Precipitation Hardening Martensitic

Alloy	Specification	Carbon (Min-Max)	Manganese (Min-Max)	Silicon (Min-Max)	Chromium (Min-Max)	Nickel (Min-Max)	Molybdenum (Min-Max)	Phosphorous (Min-Max)	Sulfur (Min-Max)	Copper (Min-Max)	Iron (Min-Max)	Other
14-4	AMS 5340	0.06	0.7	.50-1.00	13.50-14.25	3.75-4.75	2.00 -2.75	0.02	0.025	3.00-3.50	Bal.	. Cb, .15-.35; N2, .05 Max.; Ta, .05 Max.
15 5	ASTM A 747 CB 7Cu-2	0.07	0.7	1	14.00-15.50	4.50-5.50		0.035	0.03	2.50-3.20	Bal.	Cb/Ta, .15-.35; N2, .05 Max.
	AMS 5346	0.05	0.6	.50-1.00	14.00-15.50	4.20-5.00		0.025	0.025	2.50-3.20	Bal.	Cb/Ta, .15-.30; N2, .05 Max
	AMS 5347	0.05	0.6	.50-1.00	14.00-15.50	4.20-5.00		0.025	0.025	2.50-3.20	Bal.	Cb, .15-.30, N2, Ta, .05 Max
	AMS 5356	0.05	0.6	.50-1.00	14.00-15.50	4.20-5.00		0.025	0.025	2.50-3.20	Bal.	Cb, .15-.30; Ta, .05 Max
	AMS 5357	0.05	0.6	.50-1.00	14.00-15.50	4.20-5.00		0.025	0.025	2.50-3.20	Bal.	Cb, .15-.30; N2, .05 Max; Ta, .05 Max
	AMS 5400	0.05	0.6	.50-1.00	14.00-15.50	4.20-5.00		0.025	0.025	2.50-3.20	Bal.	Cb, .15-.30; N2, .05 Max; Ta, .05 Max.
17-4	ASTM A 747 CB 7Cu-1	0.07	0.7	1	15.50-17.70	3.60-4.60		0.035	0.03	2.50-3.20	Bal.	Cb, .15-.35; N2, .05 Max
	AMS 5342/5344	0.06	0.7	.50-1.00	15.50-16.7	3.60-4.60		0.025	0.025	2.80-3.50	Bal.	Cb/Ta, .15-.40; Al, .05 Max.; N2, .05 Max; Sn, .02 Max.
	AMS 5343	0.06	0.7	.50-1.00	15.50-16.70	3.60-4.60		0.025	0.025	2.80-3.50	Bal.	Cb/Ta, .15-.40; Al, .05 Max.; N2, .05 Max; Sn, .02 Max.; Ta, .05 Max
	AMS 5355	0.06	0.7	.50-1.00	15.50-16.70	3.60-4.60		0.025	0.025	2.80-3.50	Bal.	Cb/Ta, .15-.40; Al, .05 Max.; N2, .05 Max; Sn, .02 Max.; Ta, .05 Max
	MIL-S-81591 IC-17-4	0.08	1	1	15.50-17.50	3.00-5.00		0.04	0.04	3.0-5.0	Bal.	Cb/Ta, .45 Max.
AM 355	AMS 5368	.08-.15	.40-1.10	0.75	14.50-15.50	3.50-4.50	2.00-2.60	0.04	0.03		Bal.	N2, .05-.13; C+N2, .15-.25

Austenitic Stainless Steelic

Alloy	Specification	Carbon (Min-Max)	Manganese (Min-Max)	Silicon (Min-Max)	Chromium (Min-Max)	Nickel (Min-Max)	Molybdenum (Min-Max)	Phosphorous (Min-Max)	Sulfur (Min-Max)	Copper (Min-Max)	Iron (Min-Max)	Other
302	AMS 5358	0.25	1.5	2	17.0-19.0	8.0-10.0	0.75	0.04	0.03	0.75	Bal.	
	MIL-S-81591 IC 302	0.15	2	1	17.0-19.0	8.0-10.0		0.04	0.03		Bal.	
	ASTM A 743 CF20	0.2	1.5	2	18.0-21.0	8.0-11.0		0.04	0.04		Bal.	
303	AMS 5341	0.16	2	2	18.0-21.0	9.0-12.0	0.75	0.04	.15-.35	0.75	Bal.	
	MIL-S-81591 IC 303 a	0.16	1.5	2	18.0-21.0	9.0-12.0	1.5	0.17	0.04	0.5	Bal.	Se, .20-.35
	MIL-S-81591 IC 303 b	0.16	1.5	2	18.0-21.0	9.0-12.0	0 .40 -.80	0.04	.20-.40	0.5	Bal.	

