



**EARLE M. JORGENSEN
COMPANY**

REFERENCE BOOK

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J

SECTION J

TOOL STEELS

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AISI TOOL STEEL CLASSIFICATION SYSTEM

In order to overcome the difficulties arising from the existence of hundreds of different trade names assigned by various tool steel manufacturers, the American Iron and Steel Institute (AISI) has published a uniform designation system. A letter symbol is provided for each major group, as follows:

High Speed	
Molybdenum Base	M
Tungsten Base	T
Hot Work	H
Cold Work	
High Carbon, High Chromium	D
Medium Alloy Air Hardening	A
Oil Hardening	O
Shock Resisting	S
Mold Steels	P
Special Purpose Low Alloy	L
Water Hardening	W

Each major group may contain a number of individual types, which are identified by suffix numbers.

As will be noted throughout this section, EMJ Tool Steels are classified according to the AISI system. However, trade names of various producers for the respective AISI grades are shown for your convenience.

COLD WORK TOOL STEELS

These steels are particularly designed to resist wear and abrasion. In addition, they are safe-hardening, which tends to minimize the danger of cracking in the heat treating or hardening operation. They are non-deforming, which minimizes distortion and warpage. Applications include tools and dies for cold shearing, forming, drawing, trimming, and punching, knurling tools, reamers, taps, gauges, and master tools.

TYPE	AISI O 1 UNS T31501 Low Manganese Oil Hardening	AISI O 6 UNS T31506 Graphitic Oil Hardening	AISI A 2 UNS T30102 5% Chrome Air Hardening	AISI A 10 UNS T30110 Graphitic Air Hardening	AISI D 2 UNS T30402 High Carbon High Chrome Air Hardening
TYPICAL ANALYSIS	C .90 Mn 1.00 Cr .50 W .50	C 1.45 Mn .80 Si 1.00 Mo .25	C 1.00 Cr 5.00 Mo 1.00	C 1.35 Mn 1.80 Si 1.25 Mo 1.50 Ni 1.80	C 1.50 Cr 12.00 Mo 1.00 V 1.00
WEAR RESISTANCE	MEDIUM	MEDIUM	HIGH	HIGH	VERY HIGH
TOUGHNESS	MEDIUM	MEDIUM	MEDIUM	MEDIUM	LOW
DISTORTION IN H.T.	VERY LOW	VERY LOW	LOWEST	LOWEST	LOWEST
RED HARDNESS	LOW	LOW	HIGH	MEDIUM	HIGH
MACHINABILITY	HIGH	HIGHEST	MEDIUM	HIGH	LOW
FORGING Start at Do not forge below	1800°-1950°F 1550°F	1800°-1950°F 1500°F	1850°-2000°F 1650°F	1800°-1925°F 1600°F	1850°-2000°F 1700°F
ANNEALING Temperature. Max. cooling rate/hour Brinell Hardness. . .	1400°-1450°F ^a 40°F 183-212	1410°-1450°F ^a 20°F 183-217	1550°-1600°F ^b 40°F 201-235	1410°-1460°F ^b 15°F 235-269	1600°-1650°F 40°F 217-255
HARDENING Temperature. Quenching Medium	1450°-1500°F Oil	1450°-1500°F Oil	1700°-1800°F Air	1450°-1500°F Air	1800°-1875°F Air
TEMPERING Temperature. Rc Hardness	350°-500°F 62-57	350°-600°F 63-58	350°-1000°F 62-57	350°-800°F 62-55	400°-1000°F 61-54

^aO 6 is normalized from 1600°F prior to annealing.

^bA 10 is normalized from 1460°F prior to annealing.

SHOCK RESISTING and SPECIAL PURPOSE

TOOL STEELS

Shock Resisting Tool Steels are designed for use where the ability to withstand repeated blows at normal operating temperatures is more important than the ability to resist wear and abrasion. Applications include hand and pneumatic tools for chipping, punching, riveting, as well as drift pins, grippers, and mandrels.

