



## ALLOY SELECTION CHART

ALLOY	SPECIFICATION	CONDITION	TENSILE/YEILD/ELONG- ATION/REDUCTION	HARDNESS RANGE
<b>LOW ALLOY CARBON STEEL</b>				
1020	SAE-AMS22141A	ANNEALED	60/40/35	
1020	ASTM-A732 GR 1A	ANNEALED	60/40/24	
1025	ASTM-A27 65/35	ANNEALED	65/35/24/35	
1030	ASTM-A27 65/35	ANNEALED	65/35/24/35	
1030	SAE-AMS22141A	ANNEALED	65/45/25	RB 75 MAX
1030	SAE-AMS22141A	HARDENED	85/60/10	
1040	SAE-AMS22141A	ANNEALED AND CARBON RESTORED		RB 85 MAX
1040	SAE-AMS22141A	QUENCH & TEMPERED	75/48/25	
1045	IC	ANNEALED AND CARBON RESTORED	NOT APPLICABLE	0-25 RC
1050	SAE-AMS22141A ASTM-A732 4Q	ANNEALED AND CARBON RESTORED	90/50/20	RB 95 MAX
1050	SAE-AMS22141A ASTM-A732 4Q	QUENCH & TEMPERED	125/100/5	
4130	SAE-AMS22141A ASTM-A732 GR 8Q	ANNEALED AND CARBON RESTORED		RB 90 MAX
4130	SAE-AMS22141A ASTM-A732 GR 8Q	QUENCH & TEMPERED	150/115/7	
4140	SAE-AMS22141A ASTM-A732 GR 8Q	ANNEALED AND CARBON RESTORED		RC 20 MAX
4140	SAE-AMS22141A ASTM-A732 GR 8Q	QUENCH & TEMPERED	180/145/5	
4330	ASTM-A732 GR 9Q	ANNEALED, CARBON RESTORED, QUENCH & TEMPERED	150/115/7	
4330	MIL-A-11356	ANNEALED, CARBON RESTORED, QUENCH & TEMPERED	12-50 CHARPY IMPACT VALUE	18-37 RC
4340	SAE-AMS22141A	ANNEALED AND CARBON RESTORED		RC 20 MAX
4340	SAE-AMS22141A	QUENCH & TEMPERED	200/180/5	
6150	SAE-AMS22141A ASTM-A732 GR 12Q	ANNEALED AND CARBON RESTORED		RC 20 MAX
6150	SAE-AMS22141A ASTM-A732 GR 12Q	QUENCH & TEMPERED	190/170/4	
8620	SAE-AMS22141A	ANNEALED ANC CARBON RESTORED		RB 90 MAX
8620	SAE-AMS22141A	QUENCH & TEMPERED	105/85/10	
8620	ASTM-A148	ANNEALED AND CARBON RESTORED	GRADES 80/40 THRU 90/60	0-25 RC



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8620	ASTM-A148	QUENCH & TEMPERED	GRADE 105/85	26-28 RC
8620	ASTM-A732 GR 13Q	ANNEALED, CARBON RESTORED, QUENCH & TEMPERED		0-25 RC
8625/8630	SAE-AMS22141A	ANNEALED AND CARBON RESTORED		RB 90 MAX
8625/8630	SAE-AMS22141A	QUENCH & TEMPERED	150/115/7	
8625/8630	ASTM-A148	ANNEALED AND CARBON RESTORED	GRADES 80/40 THRU 90/60	0-25 RC
8625/8630	ASTM-A148	QUENCH & TEMPERED	GRADES 105/85 THRU 150/135	26-36 RC
8630	ASTM-A732 GR 14Q	ANNEALED AND CARBON RESTORED		0-25 RC
8630	ASTM-A732 GR 14Q	QUENCH & TEMPERED	150/115/7	
8640	SAE-AMS22141A	ANNEALED AND CARBON RESTORED		RC 20 MAX
8640	SAE-AMS22141A	QUENCH & TEMPERED	180/145/5	
S7140	NAAMS	ANNEALED		BHN 190-230
0050	NAAMS J435	ANNEALED		BHN 170-229
0030	NAAMS J435	ANNEALED		BHN 120-170
ALLOY	SPECIFICATION	CONDITION	TENSILE/YEILD/ELONG- ATION/REDUCTION	HARDNESS RANGE
AUSTENITIC STAINLESS STEELS				
303	ASTM-A743 GR. CF-16F	SOLUTION ANNEALED	Supplementary Requirement 70/30/25	
303	MIL-S-81591	SOLUTION ANNEALED		RB 95 MAX
304	ASTM- A743 GR. CF-8	SOLUTION ANNEALED	Supplementary Requirement 70/30/35	
304L	ASTM- A743 GR. CF-3	SOLUTION ANNEALED	Supplementary Requirement 70/30/35	
304 (or) 304L	MIL-S-81591	SOLUTION ANNEALED		RB 95 MAX
316	ASTM A743 GR. CF-8M	SOLUTION ANNEALED	Supplementary Requirement 70/30/30	
316L	ASTM A743 CF-3M	SOLUTION ANNEALED	Supplementary Requirement 70/30/30	



