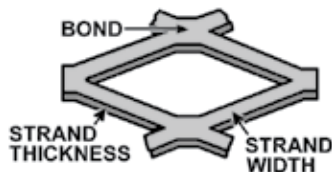
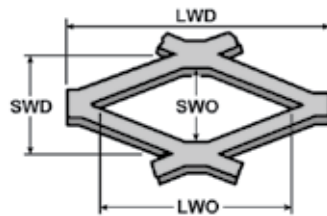
Gauge thickness of metal expanded.

STRAND WIDTH

Amount of metal fed under dies to produce one strand.

BOND

The solid intersection of two strands.



Expanded Metal

Side Shearing

The process of cutting a piece of expanded metal parallel to the long dimension of the diamond.

Random Side Shearing

Side shearing is a cut made parallel to the LWD dimension of the sheet which usually leaves open diamonds.

Bond Side Shearing

This cut is made along the length of the sheet on the center line of the bond over the specified width. In most cases it is not practical to attempt to Bond Side Shear either regular or flattened expanded metal because of the camber.

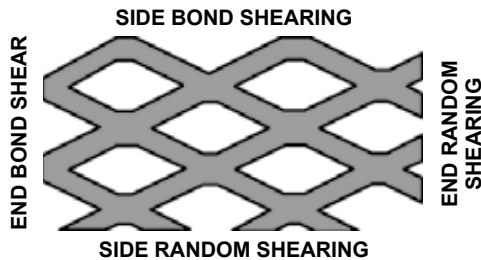
End Shearing

End Random Shearing

The process of shearing a piece of expanded metal to a specified length (LWD). This cut normally leaves open diamonds at both ends but accomplishes close tolerance when both ends are sheared.

End Bond Shearing

The process of shearing a piece of expanded metal to a specified length (LWD). One end is cut on the Bond parallel to the SWD—the other end usually has open diamonds.

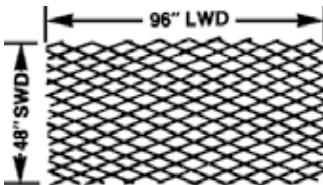


Ordering Procedure

When ordering Expanded Metals, give complete style specifications to avoid possible error. Include style, standard or flattened, type of metal, and sheet dimensions. SWD dimensions always given before LWD.

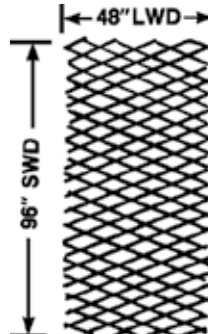
EXAMPLE 1:

1/2" #18 carbon steel standard
4 ft. SWD by 8 ft. LWD



EXAMPLE 2:

1/2" .051 aluminum standard
8 ft. SWD by 4 ft. LWD



Drawings are exaggerated
for illustrative purposes.

Expanded Metal Sheets

Carbon Steel Standard Expanded Metal 1/4" Through 2" Diamond Designs

Style	lbs per 100 Sq. ft.	Standard Sheet Size (ft)		Design Size (inches)		Opening Size (inches)		Strand Size (inches)		Overall Thick (in)	No. of Designs per Foot		Open Area (%)
		Width	Length	SWD	LWD	SWO	LWO	Width	Thick		SWD	LWD	
STANDARD													
1/4"-#20	86	4	8	.250	1.00	.125	.718	.072	.036	.135	48	12	45
1/4"-#18	114	4	8	.250	1.00	.110	.718	.072	.048	.147	48	12	43
1/2"-#20	43	4	8	.500	1.00	.438	.938	.072	.036	.140	24	10	80
1/2"-#18	70	4&6	8&10	.500	1.20	.438	.938	.088	.048	.172	24	10	72
1/2"-#16	86	4	8	.500	1.00	.375	.938	.087	.060	.175	24	10	65
1/2"-#13	147	4&6	8&10	.500	1.20	.312	.938	.096	.092	.204	24	10	57
3/4"-#16	54	4&6	8&10	.923	2.00	.813	1.750	.101	.060	.210	13	6	78
3/4"-#13	80	4&6	8&10	.923	2.00	.750	1.688	.096	.092	.205	13	6	76
3/4"-#10 (13 ga.)	120	4&6	8&10	.923	2.00	.750	1.625	.144	.092	.290	13	6	72
3/4"-#9 (10 ga.)	180	4&6	8&10	.923	2.00	.688	1.562	.150	.134	.312	13	6	68
1"-#16	44	4	8	1.00	2.40	.938	2.062	.087	.060	.192	12	5	82
1 1/2"-#18	20	4	8	1.33	3.00	1.313	2.625	.068	.048	.140	9	4	90
1 1/2"-#16	40	4	8	1.33	3.00	1.250	2.625	.108	.060	.230	9	4	85
1 1/2"-#13	60	4&6	8&10	1.33	3.00	1.188	2.500	.105	.092	.242	9	4	85
1 1/2"-#10 (13 ga.)	79	4&6	8&10	1.33	3.00	1.188	2.500	.138	.092	.284	9	4	80
1 1/2"-#9 (10 ga.)	120	4&6	8&10	1.33	3.00	1.125	2.375	.144	.134	.312	9	4	76
1 1/2"-#6 (6 ga.)	250	4&6	8	1.33	3.00	1.110	2.313	.203	.198	.433	9	4	69
2"-#10 (13 ga.)	68	6	12	1.85	4.00	1.625	3.438	.164	.092	.327	6.5	3	82
2"-#9 (10 ga.)	90	4	8	1.85	4.00	1.563	3.375	.149	.134	.312	6.5	3	84

Other
Products

Alro Steel Metals Guide



Expanded Metal Sheets

Carbon Steel Flattened Expanded Metal 1/4" Through 1-1/2" Diamond Designs

In Standard Expanded Metal, the strands are set at sharp angles to the plane of the sheet. In the Flattened Expanded Metal, the strands have been cold rolled to bring them into one plane, thus providing a flat surface.