AISI L6 is a Special Purpose Low Alloy Tool Steel, generally used for machine parts and in applications where toughness is an important consideration. Typical applications are arbors, cams, chucks, collets, jigs, and various machined tool parts.

TYPE	AISI S 1 UNS T41901 Chrome-Tungsten Oil Hardening	AISI S 5 UNS T41905 Silicon-Manganese Oil Hardening	AISI S 7 UNS T41907 Chrome-Moly Air Hardening	AISI L 6 UNS T61206 Cr-Ni-Mo Oil Hardening
TYPICAL ANALYSIS	C .50 Cr 1.50 W 2.50	C .55 Mn .80 Si 2.00 Mo .40	C .50 Cr 3.25 Mo 1.40	C .70 Cr .75 Ni 1.50 Mo .25
WEAR RESISTANCE	MEDIUM	MEDIUM	MEDIUM	MEDIUM
TOUGHNESS	VERY HIGH	HIGHEST	VERY HIGH	VERY HIGH
DISTORTION IN H.T.	MEDIUM	MEDIUM	LOWEST	LOW
RED HARDNESS	MEDIUM	LOW	HIGH	LOW
MACHINABILITY	MEDIUM	HIGH	MEDIUM	MEDIUM
FORGING Start at Do not forge below ..	1850°-2050°F 1600°F	1850°-2050°F 1600°F	1950°-2050°F 1700°F	1800°-2000°F 1550°F
ANNEALING Temperature Max. cooling rate/hour. Brinell Hardness	1450°-1500°F 40°F 183-229	1425°-1475°F 25°F 192-229	1500°-1550°F 25°F down to 1000°; then air cool 187-223	1400°-1450°F 40°F 183-255
HARDENING Temperature Quenching Medium. .	1650°-1750°F Oil	1600°-1700°F Oil	1700°-1750°F To 2½"-Air Over 2½"-Oil (until black)	1450°-1550°F Oil
TEMPERING Temperature Rc Hardness.....	400°-1200°F 58-40	350°-800°F 60-50	400°-1150°F 57-45	350°-1000°F 62-45

HOT WORK TOOL STEELS

These steels are designed to resist abrasion and washing action. They have excellent shock resistance. In addition they have enough red hardness to retain their properties at high operation temperatures. Applications include dies for hot metalworking (shearing, forming, punching, extruding, and trimming), dummy blocks, and mandrels. They are also used for structural applications where high engineering strength at elevated temperatures are required.

TYPE	AISI H 11 UNS T20811 Chrome-Moly Vanadium	AISI H 12 UNS T20812 Chrome-Moly Tungsten	AISI H 13 UNS T20813 Chrome-Moly High Vanadium
TYPICAL ANALYSIS	C .35 Cr 5.00 Mo 1.50 V .40	C .35 Cr 5.00 W 1.50 Mo 1.50 V .40	C .35 Cr 5.00 Mo 1.50 V 1.00
WEAR RESISTANCE	MEDIUM	MEDIUM	MEDIUM
TOUGHNESS	VERY HIGH	VERY HIGH	VERY HIGH
DISTORTION IN H.T.	VERY LOW	VERY LOW	VERY LOW
RED HARDNESS	HIGH	HIGH	HIGH
MACHINABILITY	HIGH	HIGH	HIGH
FORGING Start at Do not forge below	1950°-2100°F 1650°F	1950°-2100°F 1650°F	1950°-2100°F 1650°F
ANNEALING Temperature Max. cooling rate/hour . . Brinell Hardness	1550°-1650°F 40°F 192-235	1550°-1650°F 40°F 192-235	1550°-1650°F 40°F 192-229
HARDENING Preheat temperature . . . Hardening temperature . Quenching Medium	1500°F 1825°-1875°F Air	1500°F 1825°-1875°F Air	1500°F 1825°-1900°F Air
TEMPERING Temperature Rc Hardness	1000°-1200°F 54-38	1000°-1200°F 55-38	1000°-1200°F 53-38

HIGH SPEED TOOL STEELS

These steels are specifically designed to maintain high hardness at elevated temperatures (red hardness), with sufficient abrasion and shock-resisting properties for good cutting characteristics. Applications include cutting tools for lathes, shapers, boring mills, and other cutting machines, broaches, drills, and special dies.