	ASTM A 743 CF16F	0.16	1.5	2	18.0-21.0	9.0-12.0	1.5	0.17	0.04		Bal.	Se, 0.20-0.35
	ASTM A 743 CF16F A	0.16	1.5	2	18.0-21.0	9.0-12.0	.40-.80	0.04	.20-.40		Bal.	
304	ASTM A 743/744 CF8	0.08	1.5	2	18.0-21.0	8.0-11.0		0.04	0.04		Bal.	
	ASTM A 351 CF8/CF8 A	0.08	1.5	2	18.0-21.0	8.0-11.0	0.5	0.04	0.04		Bal.	
	MIL-S-81591 IC 304	0.08	2	1	18.0-20.0	8.0-12.0		0.04	0.03		Bal.	
304 L	ASTM A 743/744 CF3	0.03	1.5	2	17.0-21.0	8.0-12.0		0.04	0.04		Bal.	
	ASTM A 351 CF3/CF3A	0.03	1.5	2	17.0-21.0	8.0-12.0	0.5	0.04	0.04		Bal.	
304	AMS 5370/5371	0.05	1.0-2.0	0.75-1.50	18.0-21.0	8.0-11.0	0.75	0.04	0.04	0.75	Bal.	
	MIL-S-81591 IC 304L	0.05	1.0-2.0	1	18.0-21.0	8.0-11.0	0.5	0.04	0.03	0.5	Bal.	
	ASTM A 351 CF10	.04- .10	1.5	2	18.0-21.0	8.0-11.0	0.5	0.04	0.04		Bal.	
	ASTM A 297 HF	.20-.40	2	2	18.0-23.0	8.0-12.0	0.5	0.04	0.04		Bal.	
	DIN 1.4826	.030-.050	2	1.00-2.50	21.0-23.0	9.0-11.0	0.5	0.04	0.03		Bal.	
309	ASTM A 297 HH	.20-.50	2	2	24.0-28.0	11.0-14.0	0.5	0.04	0.04		Bal.	
	ASTM A 351 CH10	0.04-0.10	1.5	2	22.0-26.0	12.0-15.0	0.5	0.04	0.04		Bal.	
	ASTM A 351 CH20	0.04-0.20	1.5	2	22.0-26.0	12.0-15.0	0.5	0.04	0.04		Bal.	
	ASTM A 351 HK30	.25-.35	1.5	1.75	23.0-27.0	19.0-22.0	0.5	0.04	0.04		Bal.	
	ASTM A 351 HK40	.35-.45	1.5	1.75	23.0-27.0	19.0-22.0	0.5	0.04	0.04		Bal.	
310	AMS 5365	.10-.18	2	.50-1.50	23.0-26.0	19.0-22.0	0.75	0.04	0.04	0.75	Bal.	
	AMS 5366	0.18	2	.50-1.50	23.0-26.0	19.0-22.0	0.75	0.04	0.03	0.75	Bal.	
	MIL-S-81591 IC 310	0.25	2	1.5	24.0-26.0	19.0-22.0		0.04	0.03		Bal.	
	ASTM A 743 CK20	0.2	2	2	23.0-27.0	19.0-22.0		0.04	0.04		Bal.	
	ASTM A 297 HK	.20-.60	2	2	24.0-28.0	18.0-22.0	0.5	0.04	0.04		Bal.	
	ASTM A 297 HL	.20-.60	2	2	28.0-32.0	18.0-22.0	0.5	0.04	0.04		Bal.	

	ASTM A 351 CK20	04-.20	1.5	1.75	23.0-27.0	19.0-22.0	0.5	0.04	0.04		Bal.	
311	ASTM A 297 HN	.20-.50	2	2	19.0-23.0	23.0-27.0	0.5	0.04	0.04		Bal.	
312	ASTM A 743 CE30	0.3	1.5	2	26.0-30.0	8.0-11.0		0.04	0.04		Bal.	
	ASTM A 297 HE	.20-.50	2	2	26.0-30.0	8.0-11.0	0.5	0.04	0.04		Bal.	
316	AMS 5360	0.15	2	0.75	16.0-18.0	12.0-14.0	1.50-2.25	0.04	0.03	0.75	Bal.	
	AMS 5361	.15-.25	2	1	17.0-20.0	12.0-15.0	1.75-2.50	0.04	0.04	0.75	Bal.	
	MIL-S-81591 IC 316	0.08	2	1	16.0-18.0	10.0-14.0	2.0-3.0	0.04	0.03		Bal.	
	ASTM A 351	0.08	1.5	1.5	18.0-21.0	9.0-12.0	2.0-3.0	0.04	0.04		Bal.	
	ASTM 743/744 CF8M	0.08	1.5	2	18.0-21.0	9.0-12.0	2.0-3.0	0.04	0.04		Bal.	
	F-745	0.06	2	1	17.0-19.0	11.0-14.0	2.0-3.0	0.045	0.03		Bal.	
316 L	ASTM A 351 CF3M/CF3MA	0.03	1.5	1.5	17.0-21.0	9.0-13.0	2.0-3.0	0.04	0.04		Bal.	
	ASTM A 743/744 CF3M	0.03	1.5	1.5	17.0-21.0	9.0-13.0	2.0-3.0	0.04	0.04		Bal.	
	ISO 5832-1	0.03	2	1	17.0-19.0	13.0-15.0	2.25-3.0	0.025	0.01	0.5	Bal.	N2 0.10 Max
316 LN	ASTM A 351/743 CF3MN	0.03	1.5	1.5	17.0-21.0	9.0-13.0	2.0-3.0	0.04	0.04		Bal.	N2, .10-.20
316 N	ASTM A 351 CF 10M	.04-.10	1.5	1.5	18.0-21.0	9.0-12.0	2.0-3.0	0.04	0.04		Bal.	
317	ASTM A 351/743/744 CG8M	0.08	1.5	1.5	18.0-21.0	9.0-13.0	3.0-4.0	0.04	0.04		Bal.	
327	ASTM A 297 HD	0.5	1.5	2	26.0-30.0	4.0-7.0	0.5	0.04	0.04		Bal.	
330	ASTM A 297 HT	.35-.75	2	2.5	15.0-19.0	33.0-37.0	0.5	0.04	0.04		Bal.	
	ASTM A 351 HT30	.25-.35	2	2.5	13.0-17.0	33.0-37.0	0.5	0.04	0.04		Bal.	
331	ASTM A 297 HU	.35-.75	2	2.5	17.0-21.0	37.0-41.0	0.5	0.04	0.04		Bal.	
334	ASTM A 297 HW	.35-.75	2	2.5	10.0-14.0	58.0-62.0	0.5	0.04	0.04		Bal.	
335	ASTM A 297 HX	.35-.75	2	2.5	15.0-19.0	64.0-68.0	0.5	0.04	0.04		Bal.	
347	ASTM A 743/744 CF8C	0.08	1.5	2	18.0-21.0	9.0-12.0		0.04	0.04		Bal.	Cb/Ta, 8xC-1.0