Style	lbs. per 100 Sqft.	Standard Sheet Size (ft.)		Design Size (inches)		Opening Size (inches)		Strand Size (inches)		Overall Thick- ness (in.)	No. of Designs per Foot		% Open Area
		Width SWD	Length LWD	SWD	LWD	SWO	LWO	Width	Thick		SWD	LWD	
1/4"—#20	82	3&4	8	.250	1.05	0.084	.715	.079	.030	.030	48	11.600	35
1/4"—#18	108	3&4	8	.250	1.05	0.075	.715	.080	.040	.040	48	11.600	35
1/2"—#20	40	3&4	8	.500	1.25	0.375	1.00	.079	.029	.029	24	9.500	65
1/2"—#18	66	3&4	8&10	.500	1.25	0.312	1.00	.097	.039	.039	24	9.500	60
1/2"—#16	82	3&4	8&10	.500	1.25	0.312	1.00	.096	.050	.050	24	9.500	63
1/2"—#13	140	3&4	8&10	.500	1.25	0.265	1.00	.107	.070	.070	24	9.500	52
3/4"—#16	51	3&4	8&10	.923	2.10	0.750	1.750	.111	.048	.048	13	5.700	74
3/4"—#14	63	3&4	8&10	.923	2.10	0.688	1.813	.105	.061	.061	13	5.700	74
3/4"—#13	75	3&4	8,10&12	.923	2.10	0.688	1.781	.106	.070	.070	13	5.700	74
3/4"—#10 (13 ga.)	114	4	8	.923	2.10	0.637	1.755	.160	.070	.070	13	5.700	68
3/4"—#9 (10 ga.)	171	3&4	8,10&12	.923	2.10	0.563	1.688	.165	.120	.120	13	5.700	63
1"—#16	41	3&4	8	1.00	2.50	0.813	2.250	.098	.050	.050	12	4.684	78
1 1/2"—#16 (Lt.)	29	4	8	1.33	3.20	1.175	2.620	.093	.050	.050	9	3.750	83
1 1/2"—#16	38	3&4	8	1.33	3.20	1.062	2.750	.119	.048	.048	9	3.750	83
1 1/2"—#14	46	3&4	8	1.33	3.20	1.062	2.750	.134	.060	.060	9	3.750	80
1 1/2"—#13	57	3&4	8&10	1.33	3.20	1.062	2.750	.116	.070	.070	9	3.750	80
1 1/2"—#9 (10 ga.)	114	3&4-4	8&10,12	1.33	3.20	1.000	2.563	.158	.110	.110	9	3.750	75

**Above material conforms to military specification MIL-M-17194C Type II Class 1
Weights, gauges, dimensions, and sizes listed above are approximate.**

Stainless Steel Type 304 Standard Expanded Metal 1/2" Through 1-1/2" Diamond Designs

Above material conforms to EMMA 557-99

Alro Steel Metals Guide



Expanded Metal Sheets

Stainless Steel Type 304 Flattened Expanded Metal
1/2" Through 1-1/2" Diamond Designs

Style	lbs. per 100 Sq. ft.	Standard Sheet Size (ft.)		Design Size (inches)		Opening Size (inches)		Strand Size (inches)		Overall Thick- ness (in.)	No. of Designs per ft.	% Open Area
		Width SWD	Length LWD	SWD	LWD	SWO	LWO	Width	Thick			
1/2"—#20	48	4	8	.500	1.260	0.312	1.000	.091	.033	.033	24	60
1/2"—#18	69	4	8	.500	1.260	0.313	1.000	.093	.040	.040	24	68
1/2"—#16	86	4	8	.500	1.260	0.313	1.000	.093	.050	.050	24	60
1/2"—#13	178	4	8	.500	1.260	0.250	1.000	.132	.080	.080	24	56
3/4"—#18	46	4	8	.923	2.100	0.750	1.813	.118	.040	.040	13	77
3/4"—#16	57	4	8	.923	2.100	0.750	1.813	.118	.050	.048	13	75
3/4"—#13	87	4	8	.923	2.100	0.625	1.750	.120	.070	.070	13	74
3/4"—# 9 (10 ga.)	195	4	8	.923	2.100	0.563	1.688	.160	.119	.119	13	64
1 1/2"—#16	43	4	8	1.330	3.150	1.063	2.750	.124	.050	.050	9	83
1 1/2"—#13	65	4	8	1.330	3.150	1.000	2.625	.124	.079	.079	9	79
1 1/2"—#9 (10 ga.)	131	4	8	1.330	3.150	0.938	2.625	.165	.119	.119	9	76

Above material conforms to EMMA 557-99

Aluminum Alloy 3003 H14 Standard Expanded Metal 3/16" Through 1-1/2" Diamond Designs

Above material conforms to EMMA 557-99

Alro Steel Metals Guide



Expanded Metal Sheets

Aluminum Alloy 3003 H14 Flattened Expanded Metal
3/16" Through 1-1/2" Diamond Designs

Style	lbs. per 100 Sqft.	Standard Sheet Size (ft.)		Design Size (inches)		Opening Size (inches)		Strand Size (inches)		Overall Thick- ness (inch)	No. of Designs per foot	% Open Area
		Width SWD	Length LWD	SWD	LWD	SWO	LWO	Width	Thick			
3/16"-.032	25	8	4	.218	.438	.078	.313	.060	.029	.028	60	43
1/2"-.051	25	4	8	.500	1.270	.313	1.000	.091	.040	.040	24	57
1/2"-.081	41	4	8	.500	1.270	.313	1.000	.103	.060	.060	24	57
3/4"-.051	16	4	8	.923	2.120	.750	1.813	.114	.040	.040	13	73
3/4"-.064	20	4-8	8-4	.923	2.130	.750	1.780	.122	.051	.051	13	72
3/4"-.081L	25	4-8	8-4	.923	2.215	.687	1.750	.134	.070	.070	13	70
3/4"-.081H	38	4-8	8-4	.923	2.120	.688	1.750	.172	.070	.070	13	63
3/4"-.125	61	4	8	.923	2.120	.625	1.750	.180	.095	.095	13	55
3/4"-.188	107	4-8	8-4	.923	2.130	.484	1.593	.205	.170	.170	13	60
1½"-.051	11	4-8	8-4	1.330	3.090	1.095	2.750	.120	.040	.040	9	80
1½"-.081	20	4	8	1.333	3.150	1.063	2.750	.144	.055	.055	9	75
1½"-.125	40	4	8	1.333	3.150	1.100	2.750	.190	.080	.080	9	65