TYPE	AISI T 1 UNS T12001 Tungsten (18-4-1)	AISI M 1 UNS T11301 Molybdenum (8-2-1)	AISI M 2 UNS T11302 Moly-Tungsten (6-5-2)
TYPICAL ANALYSIS	C .75 Cr 4.00 W 18.00 V 1.00	C .85 Cr 4.00 W 1.50 Mo 8.50 V 1.00	C .85 Cr 4.00 W 6.00 Mo 5.00 V 2.00
WEAR RESISTANCE	VERY HIGH	VERY HIGH	VERY HIGH
TOUGHNESS	LOW	LOW	LOW
DISTORTION IN H.T.	MEDIUM	MEDIUM	MEDIUM
RED HARDNESS	VERY HIGH	VERY HIGH	VERY HIGH
MACHINABILITY	MEDIUM	MEDIUM	MEDIUM
FORGING Start at	1950°-2150°F	1900°-2100°F	1900°-2100°F
Do not forge below	1750°F	1700°F	1700°F
ANNEALING Temperature	1600°-1650°F	1500°-1600°F	1600°-1650°F
Max. cooling rate/hour. . .	40°F	40°F	40°F
Brinell Hardness	217-255	207-235	212-241
HARDENING Preheat temperature . . .	1500°-1600°F	1350°-1550°F	1350°-1550°F
Hardening temperature . .	2300°-2375°F	2150°-2225°F	2175°-2250°F
Quenching Medium	Oil or Air	Oil or Air	Oil or Air
TEMPERING Temperature	1000°-1100°F	1000°-1100°F	1000°-1200°F
Rc Hardness	65-60	65-60	65-60

WATER HARDENING (CARBON) TOOL STEELS

Two grades of water hardening (carbon) tool steels are stocked:

AISI W 1 Tool Steel is an excellent general purpose tool steel that will produce high hardness to uniform depth when heat treated.

AISI W 2 Tool Steel is similar to AISI W 1, but the addition of vanadium gives this grade a greater ability to retain a fine grain structure after heat treatment.

TYPE	AISI W 1 UNS T72301	AISI W 2 UNS T72302
TYPICAL ANALYSIS	C .60/1.40	C .60/1.40 V .25
FORGING Start at Do not forge below	1800°-1950°F 1500°F	1800°-1950°F 1500°F
ANNEALING Temperature Max. cooling rate/hour Brinell Hardness	1360°-1450°F 40°F 156-201	1360°-1450°F 40°F 156-201
HARDENING Temperature Quenching Medium	1400°-1550°F Water	1400°-1550°F Water
TEMPERING Temperature Rc Hardness	350°-650°F 64-50	350°-650°F 64-50



BRAKE DIE STEEL

Brake Die Steel is a special chromium-molybdenum analysis designed especially for brake dies. It combines good machinability with high compressive strength, wear resistance, and toughness.

It is heat treated, straightened, and stress relieved to Brinell 248-293 (Rc 24-31), and is generally used without further heat treatment.

AVAILABLE TOOL STEEL SIZES

AISI O 1 BARS

Color Marking: Ends painted Blue with Gold Stripe

Rounds — 1/4" through 16"

Squares — 3/8" through 6"

Flats — 1/4" x 1/2" through 6" x 12"

AISI O 6 BARS Stripe

Color Marking: Ends painted Aluminum with Black

Rounds — 1/4" through 13"

Squares — 1/2" through 8"

Flats — 1/4" x 3/4" through 6" x 10"

AISI A 2 BARS

Color Marking: Ends painted Green and White

Rounds — 1/4" through 16"

Squares — 1/2" through 6"

Flats — 3/8" x 1 1/2" through 6" x 12"