	ASTM A 351 CF8C	0.08	1.5	2	18.0-21.0	9.0-12.0	0.5	0.04	0.04		Bal.	Cb/Ta, 8xC-1.0
	AMS 5362	0.12	2	1.5	18.00-19.50	10.00-14.00	0.75	0.04	0.03	0.75	Bal.	Cb/Ta, 10xC-1.5, Ta 0.05 Max
	AMS 5364	0.08	2	1.5	18.00-21.00	9.00-12.00	0.75	0.04	0.03	0 .75	Bal.	Cb, 8xC-1.0;
	MIL-S-867A CL II	0.08	1.5	2	18.0-21.0	9.0-12.0		0.05	0.05		Bal.	Cb/Ta, 10xC Min., -1.10
	MIL-S-81591 IC 347	0.08	2	1	17.0-19.5	9.0-13.0		0.04	0.03		Bal.	Cb/Ta, 10xC-1.5
Misc.	ASTM A 297 HI	.20-.50	2	2	26.0-30.0	14.0-18.0	0.5	0.04	0.04		Bal.	
	ASTM A 297 HP	.35-.75	2	2.5	24-28	33-37	0.5	0.04	0.04		Bal.	
	ASTM A 351 CT 15C	.05-.15	.15-1.50	.50-1.50	19.0-21.0	31.0-34.0		0.03	0.03		Bal.	Cb/Ta, .50-1.50
	ASTM A 351/743/744 CN7M	0.07	1.5	1.5	19.0-22.0	27.5-30.5	2.0-3.0	0.04	0.04	3.0-4.0	Bal.	
	ASTM A 743/744 CN7MS	0.07	1	2.50-3.50	18.0-20.0	22.0-25.0	2.5-3.0	0.04	0.03	1.5-2.0	Bal.	
	ASTM A 743 CN3M	0.03	2	1	20.0-22.0	23.0-27.0	4.5-5.5	0.03	0.03		Bal.	
	ASTM A 351 CF10MC	0.1	1.5	1.5	15.0-18.0	13.0-16.0	1.75-2.25	0.04	0.04		Bal.	Cb 10Xc mim – 1.20 Max
	IN 864/856	0.15	1.5	2.3-3.0	17.0-19.0	10.5-12.5					Bal.	B, .23-.30
	ASTM A 990 CN3MCu	0.03	1.5	1	19.0-22.0	27.5-30.5	2.0-3.0	0.03	0.015	3.0-3.50	Bal.	
N-50	ASTM A 351/743 CG6MMN	0.06	4.00-6.00	1	20.5-23.5	11.5-13.5	1.50-3.00	0.04	0.03		Bal.	Cb/Ta, .10-.30; N2, .20-.40; V, .10-.30
N-60	ASTM A 351/743 CF10SMnN	0.1	7.00-9.00	7.00-9.00	16.0-18.0	8.0-9.0		0.06	0.03		Bal.	N2, 0.08-0.18
AL6XN	ASTM A 743/744 CN3MN	0.03	2	1	20.0-22.0	23.5-25.5	6.0-7.0	0.04	0.01	0.75	Bal.	N2, 0.18-0.26
254 SMO	O ASTM A 351/743/744 CK3MCuN	0.025	1.2	1	19.5-20.5	17.5-19.5	6.0-7.0	0.045	0.01	0.50-1.00	Bal.	N2, 0.18-0.24

Austenitic Ferritic (Duplex) Stainless Steels

Alloy	Specification	Carbon (Min-Max)	Manganese (Min-Max)	Silicon (Min-Max)	Chromium (Min-Max)	Nickel (Min-Max)	Molybdenum (Min-Max)	Phosphorous (Min-Max)	Sulfur (Min-Max)	Copper (Min-Max)	Iron (Min-Max)	Other
DUPLEX	ASTM A 890 1A CD4MCu	0.04	1	1	24.5 – 26.5	4.75-6.00	1.75-2.25	0.04	0.04	2.75-3.25	Bal.	
	ASTM A 890/995 1B CD4MCuN	0.04	1	1	24.5 – 26.5	4.7-6.0	1.7-2.3	0.04	0.04	2.7-3.3		N2, 0.10-0.25
	ASTM A 890 1C CD3MCuN	0.03	1.2	1.1	24.0 – 26.7	5.6 – 6.7	7 2.9 – 3.8	0.03	0.03	1.40-1.90	Bal.	N2, 0.22-0.33