Above material conforms to EMMA 557-99

Expanded Metal Sheets

Catwalk and Structural Gratings (Carbon Steel)

Style	Weight (lbs/sqft)	Standard Sheet Size (feet)		Design Size (inches)		Opening Size (inches)		Strand Size (inches)		Overall Thick- ness (inches)	No. of Designs per Foot		(% Open Area)
		Width SWD	Length LWD	SWD	LWD	SWO	LWO	Width	Thick		SWD	LWD	
3.0 lb.	3.0	4&6	8, 10&12	1.33	5.33	.940	3.44	.264	.183	.540	9	2.25	60
3.14 lb.	3.14	4-4&6	8&10	2.00	6.00	1.625	4.88	.312	.250	.656	6	2	69
4.0 lb.	4.0	4, 5&6	8&10	1.33	5.33	.940	3.44	.300	.215	.618	9	2.25	55
4.27 lb.	4.27	4&6	8&10	1.41	4.00	1.00	2.88	.300	.250	.625	8.5	3	58
5.0 lb.	5.0	4, 5&6	8&10	1.33	5.33	.813	3.38	.331	.250	.655	9	2.25	50
6.25 lb.	6.25	4&6	8&12	1.41	5.33	.813	3.38	.350	.312	.715	8.5	2.25	50
7.0 lb.	7.0	4	8	1.41	5.33	.813	3.38	.391	.312	.740	8.5	2.25	45

Above material meets all requirements of Military Specifications MIL-M-17194C (Metals, Expanded, Steel) and MIL-G 18015 (Ships) (Gratings, Metal, other than Bar Type) and the deflection requirements of Federal Specification RR-G-661-B.





Expanded Metal Sheets

Catwalk and Structural Gratings (Carbon Steel) Selection Chart

CONCENTRATED LOAD (lbs. per ft. of Length of Catwalk or Platform)	CLEAR SPAN (Distance between supports, measured from the inside edge of one support to the inside edge of the next support)									
	23"	30"	35"	42"	47"	54"	60"			
50# Light or Occasional Pedestrian Traffic	3.0 3.14	3.0 3.14	3.0 3.14	3.0 3.14	3.0 3.14	4.0 4.27	5.0 6.25			
100# Normal or Frequent Pedestrian Traffic	3.0 3.14	3.0 3.14	3.0 3.14	4.0 4.27	5.0 6.25	7.0	7.0			
150# Heavy or Constant Pedestrian Traffic	3.0 3.14	4.0 4.27	4.0 4.27	5.0 6.25	6.25 6.25	7.0				
200#	3.0	4.0 3.14	4.27 4.27	6.25 5.0	7.0					
250#	4.0	5.0 4.27	5.0	7.0 6.25						
300#	4.0	5.0 4.27	6.25 6.25							
350#	4.0	6.25 4.27	7.0							

The concentrated load deflections for the above selection chart do not exceed the 1/4" maximum deflection as stated by Federal Specification RR-G-661b and the generally accepted recommendation for normal pedestrian comfort.

Perforated Carbon Steel Sheets

Perforated Carbon Steel Sheets are steel sheets that have been subject to a perforation process. Perforation is the process of punching or stamping holes or other shapes into a material in a pattern or in sequence. Steel, because of its ductility and qualities of strength, makes Perforated Carbon Steel Sheets an excellent product for screening or architectural use.

Gage	Sheet Size (inches)	Hole Size (inches)			Weight (lbs./sqft.)	Weight (lbs./sheet)
20	48 x 120	1/8" round	3/16	staggered centers	.999	39.60
18	48 x 120	1/8" round	3/16	staggered centers	1.212	48.48
	48 x 120	1/4" round	3/8	staggered centers	1.200	48.00
16	48 x 120	1/8" round	3/16	staggered centers	1.500	60.00
14	48 x 120	1/8" round	3/16	staggered centers	1.878	75.12
12	48 x 120	1/8" round	3/16	staggered centers	2.630	105.20
11	48 x 120	1/8" round	3/16	staggered centers	2.550	102.00
1/4"	48 x 120	1/4" round	3/8	staggered centers	6.150	246.00
1/4"	48 x 120	1/2" round	11/16	staggered centers	5.380	215.20

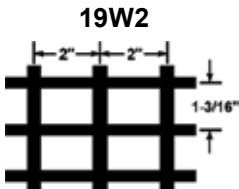
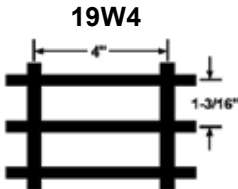
Other
Products

Steel Grating

Standard Mesh Types

Stock width of panels, 2' and 3'. Stock length panels 20' and 24'.

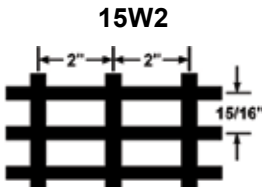
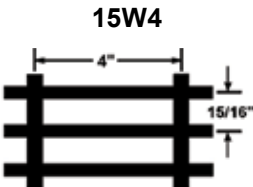
For 3/16" main bars 5/16" hexagonal cross bars are used. For 1/8" main bars 1/4" hexagonal bars are used.



Close Mesh Types

Stock width of panels, 2' and 3'. Stock length panels 20' and 24'.

For 3/16" main bars 5/16" hexagonal cross bars are used. For 1/8" main bars 1/4" hexagonal cross bars are used.



Alro Steel Metals Guide



Steel Grating

Surfaces

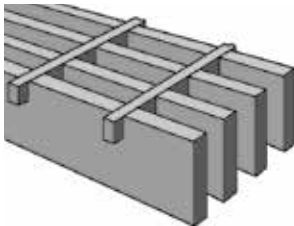
Smooth Surfaces

Smooth surface steel grating is available in a wide variety of materials for many applications.

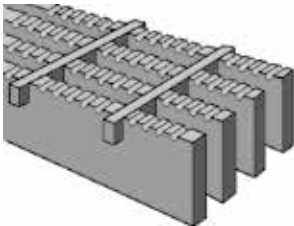
Serrated Surfaces

Serrated surfaces are available on many types of grating. The serrated surface provides a safe, slip-resistant surface. These surfaces offer more secure footing where a variety of liquids such as oil, chemicals, or water are present.