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316 (or) 316L	MIL-S-81591	SOLUTION ANNEALED		RB 95 MAX
310	ASTM A743 GR. CK20	SOLUTION ANNEALED	Supplementary Requirement 65/28/30	
310	ASTM A351 GR. CK20	SOLUTION ANNEALED	65/28/30	
347	ASTM A743 GR. CF-8C	SOLUTION ANNEALED	Supplementary Requirement 70/30/30	
347	AMS 5362	SOLUTION ANNEALED	70/30/30	
347	MIL-S-81591	SOLUTION ANNEALED		RB 95 MAX
ALLOY	SPECIFICATION	CONDITION	TENSILE/YEILD/ELONGATION/REDUCTION	HARDNESS RANGE
HARDENABLE STAINLESS STEELS				
410	MIL-S-81591 ASTM A743 GR. CA-15	ANNEALED		RC 25 MAX
410	ASTM A743 GR. CA-15	TEMPERED	(Supplementary Requirement) 90/65/18/30	
410	MIL-S-81591	QUENCH AND TEMPERED	95/75/8/20	RB 94-100
420	ASTM A743 GR. CA-40 MIL-S-81591	ANNEALED		RC 25
420	ASTM A743 GR. CA-40	TEMPERED	(Supplementary Requirement) 100/70/15/25	
431	MIL-S-81591 ASTM A743 GR. CB-30	ANNEALED		RC 30 MAX
431	MIL-S-81591	QUENCH AND TEMPERED	170/130/2	RC 38-49
17-4	ASTM A747 GR. CB7CU-1	HOMOGENIZED, SOLUTION ANNEALED, PRECIPITATION HARDENED	(Supplementary Requirement) CONDITIONS H900- H1150	BHN 269-375
17-4	AMS 5355J	HOMOGENIZED, SOLUTION ANNEALED, PRECIPITATION HARDENED	CONDITIONS H900- H1150	RC 28-40
17-4	AMS 5343D	HOMOGENIZED, SOLUTION ANNEALED, PRECIPITATION HARDENED	150/130/8/20	
15-5	ASTM A747 GR. CB7CU-2	HOMOGENIZED, SOLUTION ANNEALED, PRECIPITATION HARDENED	(Supplementary Requirement) CONDITIONS H900- H1150	BHN 269-375



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<b>ALUMINUM</b>				
356	ASTM B618	T-4 AND T-6	30/20/3	TYPICAL BHN 70
A356	ASTM B618	T-4 AND T-6	34/24/3.5	TYPICAL BHN 80
A356	AMS 4218H	T-4 AND T-6	33/27/3	
A356	MIL-A-21180D	T-4 AND T-6	38/28/5	
355	ASTM B618	T-4 AND T-6	36/25/2.5	
357	IC	T-4 AND T-6	33/27/3	
713	ASTM B618	T1 AND T5	32/22/3	TYPICAL BHN 75
ALLOY	SPECIFICATION	CONDITION	TENSILE/YEILD/ELONG- ATION/REDUCTION	HARDNESS RANGE
<b>TOOL STEELS</b>				
A-2	IC	ANNEALED		RC 25
A-2	NAAMS J435	ANNEALED		BHN 201-229
A-6	IC	ANNEALED AND CARBON RESTORED		RC 25
D-2	NAAMS J435	ANNEALED		BHN 217-255
D-2	IC	ANNEALED		
D-3	IC	ANNEALED		
H-13	IC	ANNEALED, CARBON RESTORED, QUENCH AND TEMPERED		RC 46-49
M-2	IC	AS CAST		
O-1	IC	ANNEAL AND CARBON RESTORED		RC 25
L-6	IC	ANNEALED		RB 95
S-5	IC	ANNEALED		RB 100
S-7	IC	ANNEALED		RC 25
S-7	NAAMS	ANNEALED		BHN 187-223
CC1	IC	ANNEALED		BHN 190-320
CC1	IC	NORMALIZED AND TEMPERED		BHN 250-320



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CARMO		ANNEALED		BHN 190-230
CARMO		PREHARDEN AND SUFACE HARDENED		HB 310-340
CALDIE		ANNEAL, QUENCH AND TEMPERED		RC 34-60
ALLOY	SPECIFICATION	CONDITION	TENSILE/YEILD/ELONG- ATION/REDUCTION	HARDNESS RANGE
<b>Gray Iron</b>				
G2500	NAAMS	AS CAST		BHN 163-212
G3500	NAAMS SAE J431	STRESS RELIEVE		BHN 197-241
CLASS 40	ASTM A48 BMS E115	NOMALIZED AND TEMPERED	40,000 Tensile	
CLASS 20	ASTM A48	AS CAST	20,000 Tensile	
ALLOY	SPECIFICATION	CONDITION	TENSILE/YEILD/ELONG- ATION/REDUCTION	HARDNESS RANGE
<b>Ductile Iron</b>				
D4512	NAAMS	STRESS RELIEVE		BHN 143-190
D6510	NAAMS	STRESS RELIEVE		BHN 190-248
Ductile	ASTM A536	AS CAST	88/55/06	
Ductile	ASTM A536	AS CAST	65 45 12	
ALLOY	SPECIFICATION	CONDITION	TENSILE/YEILD/ELONG- ATION/REDUCTION	HARDNESS RANGE
<b>Copper Base</b>				
Aluminum Bronze (C95400)	BMS K099	AS CAST	75/30/12	
Manganese Bronze (C86300)	ASTM B22	AS CAST		BHN 223 MIN
Manganese Bronze (C86300)	ASTM B584	AS CAST	110/60/12	
Manganese Bronze (C86200)	ASTM B584	AS CAST		RB 89-94



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<b>Nickel Base</b>				
INCONNEL 100		AS CAST		
INCONNEL 600		AS CAST		
ALLOY	SPECIFICATION	CONDITION	TENSILE/YEILD/ELONG- ATION/REDUCTION	HARDNESS RANGE
<b>COBALT</b>				
CO31		AS CAST		