	ASTM A 890/351/995 2A CE8MN	0.08	1	1.5	22.5 – 25.5	8.0-11.0	3.0-4.5	0.04	0.04		Bal.	N2, 0.10-0.30
	ASTM A 890/995 3A CD6MN	0.06	1	1	24.0 – 27.0	4.0-6.0	1.75-2.50	0.04	0.04		Bal.	N2, 0.15-0.25
	ASTM A 890/995 4A CD3MN	0.03	1.5	1	21.0 – 23.5	4.5-6.5	2.5-3.5	0.04	0.02	1	Bal.	N2, 0.10-0.30
	ASTM A 890/995 5A CE3MN	0.03	1.5	1	24.0 – 26.0	6.0-8.0	4.0-5.0	0.04	0.04		Bal.	N2, 0.10-0.30
	ASTM A 890/995 6A CD3MWCuN	0.03	1	1	24.0 – 26.0	6.5-8.5	3.0-4.0	0.03	0.025	0.5-1.0	Bal.	N2, 0.20-0.30,W, 0.5-1.0
2304	X2CrNiN23-4	0.03	2.5	1	21.5-24.5	3.00 – 5.50	0.6	0.035	0.015	.05-.60	Bal.	N2 .05 – .20
2507	X2CrNiMoN25-7-4	0.03	2	1	24.0-26.0	6.0 – 8.0	3.00 – 4.50	0.035	0.015		Bal.	N2 .20 – .35
2205	X2CrNiMoN22-5-3	0.03	2	1	21.0-23.0	4.5 – 6.5	2.50 – 3.50	0.035	0.015		Bal.	N2 .10 – .22
Z 100	X2CrNiMoCuWN25-7-4	0.03	1	1	24.0-26.0	6.0 – 8.0	3.00 – 4.00	0.035	0.015	0.5 – 1.0	Bal.	N2 .20 – .30; W 0.50 – 1.00
Cast 255	X2CrNiMoCuN25-6-3	0.03	2	0.7	24.0-26.0	5.5 – 7.5	2.70 – 4.00	0.035	0.015	1.0 – 2.5	Bal.	N2 .05 – .20

Ferritic and Martensitic Stainless Steels

Alloy	Specification	Carbon (Min-Max)	Manganese (Min-Max)	Silicon (Min-Max)	Chromium (Min-Max)	Nickel (Min-Max)	Molybdenum (Min-Max)	Phosphorous (Min-Max)	Sulfur (Min-Max)	Copper (Min-Max)	Iron (Min-Max)	Other
DUPLEX	ASTM A 890 1A CD4MCu	0.04	1	1	24.5 – 26.5	4.75-6.00	1.75-2.25	0.04	0.04	2.75-3.25	Bal.	
	ASTM A 890/995 1B CD4MCuN	0.04	1	1	24.5 – 26.5	4.7-6.0	1.7-2.3	0.04	0.04	2.7-3.3		N2, 0.10-0.25
	ASTM A 890 1C CD3MCuN	0.03	1.2	1.1	24.0 – 26.7	5.6 – 6.7	7 2.9 – 3.8	0.03	0.03	1.40-1.90	Bal.	N2, 0.22-0.33
	ASTM A 890/351/995 2A CE8MN	0.08	1	1.5	22.5 – 25.5	8.0-11.0	3.0-4.5	0.04	0.04		Bal.	N2, 0.10-0.30
	ASTM A 890/995 3A CD6MN	0.06	1	1	24.0 – 27.0	4.0-6.0	1.75-2.50	0.04	0.04		Bal.	N2, 0.15-0.25
	ASTM A 890/995 4A CD3MN	0.03	1.5	1	21.0 – 23.5	4.5-6.5	2.5-3.5	0.04	0.02	1	Bal.	N2, 0.10-0.30
	ASTM A 890/995 5A CE3MN	0.03	1.5	1	24.0 – 26.0	6.0-8.0	4.0-5.0	0.04	0.04		Bal.	N2, 0.10-0.30
	ASTM A 890/995 6A CD3MWCuN	0.03	1	1	24.0 – 26.0	6.5-8.5	3.0-4.0	0.03	0.025	0.5-1.0	Bal.	N2, 0.20-0.30,W, 0.5-1.0
2304	X2CrNiN23-4	0.03	2.5	1	21.5-24.5	3.00 – 5.50	0.6	0.035	0.015	.05-.60	Bal.	N2 .05 – .20
2507	X2CrNiMoN25-7-4	0.03	2	1	24.0-26.0	6.0 – 8.0	3.00 – 4.50	0.035	0.015		Bal.	N2 .20 – .35
2205	X2CrNiMoN22-5-3	0.03	2	1	21.0-23.0	4.5 – 6.5	2.50 – 3.50	0.035	0.015		Bal.	N2 .10 – .22

Z 100	X2CrNiMoCuWN25-7-4	0.03	1	1	24.0-26.0	6.0 – 8.0	3.00 – 4.00	0.035	0.015	0.5 – 1.0	Bal.	N2 .20 – .30; W 0.50 – 1.00
Cast 255	X2CrNiMoCuN25-6-3	0.03	2	0.7	24.0-26.0	5.5 – 7.5	2.70 – 4.00	0.035	0.015	1.0 – 2.5	Bal.	N2 .05 – .20