AISI A 10 BARS

Color Marking: Ends painted Aluminum with Blue Stripe

Rounds — 3/8" through 12"

Squares — 3/4" through 4 1/2"

Flats — 3/8" x 1" through 6" x 10"

AISI D 2 BARS

Color Marking: Ends painted Red

Rounds — 1/4" through 16"

Squares — 1/2" through 6"

Flats — 1/2" x 3/4" through 6" x 12"

AISI S 1 BARS

Color Marking: Ends painted Brown

Rounds — 1/4" through 8"

Squares — 1 1/4" through 5"

Flats — 1/2" x 3/4" through 4" x 6"

AISI S 5 BARS

Color Marking: Ends painted Pink

Rounds — 5/16" through 6"

Squares — 3/8" through 3"

Hexagons — 1/2" through 1 1/4"

Octagons — 1/4" through 1 1/4"

Flats — 1/2" x 1 1/2" through 4" x 6"

AVAILABLE TOOL STEEL SIZES (Continued)

AISI S 7 BARS **Color Marking:** Ends painted Yellow with Blue Stripe

Rounds — $\frac{1}{2}$ " through 13"

Squares — $\frac{1}{2}$ " through 8"

Flats — $\frac{1}{2}$ " x 1" through 6" x 8"

AISI L 6 BARS **Color Marking:** Ends painted Gold with Green Stripe

Rounds — $\frac{1}{2}$ " through 2 $\frac{1}{2}$ "

AISI H 12 BARS **Color Marking:** Ends painted Green and Yellow

Rounds — 1" through 10"

AISI H 13 BARS **Color Marking:** Ends painted Blue with White Stripe

Rounds — $\frac{1}{2}$ " through 12"

AISI T 1 BARS **Color Marking:** Ends painted Blue with Yellow Stripe

Rounds — $\frac{3}{4}$ " through 4 $\frac{1}{2}$ "

Squares — 1 $\frac{1}{4}$ " through 2"

Flats — $\frac{3}{8}$ " x 1 $\frac{1}{2}$ " through 1 $\frac{1}{2}$ " x 2"

AISI M 1 BARS **Color Marking:** Ends painted Black with White Stripe

Rounds — $\frac{1}{2}$ " through 7"

AISI M 2 BARS **Color Marking:** Ends painted Yellow

Rounds — $\frac{9}{32}$ " through 6"

Squares — $\frac{1}{2}$ " through 2"

Flats — $\frac{5}{16}$ " x 1 $\frac{1}{2}$ " through 3" x 4"

AISI W 1 BARS **Color Marking:** Rounds — Ends painted Green

Hexagons & Octagons — Color Marking: Ends painted Orange

Rounds — $\frac{1}{4}$ " through 3"

Hexagons — $\frac{3}{4}$ " through 1 $\frac{1}{8}$ "

Octagons — $\frac{3}{8}$ " through 1 $\frac{1}{4}$ "

BRAKE DIE **Color Marking:** Ends painted Pink with White Stripe

Rounds — $\frac{3}{4}$ " through 10"

Squares — $\frac{1}{2}$ " through 6"

Flats — $\frac{1}{2}$ " x 1 $\frac{1}{2}$ " through 3" x 6"

POLISHED DRILL ROD and PRECISION GROUND FLAT STOCK

Polished Drill Rod and Flat Ground Stock are supplied ready for use in a wide variety of applications. Surfaces are ground to a finish of better than 40 micro inches and are free from defects and decarburizaion.

These products are available in convenient, easy-to-work sizes so that no time need be spent nor metal wasted in preparing the surface to make the tool or die. They are ideally suited for precision jobs. Precision Ground Flat Stock is available in over-size stock as well as standard sizes.