Smooth Surface



Serrated Surface



Steel Grating

Weights

Special prices are available upon request for cut lengths & widths and for fabrication.

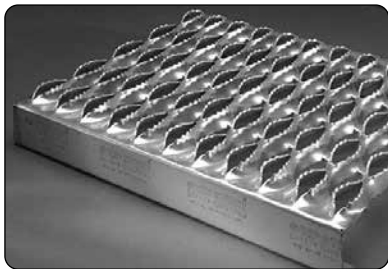
Main Bar Size		19W4 Weight (lbs./sqft.)	19W2 Weight (lbs./sqft.)	15W4 Weight (lbs./sqft.)	15W2 Weight (lbs./sqft.)
3/4	x 1/8	3.9	4.4	4.7	5.3
3/4	x 3/16	5.6	6.2	6.9	7.5
1	x 1/8	5.0	5.5	6.1	6.7
1	x 3/16	7.2	7.8	8.9	9.6
1-1/4	x 1/8	6.1	6.6	7.5	8.1
1-1/4	x 3/16	8.9	9.5	11.0	11.6
1-1/2	x 1/8	7.2	7.7	8.9	9.4
1-1/2	x 3/16	10.5	11.2	13.1	13.7
1-3/4	x 3/16	12.2	12.8	15.2	15.8
2	x 3/16	13.9	14.5	17.3	17.9
2-1/4	x 3/16	15.5	16.1	19.4	20.0
2-1/2	x 3/16	17.2	17.8	21.4	22.0



Safety Grating Products

Grip Strut®

Grip Strut® is a lightweight metal grating designed for safety underfoot. The unique one-piece diamond shaped construction provides slip resistance in all directions. Grip Strut® is ideally suited for all walking/working surfaces where mud, ice, snow, grease, oil and detergents create slippery or hazardous conditions.



Grip Strut® grating is commonly used for work platforms, industrial flooring, catwalks, balconies, storage areas, walkways, and stair treads.

Available Configurations			
Side Channels Available	Type Available	Gauge Available	Product Widths Available
1-1/2"	Galvanized HR P&O 5052-H32 Aluminum	14ga	4-3/4"
2"		12ga	7"
2-1/2"		14ga	9-1/2"
3"		12ga	11-3/4"
		.080"	18-3/4"
		.100"	24"
2"	Type *304 Stainless	16ga	9-1/2"
			11-3/4"

Walkway	Type Available	Gauge Available	Product Widths Available
4-1/2"	Galvanized HR P&O	14ga 12ga	24"

Standard Lengths: 10' and 12'.

Type 316 Stainless available upon special quote.

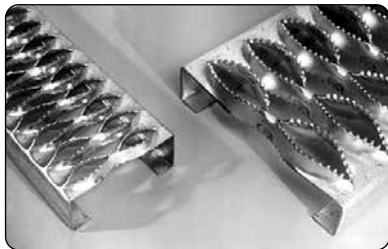
Special fabrication cutting or specialty configurations available upon request and special quotation.

*Note: Stainless only available in plank form.

Safety Grating Products

Heavy Duty Grip Strut®

Heavy Duty Grip Strut® Safety Grating products offer the advantages of regular Grip Strut® plus the capabilities for greater loads and/or longer spans. Heavy Duty Grip Strut® walkways are ideal for process plants, refineries, grain elevators, conveyor walkways, underbridge inspection walkways, papermills, etc.



Heavy Duty Grip Strut® is more competitive than ever against Bar Grating. Shorter lead times, 24-foot lengths, less support structure, and labor savings make it the most unique formed-plank grating available.

Available Configurations			
Channels Heights Available	Types Available	Gauges Available	Widths Available
2"	Galvanized	10ga	9-1/4"
2-1/2"	HR P&O	<i>Note: 11ga and 9ga are special ordered. Contact your Alro Sales Rep.</i>	13-3/4"
3"			23-1/4"
4"			27-3/4"
			36"

Walkway	Type Available	Gauge Available	Widths Available
5"	Galvanized HR P&O	10ga	24" 30" 36"

Standard Lengths: 10' and 12'.

24', special order. Contact your Alro Sales Rep

Plain HRP&O Steel available upon request and special quotation. Hot Dip Galvanized after fabrication is available upon request or special order.

Special fabrication cutting or specialty configurations available upon request and special quotation.

*Note: Stainless only available in plank form.

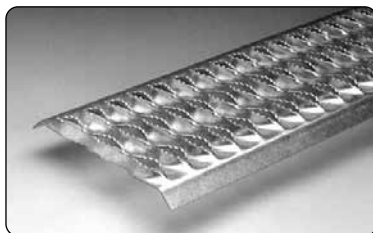
Safety Grating Products

Grip Strut® - Stair Treads, Ladder Rungs, Reconditioning Material

Alro offers a full range of standard and non-standard Stair Tread products from Grip Strut®, Heavy Duty Grip Strut®, Perf-O Grip®, Traction Tread™, and Grate-Lock. Products will be offered with or without abrasive nosing.

Reconditioning material is offered as an economical method of resurfacing worn and unsafe floors. Down-turned edges allow the grating to lie flat and secure over existing flooring.

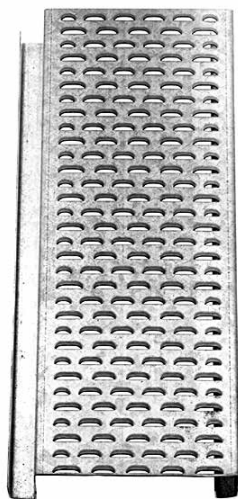
Alro offers a large variety of ladder rungs for use in different environments and industries. Grip Strut® One-Diamond Ladder Rungs are ideal in environments where safe footing is hard to come by. Grip Strut® Ladder Rungs ensure maximum slip resistance and safe footing. Traction Tread™ Ladder Rungs are ideal for use in hand-over-hand ladder applications where safe footing is also required.



Aeration Decking

Aeration Decking provides municipal waste treatment plants with a highly efficient, low-energy way to process effluents into usable compost. In North America daily production from municipally operated water treatment plants yields well over 15,000 tons (dry basis) of sludge. North America faces a growing process while keeping operating costs at a minimum. Aeration Decking can be the keystone for systems that transform waste into usable by-product, while conserving energy.