Nickel Base

Alloy	Specification	Carbon (Min-Max)	Manganese (Min-Max)	Silicon (Min-Max)	Chromium (Min-Max)	Nickel (Min-Max)	Molybdenum (Min-Max)	Tungsten (Min-Max)	Cobalt (Min-Max)	Iron (Min-Max)	Other	Liquidus
Ni Alloy B	AMS 5396	0.12	1	1	1	Bal.	26.00-30.00		2.5	4.0-7.0	P, .03 Max.; S .03 Max.; V, .20-.60	2450
	ASTM A 494 N12MV	0.12	1	1	1	Bal.	26.0-30.0			4.0-6.0	P, .040 Max.; S, .030 Max.; V, .20-.60	2450
	ASTM A 494 N7M	0.07	1	1	1	Bal.	30.0-33.0			3	P, .040 Max.; S, .030 Max.	2450
	ASTN A 494 N3M	0.03	1	0.5	1	Bal.	30.0-33.0			3	P, .040 Max; S, .030 Max.	2450
Ni Alloy C	AMS 5388	0.15	1	1	15.50-17.50	Bal.	16.00-18.00	3.75-5.25	2.5	4.5-7.0	P, .03 Max.; S, .03 Max.; V, .20-.60	2450
	AMS 5389	0.15	1	1	15.50-17.50	Bal.	16.00-18.00	3.75-5.25	2.5	4.5-7.0	P, .04 Max.; S, .04 Max.; V, .20-.60	2450
	ASTM A 494 CW12MW	0.12	1	1	15.5-17.5	Bal.	16.0-18.0	3.75-5.25		4.5-7.5	P, .04 Max.; S, .03 Max,; V, .20-.40 Max	2410
	ASTM A 494 CW6M	0.07	1	1	17.0-20.0	Bal.	17.0-20.0			3	P, .040 Max.; S, .030 Max	2450
	ASTM A 494 CW2M	0.02	1	0.8	15.0-17.5	Bal.	15.0-17.5	1		2	P, .03 Max.; S, .03 Max	2450
	ASTM A 494 CX2M	0.02	1	0.5	22.0-24.5	Bal.	15.0-16.5	TBR		1.5	P, .020 Max.; S, .020 Max (Cu, Nb, W, V, Bi, Sn) TBR	2450
	ASTM A 494 CX2MW	0.02	1	0.8	20.0-22.5	Bal.	12.5-14.5	2.5-3.5		2.0-6.0	P, .025 Max; S, .025 Max; V, .35 Max	2450
Ni Alloy D		0.12	.50-1.25	8.5-10.0	1	Bal.			1.5	2	Cu, 2.0-4.0	
Ni Alloy F	UNS-N06001	0.05	1.0-2.0	1	21.5-23.0	44.0-47.0	5.5-7.5	1	2.5	Bal.	P, .04 Max.; S, .03 Max; Cb/Ta, 1.8-2.50	
Ni Alloy G	UNS-N06007	0.05	1.0-2.0	1	21.0-23.5	Bal.	5.5-7.5	1	2.5	18.0-21.0	P, .04 Max.; S, .03 Max.; Cu, 1.5-2.5; Cb/Ta, 1.8-2.5	2400
	UNS-N06030	0.03	1.5	0.8	28.0-31.5	Bal.	4.0-6.0	1.5-4.0	5	13.0-17.0	P, .04 Max; S, .02 Max; Cu, 1.0-2.4; Cb, 0.30-1.50	2400
Ni Alloy X	AMS 5390	0.1	1	1	20.5-23.0	Bal.	8.0-10.0	.20-1.00	.50-2.50	17.00-20.00	P, .04 Max.; S, .03 Max.; B, .010 Max.; Se, .0050 Max	2440
Ni Alloy 210	ASTM A 494 CZ100	1	1.5	2		95				3	P, .03 Max.; S, .03 Max.; Cu, 1.25 Max	
Ni Alloy 213		1.0-2.5	1.5	2		Bal.				1.25	S, .015 Max.; Cu, 1.25 Max	
Ni Alloy 305		1	1.5	5.5-6.5		Bal.				1.25	S,.015 Max.; Cu, 1.25 Max	

IN 610	ASTM A 494 CY40	0.4	1.5	3	14.0-17.0	Bal.				11	P, .03 Max.; S, .03 Max	
IN 611		0.4	1.5	2	14.0-17.0	Bal.				11	Cu, .50 Max.; Cb/Ta, 1.00-3.00	
IN 625	AMS 5402	0.1	0.5	0.5	20.0-23.0	Bal.	8.0-10.0		1	5	Cb, 3.15-4.15; Cu, .30 Max.; Al, .10 Max.; Ti, .10 Max; P, .03 Max.; S,	
	ASTM A 494 CW6MC	0.06	1	1	20.0-23.0	Bal.	8.0-10.0			5	Cb 3.15-4.50, P, 0.015 Max; S, 0.015 Max	
50Cr 50Ni	ASTM A 560 50 Cr-50 Ni	0.1	0.3	1	48.0-52.0	Bal.				1	P, .02 Max; S, .02 Max.; Al, .25 Max.; Ti, .50 Max.; N2, .30 Max	
60Cr 40Ni	ASTM A 560 60 Cr-40 Ni	0.1	0.3	1	58.0-62.0	Bal.				1	P, .02 Max; S, .02 Max.; Al, .25 Max.; Ti, .50 Max.; N2, .30 Max	
IN 657	ASTM A 560 50 Cr-50 Ni-Cb	0.1	0.3	0.5	47.0-52.0	Bal.				1	Cb 1.4-1.7, P, .02 Max; S, .02 Max.; Al, .25 Max.; Ti, .50 Max.; N2,	
IN 700		.04-.08		3.00-3.50	14.5-15.5	48.0-51.0	31.0-33.0				P, .03 Max.; S, .03 Max.; Fe+Co, 3.0 Max.; N2, .05 Max.; O2, .05	
IN 825	ASTM A 494 CU5MCuC	0.05	1	1	19.5-23.5	38.0-44.0	2.5-3.5			Bal.	Cb.60-1.20, P .030 Max.; S .030 Max.; Cu 1.50-3.50	
N-155	AMS 5376	0.2	1.00-2.00	1	20.00-22.50	19.00-21.00	2.50-3.50	2.00-3.00	18.5-21.00	Bal.	P, .04 Max; S, .03 Max; Cb/Ta, .75-1.25; N2, .10-.20	2480
INVAR	MIL-I-23011C CLASS 5	0.05	0.8	0.3		41			0.5	Bal.	P, .025; S, .025; Al, .05-.10	
	IC 47 50	0.05	0.6	0.6		47.0-50.0				Bal.	P, 0.02; S, .02	