TYPICAL ANALYSIS

	C	Mn	Si	Cr	W	V	Mo
Carbon (W 1)	1.00	.30	.30	—	—	—	—
Oil Hardening (O 1)	.90	1.20	.35	.50	.50	.20	—
Graph-Mo (O 6)	1.45	1.00	1.25	—	—	—	.25
		Max.	Max.				
Air Hardening (A 2)	1.00	.50	.30	5.00	—	.25	1.10
1018 Low Carbon	.18	.50	.20	—	—	—	—
Air Hardening (A 6)	.70	2.00	.30	1.00	—	—	1.35

APPLICATIONS — Drill Rod rounds are particularly suitable for drills, taps, dies, arbors, balance staffs, chasers, cutting-off tools, engravers' tools, gauges, jewelers' tools, keys, machinery parts, milling tools, pins, punches, pinion, pivots, roller bearings, threading dies, etc.

Ground Flat Stock is ideally suited for numerous precision jobs where ease of working and fine performance are required — such as dies, fixtures, jigs, stamps, machine parts, punches, templates, stripper plates, tools, gauges, shims, etc.

TOLERANCES

Drill Rod Rounds:

Size	Diameter Tolerance
.124" or smaller	+/- .0003"
.125" to .499"	+/- .0005"
.500" to 2.000"	+/- .001"

Precision Ground Flat Stock:

	Thickness Tolerance	Width Tolerance
Standard Sizes	+/- .001"	+ .005", - 0"
Over-Sized Stock		
Under $\frac{3}{16}$ " Thick	+/- .001"	+ .005", - 0"
$\frac{3}{16}$ " Thick & Over	+ .011"/.013", - 0"	+ .010"/.015", -0"



DRILL ROD ROUNDS

W 1 (Water Hardening)

O 1 (Oil Hardening)

Stock Lengths 3'