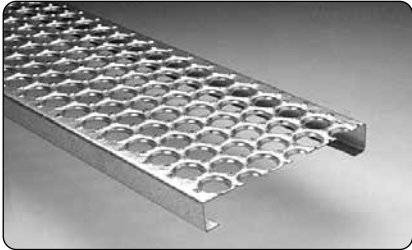
Available Configurations		
Channel Height	Material Gauge	Available Widths
2-1/2"	14 ga Galvanized Steel	9" wide



Safety Grating Products

Perf-O Grip® Grating

Perf-O Grip® is a plank metal grating offering a slightly less aggressive surface than Grip Strut®. Perf-O Grip® is made with a round hole pattern. Perf-O Grip's® light weight and resilient design makes the product easy to handle and install producing a very economical installed cost.



Available Configurations			
Channels Heights Available	Types Available	Gauges Available	Widths Available
1-1/2"	Galvanized	11ga	5", 7", 10"
2"	HR P&O	13ga	12", 18", 24"
2"	Aluminum	.125"	5", 7", 10", 12"

Walkway Heights Available	Types Available	Gauges Available	Widths Available
5"	Galvanized HR P&O	11ga	24", 30", 36"

Standard Lengths: 10' and 12'.

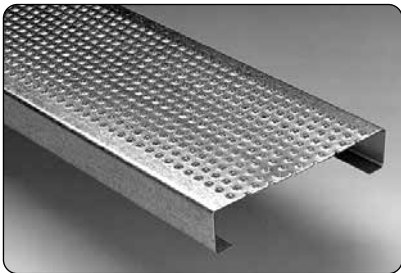
Plain HRP&O Steel and Stainless sheet available upon request and special quotation. Hot Dip Galvanized after fabrication is available upon request and special order.

Special fabrication cutting or specialty configurations available upon request and special quotation.

Traction Tread™ Flooring

Plank, Sheet and Ladder Rungs

Traction Tread™ panels have a surface of perforated raised buttons. The perforations allow spillage to drain and break oil film, detergent, and other slippery agents away from the walking surface. Traction Tread™ is ideal for pedestrian traffic and the button design is the best in the industry for allowing women in heels, as well as a man in work boots, to walk comfortably and safely over the surfaces. This product is offered in planks and 36" x 120" sheets. Traction Tread™ services many applications such as pedestrian walkways, scaffold planking, mezzanines, stair treads, the resurfacing of worn materials, etc.—useful anywhere a light slip-resistant flooring is required.



Available Configurations				
Product	Material	Gauge	Width	Channel Height
Sheet	HR P&O Steel	11ga 12ga 13ga 14ga 16ga	36"	N/A
	5052-H32 Aluminum	.125"	36"	N/A
Planks	Galvanized	11ga	7"	2"
	HR P&O Steel	13ga	10" 12"	(1-1/2" min.)
	5052-H32 Aluminum	.125"	7" 10" 12"	2"
Ladder Rungs	Galvanized	13ga	1-1/4"	1-1/2"
	HR P&O Steel		1-5/8"	1-1/8"
	5052-H32 Aluminum	.125"	2-1/4"	1-1/2"

Standard Lengths: 10' (120") Sheets.

Plank Lengths: 10' and 12'.

Ladder Rung Length: 60"

Special fabrication, cutting or specialty configurations available upon request and special quotation.

Other
Products

Alro Steel Metals Guide

Safety Grating Products

Rooftop Walkway Systems

Although roofs look durable, they were never intended to be walked on. As the volume of rooftop equipment keeps expanding, the wear and tear of mounting maintenance traffic can lead to leaks and premature roof replacement. Rooftop Walkway Systems solve these problems to keep your roof leak free and long lived. The patented elevated Grip Strut® Rooftop Walkway System is unlike others in that they are elevated and discourage shortcuts and emphatically define a path that is visible even in heavy snow. This system is interchangeable with our different walking surfaces such as Perf-O Grip® and Grate Lock and is ideal for built-up roof systems. Grate-Lock RTWW systems are also available for any standing seam metal roof.



Alro Plastics

Your Source for Engineering Plastics
Sheet • Rod • Tube • Film • Profiles • Machined Parts

Ask your Alro Plastics Sales Representative about our
Fiberglass Grating and our other alternatives to using steel.

Fiberglass Grating - Molded **Duragrate™ Molded Grating**

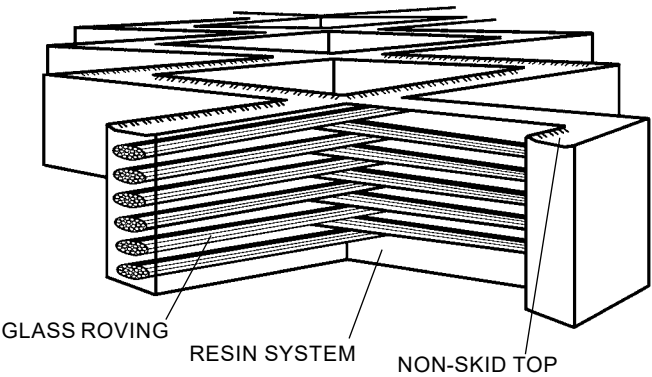
Molded Grating has many features to satisfy the needs and design requirements of our customers:

- **Corrosion Resistant:** Resistant to nearly all industrial chemicals and will give long life and low life cycle cost.
- **Slip Resistant:** The concave surface provides positive traction even when wet, creating a safer work environment.
- **Fire Retardant:** All resin systems are fire retardant Class I ASTM E-84 with zero fuel contribution.
- **Non-Conductive:** Creates a safety barrier for personnel in electrical applications. Non-magnetic and non-sparking.
- **Light Weight:** The low weight makes it easy to install and remove without heavy equipment.
- **Low Maintenance:** The high corrosive resistance eliminates costly maintenance.