Carbon and Low Alloy Steel

Alloy	Specification	Carbon (Min-Max)	Manganese (Min-Max)	Silicon (Min-Max)	Chromium (Min-Max)	Nickel (Min-Max)	Molybdenum (Min-Max)	Phosphorous (Min-Max)	Sulfur (Min-Max)	Iron	Other	Liquidus
1020	MIL-S-81591 IC 1020	0.15-.25	.30-.60	.20-1.00				0.04	0.04	Bal		
	ASTM A 216 WCC	0.25	1.2	0.6	.50*	.50*	.20*	0.04	0.045	Bal.	Cu* .30 Max.; V* .03 Max. Total Other 1.00 Max	2770
	ASTM A 352 LCC	0.25	1.2	0.6	.50*	.50*	.20*	0.04	0.045	Bal.	V* .03 Max"	2770
1025	ASTM A 216 WCB	0.3	1	0.6	.50*	.50*	.20*	0.04	0.045	Bal.	Cu* .30 Max.; V* .03 Max. Total Other 1.00 Max	2770
	ASTM A 352 LCB	0.3	1	0.6	.50*	.50*	.20*	0.04	0.045	Bal.	Cu* .30 Max.; V* .03 Max	2770
1030	MIL-S-22141B/81591 IC 1030	.25- .35	.70-1.00	.20-1.00				0.04	0.04	Bal.		
1040	MIL-S-22141B/81591 IC 1040	.35- .45	.70-1.00	.20-1.00				0.04	0.04	Bal.		
1050	MIL-S-22141B/81591 IC 1050	.45- .55	.70-1.00	.20-1.00				0.04	0.04	Bal.		
2512 MOD	ASTM A 352 LC4	0.15	50- .80	0.6		4.00-5.00		0.04	0.045	Bal.		

4020	ASTM A 352 LC2	0.25	.50-.80	0.6		2.00-3.00		0.04	0.045	Bal.		
	ASTM 487 GR1	0.3	1	0.8	.35*	.50*		0.04	0.045	Bal.	Cu*, .50 Max.; V, .04-.12; Mo+W*, .25 Max. Total Other 1.00 Max.	
4020 MOD	ASTM A 217 WC1	0.25	.50-.80	0.6	.35*	.50*	.45-.65	0.04	0.045	Bal.	. Cu*, .50 Max.; W*, .10 Max. Total Other 1.00 Max	
4115 MOD.	ASTM A 217 WC9	.05-.18	.40-.70	0.6	2.00-2.75	.50*	.90-1.20	0.04	0.045	Bal.	Cu*, .50 Max.; W*, .10 Max.; Total Other 1.00 Max	
4118 MOD.	ASTM A 217 WC6	.05-.20	.50-.80	0.6	1.00-1.50	.50*	.45-.65	0.04	0.045	Bal.	Cu*, .50 Max.; W*, .10 Max.; Total Other 1.00 Max	
4130	AMS 5336	.25-.35	.40-.80	1	.80-1.10	0.25	.15-.25	0.04	0.04	Bal.	Cu, .25 Max	2760
	MIL-S-22141B IC 4130	.25-.35	.40-.70	.20-.80	.80-1.10		.15-.25	0.04	0.04	Bal.		2760
4140	AMS 5338	.35-.45	.75-1.00	1	.80-1.10	0.25	.15-.25	0.04	0.04	Bal.	Cu, .35 Max.	2740
	MIL-S-22141B IC 4140	.35-.45	.70-1.05	.20-.80	.80-1.10		.15-.25	0.04	0.04	Bal.		2740
4330	AMS 5328	.28-36	.60-1.00	.50-1.00	.65-1.00	1.65-2.00	.30-.45	0.025	0.025	Bal.	Cu, .35 Max.	
4335 MOD.	MIL-S-22141B IC 4335M	.30-.38	.60-1.00	.50-1.00			.65-1.00	0.025	0.025	Bal.	. V, .14 Max	
4340	AMS 5330	.38-.46	.60-1.00	.50-1.00	.65-1.00	1.65-2.00 .	.30-.45	0.025	0.025	Bal.	Cu, .35 Max	2720
	MIL-S-22141B IC 4340	.36-.44	60-.90	.20-.80	.70-.90	1.65-2.00	.20-.30	0.025	0.025	Bal.		2720
4620	MIL-S-22141B IC 4620	.15-.25	.40-.70	.20-.80		1.65-2.00	.20-.30	0.04	0.04	Bal.		
6150	MIL-S-22141B IC 6150	.45-.55	.65-.95 .	20-.80	.80-1.10			0.04	0.04	Bal.	V, .15 Min	
8615	AMS 5333	.11-.17	.65-1.0	.50-1.00	35-.65	.35-.75	.15-.35	0.04	0.04	Bal.	Cu, .35 Max.	2750
E8620	MIL-S-22141B IC 8620	.15-.25	.65-.95	.20-.80	.40-.60	.40-.70 .	.15-.25	0.04	0.04	Bal.		2750
8630	AMS 5334	.25-.35	.60-.95	1	.35-.65	.35-.75	.15-.30	0.04	0.04	Bal.	Cu, .35 Max.	
	MIL-S-22141B IC 8630	.25-.35	.65-.95	.20-.80	.40-.60	.40-.70 .	.15-.25	0.04	0.04	Bal.		
8635 MOD.	MIL-S-22141B IC 8635	30-.38	.30-.70	.20-1.00	.35-.90	.35-.75	.15-.40	0.025	0.025	Bal.		
8640	MIL-S-22141B IC 8640	35-.45	.70-1.05	.20-.80	.40-.60	.40-.70	15-.25	0.04	0.04	Bal.		
52100	MIL-S-22141B IC 52100	95-1.10	.25-.55	.20-.80	1.30-1.60			0.04	0.04	Bal.		
	ASTM A 732 15A	.95-1.10	.25-.55	.20-.80	1.30-1.60	.50*		0.04	0.045	Bal.	Cu*, .50 Max.; W*, .10 Max.; Total Other 0.60 Max.	