Diameter Decimal Inches	Size No. or Fraction	Weight Lbs. per 3-Ft. Lgth.	Diameter Decimal Inches	Size No. or Fraction	Weight Lbs. per 3-Ft. Lgth.	Diameter Decimal Inches	Size No. or Fraction	Weight Lbs. per 3-Ft. Lgth.
.0156	1/64"	.002	.172	17	.237	.4531	29/64"	1.626
.0312	1/32"	.008	.175	16	.246	.4687	15/32"	1.749
.032	66	.008	.178	15	.255	.4843	31/64"	1.875
.033	65	.009	.180	14	.261	.500	1/2"	2.001
.035	64	.010	.182	13	.267	.5156	33/64"	2.127
.036	63	.011	.185	12	.276	.5312	17/32"	2.250
.037	62	.011	.1875	3/16"	.282	.5468	35/64"	2.391
.038	61	.011	.188	11	.282	.5625	9/16"	2.532
.039	60	.012	.191	10	.288	.5781	37/64"	2.673
.040	59	.013	.194	9	.297	.5937	19/32"	2.811
.041	58	.014	.197	8	.312	.6093	39/64"	3.000
.042	57	.015	.199	7	.318	.625	5/8"	3.126
.045	56	.018	.201	6	.321	.6406	41/64"	3.312
.0468	3/64"	.018	.2031	13/64"	.327	.6562	21/32"	3.435
.050	55	.021	.204	5	.327	.6718	43/64"	3.561
.055	54	.024	.207	4	.345	.6875	11/16"	3.750
.058	53	.027	.212	3	.363	.7031	45/64"	3.936
.0625	1/16"	.030	.2187	7/32"	.387	.7187	23/32"	4.125
.063	52	.033	.219	2	.387	.7348	46/64"	4.314
.066	51	.036	.227	1	.414	.750	3/4"	4.500
.069	50	.039	.234	A	.441	.7656	49/64"	4.686
.072	49	.042	.2343	15/64"	.441	.7812	25/32"	4.875
.075	48	.045	.238	B	.450	.7969	51/64"	5.124
.077	47	.048	.242	C	.462	.8125	13/16"	5.250
.0781	5/64"	.051	.246	D	.483	.8281	53/64"	5.484
.079	46	.051	.250	1/4"	.501	.8437	27/32"	5.688
.081	45	.054	.250	E	.501	.8593	55/64"	5.910
.085	44	.057	.257	F	.522	.875	7/8"	6.126
.088	43	.063	.261	G	.543	.8906	57/64"	6.354
.092	42	.069	.2656	17/64"	.561	.9062	29/32"	6.564
.0937	3/32"	.069	.266	H	.564	.9219	59/64"	6.786
.095	41	.072	.272	I	.594	.9375	15/16"	6.999
.097	40	.075	.277	J	.615	.9531	61/64"	7.248
.099	39	.078	.281	K	.636	.9687	31/32"	7.593
.101	38	.084	.2812	9/32"	.639	.9844	63/64"	7.749
.103	37	.087	.290	L	.675	1.000	1"	7.998
.106	36	.090	.295	M	.699	1.0158	11/64"	8.247
.108	35	.093	.2968	19/64"	.702	1.0313	11/32"	8.499
.1093	7/64"	.093	.302	N	.726	1.0625	11/16"	9.030
.110	34	.096	.3125	5/16"	.780	1.0937	13/32"	9.582
.112	33	.102	.316	O	.813	1.125	11/8"	10.125
.115	32	.108	.323	P	.831	1.1562	15/32"	10.696
.120	31	.117	.3281	21/64"	.861	1.1875	13/16"	11.313
.125	1/8"	.126	.332	Q	.882	1.2187	17/32"	11.898
.127	30	.129	.339	R	.924	1.250	11/4"	12.501
.134	29	.144	.3437	11/32"	.939	1.2812	19/32"	13.122
.139	28	.156	.348	S	.975	1.3125	15/16"	13.800
.1406	9/64"	.156	.358	T	1.026	1.3437	111/32"	14.445
.143	27	.165	.3593	23/64"	1.032	1.3750	13/8"	15.147
.146	26	.171	.368	U	1.086	1.4062	113/32"	15.822
.148	25	.177	.375	3/8"	1.125	1.4375	17/16"	16.563
.151	24	.183	.377	V	1.149	1.4687	115/32"	17.259
.153	23	.189	.386	W	1.200	1.500	11/2"	18.000
.155	22	.195	.3906	25/64"	1.221	1.5625	19/16"	19.560
.1562	5/32"	.198	.397	X	1.263	1.625	15/8"	21.150
.157	21	.198	.404	Y	1.281	1.75	13/4"	24.510
.161	20	.207	.4062	13/32"	1.311	1.8125	113/16"	26.310
.164	19	.216	.413	Z	1.374	1.875	17/8"	28.140
.168	18	.228	.4218	27/64"	1.416	1.9375	115/16"	30.060
.1718	11/64"	.234	.4375	7/16"	1.530	2.000	2"	32.040



PRECISION GROUND FLAT STOCK

Stock Lengths: W1, 1018 — 24"

O 1, O 6, A 2, A 6 — 18" and 36"