Fiberglass Grating - Molded

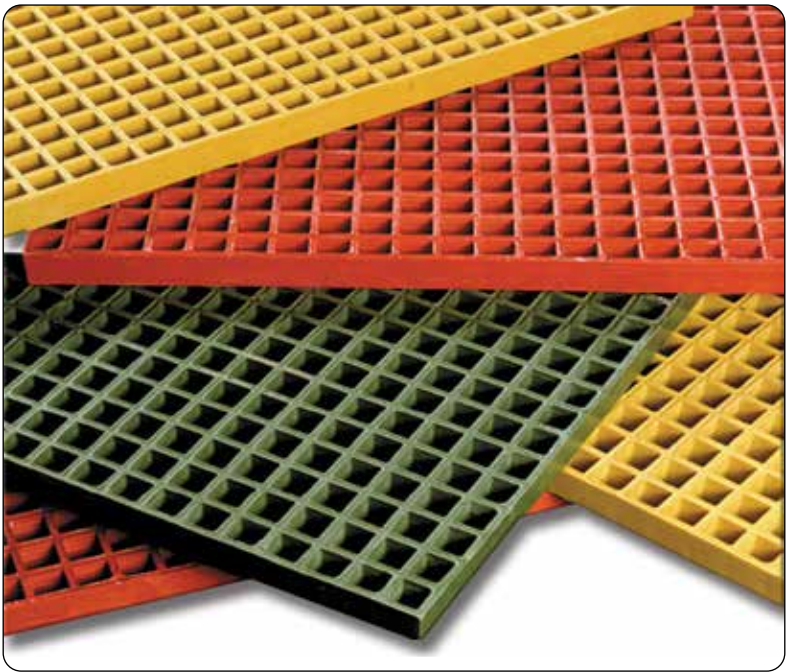
Duragrate™ Molded Grating



Resin Systems

Premium Grade Polyester Resins

DESCRIPTION	STANDARD COLORS
•Standard Fire Retardant •Extra Fire Retardant •Vinyl Ester Fire Retardant	- green - gray - orange
(Other resin systems and colors are available on special order.)	



Other
Products

Alro Steel Metals Guide



Fiberglass Grating - Molded

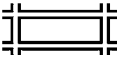
Duragrate™ Molded Grating

STANDARD GRATINGS

Additional features and accessories:

- **Gritted Top:** An epoxy grit can be added to the top of the standard grating.
- **USDA Approved Grating:** Where incidental food contact may occur USDA approved grating is available.
- **Custom Colors:** Contact Alro Plastics about custom colors.
- **Seal Kits:** All field cuts should be sealed with a compatible resin.

STANDARD GRATINGS

Top View	Open Area	Depth	Pattern	Approx Weight (lbs./sqft)	Mesh Size	Panel Sizes
	70%	1	Square Mesh	2.5	1½ x 1½	3 x 10 4 x 12
	69%	1	Rect. Mesh	2.5	1 x 4	3 x 10 4 x 12
	70%	1½	Square Mesh	3.75	1½ x 1½	3 x 10 4 x 12
	72%	2	Square Mesh	4.0	2 x 2	4 x 12

Note: Standard and Heavy Duty grades are available.

Other
Products



Fiberglass Grating - Pultruded

Duradeck™ Pultruded Grating

Fiberglass Grating bars consist of two glass reinforcements. First, continuous glass roving is used for high longitudinal strength. Second, continuous strand mat is introduced, primarily for transverse strength. The mat also provides a resin-rich surface for added corrosion resistance and helps prevent chipping and splitting from impact. Fiberglass Grating, in addition to the glass reinforcement, provides a synthetic surface veil to match the resin selection. The veil provides a greater corrosion capability for harsh chemical environments and creates an ultra-violet barrier for continuous exposure outdoors.

Product Applications

Breweries, Chemical, Fire Equipment, Food Processing, Gas/Coal Fire/Nuclear Power, Marine Applications, Micro Electronics, Mining, Offshore Equipment, Petroleum Production, Plating Operations, Pollution Control, Pulp/Paper, Recreational Equipment, Swimming Pools, and Water/Waste Water.

Specifications

Resin Systems

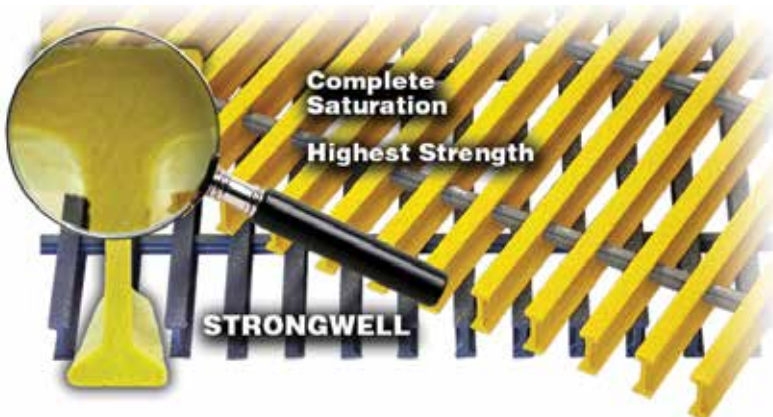
- **Isophthalic, Isophthalic Fire Retardant:** Made with a premium-grade fire retardant isophthalic polyester resin which meets ASTM E-84, Class 1, Flame Rating, and self-extinguishing requirements of ASTM D-635.
- **Vinylester, Vinylester Fire Retardant:** Made with a premium grade vinylester resin system for severe corrosion applications also meeting ASTM E-84, Class 1, Flame Rating, and self-extinguishing requirements of ASTM D-635.

Safety/Non-Skid Surfaces

The walking surfaces of Fiberglass Grating have a coarse epoxy grit bonded to both the bearing bar and the flush top cross-rod. The patented flush-top design provides a greater non-skid surface area as well as improved appearance.

Typical Properties

- | | | |
|-------------------------|--------------------|------------------------------|
| • Corrosion resistant. | • High strength. | • Low thermal conductivity. |
| • Fire retardant. | • Light weight. | • Maximum unsupported spans. |
| • High impact strength. | • Low maintenance. | • Safety non-skid surface. |



Fully Threaded Steel Bars

Low Carbon plain & High Strength (B7) plain

Low Carbon Zinc plated & High Strength (B7) Zinc plated

Stainless Steel

Standard Lengths: 2 ft., 3 ft., 6 ft., 10 ft. & 12 ft.