Carbon and Low Alloy Steel

Alloy	Specification	Carbon (Min-Max)	Manganese (Min-Max)	Silicon (Min-Max)	Chromium (Min-Max)	Molybdenum	Tungsten (Min-Max)	Cobalt (Min-Max)	Phosphorous	Sulfur (Min-Max)	Vanadium (Min-Max)	Iron (Min-Max)
A-2	ASTM A 597 CA-2	.95-1.05	0.75	1.5	4.75-5.50	.90-1.40			0.03	0.03	20-.50	Bal.
D-2	ASTM A 597 CD-2	1.40-1.60	1	1.5	11.00-13.00	.70-1.20		.70-1.00	0.03	0.03	.40-1.00	Bal.
D-5	ASTM A 597 CD-5	1.35-1.60	0.75	1.5	11.00-13.00	.70-1.20		2.50-3.50	0.03	0.03	.35- .55	Bal.
H-11	IC CH-11	.30-.40	0.75	.95-1.15	4.60-5.40	1.20-1.60			0.025	0.025	.30- .50	Bal.
H-12	ASTM A 597 CH-12	.30-.40	0.75	1.5	4.75-5.75	1.25-1.75	1.00-1.70		0.03	0.03	.20- .50	Bal.
H-13	ASTM A 597 CH-13	.30- .42	0.75	1.5	4.75-5.75	1.25-1.75			0.03	0.03	.75-1.20	Bal.
M-2	ASTM A 597 CM-2	.78- .88	0.75	1	3.75-4.50	4.50-5.50	5.50-6.75	0.25	0.03	0.03	1.25-2.20	Bal.
M-4	IC CM-4	1.25-1.35	0.75	1	3.75-4.50	4.50-5.50	5.20-6.20		0.025	0.025	3.60-4.40	Bal.
M-42	IC CM-42	1.00-1.20	0.75	1	3.50-4.25	9.0-10.0	1.25-1.75	7.50-8.50	0.025	0.025	.95-1.35	Bal.
M-43	IC CM-43	1.15-1.35	0.75	1	3.50-4.25	8.25-9.25	1.50-2.00	7.75-8.75	0.025	0.025	1.50-2.00	Bal.
O-1	ASTM A 597 CO-1	.85-1.00	1.00-1.30	1.5	.40-1.00		.40- .60		0.03	0.03	0.3	Bal.
O-2	IC CO-2	.85- .95	1.50-1.80	1	0.4	0.3			0.025	0.025	0.3	Bal.
S-2	IC CS-2	.45- .55	0.75	.90-1.20		.40- .60			0.025	0.025	0.3	Bal.
S-5	ASTM A 597 CS-5	.50- .65	.60-1.00	1.75-2.25	0.35	.20- .80			0.03	0.03	0.35	Bal.
S-7	ASTM A 597 CS-7	.45- .55	.40- .80	.60-1.00	3.00-3.50	1.20-1.60			0.03	0.03		Bal.
T-1	IC CT-1	.65- .75	0.75	1	3.75-4.50		17.25-18.75		0.025	0.025	.90-1.30	Bal.
T-15		1.60-1.50	0.15-0.40	0.15-0.40	3.75-5.00	1	11.75-13.00	5			4.50-5.25	Bal.

Cobalt Base

Alloy	Specification	Carbon (Min-Max)	Manganese (Min-Max)	Silicon (Min-Max)	Chromium (Min-Max)	Nickel (Min-Max)	Molybdenum (Min-Max)	Tungsten (Min-Max)	Cobalt (Min-Max)	Iron (Min-Max)	Other	Liquidus
Co. Alloy 3		2.0-2.7	1	1	29.0-33.0	3		11.0-14.0	Bal.	3	P, .03 Max.; S, .03 Max.	
Co. Alloy 4		1	1	1.5	28.0-32.0	3	1.5	12.5-15.5	Bal.	3		
Co. Alloy 6	AMS 5387	.90-1.40	1	1.5	27.0-31.0	3	1.5	3.5-5.5	Bal.	3	P, .04 Max.; S, .04 Max	2340