Thickness and Width	Wt. per Piece		Thickness and Width	Wt. per Piece		Thickness and Width	Wt. per Piece	
	18" Long	24" Long		18" Long	24" Long		18" Long	24" Long
1/64 X 1/2	.04	.05	5/64 X 1	.40	.53	5/32 X 1 1/2	1.20	1.60
3/4	.06	.08	1 1/2	.60	.80	2	1.59	2.12
1	.08	.11	2	.80	1.07	2 1/2	1.99	2.65
1 1/2	.12	.16	2 1/2	1.00	1.33	3	2.39	3.19
2	.16	.21	3/32 X 1 1/2	.24	.32	3 1/2	2.79	3.72
2 1/2	.20	.27	3/4	.36	.48	4	3.19	4.25
3	.24	.32	1	.48	.64	6	4.78	6.27
4	.32	.43	1 1/4	.60	.80	8	6.38	8.51
1/32 X 1/2	.08	.11	1 1/2	.72	.96	11/64 X 4	3.51	4.68
3/4	.12	.16	1 3/4	.84	1.12	3/16 X 3/16	.18	.24
1	.16	.21	2	.96	1.28	5/16	.30	.40
1 1/4	.20	.27	2 1/2	1.20	1.60	1/2	.48	.64
1 1/2	.24	.32	3	1.43	1.91	3/4	.72	.96
1 3/4	.28	.37	3 1/2	1.67	2.23	7/8	.84	1.12
2	.32	.43	4	1.91	2.55	1	.96	1.28
2 1/2	.40	.53	5	2.39	3.19	1 3/4	1.20	1.60
3	.48	.64	6	2.87	3.83	1 1/2	1.43	1.91
3 1/2	.56	.75	8	3.83	5.11	1 3/4	1.67	2.23
4	.64	.85	7/64 X 1/2	.28	.37	2	1.91	2.55
5	.80	1.07	3/4	.42	.56	2 1/2	2.39	3.19
5 1/2	.88	1.17	1	.56	.75	3	2.87	3.83
6	.95	1.27	2	1.12	1.49	3 1/2	3.35	4.47
3/64 X 1/2	.12	.16	1/8 X 1/8	.08	.11	4	3.83	5.11
3/4	.18	.24	1/2	.32	.43	5	4.78	6.37
1	.24	.32	5/8	.40	.53	6	5.74	7.65
1 1/2	.36	.48	3/4	.48	.64	8	7.65	10.20
2	.48	.64	1	.64	.85	10	9.56	12.74
2 1/2	.60	.80	1 1/4	.80	1.07	12	11.48	15.30
3	.72	.96	1 1/2	.96	1.28	7/32 X 7/32	.24	.32
4	.95	1.27	1 3/4	1.12	1.49	1/2	.56	.75
5	1.20	1.60	2	1.28	1.71	3/4	.84	1.12
6	1.43	1.91	2 1/2	1.59	2.12	1	1.12	1.49
8	1.90	2.53	3	1.91	2.55	1 1/4	1.40	1.87
1/16 X 1/2	.16	.21	3 1/2	2.23	2.97	1 1/2	1.67	2.23
3/4	.24	.32	4	2.55	3.40	2	2.23	2.97
1	.32	.43	4 1/2	2.87	3.83	2 1/2	2.79	3.72
1 1/4	.40	.53	5	3.19	4.25	3	3.35	4.47
1 1/2	.48	.64	6	3.83	5.11	4	4.46	5.95
1 3/4	.56	.75	8	5.10	6.80	6	6.70	8.93
2	.64	.85	10	6.38	8.51	1/4 X 1/4	.32	.43
2 1/2	.80	1.07	12	7.66	10.21	3/8	.48	.64
3	.96	1.28	9/64 X 1	.72	.96	1/2	.64	.85
3 1/2	1.12	1.49	1 1/2	1.08	1.43	3/4	.96	1.28
4	1.27	1.69	3	2.15	2.87	1	1.28	1.71
5	1.59	2.12	5/32 X 5/32	.12	.16	1 1/4	1.60	2.13
6	1.91	2.54	1/2	.40	.53	1 1/2	1.91	2.55
8	2.55	3.39	3/4	.60	.80	1 3/4	2.23	2.97
10	3.19	4.25	1	.80	1.07	2	2.55	3.40
5/64 X 1/2	.20	.27	1 1/4	1.00	1.33	2 1/2	3.19	4.25
3/4	.30	.40						



PRECISION GROUND FLAT STOCK (Continued)

Stock Lengths: W1, 1018 — 24"
O 1, O 6, A 2, A 6 — 18" and 36"