National Coarse Sizes		
6-32		5/8-11
8-32		3/4-10
10-24		7/8-9
1/4-20		1-8
5/16-18		1-1/8-7
3/8-16		1-1/4-7
7/16-14		1-3/8-6
1/2-13		1-1/2-6
9/16-12		1-3/4-6
		2-4-1/2

National Fine Sizes		
10-32		7/8-14
1/4-28		1-14
5/16-24		1-1/8-12
3/8-24		1-1/4-12
7/16-20		1-3/8-12
1/2-20		1-1/2-12
9/16-18		1-3/4-12
5/8-18		2-12
3/4-16		

Note: Available in Metric sizes also.

Square Key Stock

Zinc Plated finish (Cold Drawn)

Standard Lengths: 12" and 36"

Sizes (inches)		
1/8	3/8	3/4
5/32	7/16	13/16
3/16	1/2	7/8
7/32	9/16	15/16
1/4	5/8	1
5/16	11/16	

Note: Available in Metric sizes also.

Other
Products

Alro Steel Metals Guide



Steel Strapping

Regular Duty

Strap Size				Specifications	
Width		Thickness		Average Strength (lbs.)	Footage Yield (ft./lbs.)
(inch)	(mm)	(inch)	(mm)		
3/8	10	.020	.51	865	39.22
1/2	13	.015	.38	860	39.22
		.020	.51	1150	29.42
		.023	.58	1320	25.58
5/8	16	.020	.51	1440	23.53
		.023	.58	1650	20.46
3/4	19	.020	.51	1725	19.61
		.023	.58	1980	17.05

Steel Strapping

High Tensile

Strap Size				Specifications	
Width		Thickness		Average Strength (lbs.)	Footage Yield (ft./lbs.)
(inch)	(mm)	(inch)	(mm)		
1/2	13	.020	.51	1485	29.42
5/8	16	.020	.51	1855	23.53
		.023	.58	2130	20.46
3/4	19	.020	.51	2325	19.61
		.025	.64	2675	15.69
		.029	.75	3320	13.30
		.031	.80	3250	12.65
1-1/4	32	.029	.75	5437	8.11
		.031	.80	5450	7.59
		.035	.89	6780	6.72
		.044	1.12	7700	5.35
2	51	.044	1.12	12300	3.34

Other
Products

Alro Steel Metals Guide



Diamond Case Shafting

Carbon (1060) Standard Sizes

Nom. Dia.	Tolerances				Weight lbs. per inch	Surface Hardness	Depth of Hardness	Bar Lengths
	Grade 1 (L)	Grade 2 (S)	Grade 3 (N)	Grade 4 (D)				
1/4"	.2495/.2485	.2490/.2485			.014	60/65 RC	.040	144"
3/8"	.3745/.3740	.3740/.3735			.031	60/65 RC	.040	144"
1/2"	.4995/.4990	.4990/.4985	.5000/.4998		.055	60/65 RC	.060	184"
5/8"	.6245/.6240	.6240/.6235	.6250/.6248		.070	60/65 RC	.060	184"
3/4"	.7495/.7490	.7490/.7485	.7500/.7498		.125	60/65 RC	.060	184"
7/8"	.8745/.8740				.170	60/65 RC	.060	208"
1"	.9995/.9990	.9990/.9985	1.0000/.9998		.222	60/65 RC	.080	208"
1-1/8"	1.1245/1.1240				.282	60/65 RC	.080	208"
1-1/4"	1.2495/1.2490	1.2490/1.2498	1.2500/1.2498		.348	60/65 RC	.080	208"
1-3/8"	1.3745/1.3740				.421	60/65 RC	.080	208"
1-1/2"	1.4994/1.4989	1.4989/1.4984	1.5000/1.4997		.500	60/65 RC	.080	208"
1-3/4"	1.7495/1.7490				.681	60/65 RC	.100	208"
2"	1.9994/1.9987	1.9987/1.9980	2.0000/1.9997	2.0000/2.0003	.890	60/65 RC	.100	208"
2-1/4"	2.2493/2.2486				1.127	60/65 RC	.100	208"
2-1/2"	2.4993/2.4985	2.4985/2.4977			1.392	60/65 RC	.100	208"
3"	2.9992/2.9983	2.9983/2.9974	3.0000/2.9996		2.004	60/65 RC	.100	208"
3-1/2"	3.4990/3.4980				2.728	60/65 RC	.100	208"
4"	3.9988/3.9976	3.9976/3.9964			3.565	60/65 RC	.100	208"

Diamond Case Shafting

Carbon (1060) Metric Sizes

Nominal Diameter	Tolerance Grade 1 (L)	Weight per inch	Surface Hardness	Depth of Hardness	Bar Lengths
6	.2362/.2358	.012	60/65 RC	.040	144"
8	.3150/.3146	.022	60/65 RC	.040	144"
10	.3937/.3933	.035	60/65 RC	.040	144"
12	.4724/.4720	.050	60/65 RC	.060	184"
14	.5512/.5508	.069	60/65 RC	.060	184"
16	.6299/.6295	.088	60/65 RC	.060	184"
18	.7087/.7083	.112	60/65 RC	.060	184"
20	.7874/.7869	.138	60/65 RC	.060	184"
25	.9843/.9838	.216	60/65 RC	.080	208"
30	1.1811/1.1806	.311	60/65 RC	.080	208"
32	1.2598/1.2593	.349	60/65 RC	.081	208"
35	1.3780/1.3775	.417	60/65 RC	.082	208"
40	1.5748/1.5743	.553	60/65 RC	.080	208"
45	1.7717/1.7710	.698	60/65 RC	.080	208"
50	1.9685/1.9679	.864	60/65 RC	.100	208"
60	2.3622/2.3615	1.240	60/65 RC	.100	208"
63	2.4806/2.4799	1.343	60/65 RC	.100	208"
80	3.1496/3.1489	2.210	60/65 RC	.100	208"
100	3.9370/3.9363	3.397	60/65 RC	.100	208"