	AMS 5373	.90-1.4	1	1.5	27.0-31.0	3	3	3	Bal.	3	P, .04 Max.; S, .03 Max	2340
Co. Alloy 12		1.10-1.70	1	1	28.0-32.0	3		7.0-9.5	Bal.	3	P, .03 Max.; S, .03 Max	
Co. Alloy 19		1.5-2.0	1	1	29.0-33.0	3		9.0-12.0	Bal.	3	P, .03 Max.; S, .03 Max	
Co. Alloy 21	AMS 5385	.20-.30	1	1	25.00-29.00	1.75-3.75	5.00-6.00		Bal.	3	P, .04 Max.; S, .04 Max.; B, .007 Max	2510
	ASTM A 732 GR 21	.20-.30	1	1	25.0-29.0	1.7-3.7	5.0-6.0		Bal.	3	P, .04 Max.; S, .04 Max.; B, .007 Max	2510
Co. Alloy 23	AMS 5375	.35-.45	1	1	23.00-27.00	.50-3.00	1	4.0-6.0	Bal.	2	P, .04 Max.; S, .03 Max	
Co. Alloy 25	H.S. 25 (L605)	.05-.15	1.0-2.0	1	19.0-21.0	9.0-11.0		14.0-16.0	Bal.	3	P, .04 Max.; S, .04 Max	2530
Co. Alloy 27	AMS 5378	.35-.45	1	1	23.00-26.00	30.0-35.0	4.50-6.50		Bal.	2	P, .04 Max.; S, .03 Max	
Co. Alloy 30	AMS 5380	.40-.50	1	1	24.00-28.00	14.0-16.0	5.50-6.50		Bal.	2	P, .04 Max.; S, .03 Max	
Co. Alloy 31	AMS 5382	.45-.55	1	1	24.50-26.50	9.50-11.5	0.5	7.0-8.0	Bal.	2	P, .04 Max.; S, .04 Max; Zr, 0.25 Max	2470
	ASTM A 732 GR 31	.45-.55	1	1	24.5-26.5	9.5-11.5		7.0-8.0	Bal.	2	P, .04 Max.; S, .04 Max.; B, .005-.015	2470
X 40	ASTM A 567 GR 2 (Disc.-1987)	.45-.55	1	1	24.5-26.5	9.50-11.5		7.00-8.00	Bal.	2	0 P, .04 Max.; S, .04 Max.; B, .005-.015	2500
X 45	ASTM A 567 GR 13 (Disc-1987)	.20-.30	.40-1.00	.75-1.00	24.5-26.5	9.50-11.50		7.00-8.00	Bal.	2	P, .04 Max.; S, .04 Max.; B, .005-.015	2550
FSX 414	ASTM A567 GR 12 (Disc-1987)	.20-.30	.40-1.00	.50-1.00	28.5-30.5	9.50-11.50		6.50-7.50	Bal.	2	P, .04 Max.; S, .04 Max.; B, .005-.015	2530
Co. Alloy 36		.35-.45	1.0-1.5	0.35	17.5-19.5	9.0-11.0		14.0-15.0	Bal.	2	P, .03 Max.; S, .03 Max.; B, .01-.05	
Co. Alloy 93		2.75-3.25	1.5	1.5	15.0-19.0		14.0-18.0		4.0-7.0	Bal.	P, .03 Max.; S, .03 Max.; V, 1.50-2.50	
Co. Alloy T400		.04-.08		2.2-2.6	7.5-8.5		27.0-29.0		60.0-63.0		P, .03 Max.; S, .03 Max.; Ni+Fe, 3.0 Max., N2, .05 Max.; O2, .05	
Co Alloy T800		.04-.08		3.0-3.5	16.5-17.5		27.0-29.0		50.0-53.0		P, .03 Max.; S, .03 Max.; Ni+Fe, 3.0 Max.; . N2, .05 Max.; O2, .05	
CoCrMo	ASTM F75	0.35	1	1	27.00-30.00	0.5	5.00-7.00	0.2	Bal.	0.75	P, 0.020 Max.; S, 0.010 Max.; B, 0.010; Ti, 0.10 Max.; Al, 0.10 Max.; N2,	2510
	ISO 5832-4	0.35	1	1	26.5-30.0	1	4.50-7.00		Bal.	1		
Co. Alloy Misc.	STAR J	2.20-2.70	1	1	31.0-34.0	2.5		16.0-19.0	Bal.	3	P, .03 Max.; S, 03 Max.; B, .25 Max.; All Other, 2.0 Max	
	98M2	1.70-2.20	1	1	28.0-32.0	2.00-5.00	0.8	17.0-20.0	Bal.	2.5	B, .70-1.50; V, 3.70-4.70	
	WI-52	.40-.50	0.5	0.5	20.0-22.0	1		10.0-12.0	Bal.	1.00-2.50	P, .04 Max.; S, .04 Max.; Cb/Ta, 1.5-2.5	

	TANTUNG G	1.8-2.2			26.0-29.0			15.0-17.0	Bal.	2	B, .15-.25; Ta, 4.5-5.5	
HAYNES ULTIMET ALLOY	UNS-R31233	0.02-0.10	0.1-1.5	0.05-1.00	23.5-27.5	7.0-11.0	4.0-6.0	1.0-3.0	Bal.	1.0-5.0	0 P, 0.030 Max.; S, 0.020 Max.; N, 0.03 – 0.12; B, 0.015 Max	2540
N-155	AMS 5376	0.2	1.00-2.00	1	20.00-22.50	19.00-21.00	2.50-3.50	2.00-3.00	18.5-21.00	Bal.	. P, .04 Max; S, .03 Max; Cb/Ta, .75-1.25; N2, .10-.20	2480