Thickness and Width	Wt. per Piece		Thickness and Width	Wt. per Piece		Thickness and Width	Wt. per Piece	
	18" Long	24" Long		18" Long	24" Long		18" Long	24" Long
3	3.83	5.11	1	2.23	2.97	8	30.60	40.79
3 1/2	4.46	5.95	1 1/2	3.35	4.46	10	38.25	50.99
4	5.10	6.80	2	4.46	5.95	12	45.90	61.18
4 1/2	5.74	7.65	3	6.69	8.92	14	53.55	71.38
5	6.38	8.51	1/2 X 1/2	1.28	1.71	13/16 X 1	4.14	5.52
6	7.65	10.20	5/8	1.60	2.13	1 1/4	5.18	6.91
8	10.20	13.60	3/4	1.91	2.55	7/8 X 7/8	3.91	5.21
10	12.75	17.00	1	2.55	3.40	1	4.46	5.95
12	15.30	20.40	1 1/4	3.19	4.25	2	8.92	11.90
9/32 X 1	1.43	1.91	1 1/2	3.83	5.11	1 X 1	5.10	6.80
2 1/2	3.60	4.80	2	5.10	6.80	1 1/4	6.38	8.51
3	4.30	5.73	2 1/2	6.38	8.51	1 1/2	7.65	10.20
5/16 X 5/16	.50	.67	3	7.65	10.20	1 3/4	8.93	11.91
1/2	.80	1.07	3 1/2	8.93	11.90	2	10.20	13.60
3/4	1.19	1.59	4	10.20	13.60	2 1/2	12.75	17.00
1	1.59	2.12	4 1/2	11.48	15.30	3	15.30	20.40
1 1/4	1.99	2.65	5	12.75	17.00	4	20.40	27.19
1 1/2	2.39	3.19	6	15.30	20.40	5	25.50	33.99
1 3/4	2.79	3.72	8	20.40	27.19	6	30.60	40.79
2	3.19	4.25	10	25.50	33.99	7	35.70	47.59
2 1/2	3.98	5.31	12	30.60	40.79	8	40.80	54.39
3	4.78	6.37	9/16 X 1	2.87	3.83	10	51.00	67.98
3 1/2	5.58	7.44	2 1/2	7.18	9.57	12	61.20	81.58
4	6.38	8.51	5/8 X 5/8	1.99	2.65	14	71.40	95.18
4 1/2	7.18	9.57	3/4	2.39	3.19	1 1/4 X 1 1/4	7.97	10.62
5	7.97	10.62	1	3.19	4.25	1 1/2	9.57	12.76
6	9.56	12.74	1 1/4	3.99	5.32	2	12.75	17.00
8	12.75	17.00	1 1/2	4.78	6.37	3	19.13	25.50
10	15.94	21.25	2	6.38	8.51	4	25.50	33.99
12	19.13	25.50	2 1/2	7.97	10.62	5	31.88	42.50
3/8 X 3/8	.72	.96	3	9.56	12.74	6	38.25	50.99
1/2	.96	1.28	4	12.75	17.00	7	44.63	59.49
3/4	1.43	1.91	5	15.94	21.25	8	51.00	67.98
1	1.91	2.55	6	19.13	25.50	10	63.75	84.98
1 1/4	2.39	3.19	8	25.50	33.99	12	76.50	101.97
1 1/2	2.87	3.83	10	31.88	42.50	14	89.25	118.97
1 3/4	3.35	4.46	12	38.26	51.00	1 1/2 X 1 1/2	11.48	15.30
2	3.83	5.11	3/4 X 3/4	2.87	3.83	2	15.30	20.40
2 1/2	4.78	6.37	1	3.83	5.11	3	22.95	30.59
3	5.74	7.65	1 1/4	4.78	6.37	4	30.60	40.79
3 1/2	6.70	8.93	1 1/2	5.74	7.65	5	38.25	50.99
4	7.65	10.20	2	7.65	10.20	6	45.90	61.18
4 1/2	8.61	11.47	2 1/2	9.56	12.75	8	61.20	81.58
5	9.56	12.74	3	11.48	15.30	10	76.50	101.97
6	11.48	15.30	3 1/2	13.39	17.85	15/8 X 15/8	13.47	17.96
8	15.30	20.40	4	15.30	20.40	2X 2	20.40	27.19
10	19.13	25.50	4 1/2	17.22	22.95	2 1/2 X 2 1/2	31.88	42.50
12	22.95	30.59	5	19.13	25.50	3 X 3	45.90	61.18
7/16 X 3/4	1.67	2.23	6	22.95	30.59	4 X 4	81.60	108.77



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