Other
Products

Alro Steel Metals Guide



Diamond Case Shafting

Stainless (440 C) Standard Sizes

Nominal Diameter	Tolerances		Weight per inch	Surface Hardness	Depth of Hardness	Bar Lengths
	Grade 1 (L)	Grade 2 (S)				
1/2"	.4995/.4990	.4990/.4985	.055	50/550 RC	.060	184"
5/8"	.6245/.6240	.6240/.6235	.086	50/550 RC	.060	184"
3/4"	.7495/.7490	.7490/.7485	.125	50/550 RC	.060	184"
1"	.9995/.9990	.9990/.9985	.222	50/550 RC	.080	208"
1-1/4"	1.2495/1.2490	1.2490/1.2485	.348	50/550 RC	.080	208"
1-1/2"	1.4994/1.4989	1.4989/1.4984	.500	50/550 RC	.080	208"
2"	1.9994/1.9987	1.9987/1.9980	.890	50/550 RC	.100	208"

Diamond Case Linear Shafting Specifications:

- **Material** - 1060 or 440C stainless
- **Dimensional Tolerance** - See pages 9-54 & 9-55
- **Roundness** - Superior
- **Cylindricity** - High
- **Straightness** - .001/.002 TIR cumulative
- **Surface Finish** - 8 RMS or better
- **Hardness** - See pages 9-54 & 9-55
- **Depth of Hardness** - See pages 9-54 & 9-55

Other
Products



Strapping Seals

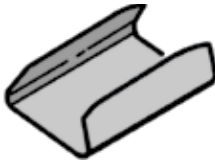
Regular Duty Seals

Strap Width (inches)	Seal Number	Seal Type	Type of Joint (Notch)	Seal Length (inches)	Standard Pack	Shipping Weight (pounds)
3/8	31	Open	Double	1	5000	31
	32PB	Push	Double	1	6000	53
1/2	41	Open	Double	1	5000	39
	42	Closed	Double	1	5000	42
	44PB	Push	Single	7/8	6000	56
5/8	51	Open	Double	1-3/32	5000	53
	52FM	Closed	Double	1-3/32	5000	54
	52PB	Push	Double	1-3/32	5000	68
3/4	61	Open	Double	1-3/32	5000	60
	62PB	Push	Double	1-3/32	5000	78
	632 PBH	Push	Double	1-25/32	2500	78
	637	Semi-Open	Double	1-25/32	2000	43
1-1/4	1032 PBH	Push	Double	2-1/4	1000	63

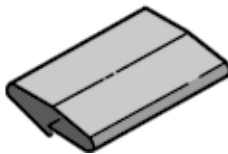
Other
Products

Alro Steel Metals Guide

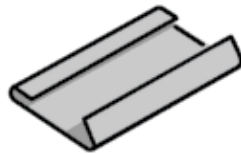
Seal Examples



OPEN (SNAP-ON)
Open seals have open legs to permit them to be snapped onto the overlapping strap-ends prior to tensioning. Regular Duty sizes only.



PUSH (OVERLAP)
Push-type seals have closed overlapping legs to be used with push-type tensioners.



SEMI-OPEN (ONE LEG RAISED)
Semi-open seals are used on heavy-duty strapping. The closed leg is hooked over the strapping and the seal snapped down into position.



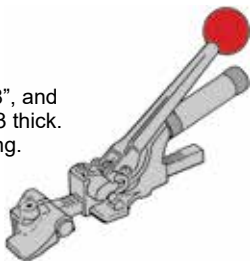
Tools for Steel Strapping

Regular Duty

Manual

NH-4 Tensioner

Use for 3/8", 1/2", 5/8", and 3/4" widths, .015-.023 thick. Regular duty strapping.

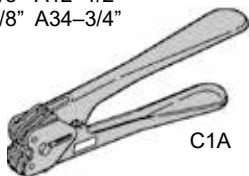


Om Tensioner (Manual)



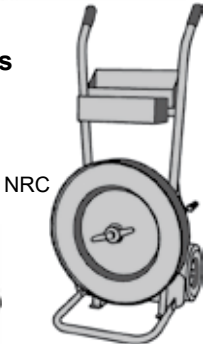
Multicrimp Tong Sealers

A38-3/8" A12-1/2"
A58-5/8" A34-3/4"



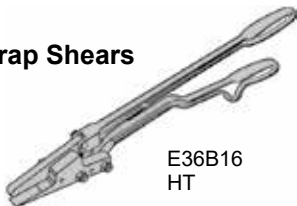
C1A

Dispensers

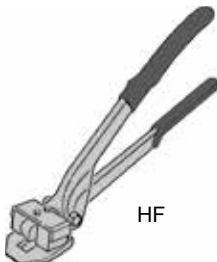


NRC

Strap Shears



E36B16
HT

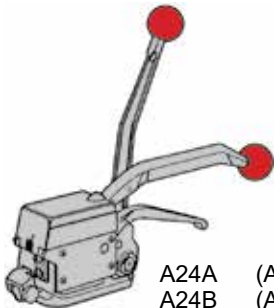
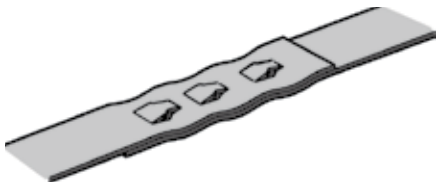


HF

Model	Strap Size		Weight	
	(inches)	(millimeters)	(lbs.)	(kg.)
E14B0 S	thru 3/4 x .025	thru 19 x 0.64	1	0.45
	thru 3/4 x .025	thru 19 x 0.64	1	0.45
E36C0 V HF	thru 1-1/4 x .035	thru 32 x 0.89	2	0.90
	thru 1-1/4 x .035	thru 32 x 0.89	2	0.90
	thru 1-1/4 x .035	thru 32 x 0.89	2	0.90
E36B16 HT	thru 2 x .065	thru 51 x 1.65	7	3.14
	thru 2 x .050	thru 51 x 1.27	6	2.69

Sealless Joint

Eliminates the need for separate metal seals.



A24A (A332)
A24B (A333, A335)

Other
Products

Alro Steel Metals Guide

Shipping Steel Strapping

All Regular Duty and Supramet is shipped in approximately 100 lb. (45kg) oscillated coils, which are approximately 1,100 lbs. (499.2 kg) per skid. Heavy duty and High Tensile strapping is shipped in approximately 60 to 105 lb. ribbon wound coils, which are approximately 1,500 to 2,500 lbs. (680.7 to 1134.5 kg) per skid.



Oscillated



Ribbon

Skids are available in cardboard wrapped Skid Packs and unwrapped Open Packs.



Skid Pack



Open Pack